C2 BSAI CRAB STOCKS

KATIE PALOF & MIKE LITZOW (CPT CO-CHAIRS)

JUNE 2025 NPFMC MEETING

CPT MEETING MINUTES – MAY 12TH – 15TH VIRTUAL

BSAI CRAB STOCKS MANAGEMENT TIMING

Aleutian Islands golden king crab
Pribilof Islands golden king crab *
Western Aleutian Islands(Adak) red king crab *

→ Assessed in May/June

→ Triennial cycle, next assessment in 2026

EBS snow crab
Bristol Bay red king crab
EBS Tanner crab
Pribilof Islands blue king crab *
Pribilof Islands red king crab *
St. Matthew blue king crab *

→ Biennial cycle, next assessment in 2025

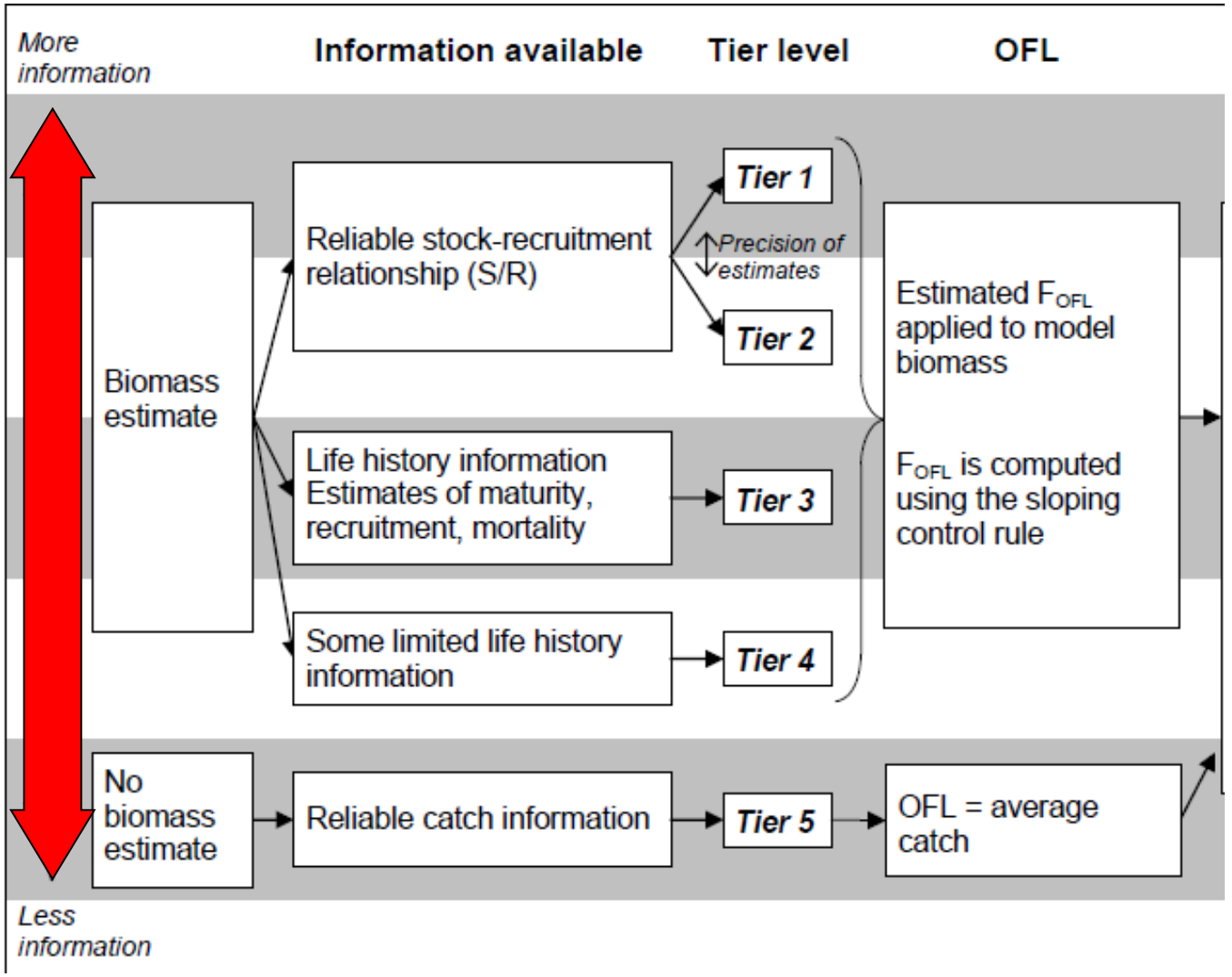
→ Assessed in September/ October

→ Triennial cycle, next assessment in 2025

→ Biennial cycle, next assessment in 2026

Norton Sound red king crab

