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# SEDAR 57 Spiny Lobster

Review Workshop  
Presentation 4  
STT Base model

July 9-11, 2019

# STT Base Model

- Structure
- Model Fit
- Diagnostics
- Derived Quantities



# Base Model Structure

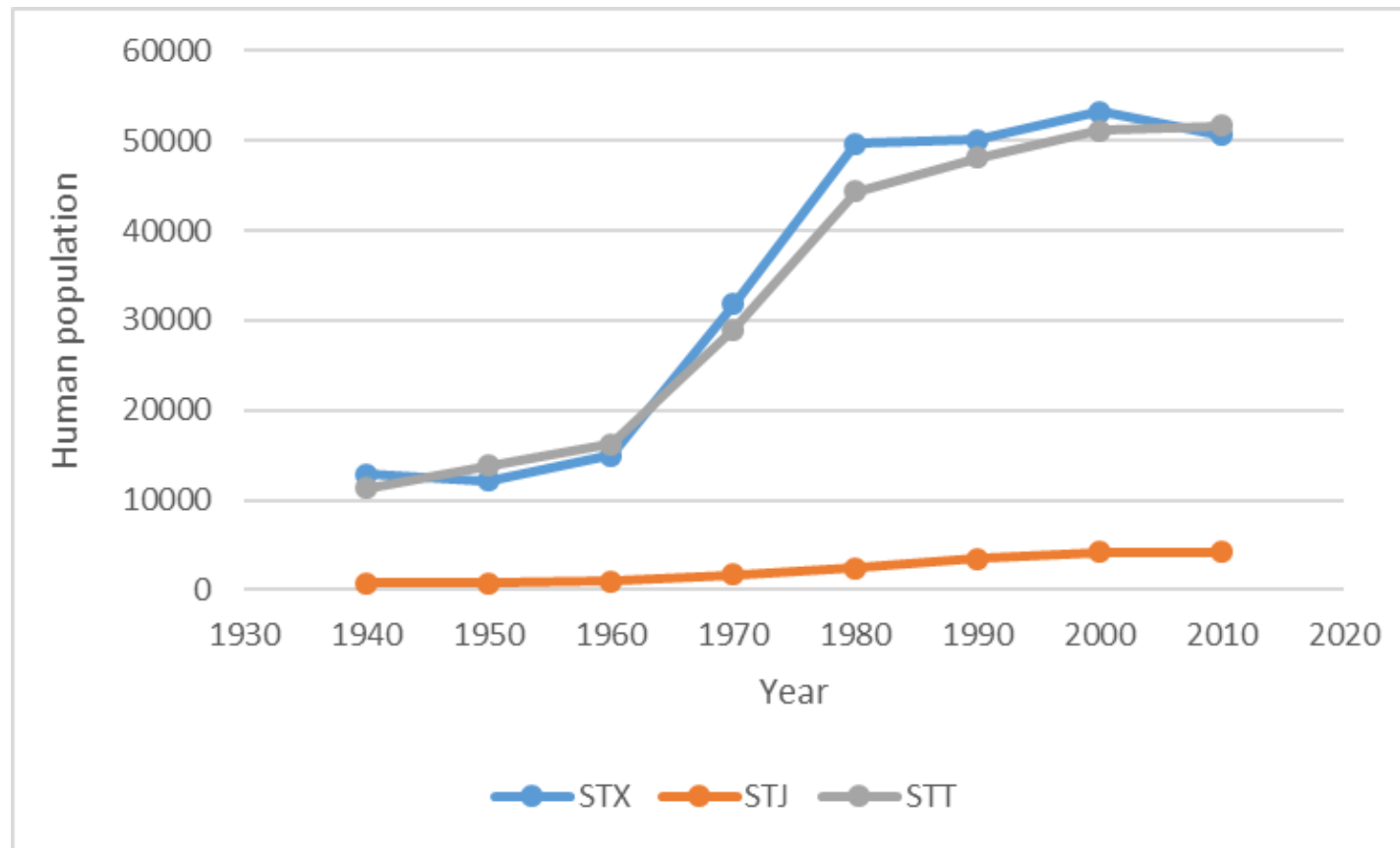


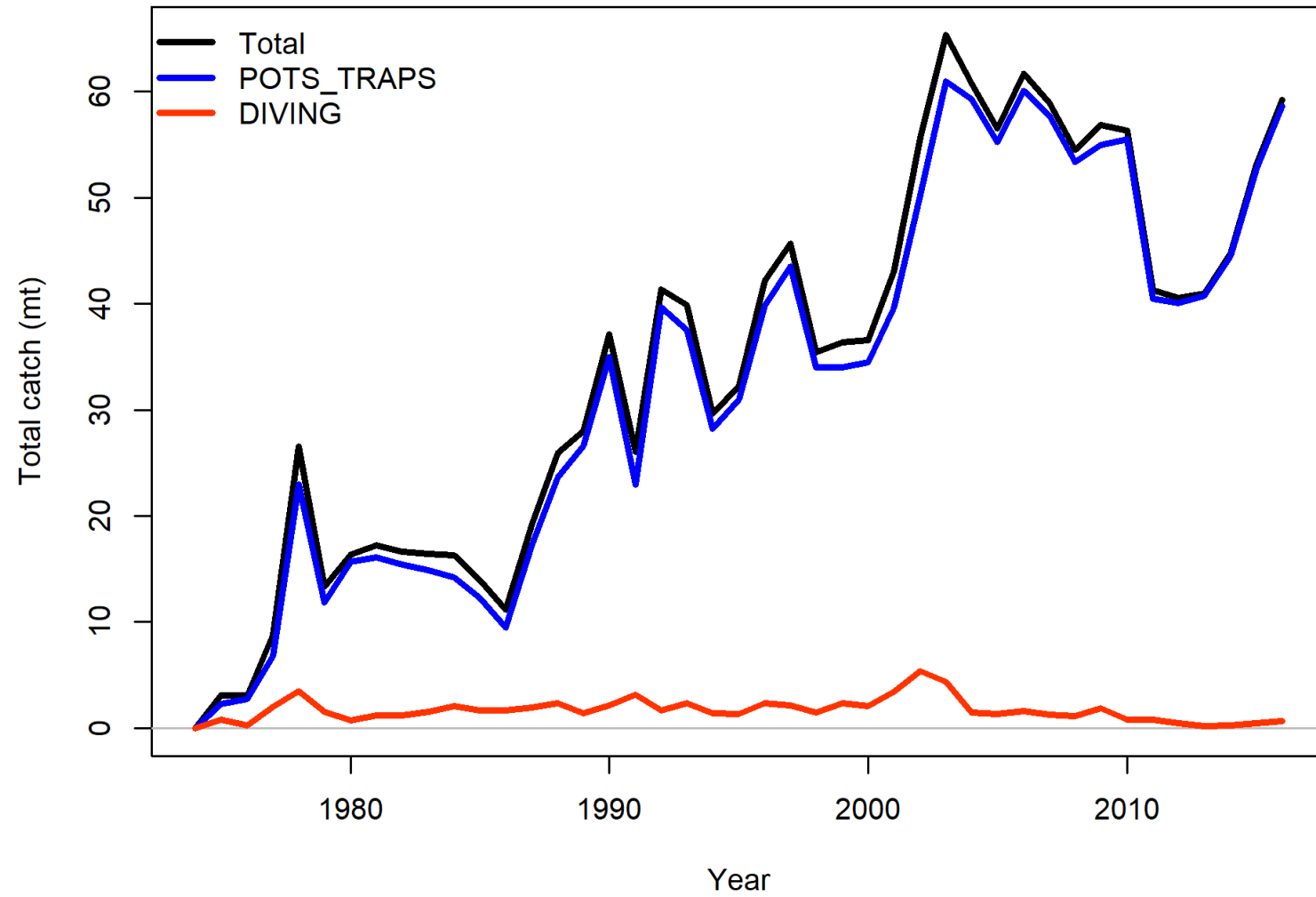
# Fisheries

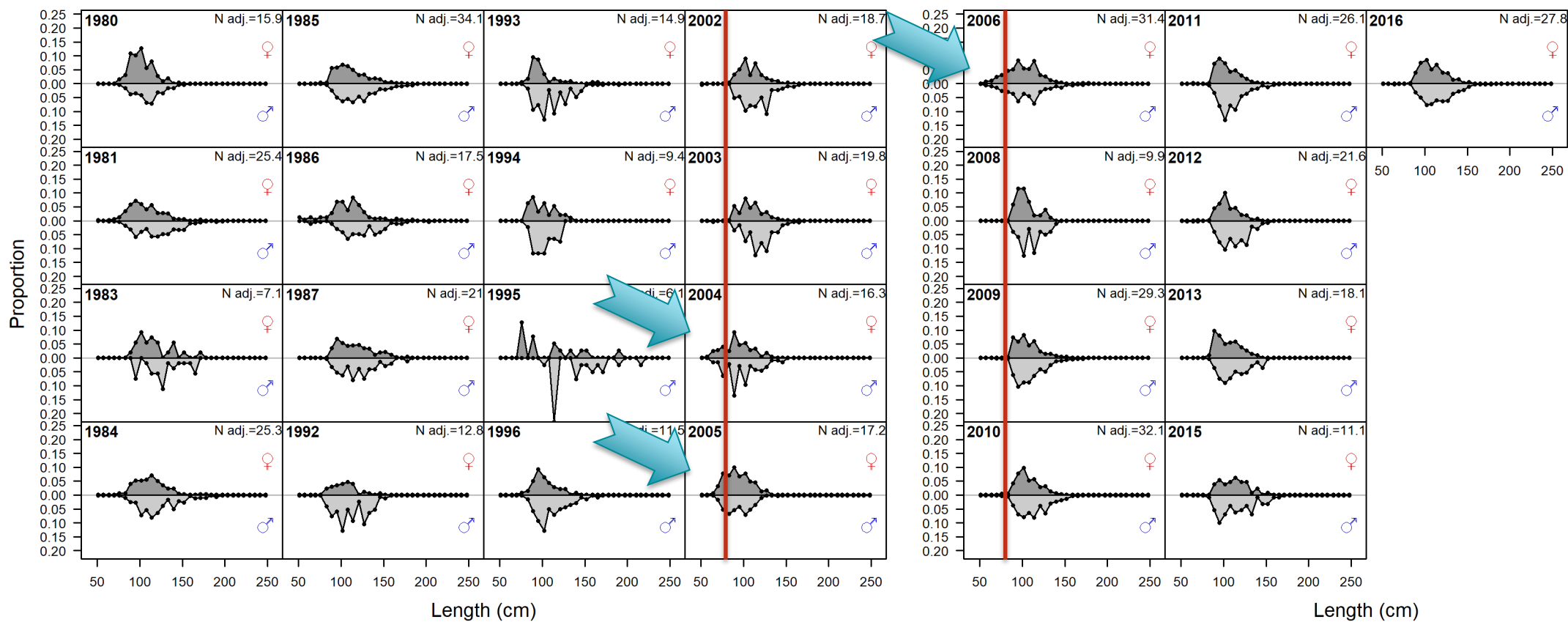
- Two fisheries:
  - Pots and traps, diving
  - Selectivity at length: estimated for Pots/traps, mirrored for diving
  - $F_{initial} = 0$
- Retention blocks:
