

# Western Aleutian Islands red king crab 2023 assessment

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# Recap and Status Determination

## Tier 5: 3-yr cycle, last assessment in May 2020

- Overfishing did not occur during 2020/21, 2021/22, or 2022/23 seasons

Management Performance Table (values in t)

| <b>Fishing Year</b> | <b>MSST</b> | <b>Biomass (MMB)</b> | <b>TAC<sup>a</sup></b> | <b>Retained Catch</b> | <b>Total Catch</b> | <b>OFL</b> | <b>ABC</b> |
|---------------------|-------------|----------------------|------------------------|-----------------------|--------------------|------------|------------|
| 2018/19             | N/A         | N/A                  | Closed                 | 0                     | <1                 | 56         | 14         |
| 2019/20             | N/A         | N/A                  | Closed                 | 0                     | <1                 | 56         | 14         |
| 2020/21             | N/A         | N/A                  | Closed                 | 0                     | <1                 | 56         | 14         |
| 2021/22             | N/A         | N/A                  | Closed                 | 0                     | <1                 | 56         | 14         |
| 2022/23             | N/A         | N/A                  | Closed                 | 0                     | <1                 | 56         | 14         |
| 2023/24             | N/A         | N/A                  |                        |                       |                    | 56         | 14         |
| 2024/25             | N/A         | N/A                  |                        |                       |                    | 56         | 14         |
| 2025/26             | N/A         | N/A                  |                        |                       |                    | 56         | 14         |

- 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.

