

8 Aleutian Islands Golden King Crab

Fishery information relative to OFL setting

The directed fishery has been prosecuted annually since the 1981/82 season. Retained catch peaked in 1986/87 at 14.7 million lb and averaged 11.9 million lb over the 1985/86-1989/90 seasons. Average harvests dropped sharply from 1989/90 to 1990/91 to a level of 6.9 million lb for the period 1990/91–1995/96. Management based on a formally established GHL began with the 1996/97 season. The 5.9 million lb GHL established for the 1996/97 season, which was based on the previous five-year average catch, was subsequently reduced to 5.7 million lb beginning in 1998/99. The GHL (or TAC, since 2005/06) remained at 5.700 million lb for 2007/08, but was increased to 5.985 million lb for the 2008/09–2011/12 seasons, and to 6.290 million lb starting with the 2012/13 season. Average annual retained catch for the period 1996/97–2007/08 was 5.62 million lb and 5.96 million lb for the period 2008/09–2012/13. The retained catch for 2013/14 was 6.38 million lb. This fishery is rationalized under the Crab Rationalization Program. The 2014/15 season ends by regulation on 15 May 2015.

Non-retained bycatch occurs mainly in the directed fishery, and to a minor extent in other crab fisheries. Bycatch also occurs in fixed-gear and trawl groundfish fisheries although that bycatch is low relative to bycatch in the directed fishery. Total annual non-retained catch of golden king crab during crab fisheries decreased relative to the retained catch after the 1990s. Bycatch in the post-rationalized fishery (2005/06–2013/14) has ranged from 2.5 million lb in 2005/06 (46% of the retained catch) to 3.2 million lb for 2013/14 (50% of the retained catch). Estimated total mortality (retained catch plus bycatch in crab and groundfish fisheries) ranged from 5.8 to 9.4 million lb since 1995/96. Estimated total mortality in 2013/14 was 7.0 million lb.

Data and assessment methodology

Available data used in the Tier 5 assessment are from ADF&G fish tickets, size-frequencies from samples of landed crabs, at-sea observations from pot lifts sampled during the fishery, and bycatch estimates from the groundfish fisheries. These data are available through the 2013/14 season; complete data from the 2014/15 fishery season, which ends on 15 May 2015, are not currently available. Most of the available data were obtained from the directed fishery which targets legal-size (≥ 6 -inch CW) males. A new survey and assessment model are currently being developed for this stock.

Stock biomass and recruitment trends

Although a stock assessment model is in development, it has not yet been accepted for use in management. There are consequently no estimates of stock biomass. Estimates of recruitment trends and current levels relative to virgin or historic levels are also not available.

Summary of major changes

Fishery data that have been updated with the results for 2013/14 include: retained catch for the directed fishery and bycatch estimates for the directed fishery, non-directed crab fisheries, and groundfish fisheries.

Tier determination/Plan Team discussion and resulting OFL and ABC determination

The CPT recommends that this stock be managed as a Tier 5 stock in 2015/16. The B_{MSY} and MSST are not estimated for this stock. Observer data on bycatch from the directed fishery and groundfish fisheries provide the estimate of total bycatch mortality. Bycatch data from the directed fishery for the 1990/91 – 1995/96 seasons (excluding 1993/94 and 1994/95 seasons due to insufficient data) and from the groundfish fisheries from the 1993/94 – 2008/09 seasons were used. There are no directed fishery observer data prior to the 1988/89 season and observer data are lacking or confidential for four seasons in

at least one management area in the Aleutian Islands during 1988/89–1994/95.

