



**NOAA**  
**FISHERIES**

SEFSC

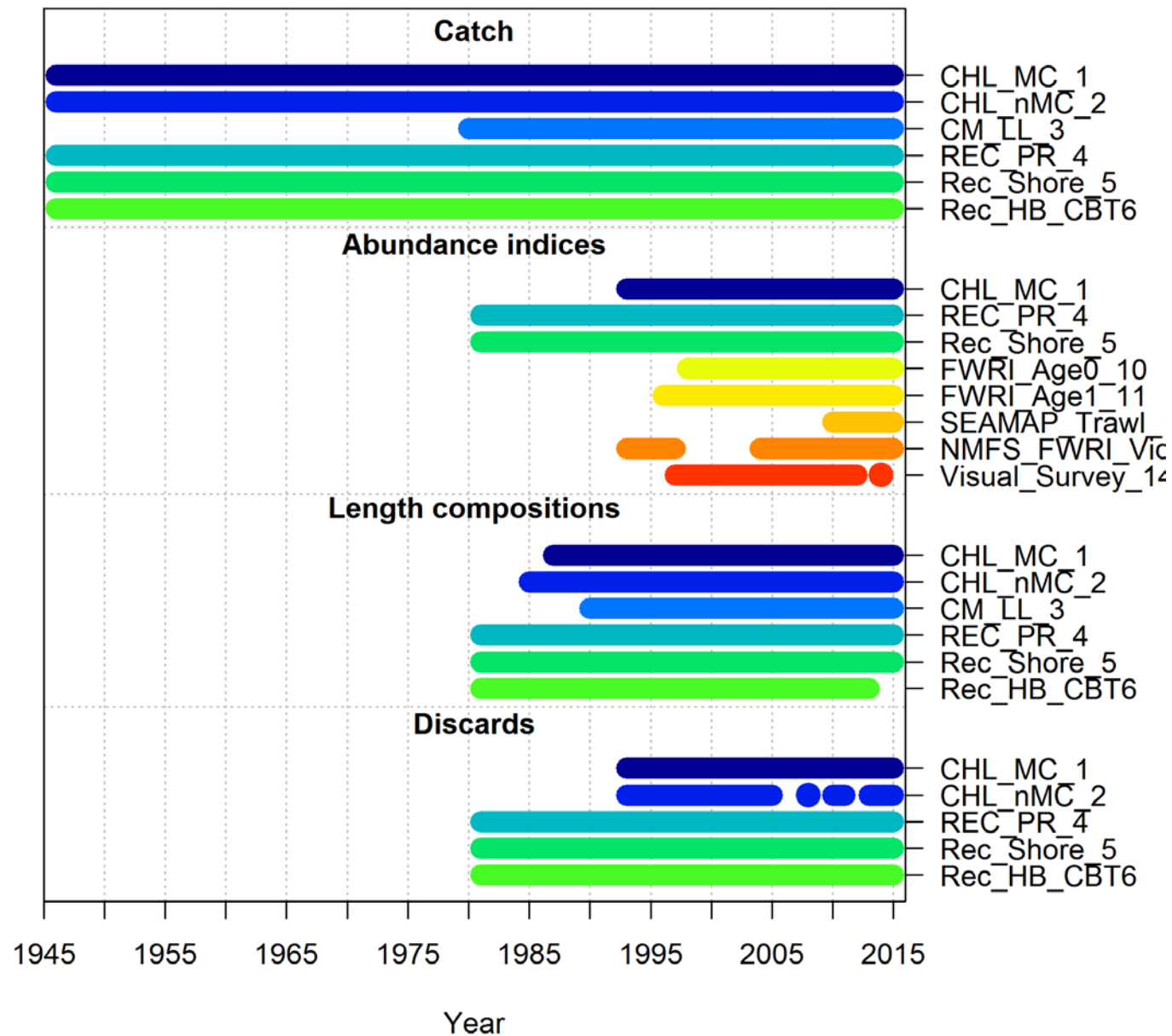
# Gulf of Mexico Gray Snapper Benchmark Assessment: assessment results



Jeff Isely  
SEFSC Miami

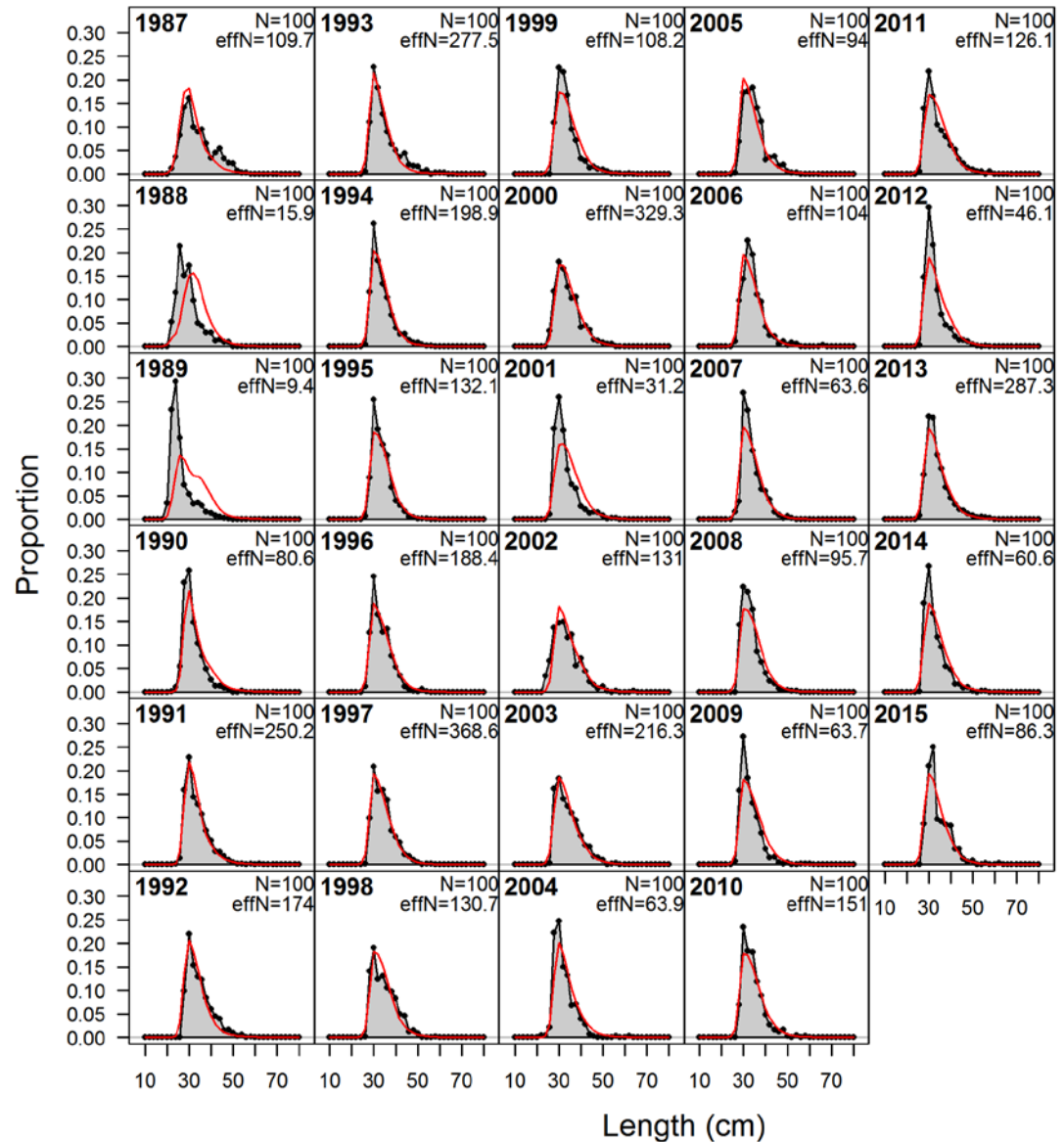
GMFMC SSC Meeting  
Tampa, FL  
May 30-June 1, 2018