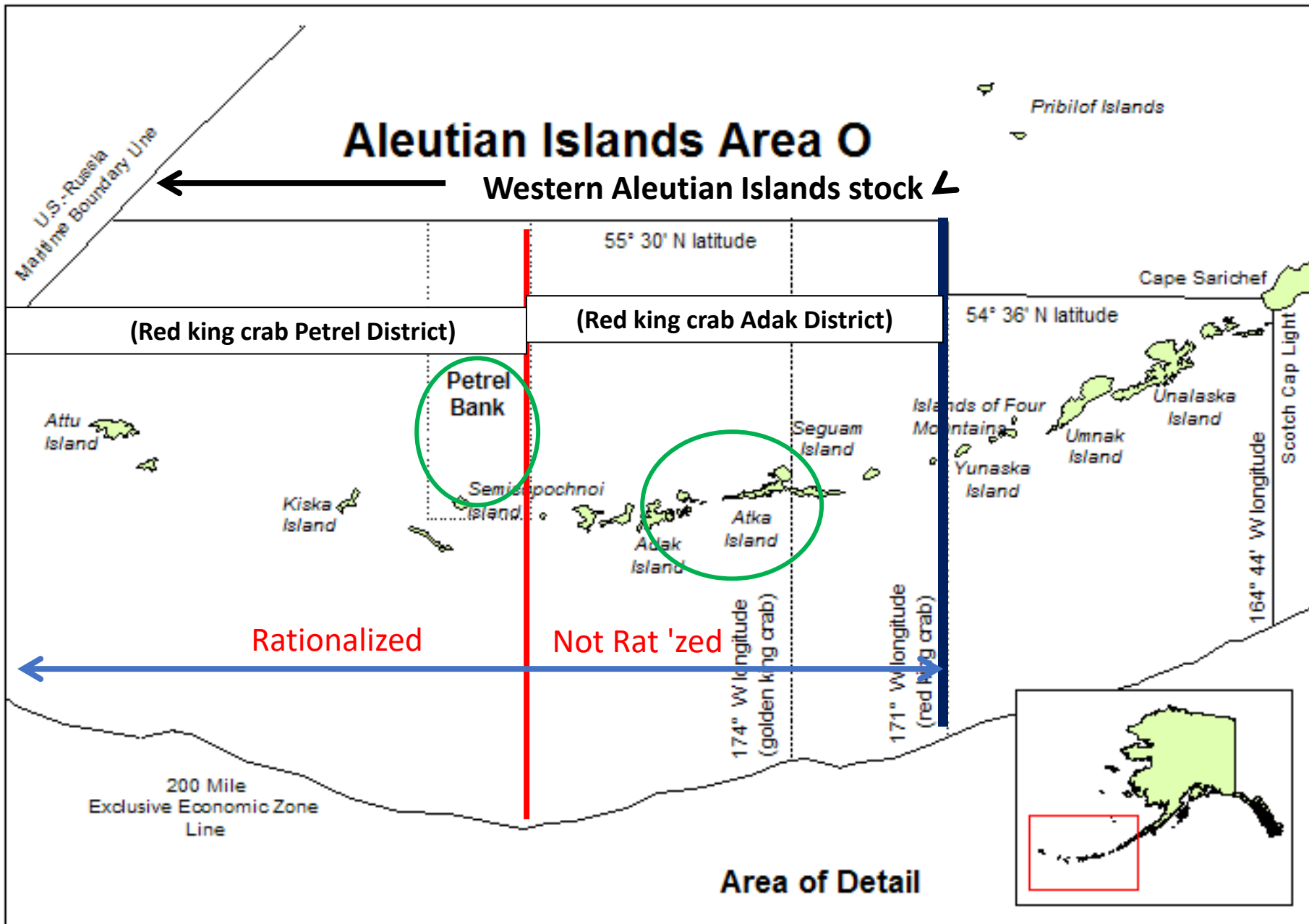
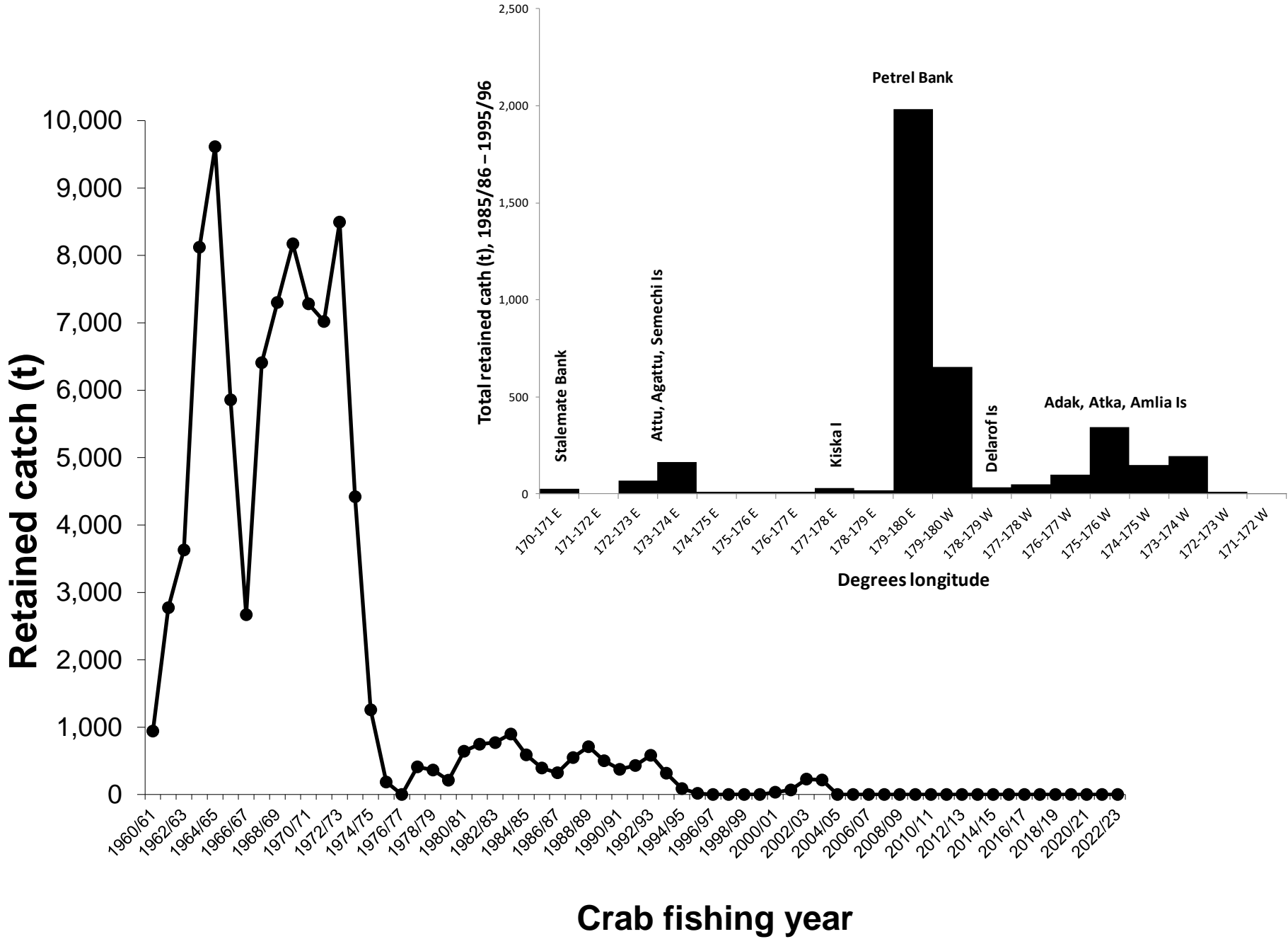