  - Minimum size limit 89 mm (3.5") introduced in 1985
  - Time block for retention estimated over across years: 1985-2003, 2007-2016
  - Period of 2004-2006 undersized reporting evident, thus not included in retention block



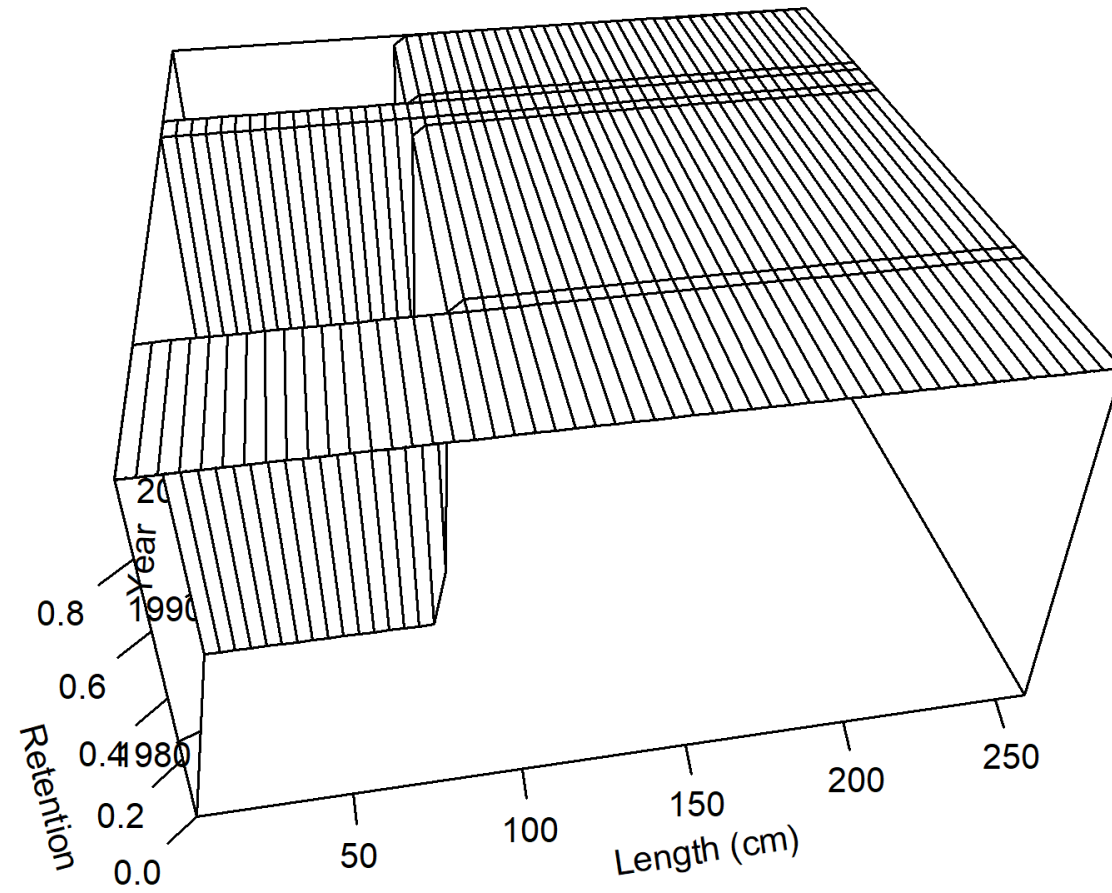
# Human population growth USVI. Obtained from United States Census Bureau.







### Male time-varying retention for POTS\_TRAPS





# Fixed and estimated quantities

Estimated quantities:

- Unfished recruitment ( $R_0$ )
- Selectivity – 3 parameters

Fixed quantities:

