

Alaskan Sablefish Groundfish Joint Plan Team

Daniel Goethel and Craig Marsh



September, 2023



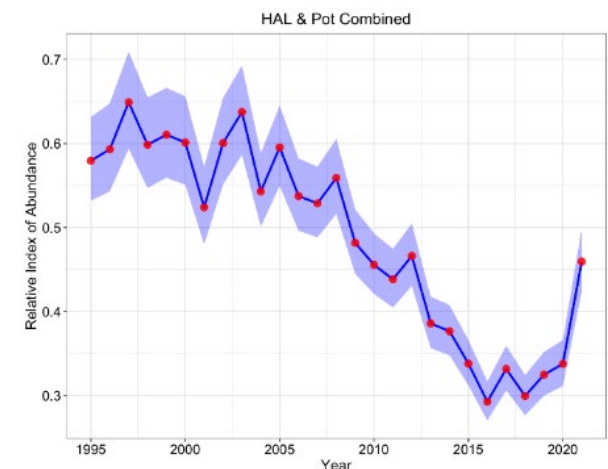
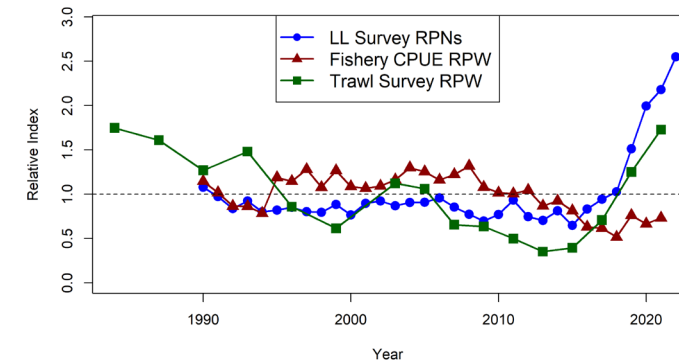
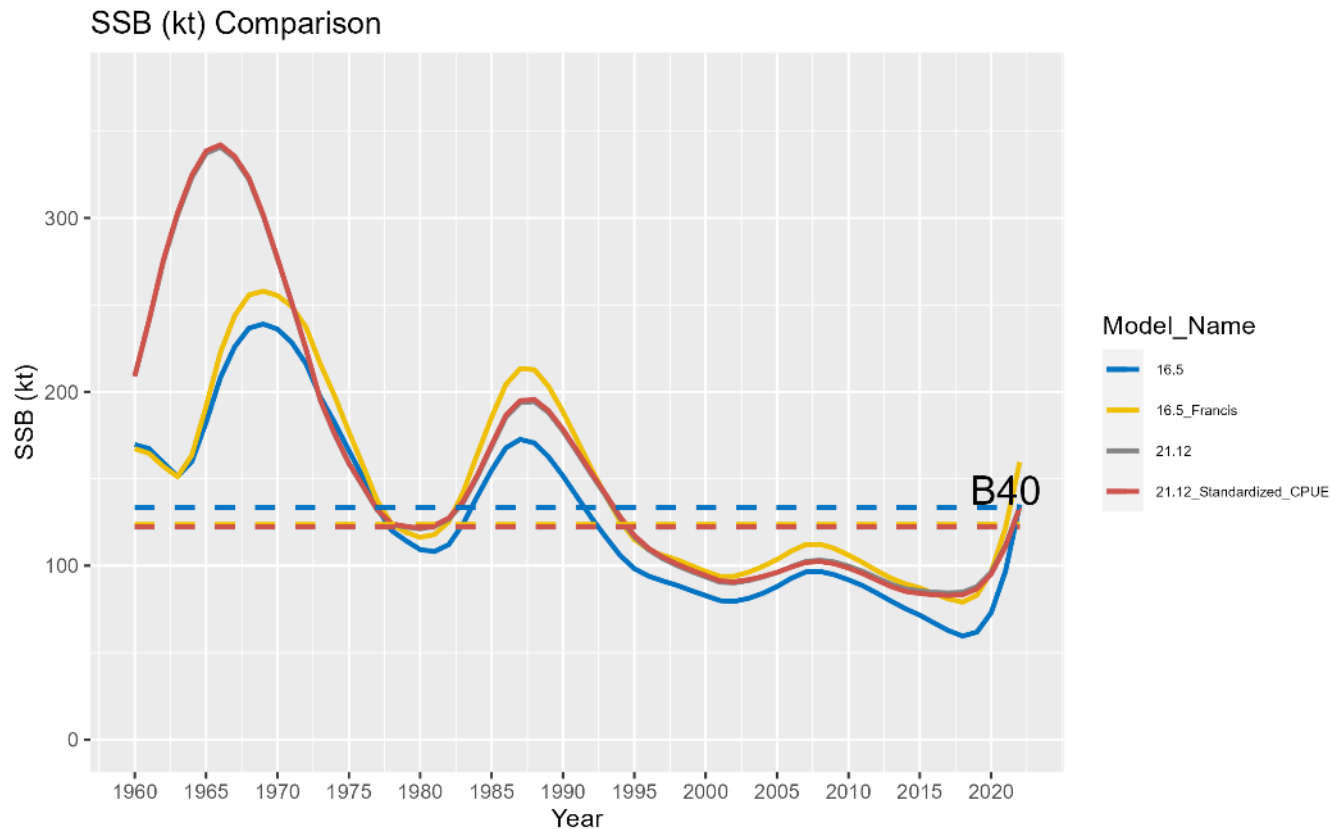
Notes and Minor Changes for 2023 SAFE