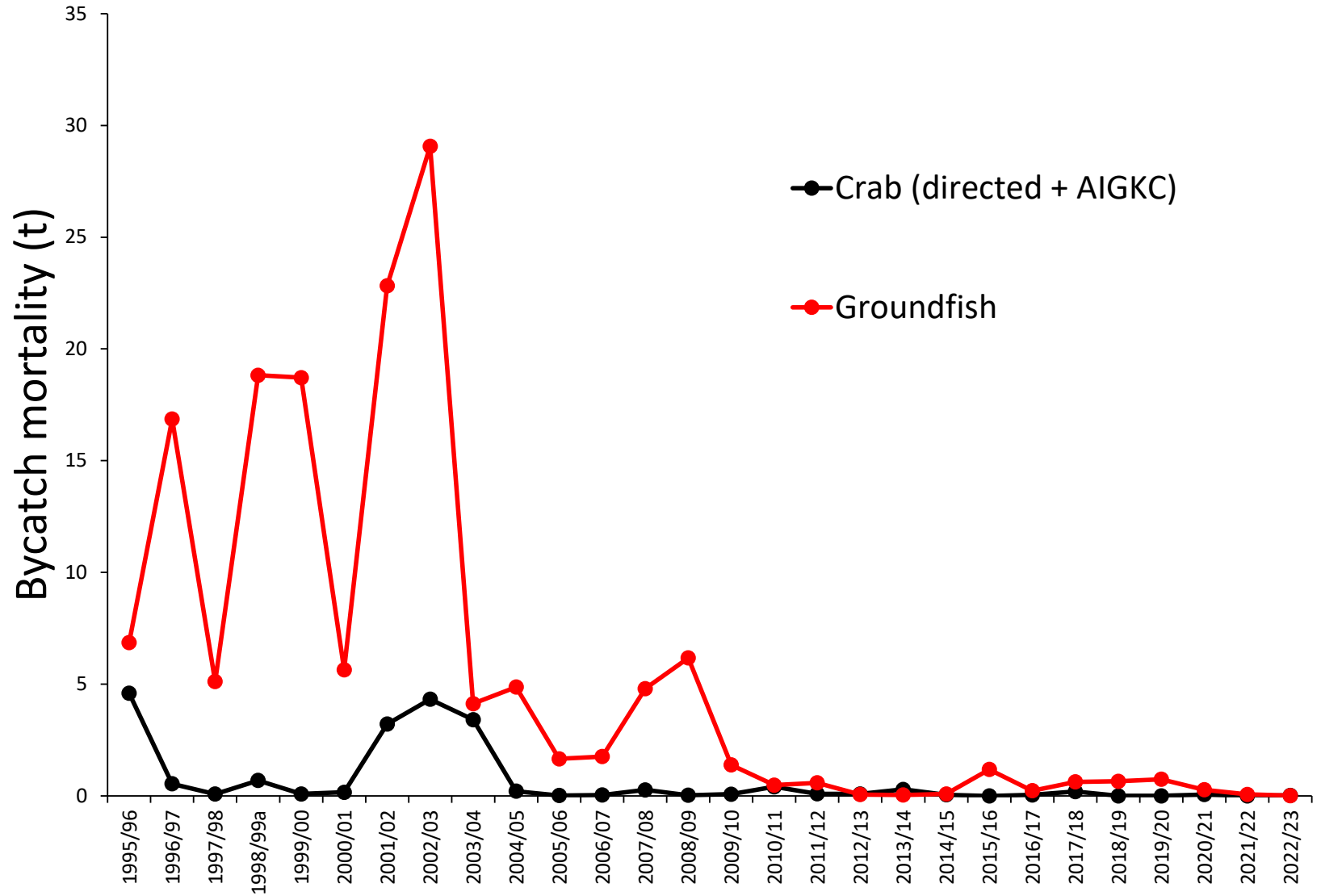