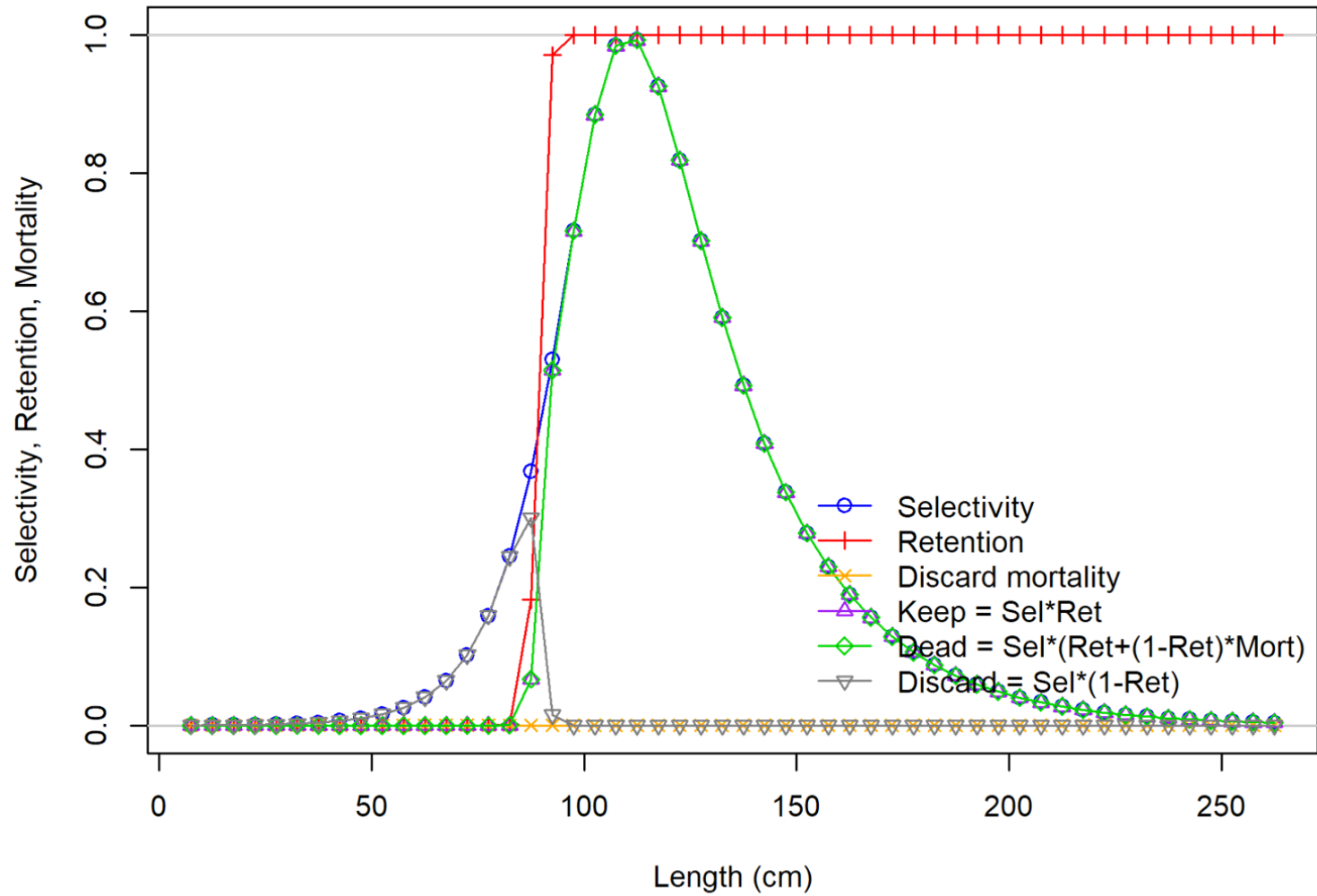
- LVB Female:  $L_{inf}=191$  mm,  $K=0.25$  /year
- LVB Male:  $L_{inf}=195$ ,  $K=0.24$  /year
- $M=0.34$  /year
- Maturity function,  $L_{50}=92$  mm; L-W relationship
- Steepness,  $h=0.95$



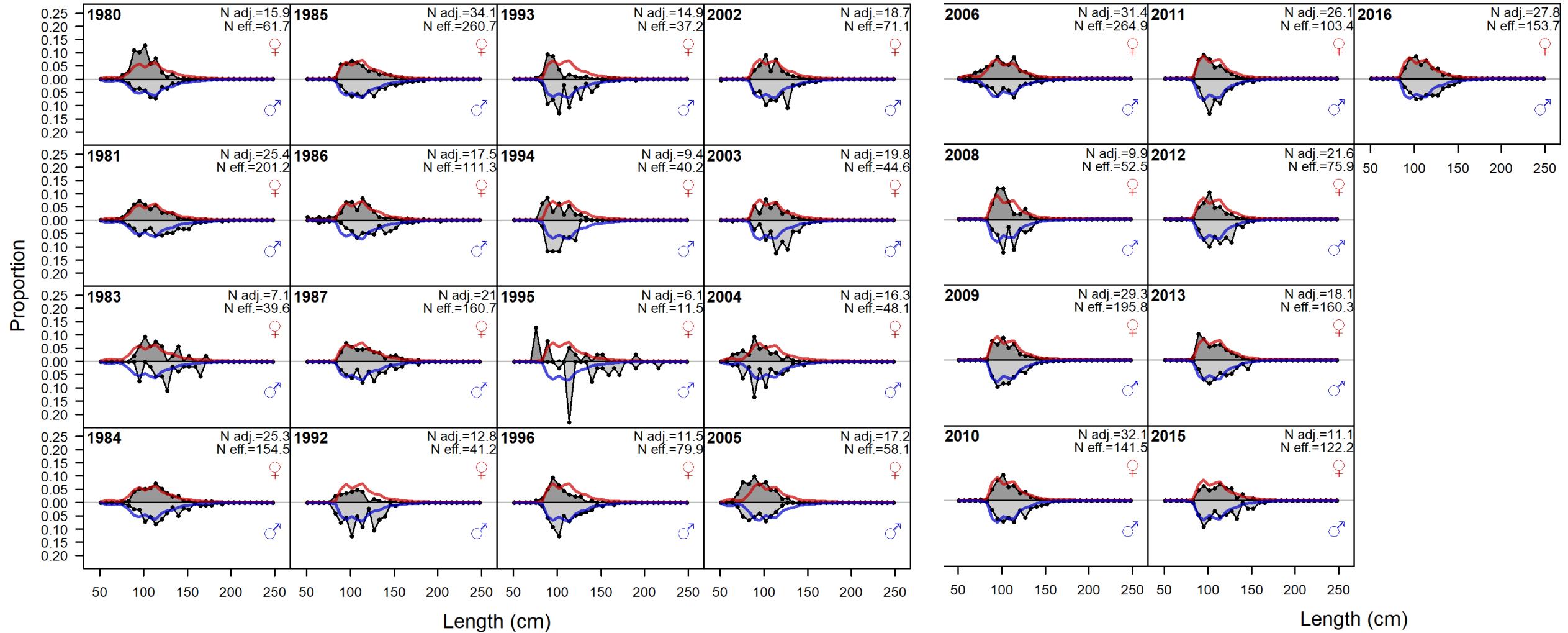
# Model Fit



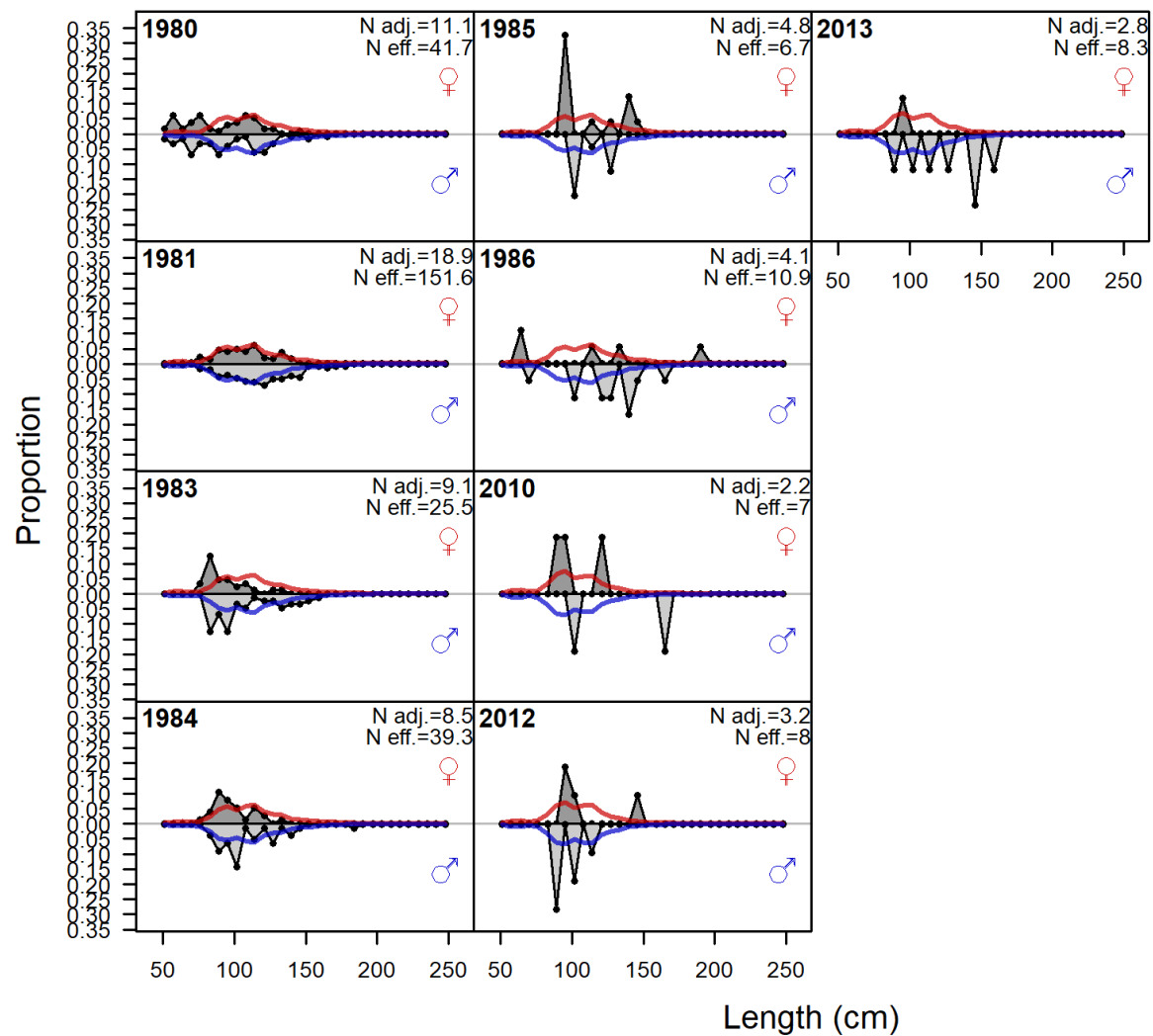
### Female ending year selectivity for POTS\_TRAPS



