SEDAR 100: US Gulf of America Gray Triggerfish (*Balistes capriscus*)

NOAA FISHERIES

SEFSC

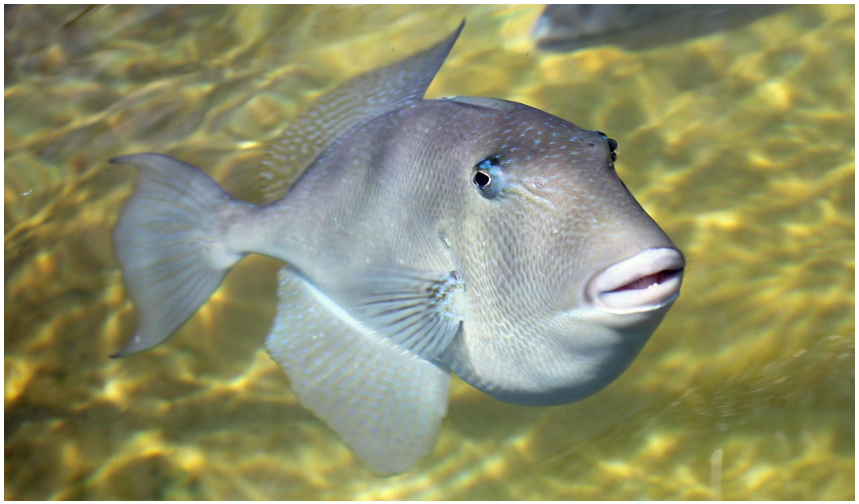


Photo courtesy of F. Forrestal

Assessment Check-in

GFMC SSC Meeting

February 26, 2026

Past assessment history

Valle et al. & Porch (2001)
Two assessments conducted (undergoing overfishing and overfished) but not used for catch advice (too much uncertainty)

SEDAR 9 (2006)
Assessment conducted (undergoing overfishing and overfished(?)) but not used for catch advice (too much uncertainty)

SEDAR 9 Update (2011)
Assessment accepted (undergoing overfishing and overfished) and used to set catch advice (ABC = 305,300 pounds whole weight)

Catchability analysis (2013)
Additional analysis conducted that showed no change in stock status; not used for catch advice

SEDAR 43 (2015)
Assessment accepted
Stock overfished (2013)
Used for rebuilding plan only (no change in catch levels)

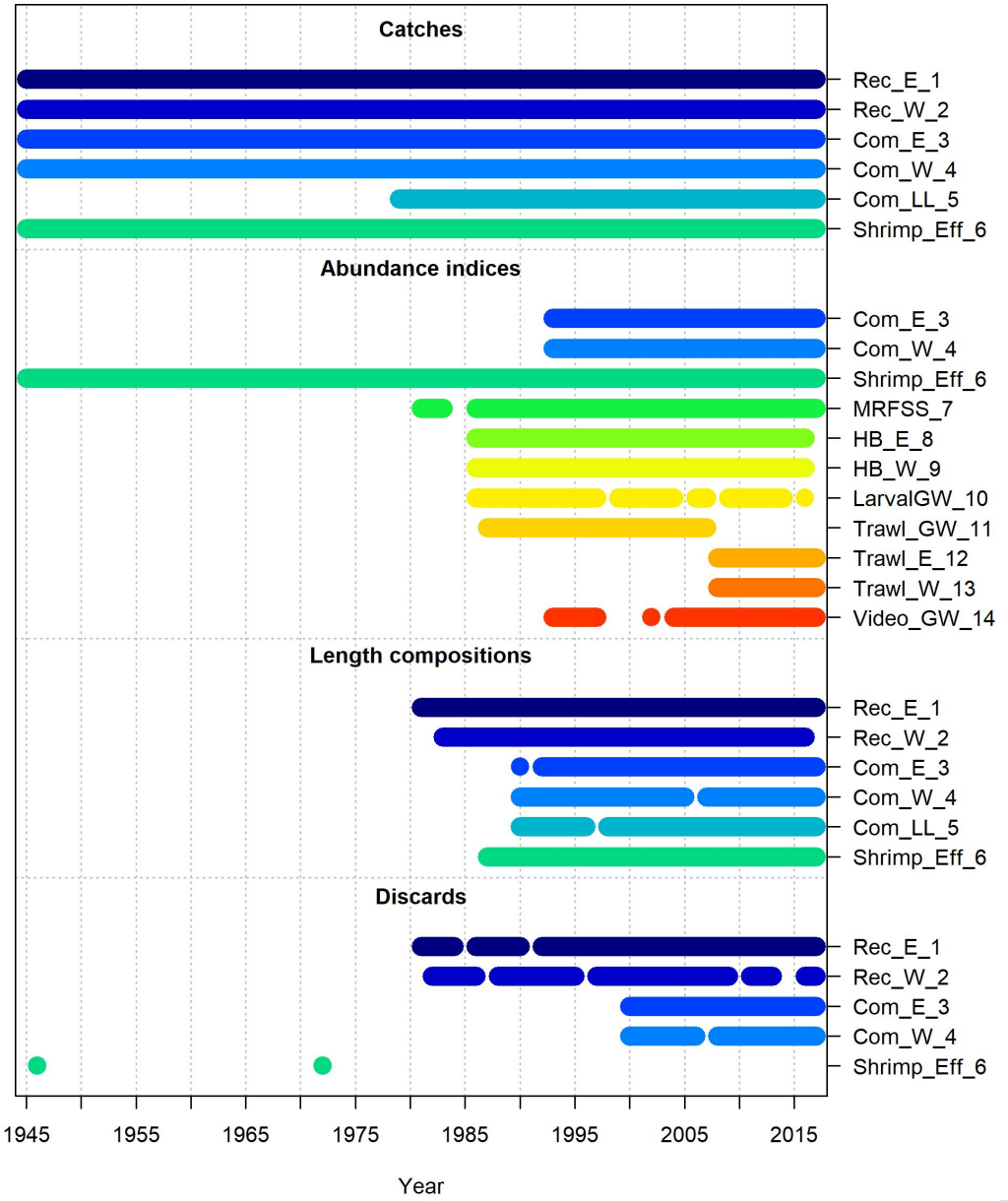
SEDAR 62 (2019)
Assessment halted near end due to data issues

Interim Analysis (2020)
Analysis adjusted ABC based on recent video index trend; ABC increased to 456,900 pounds whole weight

SEDAR 100

SEDAR 62 overview

- Major overhaul of model was attempted, but was not completed
  - Stratification of data complicated model development
  - Different spatial configurations were considered but not completed.



Major issues during SEDAR 62

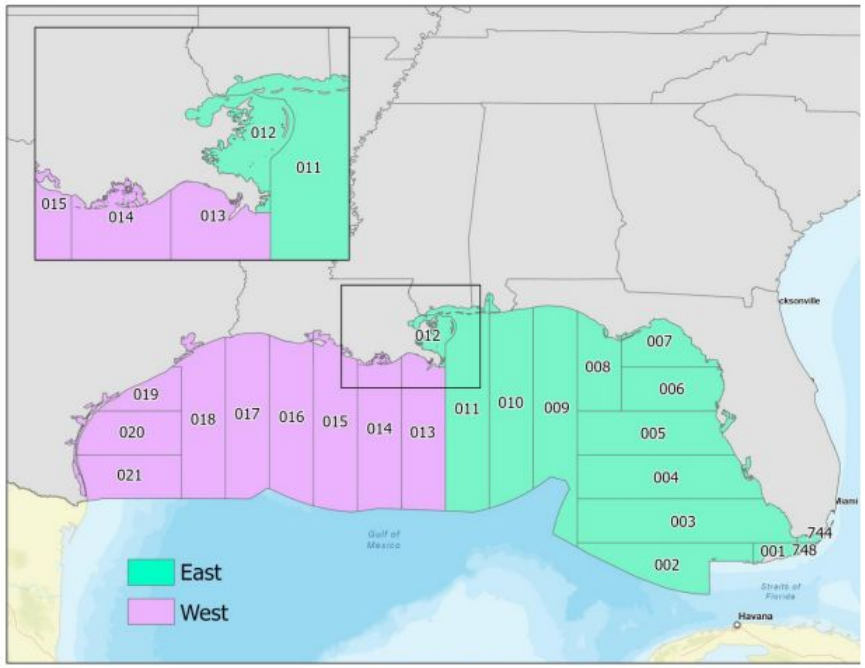
- Age data were not recommended for use because age readings from spines were found to be biased
  - Fit to length compositions instead, which required a switch from age-based to length-based selectivity
  - Fixed growth parameters at Patterson *et al.* values which were derived from otolith data
- Data inconsistencies (within the assessment model):
  - Historical recreational landings (1945-1980) were not updated to MRIP-FES units
  - Shrimp bycatch estimates were not updated (=SEDAR 43)

