Western Aleutian Islands red king crab 2017/18 Tier 5 assessment

May 2017 Crab Plan Team meeting

1. **Responses to the most recent two sets of SSC and CPT comments on assessments in general:**
    - CPT, May 2016: *None pertaining to a Tier 5 assessment.*
    - SSC, June 2016: *None pertaining to a Tier 5 assessment.*
    - CPT, September 2016 (via September 2015 SAFE Introduction chapter): *None pertaining to a Tier 5 assessment.*
    - SSC, October 2015: *None pertaining to a Tier 5 assessment.*

2. **Responses to the most recent two sets of SSC and CPT comments specific to the assessment:**
    - CPT, May 2016: *None.*
    - SSC, June 2015: *"The industry expressed no desire to pursue a red king crab fishery in the Adak area at this time. However, the Petrel Bank region will be surveyed during September 2016."*
        - Response: *Okay. Updates/results?*
    - *"The SSC also appreciates the addition of size frequency data in Appendices A1-A4. The SSC requests plotting these data to enable visualization of progression of size modes in next year's assessment."*
        - Response: Done. See appendix A5.
    - CPT, September 2016: *None.*
    - SSC, October 2016: *None.*

5. Management performance:

Overfishing did not occur during 2015/16 because the 2015/16 estimated total catch (1.2 t; 2,648 lb) did not exceed the Tier 5 OFL established for 2015/16 (56 t; 0.12-million lb). The 2015/16 estimated total catch did not exceed the ABC established for 2015/16 (34 t; 0.07-million lb). No determination has yet been made for a fishery opening or harvest level, if opened, for 2017/18. The OFL and ABC values for 2017/18 in the tables below are the author's status quo, Alternative 1 recommended values.

Management Performance Table (values in t)

Fishing Year	MSST	Biomass (MMB)	TAC[a]	Retained Catch	Total Catch	OFL	ABC
2012/13	N/A	N/A	Closed	0	<1	56	34
2013/14	N/A	N/A	Closed	0	<1	56	34
2014/15	N/A	N/A	Closed	0	<1	56	34
2015/16	N/A	N/A	Closed	0	1.3	56	34
2016/17	N/A	N/A	Closed	0		56	34
2017/18	N/A	N/A				56	34

a. Pre-season harvest levels are established as total allowable catch for the rationalized fishery west of 179° W longitude and as a guideline harvest level for the non-rationalized fishery east of 179° W longitude.

Management Performance Table (values in lb)

Fishing Year	MSST	Biomass (MMB)	TAC[a]	Retained Catch	Total Catch	OFL	ABC
2012/13	N/A	N/A	Closed	0	624	0.12[b]	0.07[b]
2013/14	N/A	N/A	Closed	0	732	0.12[b]	0.07[b]
2014/15	N/A	N/A	Closed	0	474	0.12[b]	0.07[b]
2015/16	N/A	N/A	Closed	0	2,964	0.12[b]	0.07[b]
2016/17	N/A	N/A	Closed	0		0.12[b]	0.07[b]
2017/18	N/A	N/A				123,867	74,320

a. Pre-season harvest levels are established as total allowable catch for the rationalized fishery west of 179° W longitude and as a guideline harvest level for the non-rationalized fishery east of 179° W longitude.

b. Established in millions of lb.

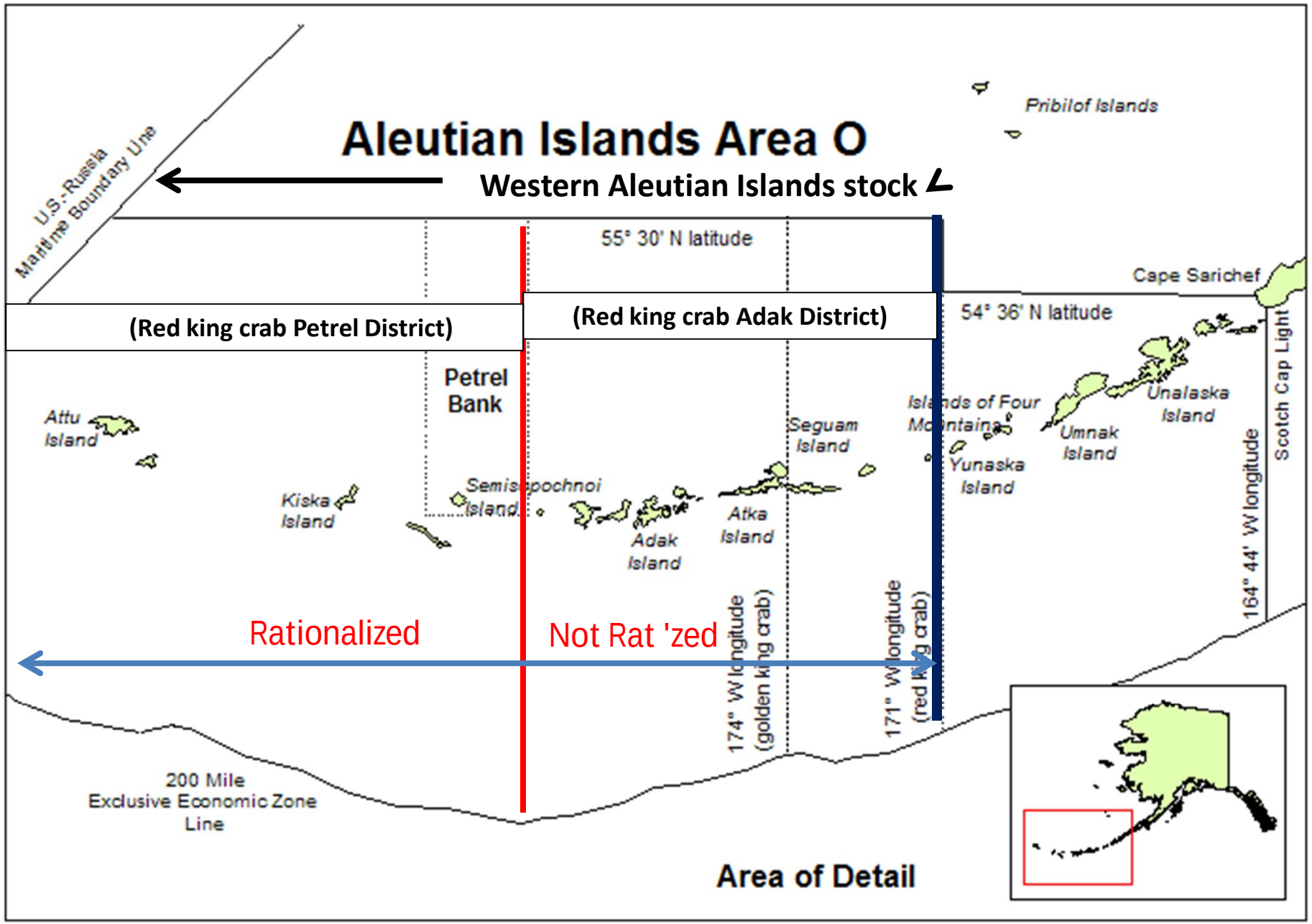


Figure 1. Aleutian Islands, Area O, red and golden king crab management area (from Baechler and Cook 2014, updated to show boundaries of the Adak and Petrel Districts for red king crab as established by the Alaska Board of Fisheries in March 2014).