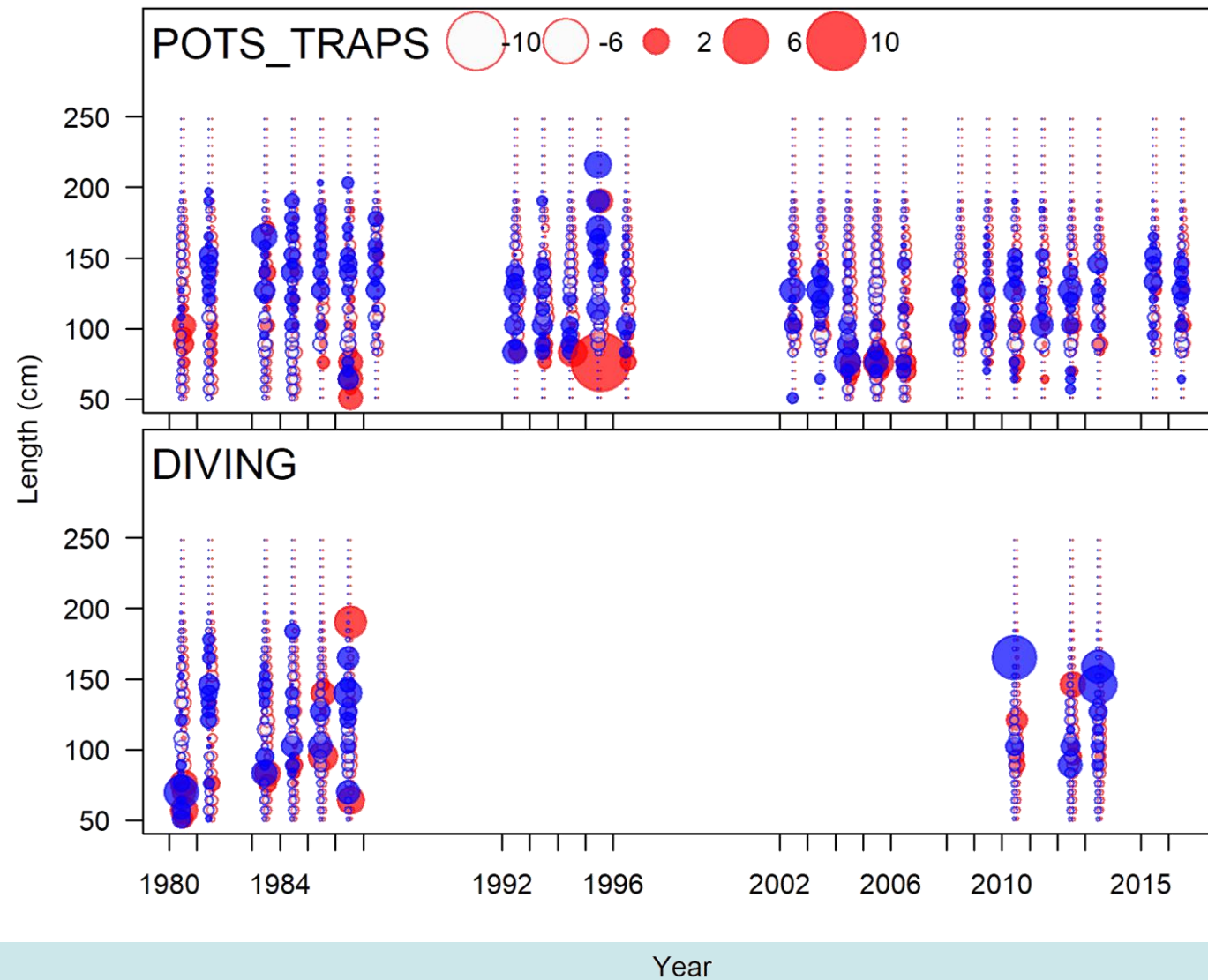
# Pots and traps



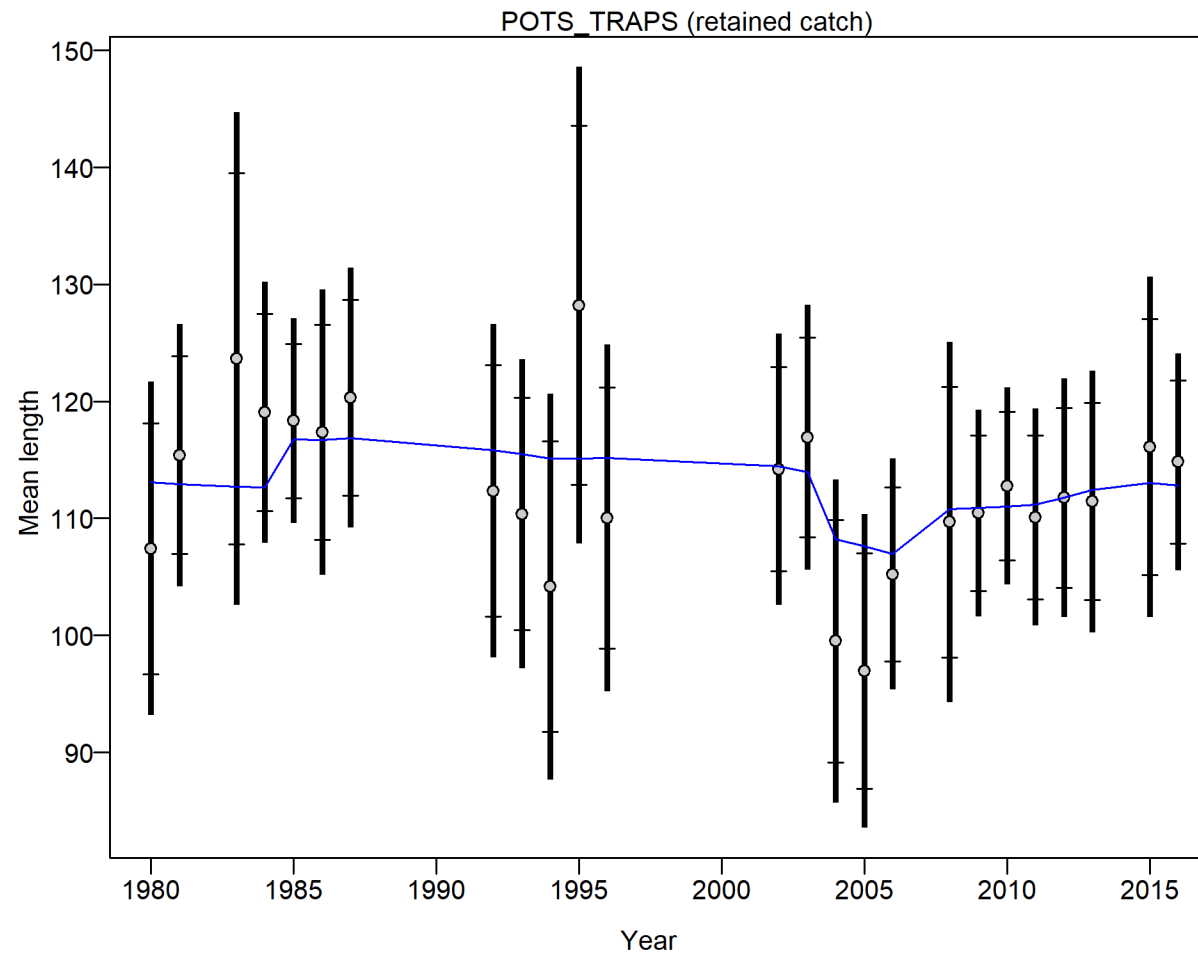
# Dive



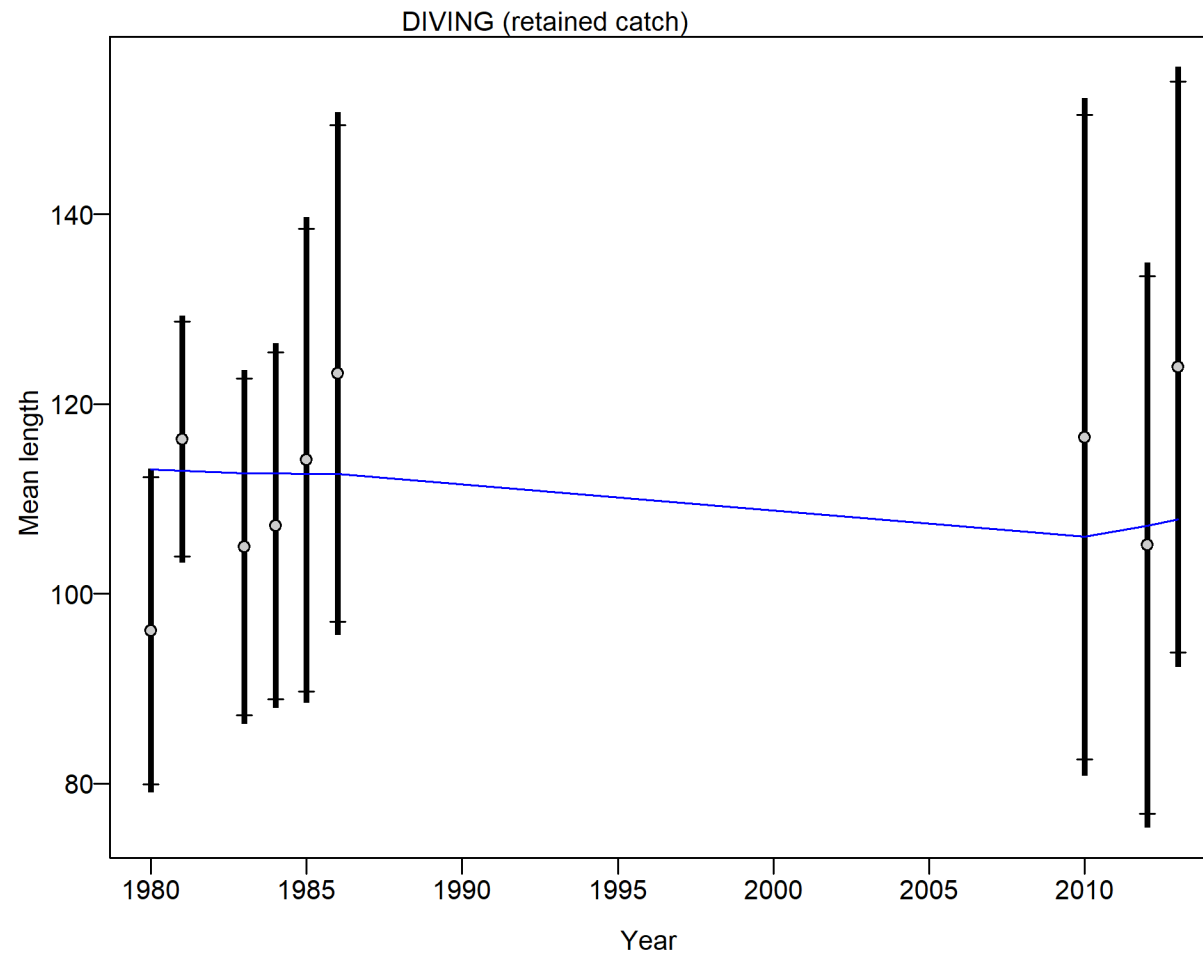
# Length composition residuals



# Pots and traps



# Dive





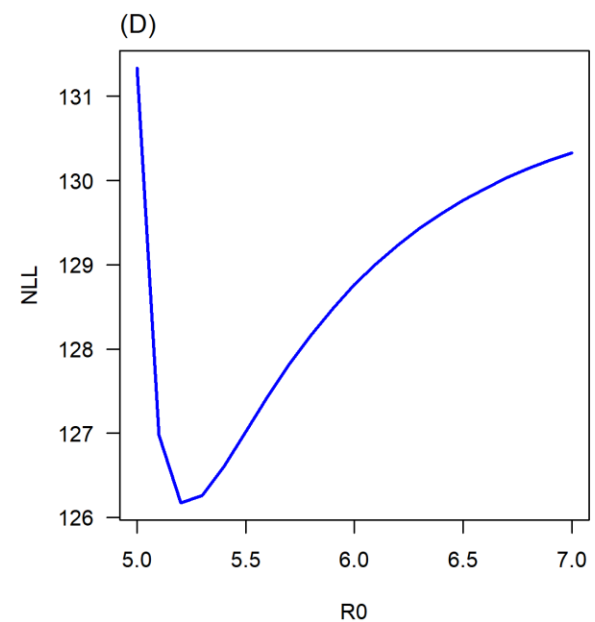