# Results: Data Summary



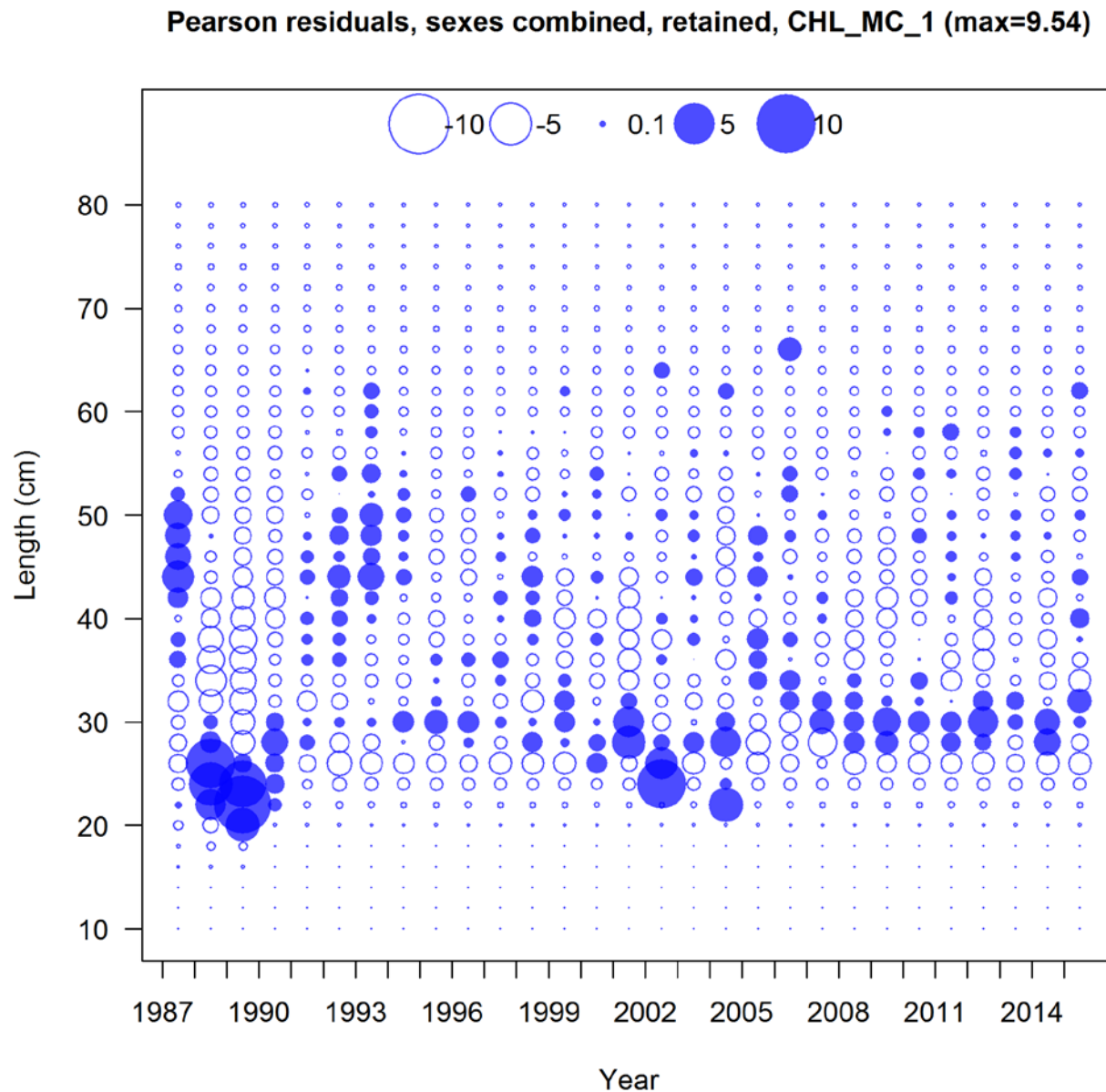
# Model Fits: Length Composition

- Com HL+Other
- Monroe County



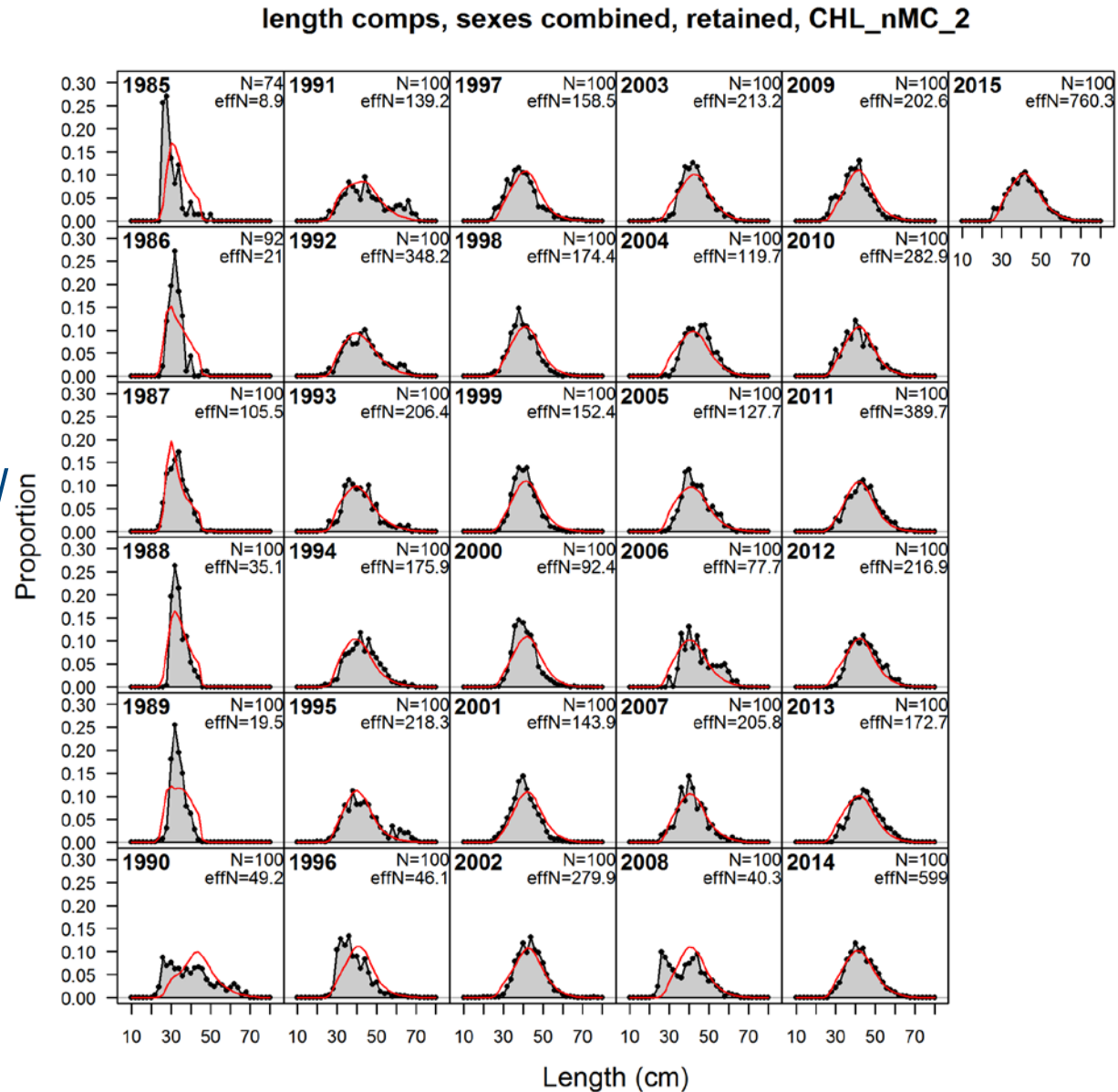
# Model Fits: Length Composition

- Com HL+Other
- Monroe County



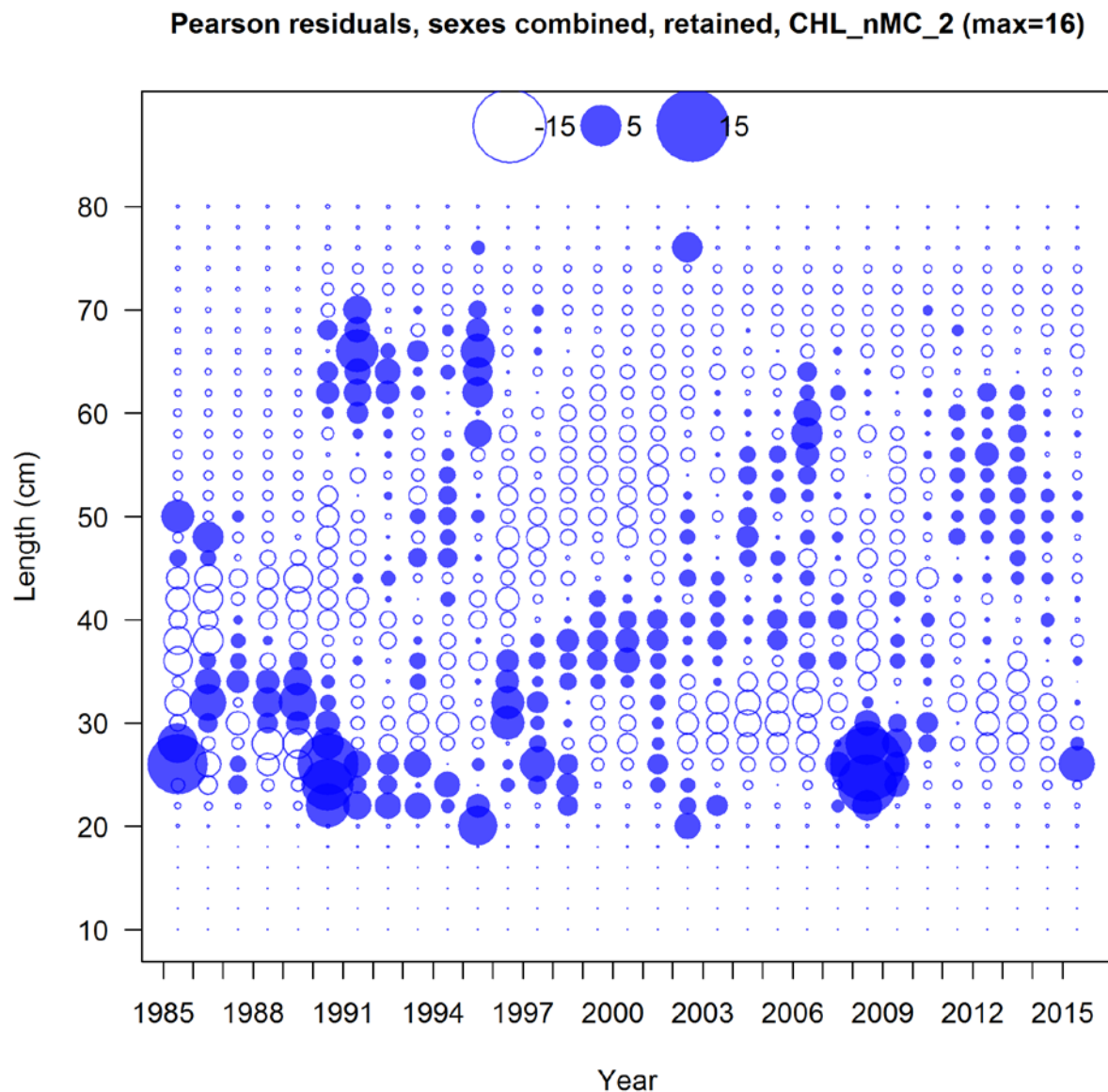
# Model Fits: Length Composition

- Com HL+Other
- Outside Monroe County



# Model Fits: Length Composition

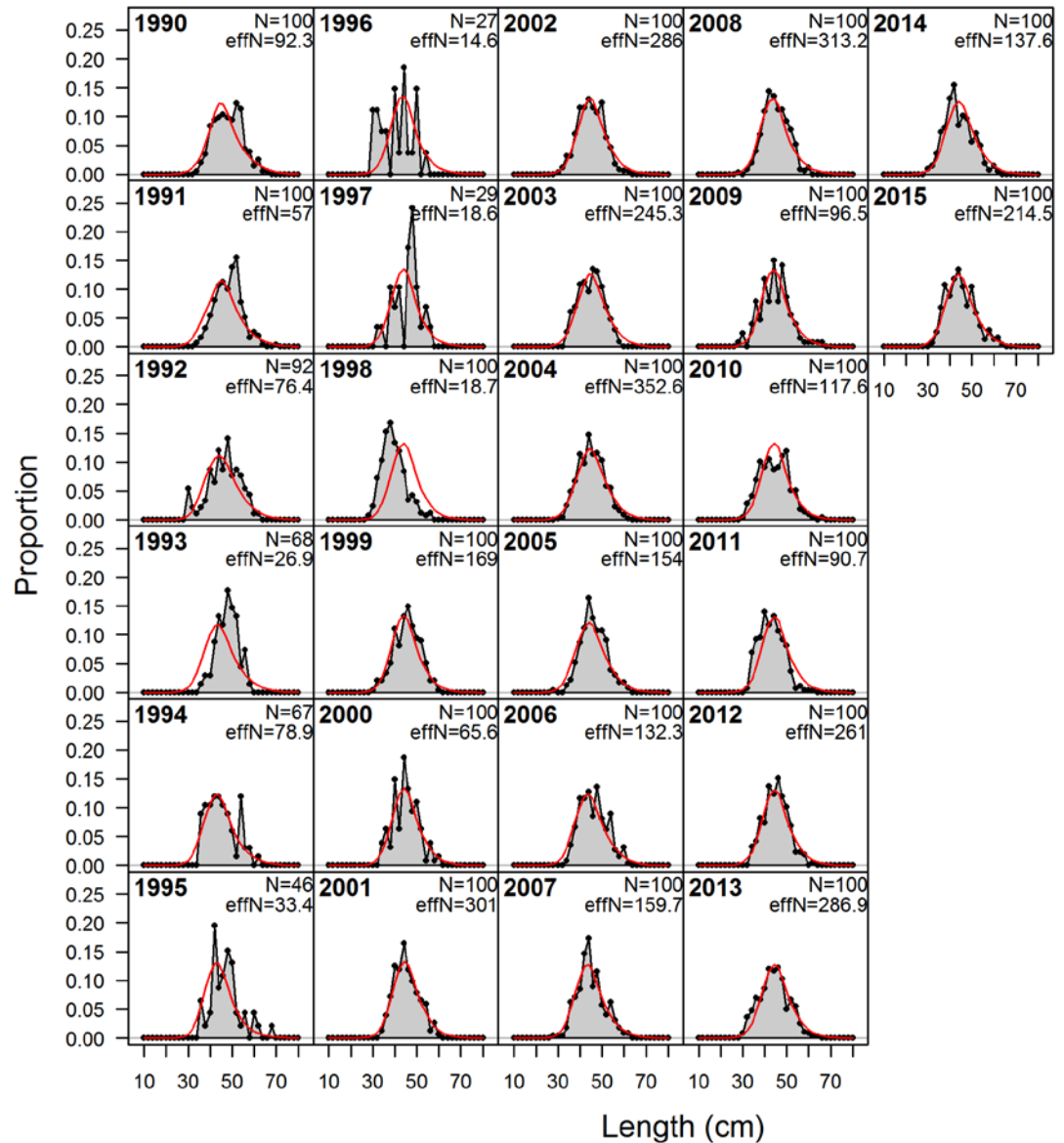
- Com HL+Other
- Outside Monroe County





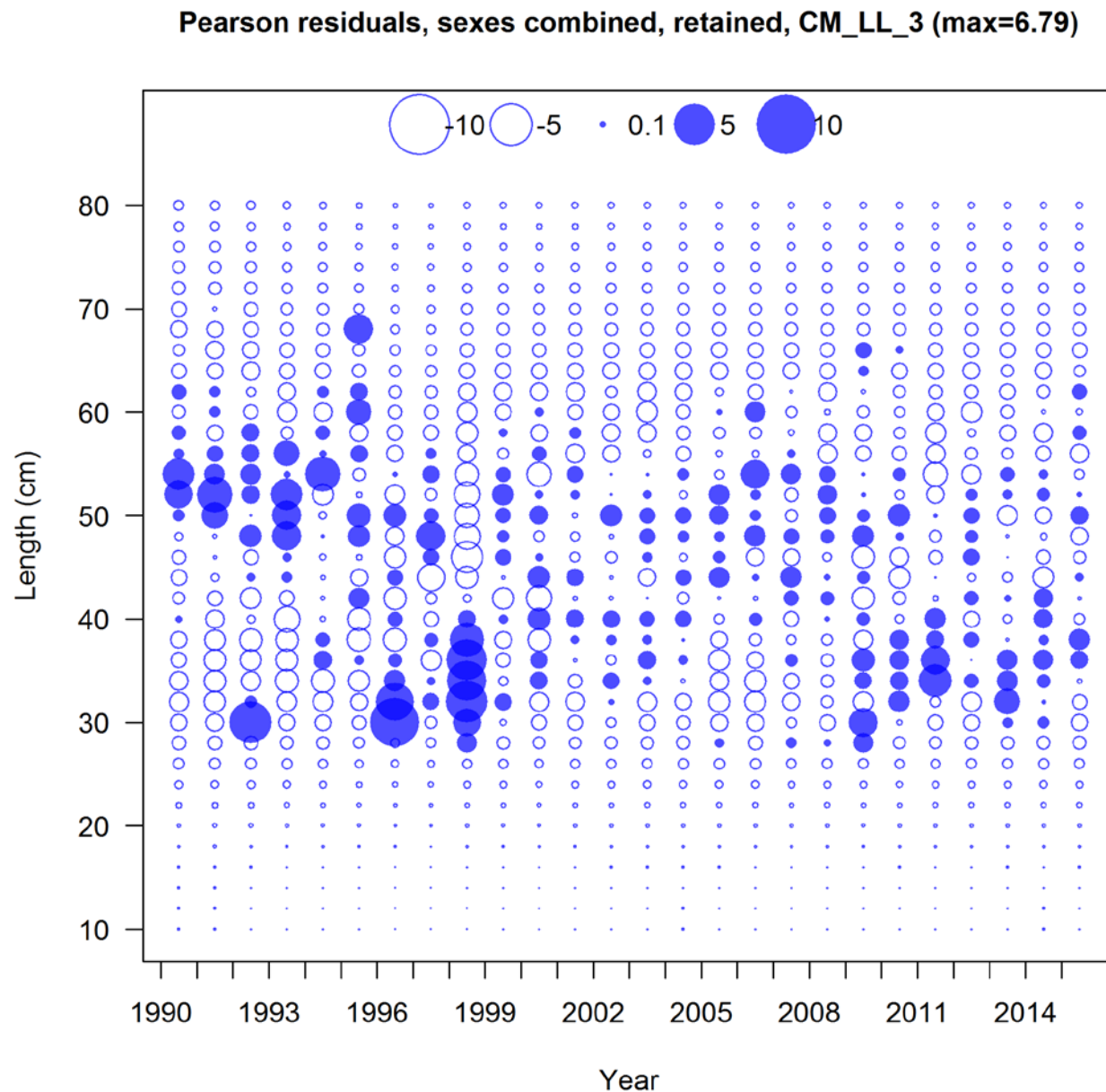
# Model Fits: Length Composition

- Com LL



# Model Fits: Length Composition

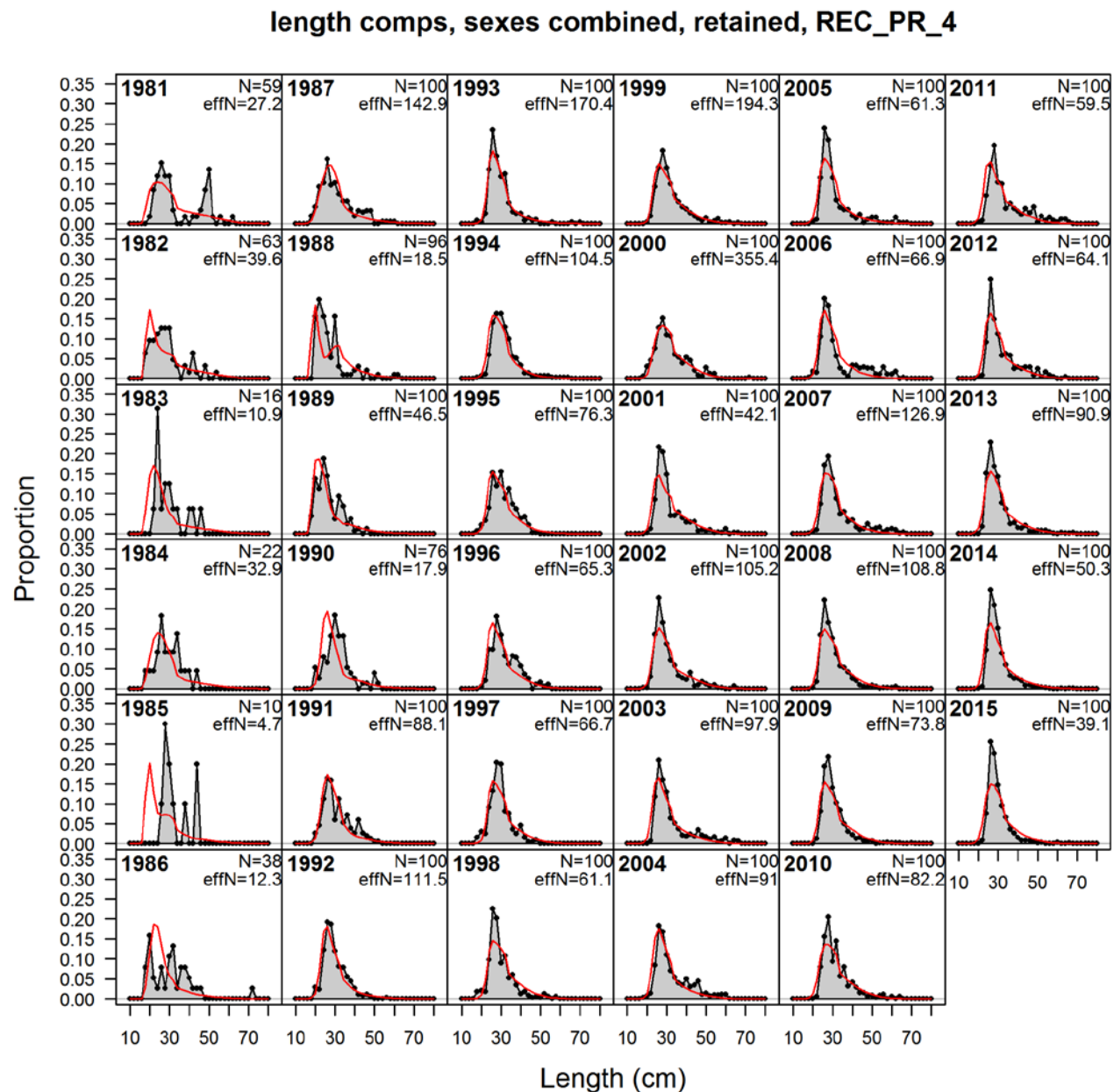
- Com LL