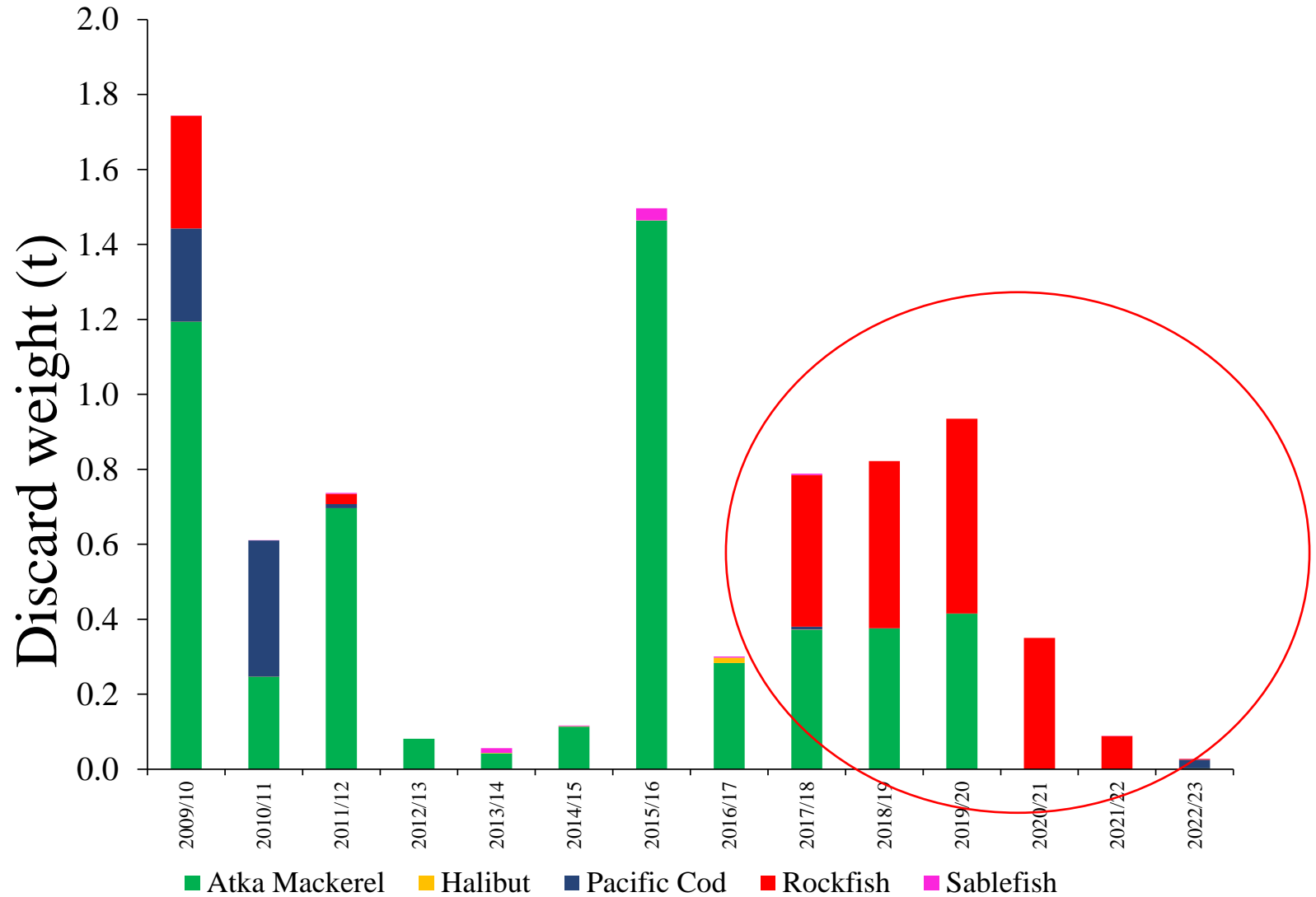
Figure 1. Aleutian Islands, Area O, red and golden king crab management area (from Baechler and Cook 2014, updated to show boundaries of the Adak and Petrel Districts for red king crab as established by the Alaska Board of Fisheries in March 2014).