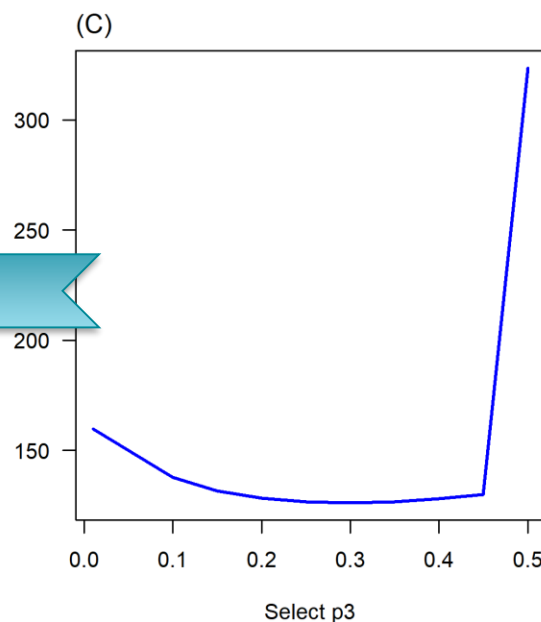
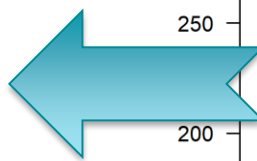
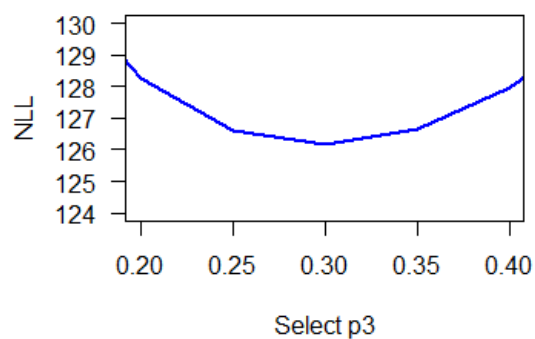
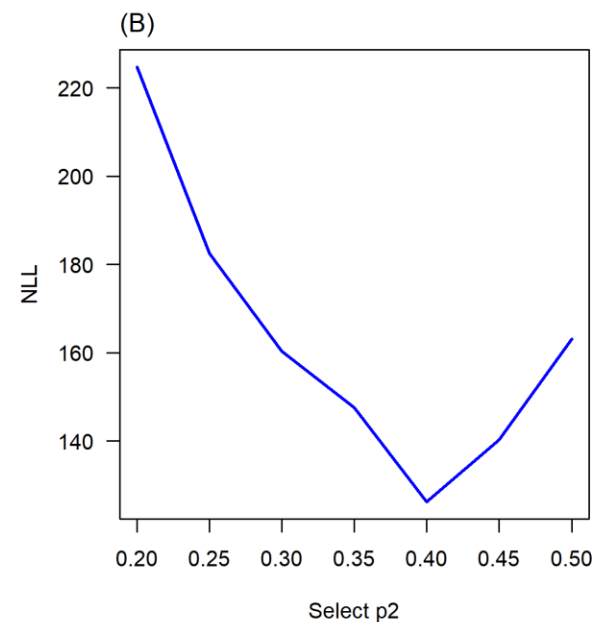
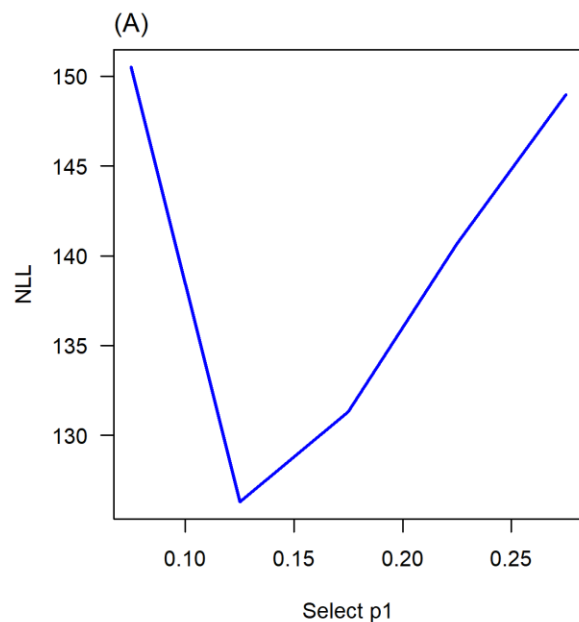
# Diagnostics