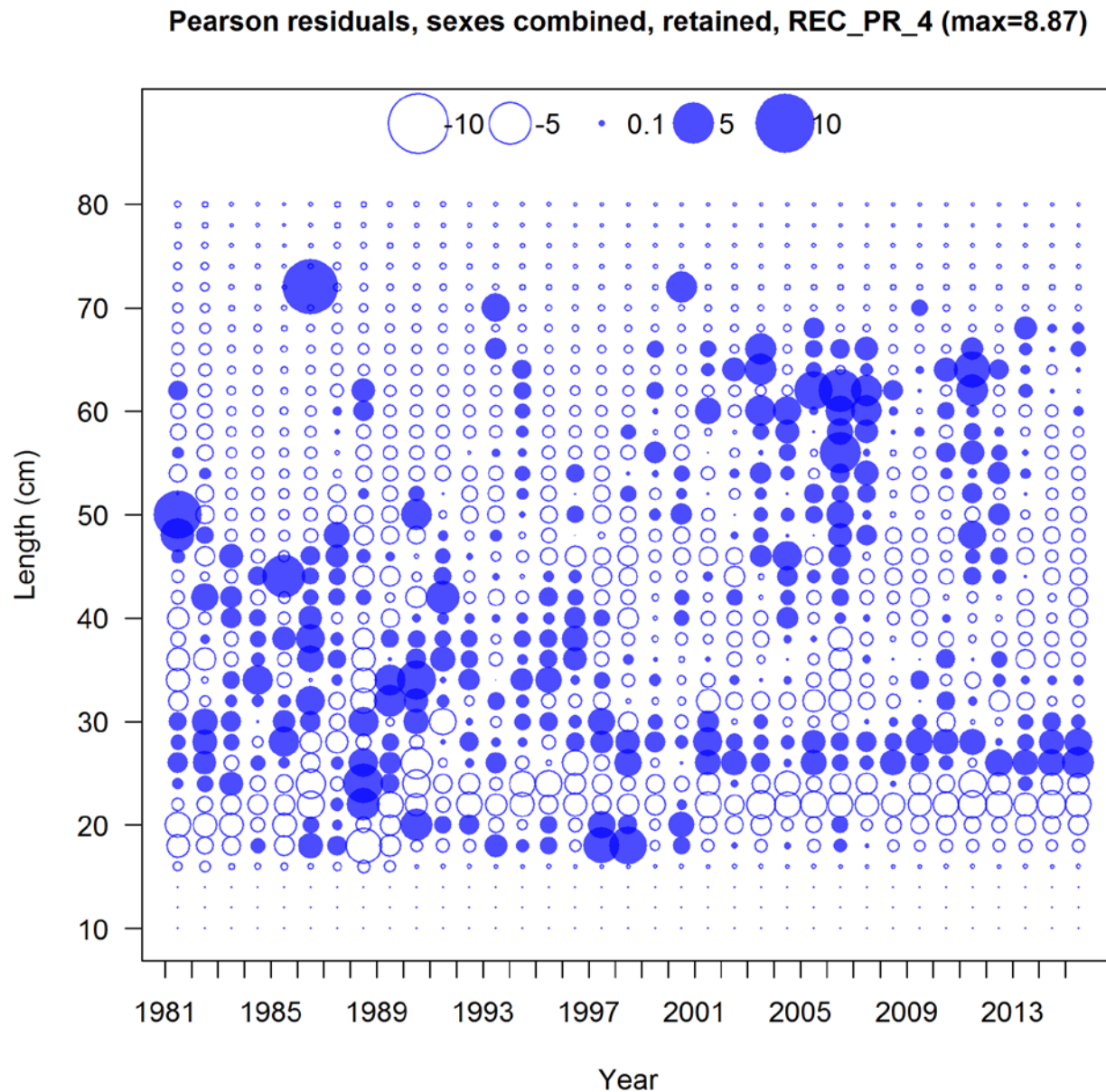
# Model Fits: Length Composition

- Rec Private Boat



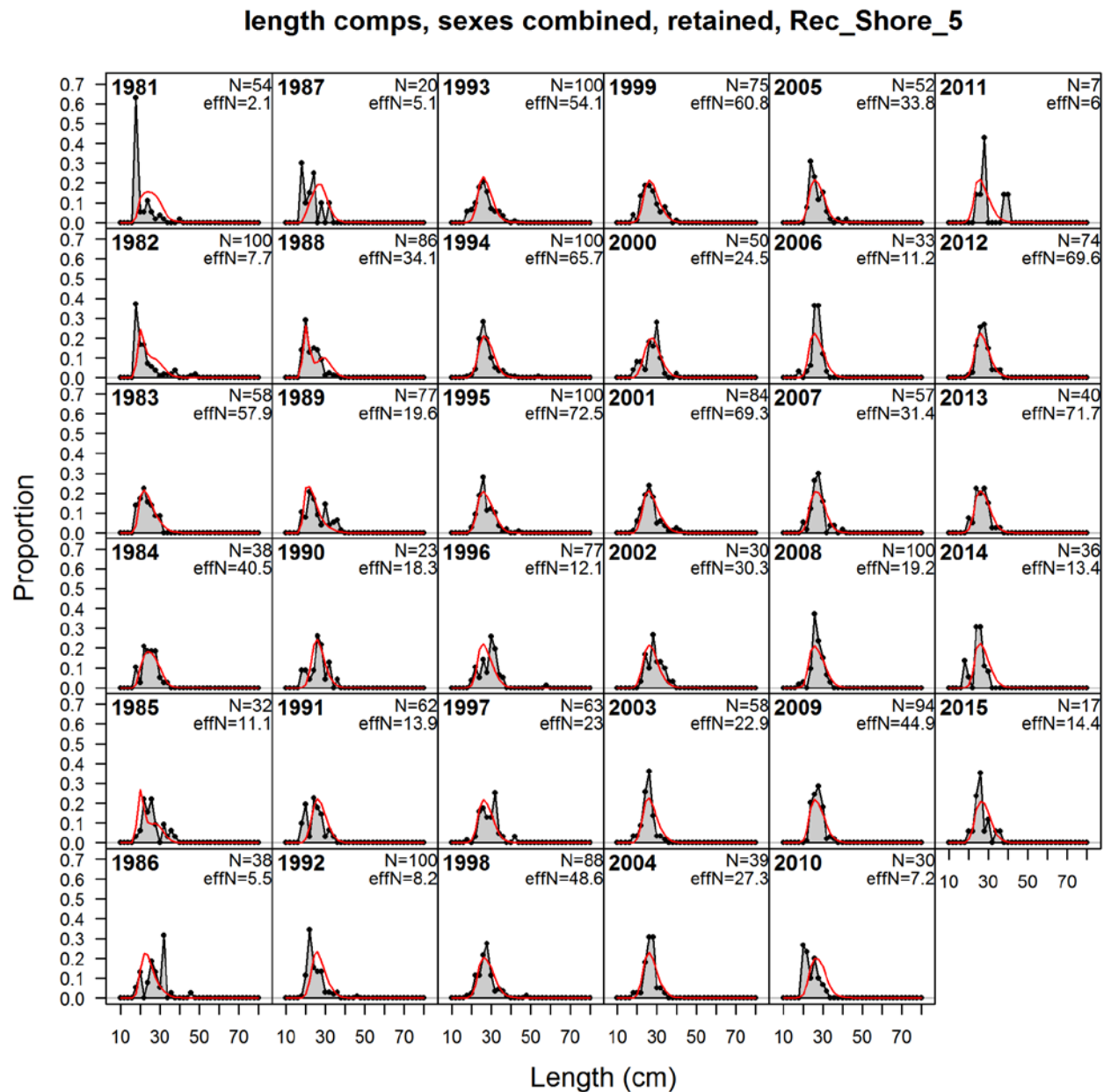
# Model Fits: Length Composition

- Rec Private Boat



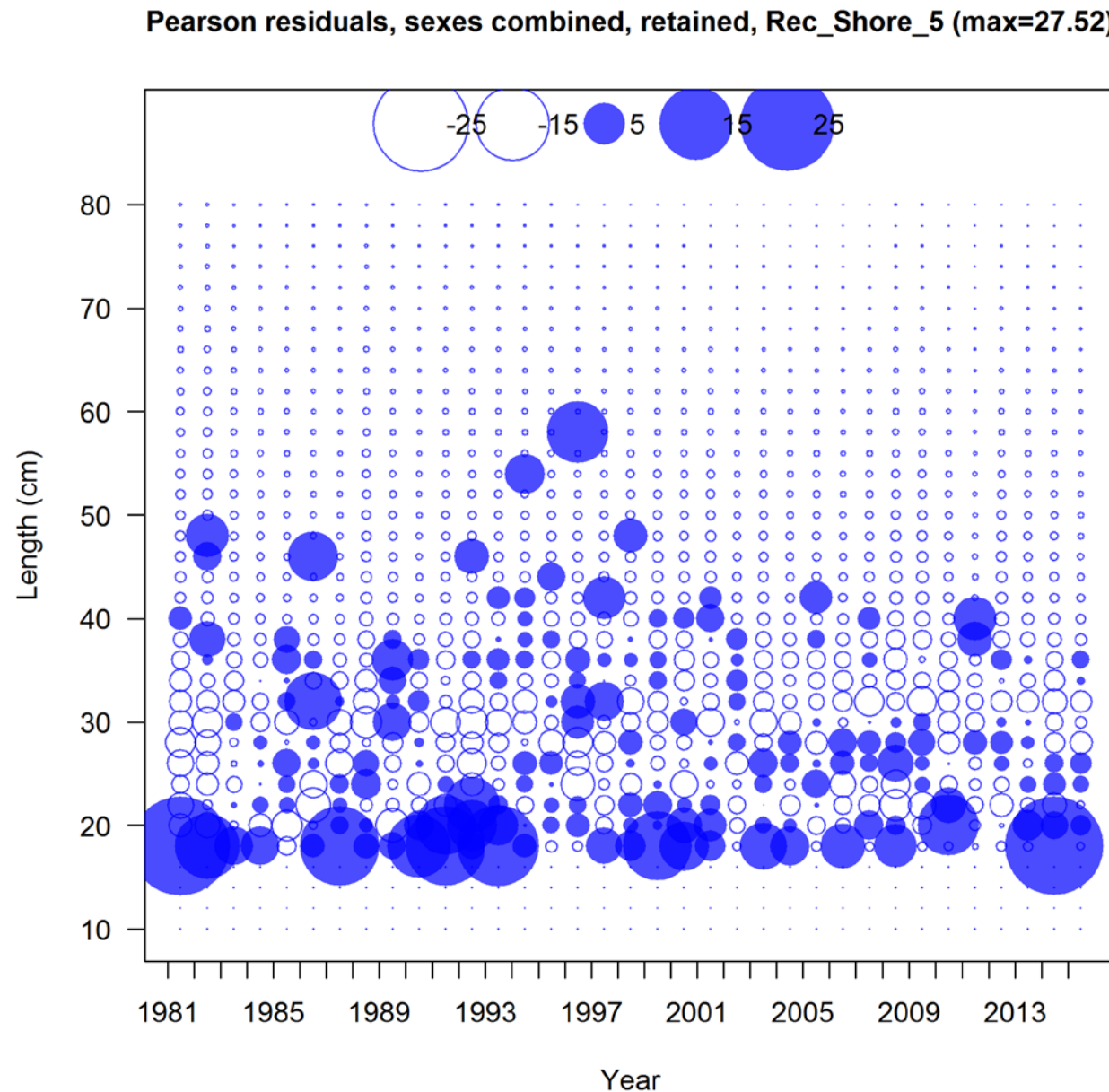
# Model Fits: Length Composition

- Rec Shore



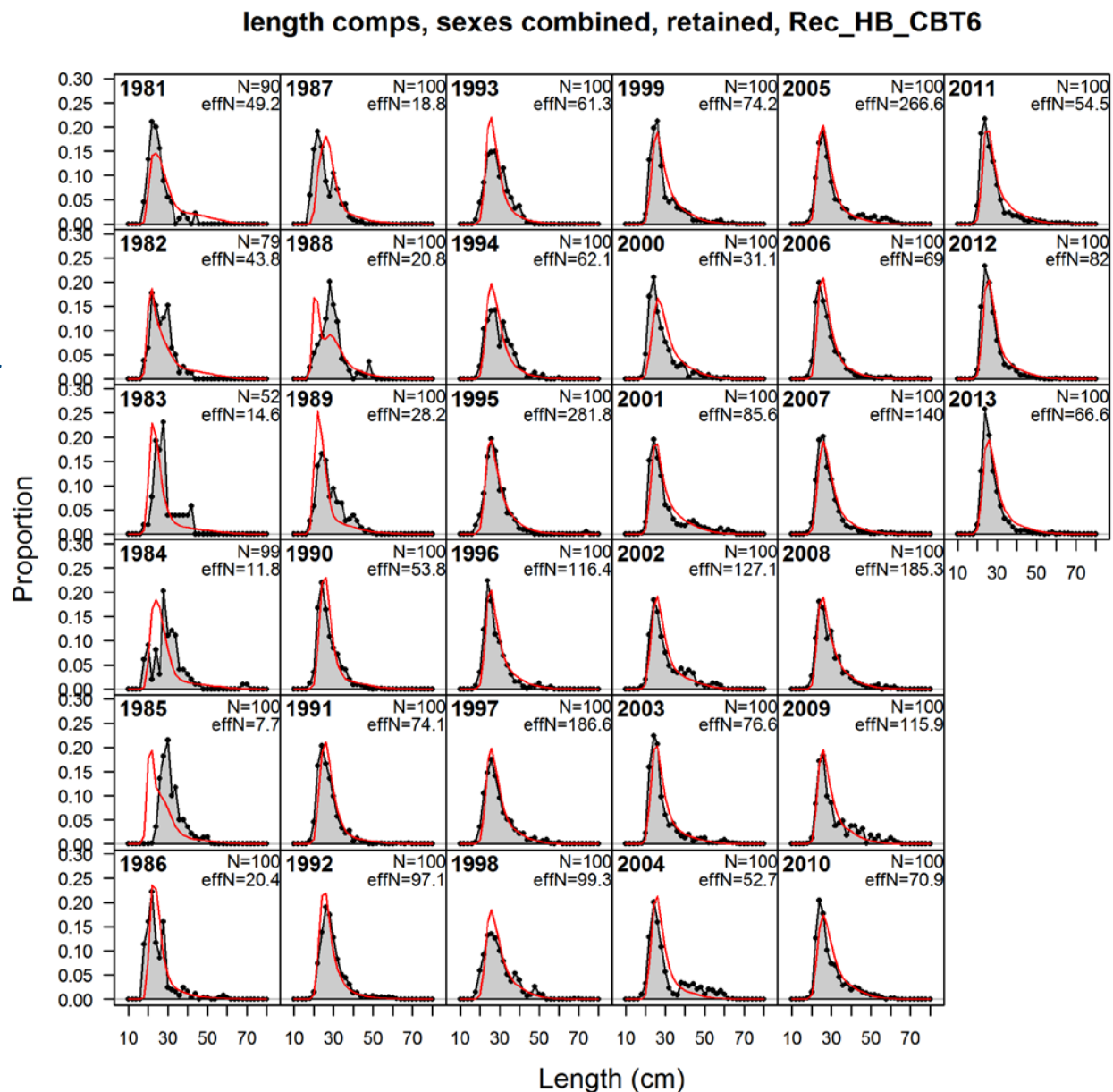
# Model Fits: Length Composition

- Rec Shore



# Model Fits: Length Composition

- Rec Head and Charter

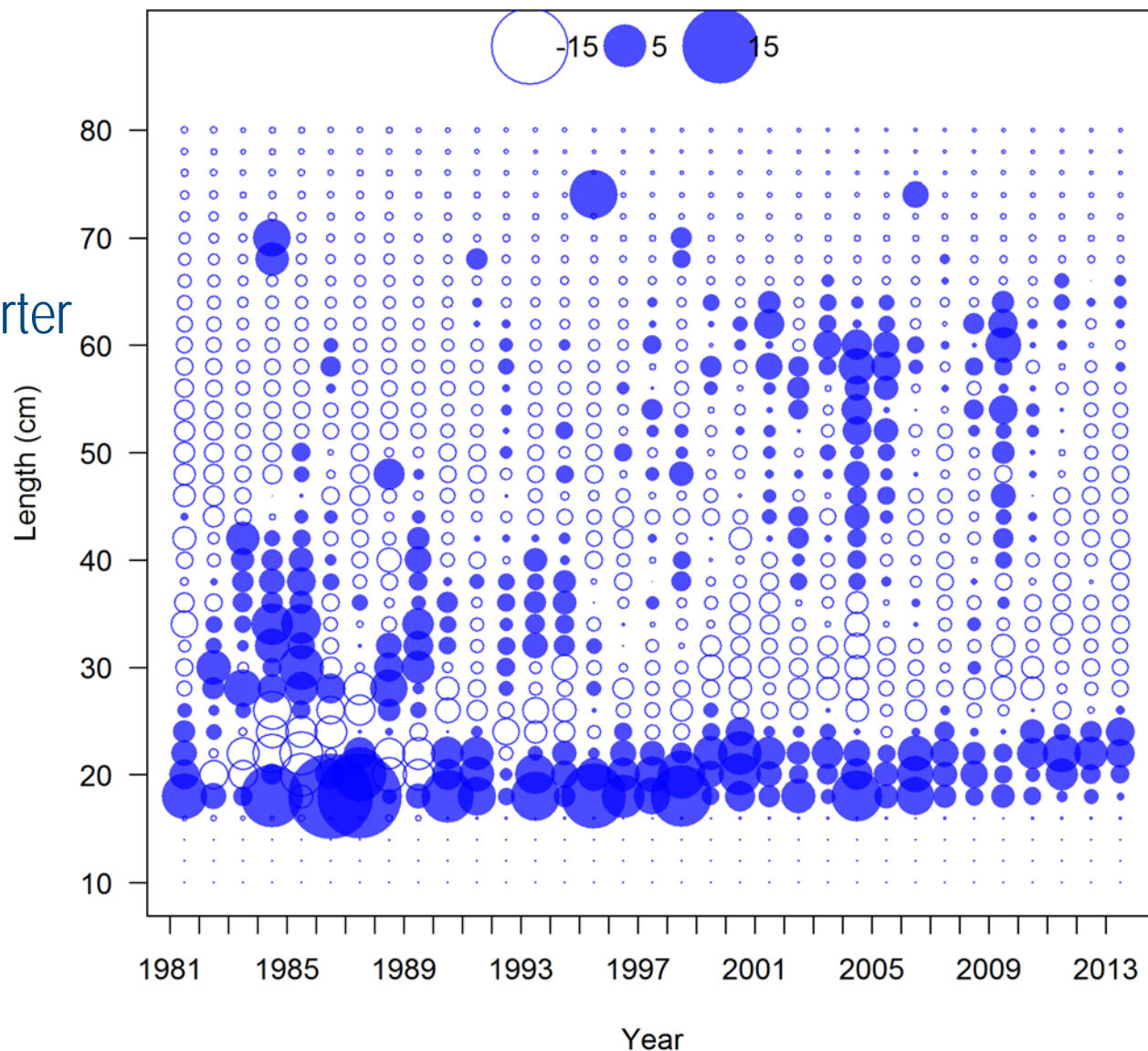




# Model Fits: Length Composition

- Rec Head and Charter

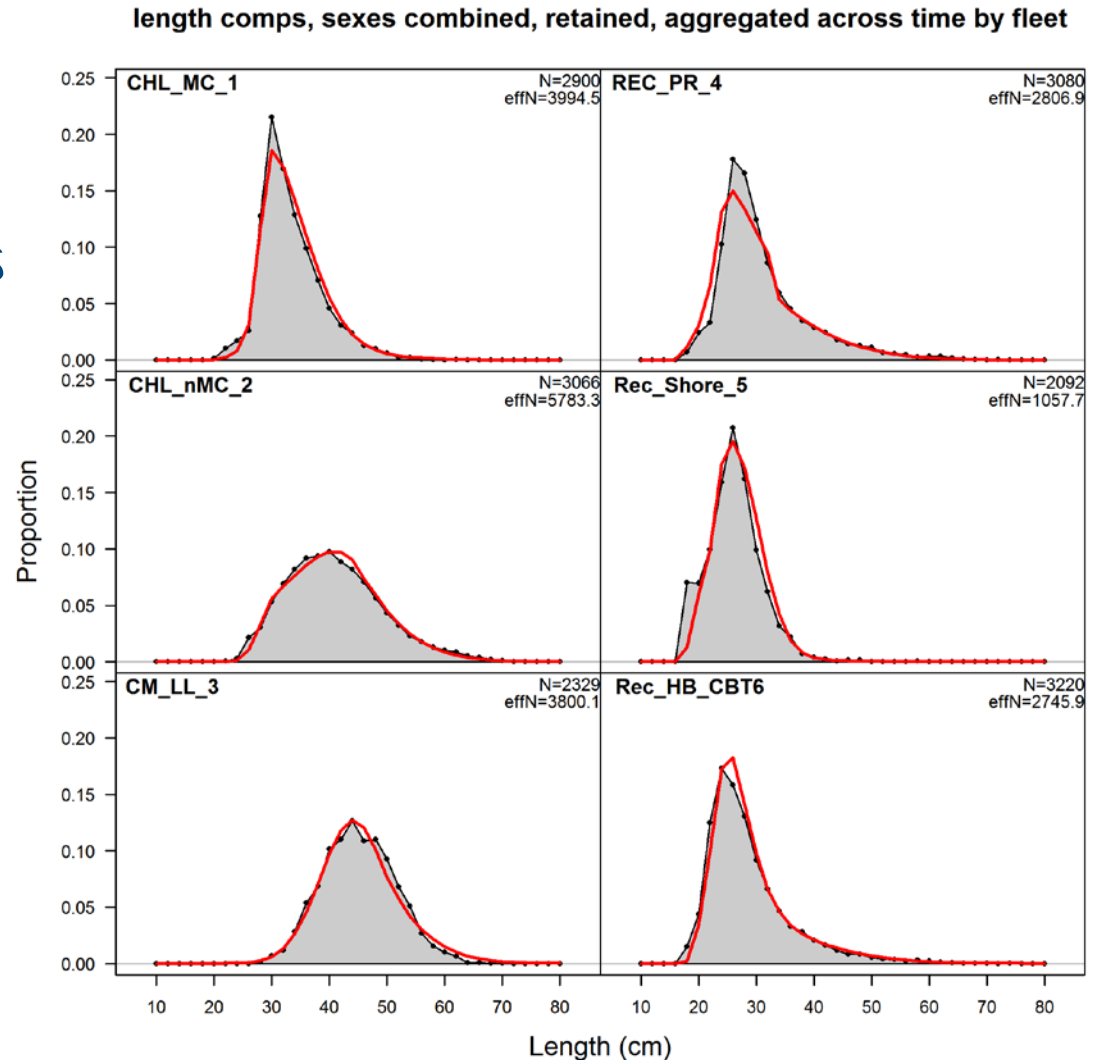
Pearson residuals, sexes combined, retained, Rec\_HB\_CBT6 (max=18.89)