Table 1a. Commercial fishery history for the western Aleutian Islands red king crab commercial fishery, 1960/61–2015/16: number of vessels, guideline harvest level (GHL; established in lb, **converted to t**) for 1973/74–2004/05, total allowable catch (TAC; established in lb, **converted to t**) in the area west of 179° W longitude combined with GHL (established in lb, **converted to t**) in the area east of 179° W longitude for 2005/06–2015/16, weight of retained catch (Harvest; **t**), number of retained crab, pot lifts, fishery catch per unit effort (CPUE; retained crab per pot lift), and average weight (**kg**) of retained crab.

Crab fishing year	Area	Vessels	GHL/TAC	Harvest[a]	Crab[a]	Pots lifted	CPUE	Weight
1960/61	West of 172° W	4	-	941	NA	NA	NA	NA
1961/62	West of 172° W	8	-	2,773	NA	NA	NA	NA
1962/63	West of 172° W	9	-	3,631	NA	NA	NA	NA
1963/64	West of 172° W	11	-	8,121	NA	NA	NA	NA
1964/65	West of 172° W	18	-	9,613	NA	NA	NA	NA
1965/66	West of 172° W	10	-	5,858	NA	NA	NA	NA
1966/67	West of 172° W	10	-	2,668	NA	NA	NA	NA
1967/68	West of 172° W	22	-	6,410	NA	NA	NA	NA
1968/69	West of 172° W	30	-	7,303	NA	NA	NA	NA
1969/70	West of 172° W	33	-	8,172	NA	115,929	NA	2.5
1970/71	West of 172° W	35	-	7,283	NA	124,235	NA	NA
1971/72	West of 172° W	40	-	7,020	NA	46,011	NA	NA
1972/73	West of 172° W	43	-	8,493	3,461,025	81,133	43	2.5
1973/74	West of 172° W	41	9,072[b]	4,419	1,844,974	70,059	26	2.4
1974/75	West of 172° W	36	9,072[b]	1,259	532,298	32,620	16	2.4
1975/76	West of 172° W	20	6,804[b]	187	79,977	8,331	10	2.3
1976/77	West of 172° W	FC	FC	FC	FC	FC	FC	FC
1977/78	West of 172° W	12	113–1,134	411	160,343	7,269	22	2.6
1978/79	West of 172° W	13	227–1,361	366	149,491	13,948	11	2.4
1979/80	West of 172° W	18	227–1,361	212	82,250	9,757	8	2.6
1980/81	West of 172° W	17	227–1,361	644	254,390	20,914	12	2.5
1981/82	West of 172° W	46	227–1,361	748	291,311	40,697	7	2.6
1982/83	West of 172° W	72	227–1,361	772	284,787	66,893	4	2.7
1983/84	West of 172° W	106	227–1,361	899	298,958	60,840	5	3.0
1984/85	West of 171° W	64	680–1,361	588	196,276	48,642	4	3.0
1985/86	West of 171° W	35	227–907	394	156,097	29,095	5	2.5
1986/87	West of 171° W	33	227–680	323	126,204	29,189	4	2.6
1987/88	West of 171° W	71	227–680	551	211,692	43,433	5	2.6
1988/89	West of 171° W	73	454	711	266,053	64,334	4	2.7
1989/90	West of 171° W	56	771	502	193,177	54,213	4	2.6
1990/91	West of 171° W	7	NA	376	146,903	10,674	14	2.6
1991/92	West of 171° W	10	NA	431	165,356	16,636	10	2.6
1992/93	West of 171° W	12	NA	584	218,049	16,129	14	2.7
1993/94	West of 171° W	12	NA	317	119,330	13,575	9	2.7
1994/95	West of 171° W	20	454–680	89	30,337	18,146	2	2.9
1995/96	West of 171° W	4	454–680	18	6,880	1,986	3	2.6
1996/97–1997/98	West of 171° W	FC	FC	FC	FC	FC	FC	FC
1998/99	174°–179° W; west of 179° E	1	7	CF	CF	CF	CF	CF
1999/00	West of 171° W	FC	FC	FC	FC	FC	FC	FC
2000/01[c]	179° W–179° E	1	(Permit/Survey)	35	11,299	496	23	3.1
2001/02[d]	179° W–179° E	4	(Permit/Survey)	70	22,080	564	39	3.2
2002/03	179° W–179° E	33	227	229	68,300	3,786	18	3.4
2003/04	179° W–179° E	30	227	217	59,828	5,774	10	3.6
2004/05–2015/16	West of 171° W	FC	FC	FC	FC	FC	FC	FC

Note: NA = Not available, FC = fishery closed, CF = confidential.

[a] Deadloss included.

[b] GHL includes all king crab species. Golden king crab incidental to red king crab.

[c] January/February 2001 Petrel Bank survey.

[d] November 2001 Petrel Bank survey.

