

Research and developments on the eastern Bering Sea walleye pollock stock assessment

Thanks to co-authors and contributors!

https://noaa-afsc.github.io/EBS_pollock/

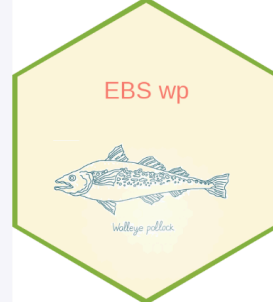
James Ianelli
Sophia Wassermann
Carey McGilliard
Grant Adams
Matt Cheng
Cody Szuwalski
Cole Monnahan

Last year activities

- [Part 1: Discussion paper presented to CIE review](#)
- [Part 2: Assessment research developments for NPFMC review](#)
- [Part 3: Three-parameter double-logistic selectivity](#)

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Discussion paper for CIE review of the eastern Bering Sea walleye pollock stock assessment

May 2025, CIE review

AUTHOR

Jim Ianelli, Carey McGilliard, Sophia Wassermann

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Executive Summary

This report builds on the 2024 pollock stock assessment, using the same datasets but extending the evaluation through new tools, data comparisons, and sensitivity analyses. The primary goal is to evaluate how alternative data sources, modeling approaches, and assumptions affect the perception of stock status and management advice.

The first section introduces the **R library ebwp** ([see 1](#)), which streamlines compilation and visualization of assessment results. This provides a foundation for reproducible workflows across different model scenarios.

The second section presents **comparisons of FT-NIR and traditional microscope age estimates** ([see 2](#)). FT-NIR offers efficiencies but showed lower cohort consistency in bottom-trawl data compared to traditional ageing. Model runs incorporating FT-NIRs demonstrated that treatment of ageing error (fleet-aggregated vs. fleet-specific) influences perception of spawning biomass and reference points, though management quantities remained broadly comparable.

In the next section we explore **leave-one-out survey sensitivity analyses** ([see 3](#)). Results indicated that the influence of the bottom-trawl survey (BTS) was largest. Spawning biomass and recruitment estimates changed considerably when BTS data were downweighted. Other data sources, such as ATS and AVO indices, contributed less to overall stock trends.

The next sections examine incorporation of **multi-species natural mortality (M-at-age and year) estimates and revised acoustic-trawl survey uncertainty** ([see 4](#)). CEATTLE-based M estimates led to higher mortality at many ages, resulting in higher recruitment but lower near-term spawning biomass relative to the 2024 base model. Alternative acoustic estimates (Urmy, Ressler, and De Robertis ([2025](#))) had smaller effects on management benchmarks, but highlight areas for further refinement.

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The first section introduces the **R library** for visualization of assessment results. The second section explores different model scenarios.

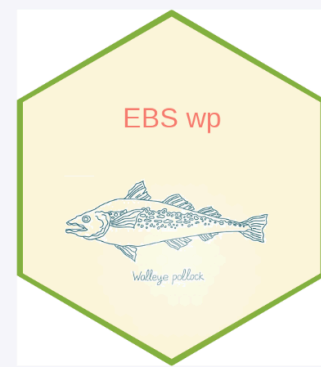
The second section presents **comparisons** (see 2). FT-NIR offers efficiencies but shows ageing error compared to traditional ageing. Model reference points, though management

In the next section we explore **leave-one-out** sensitivity analysis, which indicated that the influence of the bottom-trawl recruitment estimates changed considerably with different sources, such as ATS and AVO indices, compared

The next sections examine incorporating **estimates and revised acoustic-trawl** data to higher mortality at many ages, resulting in a population that is

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September 2025, Plan Team Draft

AUTHOR

Jim Ianelli, Carey McGilliard, Sophia Wassermann

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1 Summary

This document is a follow-up to the discussion paper presented to the Center for Independent Experts (CIE) review panel prepared in May 2025 ([link here; part 1 of this report](#)). The review panel provided a set of recommendations to enhance the model structure, address key uncertainties, and improve transparency. This is Part 2 in which we show actions taken since the review and is intended inform the September 2025 NPFMC review. It focuses on migrating the operational model from ADMB to RTMB and begins to examine ways to evaluate the influence of the Russian fishery.

Since the May 2025 CIE review, several key developments have been made in the EBS pollock assessment. The most significant is the completed transition from ADMB to RTMB. The ported model successfully reproduces ADMB results for spawning biomass and recruitment with negligible differences, while enabling greater flexibility in estimating random-walk selectivity and recruitment deviations, propagating error through marginal likelihood, and integrating random effects. This provides a more modern and transparent framework for assessment. Work is also underway to address one of the reviewers' main concerns—the absence of Russian removals. Scenario modeling is being conducted using Russian catch levels equivalent to 20–45% of U.S. catch, following reviewer guidance and recent publications. These runs will help bound the potential influence of transboundary removals before more collaborative modeling efforts are considered. Other areas highlighted by the review, such as process uncertainty, growth, weight-at-age, and alternative data-weighting approaches, remain planned or deferred. The tools for

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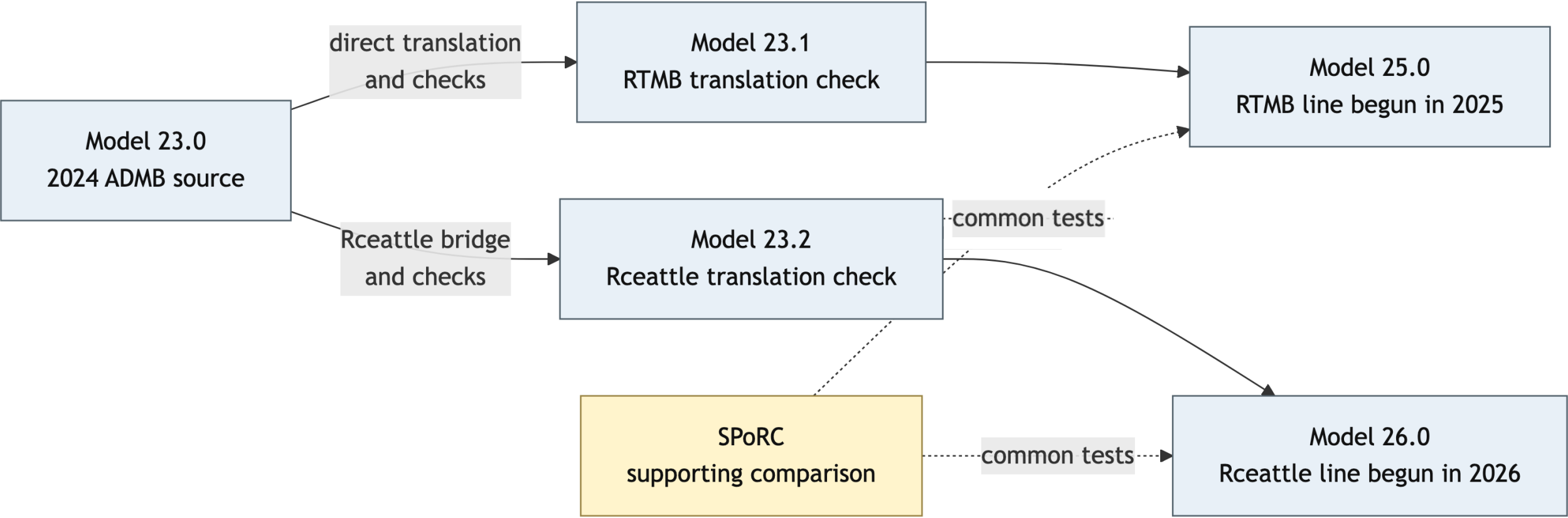
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1 Summary

