THE SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

Mechanisms for Integrating Best Fishing Practices into Science and Management

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SAFMC Staff

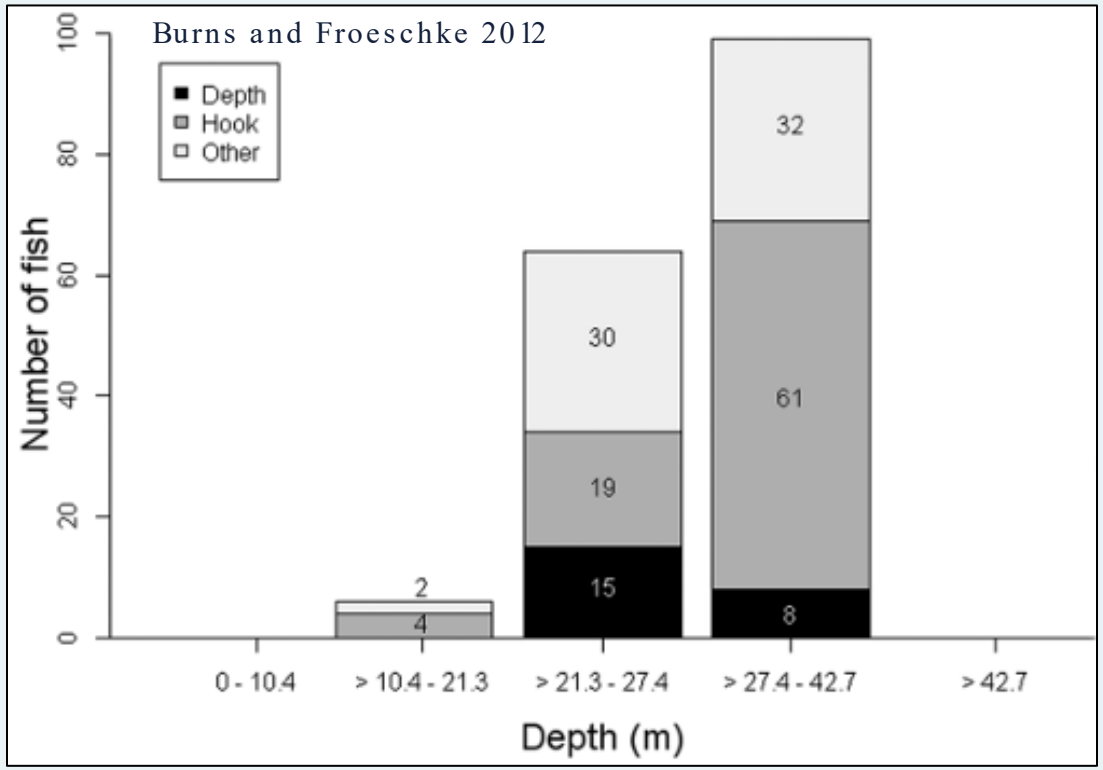
How can best fishing practices be incorporated into stock assessments and management?