→ Nov (virtual) / Dec council



ABC buffer:

Determined based on stock information available and uncertainties not incorporated in the assessment model.

MAY 2025 AGENDA

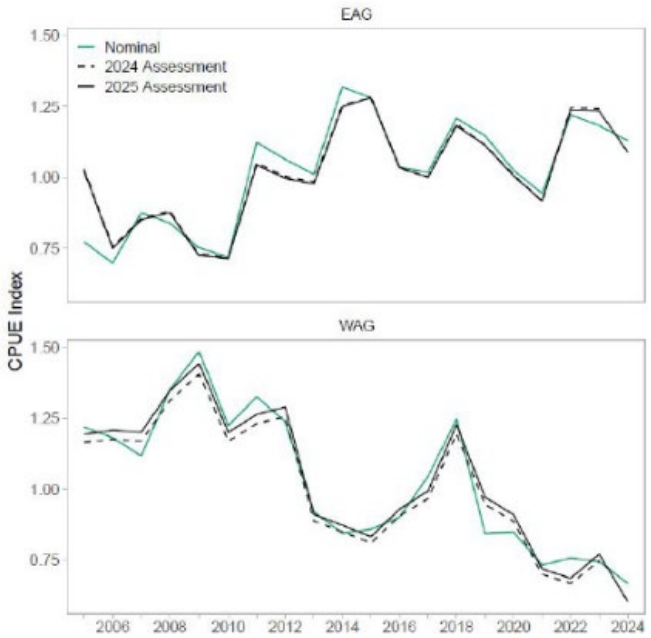
- ✓ **AIGKC final assessment, OFL and ABC**
- ✓ Proposed model runs: Snow crab, Tanner crab, BBRKC, NSRKC, PIBKC, PIRKC
- ✓ Balance of CPT report:
  - ✓ ESP updates
  - ✓ Risk table progress
- ✓ SSC comment responses (jittering and MCMC diagnostics)
- ✓ Model based indices updates
- ✓ Survey data processing updates
- ✓ BSFRF research updates
- ✓ Council topic updates & climate readiness/planning updates
- ✓ Survey modernization updates (April SSC summary)

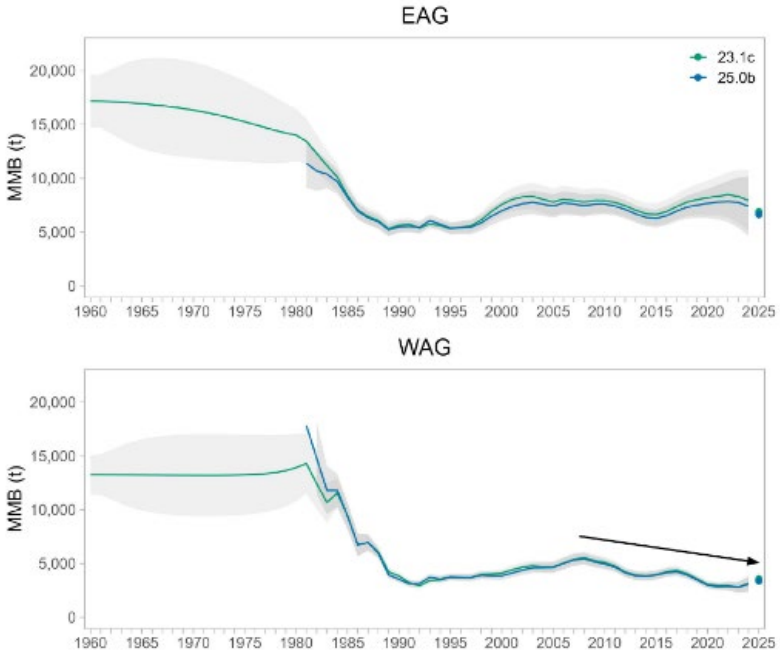
ALEUTIAN ISLAND GOLDEN KING CRAB (AIGKC)

