8. Aleutian Islands Golden King Crab

Fishery information relative to OFL setting

During the 2025/26 fishery, the estimated retained catch was 1,943 kt (4.3 million lb), while the estimated total catch mortality was 2.341 kt (5.2 million lb). At the time of the 2025/26 assessment, the groundfish fisheries had not been completed, so the total catch mortality was an estimate. Total mortality will be updated in September 2026.

Data and assessment methodology

The assessment for AI golden king crab establishes a single OFL and ABC for the whole stock. However, separate models are evaluated for the EAG and the WAG owing to, *inter alia,* different abundance trends in each area. A Tier 3 modeling framework for AI golden king crab based on fisheries-only data was developed over several years starting in 2011, with model assumptions and data inputs refined by reviews by the SSC and CPT. This modeling framework was recommended for the assessment by the CPT in September 2016 and approved by the SSC in October 2016. The CPT endorsed, and the SSC subsequently approved, the GMACS model for this stock during January 2023, and GMACS has formed the basis for stock assessments for this stock since the 2023 assessment.

The stock assessment involves fitting a male-only population dynamics model to data on catches and discards in the directed fishery, discards in the groundfish fishery, standardized indices of abundance based on observer and fish ticket data, size-composition data for the directed fishery (landings and total catch), and mark-recapture data. Some of the catch and size-composition data were revised for the 2026 assessment and new data for the most recent year added. The groundfish fisheries in both areas were still operating when the assessment was conducted, but the difference in total catch mortality from that in the assessment is likely to be low.

The assessment author examined four models for the EAG and WAG this assessment cycle. Model 23.1c was the 2025 assessment model with updated catch and size-composition time series and a CPUE index based on fitting GAMs. This model started in 1960 in an equilibrium state, included three catchability periods, knife-edge male maturity size at 116 mm CL, M set to 0.22 yr^{-1}, and a fixed period (1987–2022; updated from 1987-2021 for the 2024/25 assessment) for recruitment for reference points calculation. Model 26.0 was model 23.1c with the CPUE index based on a spatiotemporal index standardization approach, model 26.0a was model 26.0 with non-equilibrium initial (1981) conditions and equal emphasis on all catch likelihood components, and model 26.1 was model 26.0a with subdistrict-specific time-blocks for selectivity for the directed pot fishery. The aim of model 26.1 was to remove the retrospective pattern evident for the EAG in previous assessments.

The four models for the EAG fitted the catch and size-composition data well. However, models 23.1c, 26.0, and 26.0a all fitted the CPUE index data poorly, leading to large values for Mohn's rho (i.e., evidence for retrospective pattern). Model 26.1 fitted the CPUE index data better and had a lesser retrospective pattern.

For the WAG, the four models fitted all data sources adequately. However, a jitter analysis suggested that the models considered in the assessment report for the provision of advice were not those corresponding to the maximum likelihood estimates. However, the "best" models for the WAG corresponded to unrealistic values for bycatch in the groundfish fishery in 1996 so the CPT used the models included in the assessment report to recommend OFLs.

The author-preferred model was 26.0a for both areas. This model makes use of the spatiotemporal model approach to standardizing the catch and effort data, which is a more flexible way to develop an index for

use in the assessment. In addition, the model starts in 1981 which is closer to when index and size-composition data first become available. The CPT agreed with the author on the model for the 2026 assessment. In not selecting model 26.1, which included multiple time blocks, the CPT noted that it appeared that this model was selecting selectivity patterns to better fit the CPUE index rather than the size-composition data. The 2026 assessment provided the relationship between fishing mortality rate and stock status, and fishing mortality for both stocks for the 2024/25 fishing year is estimated to have been below that expected under the Tier 3 harvest control rule. This has not been the case in recent years for the WAG.

Stock biomass and recruitment trends

Estimated mature male biomass (MMB) for the EAG decreased from the 1980s to the 1990s, then increased during the 2000s, decreased marginally during the early 2010s, increased from 2014 to 2022 and declined from 2023. Estimated MMB for the WAG decreased substantially during the late 1980s and 1990s, increased somewhat during the 2000s, decreased for several years after 2008 and declined steadily to a low in 2021 and has increased since. Recruitment to the EAG has declined from a high in 2017 to low but stable recruitment since 2020. Recruitment to the WAG has declined slowly since 1985, although 2022 and 2025 recruitment are the highest since 2014. The 2025 recruitment remains uncertain as it is still relatively poorly selected by the fishery.

Summary of major changes

The assessment model recommended by the CPT, Model 26.0a, is identical to the model used in the previous assessment, except that it makes use of a CPUE index based on a spatiotemporal method for index standardization instead of a GAM, and starts the model later than was the case for the 2025 assessment.