Discard Mortality Estimates

Selectivity in Stock Assessments

Citizen Science Data Sources

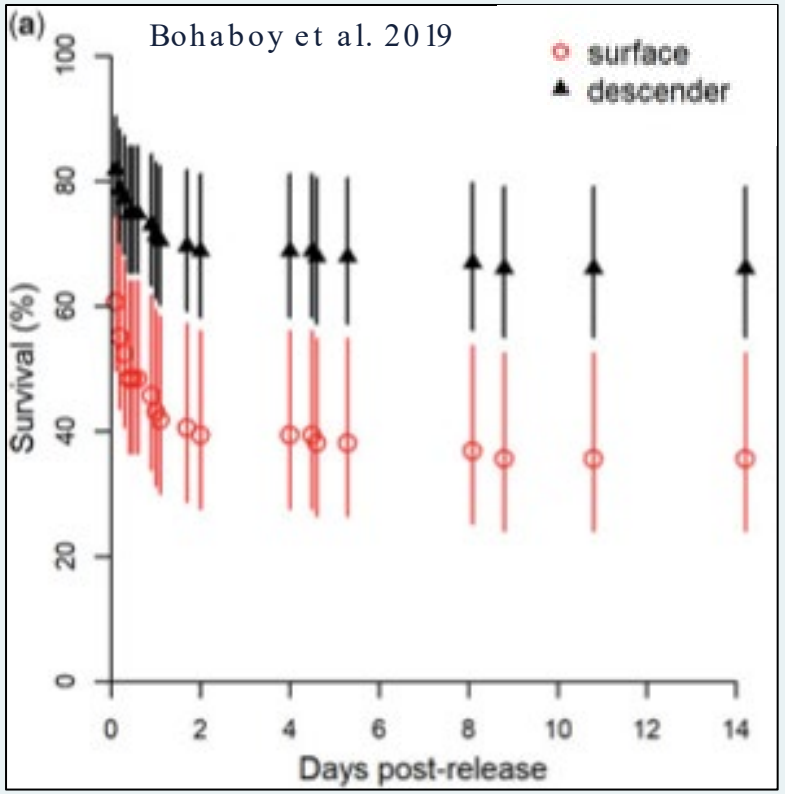
Discard Mortality



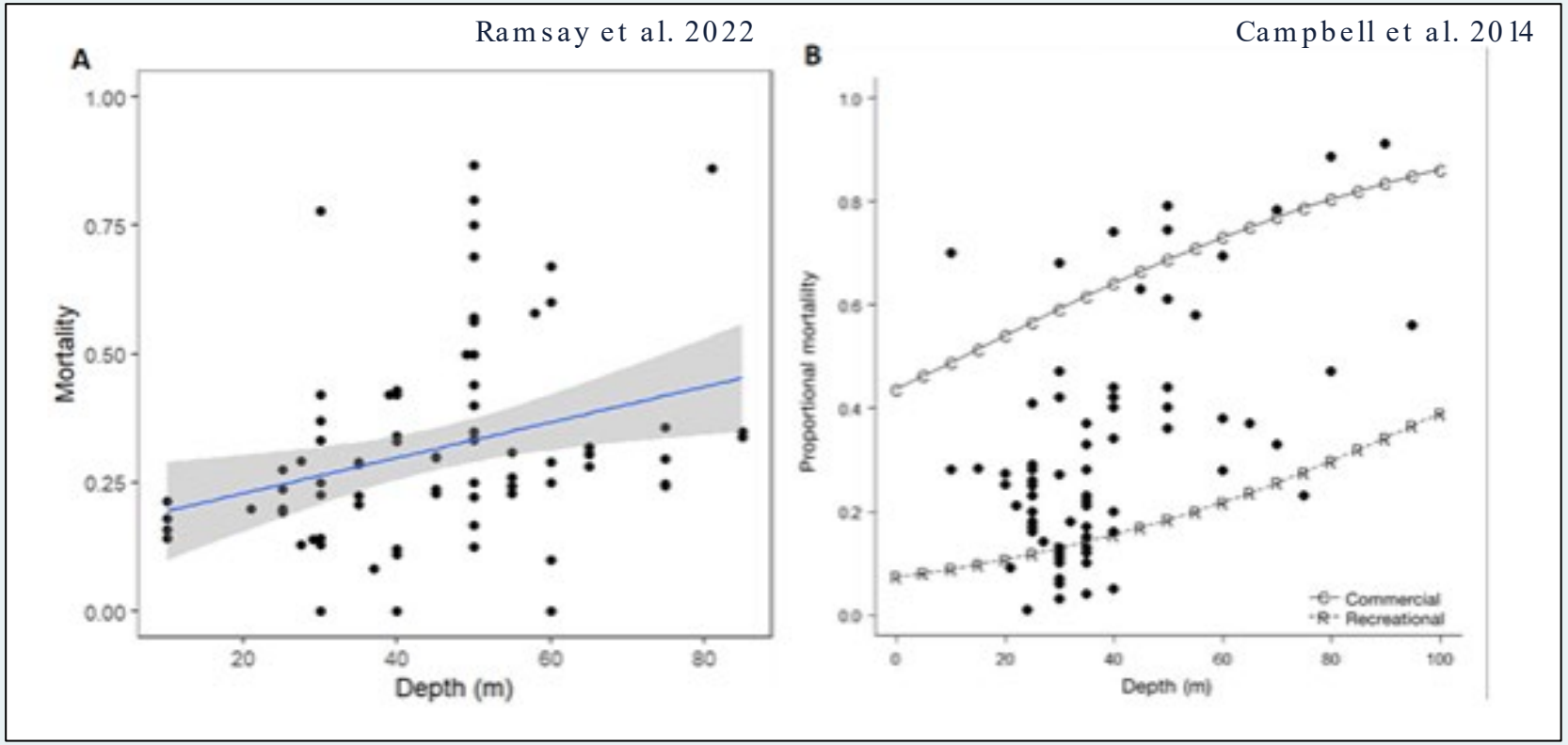
- Barotrauma and depth related injuries
- Hooking injuries
- Other:
  - Heat stress
  - Handling
  - Improper venting
  - Etc.