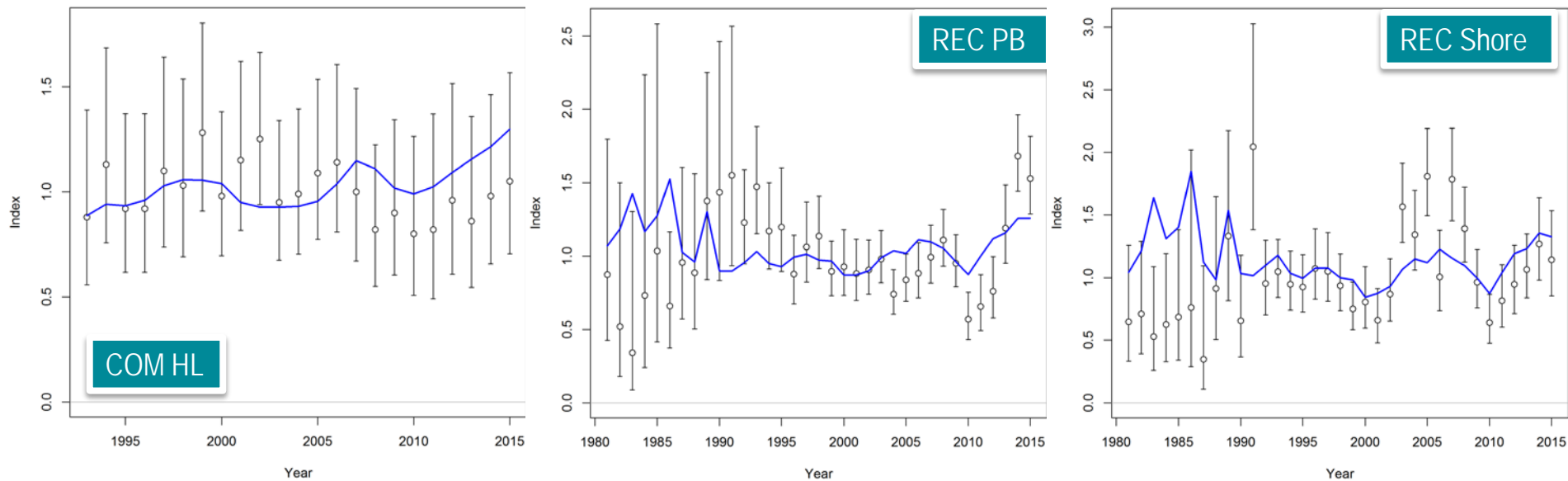


# Model Fits: Length Composition

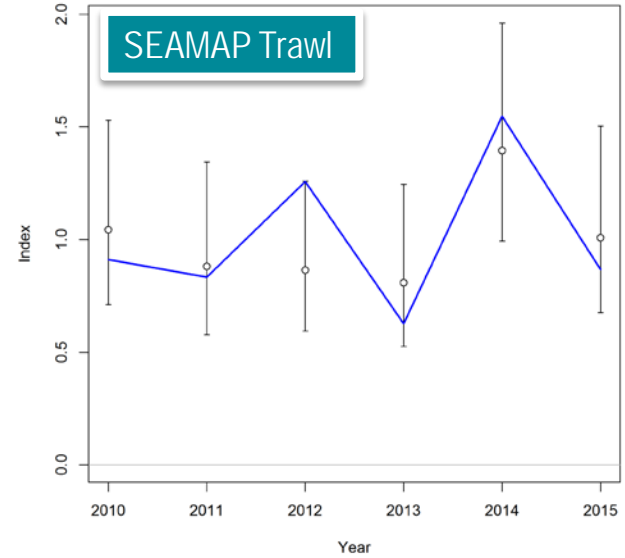
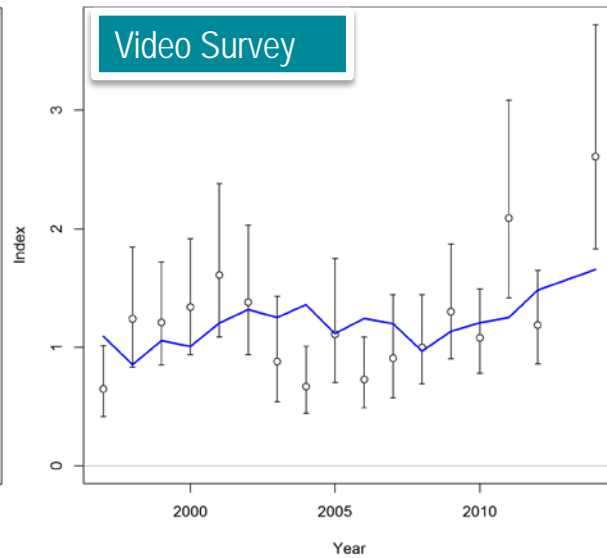
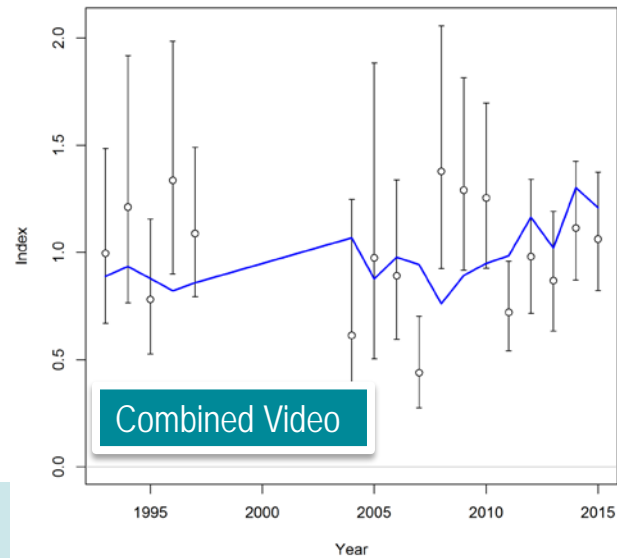
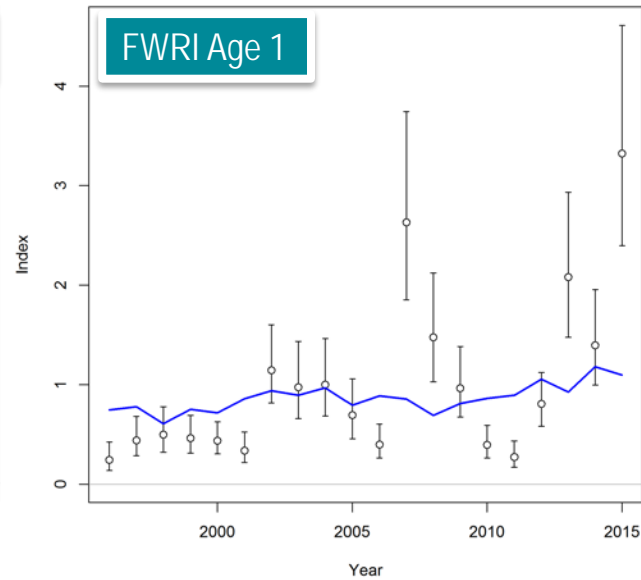
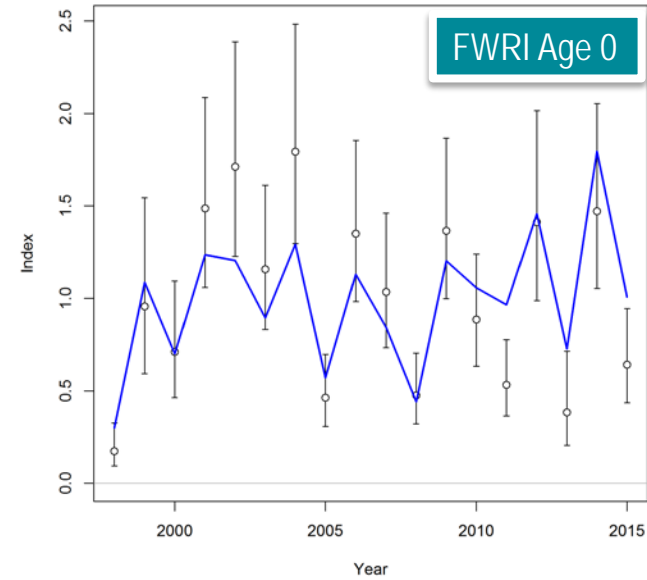
- Summary across all years



# Model Fits: Fishery Dependent Indices

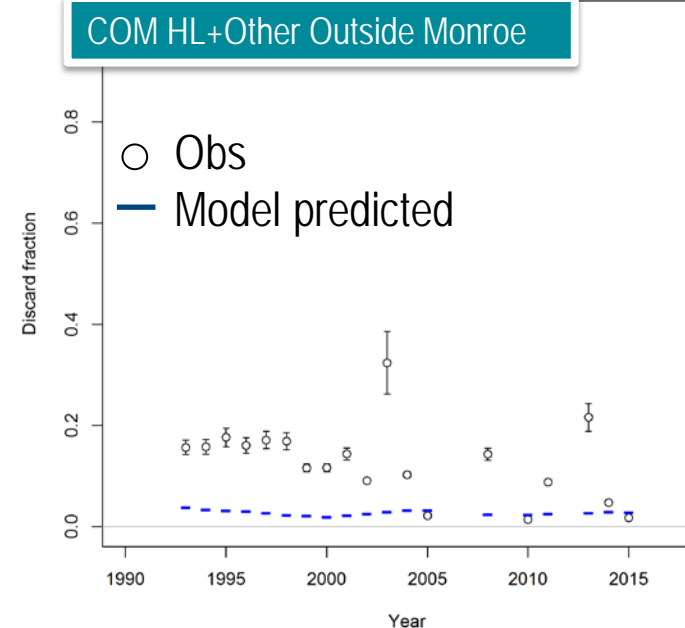
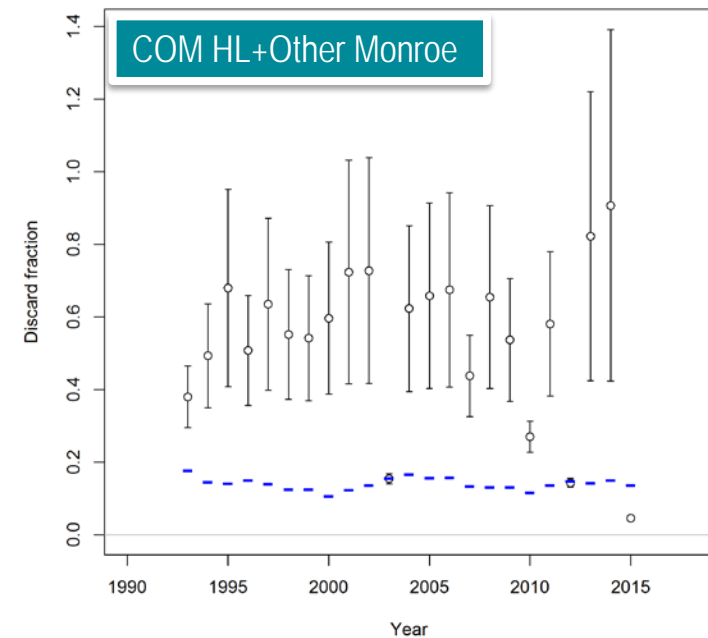


# Model Fits: Fishery Independent Indices



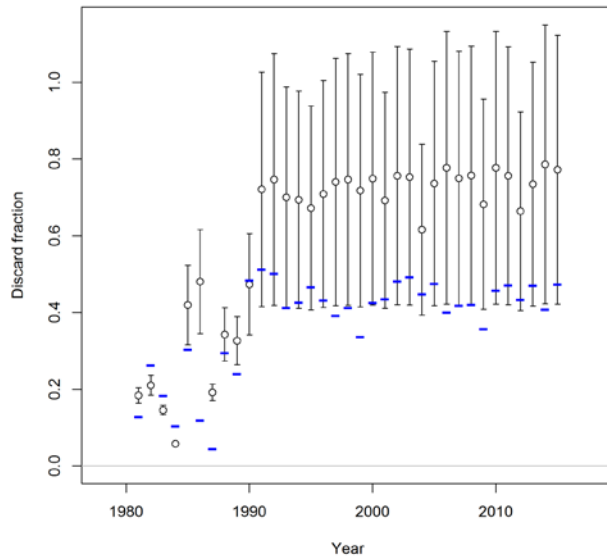
# Model Fits: Com Discards

- Discards least certain component of model.
- Discard lengths were not available.
- Conflict between magnitude of commercial discards and other model components.
- Model not able to fit observed commercial discard fractions without degrading other components that were better known.