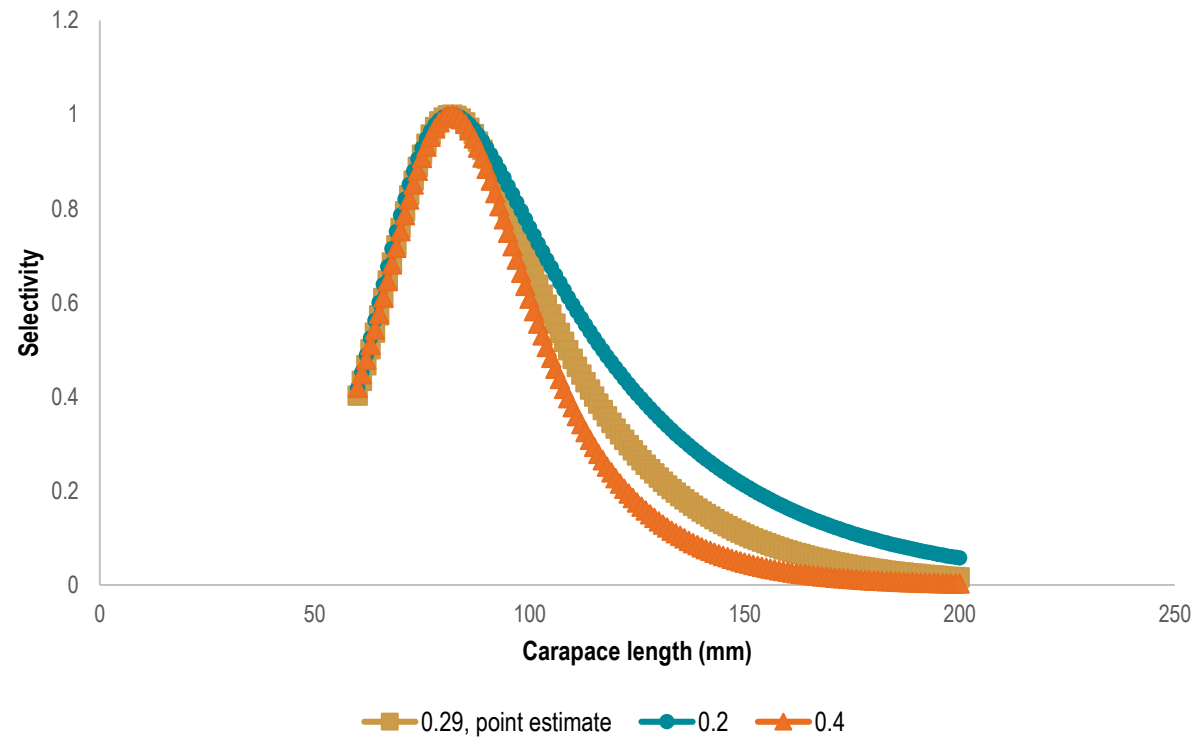
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# Profile likelihood

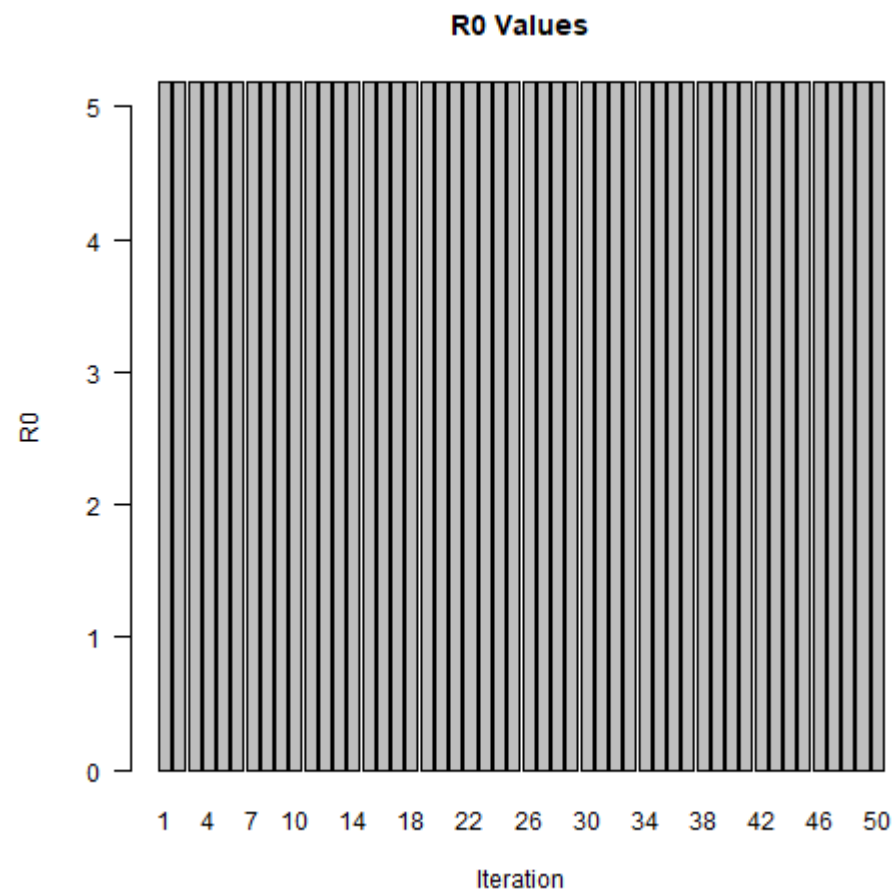
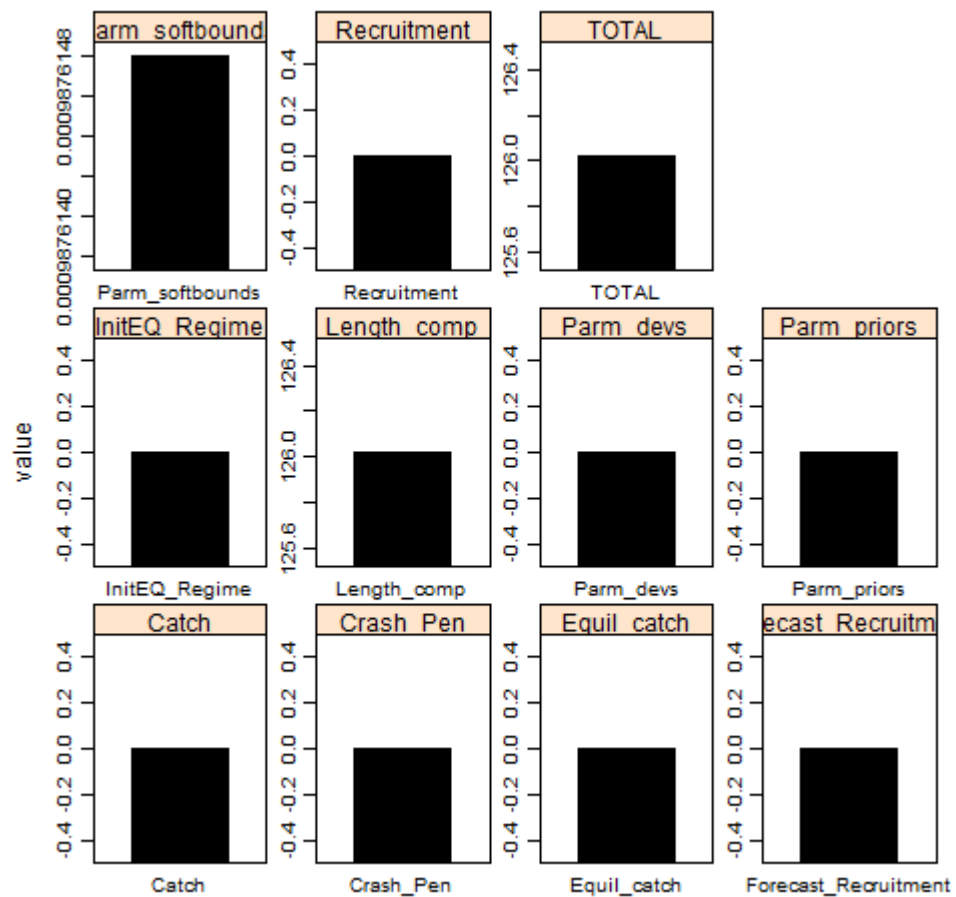
Parameter correlations:  
> |0.70|