→ *All sources additive to discard mortality estimates in stock assessment*
→ *All potentially mitigated (to an extent) by best fishing practices and tools*

How to Estimate Discard Mortality?



Bohaboy et al. 2019



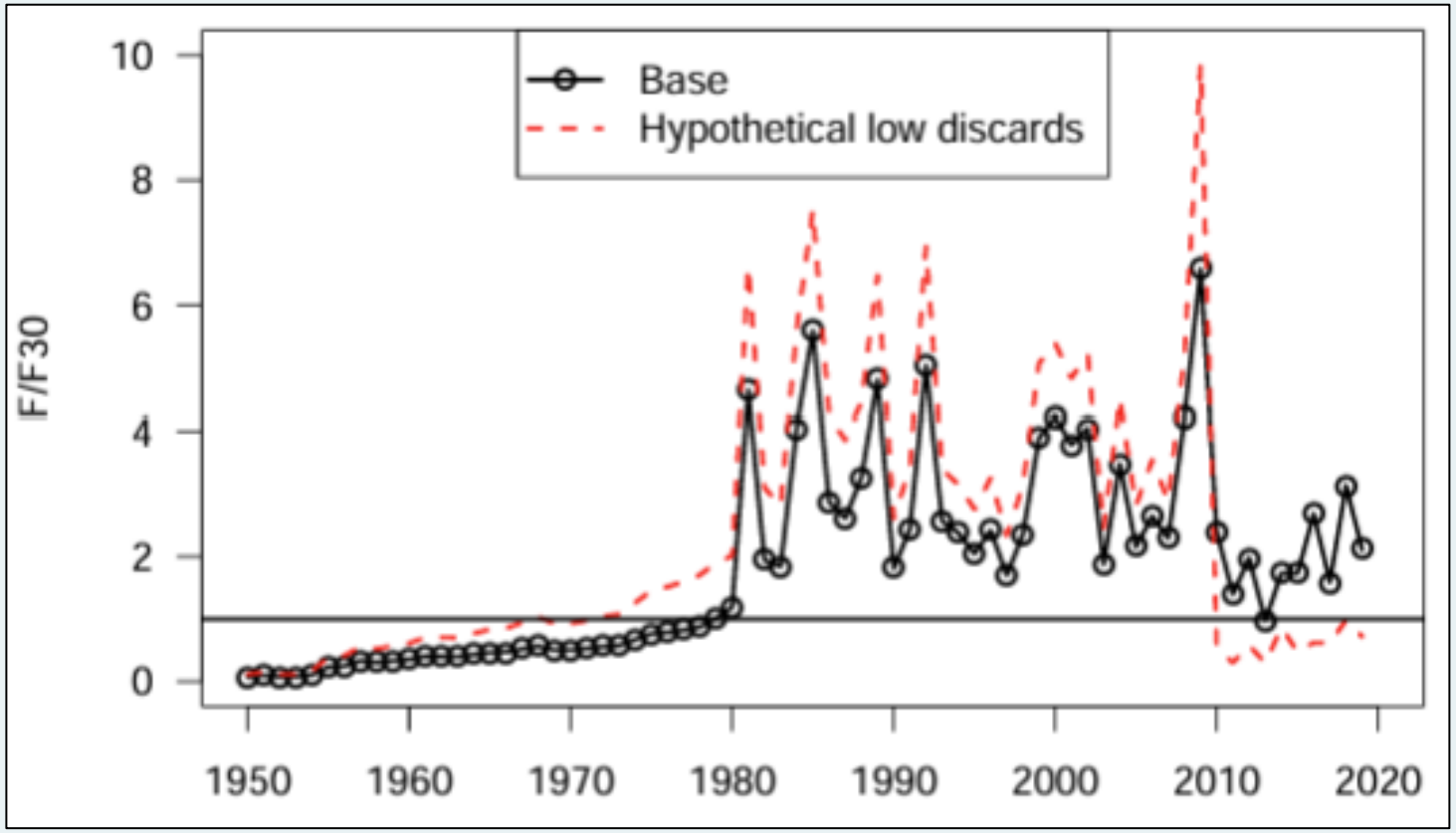
Ramsay et al. 2022

Campbell et al. 2014

- Estimates of discard mortality will vary by:
  - Season, depth, release treatment, fish condition, depredation, sector, etc.
- Uncertainty around estimates

How to Estimate Discard Mortality?