- Moving to full 5-year average survey apportionment in 2024 harvest specifications
 - No more SSC stairstep!
- Standardized CPUE will replace nominal CPUE
- Whale depredation will not be updated
 - Magnitude is small and variability is relatively limited compared to ABC
 - Recommendations supported simplifying process
 - Catch-in-Areas database maintained by Steve Lewis—unknown who will/would update/maintain
- Will implement ‘update’ assessment document



Utilizing Standardized CPUE

- Replacing the CPUE index with a standardized index (from M. Cheng, UAF) that includes both pot and hook-and-line gear data had minimal impact
- Authors recommend using new index for 2023 SAFE (as reviewed last year)



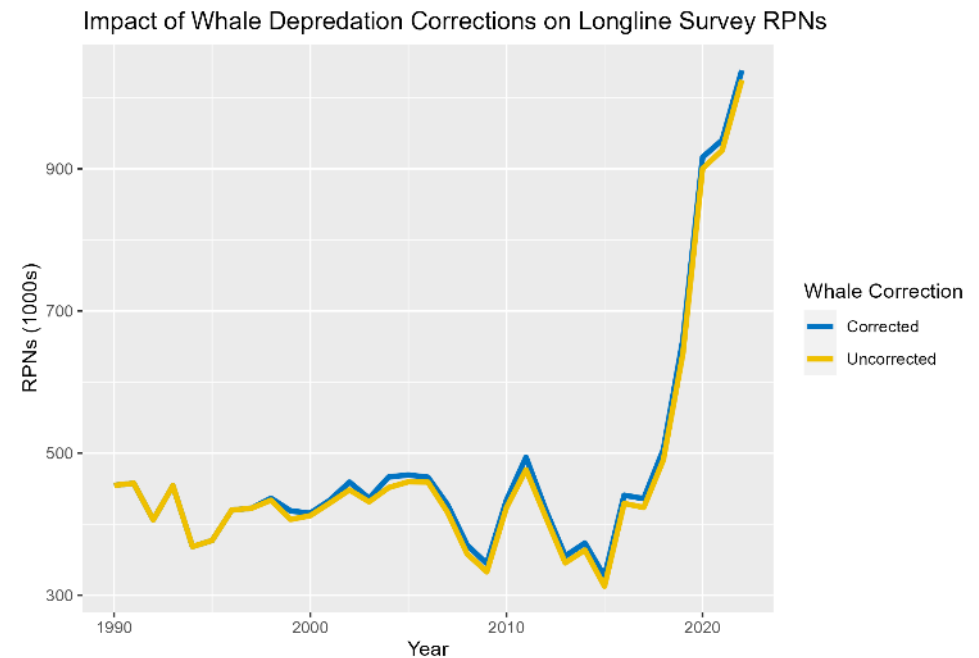
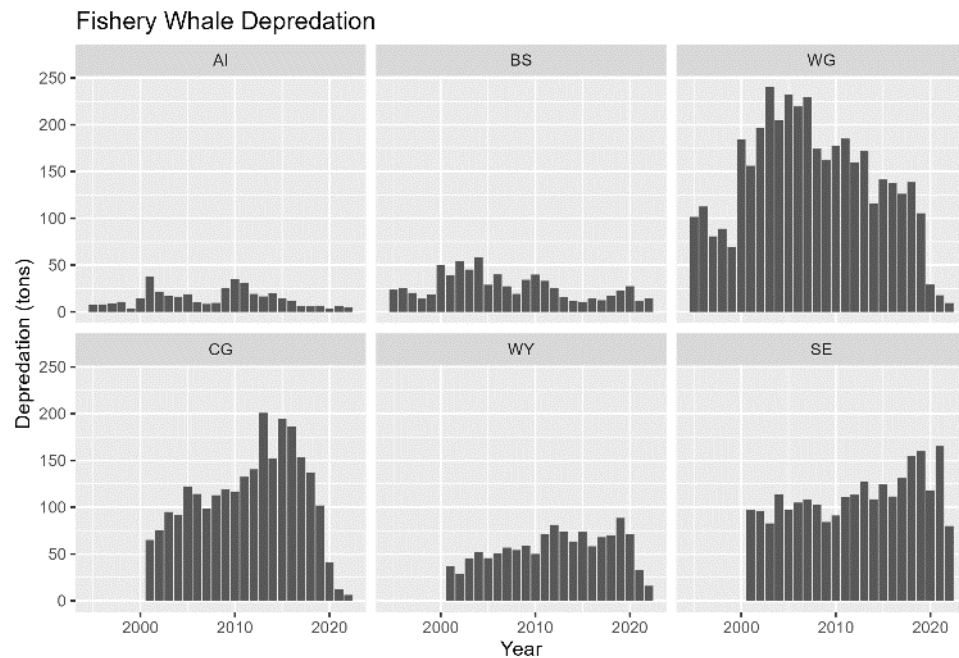
Whale Depredation