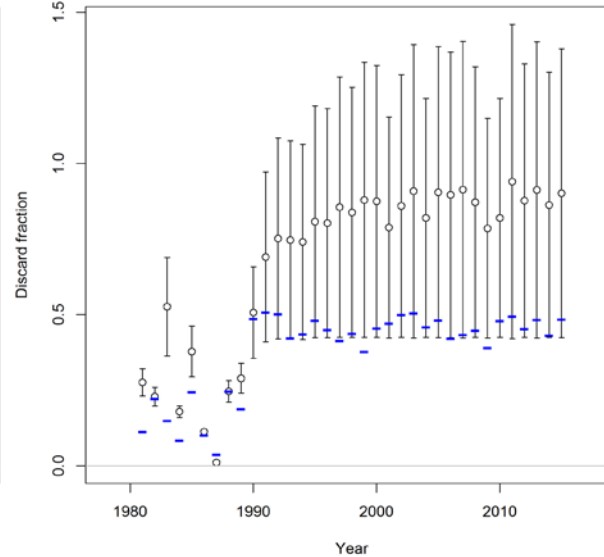


# Model Fits: Recreational Discards

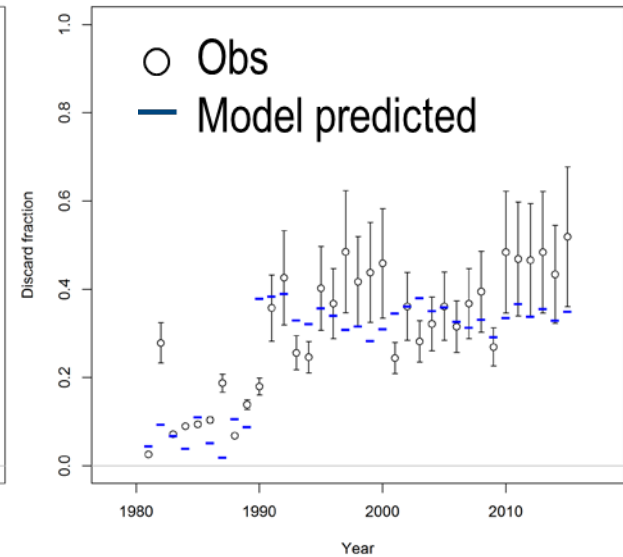
REC Private Boat



REC Shore

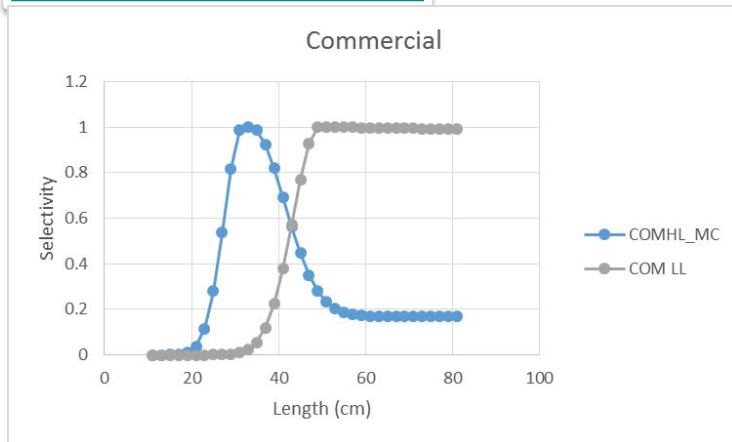


REC Charter + Headboat

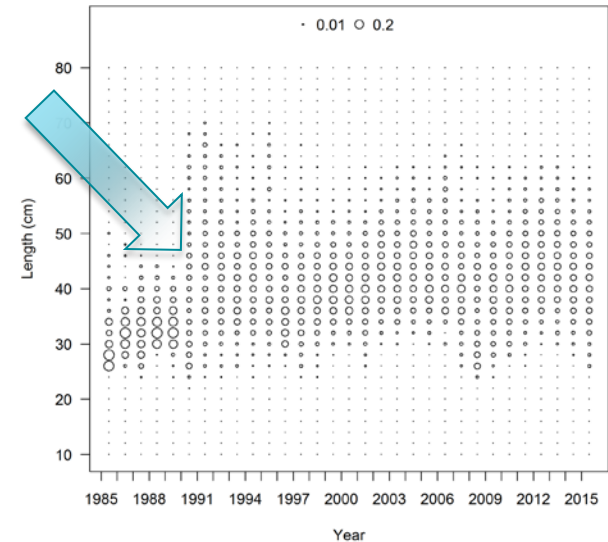


# Model Results: Length-Based Selectivity

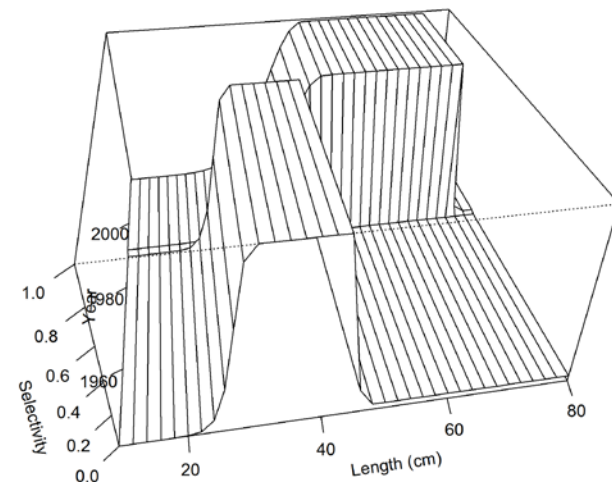
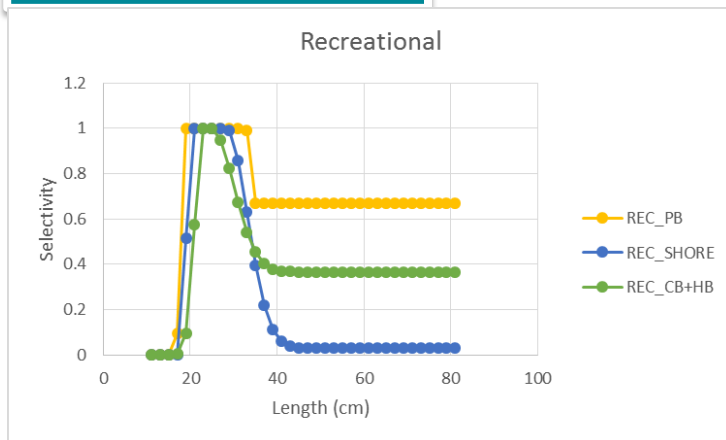
## Length-Based: Commercial



One Fleet, COM\_HL outside of Monroe, was modeled with time-varying selectivity

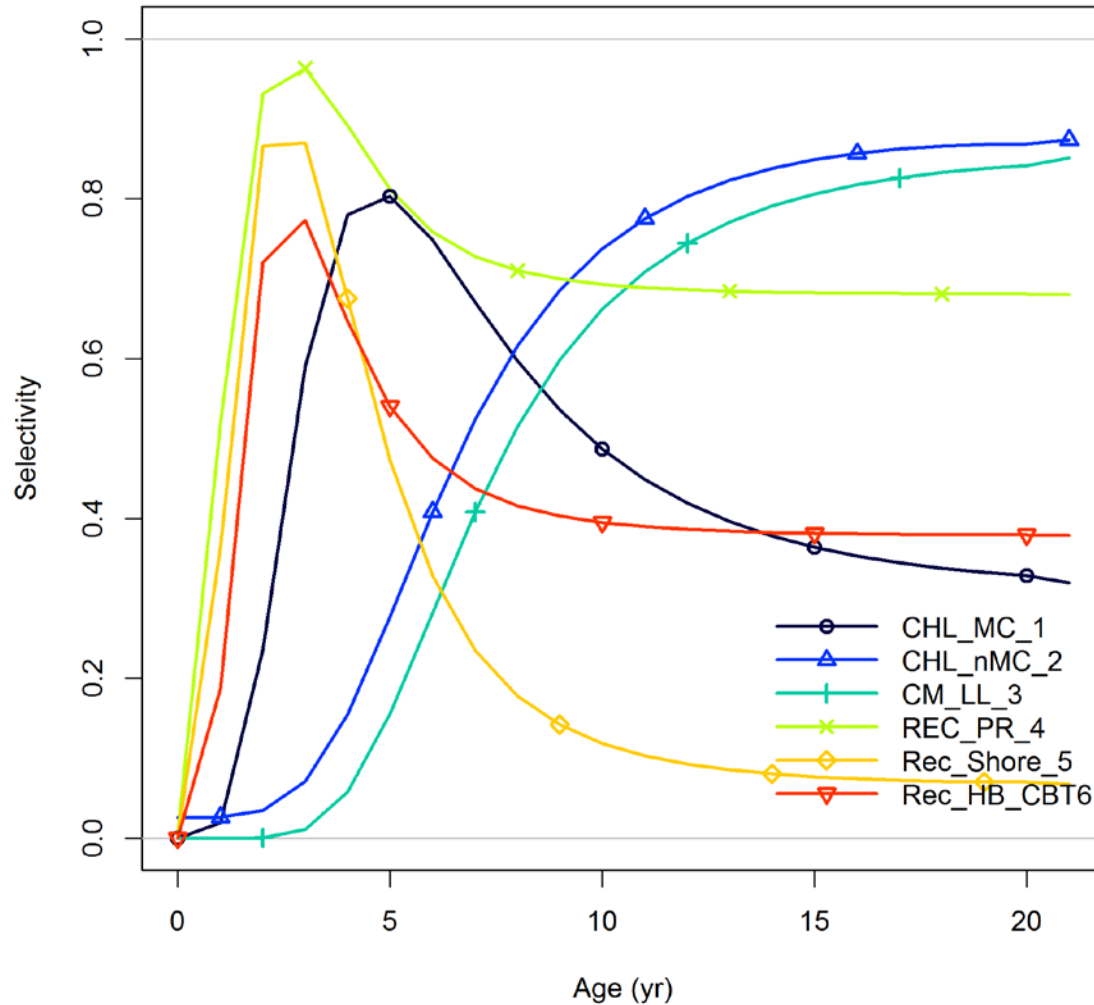


## Length-Based: Recreational



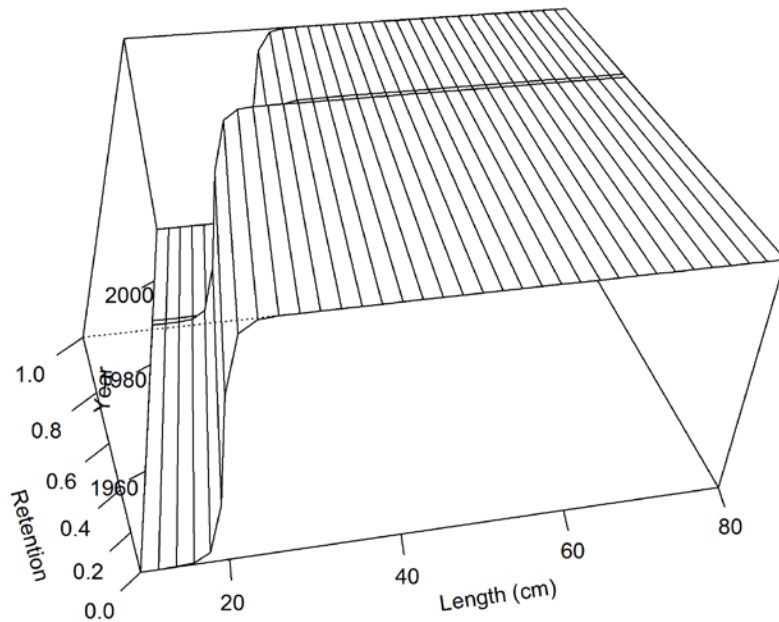


# Model Results: Derived Age-Based Selectivity

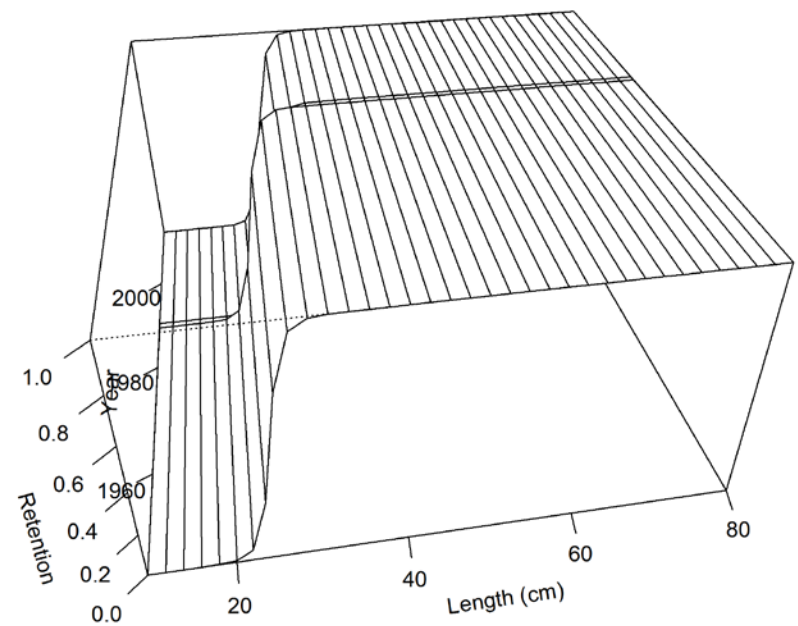


# Model Results: Time Varying Retention (COM)

COM HL Monroe

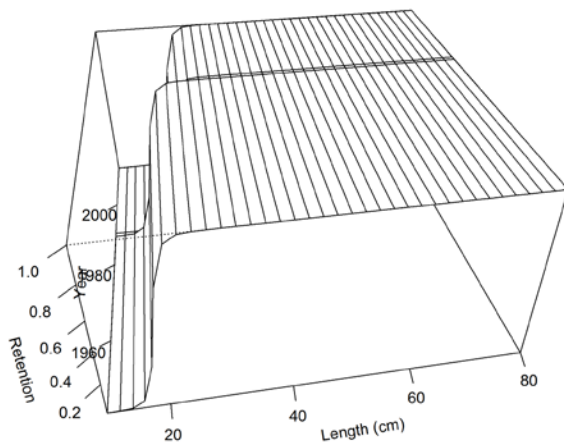


COM HL Outside Monroe

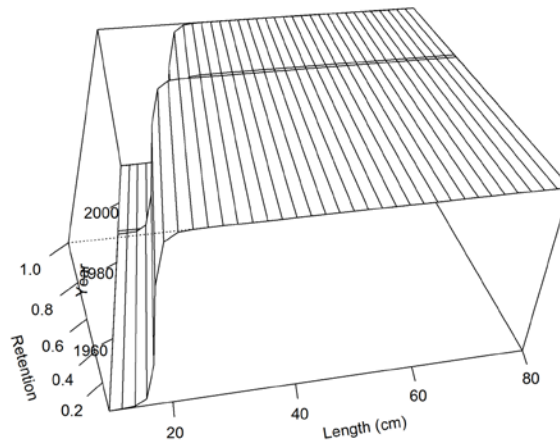


# Model Results: Time Varying Retention (REC)

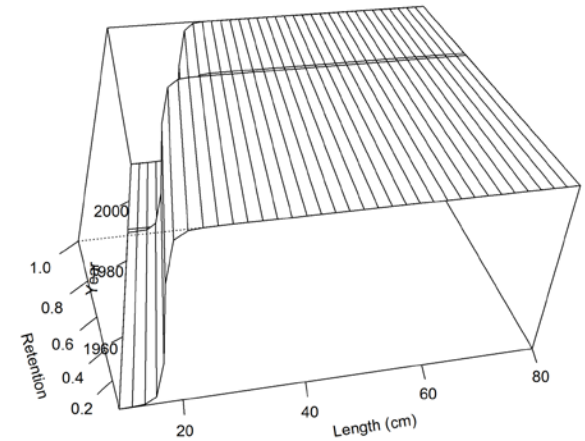
REC Private



REC Shore

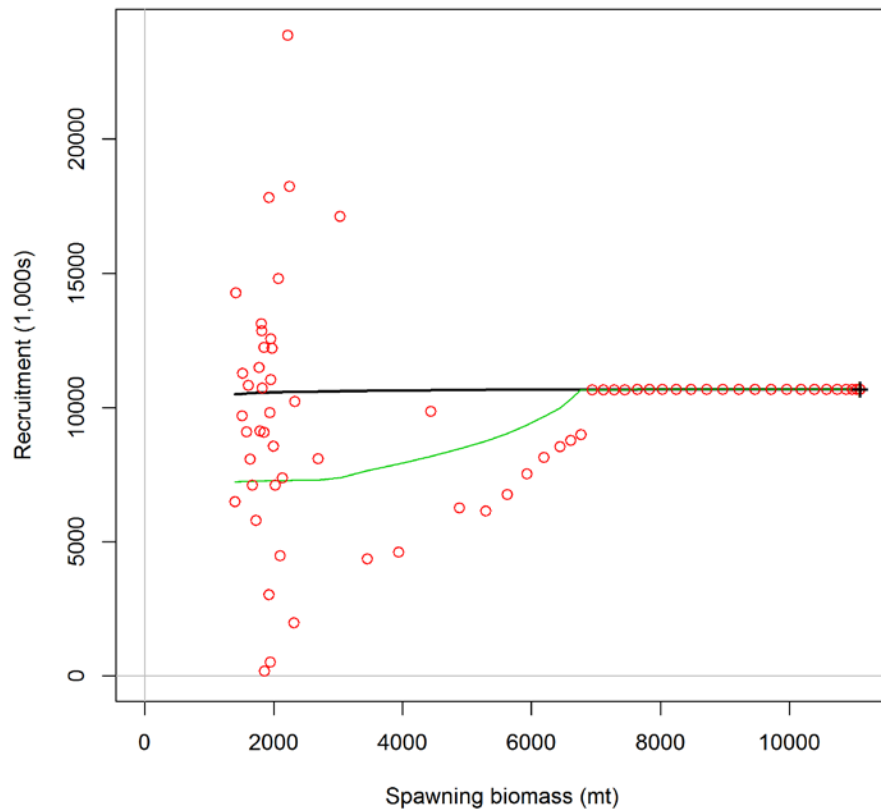


REC Charter + Headboat

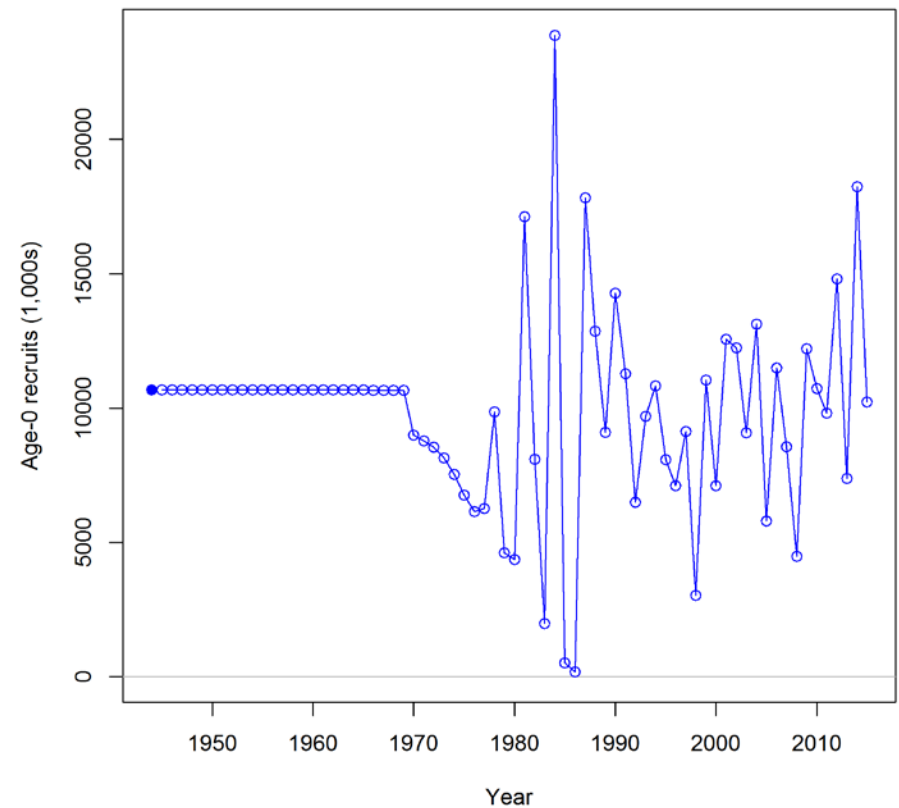


# Model Results: S/R Relationship and Recruitment

S/R Relationship

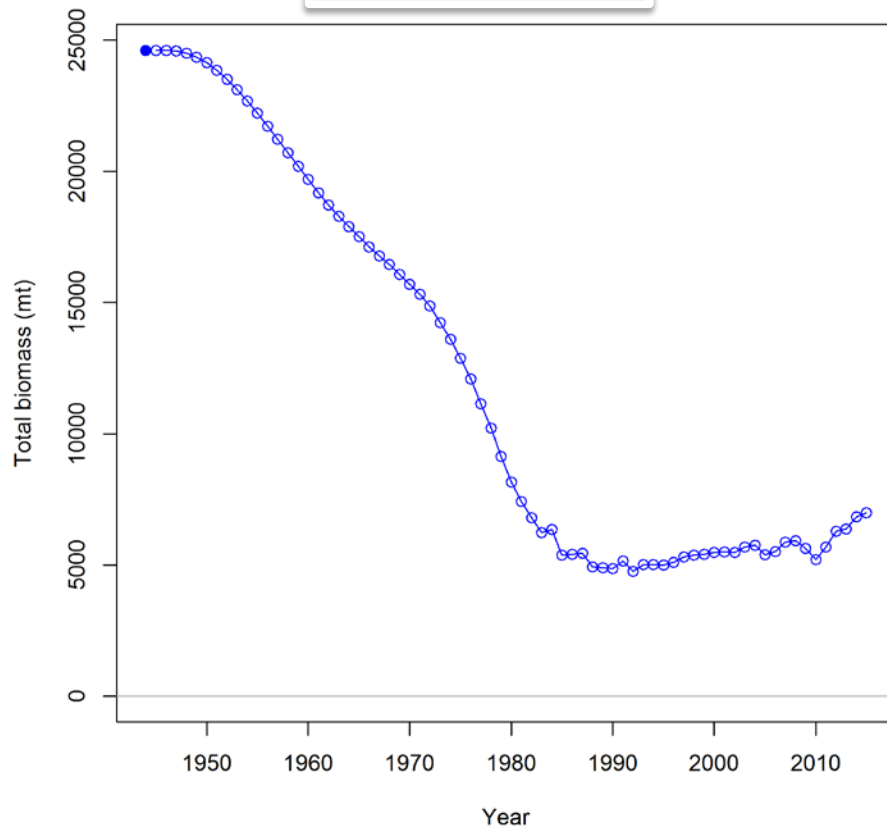


Recruits (Age 0)