FINAL SAFE, OFL / ABC 2025

AIGKC MODELS

- No large changes in data or CPUE standardization from 2024 final assessment
- Data updated to include most recent season
- Model options:
  - 23.1c (base model from 2024)
  - 25.0b (change to model initialization)
- Similar model fit and estimates





CPT RECOMMENDATIONS

- Model 23.1c for both areas
- 25% ABC buffer consistent with 2024 assessment
  - Risk table draft provided – Appendix C – (Assessment level 1, Pop Dy level 2, Ecosystem level 1, Fishery performance level 2)
  - Level of uncertainty similar to last few years
- WAG – stakeholder concerns on gear overlaps and interactions
- Future work:
  - Revisit size-at-maturity analysis by area
  - Spatiotemporal CPUE std (Appendix B)
  - Risk table collaborations with ESR group
  - EAG cooperative survey inclusion into model

Reference Points

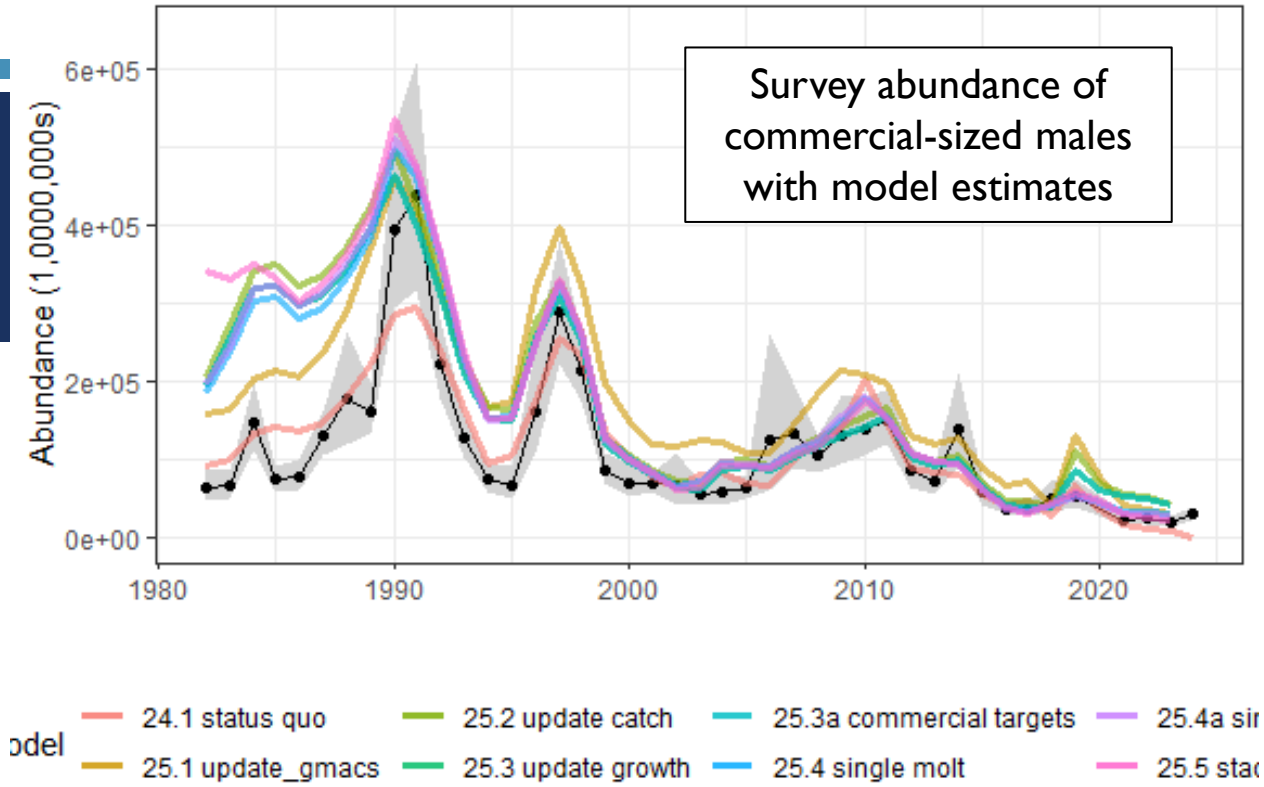
Subdistrict	Model	MMB (t)	$B_{35\%}$ (t)	Status	*R '87-'21*	$F_{35\%}$	F_{OFL}	OFL (t)
EAG →	23.1c	6,906	6,734	1.03	2,691	0.52	0.52	2,401
	25.0b	6,633	6,641	1.00	2,639	0.52	0.52	2,223
WAG →	23.1c	3,570	4,530	0.79	1,817	0.51	0.39	765
	25.0b	3,366	4,525	0.74	1,805	0.53	0.38	702