SEDAR 100 approach for data provision

- Since SEDAR 9, have used a **one area model but treat fishing fleets as areas** (e.g., Fleet 1 = Recreational East, Fleet 2 = Recreational West, etc.):
  - All fishery-dependent data split into **West** and **East** to capture differences in selectivity and fishing mortality
  - Fishery-independent and shrimp bycatch Gulf-wide

Requested all data split:

1. **West** vs **East**
2. Gulf-wide



SEDAR100-DW05, Figure 1

SEDAR 100 approach for modeling

- Starting with SEDAR 43 Base Model as our continuity
  - Considering SEDAR 62 model configuration changes

Main modeling questions:

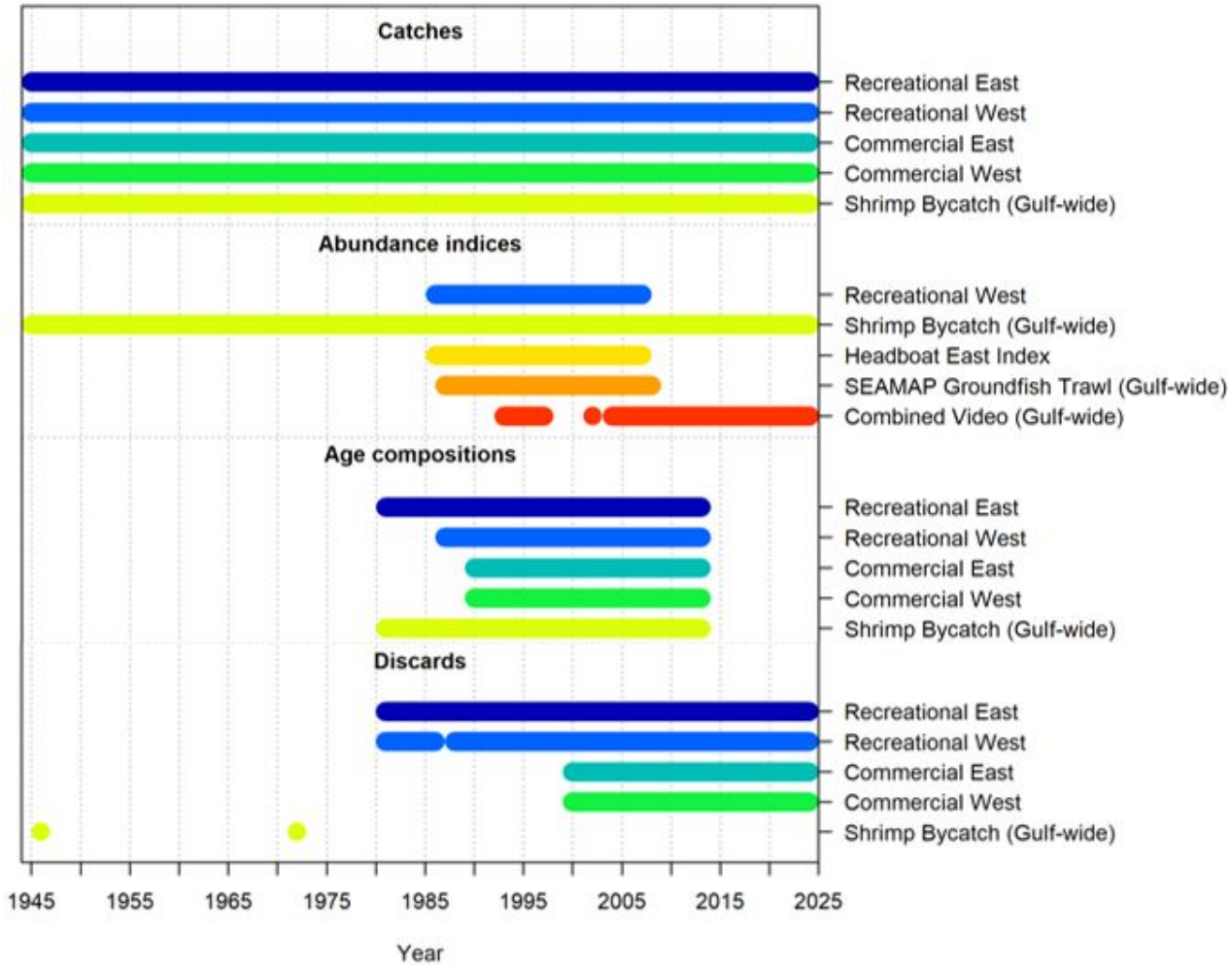
1. Which composition data (length, age, or both) to use and how to define selectivity (age-based or length-based)?

2. Do data support a true two-area (East vs West) model configuration, the continuity approach of treating fishing fleets as areas, or a Gulf-wide model?

SEDAR 43 data structure

Major changes to:

- Recreational removals (FES)
- Uncertainty in removals
- Commercial discard estimation
- Shrimp bycatch estimation
- G-FISHER survey
- Ageing protocol/age data and derived inputs (growth, M, maturity-at-age, compositions)
  - Re-aged all spines 5+ yrs
  - SEDAR 43 used ALKs to get age compositions
- Indices not recommended for use in SEDAR 100:
  - MRIP East CPUE
  - Commercial East & West CPUE
  - Fall Plankton Survey
  - Headboat 2008+



SEDAR 100 data

- **Landings**
  - Recreational East WWT or Numbers: 1945-2024
  - Recreational West WWT or Numbers: 1945-2024
  - Commercial East WWT: 1945-2024
  - Commercial West WWT: 1945-2024
- **Mean weight of landings (kg whole weight per fish)**
  - Recreational East: 1981-2024
  - Recreational West: 1981-2024
- **Abundance indices**
  - Headboat West: 1986-2007
  - Shrimp Effort: 1945-1959 (back-calculated), 1960-2023
  - Headboat East: 1986-2007
  - SEAMAP Trawl Survey (Early): 1987-2008
  - SEAMAP Trawl Survey (Late): 2009-2024
  - Video survey (FWRI, PC, SEAMAP): 1993-2024
- **Discards**
  - Recreational East Numbers: 1981-2024
  - Recreational West Numbers: 1981-2024
  - Commercial East WWT or Numbers: 2000-2024
  - Commercial West WWT or Numbers: 2000-2024
  - Shrimp Bycatch Numbers: 1946-1983 (back-calculated), 1984-2023 (estimated)
- **Length composition of discards**
  - Recreational East: 2009-2024 (At-Sea observers)
  - Commercial East: 2007-2024 (NMFS Obs. Program)
  - Commercial West: 2007-2024 (NMFS Obs. Program)
  - Shrimp bycatch: 1984-2023 (trawl used as proxy)
- **Length composition of retained catch**
  - Recreational East: 1981-2024
  - Recreational West: 1981-2024
  - Commercial East: 1989-2024
  - Commercial West: 1989-2024
- **Conditional age-at-length and mean length-at-age of retained catch**
  - Recreational East & West: 2003-2024
  - Commercial East & West: 2003-2024
- **Age composition of retained catch (Nominal)**
  - Recreational East: 2003-2024
  - Recreational West: 2007-2024
  - Commercial East: 2003-2024
  - Commercial West: 2005-2024
- **Length composition of survey data**
  - SEAMAP Trawl Survey: 1987-2008, 2009-2024
  - Video: 1995-2024