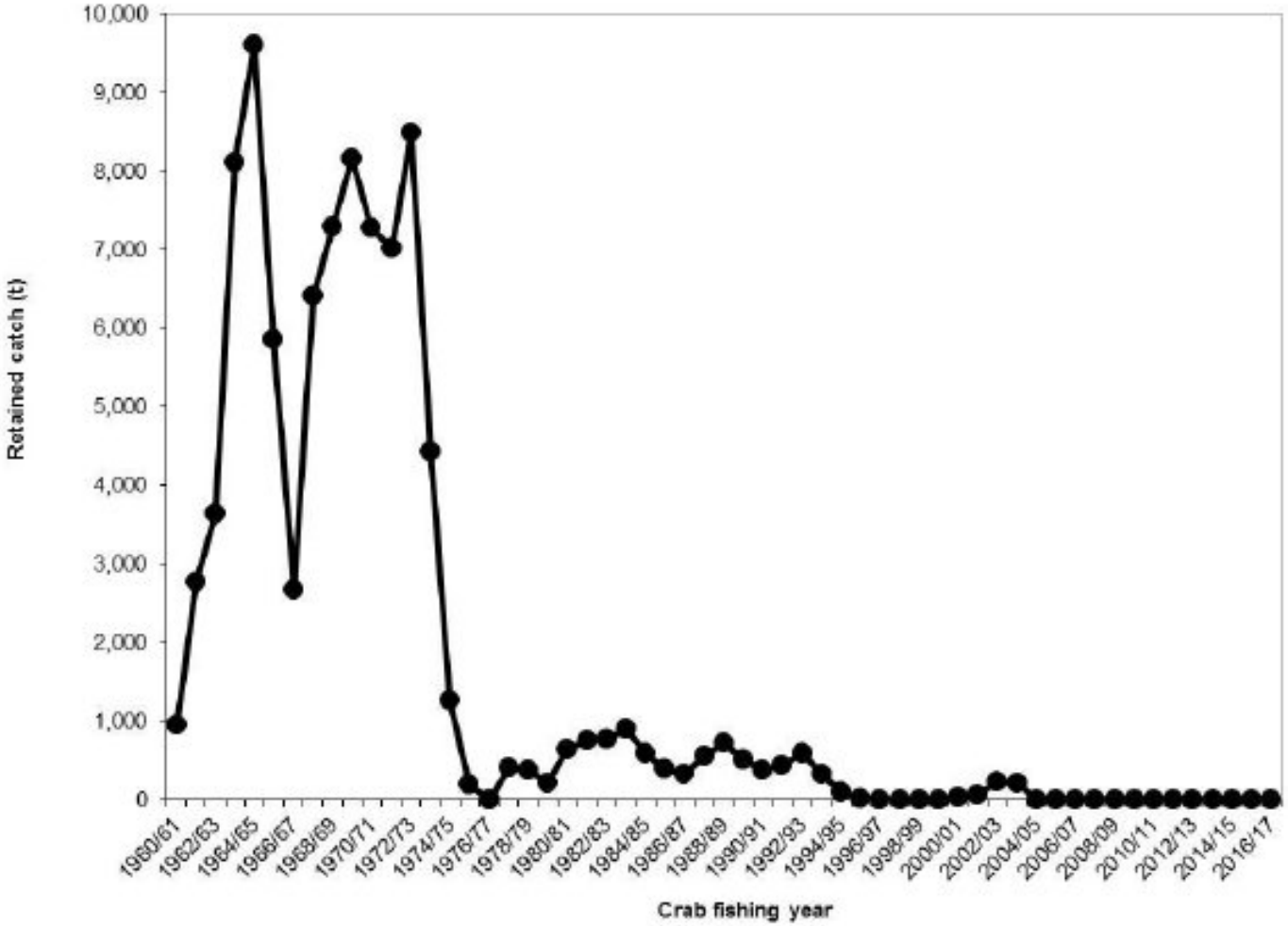


Figure 3. Retained catch (t) in the Western Aleutian Islands red king crab fishery, 1960/61–2016/17 (catch is for the area west of 172° W longitude during 1960/61–1983/84 and for the area west of 171° W longitude during 1984/85–2016/17; see Table 1a).

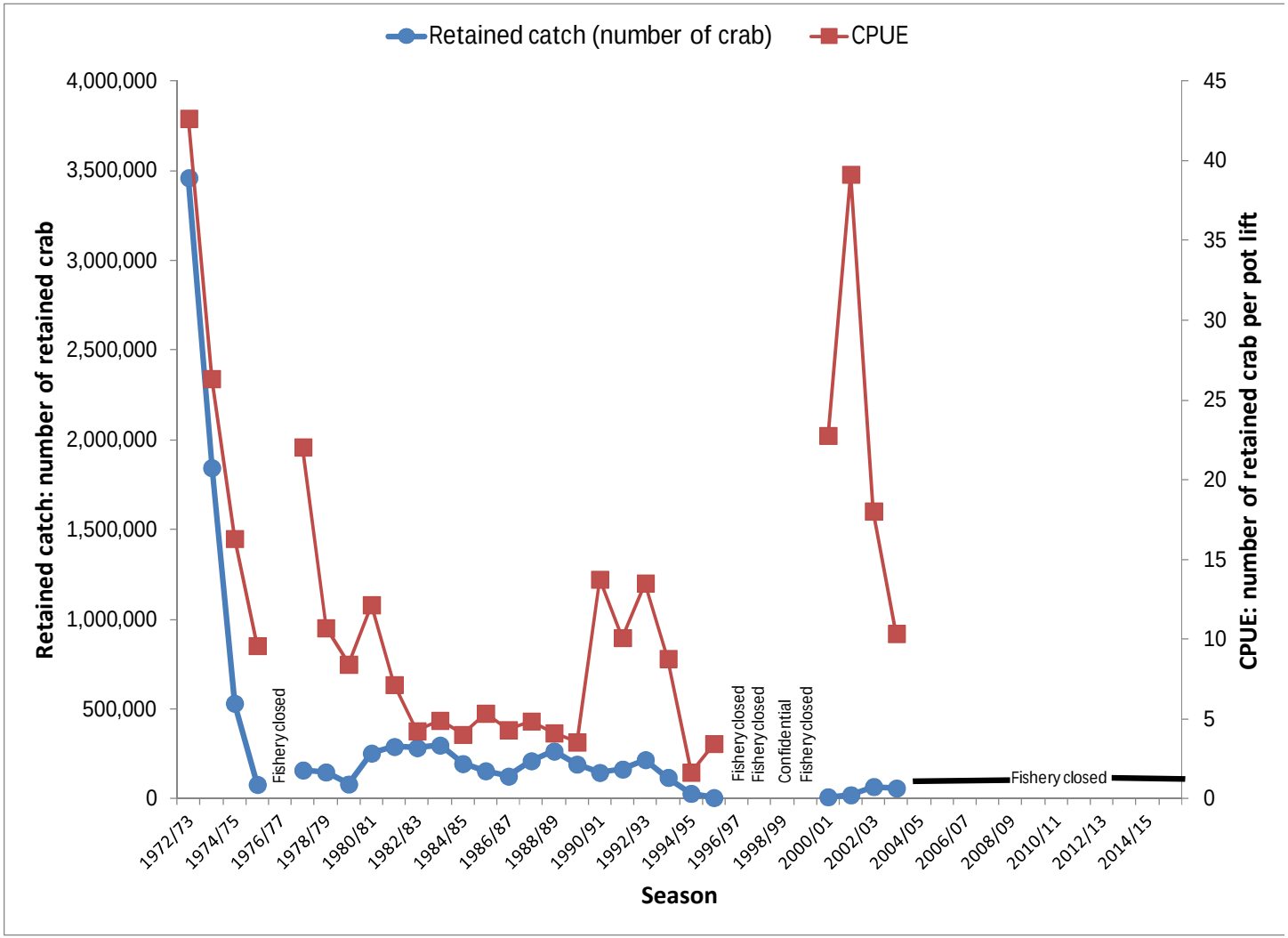


Figure 6. Retained catch (number of crab) and CPUE (number of retained crab per pot lift) in the western Aleutian Islands red king crab fishery, 1972/73–2014/15 (from Table 1a). Data for 1972/73–1983/84 are for the area west of 172° W longitude; data for 1984/85–1997/98, 1999/00, and 2004/05–2014/15 are for the area west of 171° W longitude; data for 1998/99 are for the area west of 174° W longitude; and data for 2000/01–2003/04 are for the area between 179° W longitude and 179° E longitude.

