C1 BSAI CRAB STOCKS
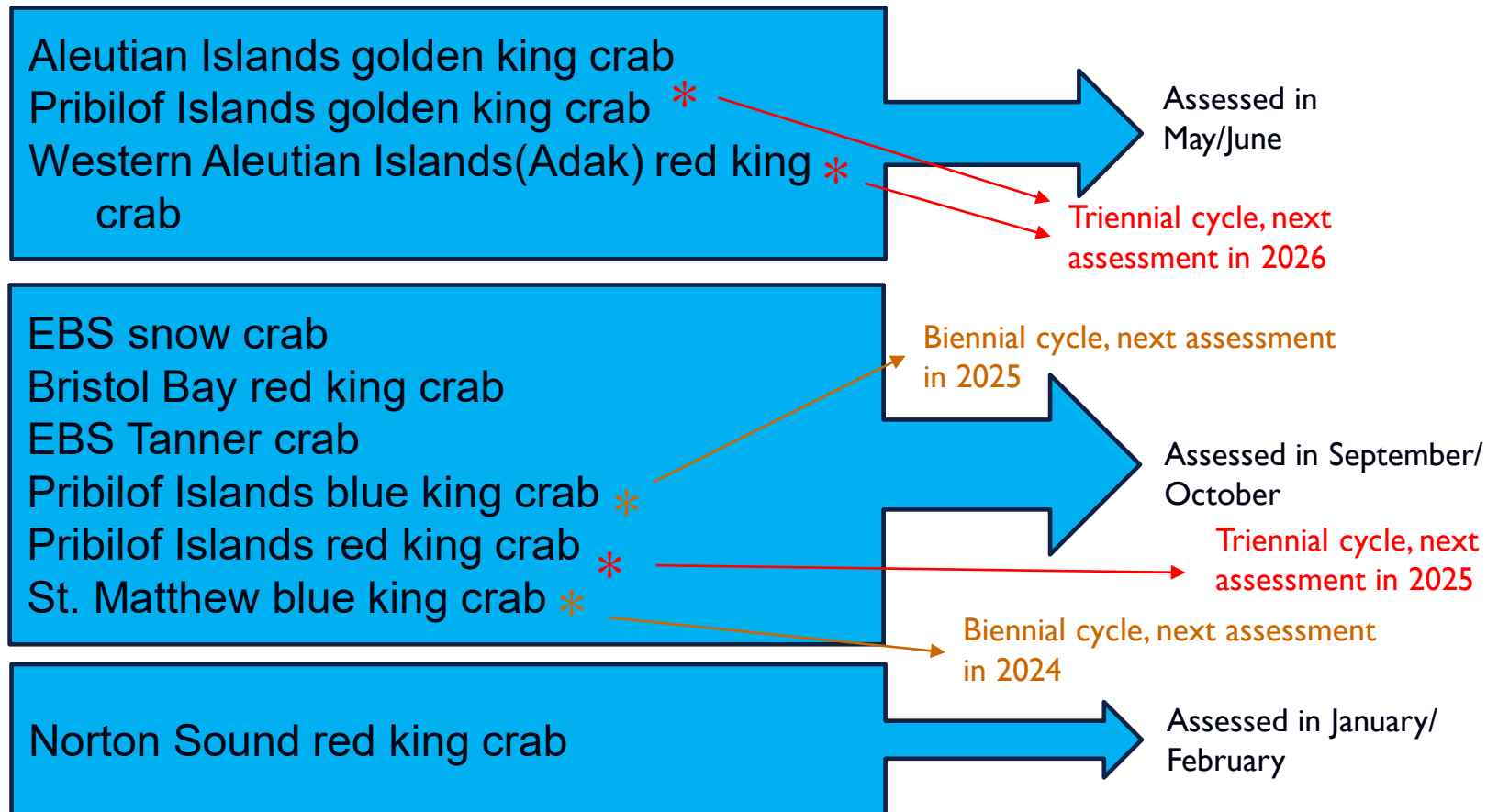
KATIE PALOF & MIKE LITZOW (CPT CO-CHAIRS)
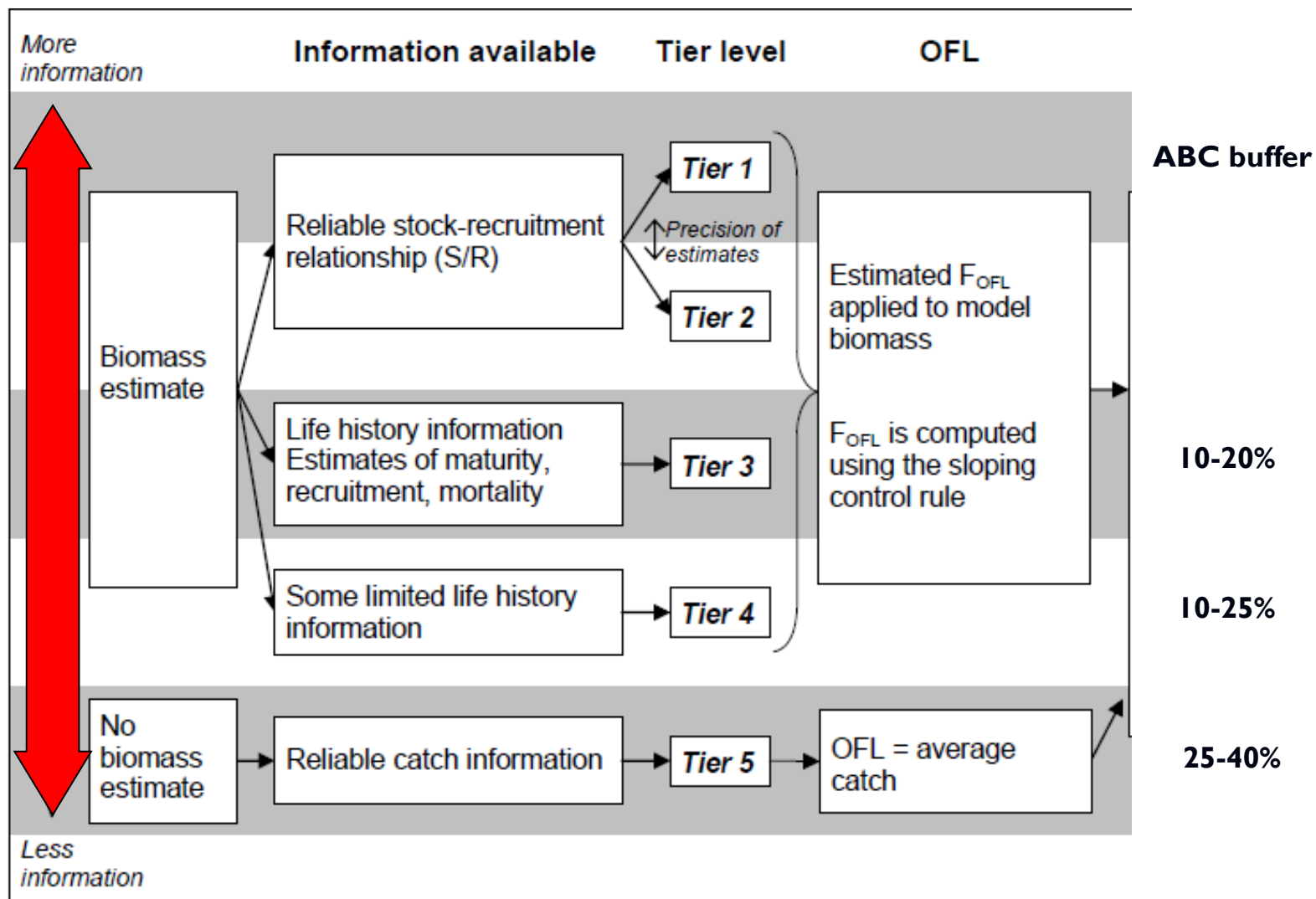
FEB 2024 NPFMC MEETING