- Uncertainty around estimates
  - Sensitivity analysis
- Hyp Low Discards:
  - Reducing overall number of discards
  - Reducing discard mortality rate
- F/F30
  - overfishing threshold



SEDAR 73 SA Red Snapper

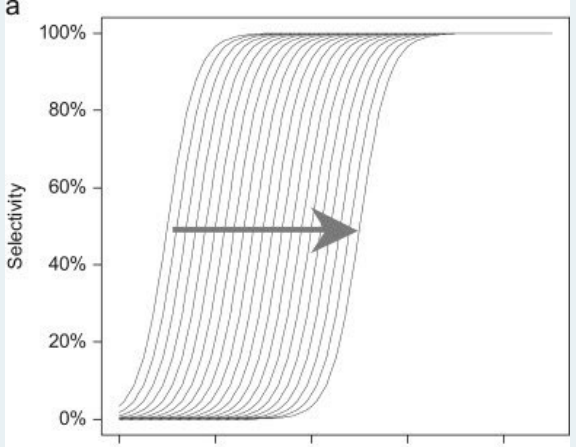
Selectivity

Contact Selectivity

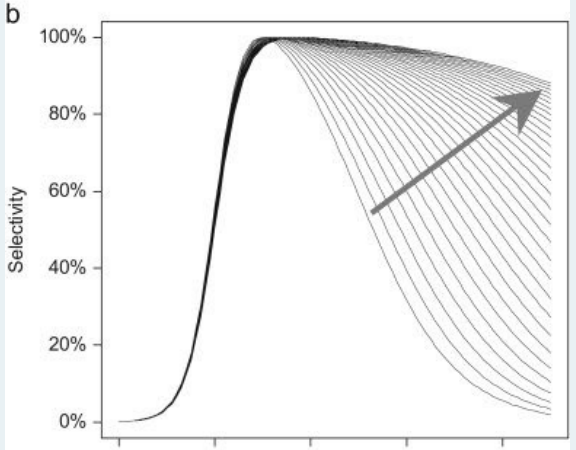
- If a fish encounters gear, what is the probability it is caught?

Population Selectivity

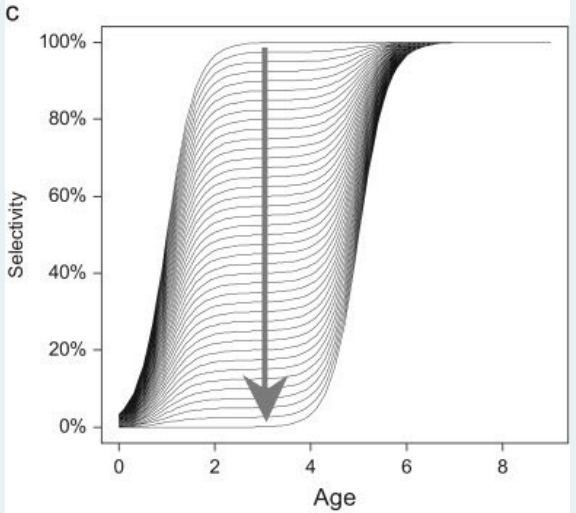
- Probability that fish of given age or size will encounter the gear and be caught.