Combined OFL = 3,166 t (6.98 mil lb)

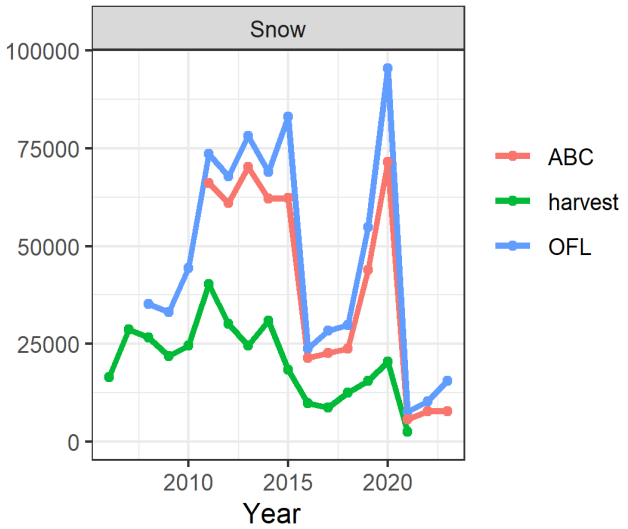
ABC (25% buffer) = 2,374 t (5.234 mil lb)

SNOW CRAB PROPOSED MODELS - CONTEXT

- Commercial-sized males at all-time lows for the past 8 survey years
- F_{OFL} with morphometric maturity (status quo) allows taking of all commercial-sized males
- State TAC averages 43% of ABC (2011-2021), so federal rules do not currently constrain harvest
- In spite of conservative state management for morphometric males, abundance of large males continues to decline



OFL / ABC / TAC (harvest) history



SNOW CRAB - CURRENCY OF MANAGEMENT

Morphometric maturity

- Reference points allow removal of all large males
- Maximin analysis indicates B_{MSY} proxy cannot be reached
- OFL will not be constraining
- Does not address declining abundance of large males

Large males (e.g., > 95 mm carapace width)