This assessment author recommended using the same approach for determining the 2015/16 total catch OFL as has been used to determine the total catch OFL since 2012/13. This approach uses data for 1985/86–1995/96 to estimate the mean retained catch in the crab fisheries, and bycatch data for 1990/91–95/96 to estimate the mean bycatch rate (0.363):

$$\text{OFL}_{2015/16} = (1 + R_{90/91-95/96}) \cdot \text{RET}_{85/86-95/96} + \text{BM}_{\text{GF},93/94-08/09} = 12,533,570 \text{ lb}$$

where,

- $R_{90/91-95/96}$ is the average of the annual ratios of bycatch mortality due to crab fisheries to retained catch in pounds over the period of the subscribed years, excluding 1993/94–1994/95 due to data confidentiality and lack of data,
- $\text{RET}_{85/86-95/96}$ is the average annual retained catch in the directed crab fishery over the period 1985/86–1995/96), and
- $\text{BM}_{\text{GF},93/94-08/09}$ is the average of the annual estimates of bycatch mortality due to groundfish fisheries over the period 1993/94–2008/09.

The assessment author recommended a 25% buffer between the OFL and ABC, which is the same buffer used to set the 2014/15 ABC. There remains uncertainty regarding the time-period that represents productivity. The CPT agrees with the assessment author's recommendation and notes that this is consistent with considering uncertainty in other crab stocks. The CPT recommended ABC is 9,400,178 lb.

Status and catch specifications (1000 t) of Aleutian Islands golden king crab

Year	MSST	Biomass (MMB)	TAC	Retained Catch	Total Catch	OFL	ABC
2011/12	N/A	N/A	2.72	2.71	2.95	5.17	4.66
2012/13	N/A	N/A	2.85	2.84	3.12	5.69	5.12
2013/14	N/A	N/A	2.85	2.89	3.19	5.69	5.12
2014/15	N/A	N/A	2.85	*	*	5.69	4.26
2015/16	N/A	N/A				5.69	4.26

* to be added after fishery closure by September 2015.

Status and catch specifications (million lb) of Aleutian Islands golden king crab

Year	MSST	Biomass (MMB)	TAC	Retained Catch	Total Catch	OFL	ABC
2011/12	N/A	N/A	5.99	5.96	6.51	11.40	10.26
2012/13	N/A	N/A	6.29	6.27	6.87	12.54	11.28
2013/14	N/A	N/A	6.29	6.38	7.04	12.54	11.28
2014/15	N/A	N/A	6.29	*	*	12.53	9.40
2015/16	N/A	N/A				12.53	9.40

* to be added after fishery closure by September 2015.

Overfishing did not occur during 2013/14 because the estimated total catch did not exceed the Tier 5 overfishing limit (OFL) of 12.54-million lb (5.69 thousand t). The total catch did not exceed the ABC established for 2013/14 (11.28-million lb, or 5.12 thousand t). The OFL and ABC values for 2014/15 in the table above are the values recommended by the SSC in June 2014. The 2014/15 TAC was established by ADF&G on 15 July 2014. The TACs for 2013/14 and 2014/15 in the table above do not include landings towards a cost-recovery fishing goal of up to \$500,000 to cover costs of observer deployments in the fishery and research surveys for Aleutian Islands golden and red king crab; total catch for 2013/14 do include the catch towards the 2013/14 cost-recovery fishery.

Additional Plan Team recommendations

The CPT reviewed progress on the assessment model for Aleutian Islands golden king crab. Detailed comments and recommendations for the model are contained in the CPT report.

9 Pribilof District Golden King Crab

Fishery information relative to OFL setting

The Pribilof District golden king crab fishery began in the 1981/82 season. The directed fishery mainly occurs in Pribilof Canyon of the continental slope. Peak directed harvest was 0.856-million lb (388 t) by 50 vessels during the 1983/84 season; fishery participation has since been sporadic and retained catches vary from 0 to 0.342-million lb (155 t). The fishing season is based on a calendar year. A guideline harvest level (GHL) was first established in 1999 at 0.200-million lb (91 t) and the fishery has been managed with a GHL of 0.150-million lb (68 t) since 2000; a GHL for 2015 has not yet been set. No directed fishery occurred during 2006–2009. One vessel landed catch in 2010, two vessels landed catch in 2011, and one vessel landed catch each year from 2012 to 2014. The 2015 season is ongoing and no vessels have participated so far. Data from the directed fishery since 2003 cannot be reported under state confidentiality regulations; however, the GHL has not been reached. Non-retained bycatch occurs in the directed fishery and can occur in the eastern Bering Sea snow crab fishery, Bering Sea grooved Tanner crab fishery, and Bering Sea groundfish fisheries. Estimated fishing mortality from 2001 to 2014 due to directed and non-directed crab fisheries ranged from 0 to 0.160 million lb (73 t). Bycatch mortality in the groundfish fisheries ranged from <0.001 million lb (< 1 t) to 0.019 million lb (12 t) from 1991/92 to 2013/14.