JPT: Annual updates to the model may be unnecessary due to the limited amount of mortality. However, if data were lacking to inform the model and pot gear catch continues to increase, it may be worthwhile to provide stability and simplicity in how the estimates were applied.

SSC: There was a considerable decrease in total sablefish mortality due to whales in 2021, likely due to an increase in pot gear use and a decrease in hook-and-line gear, and that the overall magnitude of whale depredation remains low relative to TAC (less than 1%). The SSC agrees that in the future, particularly if pot gear catch continues to increase, it may be worth exploring ways to provide stability and simplicity in how the depredation estimates are applied and possibly update these estimates less frequently.

Authors recommend using 2022 value until new methodology developed or major changes observed.



Future Directions

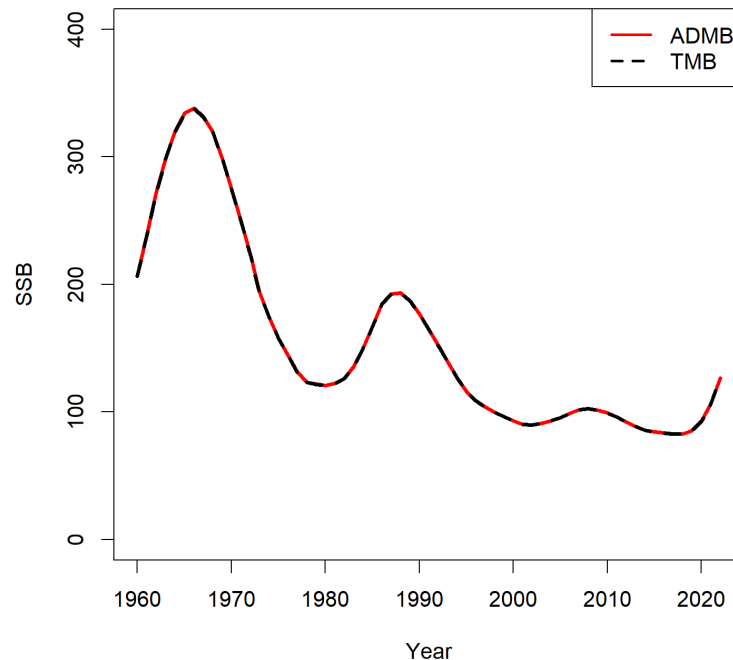
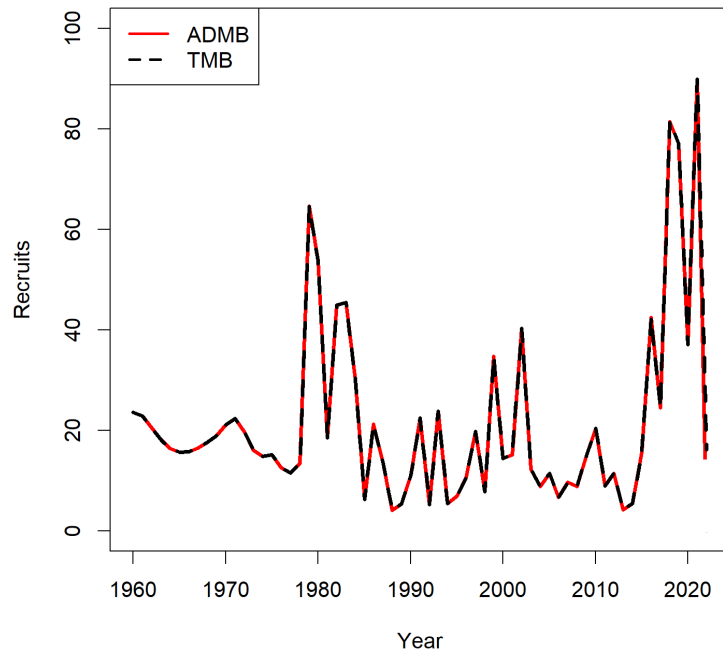
- Incorporating pot fleet and best practices for sex-specific assessments
 - Matt Cheng (UAF Ph.D. Student, Prof. Curry Cunningham) exploring these issues
- Develop spatially explicit, tag-integrated model to estimate regional biomass and account for movement among areas
 - Kari Fenske recently completed dissertation on a 3 area model
 - Craig Marsh (NRC postdoc) finishing work with a tag-integrated model that estimates movement
- Develop closed-loop simulation model to explore efficacy of the $B_{40\%}$ harvest control rule for sablefish
 - Postdoc being sought through UAF (Curry Cunningham advisor; Ben Williams, Chris Lunsford are co-PIs)