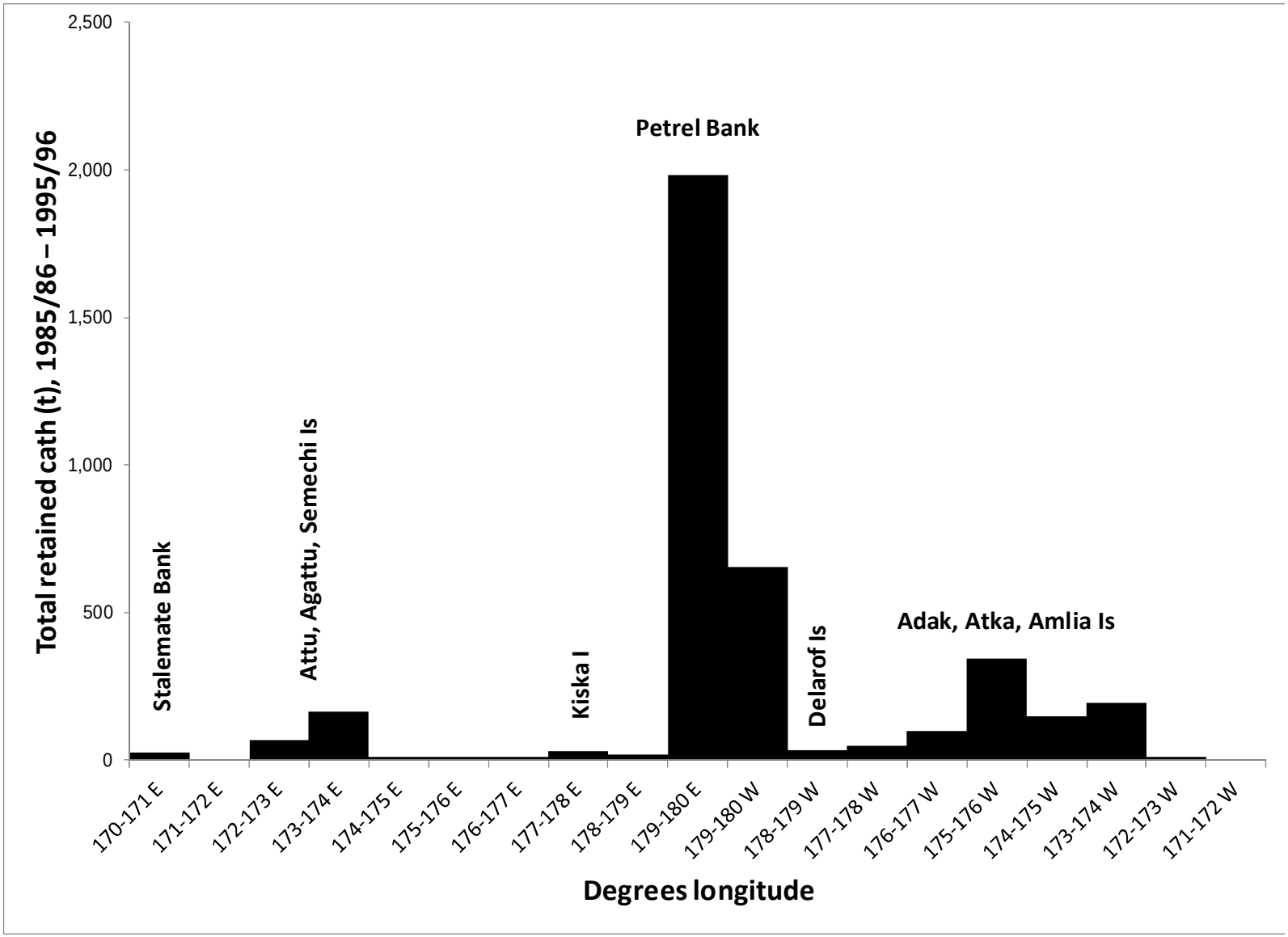


Figure 2. Retained catch (**t**) in the Western Aleutian Islands red king crab fishery, 1985/86–1995/96 by 1-degree longitude grouping, summarized from fish ticket catch by state statistical area landing data.