Flat-Topped



Dome



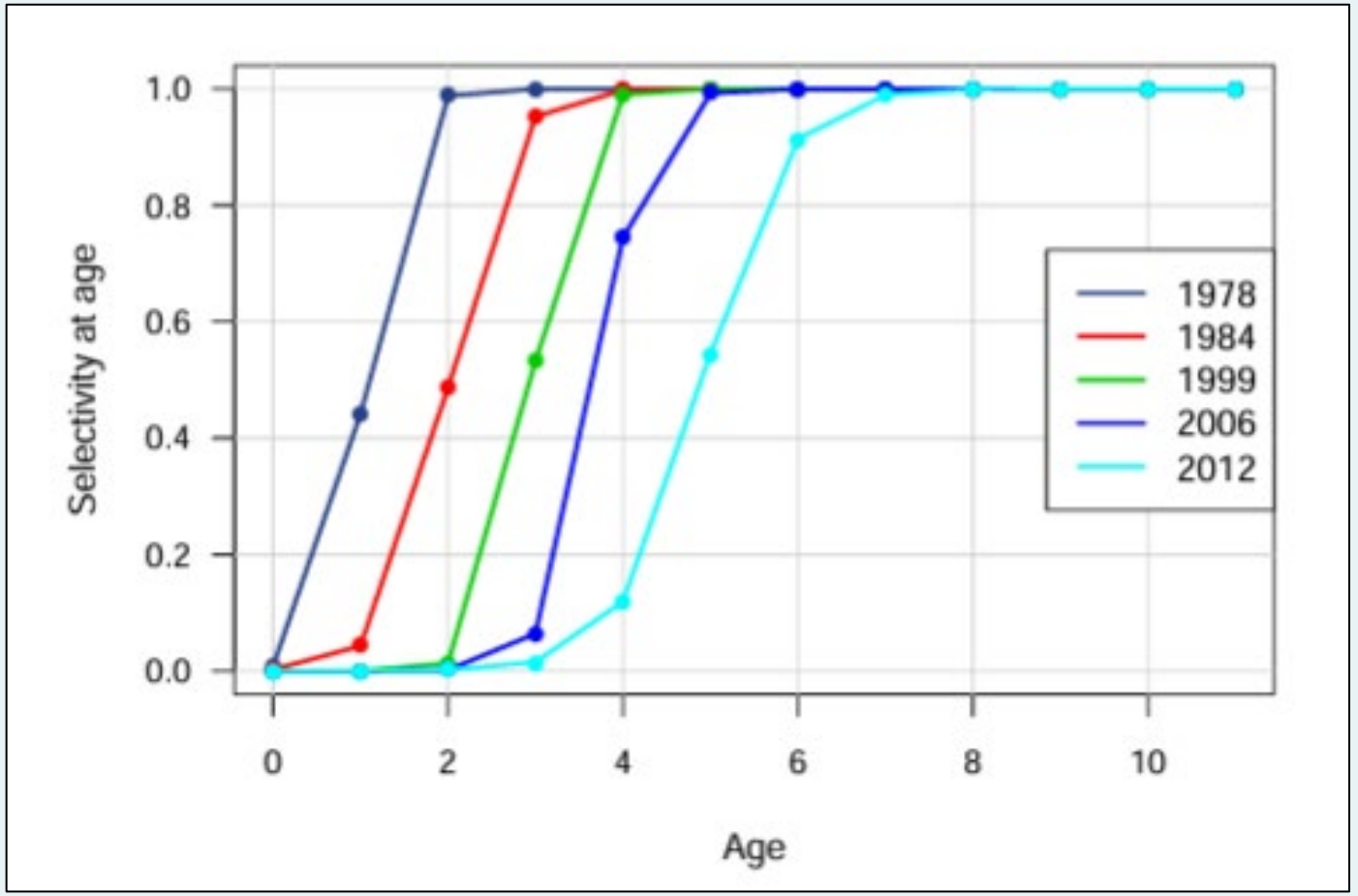
Two fleets combined

Scott and Sampson 2011.

Changes in Selectivity

- Response to management actions
  - e.g., increasing the minimum size limit
- Response to changing fishery dynamics
  - e.g., older ages removed through fishing