SEDAR 43 "Continuity" model configuration

- 1945 (start unfished) – 2024
  - Re-evaluate start year (**TOR**)
- 1 area (Gulf-wide), 1 season model
  - Re-evaluate spatial structure (**TOR**)
- 1 gender model (50:50 sex ratio)
- Maturity a function of age
  - Reliability questioned given **ageing issues**
- Fecundity a function of length
  - Reliability questioned because assessment model **does not incorporate uncertainty**

SEDAR 43 "Continuity" model configuration (cont'd)

- von Bertalanffy growth
  - Needs updating due to **revised age data**
- Lorenzen natural mortality
  - Needs updating with **Hamel and Cope (2022)** approach for specifying target M
- Beverton-Holt spawner-recruitment relationship
  - Steepness estimated (0.46)
  - SigmaR estimated (0.36)
  - Recruitment deviations: 1981-2024
- Ageing error matrix
  - Needs updating based on **revised age data**

SEDAR 43 "Continuity" model configuration (cont'd)

- 5 fishing fleets with landings, discards, and composition inputs
  - Shrimp bycatch included as a discard only fleet
- Age-based selectivity for fleets
  - SEDAR 43 input **different age composition**; fitted to ages converted from length compositions with Age-Length Keys
- Time-varying retention to account for changes in regulations for targeted fleets
  - Inflection points fixed at size limits
  - **1999 incorrect** in SEDAR 43

SEDAR 43 "Continuity" model configuration (cont'd)

- 2 fishery-dependent CPUE indices of abundance recommended for SEDAR 100 (SEDAR 43 had 5):
  - ~~Recreational East (MRIP East)~~ (**not representative** of abundance, numerous recent regulation changes)
  - Recreational West (Headboat West) (**truncated in 2007** due to regulations, notably implementation of circle hooks)
  - ~~Commercial East (logbook)~~ (**not representative** of abundance, numerous recent regulation changes)
  - ~~Commercial West (logbook)~~ (**not representative** of abundance, numerous recent regulation changes)
  - Headboat East (**truncated in 2007** due to regulations, notably implementation of circle hooks)

SEDAR 43 "Continuity" model configuration (cont'd)

- 2 fishery-independent surveys (SEDAR 43 had 3):
  - ~~Fall Plankton Survey (index only)~~
    - Captures mostly juveniles, not larvae, and therefore **not a good indicator of spawning stock biomass**
  - Groundfish Trawl Survey (index only)
    - **Split into 1987-2008 and 2009-2024** to account for major survey design change
    - **Summer + Fall combined** for SEDAR 100 based on similarities in compositions (Fall only in SEDAR 43)
    - Data suggest **more than age-0 are encountered**
  - Video Survey (index only)
    - **Updated to reflect G-FISHER** survey design which combines three video surveys using a habitat-based approach
- Age-based selectivity for surveys (**fixed in SEDAR 43**)

SEDAR 43 “Continuity” model

- A true SEDAR 43 “Continuity model” is not possible for this assessment given numerous changes in data provision and recommendations for inclusion

- **SEDAR 100 Approach**: build a “revamped continuity model” for the purpose of model bridging and development using the data submitted for SEDAR 100 combined with a better understanding of data quality

1. SEDAR 100 approach for compositions

- Which composition data (length, age, both) to use and how to define selectivity (age-based vs length-based)?

Data Input (Availability)	Fishing Fleet	Survey	Shrimp Bycatch
Length compositions	Yes: -DW04, -DW07, -DW11, -DW13	Yes	(Trawl as Proxy)
Age compositions		Trawl only	
Conditional age-at-length		Trawl only	
Mean length-at-age (of landings)			

Gulf Gray Triggerfish Assessment Terms of Reference May 2025

Data Workshop

Assessment Process

1. Explore the appropriateness of an age-based, length-based, and hybrid (age- and length-based) approaches for describing fleet and survey selectivity.

2. Consider continuity model stratification and data structure and suggest any recommended revisions.

- Explore fleet-specific length compositions

Ageing improvements for SEDAR 100

- Enormous undertaking by Life History team to revise age data and ageing error matrix for this assessment
- Re-aged all fish 5+ years to reduce bias when reading spines based on protocol developed by Potts et al. (2023) and later validated by Chamberlin et al. (2024)[**RD03**]

Potts et al. (2023)