This document is a follow-up to the discussion paper prepared by the Experts (CIE) review panel prepared in May 2025 ([link here](#)) which provided a set of recommendations to enhance the model and improve transparency. This is Part 2 in which we share the model intended to inform the September 2025 NPFMC review. It transitions from ADMB to RTMB and begins to examine ways to evaluate the model.

Since the May 2025 CIE review, several key developments have occurred in the assessment. The most significant is the completed transition of the model successfully reproduces ADMB results for spawning stock differences, while enabling greater flexibility in estimating recruitment deviations, propagating error through management effects. This provides a more modern and transparent framework that is underway to address one of the reviewers' main concerns. Scenario modeling is being conducted using Russian catch, following reviewer guidance and recent publications on the potential influence of transboundary removals before management is considered. Other areas highlighted by the review, such as age, and alternative data-weighting approaches, remain under consideration.

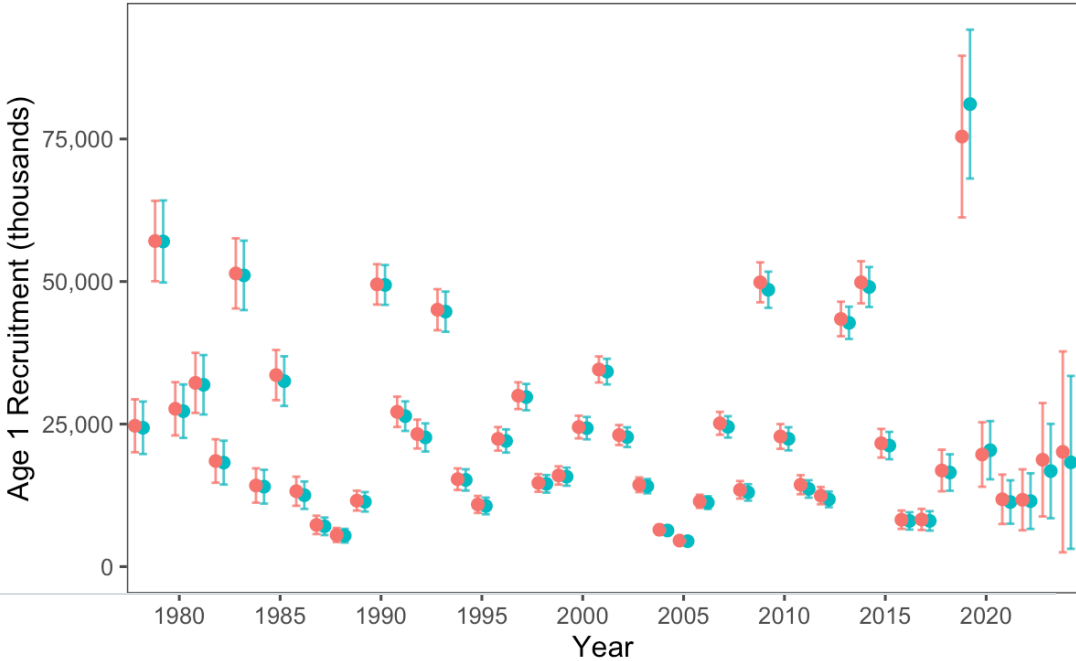
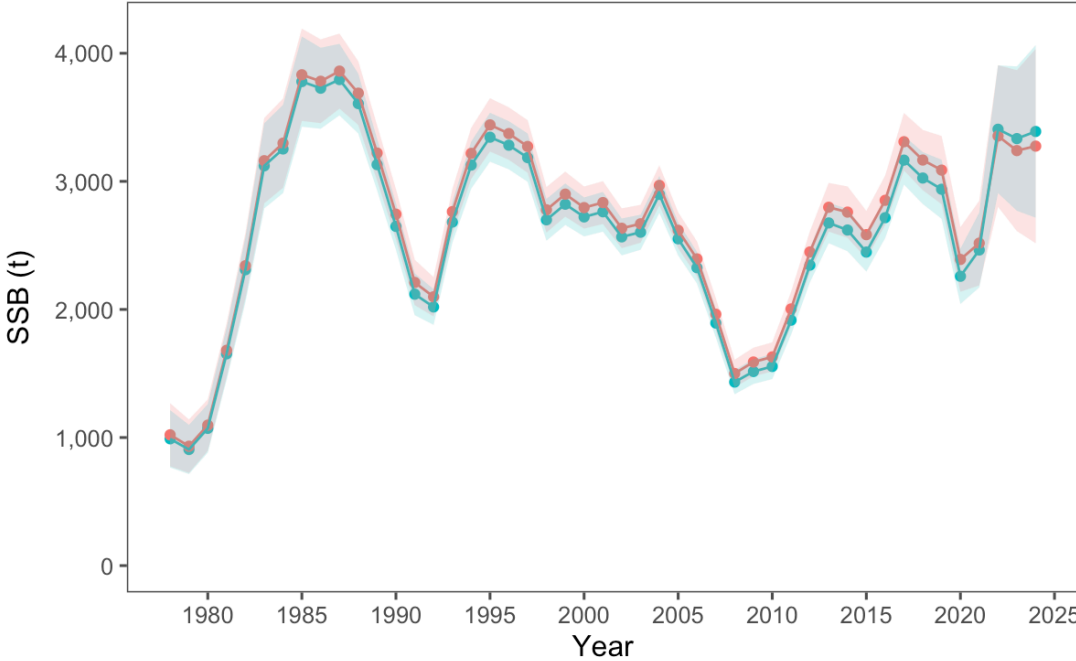
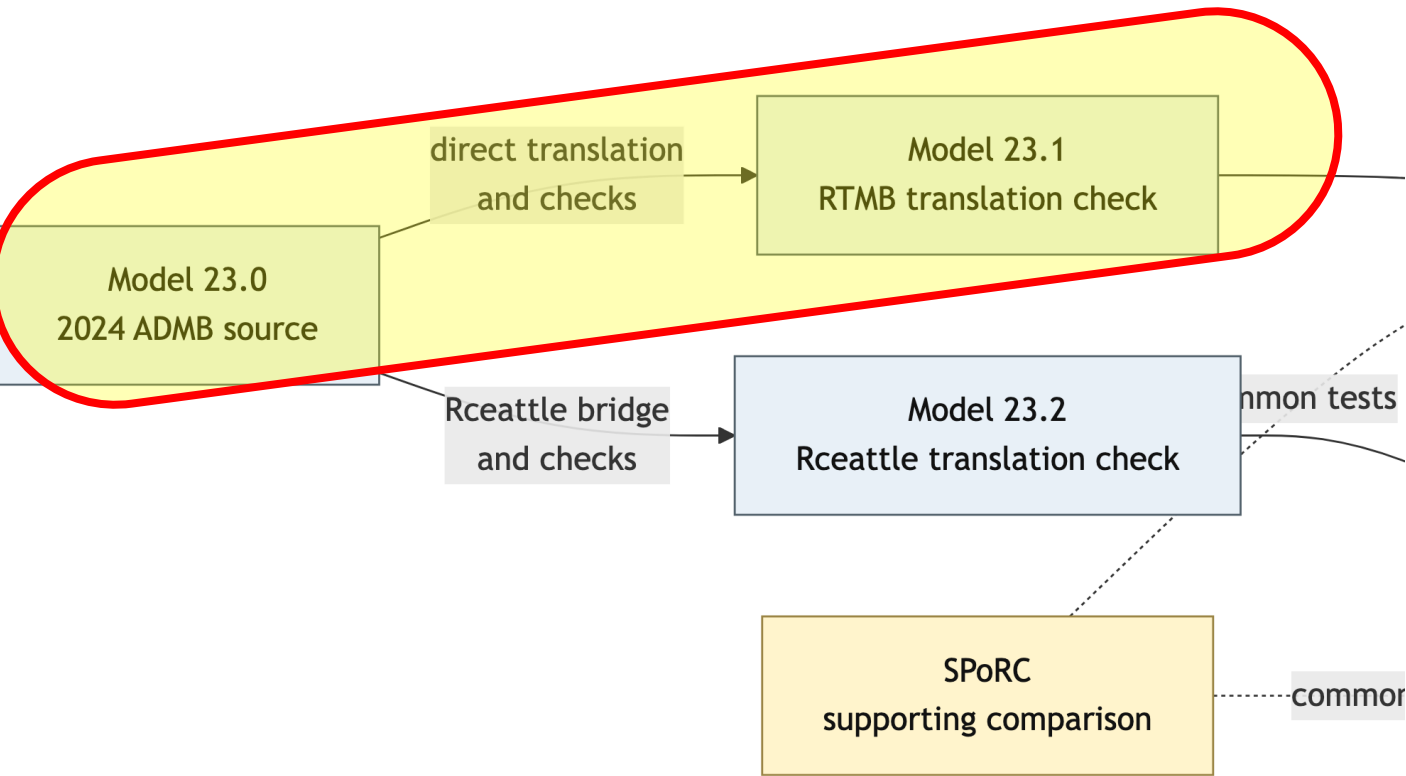