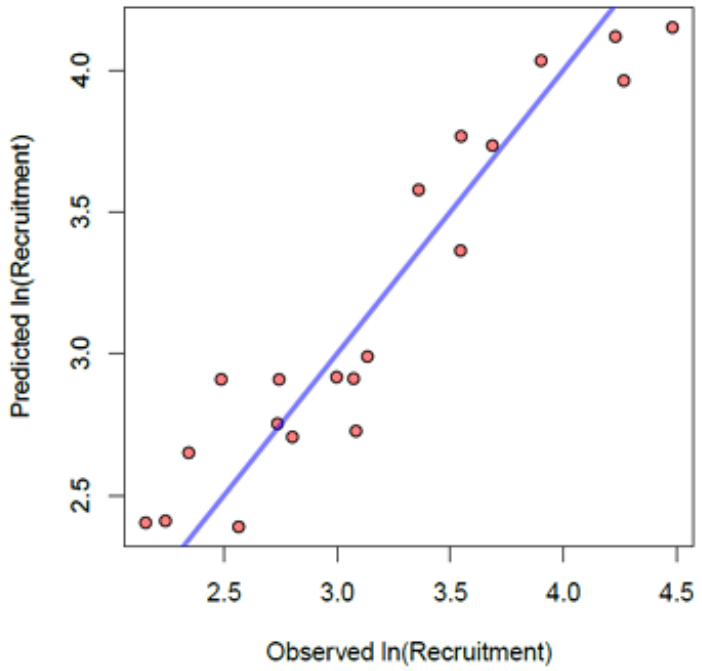
- Aligns currency with vulnerability to the fishery
- Addresses issue of declining large male abundance
- Potential choke species at the federal level
- Potential conflicts with the state rule, which uses morphometric maturity

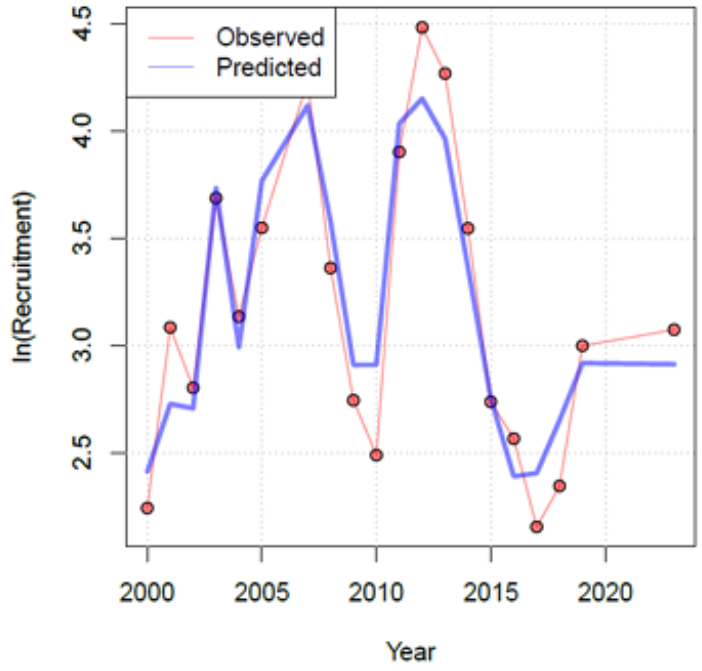
SNOW CRAB - CPT RECOMMENDATIONS

- Author & CPT recommendation:
  - **Model 25.3:** updated GMACs version, updated catch and growth data, morphometrically mature biomass as currency of management
  - **Model 25.3a:** model 25.3, functional maturity proxy (> 95 mm carapace width biomass) as currency of management
- SSC recommendation:
  - Bring forward **model 25.3** only (status quo morphometric currency)