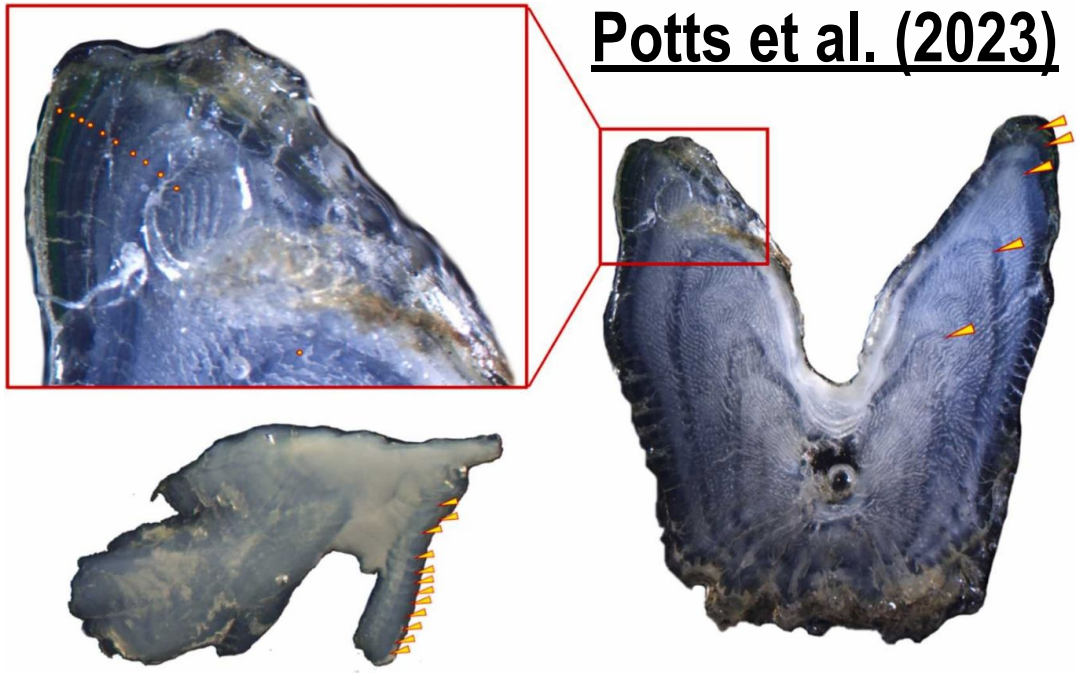
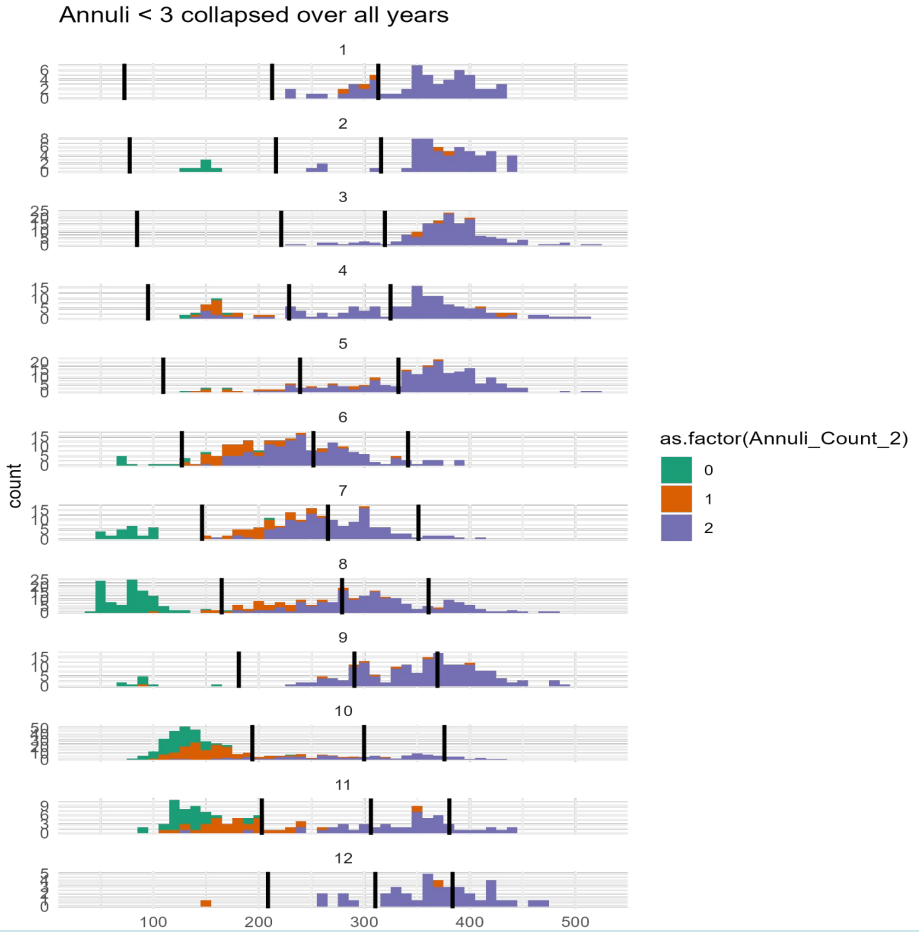
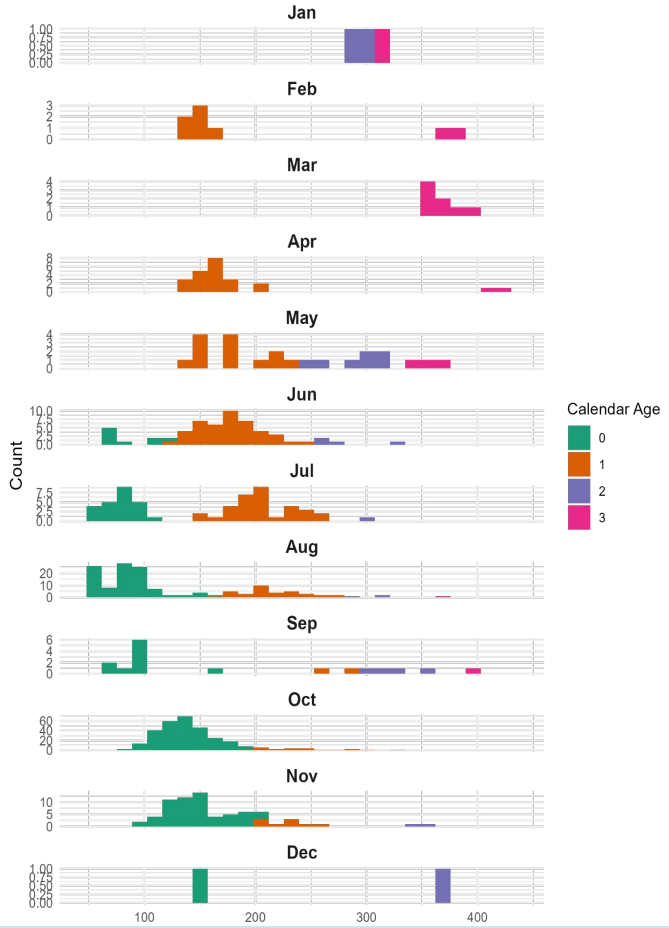


Fig. 10. Images of an otolith section and spine section from the same individual gray triggerfish, *Balistes capriscus*. Yellow arrows represent initial age readings (otolith age = 12 and spine age = 5). Inset is magnified area of spine containing wide translucent zone showing compacted growth zones (yellow dots). The faint yellow/green mark on the spine section is the calcein chemical mark.

More ageing improvements during SEDAR 100

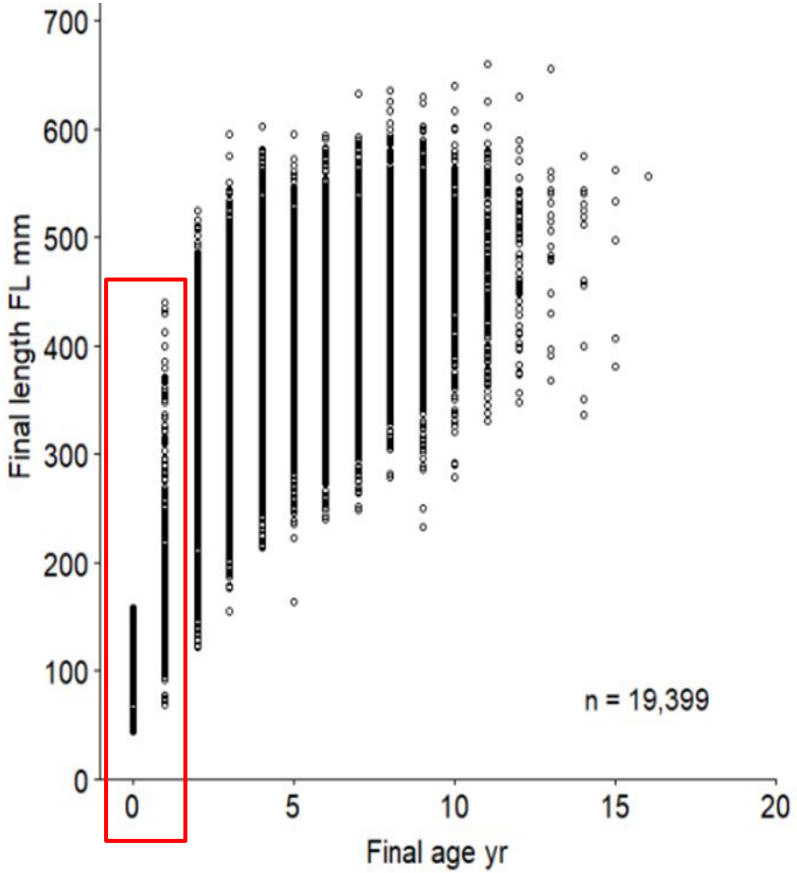
- Re-evaluated calendar age assignments for samples with annuli counts of 0 and 1 by re-aging and then using ELEFAN and age slicing