- Model 23.2 is the direct reference for Model 26.0 implementation checks.
- Research on pollock movement between U.S. and Russian waters continues under SPoRC.

Data product issues:

1. Traditional microscopic age-determination (TMA) method switching to near-infrared approach that affect BTS and Fishery data
 - AFSC Scientists actively improving machine-learning with updated data
 - Smaller TMA data available as “**tester**”
2. For BTS, estimator expanding age samples to annual proportions changed.
 - Largest revisions are in the plus-group ages of 2023–2024.

Figure 4 Original and modified ADMB bridge results—**model 23.0 to 23.1**



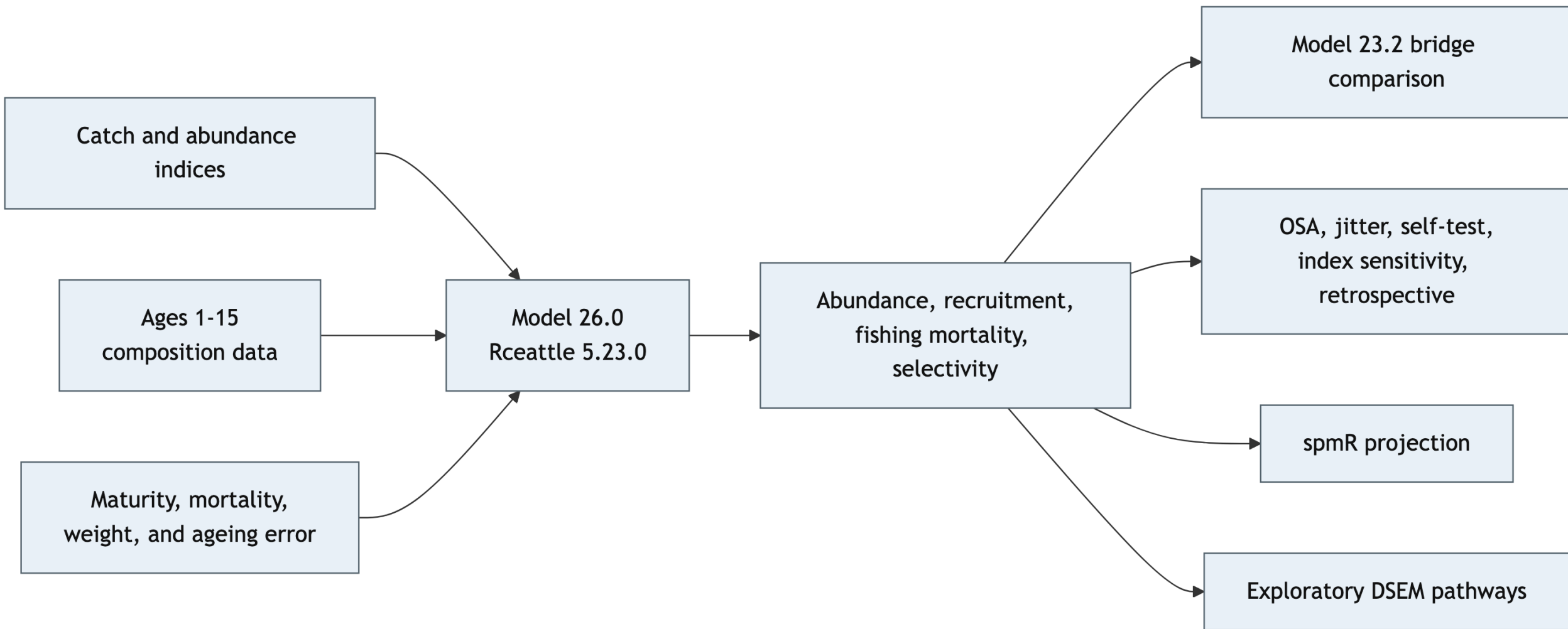
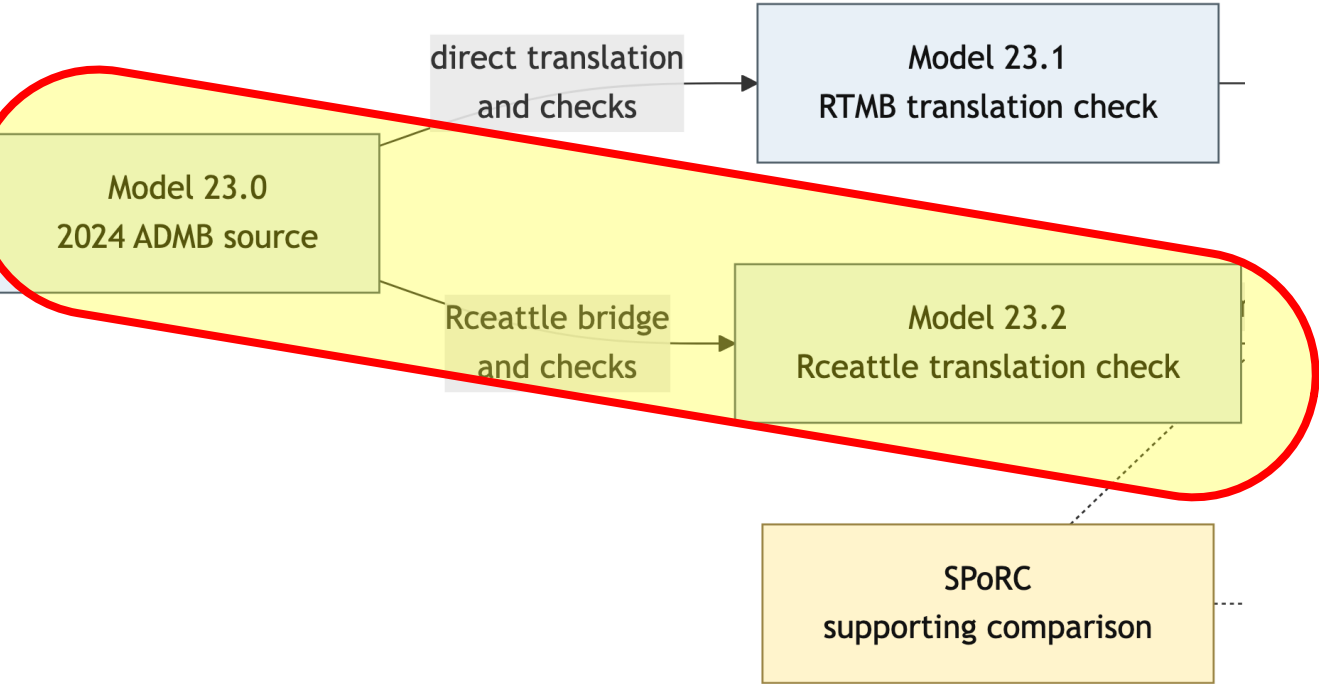