# Bycatch mortality



# Groundfish fishery bycatch



# Response to Comments, 2020

**CPT:** *“The CPT was curious about the relative increase in the proportion of WAIRKC bycatch attributed to the rockfish fishery during 2017/18–2019/20, an aspect believed related to the Pacific ocean perch trawl fishery.”*

**Response:** RKC captured in rockfish fisheries via non-pelagic trawl gear, mostly north of Atka and Amlia Islands, mostly during June-August each year, mostly during the Pacific ocean perch (POP) fishery, with minimal amounts coming from the Northern Rockfish fishery.

# Response to Comments, 2020

**CPT:** *“A change to the OFL calculation is not anticipated unless bycatch information from 1995/96-2007/08 is revised, so the author recommends a status quo OFL of 56 t with a 75% buffer for a status quo ABC of 14 t (30,967 lb), which could allow for a small exploratory fishery. The CPT noted that this approach seems reasonable given the depressed stock status, the lack of new information, and the absence of interest in a directed fishery.”*

**Response:** This logic still applies.



# Response to Comments, 2020

**SSC:** *“The SSC, however, encourages the author to provide additional context for the two most recent surveys in Adak and Petrel Bank in the next assessment report. For example, how do the CPUEs for these surveys compare to older surveys or the fishery dependent information?”*

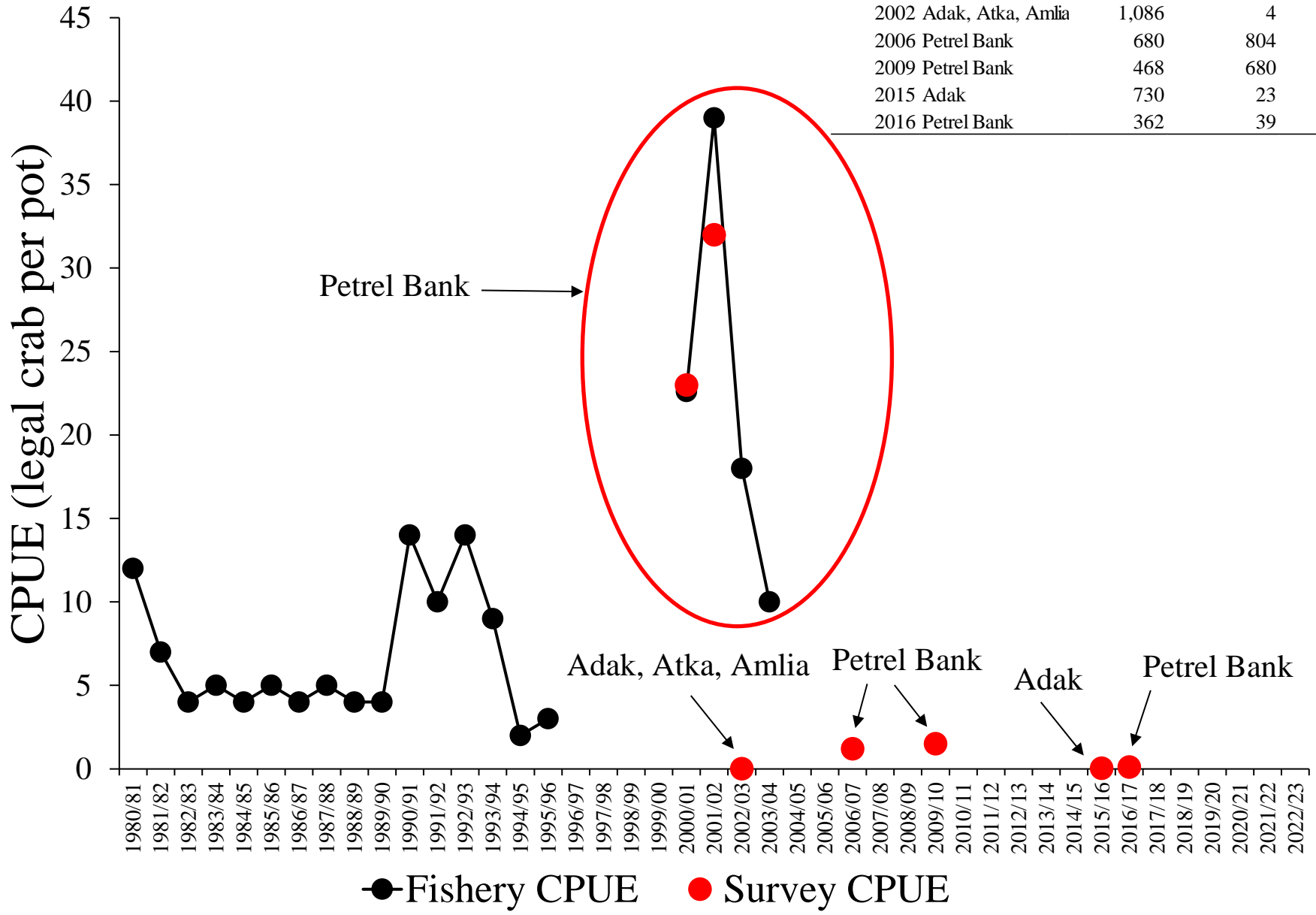
**Response:** Crab years 2001 and 2002 are the only years in which both a fishery and survey were conducted. In those years, the Petrel Bank fishery and survey legal male mean CPUE compare reasonably well. Subsequent Petrel Bank surveys indicate very low legal male CPUE (1.2, 1.5, 0.1 in 2006, 2009, and 2016 respectively). Adak area surveys in 2002 and 2015 indicate very low legal male CPUE (<0.1 in both years). All survey data, especially the most recent Adak and Petrel Bank surveys indicate that the stock is severely depressed, as all size sex category CPUEs are <0.3.