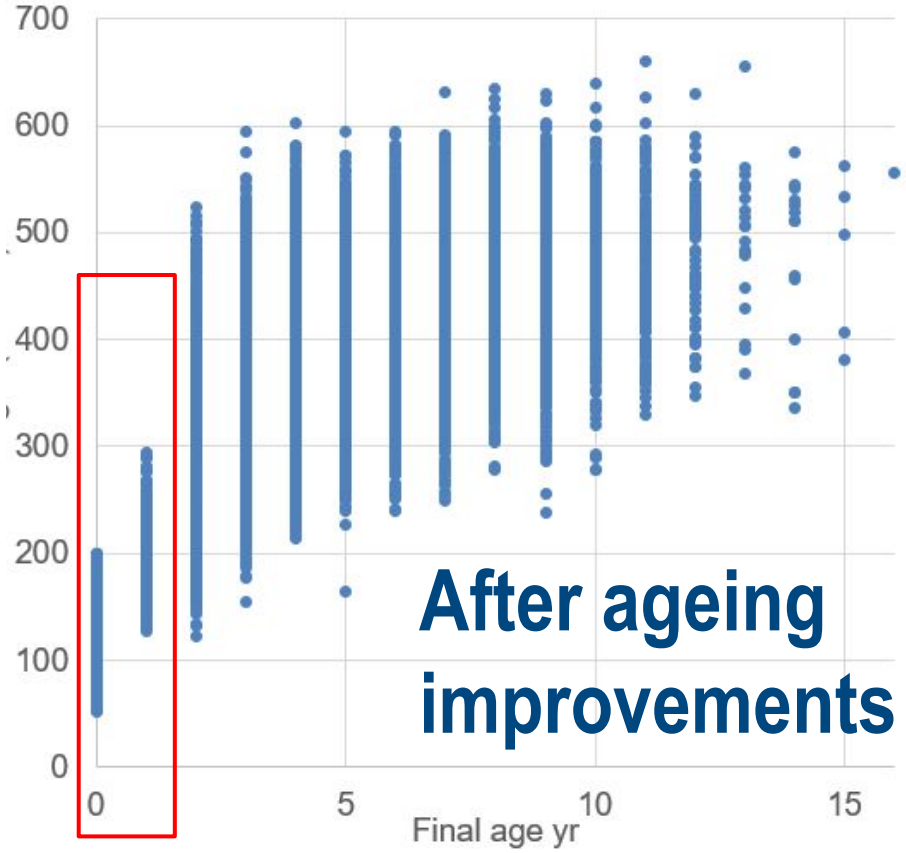




But… ageing remains a key uncertainty

- Species remains very difficult to age
  - Concerns voiced in public comments (**DW20**)





SEDAR 100 proposal for compositions

DATA

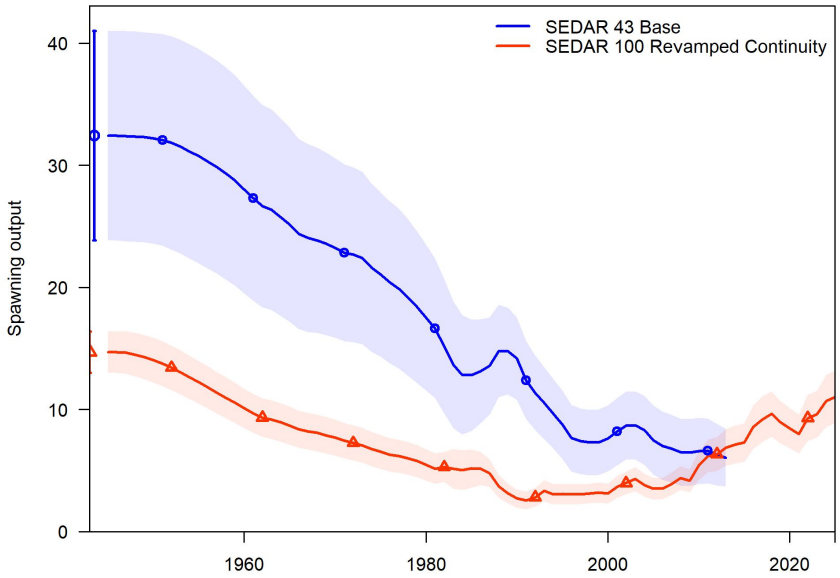
- Input length compositions
  - Weighted preferred, nominal if not available
- Input age compositions (conditional age-at-length preferred but nominal if needed)
  - Weighted age compositions are limited by data, and their inclusion prevents the use of weighted length compositions in the model (they are used to weight the age comps)
- Input ageing error matrix to account for uncertainty in age estimates

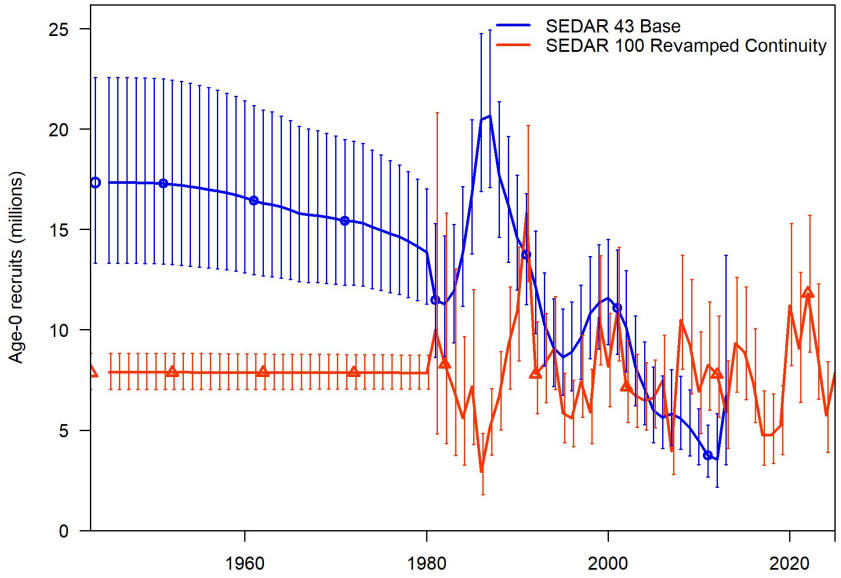
MODEL

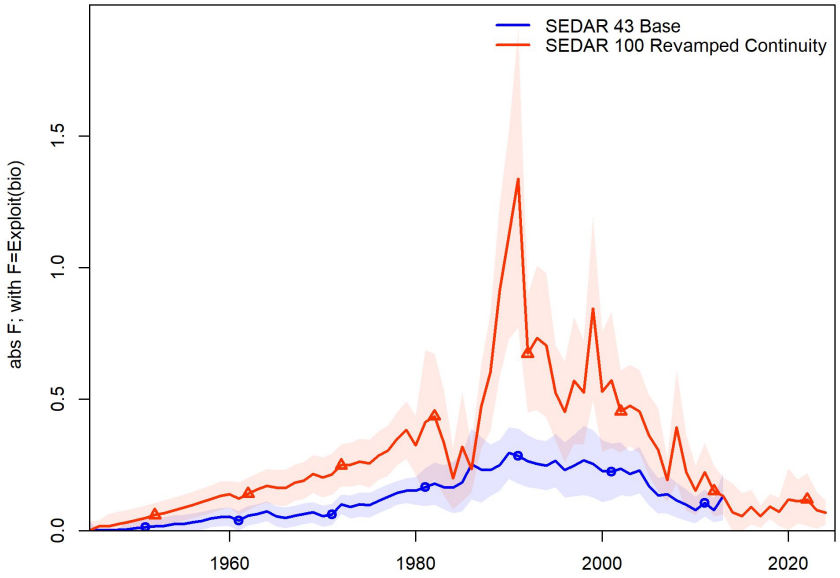
- Use length-based selectivity for all fishing fleets, shrimp bycatch, and surveys

Model comparison

- Revamped continuity based on different data and model configuration
- Differences evident in time series but some time periods have similar trends







2. SEDAR 100 approach for area(s) modeled

- How many areas to model?