Template Model Builder (TMB) Implementation

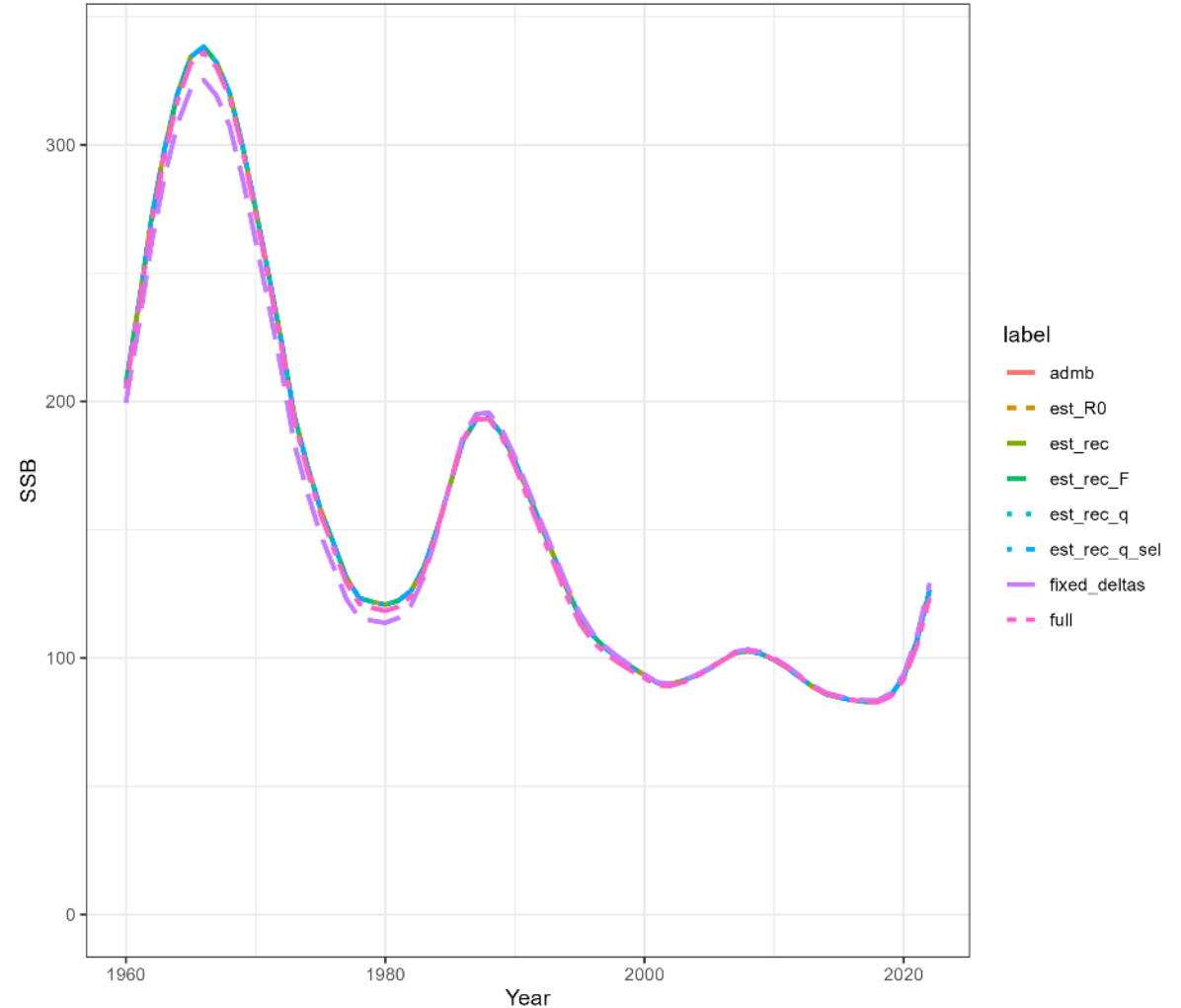
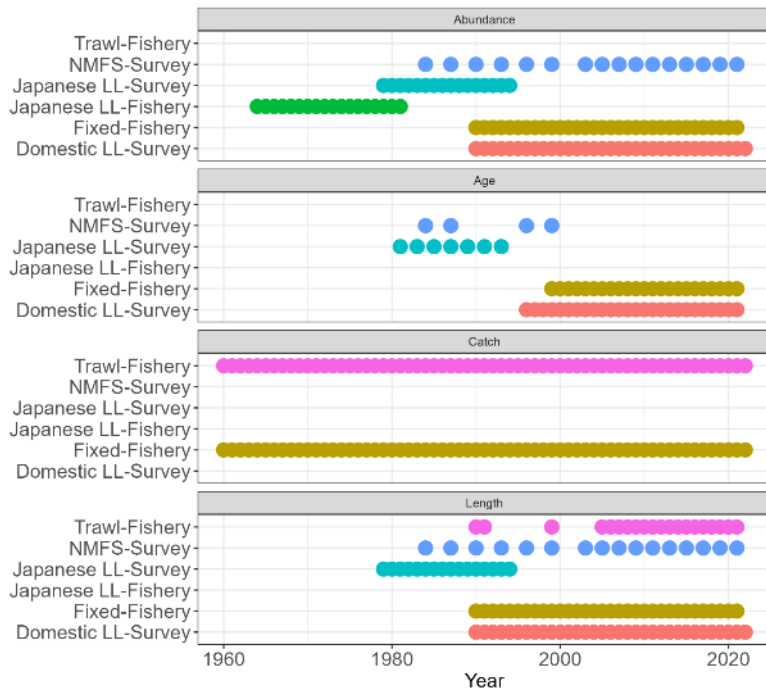
- Potential changes to programming languages used for assessment
- ADMB is dead, long-live TMB...or FIMS...or...?