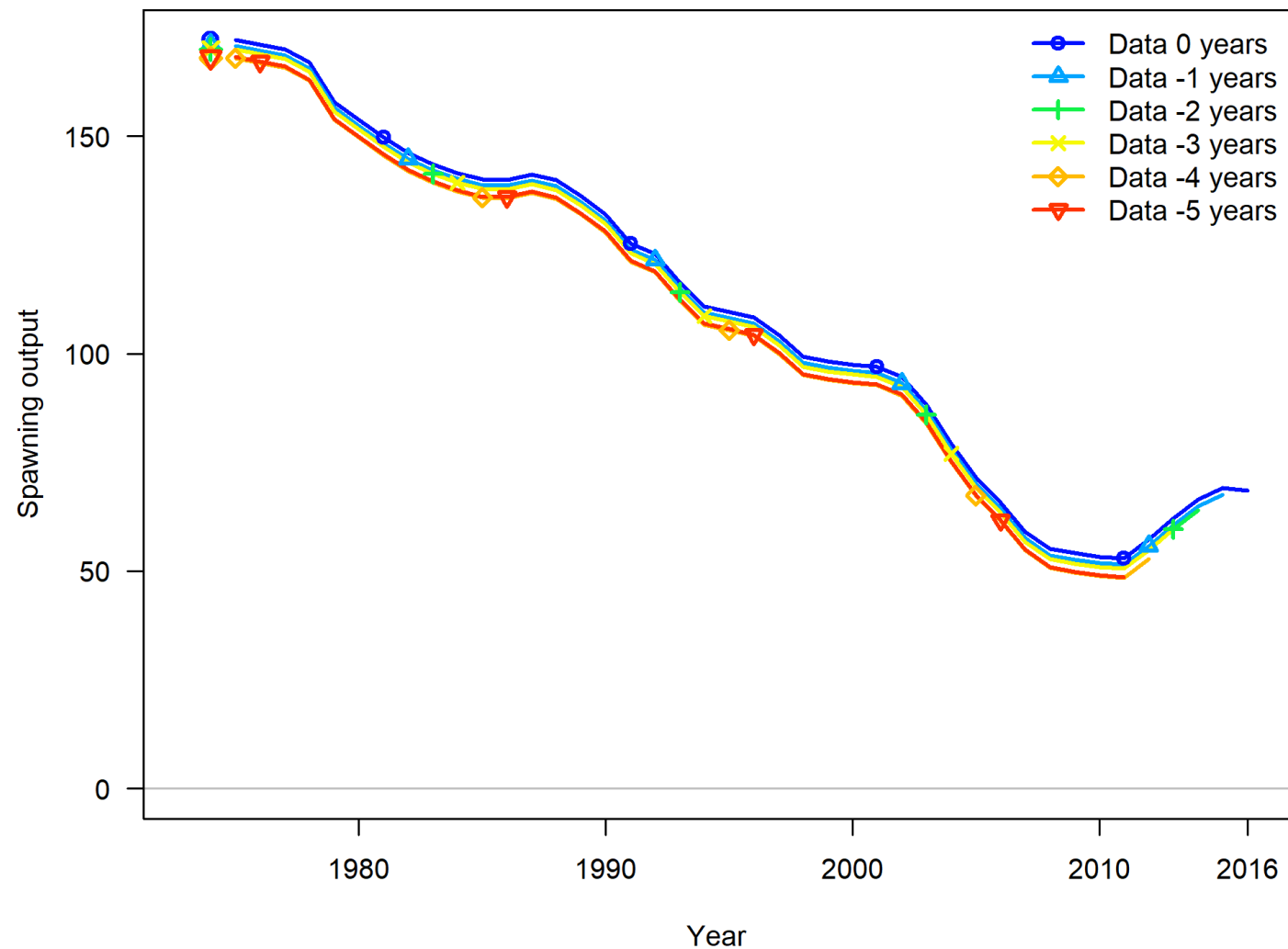
# Selectivity using profile LL confidence interval