CPT MEETING MINUTES – JAN 10TH – 12TH ANCHORAGE, AK

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 2024

Norton Sound red king crab

Assessed in January/ February

2

	Information available	Tier level	OFL	
More information				ABC buffer
Biomass estimate	Reliable stock-recruitment relationship (S/R)	Tier 1 ↑Precision of ↓estimates Tier 2	Estimated F_{OFL} applied to model biomass	
	Life history information Estimates of maturity, recruitment, mortality	Tier 3	F_{OFL} is computed using the sloping control rule	10-20%
	Some limited life history information	Tier 4		10-25%
No biomass estimate	Reliable catch information	Tier 5	OFL = average catch	25-40%
Less information				

3

JANUARY 2024 AGENDA

✓ **NSRKC final assessment, OFL and ABC**

✓ Proposed model runs: AIGKC

✓ Stock prioritization and council timing pertaining to crab assessment timing

✓ SSC general comments for crab stocks

✓ Research priorities (presented separately)

✓ UFMWG – presented in June

✓ Econ SAFE

✓ BSFRF update

✓ Currency of management discussion to guide May models

✓ Research updates (4 of them)

✓ ESP updates and planning / BBRKC skipper survey prelim results

✓ Modeling workshop (GMACS and follow up from spring 23 simpler modeling group)

NORTON SOUND RED KING CRAB (NSRKC)

FINAL ASSESSMENT 2024

NSRKC MODEL APPROACH

- Tier 4 stock (4a)

- Male-only assessment

- Seven size bins

- Fit to NMFS bottom trawl survey and ADF&G trawl survey in Norton Sound

- Separate fits to old-shell and new-shell crab

- Fishery harvests occur instantaneously:

  - Winter fishery: Feb 01: Nov – May

  - Summer fishery: July 01:   Jun – Sept

- Progress is occurring on GMACS version – modeling workshop progress

FISHERY & SURVEY DATA

Winter fishery 2023
- Commercial: 10,013 lbs
- Subsistence: 1,604 lbs

Summer commercial fishery 2023
- Retained catch 413,327 lbs
- Discard mortality: **18,866 lbs** (model estimate)
- Negligible bycatch in other fisheries

Total harvest: 0.444 million lbs < ABC (0.450 million lbs)
- No overfishing occurred in 2023

All data FINALIZED

ADF&G 2023 Summer trawl survey abundance
- 3.44 million (CV = 0.325)

NOAA 2023 NBS trawl survey abundance
- 1.74 million (CV = 0.379)

RESPONSES TO CPT-SSC (SEPT-OCT 2023)

Responses in italics

- Maps of survey coverage, information on # of stations and crabs sampled each year, comparison of current index with index using stations sampled each year -- *Requested information presented*

- Use of tagging data to inform *M* using Barefoot ecologist -- *Not suitable for crab life histories*

- Implementation of an observer program -- *Outside the scope of the assessment*

- Comparison of current survey index with VAST estimate -- *Done, CPT will revisit model-based estimates for all stocks at 2025 modeling workshop*

- Eliminating shell condition from model -- *CPT discussed, not moving forward*

- CPT noted that several requests have been repeated through the years, and in some cases these require research efforts beyond the scope of the assessment

- CPT recommends moving to GMACS as the leading priority for this model

# NSRKC MODEL OPTIONS AND RECOMMENDATIONS

Models considered:

