Draft SSC Report
October 2024

C1 BSAI crab

C1 BSAI Crab

General Crab Comments

- The SSC ***suggests*** guidance for interpreting jittering analyses
  - In a good jitter analysis, many models should fail to converge.
  - Models that fail to return are not appropriate for statistical inference
  - Uncertainty in management is most appropriately expressed by likelihood profiles on key quantities
- The SSC would like to see additional diagnostics for length composition data in GMACS and suggests coordination with groundfish authors regarding one-step-ahead and Pearson residuals.

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General Crab Comments

- The SSC ***suggests*** that the CPT consider whether distinguishing between full or update assessments could be useful for crab
    - Identifying assessments as updates with minimal changes may reduce review burden and lead to efficiencies for authors, the CPT and the SSC.

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Ecosystem Status Report Preview

- Bering Sea water temperature, sea ice extent, and cold pool extent were near the long-term averages..
- The SSC ***supports*** conclusions of no red flags, suggesting neutral or good conditions for both pelagic and benthic life stages of crab.
- The SSC ***notes*** that long-term declines in pH, with particularly low pH waters on the slope and northern outer shelf, may become a concern.
- The SSC ***notes*** that the SEBS continues a 10-year period of temperatures at or above the long-term mean.

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Trawl Survey Updates

- The SSC received a presentation on EBS bottom trawl survey results relevant to crab stocks
- The SSC ***continues*** to be impressed with the turnaround time of survey data and assessment models that incorporate these data
- Survey results continue to vary among stocks
  - There were generally positive trends for EBS snow and Tanner crab (increases from 2023 in multiple size-sex categories)
  - Other stocks declined or were steady compared to 2023

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Trawl Survey Updates

- With the continued depressed state of most crab stocks, the SSC ***continues to be concerned*** about the loss of data collection supporting BSAI crab stocks
  - For example, the loss of the high density corner stations and lack of NBS survey

C1 BSAI Crab Harvest Specifications

Stock	Tier	F_{OFL}	B_{MSY} or B_{MSY} proxy	2024/25 MMB	2024/25 MMB/ B_{MSY}	2024/25 OFL	2024/25 ABC	ABC Buffer
EBS snow crab	3b	25.07	191.81	96.77	0.50	**19.6**	**6.86**	**65%**
Bristol Bay red king crab	3b	0.33	18.69	15.43	0.83	5.02	4.02	20%
EBS Tanner crab	3a	1.23	40.01	56.06	1.40	41.29	33.03	20%
St. Matthew blue king crab	4b	0.11	2.93	1.53	0.52	0.129	0.097	25%

C1 BSAI Crab Harvest Specifications

Overfishing status

- For the four stocks with harvest specifications in Sep/Oct (EBS snow crab, BBRKC, EBS Tanner crab, SMBKC):
  - Catches for each stock were below the 2023/2024 OFL, and so **no crab stock was subject to overfishing.**
  - St. Matthew blue king crab remains overfished.
  - **None of the other stocks is overfished**, but snow crab remain under a rebuilding plan.

C1 BSAI Crab Harvest Specifications

EBS Snow Crab

- Full assessment, increasing stock trends across all sizes following the recent lowest levels of large male biomass in the time-series
- Tier 3b, projected to be at 50% of the B_{MSY} proxy
- The SSC ***recommends*** model 24.1a, differing from the Tier 4 model suggested by the author and 24.1b recommended by the PT
- 65% ABC buffer, larger than last year (50%)
  - Unresolved uncertainty in the reproductive contributions of small male crab, recent mortality event, very high fishing mortality rate on large crab, and potential for truncation of the size structure associated with $F_{35\%}$

C1 BSAI Crab Harvest Specifications

EBS Snow Crab

- The SSC strongly supports biological research to determine the reproductive role of small (<95 mm) male snow crab
- The SSC ***recommends*** additional work to:
  - Evaluate alternative F_{MSY} and B_{MSY} proxies reflecting the uncertainty in reproductive dynamics
  - Develop a Tier 4 fallback model that is similar to BBRKC and Tanner for use if the Tier 3 model fails
  - Evaluate estimated differences in male & female recruitment years
  - Use a geostatistical model to estimate trends including the NBS