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

The CPT recommends that this stock be managed as a Tier 3 stock in 2026/27. A single OFL and ABC is defined for AIGKC. However, separate models are available by area. During its May 2017 meeting, the CPT recommended that stock status be determined by adding the area-specific estimates of current MMB and B_{MSY} to ensure that there would only be one stock status for the AIGKC stock. The 2026 assessment computed F_{OFL} based on the area-combined MMB estimates. This differs from the approach taken in 2025 and earlier assessments when area-specific stock status was used to determine the ratio of F_{OFL} to $F_{35\%}$ by area, which was then used to calculate the OFLs by area, which were then summed to calculate an OFL for the entire stock. The CPT recommends that the B_{MSY} proxy for the Tier 3 harvest control rule be based on the average recruitment from 1987-2022, years for which recruitment estimates are relatively precise.

This is the only crab assessment that relies solely on fishery CPUE as an index of abundance. The CPUE index standardization process, subject to past CPT and SSC review, is a key reason for the 25% buffer between the OFL and the ABC used in past years. A risk table following the format and process identified during the May 2026 CPT meeting has yet to be created so the advice on the buffer between the OFL and ABC is based on the approach used in 2025 and earlier. The concerns raised in recent assessments are summarized in the following table:

Concern	Year expressed	CPT 2026 concern?	Reason
Only crab assessment that relies entirely on fishery CPUE as an index of abundance	2020	Yes	No change.
Uncertainty in natural mortality	2020	Yes	No change.
The limited spatial coverage of the fishery with respect to the total stock distribution	2020	Yes	No change.
The small number of vessels on which CPUE is based	2020	Yes	No change.
Retrospective pattern for the EAG	2020	Yes	No change
CPUE standardization is still subject to some methodological concerns	2020	No	The CPT is satisfied with the new spatiotemporal approach to index standardization
Catches from the directed fishery that were not included in the assessment	2021	No	Only the bycatch in the groundfish fishery was not finalized for the 2026 assessment
Model convergence concerns (jitter analysis resulted in implausible MLE)	2026	Yes	The best fit model for the WAG had an unrealistic estimate of 1996 bycatch in the groundfish fishery so the assessment is based on the 2nd best model according to model fit.
Model does not fit the trend in the index for the EAG.	2024	Yes	The fit to the standardized CPUE index for the EAG remains poor – the retrospective pattern observed for the EAG is likely related to this poor fit.
Abundance trend in the WAG	2025	Yes	CPUE improved in 2025, but multiple years of improvement are necessary to relieve concerns.

In 2022/23, the CPT recommended, and the SSC concurred with, a buffer of 25%. For 2023/24 to 2026/27, the CPT found that several previously expressed concerns continued to exist, the principal one being the retrospective patterns for the recommended EAG model. Thus, the CPT recommends continuing to use a 25% buffer on the OFL for the ABC.

Status and catch specifications (1000 t) for Aleutian Islands golden king crab. Shaded values are new estimates or projections based on the current assessment. Other table entries are based on historical assessments and are not updated except for total and retained catch.

Year	MSST	Biomass (MMB)	TAC	Retained Catch	Total Catch	OFL	ABC
2022/23	5.832	13.600	2.291	2.369	2.612	3.761	2.821
2023/24	5.772	12.716	2.508	2.578	2.765	4.182	3.137
2024/25	5.632	11.087	2.214	2.287	2.426	3.725	2.794
2025/26	5.579	10.858	1.901	1.943	TBA[a]	3.166	2.374
2026/27		10.670				3.493	2.620

Status and catch specifications (million lb) for Aleutian Islands golden king crab. Shaded values are new estimates or projections based on the current assessment. Other table entries are based on historical assessments and are not updated except for total and retained catch.

Year	MSST	Biomass (MMB)	TAC	Retained Catch	Total Catch	OFL	ABC
2022/23	12.857	29.983	5.051	5.223	5.758	8.292	6.219
2023/24	12.725	28.034	5.530	5.684	6.096	9.220	6.916
2024/25	12.417	24.443	4.881	5.042	5.348	8.212	6.159
2025/26	12.300	23.938	4.191	4.284	TBA[a]	6.980	5.234
2026/27		23.523				7.701	5.776

[a] The groundfish bycatch fisheries were still being prosecuted when the 2026 assessment was conducted. At the time the assessment was conducted, the total catch was 2,341 kt (5.2 million lb).

For the 2025/26 season biomass (MMB) is above MSST therefore this stock is not overfished. The total fishery mortality for 2025/26 will be updated in September 2026, along with the overfishing status.