Figure 6 Model 23.0 and Model 23.2 ADMB comparison



NOTE: Based on data through 2024

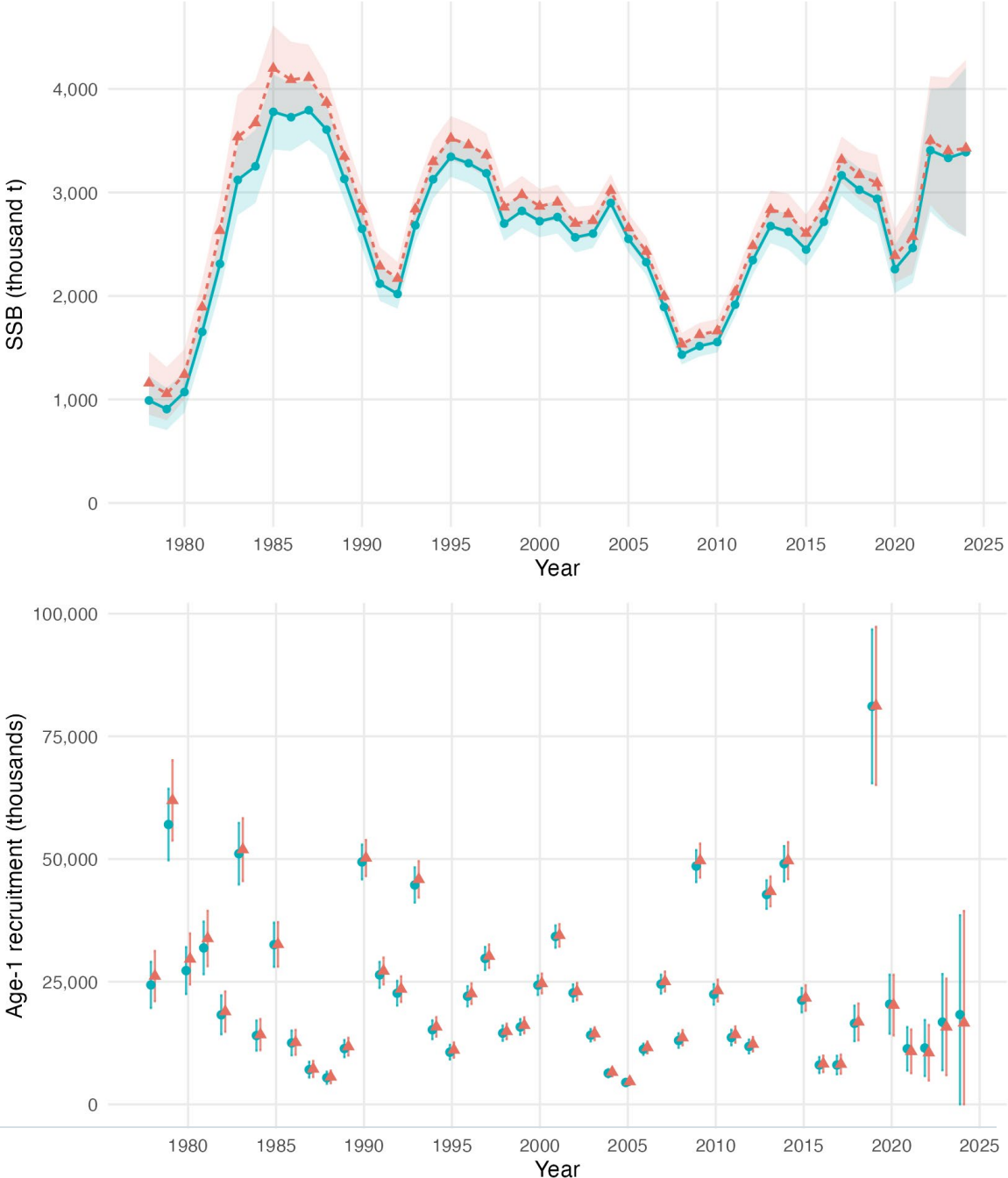
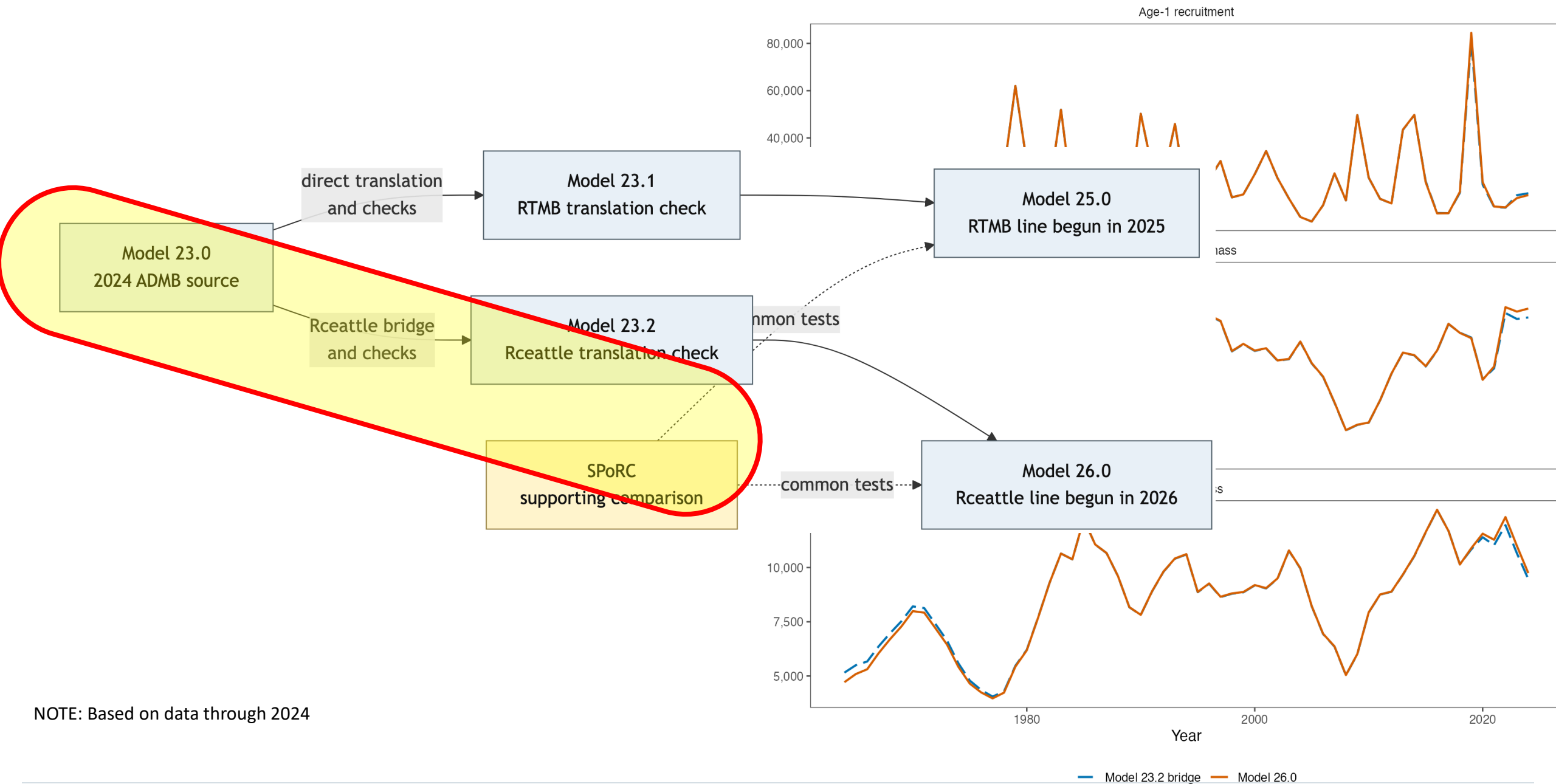