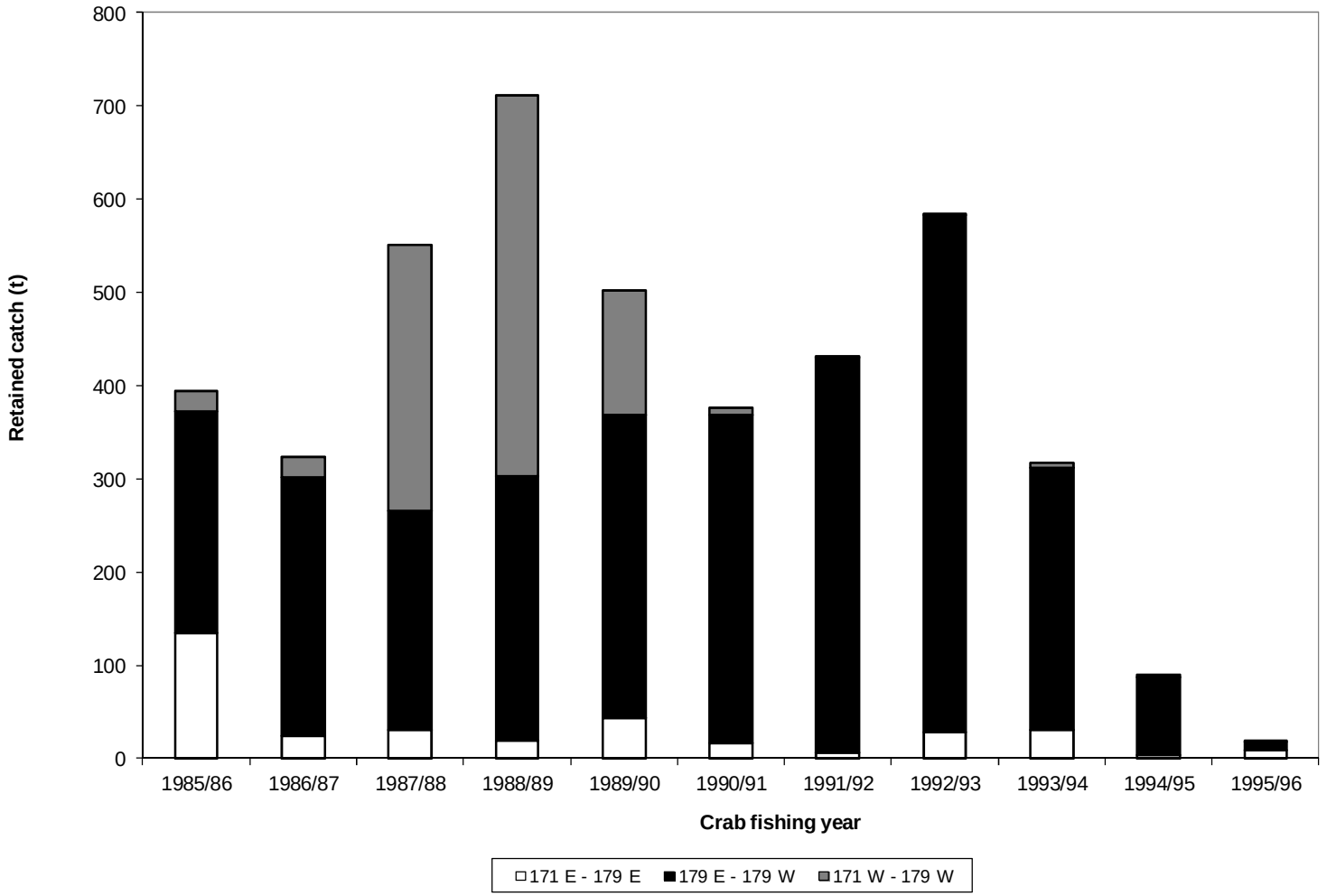


Figure 4. Annual retained catch (**t**) in the Western Aleutian Islands red king crab fishery during 1985/86–1995/96, partitioned into three longitudinal zones: 171º W longitude to 179º W longitude (white bars); 179º W longitude to 179º E longitude (black bars); and 179º E longitude to 171º E longitude.

Table 2. A summary of relevant fishery activities and management measures pertaining to the Western Aleutian Islands red king crab fishery since 1996/97.

Crab fishing year	Fishery Activities and Management Measures
1996/97–1997/98	• Fishery closed.
1998/99	• GHL of 7 t (15,000 lb) for exploratory fishing with fishery closed in the Petrel Bank area (i.e., between 179° W longitude and 179° E longitude) o 1 vessel
1999/00	• Fishery closed
2000/01	• Fishery closed • Catch retained during ADF&G-Industry survey of Petrel Bank area (i.e., between 179° W longitude and 179° E longitude) conducted as commissioner's permit fishery, Jan–Feb 2001 o 1 vessel o Retained catch weight = 35 t (76,562 lb) o CPUE = 23 retained crab per pot lift
2001/02	• Fishery closed • Catch retained ADF&G-Industry survey of Petrel Bank area (i.e., between 179° W longitude and 179° E longitude) conducted as commissioner's permit fishery, November 2001 o 4 vessels o Retained catch weight = 70 t (153,961 lb) o CPUE = 39 retained crab per pot lift
2002/03	• Fishery opened with GHL of 227 t (500,000 lb) restricted to Petrel Bank area (i.e., between 179° W longitude and 179° E longitude) o 33 vessels o Retained catch weight = 229 t (505,642 lb) o CPUE = 18 retained crab per pot lift • ADF&G-Industry survey of the Adak, Atka, and Amlia Islands area conducted as a commissioner's permit fishery o 4 legal males captured in 1,085 pot lifts
2003/04	• Fishery opened with GHL of 227 t (500,000 lb) restricted to Petrel Bank area (i.e., between 179° W longitude and 179° E longitude) o 30 vessels o Retained catch weight = 217 t (479,113) lb o 10 retained crab per pot lift
2004/05–2016/17	• Fishery closed o 2006 and 2009 ADF&G pot surveys on Petrel Bank o 2015 exploratory/reconnaissance survey in Adak Island area. o 2016 exploratory/reconnaissance survey in the Petrel Bank area.

A. Summary of Major Changes

1. **Changes to the management of the fishery**: No changes have been made to management of the fishery (the fishery has remained closed) and no changes have been made to regulations pertaining to the fishery since those adopted by the Alaska Board of Fisheries in March 2014.

2. **Changes to the input data**:
   - Data on retained catch, discarded catch, and estimates of bycatch mortality in crab and groundfish fisheries during 2015/16 have been added, but were not entered into the calculation of the recommended 2017/18 total-catch OFL.

3. **Changes to the assessment methodology**: None: the computation of OFL in this assessment follows the methodology recommended by the SSC in June 2010.

4. **Changes to the assessment results, including projected biomass, TAC/GHL, total catch (including discard mortality in all fisheries and retained catch), and OFL**: None: the computation of OFL in this assessment follows the methodology recommended by the SSC in June 2010 applied to the same data and estimates with the same assumptions that were used for estimating the 2010/11–2016/17 OFLs.

Retained and non-retained catch in crab fisheries (no bycatch mortality applied)

Table 3. Annual retained catch (t) of Western Aleutian Islands red king crab, with the estimated annual discarded catch (t; not discounted for an assumed bycatch mortality rate) and components of discarded catch (legal males, sublegal males, and females) during commercial crab fisheries, 1995/96–2015/16.

	WAI red king crab fishery				AI golden king crab fishery			
Crab fishing		Discarded			Discarded			Total
year	Retained	Legal male	Sublegal male	Female	Legal male	Sublegal male	Female	Discarded
1995/96	17.66	0.00	9.38	12.53	0.00	0.93	0.14	22.98
1996/97	0.00	0.00	0.00	0.00	1.49	0.92	0.30	2.71
1997/98	0.00	0.00	0.00	0.00	0.08	0.26	0.08	0.42
1998/99[a]	2.68	–[a]	–[a]	–[a]	0.34	0.06	0.08	–[a]
1999/00	0.00	0.00	0.00	0.00	0.07	0.34	0.04	0.46
2000/01	34.73	0.00	0.35	0.17	0.17	0.12	0.02	0.83
2001/02	69.84	0.08	2.98	3.80	9.07	0.00	0.17	16.09
2002/03	229.36	0.75	2.73	7.91	9.86	0.16	0.23	21.65
2003/04	217.32	0.29	2.99	3.61	4.28	2.88	3.03	17.08
2004/05	0.00	0.00	0.00	0.00	0.97	0.10	0.00	1.07
2005/06	0.00	0.00	0.00	0.00	0.09	0.00	0.02	0.11
2006/07	0.00	0.00	0.00	0.00	0.15	0.05	0.02	0.22
2007/08	0.00	0.00	0.00	0.00	0.28	0.83	0.25	1.36
2008/09	0.00	0.00	0.00	0.00	0.10	0.01	0.04	0.15
2009/10	0.00	0.00	0.00	0.00	0.26	0.11	0.02	0.39
2010/11	0.00	0.00	0.00	0.00	1.96	0.08	0.04	2.07
2011/12	0.00	0.00	0.00	0.00	0.43	0.01	0.04	0.49
2012/13	0.00	0.00	0.00	0.00	0.40	0.03	0.02	0.44
2013/14	0.00	0.00	0.00	0.00	1.34	0.05	0.08	1.46
2014/15	0.00	0.00	0.00	0.00	0.24	0.01	0.03	0.28
2015/16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average	27.22	0.06	0.92	1.40	1.56	0.34	0.23	4.51

[a] Data on discarded catch of red king crab during the red king crab fishery not available (see Moore et al. 2000).