- Craig translated the current ADMB model into TMB
- Performed thorough model comparisons and testing

Deterministic Comparisons



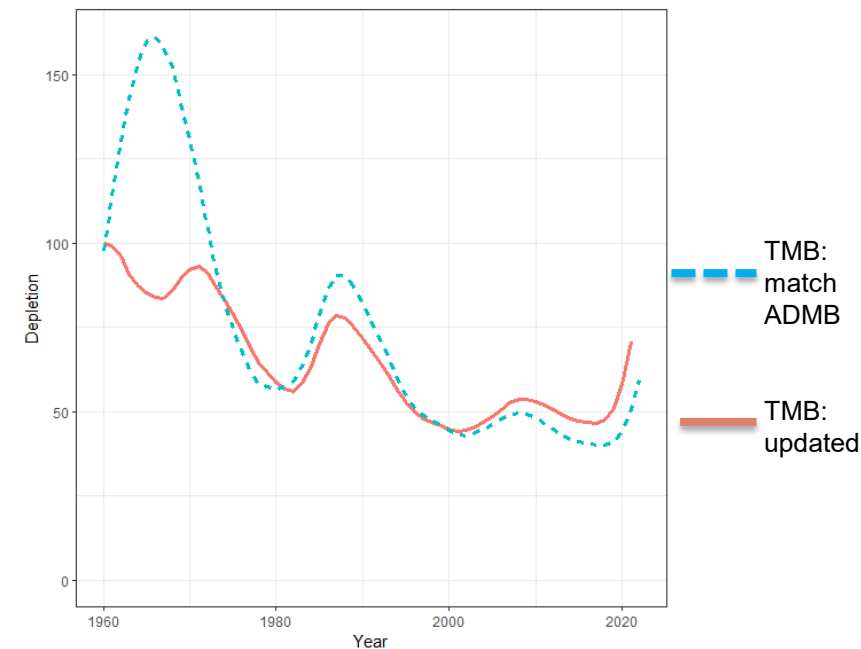
Template Model Builder (TMB) Implementation