Data and assessment methodology

There is no assessment model for this stock. Fish ticket and observer data are available, size-frequency data from samples of landed crabs, and pot lifts sampled during the fishery, and from the groundfish fisheries. Much of the directed fishery data are confidential due to low participation levels.

Stock biomass and recruitment trends

There is no stock biomass data used in this Tier 5 assessment.

Tier determination/Plan Team discussion and resulting OFL and ABC determination

The CPT recommends this stock be managed under Tier 5 in 2016. The CPT concurs with the author's recommended status quo OFL of 0.20 million lb and an ABC of 0.15 million lb. The ABC was derived by applying a 25% buffer of the OFL, $ABC = 0.75 * OFL$, the same buffer used for other Tier 5 stocks with similar levels of concern. The 2016 OFL calculation is the same as recommended by the SSC for 2012–2015:

$$OFL_{2016} = (1 + R_{2001-2010}) * RET_{1993-1998} + BM_{NC,1994-1998} + BM_{GF,1992/93-1998/99}$$

where,

- $R_{2001-2010}$ is the average of the estimated annual ratio of lb of bycatch mortality to lb of retained in the directed fishery during 2001–2010.
- $RET_{1993-1998}$ is the average annual retained catch in the directed crab fishery during 1993–1998.
- $BM_{NC,1994-1998}$ is the estimated average annual bycatch mortality in non-directed crab fisheries during 1994–1998.
- $BM_{GF,1992/93-1998/99}$ is the estimated average annual bycatch mortality in groundfish fisheries during 1992/93–1998/99.

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Year	MSST	Biomass (MMB)	GHL	Retained Catch	Total Catch	OFL	ABC
2012	N/A	N/A	68	Conf.	Conf.	91	82
2013	N/A	N/A	68	Conf.	Conf.	91	82
2014	N/A	N/A	68	Conf.	Conf.	91	82
2015	N/A	N/A	TBA			91	68
2016	N/A	N/A				91	68

N/A = not available

Conf. = confidential

TBA = to be announced

Status and catch specifications (millions lb) of Pribilof District golden king crab

Year	MSST	Biomass (MMB)	GHL	Retained Catch	Total Catch	OFL	ABC
2012	N/A	N/A	0.15	Conf.	Conf.	0.20	0.18
2013	N/A	N/A	0.15	Conf.	Conf.	0.20	0.18
2014	N/A	N/A	0.15	Conf.	Conf.	0.20	0.18
2015	N/A	N/A	TBA			0.20	0.15
2016	N/A	N/A				0.20	0.15

N/A = not available

Conf. = confidential

TBA = to be announced

10 Western Aleutian Islands red king crab

Fishery information relative to OFL and ABC setting

The domestic fishery was opened every season from 1960/61 to 1995/96. After 1995/96, the fishery was opened only in 1998/99, and from 2000/01 to 2003/04. The fishery has been closed since the end of the 2003/04 season. Peak harvest occurred during the 1964/65 season with a retained catch of 21.19 million lb. During the early years of the fishery through the late 1970s, most or all of the retained catch was harvested in the area between 172° W longitude and 179° W longitude. As the annual retained catch decreased into the mid-1970s and the early-1980s, a large portion of the retained catch came from the area west of 179° W longitude.