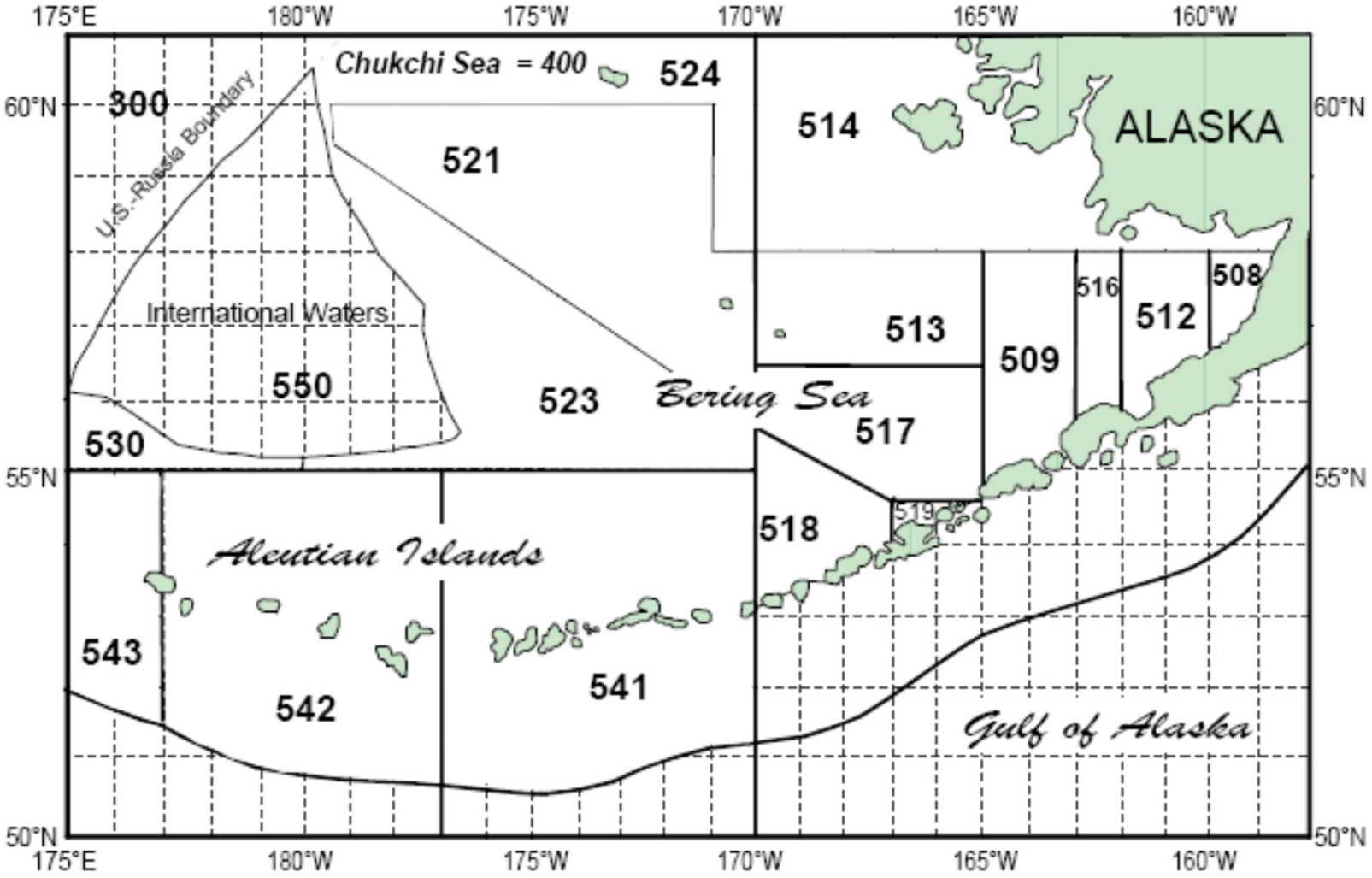


Figure 5. Map of federal groundfish fishery reporting areas for the Bering Sea and Aleutian Islands showing reporting areas 541, 542, and 543 that are used to obtain data on discarded catch of Western Aleutian Islands red king crab during groundfish fisheries (from http://www.alaskafisheries.noaa.gov/rr/figures/fig1.pdf).

Bycatch mortality: 0.5 for fixed, 0.8 for trawl

Table 4. Estimated annual weight (t) of discarded catch of red king crab (all sizes, males ar females) and estimated annual bycatch mortality (t) during federal groundfi fisheries by gear type (fixed or trawl) in reporting areas 541, 542, and 543 (Aleuti Islands west of 170° W longitude), 1993/94–2015/16 (assumes bycatch mortality ra of 0.5 for fixed-gear fisheries and 0.8 for trawl fisheries).

Crab fishing	Discarded catch		Bycatch Mortality		
year	Fixed Gear	Trawl Gear	Fixed Gear	Trawl Gear	Total
1993/94	0.60	40.09	0.30	32.07	32.37
1994/95	1.36	10.34	0.68	8.27	8.95
1995/96	2.63	6.93	1.32	5.55	6.86
1996/97	1.30	20.26	0.65	16.21	16.86
1997/98	1.73	5.31	0.87	4.25	5.12
1998/99	4.60	20.65	2.30	16.52	18.82
1999/00	17.13	12.69	8.57	10.15	18.72
2000/01	1.22	6.30	0.61	5.04	5.65
2001/02	2.42	27.01	1.21	21.61	22.82
2002/03	5.12	33.12	2.56	26.50	29.06
2003/04	1.62	4.15	0.81	3.32	4.13
2004/05	0.36	5.86	0.18	4.69	4.87
2005/06	1.61	1.07	0.80	0.86	1.66
2006/07	3.08	0.28	1.54	0.22	1.76
2007/08	7.70	1.19	3.85	0.95	4.80
2008/09	4.89	4.67	2.44	3.73	6.18
2009/10	0.14	6.40	0.07	5.12	5.19
2010/11	0.04	1.99	0.02	1.59	1.61
2011/12	1.19	0.82	0.60	0.41	1.01
2012/13	0.01	0.24	0.00	0.19	0.19
2013/14	0.01	0.04	0.01	0.03	0.04
2014/15	0.00	0.11	0.00	0.09	0.09
2015/16	0.03	1.46	0.02	1.17	1.19
Average	2.56	9.17	1.28	7.33	8.61

Table 5. Estimated annual weight of discarded catch (t; not discounted by an assumed bycatch mortality rate) of red king crab in reporting areas 541, 542, and 543 (Aleutian Islands west of 170° W longitude) during federal groundfish fisheries (all gear types combined) by reporting area, 1993/94–2015/16.