- But, also can result from alterations in fishing practices…

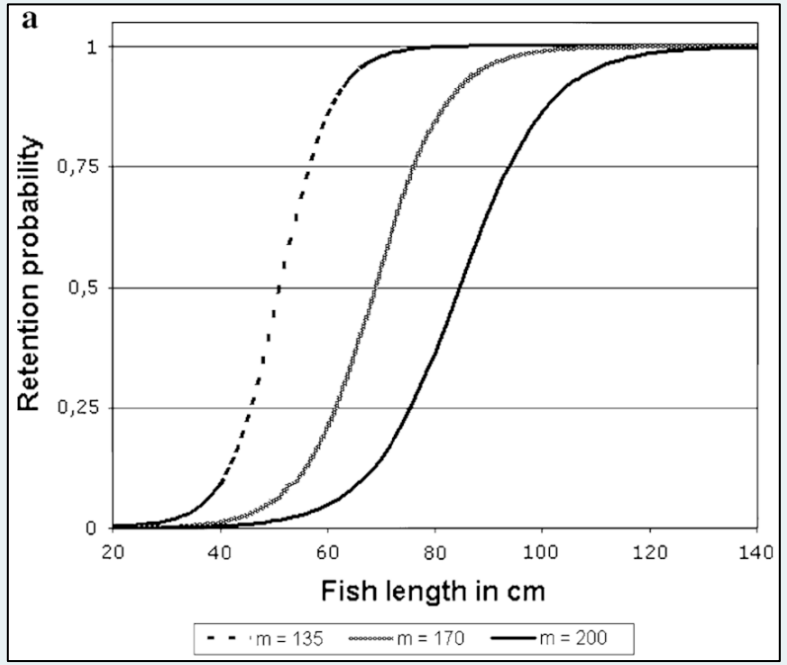


SEDAR56: South Atlantic Black Sea Bass

Changes in Selectivity

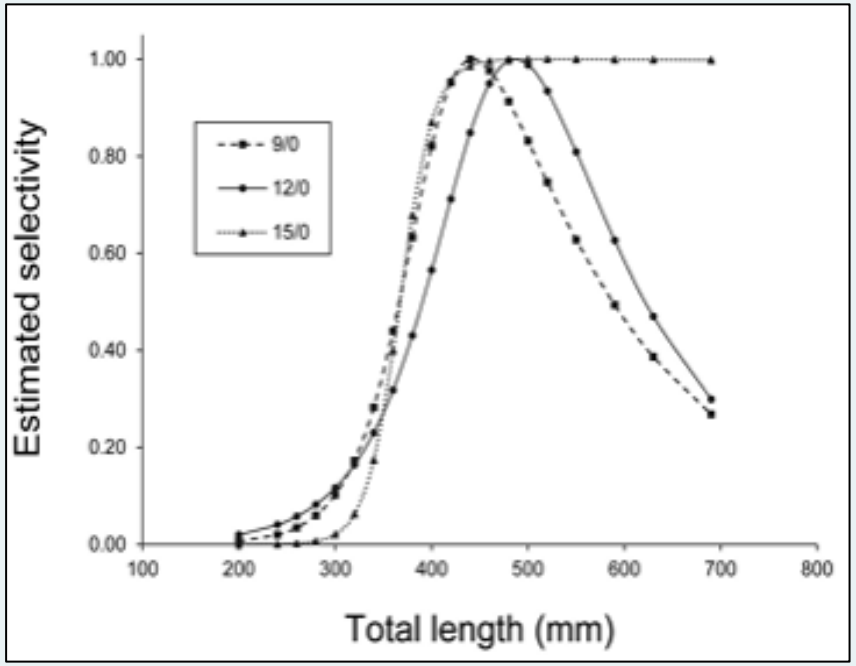
- Gear modifications:

Trawl Mesh Size



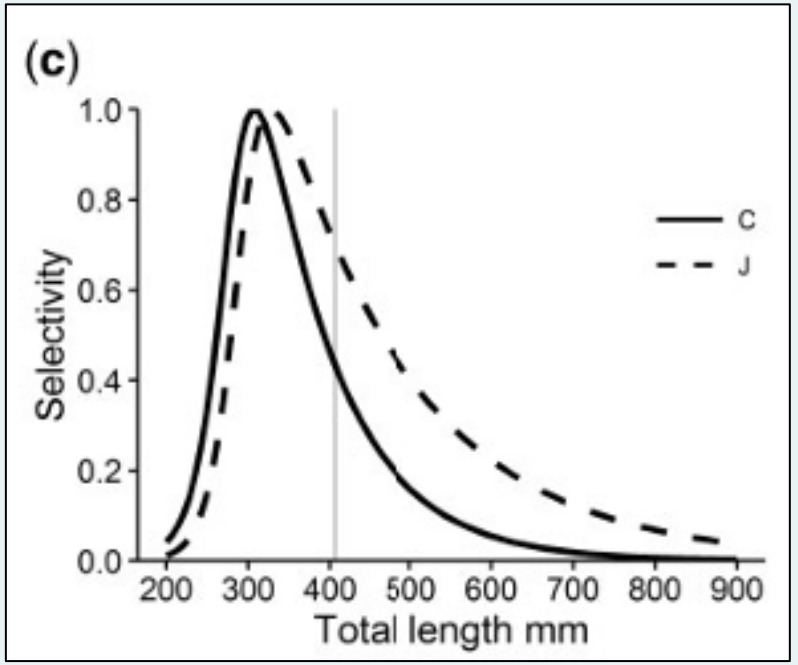
Diekert et al 2010

Hook Size



Patterson et al. 2012

Hook Type



Garner et al. 2017

SEDAR 73 (2021)
South Atlantic Red Snapper Stock Assessment

- Selectivity and Time Blocks
  - SEDAR41 used two time blocks for discard mortality, to account for transition from J-hooks to circle hooks
  - SEDAR73 maintains those blocks and adds two more to account for increased use of descender devices.
    - The first new block (Block 3, 2017–2020) assumes 25% usage of descender devices
    - The second new block (Block 4, 2021–) assumes 75% usage of descender devices.

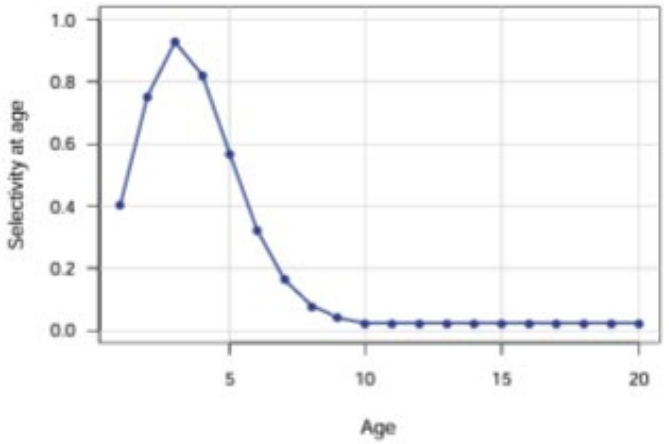
Discard Mortality Time Blocks

Fleet	Block 1	Block 2	Block 3	Block 4
cH	0.48 (0.38-0.58)	0.38 (0.28−0.48)	0.36 (0.26−0.46)	0.32 (0.22−0.42)
HB	0.37 (0.27−0.45)	0.26 (0.18−0.34)	0.25 (0.17−0.33)	0.22 (0.14−0.30)
GR	0.37 (0.27−0.45)	0.28 (0.20−0.36)	0.26 (0.18−0.34)	0.23 (0.15−0.31)