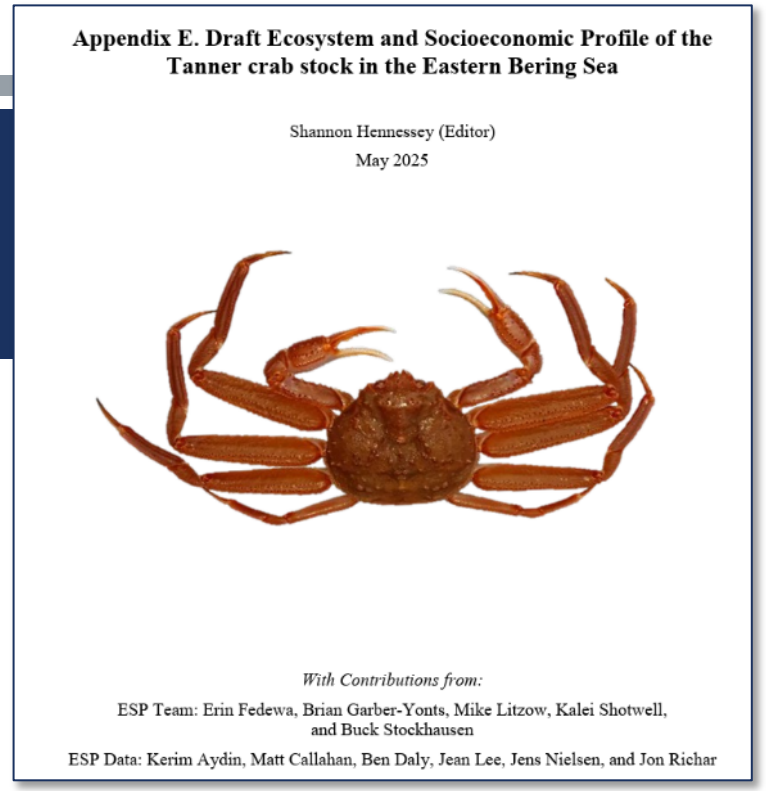
TANNER CRAB PROPOSED MODELS - DRAFT ECOSYSTEM AND SOCIOECONOMIC PROFILE

- Draft ESP in May; Full ESP in September





The model explained a large amount of variation in “pre-recruits” (70-85mm males) from survey estimates



Appendix E. Draft Ecosystem and Socioeconomic Profile of the Tanner crab stock in the Eastern Bering Sea

Shannon Hennessey (Editor)

May 2025

With Contributions from:

ESP Team: Erin Fedewa, Brian Garber-Yonts, Mike Litzow, Kalei Shotwell, and Buck Stockhausen

ESP Data: Kerim Aydin, Matt Callahan, Ben Daly, Jean Lee, Jens Nielsen, and Jon Richar

TANNER CRAB PROPOSED MODEL RUNS

Models presented

- 22.03d5 - base model in custom modeling framework

Additional research models in custom modeling framework

- 25.01- eliminates tail compression for size composition
- 25.01a - uses arithmetic rather than lognormal errors for survey biomass
- 25.02 - uses side-by-side derived catchability curves for NMFS survey

- 25.05 GMACS model (universal modeling framework for crab assessments)

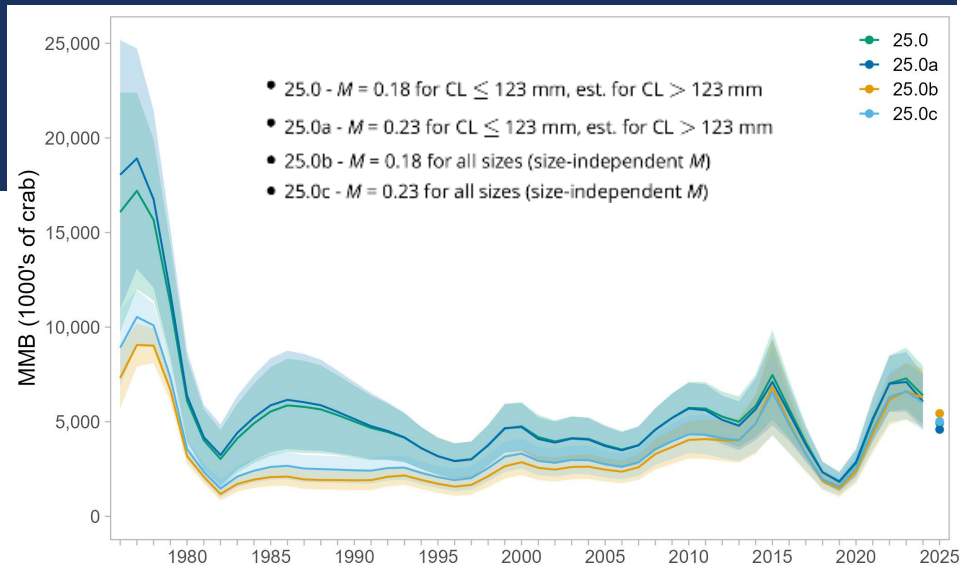
CPT recommendation

- Bring forward only **22.03d5** and **25.05** in order to concentrate effort on completing the GMACS transition