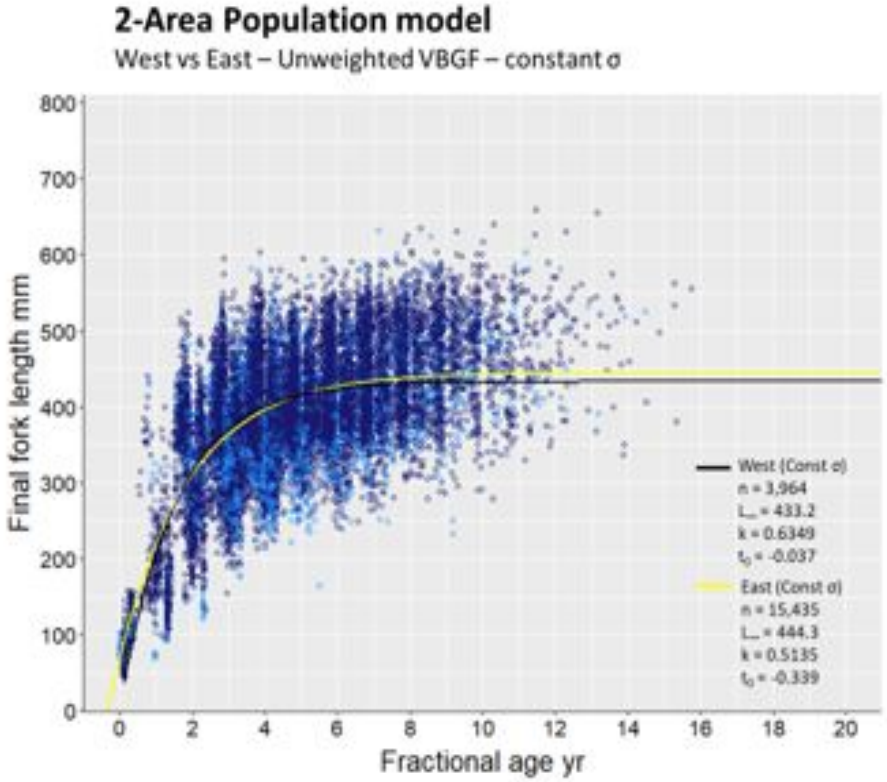
Assessment Process

	Continuity	Alternate 1	Alternate 2
Number of Areas	1, but fleets treated as areas: Fleet 1 = Recreational East Fleet 2 = Recreational West …	1 (Gulf-wide)	2 (East and West separated)
Data Needs	Fishery-dependent data by region	All data inputs provided Gulf-wide	All data inputs provided East and West

- Consider continuity model stratification and data structure, and suggest any recommended revisions.
- Re-evaluate whether commercial and recreational fleets should be separated by East and West by reviewing all available data (landings, discards, indices, compositions).

Support for true two-area model?

- Is there strong evidence to support different stock structure between East and West? - No
  - Considered a single stock based on the species' prolonged, indeterminate larval stage
  - No differences in growth evident between West and East in SEDAR 100



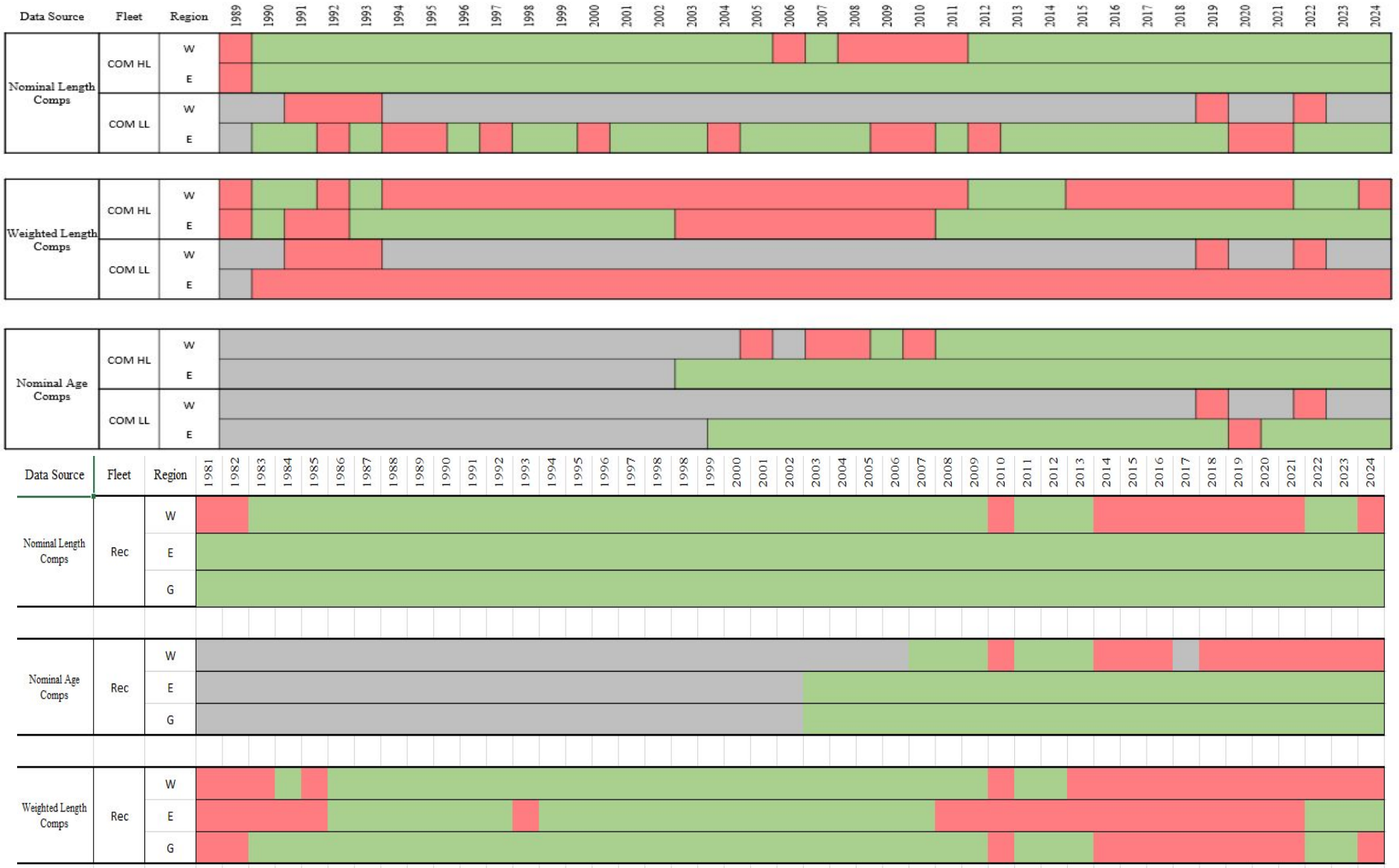
Is there support to continue with fleets-as-areas?

- Do data support separating West and East fishing fleets?
- Majority of data from East, generally limited data in the West

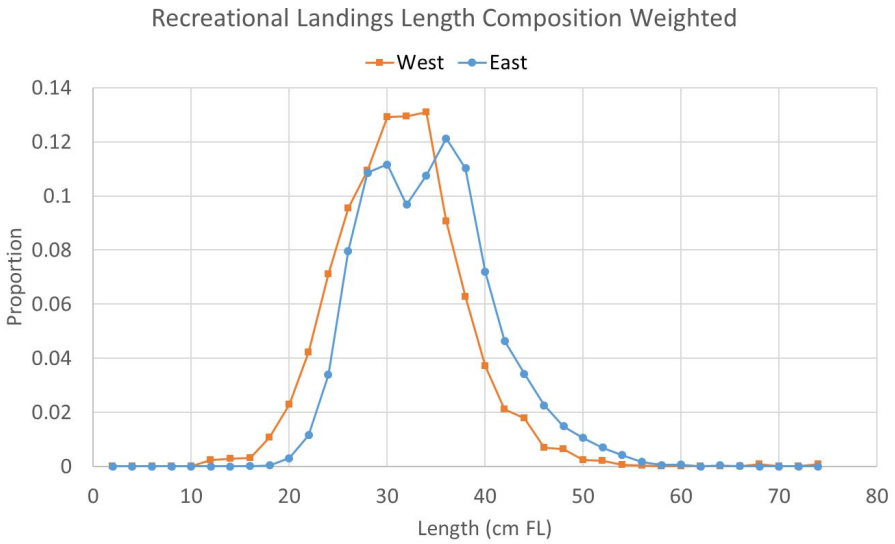
Type of data	Rec West	Rec East	Com* West	Com* East
Landings (numbers or weights*)	9%	**91%**	28%	**72%**
Discards (numbers)	4%	**96%**	15%	**85%**
Landings lengths (raw data)	19%	**81%**	37%	**63%**
Landings ages (raw data)	5%	**95%**	**67%**	33%
Discard length comp	NA	**100%**	7%	**93%**