Retained catch from 1985/86 to 1994/95 averaged 0.94 million lb, but the retained catch during the 1995/96 season dropped to 0.04 million lb. Most of the catch since the 1990/91 season was harvested in the Petrel Bank area (between 179° W longitude and 179° E longitude) and the last two commercial fishery seasons (2002/03 and 2003/04) were opened only in the Petrel Bank area. Retained catches in those two seasons were 0.51 million lb (2002/03) and 0.48 million lb (2003/04).

Non-retained catch of red king crabs occurs in both the directed red king crab fishery, the Aleutian Islands golden king crab fishery, and in groundfish fisheries. Estimated bycatch mortality during the 1995/96 to 2013/14 seasons averaged 0.002 million lb in crab fisheries and 0.018 million lb in groundfish fisheries. Estimated annual total fishing mortality from 1995/96 to 2013/14 averaged 0.087 million lb. The average retained catch during that period was 0.066 million lb. This fishery is rationalized under the Crab Rationalization Program only for the area west of 179° W longitude.

Data and assessment methodology

The 1960/61 to 2007/08 time series of retained catch (number and pounds of crabs), effort (vessels, landings and pot lifts), average weight and average carapace length of landed crabs, and catch-per-unit effort (number of crabs per pot lift) are available. Bycatch from crab fisheries from 1995/96 to 2013/14 and from groundfish fisheries from 1993/94 to 2013/14 are available. There is no assessment model for this stock. The standardized surveys of the Petrel Bank area conducted by ADF&G in 2006 and 2009 and the ADF&G-Industry Petrel Bank surveys conducted in 2001 were too limited in geographic scope and too infrequent for reliable estimation of abundance for the entire western Aleutian Islands area.

Stock biomass and recruitment trends

Estimates of stock biomass are not available for this stock. Estimates of recruitment trends and current levels relative to virgin or historic levels are not available. The fishery has been closed since 2003/04 due to apparent poor recruitment. A 2009 survey conducted by ADF&G in the Petrel Bank area encountered an ageing population of legal male crab occurring in a more limited area and at lower densities than were found in a 2006 survey and provided no expectations for recruitment. A test fishery conducted by a commercial vessel during October-December 2009 in the area west of Petrel Bank yielded only one legal male red king crab.

Industry is working with ADF&G to conduct a “reconnaissance survey” in the Adak Island area in September 2015. No red king crab will be retained in the survey, but handling mortality is expected and will be accounted for.

Tier determination/Plan Team discussion and resulting OFL and ABC determination

The CPT recommends that this stock be managed under Tier 5 for the 2015/16 season. The CPT concurs with the assessment author's recommendation of an OFL based on the 1995/96–2007/08 average total catch following the recommendation of the SSC in June 2010 to set the time period for computing the OFL at 1995/96–2007/08. The CPT recommends an OFL for 2015/16 of 0.12 million lb.

The CPT continues to have concerns regarding the depleted condition of this stock. Groundfish bycatch in recent years has accounted for the majority of the total catch. The CPT recommends an ABC of 0.074 million lb for 2015/16, which is below the maximum permissible ABC of 0.11 million lb; equivalent to a 40% buffer.

Status and catch specifications t of Western Aleutian Islands red king crab

Year	MSST	Biomass (MMB)	TAC	Retained Catch	Total Catch	OFL	ABC
2011/12	N/A	N/A	Closed	0	1	54	12
2012/13	N/A	N/A	Closed	0	<1	54	32
2013/14	N/A	N/A	Closed	0	<1	54	32
2014/15	N/A	N/A	Closed	0	*	54	32
2015/16						54	32

* to be added after fishery closure by September 2015.

Status and catch specifications (millions lb) of Western Aleutian Islands red king crab

Year	MSST	Biomass (MMB)	TAC	Retained Catch	Total Catch	OFL	ABC
2011/12	N/A	N/A	Closed	0	0.002	0.12	0.03
2012/13	N/A	N/A	Closed	0	<0.001	0.12	0.07
2013/14	N/A	N/A	Closed	0	<0.001	0.12	0.07
2014/15	N/A	N/A	Closed	0	*	0.12	0.07
2015/16						0.12	0.07

* to be added after fishery closure by September 2015.