Consistent estimation between ADMB and TMB model



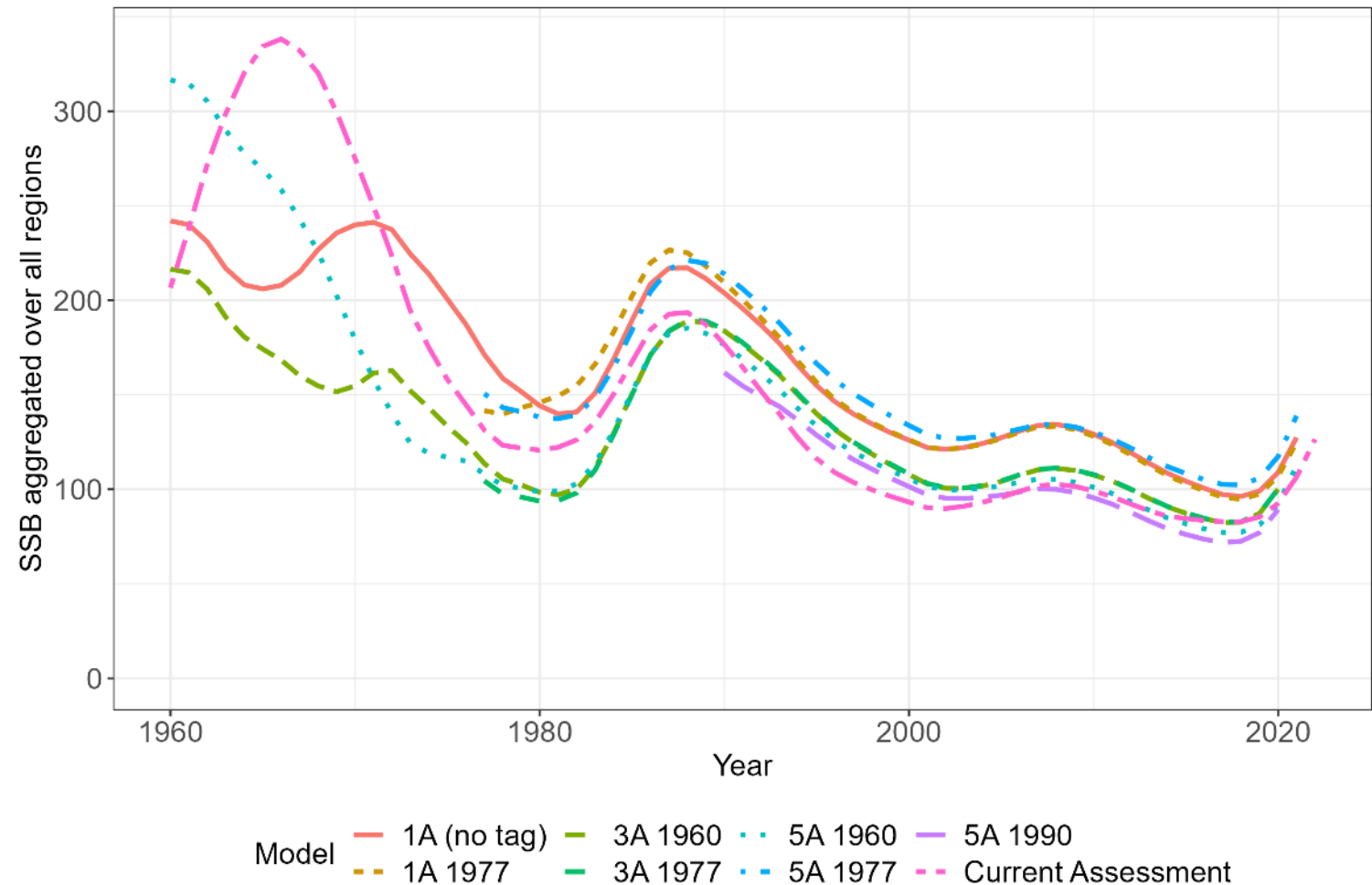
Template Model Builder (TMB) Implementation