Figure 7 Model 26.0 and Model 23.2 trajectories



NOTE: Based on data through 2024

Figures 8, 9 selectivity in Models 23.2 and 26.0

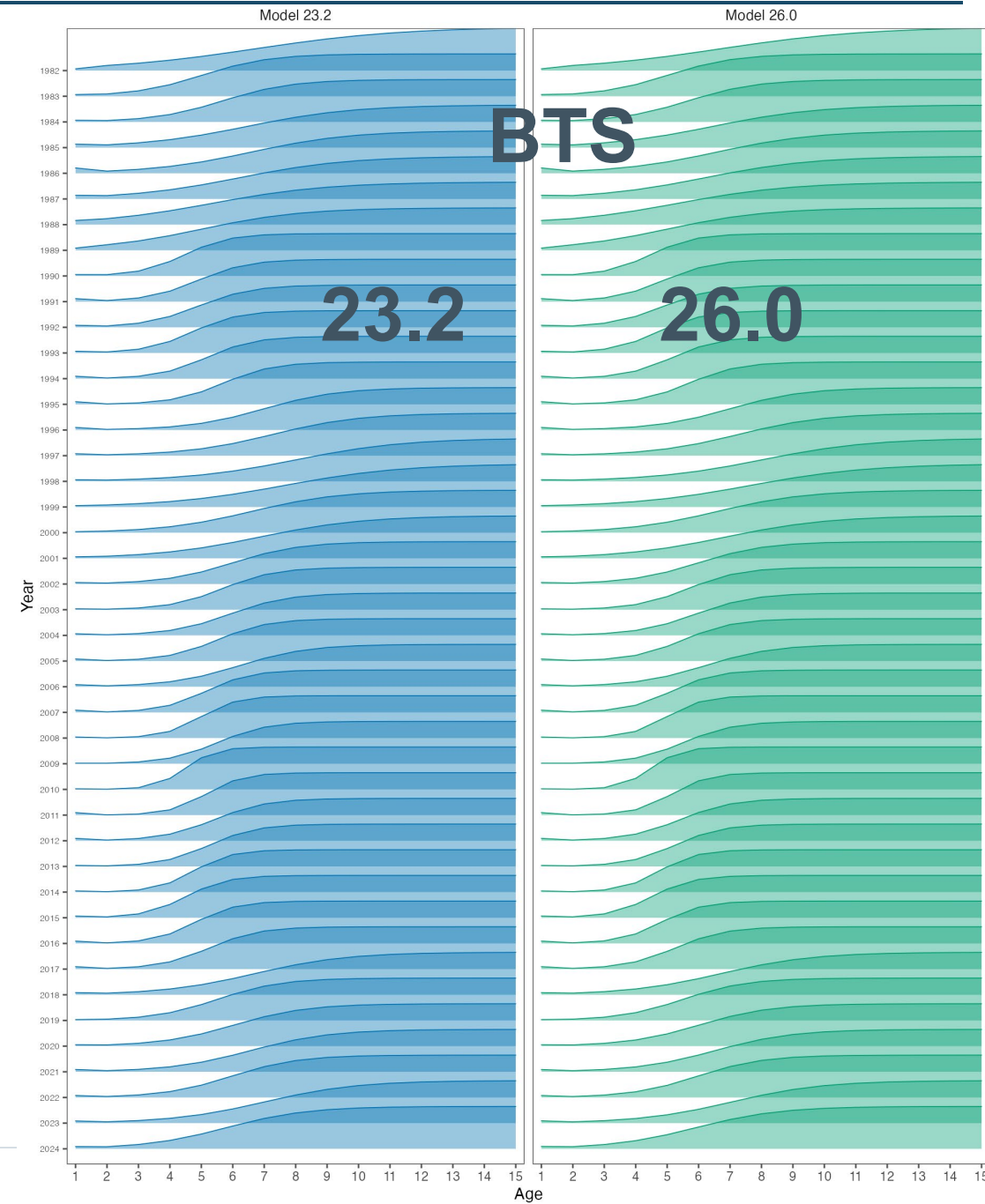
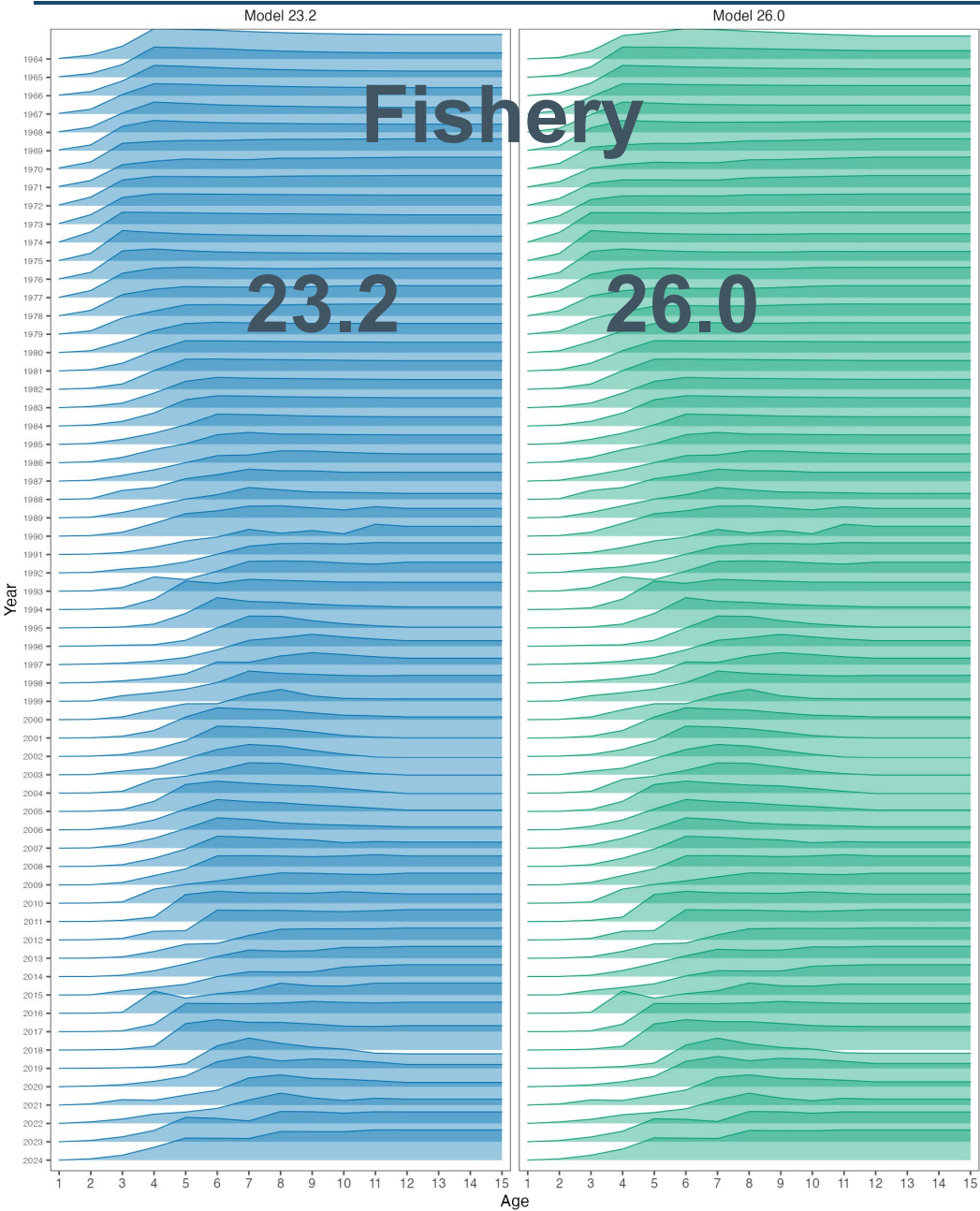
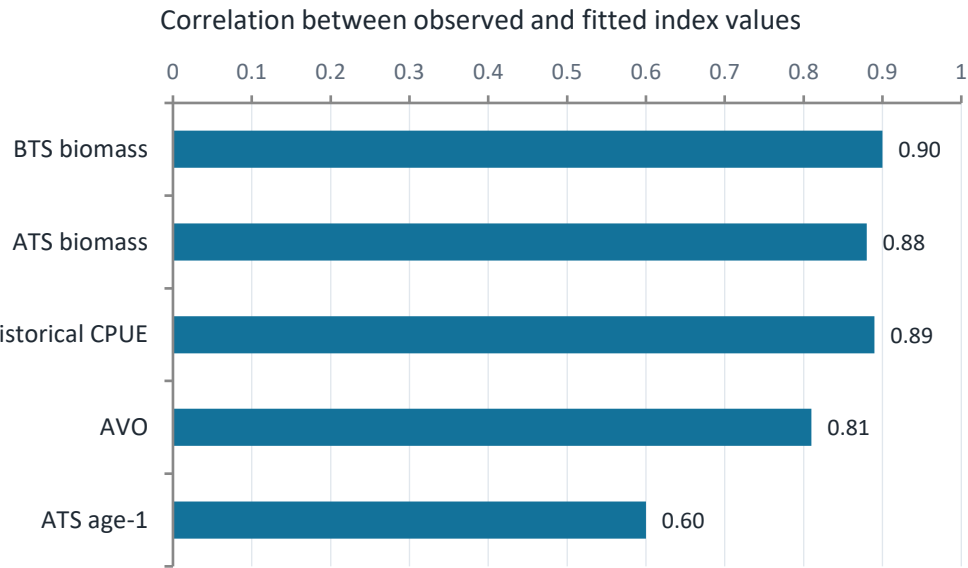