# Response to Comments, 2020

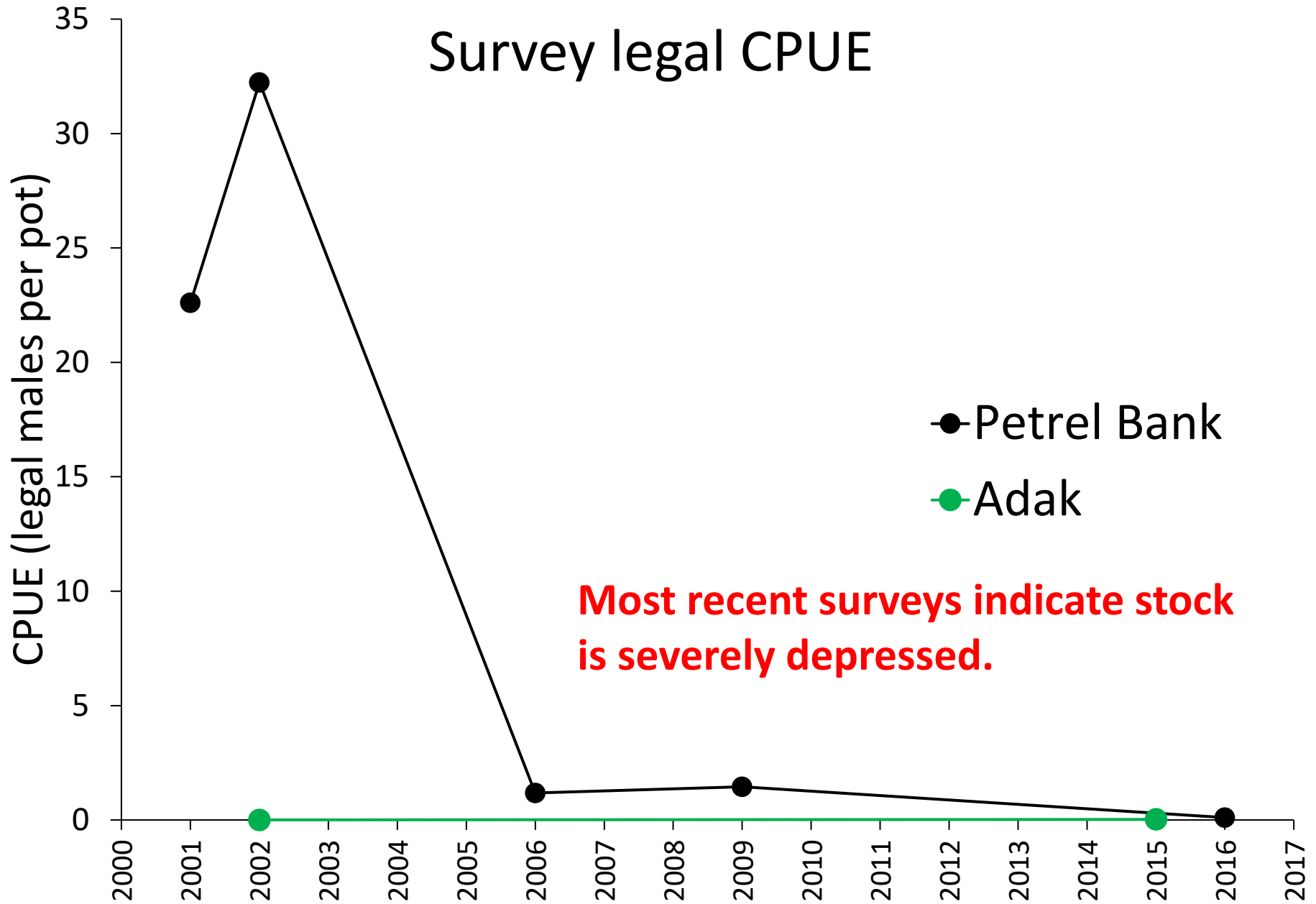
**SSC:** *“The SSC, however, encourages the author to provide additional context for the two most recent surveys in Adak and Petrel Bank in the next assessment report. For example, how do the CPUEs for these surveys compare to older surveys or the fishery dependent information?”*