C1 BSAI Crab Harvest Specifications

Tanner Crab

- Full assessment, only minor changes from from last year
- Increasing survey biomass trends, particularly in western area
- Recent, apparent cohorts did not materialize, but current survey shows promising signs of a strong, incoming cohort
- The SSC ***recommends*** using Model 22.03d5 for 2024/25 harvest specifications (as recommended by CPT)
- The SSC recommends 20% buffer between OFL and ABC, consistent with CPT and last year's buffer (same concerns)
- The SSC **supports** author and CPT recommendations to:
    - Prioritize transition to GMACS
    - Develop consistent approach for including BSFRF data

C1 BSAI Crab Harvest Specifications

Tanner Crab

- The SSC **supports** author and CPT recommendations to:
  - Prioritize transition to GMACS
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C1 BSAI Crab Harvest Specifications

Bristol Bay Red King Crab

- Full assessment, survey biomass remains low, no substantial recruitment in almost two decades
- Tier 3b, as estimated biomass is below the B_{MSY} proxy (83% of $B_{35\%}$)
- The SSC ***recommends*** model 24.0c, in agreement with authors and PT
- The SSC ***recommends*** a 20% buffer, consistent with CPT & author
  - Continuing retrospective bias (although improved)
  - Tight constraints on natural mortality and survey catchability
  - Lack of fit to BSFRF data

C1 BSAI Crab Harvest Specifications

Bristol Bay Red King Crab

- The SSC had additional ***recommendations***, including:
  - Technical suggestions to authors
  - Additional clarity in ESP, e.g.
    - discussion of how indices (e.g. skipper survey data) are relevant to the assessment or linked to stock dynamics
    - Break out some indices between pre- and post-Crab rationalization periods

C1 BSAI Crab Harvest Specifications

St. Matthew Blue King Crab

- Biennial schedule, full assessment
- Stock status is improving and is projected to be above MSST in 2024/25, remains in Tier 4b
- The SSC ***recommends*** Model 24.1 (retaining corner stations) and a 25% ABC buffer, in agreement with the author and CPT
    - Buffer same as last year: reduced concerns due to model improvement, but dropping corner stations in 2024 increased uncertainty
- The SSC ***recommends*** that the authors/survey group further evaluate the bias caused by removing corner stations

C1 BSAI Crab Harvest Specifications

Overfishing Status Updates

- The SSC received status updates on five other stocks
  - WAIRKC, PIGKC, AIGKC, PIBKC, and PIRKC
- Total catch mortality was below the 23/24 OFL, so no overfishing occurred
- PIBKC remains overfished
- PIRKC and AIGKC are not overfished
- WAIRKC and PIGKC are Tier 5, so no status determination can be made.

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Aleutian Islands Golden King Crab Model Runs

- The SSC ***recommends*** Models 23.1c and 25.0b for setting specification in May 2025, in agreement with author and CPT
- The SSC ***commends*** the author's responsiveness to prior CPT and SSC comments and considers the thorough and systematic model update and exploration to be exemplary
- The SSC ***supports*** the proposed future work outlined by the author and CPT.

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Norton Sound Red King Crab Model Runs

- The SSC ***recommends*** Models 21.0 and 24.0 be provided for specification setting in December, in agreement with CPT.
- The SSC ***commends*** the author on the successful implementation of the NSRKC model in GMACS and appreciates the substantial assistance provided by Tyler Jackson (ADF&G-Kodiak).
- The SSC ***supports*** the CPT recommendations to conduct retrospective and jittering analysis for Model 24.0, plot fits to the different trawl time series separately, and to use of the multiple directed fleets OFL calculations.

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Risk Tables Implementation

- The SSC ***commends*** the progress made to implement risk tables for BSAI crab stocks
- The SSC ***recommends*** increased communication with groundfish assessment authors, and consulting available resources (workshop report, SSC/GPT reports, Council motions) that may help the CPT develop their guidelines further
- However, the SSC ***acknowledges*** the implementation of risk tables for crab stocks may necessitate alternative approaches
- The SSC looks forward to more discussion following the May 2025 CPT meeting

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BSFRF Research Update

- The SSC ***appreciates*** the updates provided to the CPT on BSFRF research activities
    - BSFRF research provides information and direct inputs to multiple crab assessments
- The SSC notes BSFRF's multiple ongoing research projects, including:
    - Cooperative pot surveys and analysis
    - Pilot project on snow crab to improve understanding of male distribution and survey calibration efforts