# Jitter



# Retrospective patterns

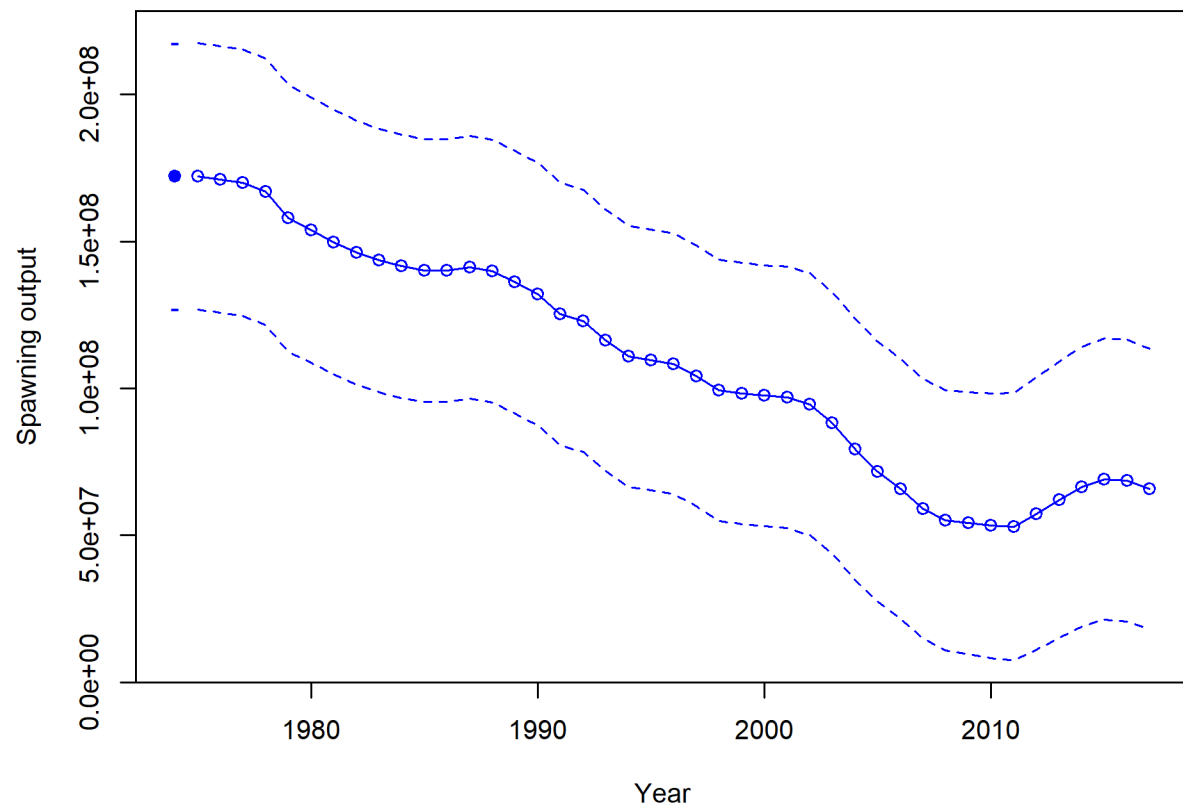


# Derived Quantities

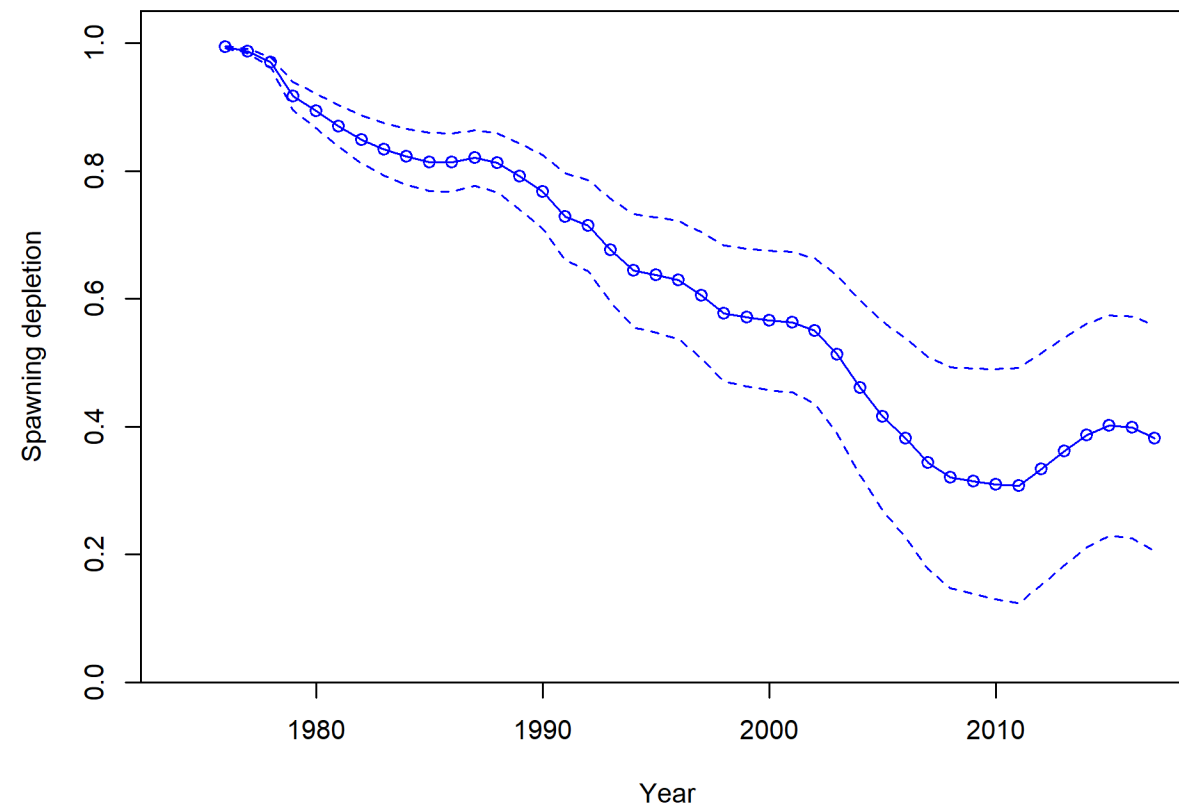


# Biomass trend

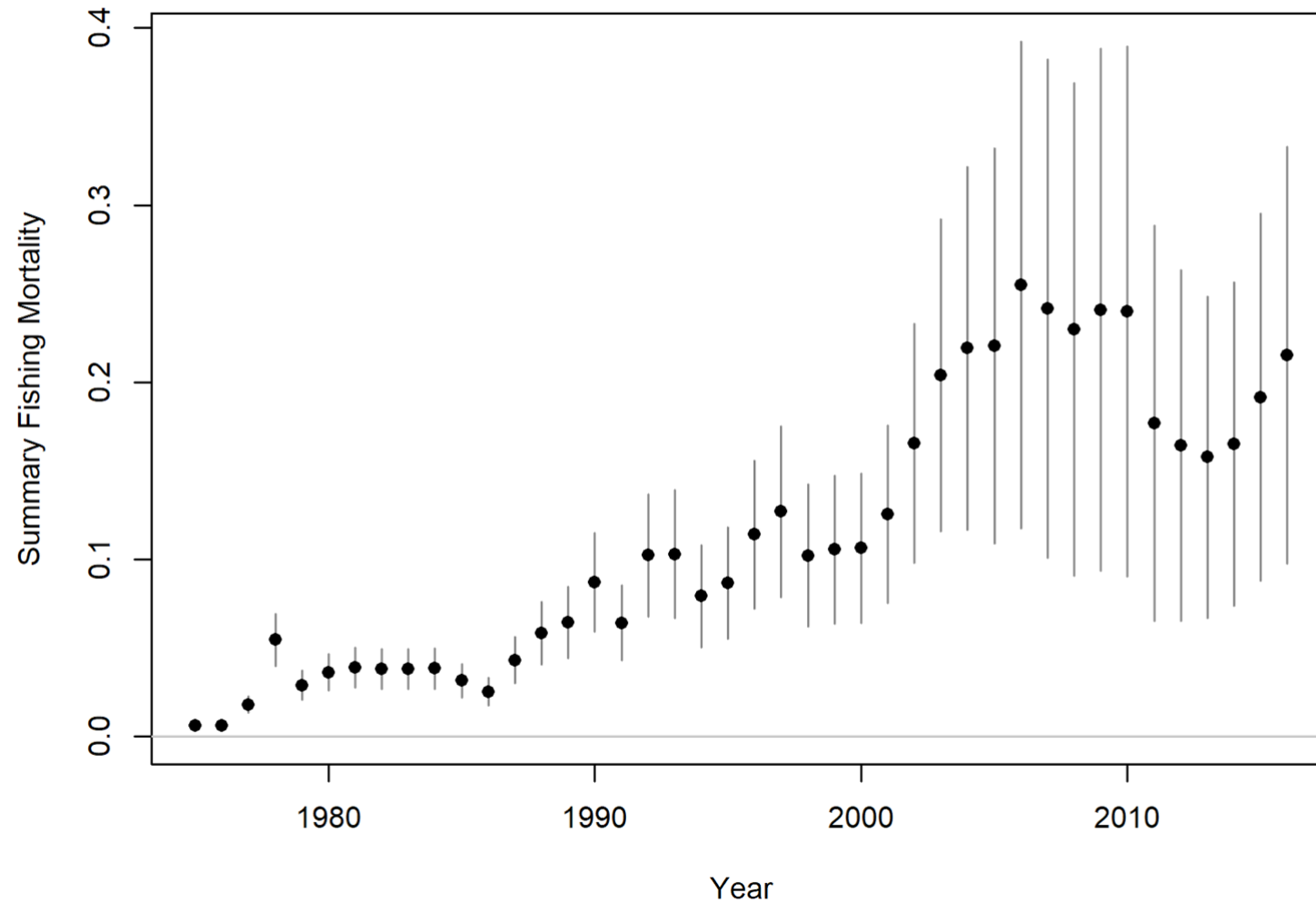
Spawning output with ~95% asymptotic intervals



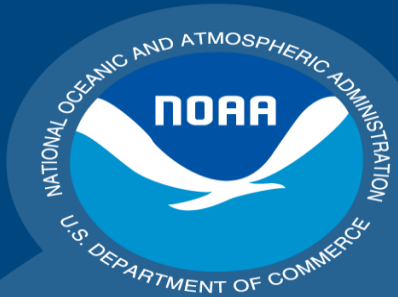
Spawning depletion with ~95% asymptotic intervals



# Harvest rate (biomass landed / total biomass)







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