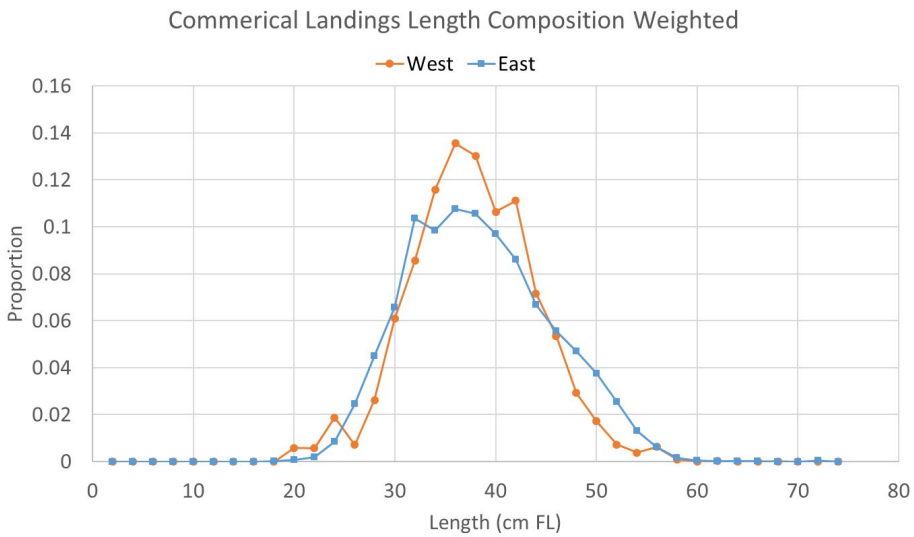
	West	East
Shrimp Effort (Days)	**75%**	25%
Shrimp Bycatch (Numbers)	**93%**	7%

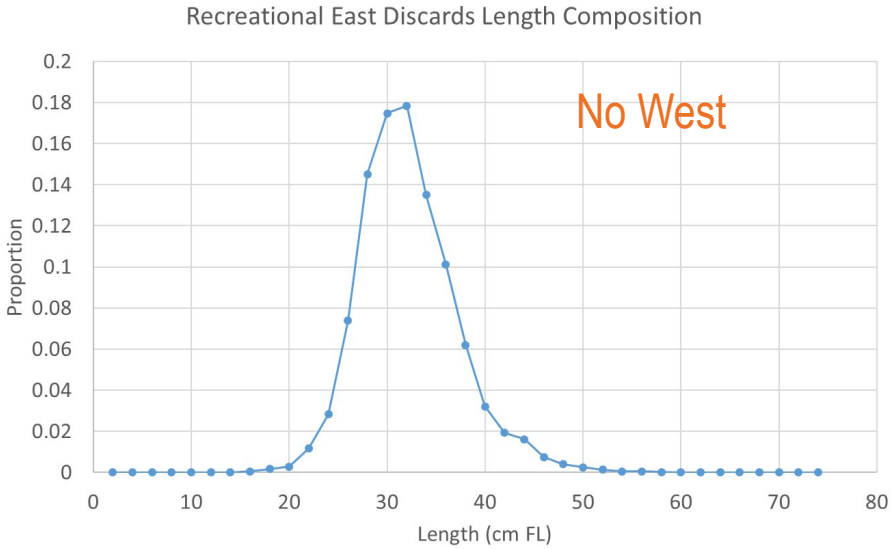
Composition data very limited in the West

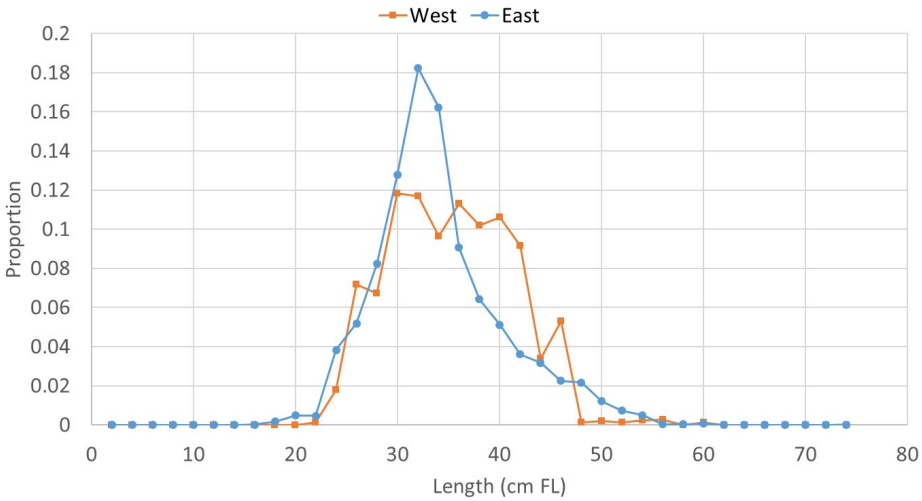


Length: Small differences between West vs East

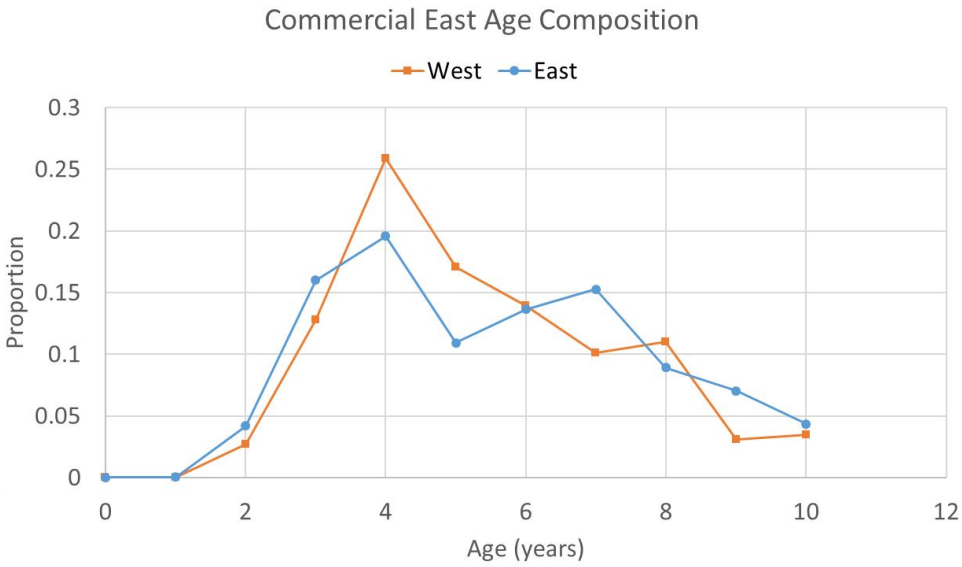








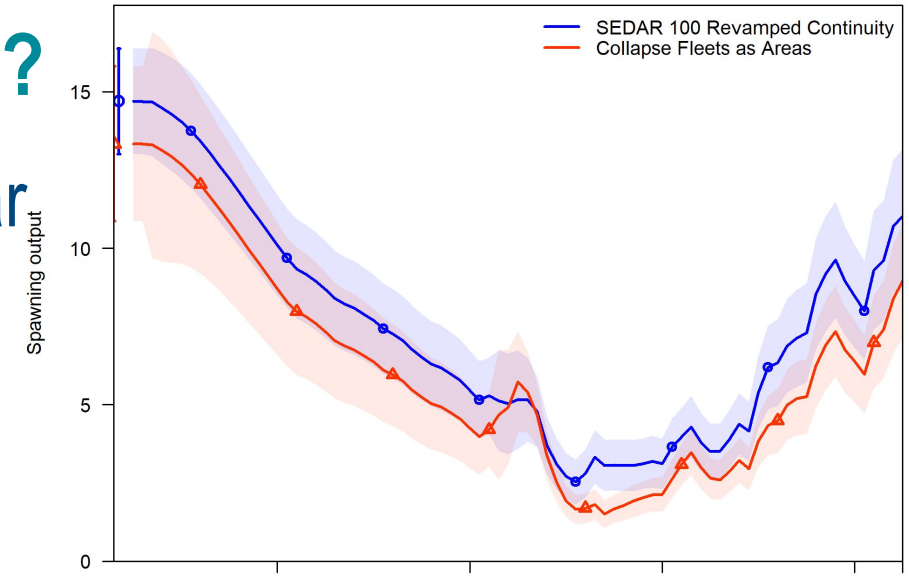
Age: Small differences between West vs East