- 21.0 -- Accepted model from 2021, fit to 2023 data
  - Assumed M = 0.18 for size class 1-6,
  - Estimated M (0.61) for carapace length > 123mm
- 23.0 -- Single value of M (0.41) estimated for all size classes
- 23.1 -- 23.0 + prior on M - *results dependent on choice of prior, detailed results not presented*
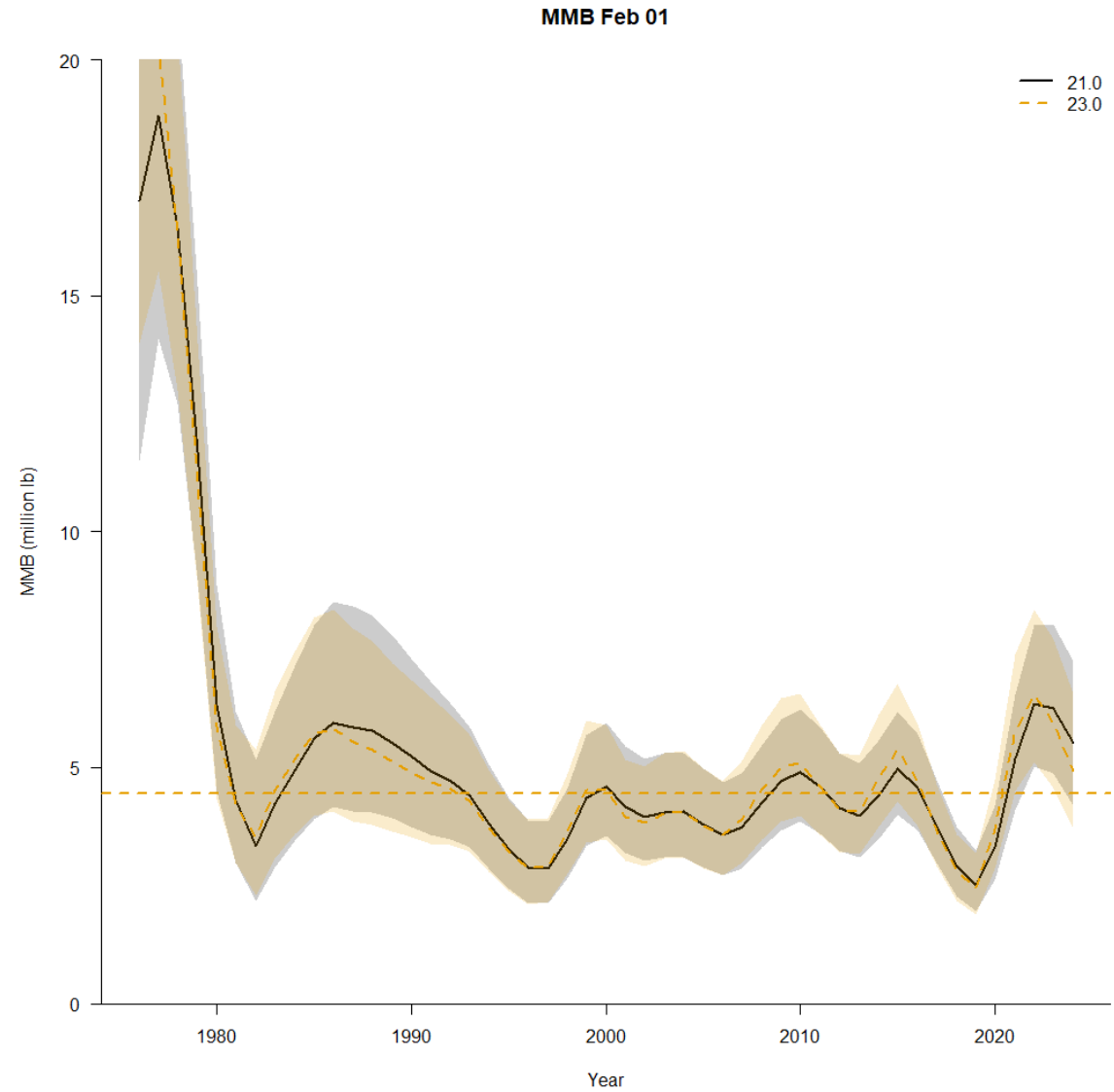
CPT recommendations:

- 21.0 fits data slightly better than 23.0
- 23.0 produces biologically unrealistic value of M across all size classes
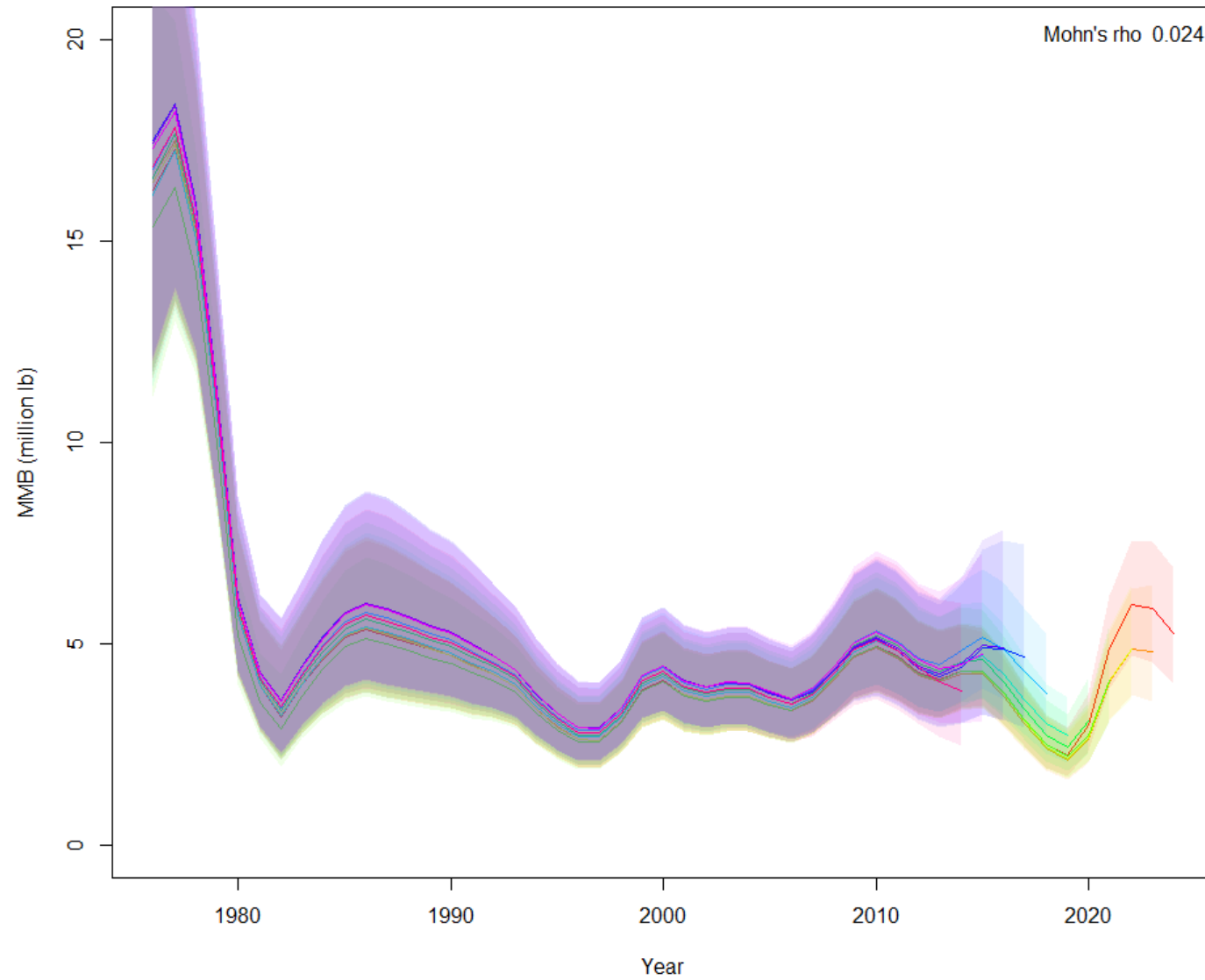- Retain 21.0 -- maintain consistency, no perceived benefit to a change