Crab fishing	Reporting Area			
year	541	542	543	Total
1993/94	37.9893	2.6590	0.0372	40.6855
1994/95	10.7216	0.8718	0.1025	11.6959
1995/96	5.9520	1.8398	1.7763	9.5681
1996/97	1.9477	3.0890	16.5258	21.5624
1997/98	1.0061	3.9639	2.0770	7.0470
1998/99	6.7549	7.1659	11.3335	25.2542
1999/00	16.3416	8.0535	5.4227	29.8183
2000/01	1.7686	3.6541	2.0961	7.5192
2001/02	3.4750	24.0341	1.9250	29.4341
2002/03	10.9996	21.3098	5.9384	38.2483
2003/04	2.2294	3.5280	0.0163	5.7733
2004/05	0.5280	5.6803	0.0154	6.2237
2005/06	1.6057	0.0395	1.0333	2.6785
2006/07	2.9688	0.3869	0.0000	3.3557
2007/08	5.1233	3.0427	0.7248	8.8909
2008/09	1.1440	7.5455	0.8668	9.5563
2009/10	1.6719	3.7548	1.1136	6.5404
2010/11	0.2123	1.8162	0.0005	2.0289
2011/12	0.8768	1.1335	0.0000	2.0108
2012/13	0.1560	0.0903	0.0000	0.2463
2013/14	0.0000	0.0435	0.0118	0.0553
2014/15	0.0000	0.1148	0.0005	0.1152
2015/16	0.0000	0.8864	0.6102	1.4966
Average	4.9336	4.5523	2.2447	11.7307

Table 6. Estimated annual weight (**t**) of total fishery mortality to Western Aleutian Islands red king crab, 1995/96–2015/16, partitioned by source of mortality: retained catch, estimated bycatch mortality during crab fisheries, and estimated bycatch mortality during groundfish fisheries.

		Bycatch Mortality by Fishery Type		Total Estimated
Crab fishing year	Retained Catch	Crab	Groundfish	Fishery mortality
1995/96	17.66	4.60	6.86	29.12
1996/97	0.00	0.54	16.86	17.40
1997/98	0.00	0.08	5.12	5.20
1998/99[a]	2.68	0.70	18.82	22.19
1999/00	0.00	0.09	18.72	18.81
2000/01	34.73	0.17	5.65	40.54
2001/02	69.84	3.22	22.82	95.88
2002/03	229.36	4.33	29.06	262.75
2003/04	217.32	3.42	4.13	224.87
2004/05	0.00	0.21	4.87	5.08
2005/06	0.00	0.02	1.66	1.68
2006/07	0.00	0.04	1.76	1.81
2007/08	0.00	0.27	4.80	5.08
2008/09	0.00	0.03	6.18	6.21
2009/10	0.00	0.08	5.19	5.27
2010/11	0.00	0.41	1.61	2.02
2011/12	0.00	0.10	1.01	1.10
2012/13	0.00	0.09	0.19	0.28
2013/14	0.00	0.29	0.04	0.33
2014/15	0.00	0.06	0.09	0.15
2015/16	0.00	0.16	1.19	1.34
Mean, 1995/96–2007/08	43.97	1.36	10.86	56.19
CV of mean	0.52	0.37	0.23	0.43
Mean, 1995/96–2015/16	27.22	0.90	7.46	35.58
CV of mean	0.54	0.37	0.25	0.45

Table 7. Annual retained catch weight (t) and estimates of annual discarded catch weight (t not discounted for an assumed bycatch mortality rate) of Western Aleutian Island red king crab available for a Tier 5 assessment; shaded, bold values are used in computation of the recommended (status quo) 2017/18 Tier 5 OFL.

	Retained catch weight	Discarded catch weight (estimated)		
	Fish tickets	Observer data: lengths, catch per sampled pot	Blend method; Catch Accounting System	
Crab Fishing Year	Directed fishery	Crab fisheries	Fixed gear, groundfish	Trawl gear, groundfish
1960/61	940.75	—	—	—
1961/62	2773.27	—	—	—
1962/63	3631.46	—	—	—
1963/64	8121.13	—	—	—
1964/65	9612.99	—	—	—
1965/66	5858.15	—	—	—
1966/67	2668.49	—	—	—
1967/68	6409.72	—	—	—
1968/69	7302.85	—	—	—
1969/70	8171.93	—	—	—
1970/71	7283.34	—	—	—
1971/72	7019.78	—	—	—
1972/73	8493.14	—	—	—
1973/74	4418.66	—	—	—
1974/75	1258.70	—	—	—
1975/76	186.69	—	—	—
1976/77	0.00	—	—	—
1977/78	410.74	—	—	—
1978/79	366.14	—	—	—
1979/80	211.93	—	—	—
1980/81	643.88	—	—	—
1981/82	747.94	—	—	—
1982/83	771.93	—	—	—
1983/84	898.83	—	—	—
1984/85	588.03	—	—	—
1985/86	394.09	—	—	—
1986/87	323.20	—	—	—
1987/88	550.61	—	—	—
1988/89	710.92	—	—	—
1989/90	501.66	—	—	—
1990/91	375.62	Confidential	—	—
1991/92	431.49	Confidential	—	—
1992/93	583.51	Confidential	—	—
1993/94	316.64	Confidential	0.60	40.09
1994/95	89.34	Confidential	1.36	10.34
1995/96	**17.66**	**22.98**	**2.63**	**6.93**
1996/97	**0.00**	**2.71**	**1.30**	**20.26**
1997/98	**0.00**	**0.42**	**1.73**	**5.31**
1998/99	**2.68**	**3.48**	**4.60**	**20.65**
1999/00	**0.00**	**0.46**	**17.13**	**12.69**
2000/01	**34.73**	**0.83**	**1.22**	**6.30**
2001/02	**69.84**	**16.09**	**2.42**	**27.01**
2002/03	**229.36**	**21.65**	**5.12**	**33.12**
2003/04	**217.32**	**17.08**	**1.62**	**4.15**
2004/05	**0.00**	**1.07**	**0.36**	**5.86**
2005/06	**0.00**	**0.11**	**1.61**	**1.07**
2006/07	**0.00**	**0.22**	**3.08**	**0.28**
2007/08	**0.00**	**1.36**	**7.70**	**1.19**
2008/09	0.00	0.15	4.89	4.67
2009/10	0.00	0.39	0.14	6.40
2010/11	0.00	2.07	0.04	1.99
2011/12	0.00	0.49	1.19	0.82
2012/13	0.00	0.44	0.01	0.24
2013/14	0.00	1.46	0.01	0.04
2014/15	0.00	0.28	0.00	0.11
2015/16	0.00	0.00	0.03	1.46