Overfishing did not occur during 2013/14; the estimated total catch did not exceed the Tier 5 OFL of 0.12-million lb (56 t). The total catch did not exceed the ABC established for 2013/14 (0.7-million lb, or 34 t). The OFL and ABC values for 2014/15 in the tables below are the values recommended by the SSC in June 2014. Data for computing total catch relative to the 2014/15 OFL and ABC are not yet available. No determination has yet been made for a fishery opening or harvest level, if opened, for the 2015/16 season.

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Table 3 Crab Plan Team recommendations for May 2015 (stocks 8-10). Shaded areas will be filled out for the final SAFE in September 2015. Note diagonal fill indicates parameters are not applicable for that tier.

Chapter	Stock	Tier	Status (a,b,c)	F _{OFL}	B _{MSY} or B _{MSYproxy}	Years ¹ (biomass or catch)	2015/16 ^{2,3} MMB	2015 MMB / MMB _{MSY}	γ	Mortality (M)	2014/15 OFL	2014/15 ABC	ABC buffer (%)
1	EBS snow crab												
2	BB red king crab												
3	EBS Tanner crab												
4	Pribilof Islands red king crab												
5	Pribilof Islands blue king crab												
6	St. Matthew Island blue king crab												
7	Norton Sound red king crab												
8	Aleutian Islands golden king crab	5				See intro chapter					5.69	4.26	25%
9	Pribilof Islands golden king crab	5				See intro chapter					0.09	0.07	25%
10	WAI red king crab	5				1995/96–2007/08					0.05	0.03	40%

¹ For Tiers 3 and 4 where B_{MSY} or B_{MSYproxy} is estimable, the years refer to the time period over which the estimate is made. For Tier 5 stocks it is the years upon which the catch average for OFL is obtained.

² MMB as projected for 2/15/2016 at time of mating.

³ Model mature biomass on 7/1/2014.

Table 4 Maximum permissible ABCs for 2015/16 and Crab Plan Team recommended ABCs for those stocks where the Plan Team recommendation is below the maximum permissible ABC as defined by Amendment 38 to the Crab FMP. Note that the rationale is provided in the individual introduction chapters for recommending an ABC less than the maximum permissible for these stocks.

Stock	Tier	2015/16 <i>Max</i> ABC (1000 t)	2015/16 ABC (1000 t)
EBS Snow Crab			
Bristol Bay red king crab			
EBS Tanner Crab			
Pribilof Islands red king crab			
Pribilof Islands blue king crab			
Saint Matthew blue king crab			
Norton Sound red king crab			
Aleutian Islands golden king crab	5	5.12	4.26
Pribilof Islands golden king crab ¹	5	0.08	0.07
WAI red king crab	5	0.05	0.03

¹ for Pribilof Islands golden king crab this is for the 2016 calendar year instead of the 2015-2016 crab fishing year.

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Table 5. Stock status in relation to status determination criteria 2014/15. Shaded areas to be filled in for the final September 2015 SAFE. (Note diagonal fill indicates parameters not applicable for this tier level).

Chapter	Stock	Tier	MSST	B _{MSY} or B _{MSYproxy}	2013/14 ⁵ MMB	2013/14 MMB / MMB _{MSY}	2013/14 OFL 1000 t	2013/14 Total catch	Rebuilding Status
1	EBS snow crab								
2	BB red king crab								
3	EBS Tanner crab								
4	Pribilof Islands red king crab								
5	Pribilof Islands blue king crab								
6	St. Matthew Island blue king crab								
7	Norton Sound red king crab								
8	Aleutian Islands golden king crab	5					5.69		
9	Pribilof Islands golden king crab	5					0.09	Conf.	
10	WAI red king crab	5					0.054		

⁵ MMB as estimated during this assessment for 2014/15 as of 2/15/2015.