BBRKC PROPOSED MODEL WORK

- Directed fishery was open in 2023/24 & 2024/25 after being closed for 2 seasons (2021/22, 2022/23) due to low mature female abundance
- Low recruitment in recent years (last 10 -15 years) still concerning
- Model explorations around a few themes:
  - Housekeeping updates: GMACS version, updated catch data time series (ADF&G), input file cleanup, fixed gear handling mortality sensitivity
  - Selectivity estimation using BSFRF data as a prior for NMFS survey
- CPT recommendations:
  - Model 24.0c.2 – base model with data updates and GMACS versions
  - Tier 4 fallback option
- CPT / SSC made recommendations on future work that includes revisiting size bins, growth assumptions, and survey selectivity

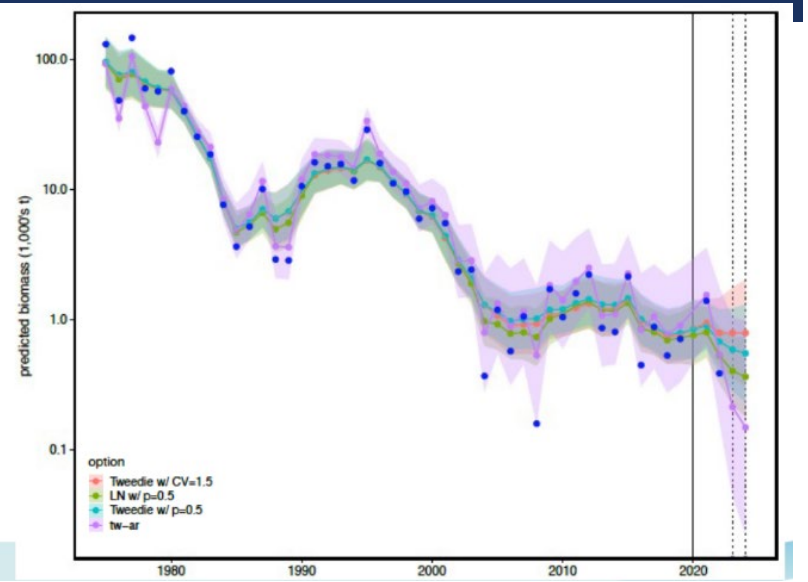
NSRKC PROPOSED MODEL WORK



- New assessment authors
- Authors provided feedback to SSC / CPT comments
  - Transition to GMACS adjustments (ensuring model convergence at MLE)
  - Long-standing issues:
    - Use of shell condition in model
    - Over-estimation of large males, size-dependent M
      - Models explored size-independent and size dependent with two levels of base M (0.18 – historic and 0.23 – BBRKC estimate)
    - Inconsistencies in area used to calculate abundance among trawl surveys –model-based indices exploration
- Proposed models include: GMACS model updates, shell condition, natural mortality (M), model-based indices
- CPT recommendations:
  - 24.0b (reviewing parameter space for F values and ensuring model is at the MLE)
  - 25.0a (no shell condition, M fixed at 0.23 for males <123 CL, and estimated for larger males)