F. Calculation of the OFL

1. **Specification of the Tier level and stock status level for computing the OFL:**
   - Recommended as Tier 5, total-catch OFL computed as the estimated average annual total catch over a specified period.
   - Recommended time period for computing retained-catch portion of the OFL: 1995/96–2007/08.
   - Recommended time period for computing bycatch mortality due to crab fisheries: 1995/96–2007/08.
   - Recommended time period for computing bycatch mortality due to groundfish fisheries: 1995/96–2007/08.
   - Recommended bycatch mortality rates: 0.2 for crab fisheries; 0.5 for fixed-gear groundfish fisheries; 0.8 for trawl groundfish fisheries.
   - Recommended OFL for 2017/18 is estimated by,

$$OFL_{2017/18} = RET_{95/96\text{-}07/08} + BM_{CF,\ 95/96\text{-}07/08} + BM_{GF,\ 95/96\text{-}07/08},$$

where,

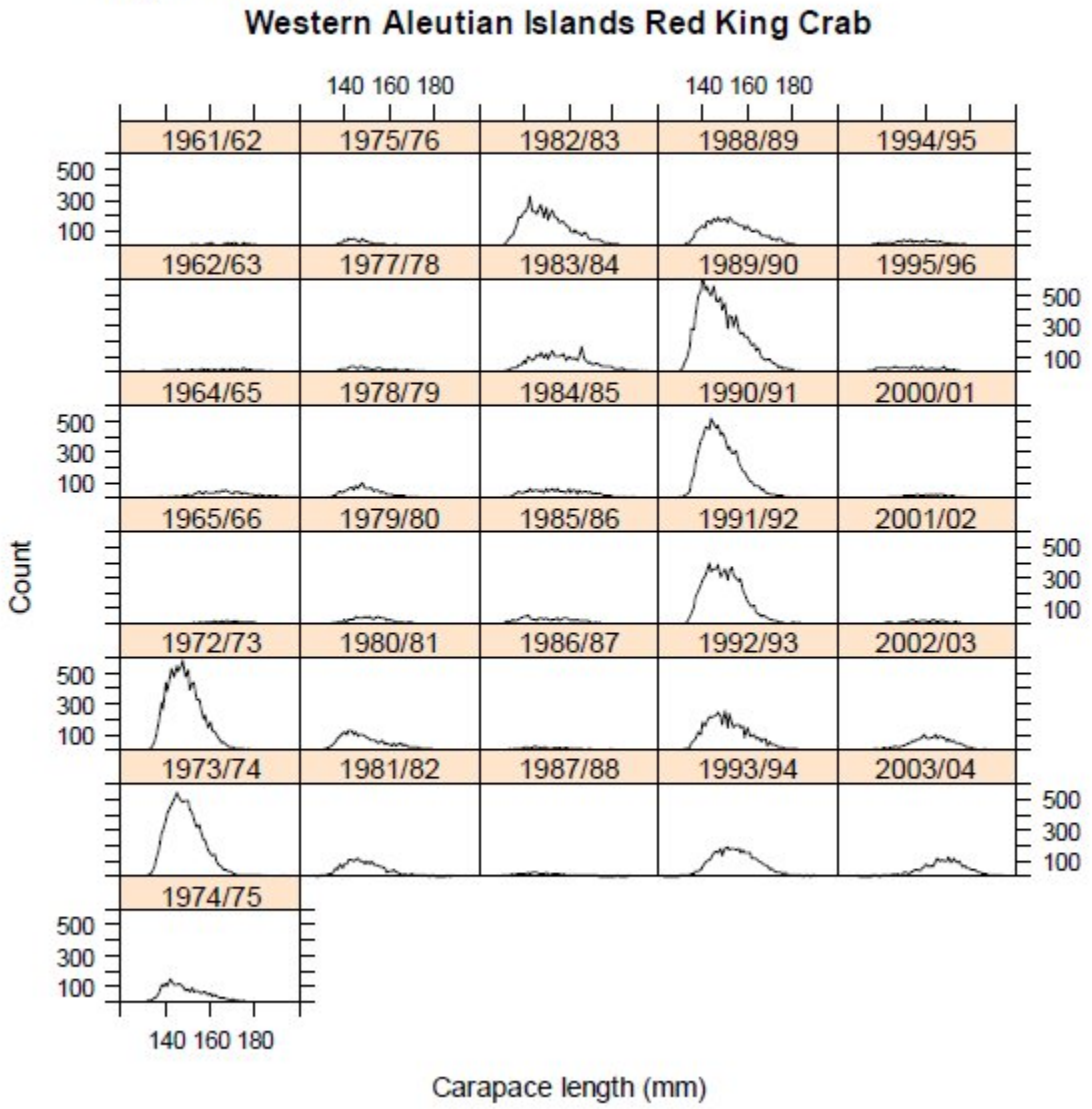
- $RET_{95/96\text{-}07/08}$ is the average annual retained catch in the directed crab fishery during 1995/96–2007/08
- $BM_{CF,\ 95/96\text{-}07/08}$ is the estimated average annual bycatch mortality in the directed and non-directed crab fisheries during 1995/96–2007/08, and
- $BM_{GF,\ 95/96\text{-}07/08}$ is the estimated average annual bycatch mortality in the groundfish fisheries during 1995/96–2007/08.

Statistics on the data and estimates used to calculate $RET_{95/96\text{-}07/08}$, $BM_{CF,\ 95/96\text{-}07/08}$, and $BM_{GF,95/96\text{-}07/08}$ are provided in the "Mean, 1995/96–2007/08" row of Table 6. Using the calculated values of $RET_{95/96\text{-}07/08}$, $BM_{CF,\ 95/96\text{-}07/08}$, and $BM_{GF,95/96\text{-}07/08}$, $OFL_{2016/17}$ is,

$$OFL_{2017/18} = 43.97\ t + 1.36\ t + 10.86\ t = 56\ t\ (123{,}867\ lb).$$

4. Author recommended ABC: 34 t. This is the status quo ABC that has been recommended by the author since the SSC recommended a 34 t ABC for 2012/13. The SSC's recommended ABC of 34 t for 2012/13 was determined as a value "sufficient to cover bycatch and the proposed test fishery catch" (June 2012 SSC meeting minutes, page 10). It provides a 40% buffer on the OFL of 56 t. Note that the ABC recommended by the SSC for 2011/12 was lower (12 t) and was based on the estimated average bycatch mortality due to groundfish and the non-directed crab fisheries during 1995/96–2007/08.

Appendix A5. Page 1 of 1. Plot of available retained catch size frequency sample data 1961/62–2003/04 western Aleutian Islands directed red king crab fishery (data listed in Appendices A2-A4).



2016 Petrel Bank survey

- John Hilsinger will provide update…