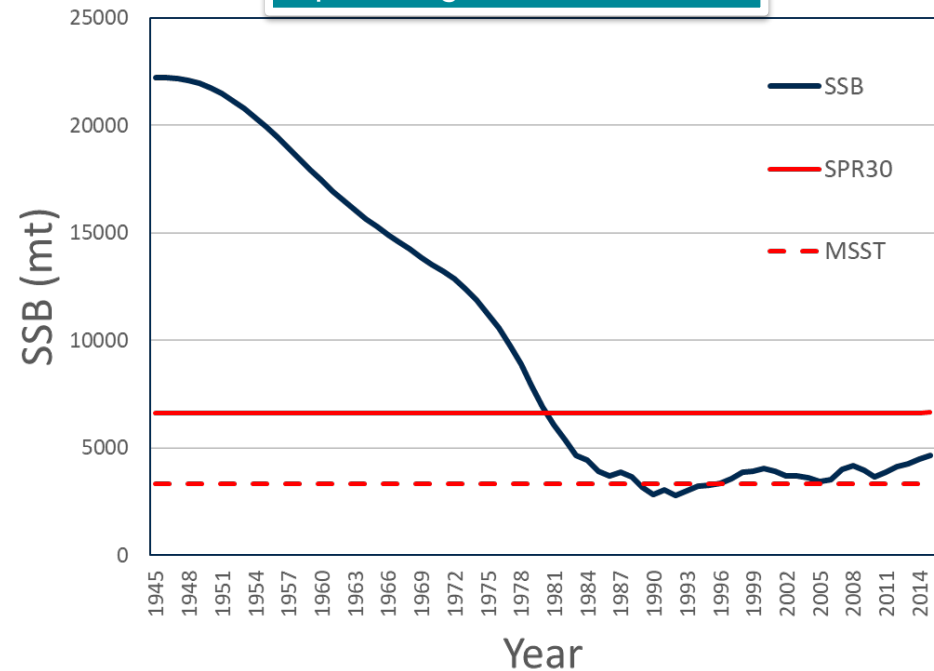


# Model Results: Biomass Trajectory

Total Biomass

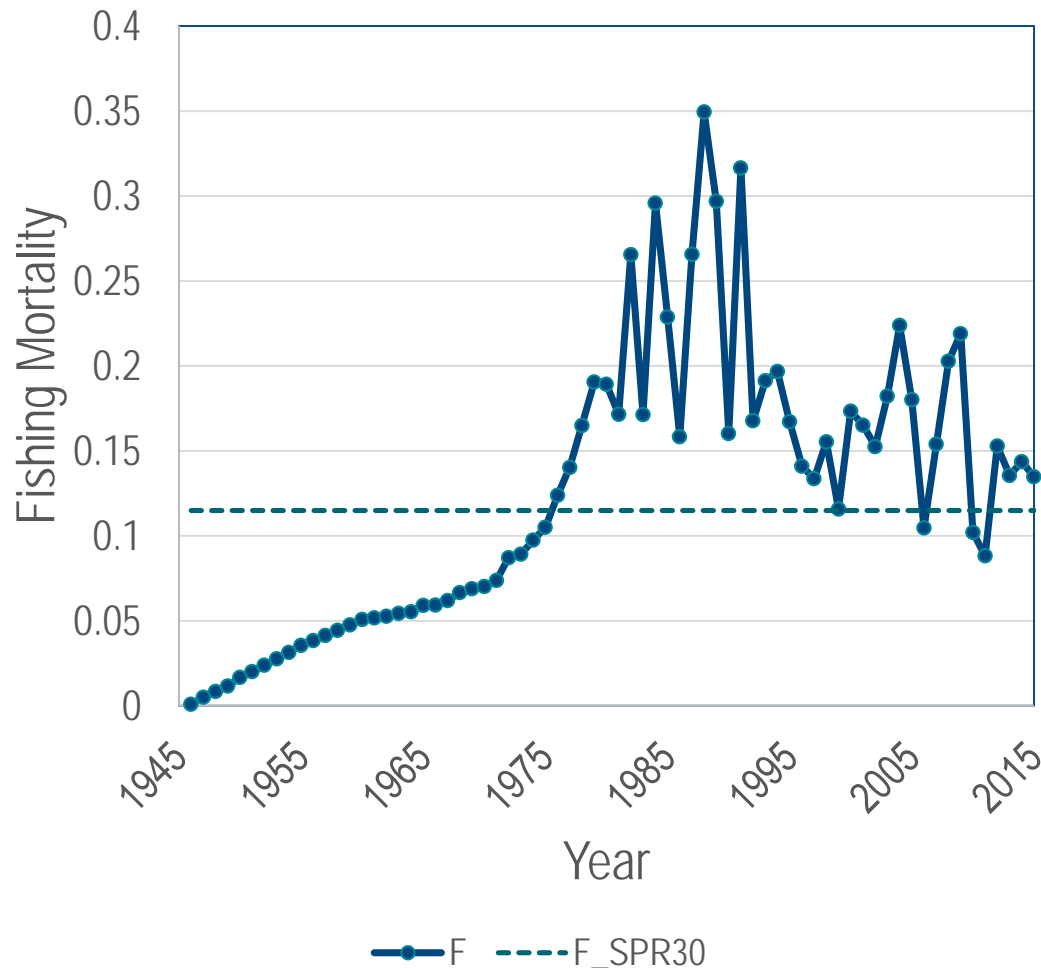


Spawning Stock Biomass



SPR30% was selected as an MSY-proxy. MSST was defined as 50% of SSB\_SPR 30. Based on this definition, the stock is currently **not overfished** ( $SSB_{2015}/SSB_{SPR30} = 0.703$ ).

# Model Results: Fishing Mortality

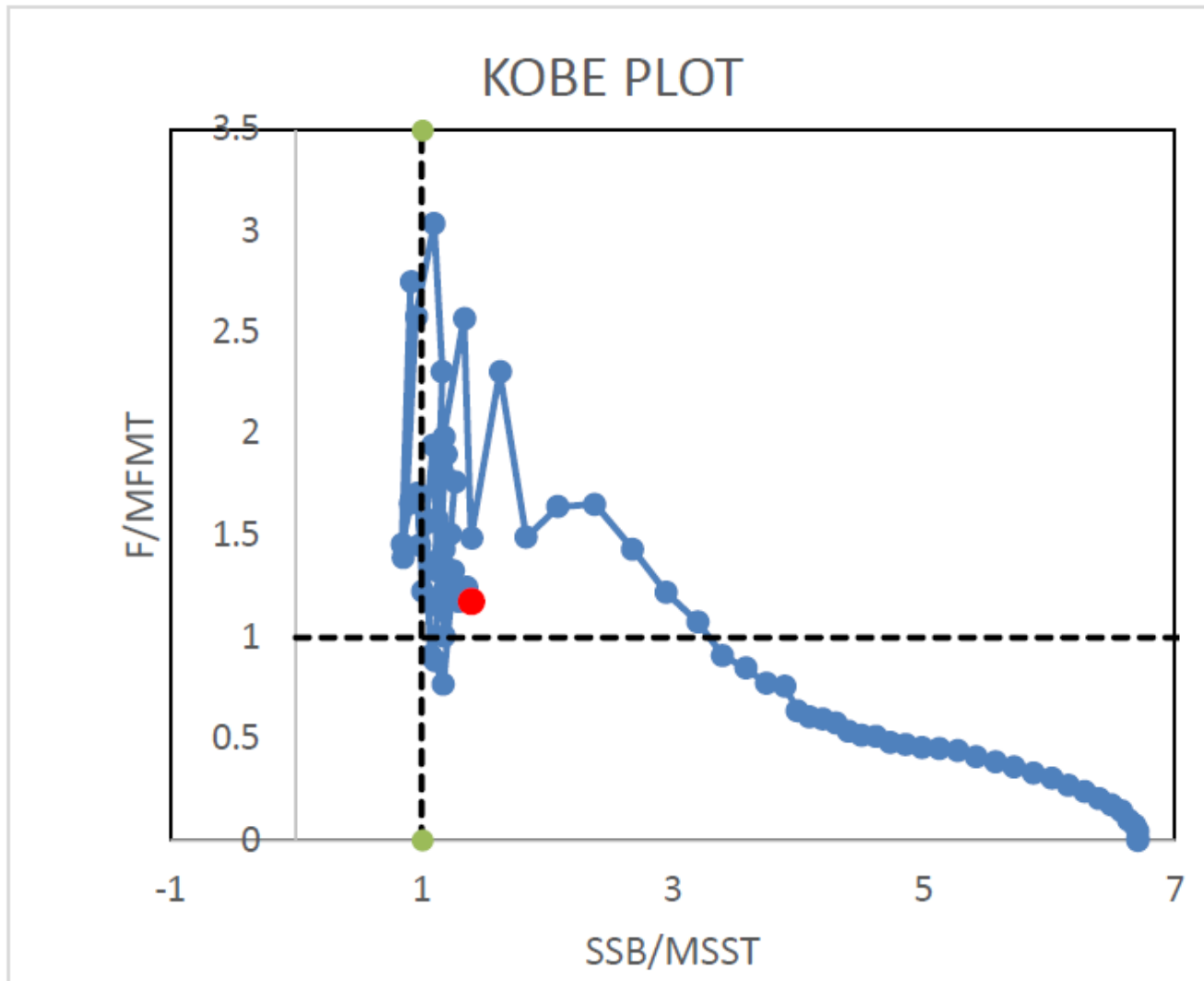


MFMT defined as  $F_{30\%SPR}$ .  
stock is currently undergoing overfishing  
( $F_{current}/F_{SPR30} = 1.2$ ) and has been  
undergoing overfishing for most years  
since 1976.

Biomass is 70.3% of  $SSB_{SPR30}$ .  
However, since MSST is 50%  
 $SSB_{SPR30}$ , stock remains above  
MSST and is **not overfished**.



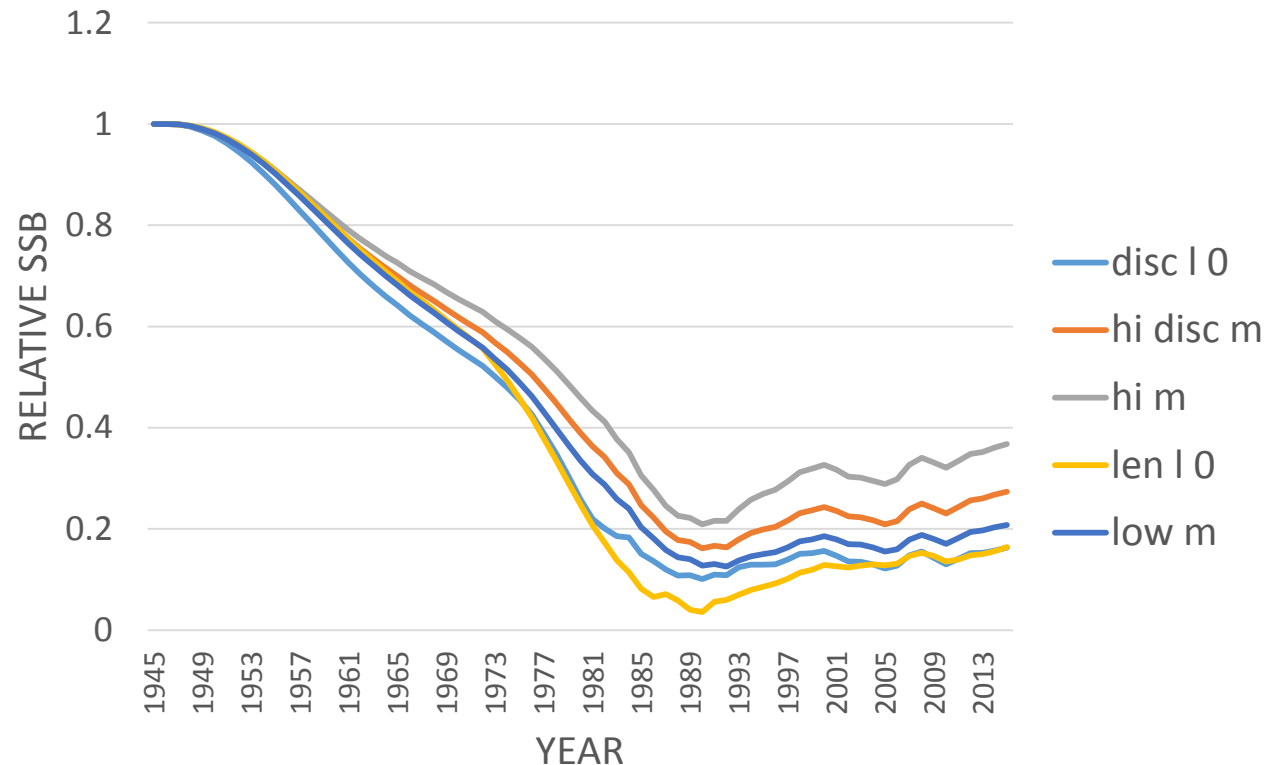
# Model Results: Stock Status Trajectory



# Model Diagnostics: Sensitivity Runs

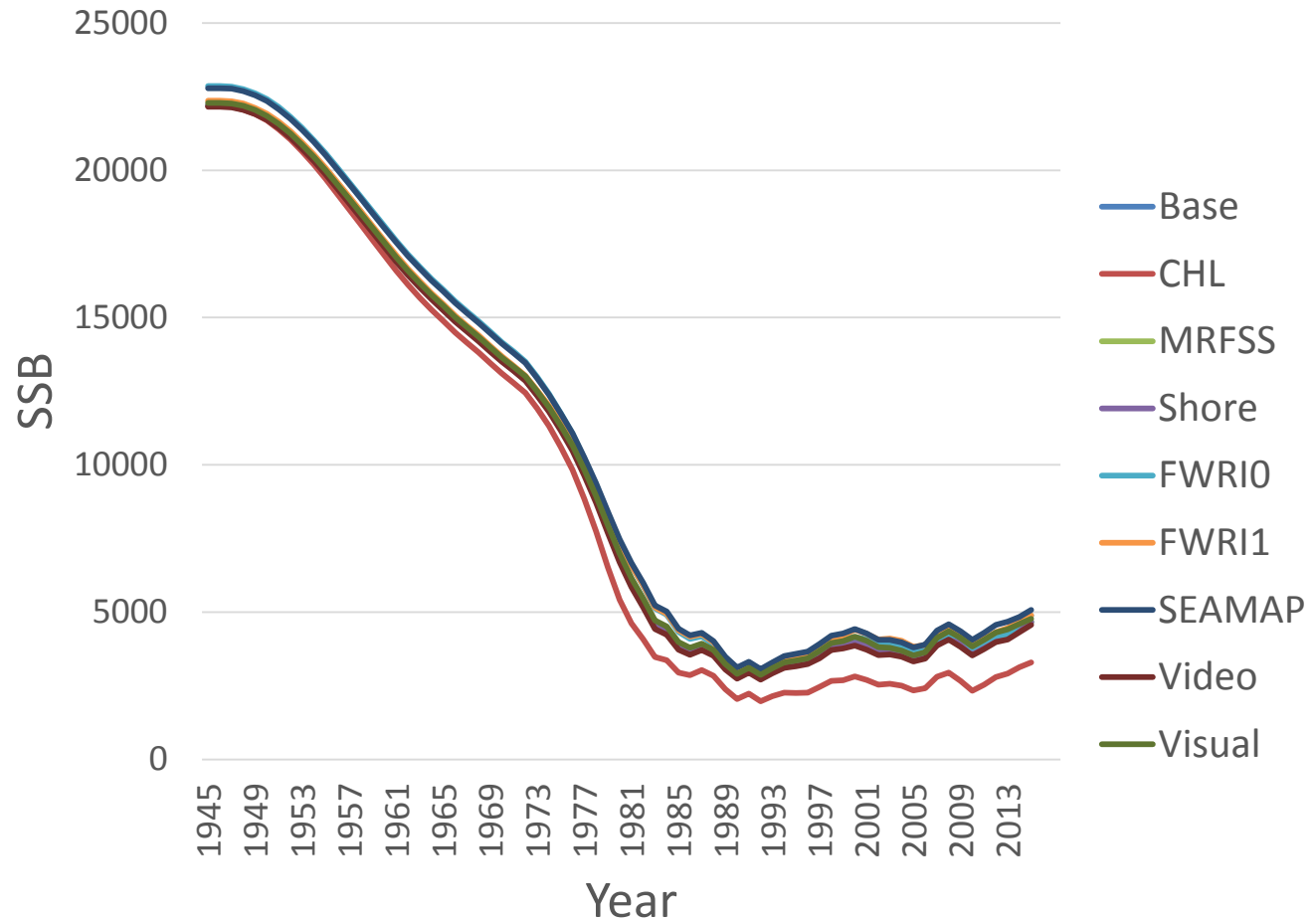
## Sensitivities

- Low Natural Mortality
- High Natural Mortality
- High Discard Mortality
- No Length effect
- No discard effect