PIBKC PROPOSED MODELS

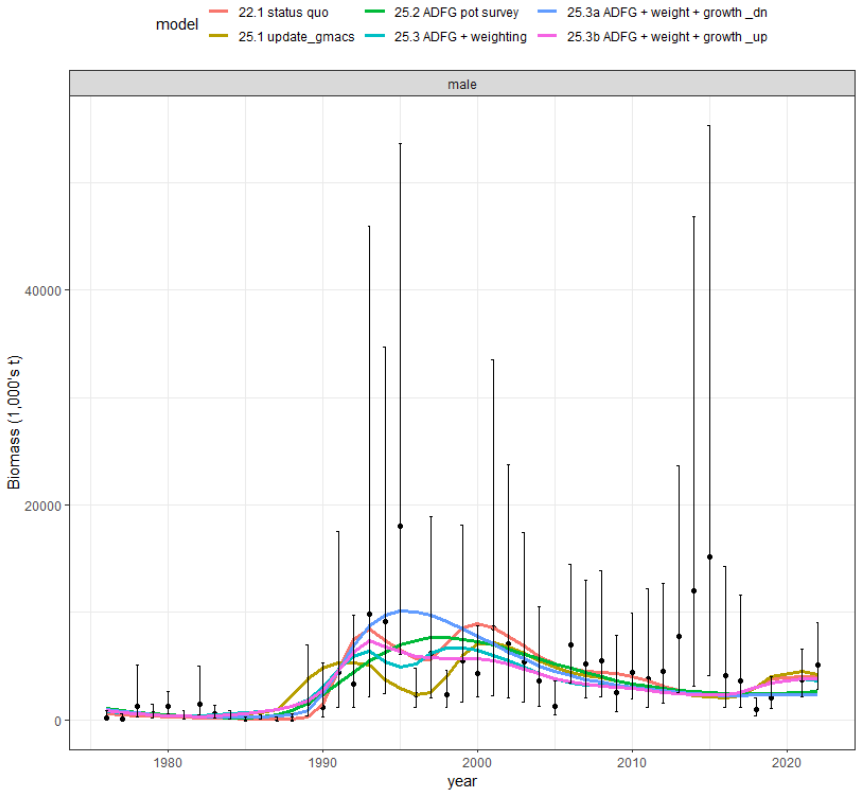
- Biennial assessment cycle, will begin a four-year cycle after 2025
- Currently under a rebuilding plan with Tier 5 average bycatch mortalities for the OFL, Tier 4 model used to determine stock status
- SSC/CPT comments:
  - Loss of "corner" stations (large differences in annual estimates and variability without the "corners")
  - Dealing with survey MMB time series 0's : explorations using *rema* and *sdmTMB*
- CPT recommended using sdmTMB and the "tw-ar" model for September
  - Use of spatiotemporal model to estimate MMB across space and time preferrable to arbitrary *rema* approaches
  - Improved diagnostics for PIBKC (see model-based indices agenda item in May 2025)



PIRKC PROPOSED MODELS

- Triennial assessment, Tier 4 in GMACS framework, most of life history information borrowed from BBRKC
- Currently no open fishery due to concern for PIBKC bycatch
- SSC/CPT comments:
  - Existing growth data review from BBRKC, data used as a prior in assessment
  - Standard deviation of growth estimate compared to tagging data for BBRKC
  - Add 4 years of ADF&G pot survey to model (2003, 2005, 2008, 2011)
- CPT recommended bringing forward models
  - 25.1 – updated base model with current version of GMACS
  - 25.3 – includes ADF&G pot data with weighting

Model fits to the observed mature male biomass at survey.



BALANCE OF CPT REPORT

ECOSYSTEM AND SOCIOECONOMIC PROFILES

General CPT recommendations

- Evaluate the evidence for proposed driver-response relationships for crab productivity and recruitment
  - Highlight the relationships supported by data when considering ABC buffer decisions
  - De-emphasize proposed relationships that are not supported by data
- Also consider contextual indicators
  - Indicators without a proposed quantitative link to recruitment that might also be important for understanding health of the stock or fishery
  - Examples include snow crab clutch fullness, Northern District : Bristol Bay District abundance ratios for RKC

RISK TABLES

CPT recommendation

- Risk tables should be conducted for all annual crab stock assessments (Snow crab, Tanner crab, BBRKC, NSRKC, and AIGKC)
- Risk tables will collect the information used to make ABC buffer decisions in a transparent, organized way
- The CPT will develop a summary table to track buffers, risk table scores/concerns, and justification for buffers. This table will also be used to ensure that risk table scoring and buffer considerations are consistent within a stock across years.

QUESTIONS?

- Thanks to all CPT members and crab assessment authors.