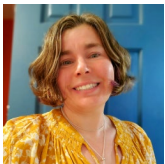
21.0 and 23.0: M, molting probability, selectivity, and retention probability
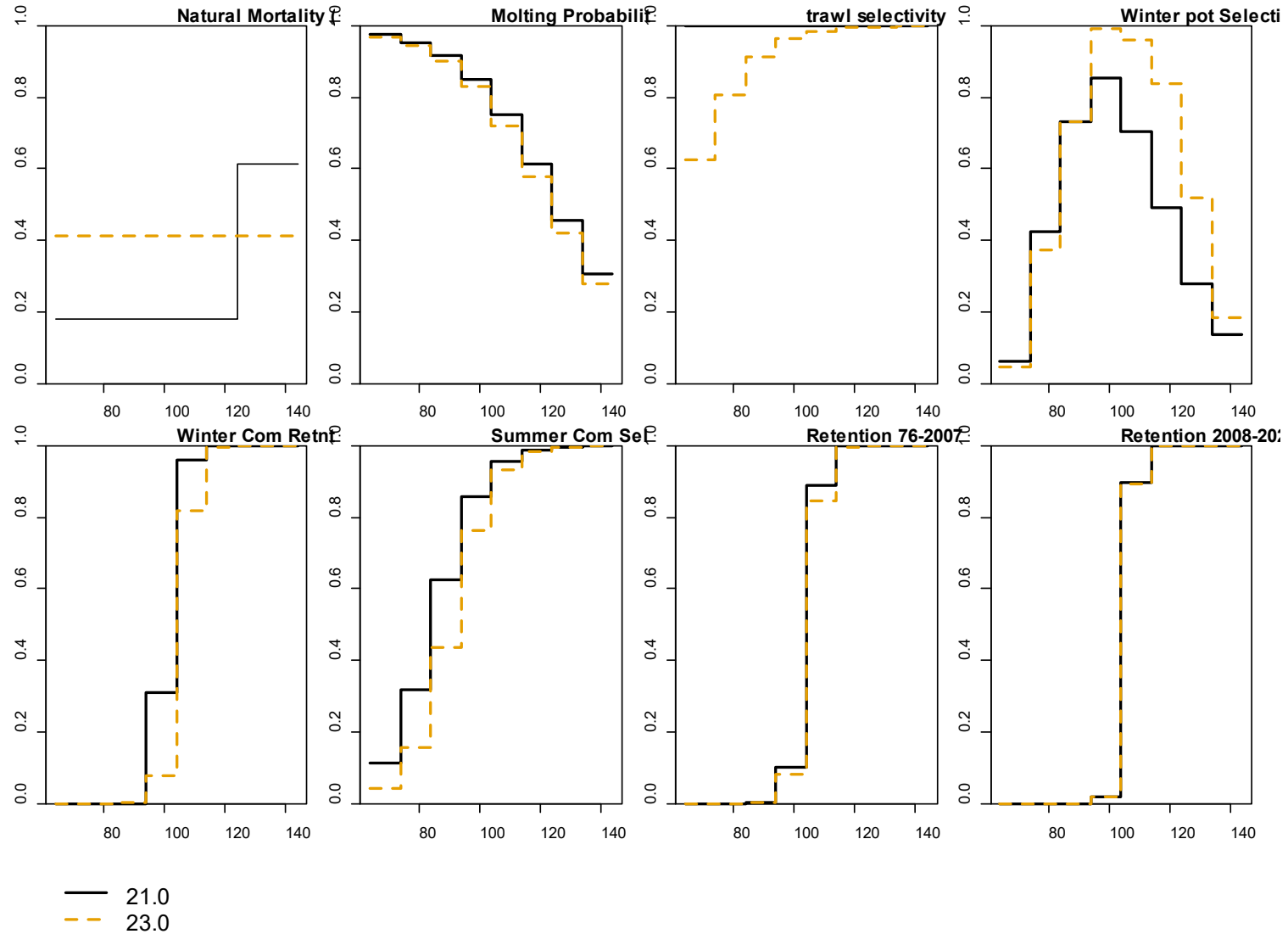
MMB: SIMILAR BETWEEN 21.0 AND 23.0

