NORTH PACIFIC FISHERY MANAGEMENT COUNCIL

BSAI Crab Plan Team
REPORT

November 5, 2024 Anchorage, AK

Virtual Meeting

Committee Members in attendance:

Katie Palof, **Co-Chair** (ADF&G-Juneau)   Ethan Nichols (ADF&G-Dutch Harbor)
Mike Litzow, **Co-Chair** (AFSC-Kodiak)   Ginny Eckert (UAF/CFOS-Juneau)
Anita Kroska, **Coordinator** (NPFMC)   Krista Milani (NMFS-Dutch Harbor)
Andrew Olson (NMFS-Juneau)   Tyler Jackson (ADF&G-Kodiak)
Brian Garber-Yonts (AFSC-Seattle)   William Bechtol (UAF-Homer)
Cody Szuwalski (AFSC-Seattle)   William Stockhausen (AFSC-Seattle)
Erin Fedewa (AFSC-Kodiak)   *Vacant, quantitative expert*

Members absent: Ben Daly (ADF&G-Kodiak), André Punt (Univ. of Washington)

NSRKC- final assessment, stock status, OFL/ABC

Hamachan Hamazaki presented the 2025 final assessment for Norton Sound red king crab, which sets harvest specifications for the 2025/26 season. Two models were brought forward. Model 21.0 was the 2024 accepted model, which will henceforth be referred to as the bespoke model. Model 24.0 is the GMACS implementation of model 21.0. Data had been updated for the draft assessment presented to the Plan Team in September 2024, so Hamachan focused on differences between model structure and requests from the CPT and SSC.

The main difference between the bespoke model and 24.0 is that fishing mortality (i.e., catch) is subtracted exactly in the bespoke model, whereas model 24.0 estimates fishing mortality as a rate, *F*. Hamachan noted that the fits to total catch during the winter subsistence fishery were poor and this dataset was ultimately removed from model 24.0, although it was included in the bespoke model. Catch during the winter subsistence fishery is typically very minor, and fits to retained winter subsistence catch are included in model 24.0. **Fits to catch data were not shown, but are requested for future assessments.**

Hamachan provided a detailed comparison of the annual structure of both models. The modeled year runs from Feb 1 to Jan 31. The winter commercial fishery occurs instantaneously on Feb 1, followed by a period of natural mortality until the summer fishery occurs. The bespoke model subtracts catch at the mid-point of the summer fishery, whereas model 24.0 estimates fishing mortality at the beginning of the summer fishery. The summer trawl surveys occur either during

or after the summer commercial fishery, depending on the year considered. Molting and growth occur immediately after summer fishery removals in both models, followed by another period of natural mortality until Jan 31.

Fits to trawl survey abundance (historical NMFS [1976-1991], current NMFS [2010-2023], ADF&G [1996-2023]) were similar between the models, with some differences in fit to 2020-2021 ADF&G trawl survey data. Estimated numbers at size were very similar in most years, although fits to size composition data were not shown. There was some discussion that a key difference between models was that the bespoke model fits size compositions for old and new shell crab separately, while model 24.0 aggregates across shell condition before computing the likelihood. Abundance and recruitment trajectories were also similar, with GMACS estimating a greater abundance since 2020 and lower recruitment in the last two seasons.

Hamachan conducted a jittering and retrospective analysis at the request of the CPT and SSC. A statistical summary of jittering results was presented as a table. Hamachan noted that most jitter runs converged at the MLE, but those that did not converged on a large range of values. **The CPT requested that jitter results be presented as plots during the next cycle, following guidance for all assessments to be discussed at the January modeling workshop.** Model 24.0 had greater retrospective bias than the bespoke model, but there was not clear evidence as to a potential reason other than differences in model structure. It was noted that this retrospective analysis evaluated the projection year for both the bespoke model and 24.0, which may be more aptly interpreted as a one step ahead residual analysis. All other BSAI crab assessments evaluate retrospective bias without including the projection year.

Biological reference points were similar between the two models, although slightly greater for model 24.0. Since the issue with computing Tier 4 F_{OFL} using multiple directed fleets has not yet been resolved in GMACS, Hamachan used the model-estimated MMB and BMSYproxy to compute the OFL outside of the model, as is done in the bespoke model. **The CPT recommends using model 24.0 (the GMACS model) for harvest specifications.** The recommended OFL based on model 24.0 was 0.63 t. The CPT discussed buffer considerations but did not see any compelling reasons to depart from the existing ABC buffer of 30%, thus the recommended ABC is 0.44 t. Specific reasoning for the 30% ABC buffer are detailed in the Jan 2024 CPT minutes.

Lastly, the CPT noted that this was Hamachan's last NSRKC assessment. The CPT congratulated Hamachan on his new position at ADF&G and commended him on his work with NSKRC and his contributions to BSAI crab assessments over many years. The NSRKC assessment will be prepared by a new author during the next cycle.

January modeling workshop reminders

CPT members discussed topics for the Jan modeling workshop. This meeting will be hybrid and open to the public but is not a CPT meeting. Therefore, topics discussed at this meeting are considered to be part of the modeling process and will be vetted by the entire CPT when topics are incorporated into models or at the next official CPT meeting (May) if CPT review is needed.

January modeling workshop (Tue. Jan 14 and Wed. Jan 15 - 9am to 5pm)

- VAST sdmTMB comparison for constructing model-based indices of survey data (1.5 hrs)
- Guidelines for diagnostics and plotting for jitter run results and MCMC (~ 0.5 hr)
- BSFRF SBS selectivity (Buck) (1 hr)
- Snow crab topics (Cody) (1 hr)
- CPUE feedback (Tyler) (0.5 hr)
- AKFIN data access (TBD)
- Survey data length-weight regression (TBD if time allows)
- Variable spatial footprint for producing biomass estimates (TBD survey group)
- Catch time series (Tyler -update)
- GMACS (total 2-3 hrs ?)
  - Coding updates and model developments – ongoing and needed (update task list)
  - NSRKC OFL calcs
  - Simulations
  - Version control review
  - GMACS and RTMB

New business

Upcoming CPT meeting dates and locations:
- Jan 14 - 15, 2025: modeling workshop, no CPT meeting, Anchorage, AK (NPFMC office)
- May 12 - 16, 2025: Kodiak
- Sep 8 - 12, 2025: Seattle, WA (AFSC)

Others in attendance: *indicates presenter*

Toshihide "Hamachan" Hamazaki*   Caitlin Stern
Kendall Henry   Diana Stram
Wes Jones
Zach Liller
Danielle Merculief
Harrison Moore
pflandback
Keeley Rielly