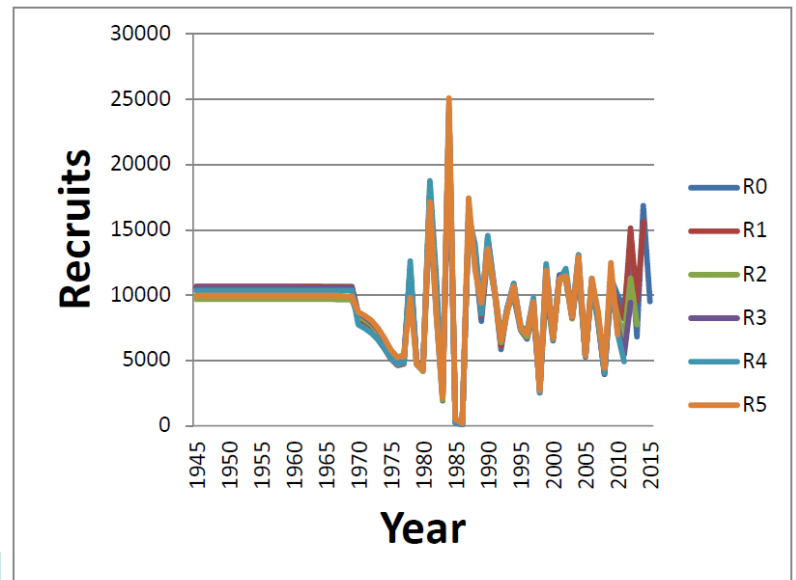
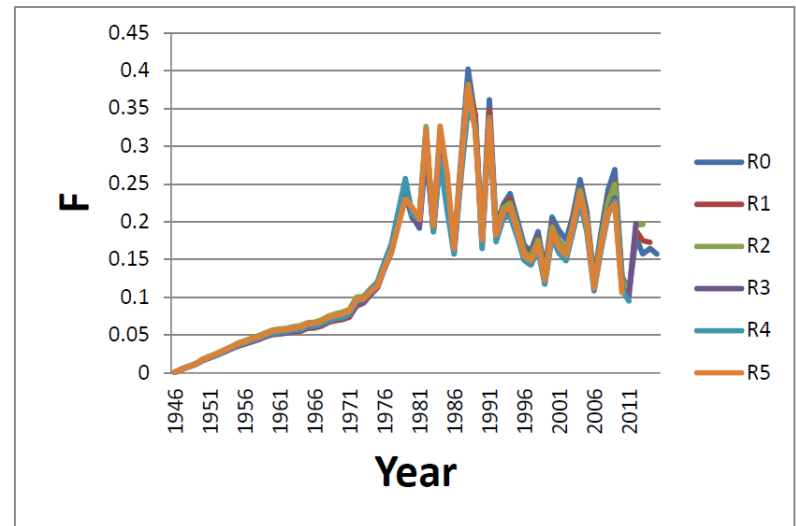
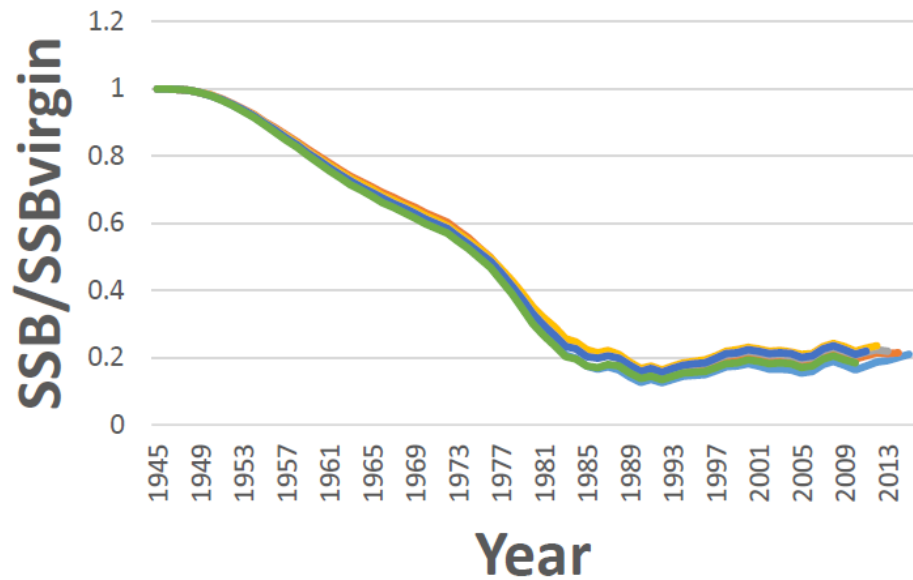


# Model Diagnostics: Sensitivity Runs

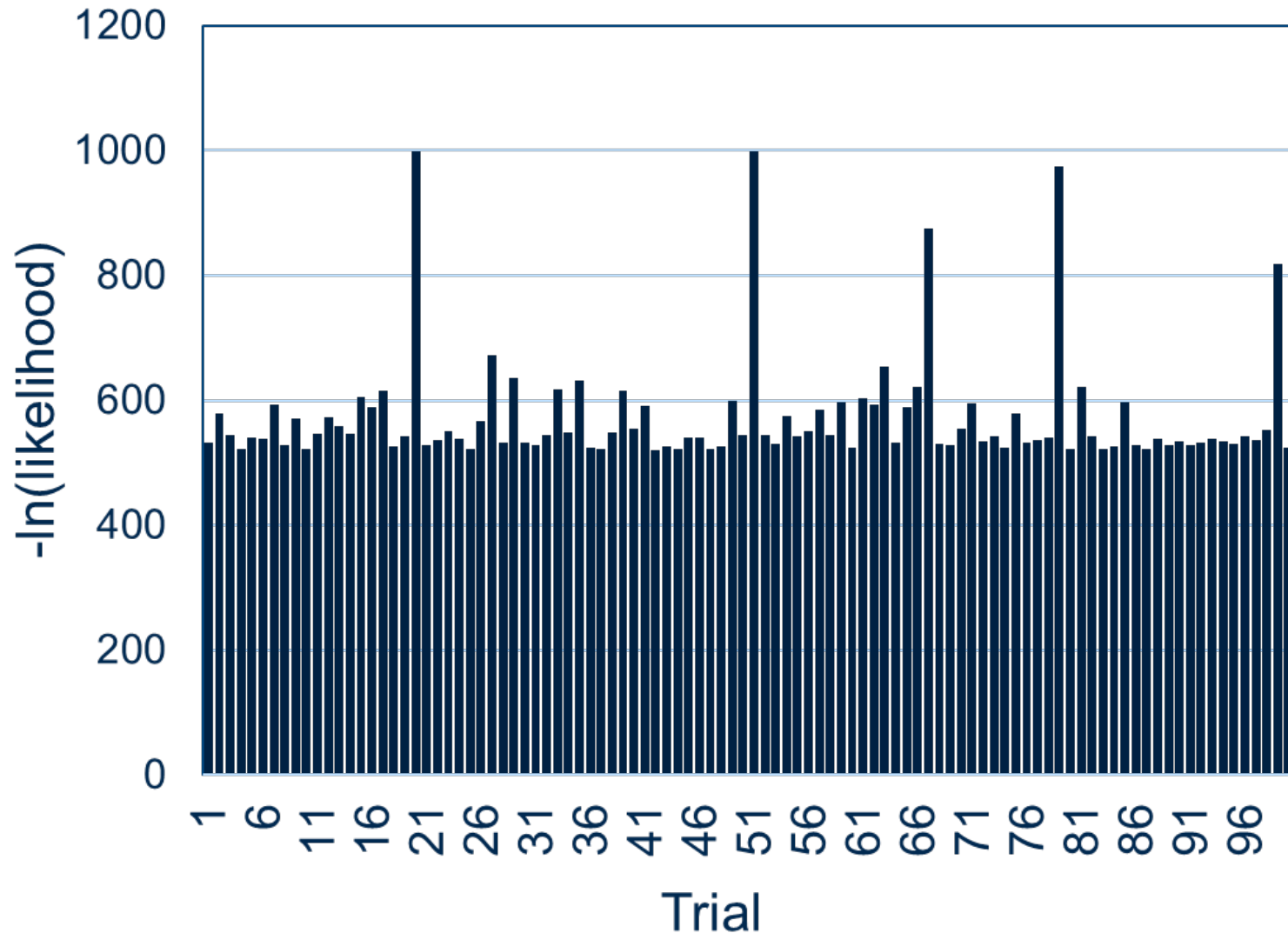
- Index Jack-Knife



# Model Diagnostics: Retrospectives



# Model Diagnostics: Jitter Analysis



# Projection Settings

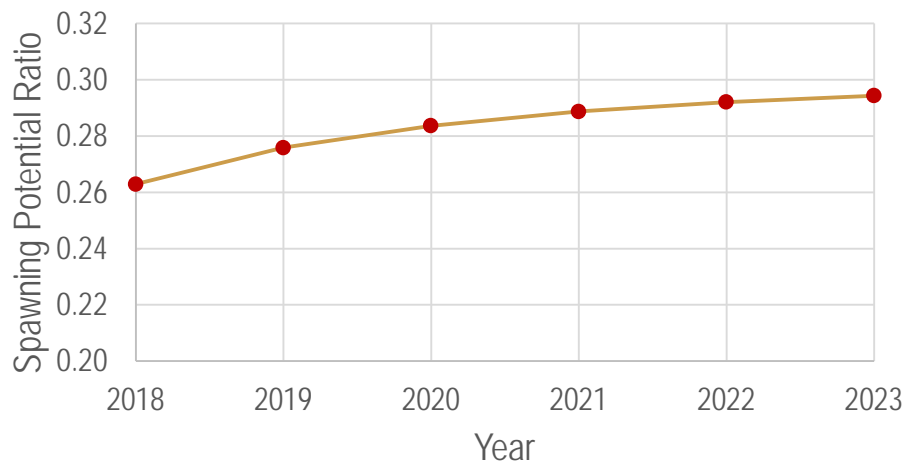
- RW panel supported FMSY-proxy of FSPR30.
- Projections assumed recruitment at recent (1990-2015) average in short term; steepness was fixed at 1.0.
- Selectivity and retention parameters retained at average of 2013-2015.
- Since stock not overfished, and no recovery plan required, panel agreed to project FSPR30 and 75%FSPR30 for advice.



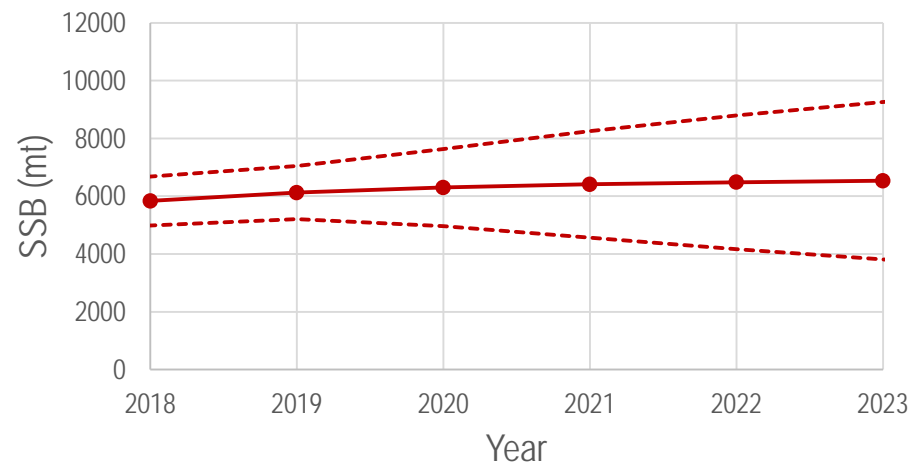
# Projections: SSB

- Project Constant  $F_{\text{SPR30}}$

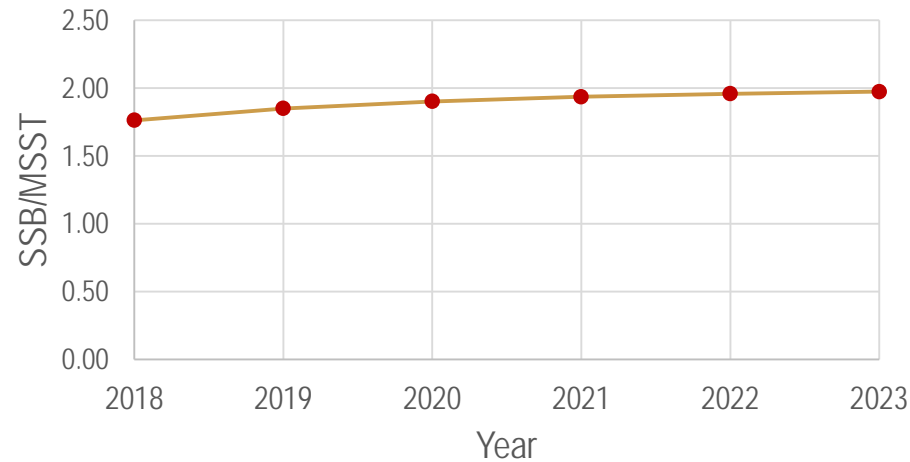
Depletion ( $\text{SSB}/\text{SSB}_0$ )



Spawning Stock Biomass

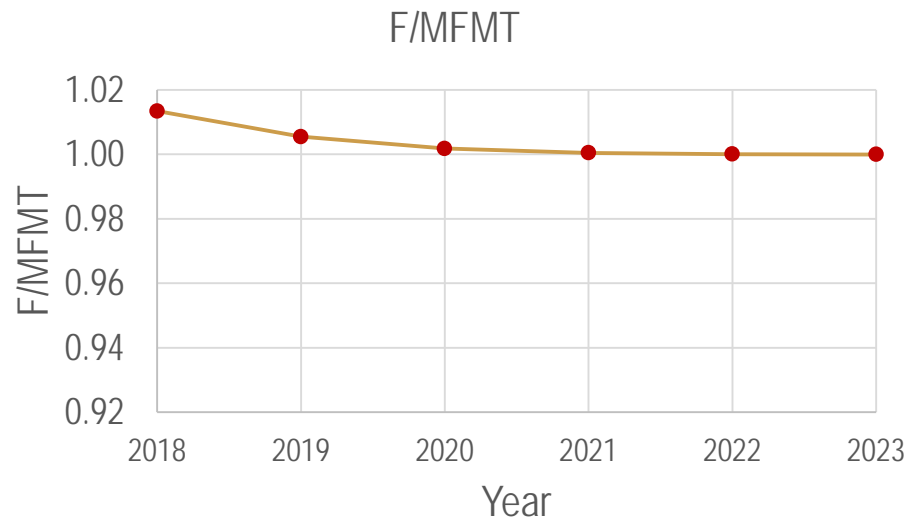
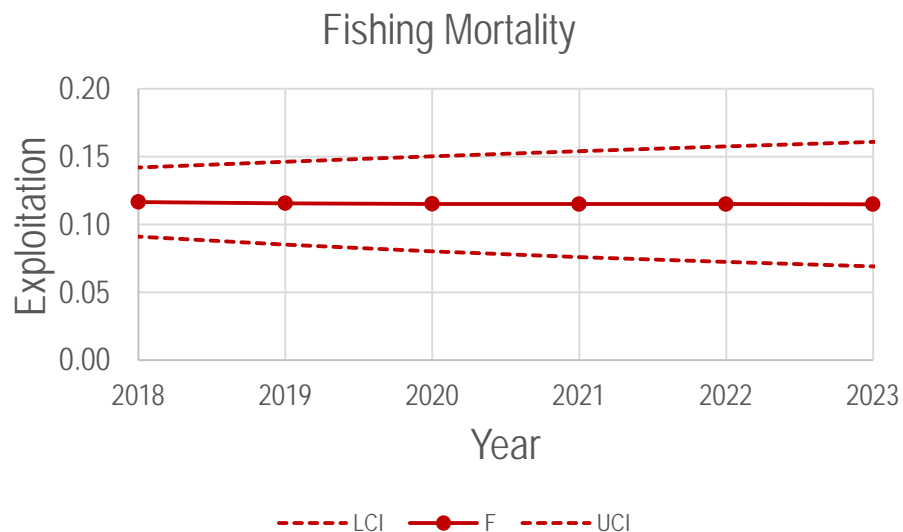