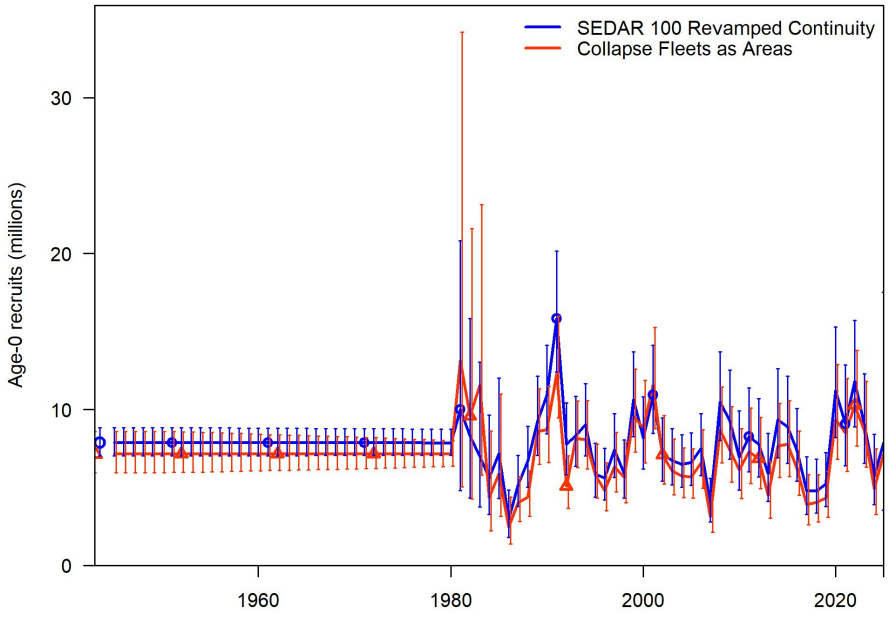


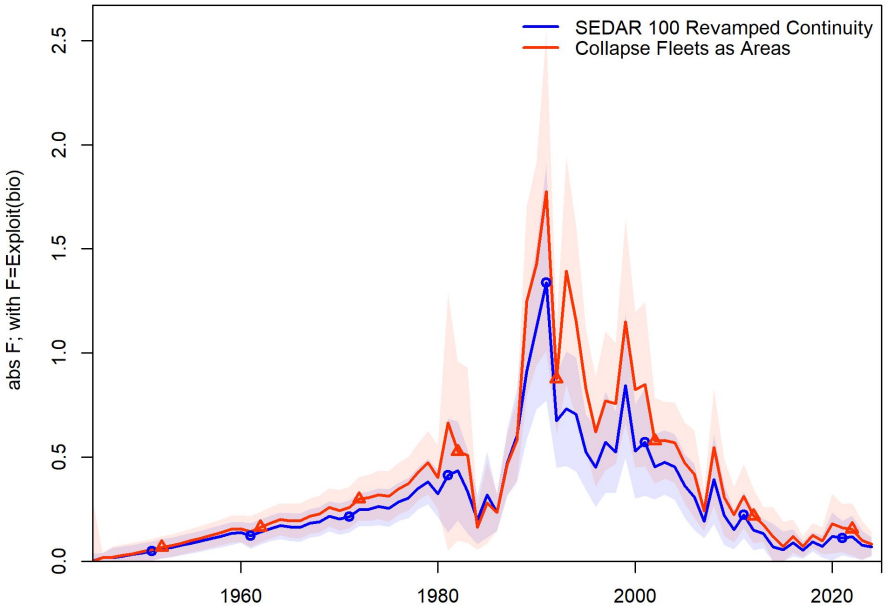
- Do data support separating West and East fishing fleets?
  - No
    - Limited data in the West
    - No strong evidence for different selectivities

Support to move to a single area model (i.e. collapse fleets-as-areas)?

- Overall, time series are similar and quantities generally remain within or very close to confidence limits



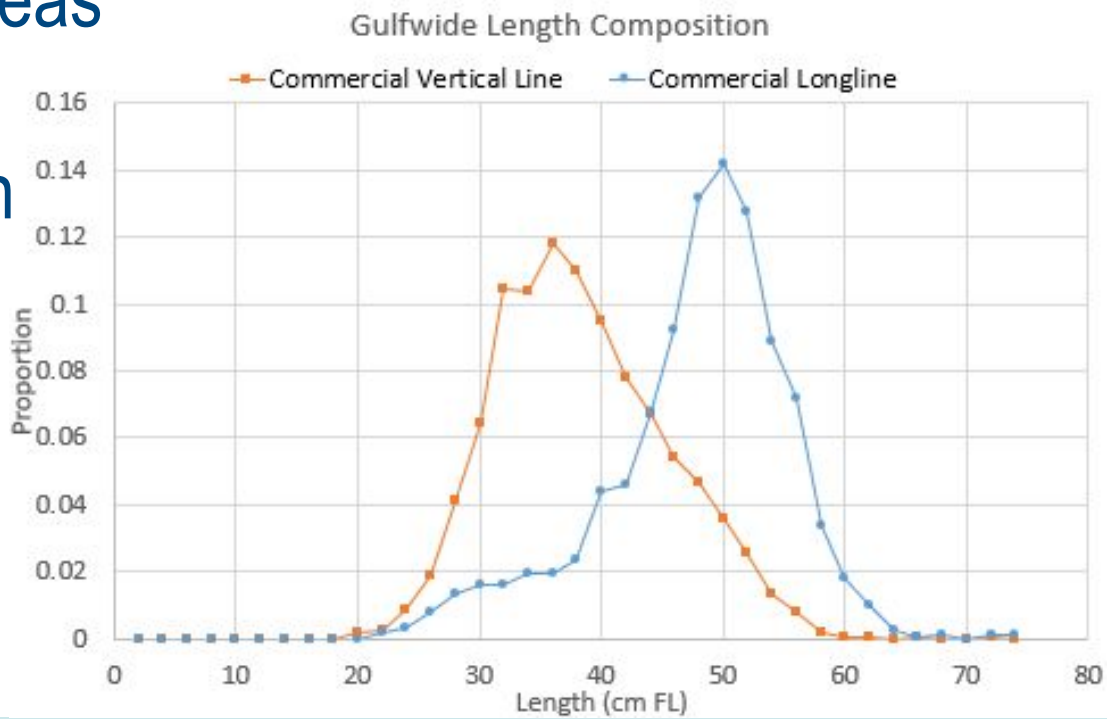




SEFSC recommendations for SEDAR 100

Move forward with model configuration that:

- Uses length compositions and incorporates age data as feasible
- Collapses fleets-as-areas
- Separates longline from vertical line given strong differences in selectivities
  - Decision made during SEDAR 62



Planned topics for sensitivities

- Start year
- Initial F (if starting in fished condition)
- Shrimp bycatch selectivity
- Growth estimation
- Steepness
- Discard mortality rates

Next steps

- Finalize Data Workshop report
- Continue development towards a base model and conduct a full suite of diagnostics in preparation for Review Workshop

SEDAR 100
Gulf Gray Triggerfish
Schedule of Events

October 2024
Updated: March, August 2025

RW Working Paper Submission	July 2026
Final Assessment Report distribution to review panel	July 2026
Review Workshop: (Tampa, FL)	**August 2026**
First Draft Review Reports	(end of workshop)
Review Workshop Panel Drafts due to Chair	September 2026
Review Workshop Addenda/Revision Reports due to Chair & SEDAR Staff	September 2026
Review Workshop Reports due to SEDAR Staff:	September 2026
Complete Assessment Report Submitted to Council/SERO/SEFSC	October 2026

Questions?

Thank you for your attention!