|                        | 2015 Adak |      | 2016 Petrel Bank |      |
|------------------------|-----------|------|------------------|------|
| Pot lifts              | 730       | CPUE | 362              | CPUE |
| Female captured        | 205       | 0.28 | 0                | 0.00 |
| Juvenile male captured | 140       | 0.19 | 0                | 0.00 |
| Pre-recruit captured   | 74        | 0.10 | 1                | 0.00 |
| Legal captured         | 23        | 0.03 | 39               | 0.11 |

| Crab year | Location          | Pots fished | # legal RKC | CPUE  |
|-----------|-------------------|-------------|-------------|-------|
| 2001      | Petrel Bank       | 498         | 11,257      | 22.60 |
| 2002      | Petrel Bank       | 700         | 22,561      | 32.23 |
| 2002      | Adak, Atka, Amlia | 1,086       | 4           | 0.00  |
| 2006      | Petrel Bank       | 680         | 804         | 1.18  |
| 2009      | Petrel Bank       | 468         | 680         | 1.45  |
| 2015      | Adak              | 730         | 23          | 0.03  |
| 2016      | Petrel Bank       | 362         | 39          | 0.11  |



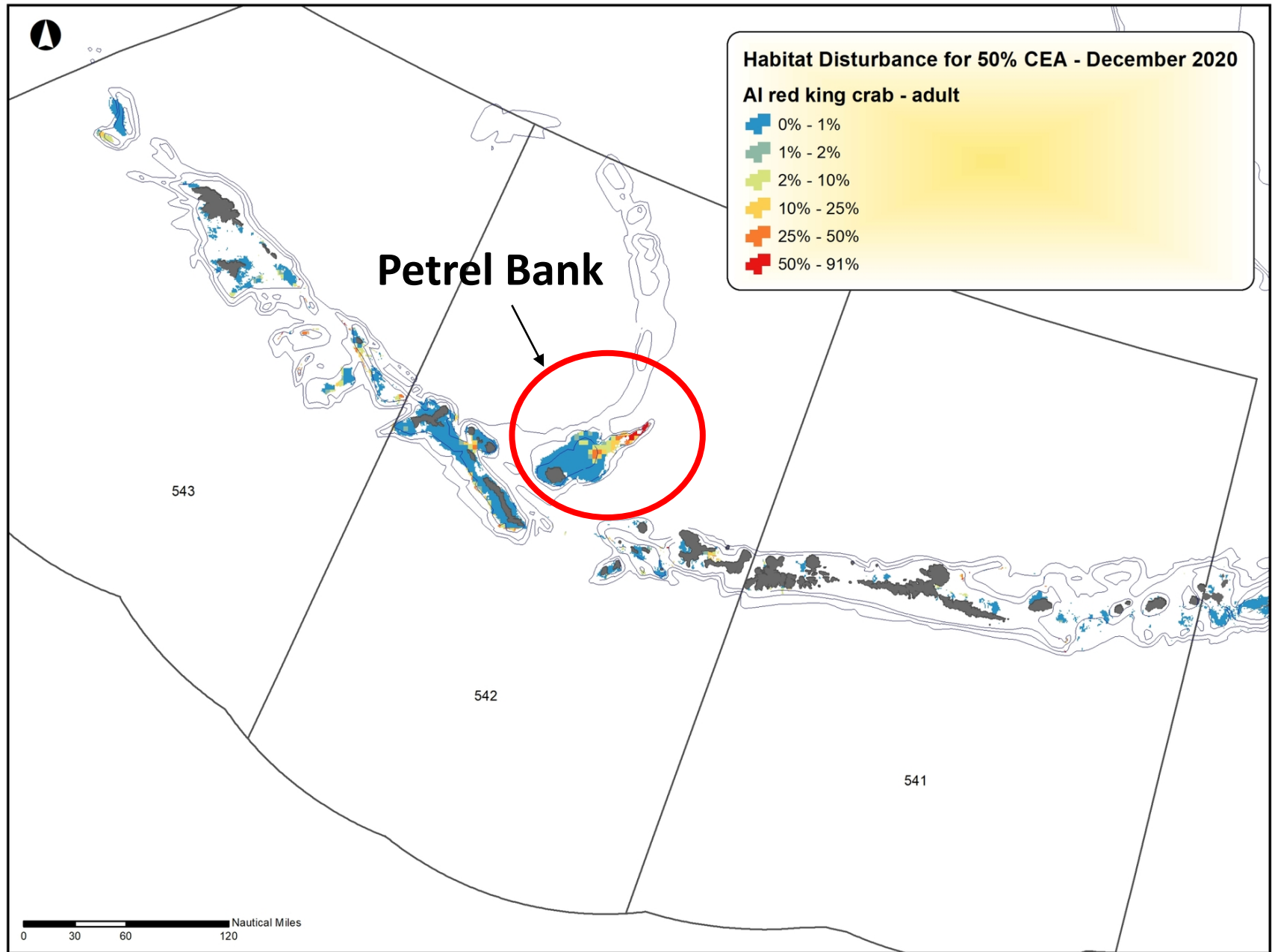
# Survey legal CPUE



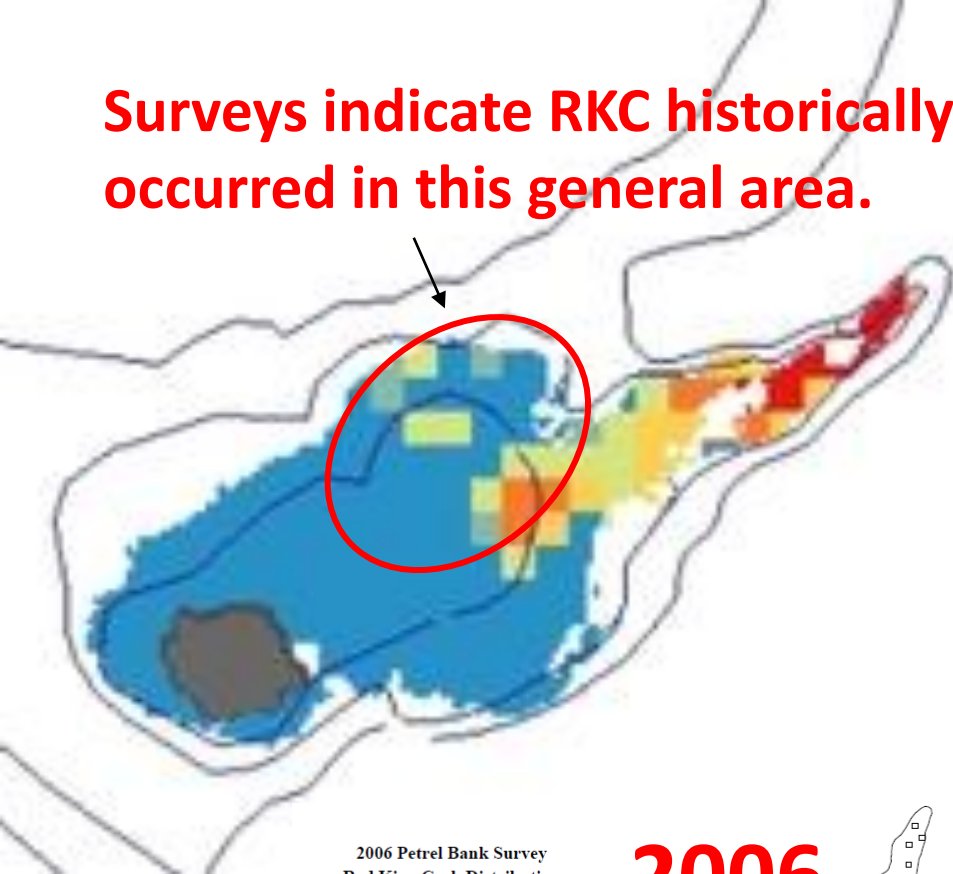
# Response to Comments, 2020

**SSC:** *“The SSC also reiterates that any data that could provide additional information on the status of the stock would be valuable, and encourages the author to explore any potential sources.”*

**Response:** I was not made aware of additional data that could provide new information about the status of the stock. However, I highlight Petrel Bank as a potential “habitat area of particular concern (HPAC)”, given recent estimated habitat disturbance in that area (this was also flagged during the EFH 5-year review fishing effects evaluation).

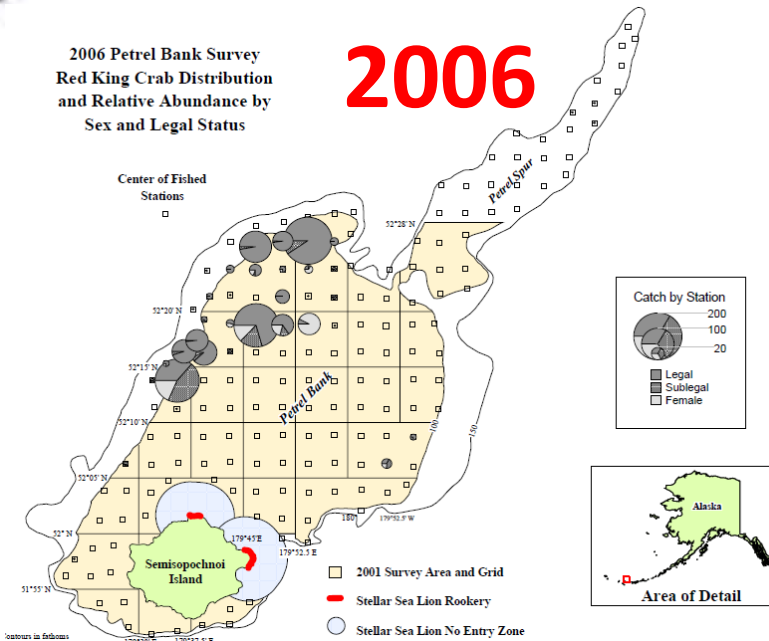


Surveys indicate RKC historically occurred in this general area.