MMB Feb 01

Retrospective Analysis Model 21.0 Final

NSRKC: ABC RECOMMENDATIONS

- Author presented SSC-requested approach using long-term average F as the proxy for F_{OFL} instead of M

    - This approach produces buffer of 41%

    - CPT considered this approach more appropriate for setting TAC than setting ABC, since ABC is meant to account for scientific uncertainty

- CPT found considerations affecting uncertainty largely unchanged from 2023

- CPT recommends retaining 30% buffer

    - Consistent model choice and no large changes in uncertainty considerations
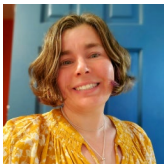
NSRKC FINAL OFL/ABC

Recommended OFL = 332 t, ABC = 233 t

Status and catch specifications (1000 t)

Year	MSST	Biomass (MMB)	GHL	Retained Catch Mortality[1]	Total Catch Mortality[2]	OFL[3]	ABC[3]
2019	1.03	1.41	0.07	0.04	0.04	0.11	0.09
2020	1.04	1.66	0.08	Conf.	Conf.	0.13	0.09
2021	1.03	2.27	0.14	0.003	0.003	0.29	0.16
2022	0.95	2.42	0.15	0.15	0.16	0.30	0.18
2023	1.20	2.40	0.18	0.19	0.20	0.310	0.220
2024	1.00	2.50				0.332	0.233

Notes:
[1]2019:2020: Refers to commercial fisheries only; 2021-2023: refers to all (commercial + subsistence) retained catch
[2]2019:2020: Do not include discard mortality (total retained catch only); 2021-2023 include estimated discard mortality
[3]OFL/ABC are total catch values in 2021-2024

ALEUTIAN ISLAND GOLDEN KING CRAB (AIGKC)

PROPOSED MODELS 2024

AIGKC EXPLORATIONS

- Author transition – first model explorations with new authorship (Tyler Jackson)

- Data streamlining and recreating historic data from database (model 23.0)
  - Groundfish bycatch changes due to raw vs. expanded valuing being used

- CPUE standardization updates
  - Using GAM instead of GLM-based standardization approach (model 23.0a)
  - New variable (slope) and exploration of lat-long interaction implemented as a two-dimensional spline

- Size composition truncation (model 23.1), effective sample size for size comps (model 23.1a), and two selectivity periods for pre-rationalized directed fishery (model 23.1b)

- Industry survey (23.2 just for EAG)

AUTHOR SUMMARY

- Data updates are necessary, 22.1e2 only evaluated for comparison
- Models 23.1 and 23.1b improve fits to size comp, without compromise to index fits
- No models improved fits to size comp in EAG, likely drives retrospective bias
  - Need to better explore time varying catchability
  - Data weighting
- Coop survey was not very informative to the model at this time
  - Larger recruitment swings, higher recent F, lower MMB
  - More work needed
- Author recommendation for final assessment
  - Models 22.1e2, 23.1, 23.1b, 23.2

CPT RECOMMENDED MODELS FOR MAY 2024

CPT agreed with author recommended models moving forward except we felt comfortable replacing the base model from May 23 (22.1e2) with model 23.0a since those changes were made to increase data transparency and accuracy.

Some recommendations for standardized CPUE and general assessment comments for May (see minutes)

Model 23.0a (updated base model)

Model 23.1 (23.0a with truncated size composition on smaller end)