Figure 11 Observed and fitted abundance indices



Fitted indices follow the observed changes through time

NOTE: Based on data through 2024

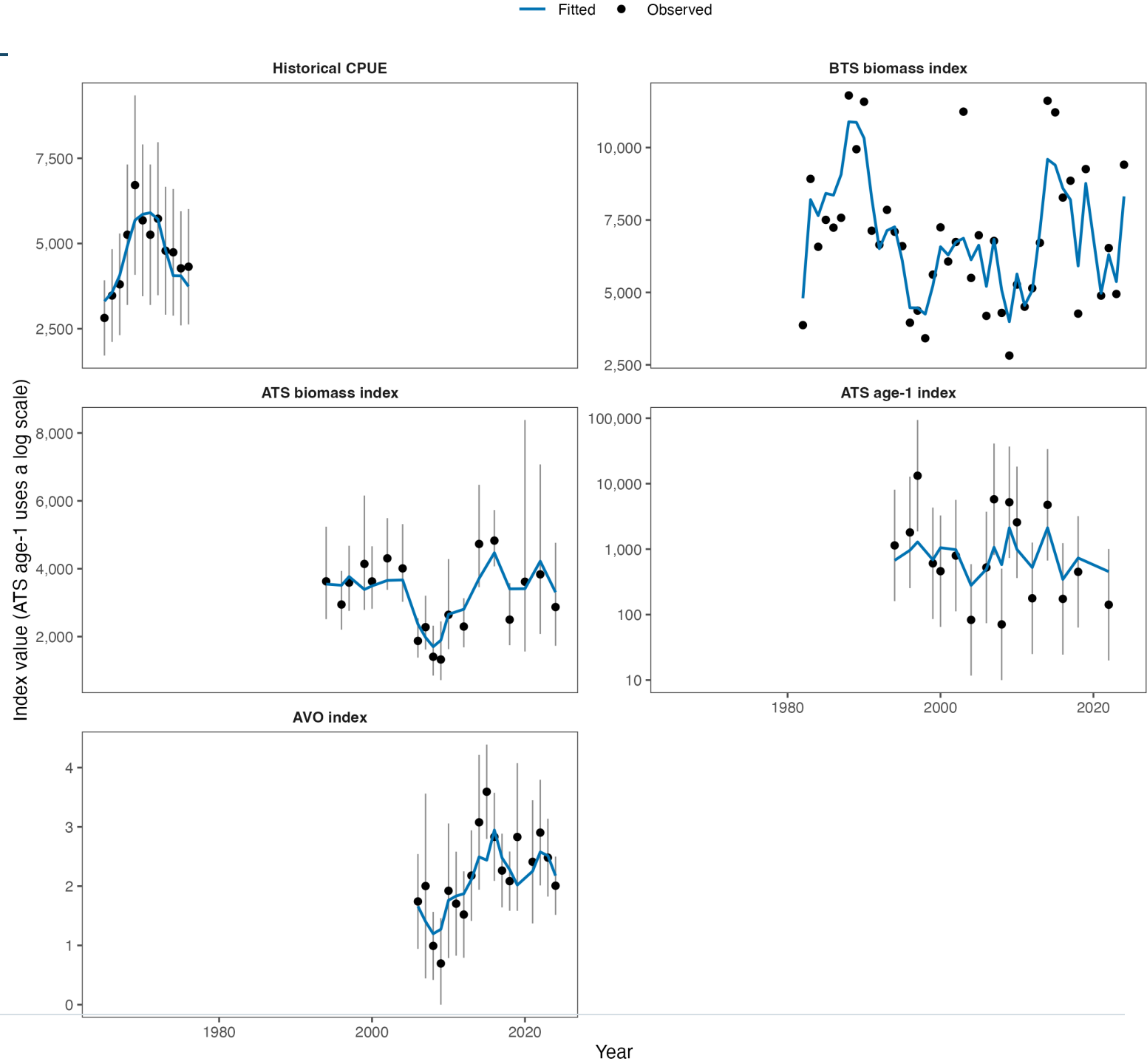
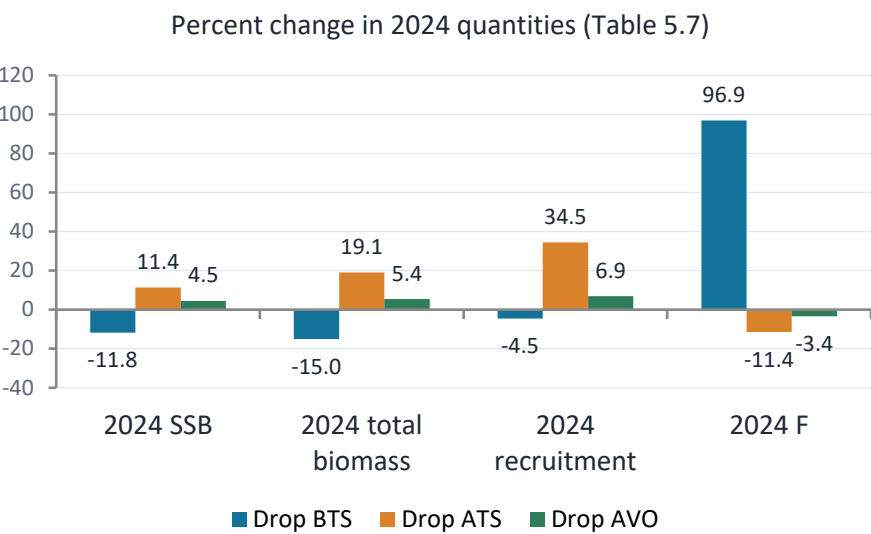