- Pending my ability to adequately learn TMB (you can't teach an old bear new tricks, but maybe you can trick him to do something different), MIGHT switch in 2024
- Probably associated with a handful of modeling improvements
 - Sex-specific age comps and drop lengths when have ages
 - Simplify fleet structure, selectivity parameter sharing, and time blocks
 - Remove CPUE and some historical data with unknown provenance
 - Improved data weighting
 - Minor patches/fixes
 - Better graphics and diagnostics
 - Simplified simulation capabilities
- Public GitHub for those interested in migrating to TMB
 - <https://github.com/Craig44/SpatialSablefishAssessment>
 - 2 assessment versions:
 - Current_assessment: matches sablefish ADMB model
 - Tag_Integrated: the more generalized version with spatial capabilities, tag integration, and improved assumptions



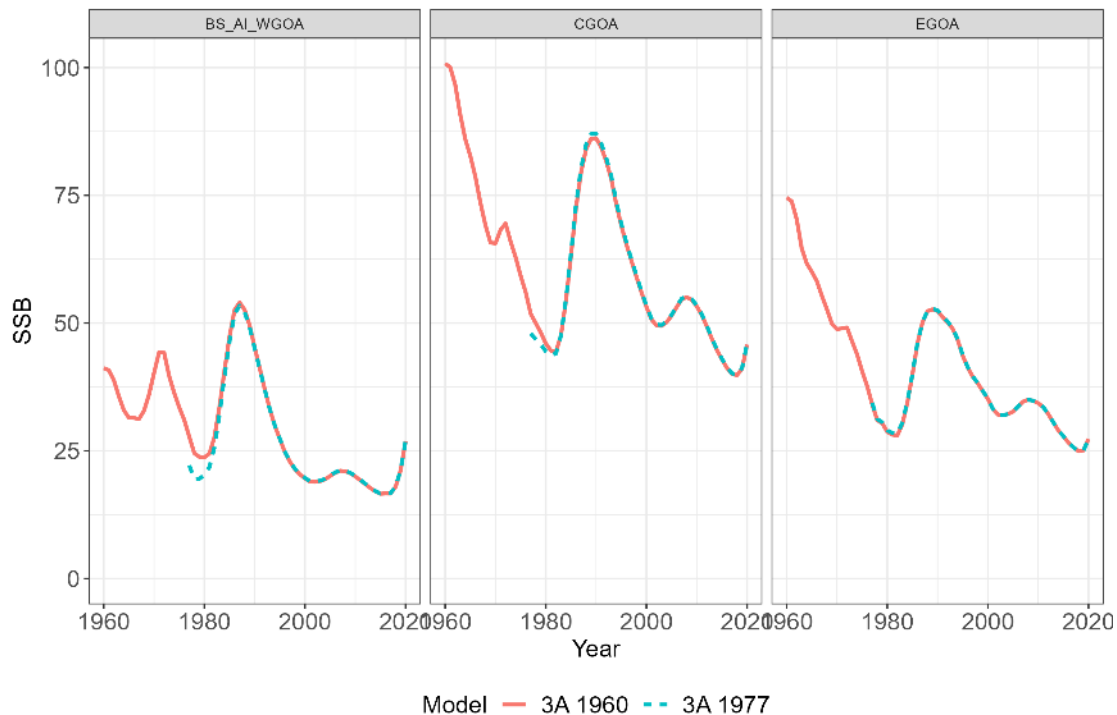
Spatial Modeling Preliminary Results

- General alignment among model structures in magnitude and trend
- Start year has important implications for B_0 and depletion
 - 1960: start of historical catch data
 - 1977: start of reliable catch and survey data by region/fishery
 - 1990: start of compositional data
- Estimation of movement difficult even with extensive mark-recapture data