SSB/MSST



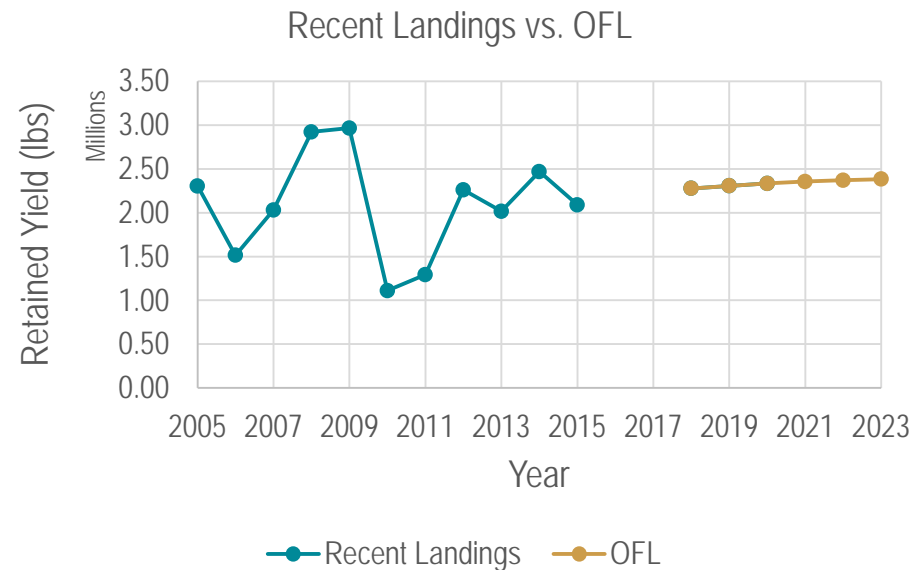
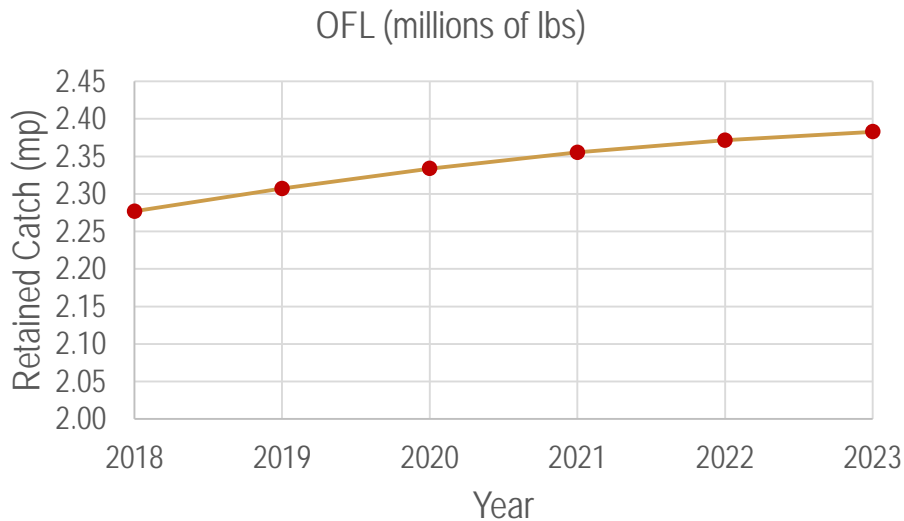
# Projections: F and Recruits

- Project Constant  $F_{\text{SPR30}}$



# Projections: Implications for Catch Advice

- Project Constant  $F_{\text{SPR30}}$



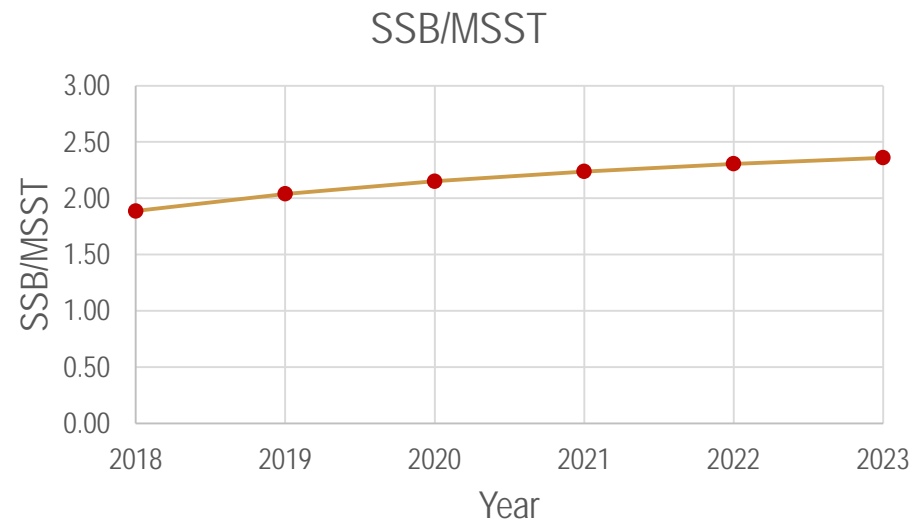
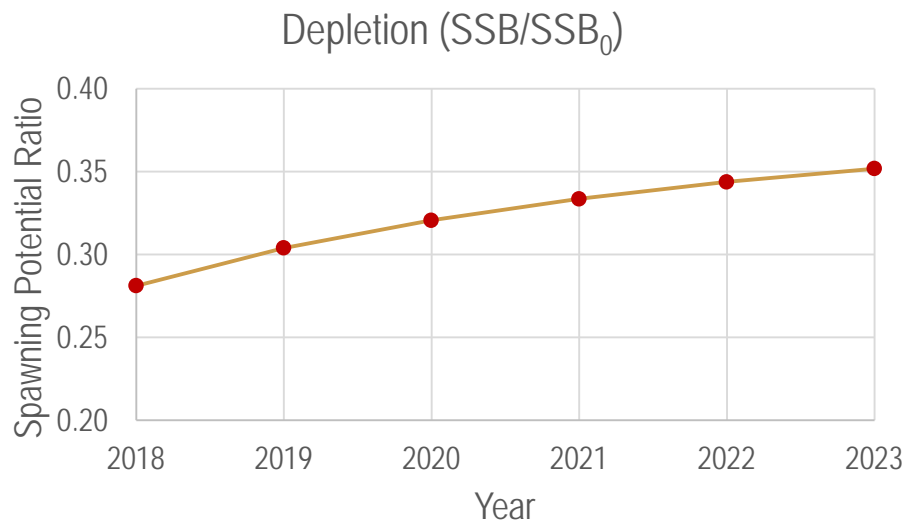
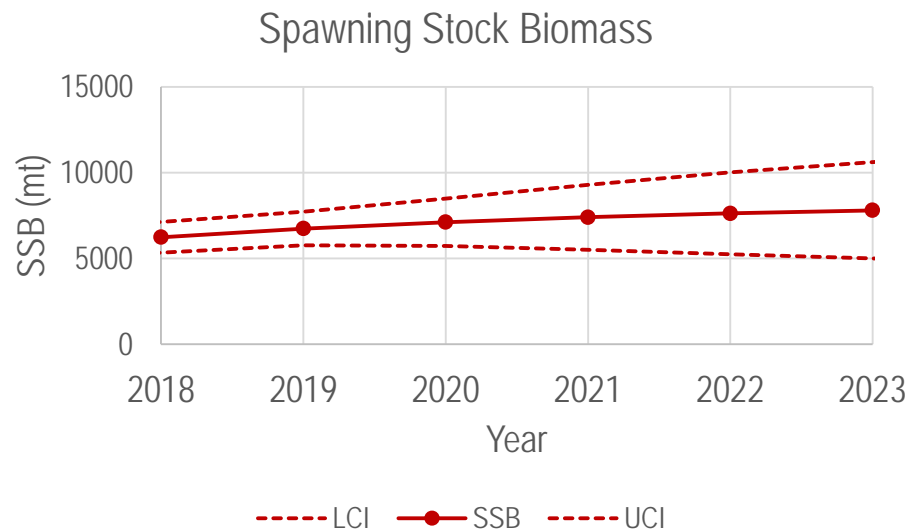
# Projections: Implications for Catch Advice

- Project Constant  $F_{\text{SPR30}}$

YEAR	LCI	Retained Yield (mt)	UCI	OFL	ABC @ P =0 .40
2019	951	1046	1142	2.307	2.266
2020	967	1059	1150	2.334	2.294
2021	978	1068	1159	2.355	2.316
2022	985	1076	1167	2.372	2.332
2023	988	1081	1174	2.383	2.342
2024	989	1084	1180	2.390	2.349
2025	988	1087	1185	2.395	2.353

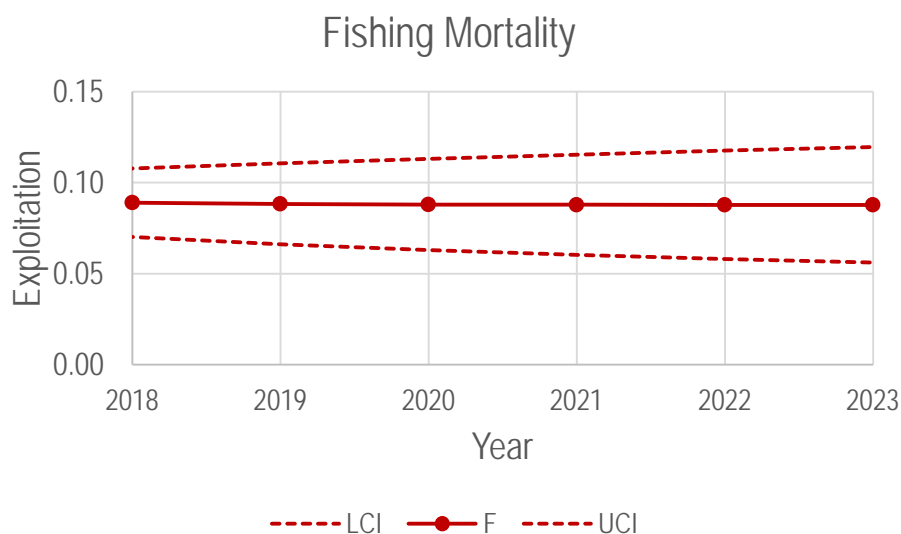
# Projections: SSB

- Project Constant  $F_{0Y}$   
(75%  $F_{SPR30}$ )



# Projections: F and Recruits

- Project Constant  $F_{0Y}$   
(75%  $F_{SPR30}$ )

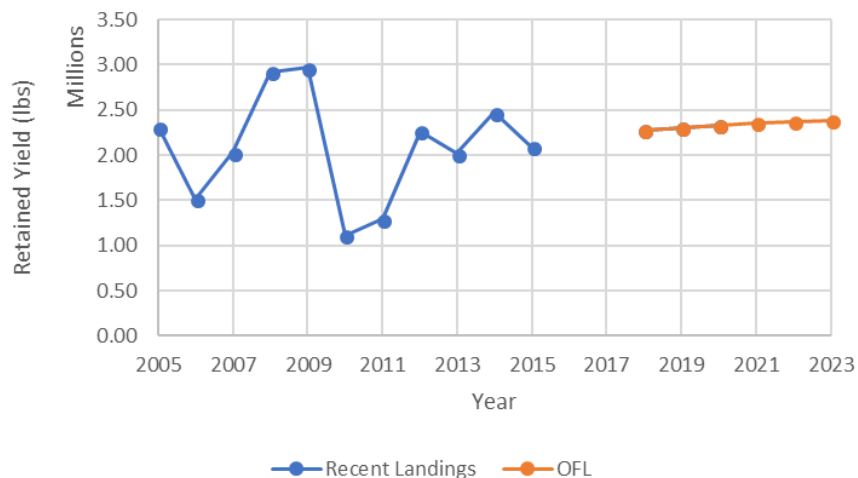


# Projections: Implications for Catch Advice

- Project Constant  $F_{OY}$  (75%  $F_{SPR30}$ )

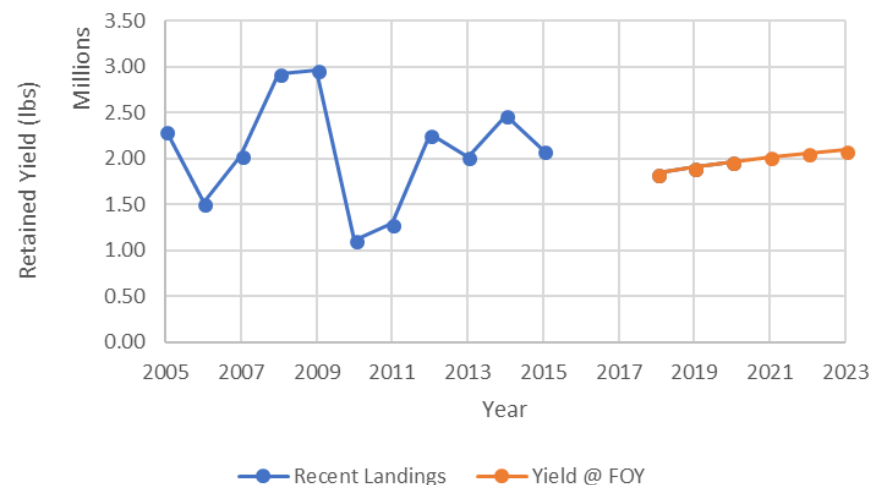
FSPR30

Recent Landings vs. Yield@FSPR30



75% FSPR30

Recent Landings vs. Yield@ $F_{OY}$



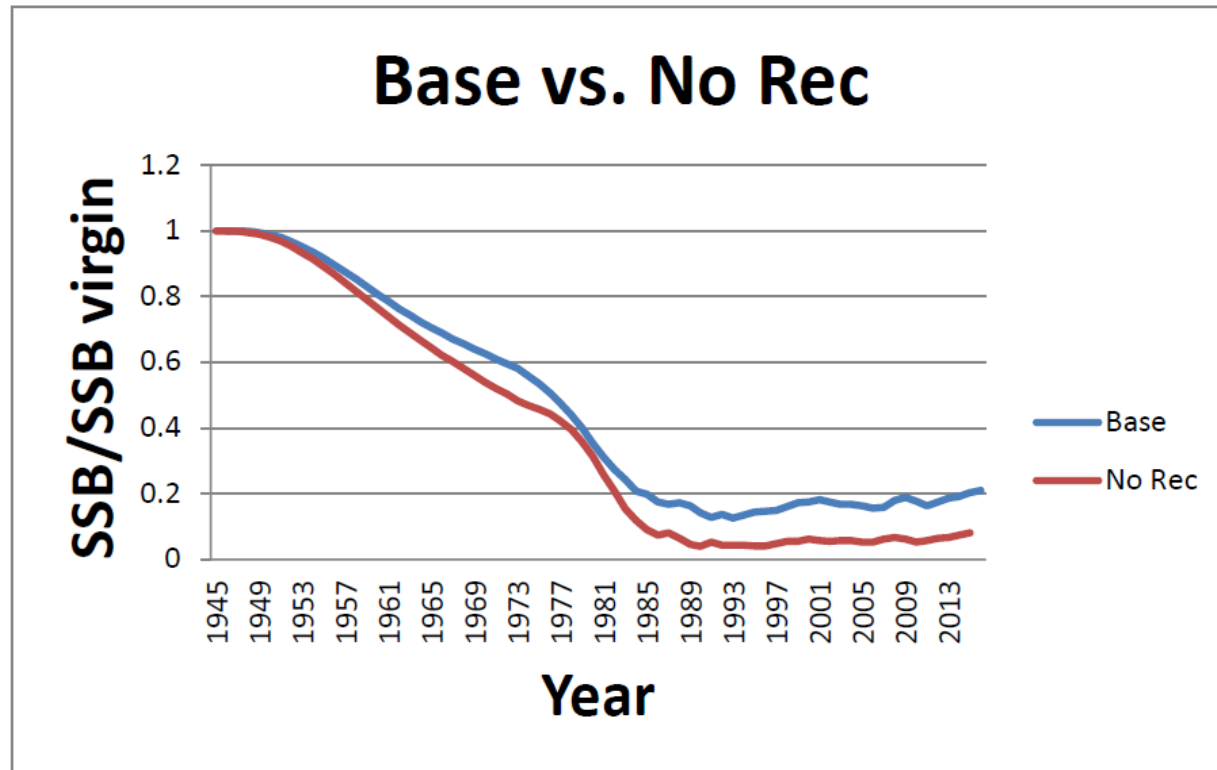


# Projections: Implications for Catch Advice

YEAR	LCI	Retained Yield (mt)	UCI	Yield @ $F_{0Y}$
2019	786	864	943	1.905
2020	815	891	968	1.965
2021	838	914	990	2.016
2022	856	933	1010	2.057
2023	870	948	1027	2.091
2024	879	961	1042	2.118
2025	887	970	1054	2.139

# EXTRA SLIDES

# RW Sensitivity Runs



**Figure 11.**-Sensitivity analyses of the base model without recreational indices or length effects relative to virgin Spawning Stock Biomass compared to the base model for the Gulf of Mexico Gray Snapper stock assessment.

# RW Sensitivity Runs