Model 23.1b (23.1 with two selectivity periods for pre-rationalized directed fishery corresponding to changes in gear)
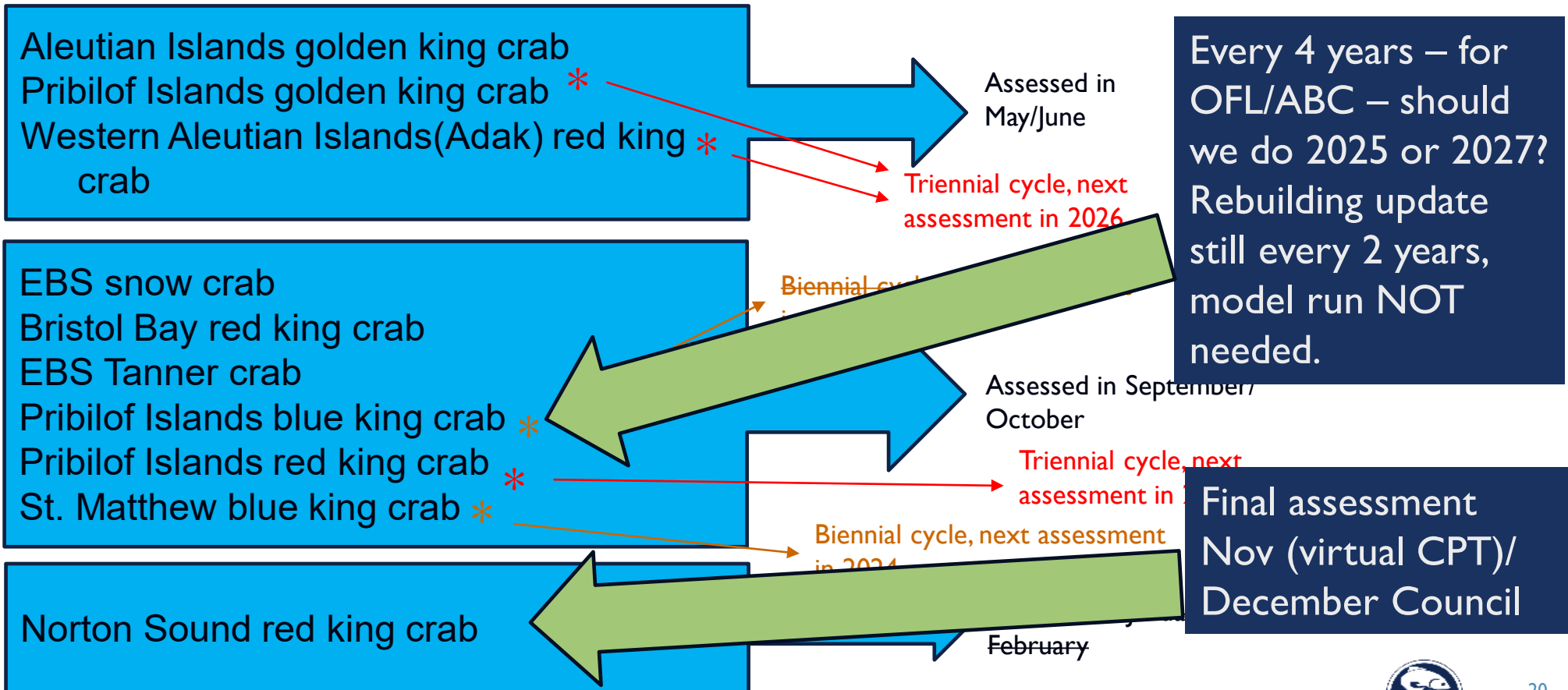
Model 23.2 (EAG)

BALANCE OF CPT REPORT

STOCK PRIORITIZATION AND COUNCIL 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
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Pribilof Islands red king crab
St. Matthew blue king crab

Biennial cycle

Assessed in September/October

Triennial cycle, next assessment in

Biennial cycle, next assessment in 2024

Norton Sound red king crab

February

Every 4 years – for OFL/ABC – should we do 2025 or 2027? Rebuilding update still every 2 years, model run NOT needed.

Final assessment Nov (virtual CPT)/ December Council

20

RESPONSE TO GENERAL SSC COMMENTS ON CRAB (OCT 2023)

- Start date for assessment / survey data

  - CPT consensus is to use all available data and deal with spatial and gear changes with time blocks for q

- Response to all previous recommendations

  - Encourage authors to track these better in SAFEs and those assigned to minutes to track – potential for google sheets to track these by stock (tentative)

- Risk Tables

  - Drafts for 3 "big" stocks in Sept 2024

- VAST – review of status and method review modeling workshop Jan 2025 (tentative)

- Assessment authors available during CPT presentations to SSC (requested of authors if possible)

QUESTIONS?

- Welcome Ethan Nichols (ADF&G Dutch Harbor) as a new CPT member

- Thanks to all CPT members and crab assessment authors.