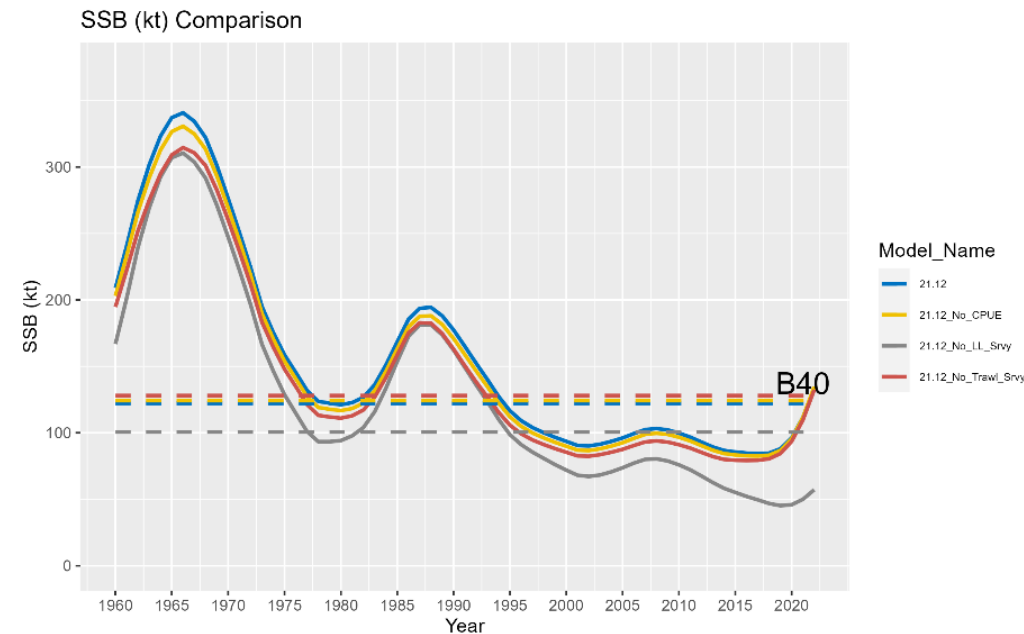
Spatial Modeling Preliminary Results

- Number of regions has limited impact on results
- Recruitment strongest in western regions, but SSB/biomass highest in CGOA and EGOA
- Work is ongoing and manuscript to be published in early 2024



Potential Changes for 2024 SAFE

- Adopt TMB model and associated model/data changes(?)
- Uncertainty in CPUE availability
 - Updated for 2023
 - Will reassess again in 2024
 - Impact on assessment is minimal, not used for apportionment any longer
- Address small sablefish discards (pending NPFMC decision)
 - If minimum size limit adopted, then...
 - **May switch to an age-3+ formulation to avoid dealing with discards (proposed MSL corresponds well with age-3+)**
 - Otherwise, need to model discarding process explicitly(?)....with no/limited data to inform discard size composition or discard mortality rate



QUESTIONS?



Sablefish Simulation Study Postdoctoral Research Opportunity



Location: This position will be located in Juneau, Alaska, at the Juneau Fisheries Center of the University of Alaska Fairbanks. *Remote work options may be available.*

Project Title: Developing a Generalized MSE Framework for North Pacific groundfish

Project Description: Recent ecosystem changes in the North Pacific have led to extreme biological events including abnormally high recruitment, shifting species distributions, and dramatic changes in fishery dynamics (e.g., changes in spatiotemporal patterns of removals and redistribution of removals across gear types). These changes have fostered increased interest in exploring the efficacy of current North Pacific Fishery Management Council (NPFMC) harvest control rules using simulation analysis. *The goal of this postdoctoral fellowship* is to explore and evaluate key uncertainties in



Alaska management processes as they relate to the Tier 3 harvest control rules by developing a management strategy evaluation framework. The framework will be tested and initially tailored to sablefish (*Anoplopoma fimbria*) in Alaskan waters as a timely and high profile case study, though adaptable for other Alaska groundfish species. This fellowship will be a direct collaboration with the Marine Ecology and Stock Assessment (MESA) Program at the NOAA Alaska Fisheries Science Center.

Qualifications: A Ph.D. in fisheries, resource management, biostatistics, or a related field is required. The successful applicant will be highly motivated and creative; have a background in fisheries, quantitative population dynamics, or stock assessment. The applicant should have expertise in R programming, and experience with (or an interest in learning) non-linear function minimizers including AD Model Builder or Template Model Builder. Candidates should be comfortable communicating with our team of NOAA stock assessment scientists, fishery stakeholders, and policy makers.

Funding: We offer 1 full year of funding (\$63,000/year, plus benefits). This research is funded by the NOAA Alaska Fisheries Science Center through Cooperative Institute for Climate, Ocean, & Ecosystem Studies (CICOES).

Closing Date: Open until filled.

Start Date: Winter 2022-2023.

To Apply: E-mail the following to Drs. Curry Cunningham (cjcunningham@alaska.edu) and Ben Williams (ben.williams@noaa.gov): (1) cover letter describing your interest in the project and qualifications; (2) CV or resume; and (3) contact information for *three* references.