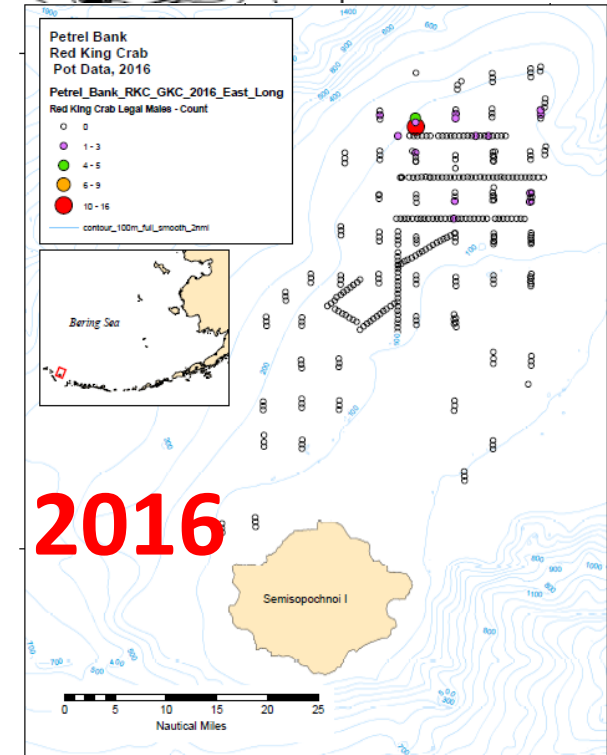
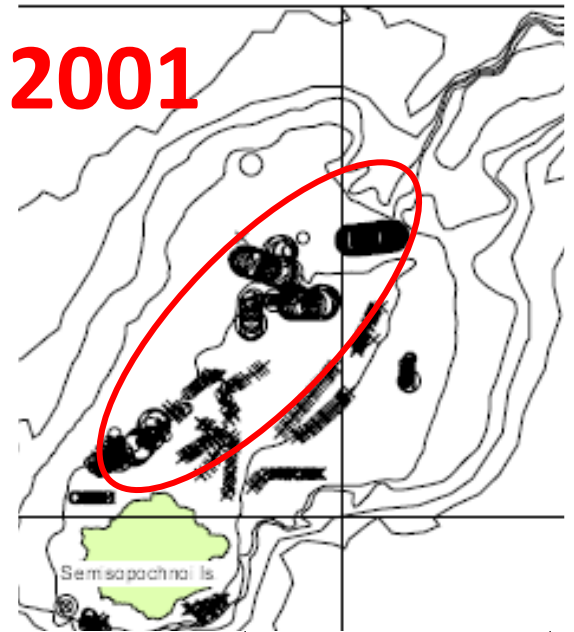


2006 Petrel Bank Survey  
Red King Crab Distribution  
and Relative Abundance by  
Sex and Legal Status

2006



2001



2016

# Tier 5 Approach



$$\text{OFL} = 56 \text{ t (123,867 lb)}$$

$$\text{OFL}_{23/24-25/26} = \text{RET}_{95/96-07/08} + \text{BM}_{\text{CF}, 95/96-07/08} + \text{BM}_{\text{GF}, 95/96-07/08},$$

where,

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

***“Given the strong recommendations from the SSC in June 2010, Tier 5 total-catch OFLs would change only if retained catch data and estimates of discarded catch for the period 1995/96–2007/08 or assumed values of bycatch mortality rates used in the 2010 SAFE were revised.”***

# No alternatives evaluated

**2010 SAFE:** “The team recommended a total catch OFL for the 2010/11 season because complete information on total catch is available for the period 1995/96-2007/08.”

**June 2010 SSC minutes:** “The CPT recommended, and the SSC agrees, that the base time period for estimation of the OFL should be changed to 1995/96 through 2007/08 (this time period will then be fixed) to allow the estimation of a total catch OFL.”

Table 7. Estimated annual weight (t) of total fishery mortality to Western Aleutian Islands red king crab, 1995/96–2022/23, partitioned by source of mortality: retained catch, estimated bycatch mortality during crab fisheries, and estimated bycatch mortality during groundfish fisheries.

| Crab fishing year     | Retained Catch | Bycatch Mortality<br>by Fishery Type |            | Total Estimated<br>Fishery mortality |
|-----------------------|----------------|--------------------------------------|------------|--------------------------------------|
|                       |                | Crab                                 | Groundfish |                                      |
| 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 <sup>a</sup>  | 2.68           | 0.70                                 | 18.82      | 22.20                                |
| 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      | 95.87                                |
| 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                                 | 1.39       | 1.47                                 |
| 2010/11               | 0.00           | 0.41                                 | 0.49       | 0.90                                 |
| 2011/12               | 0.00           | 0.10                                 | 0.59       | 0.68                                 |
| 2012/13               | 0.00           | 0.09                                 | 0.06       | 0.15                                 |
| 2013/14               | 0.00           | 0.29                                 | 0.04       | 0.33                                 |
| 2014/15               | 0.00           | 0.06                                 | 0.09       | 0.15                                 |
| 2015/16               | 0.00           | 0.00                                 | 1.19       | 1.19                                 |
| 2016/17               | 0.00           | 0.05                                 | 0.24       | 0.28                                 |
| 2017/18               | 0.00           | 0.20                                 | 0.63       | 0.83                                 |
| 2018/19               | 0.00           | 0.01                                 | 0.66       | 0.66                                 |
| 2019/20               | 0.00           | 0.01                                 | 0.75       | 0.75                                 |
| 2020/21               | 0.00           | 0.06                                 | 0.28       | 0.34                                 |
| 2021/22               | 0.00           | 0.00                                 | 0.07       | 0.07                                 |
| 2022/23               | 0.00           | 0.02                                 | 0.01       | 0.04                                 |
| 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, 1995/96–2022/23 | 20.41          | 0.68                                 | 5.49       | 26.59                                |
| CV of mean            | 0.55           | 0.38                                 | 0.28       | 0.46                                 |

**Bycatch mortality rates:**

Crab pot: 0.2

GF fixed: 0.5

GF trawl: 0.8

# Author Recommended ABC

- Status Quo: 14 t (30,967 lb)
  - 75% buffer on OFL
- Allows some room for exploratory survey/fishery
- 2015 Adak and 2016 Petrel Bank surveys indicate low population abundance:

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|                        | 2015 Adak |      | 2016 Petrel Bank |      |
|------------------------|-----------|------|------------------|------|
| Pot lifts              | 730       | CPUE | 362              | CPUE |
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