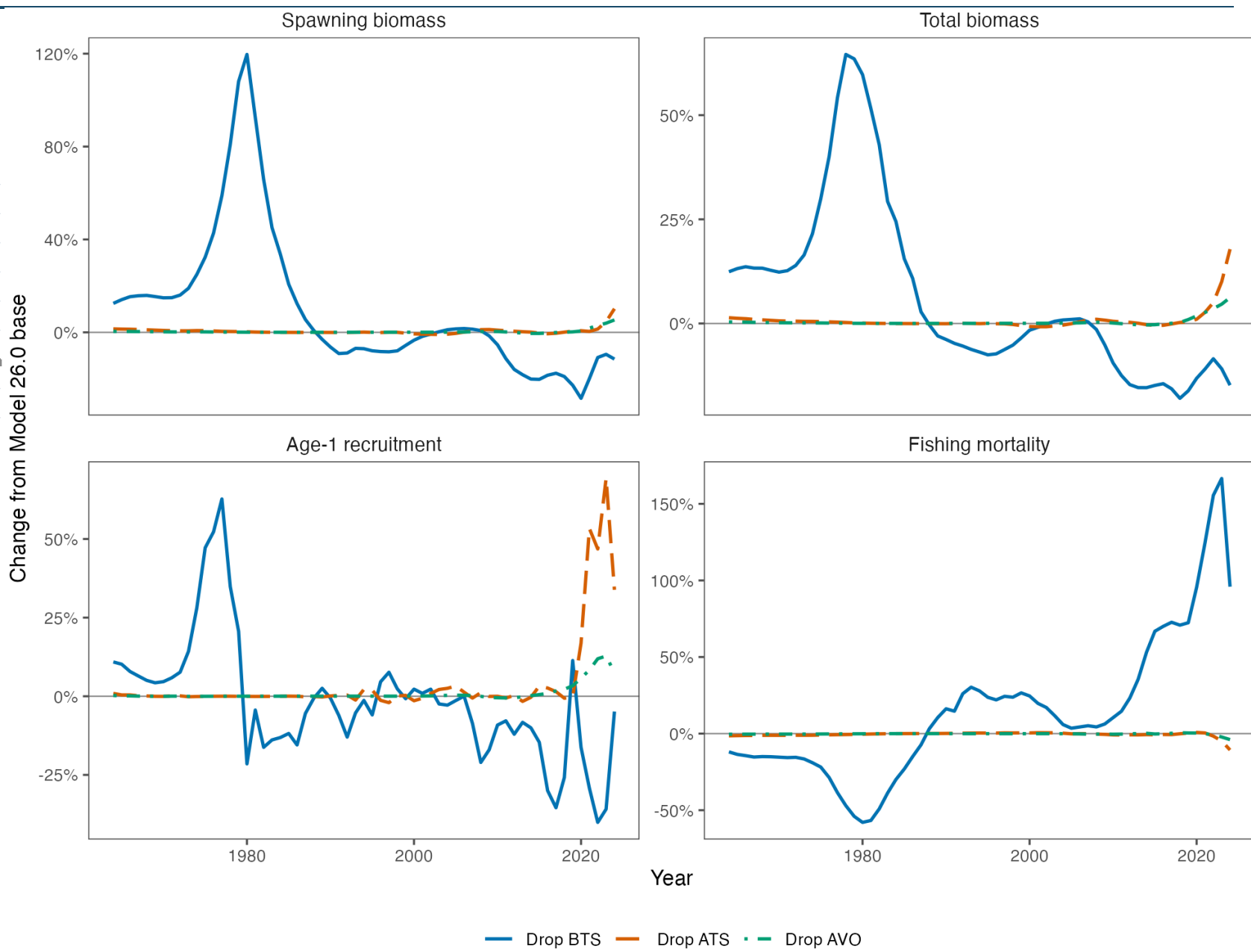
Figure 19 Whole-index sensitivity results



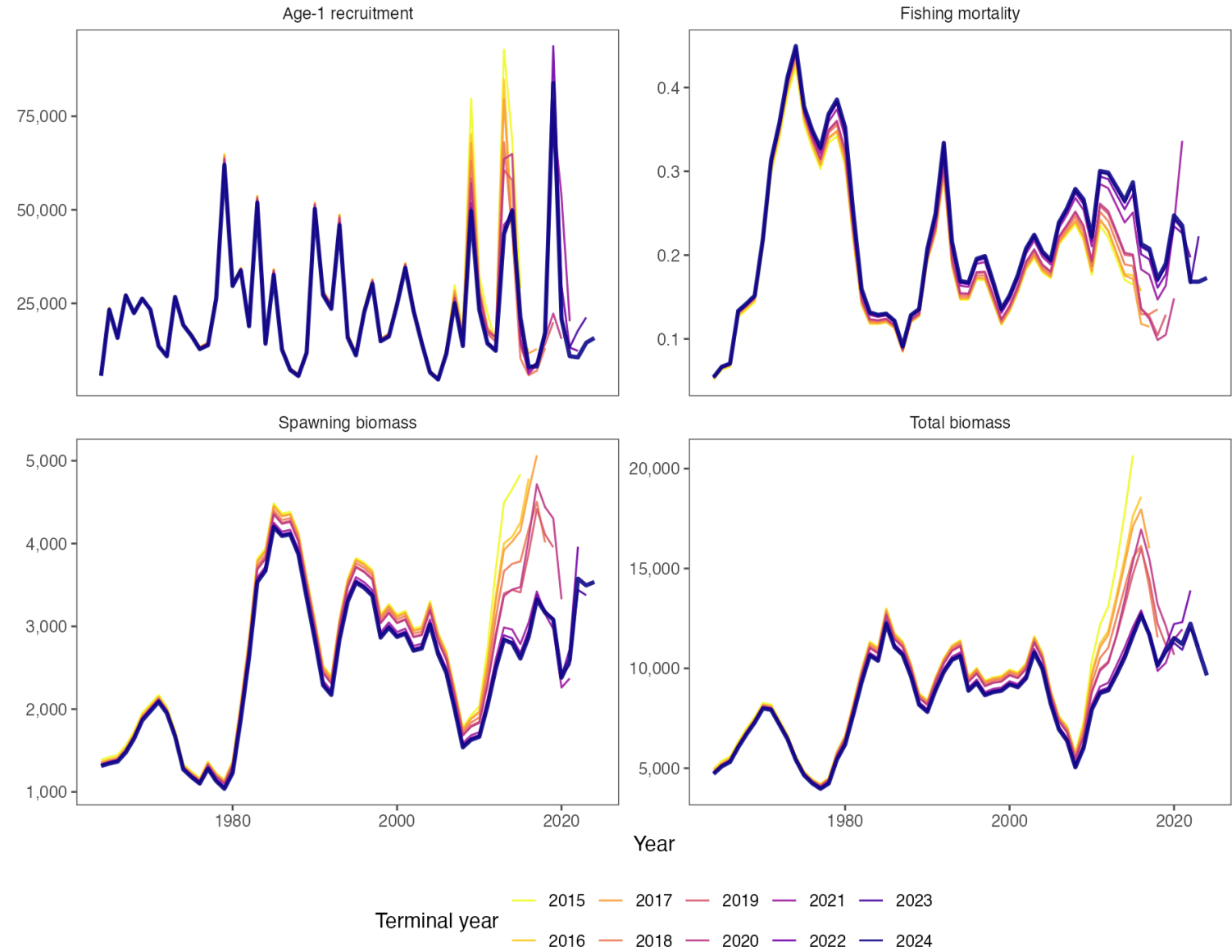
Dropping BTS nearly doubles 2024 F

Illustrating importance of continuing survey data

NOTE: Based on data through 2024



- Largest for SSB and concentrated in the 2015–2020 terminal years
- The 2020 → 2021 peel transition carries the main downward revision and is dissected in document



NOTE: Based on data through 2024

Conclusion

- Model 26.0 closely follows the aligned ADMB bridge and gives us a reproducible fitting and projection workflow. The spawning-biomass retrospective remains substantial (consistent with either codebase).
- We propose moving forward with Model 26.0, with updated inputs and the convergence, retrospective and projection checks repeated for the production assessment

Model 26.0 · recommended

Full report, data, and scripts: noaa-afsc.github.io/EBS_pollock