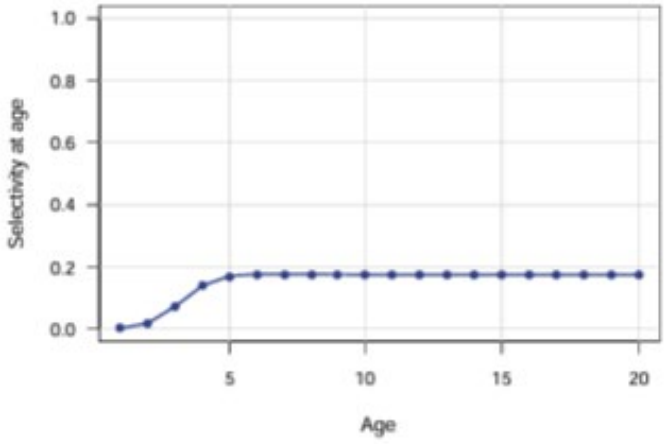
Transition from J-hooks to Circle hooks

Assume 25% descending device use

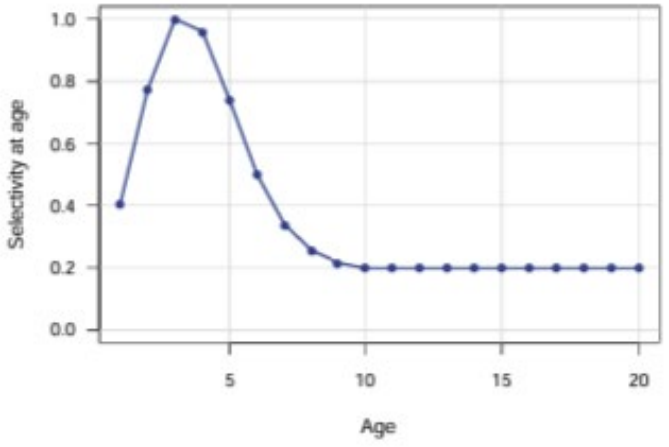
Assume 75% descending device use



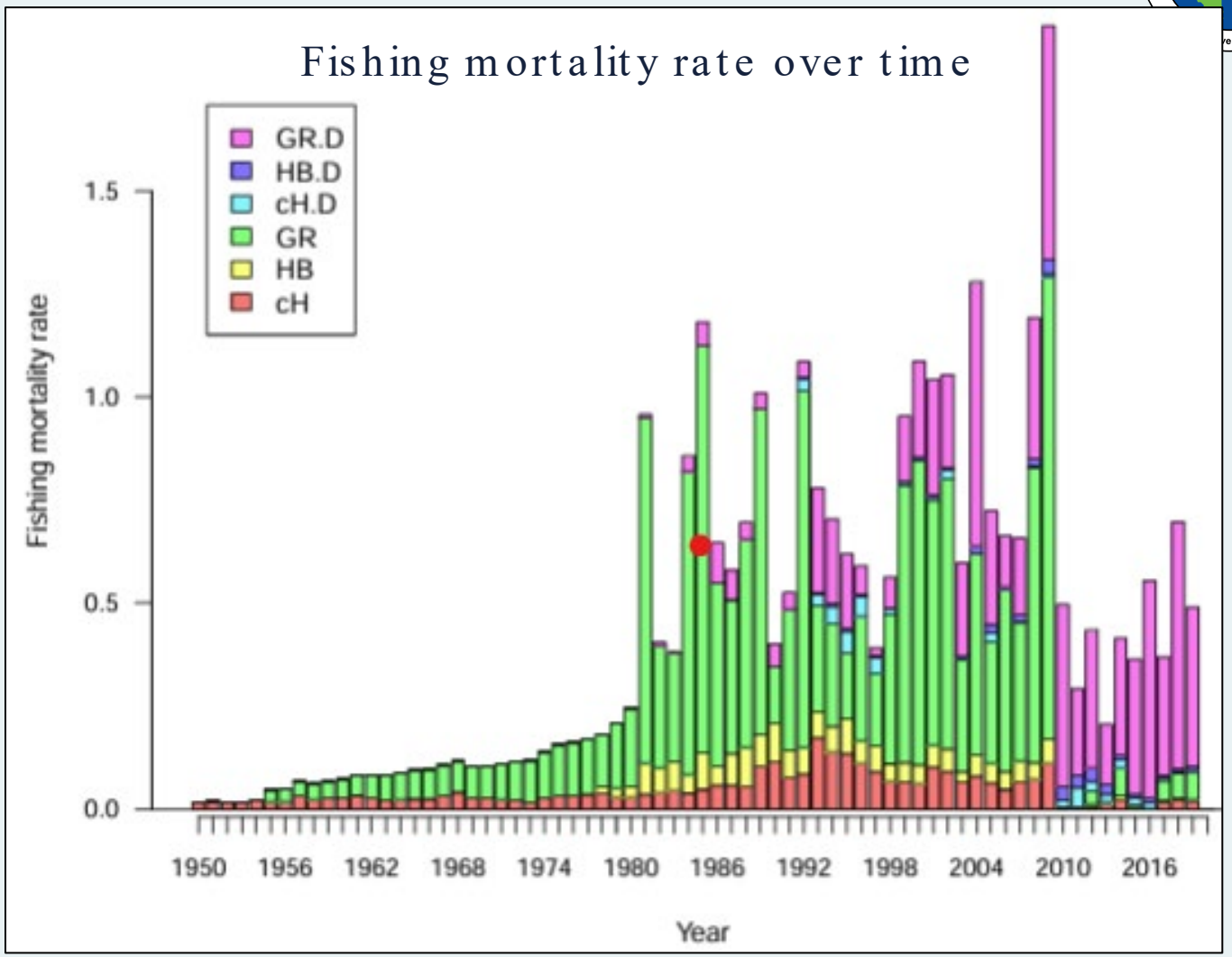
Discard selectivity



Landings selectivity



Total weighted average



SEDAR 73 SA Red Snapper

Citizen Science Data

FISHstory

Documenting historic for-hire catch and length estimates using historic fishing photos

© Judy Helmey

Citizen Science

Project Components

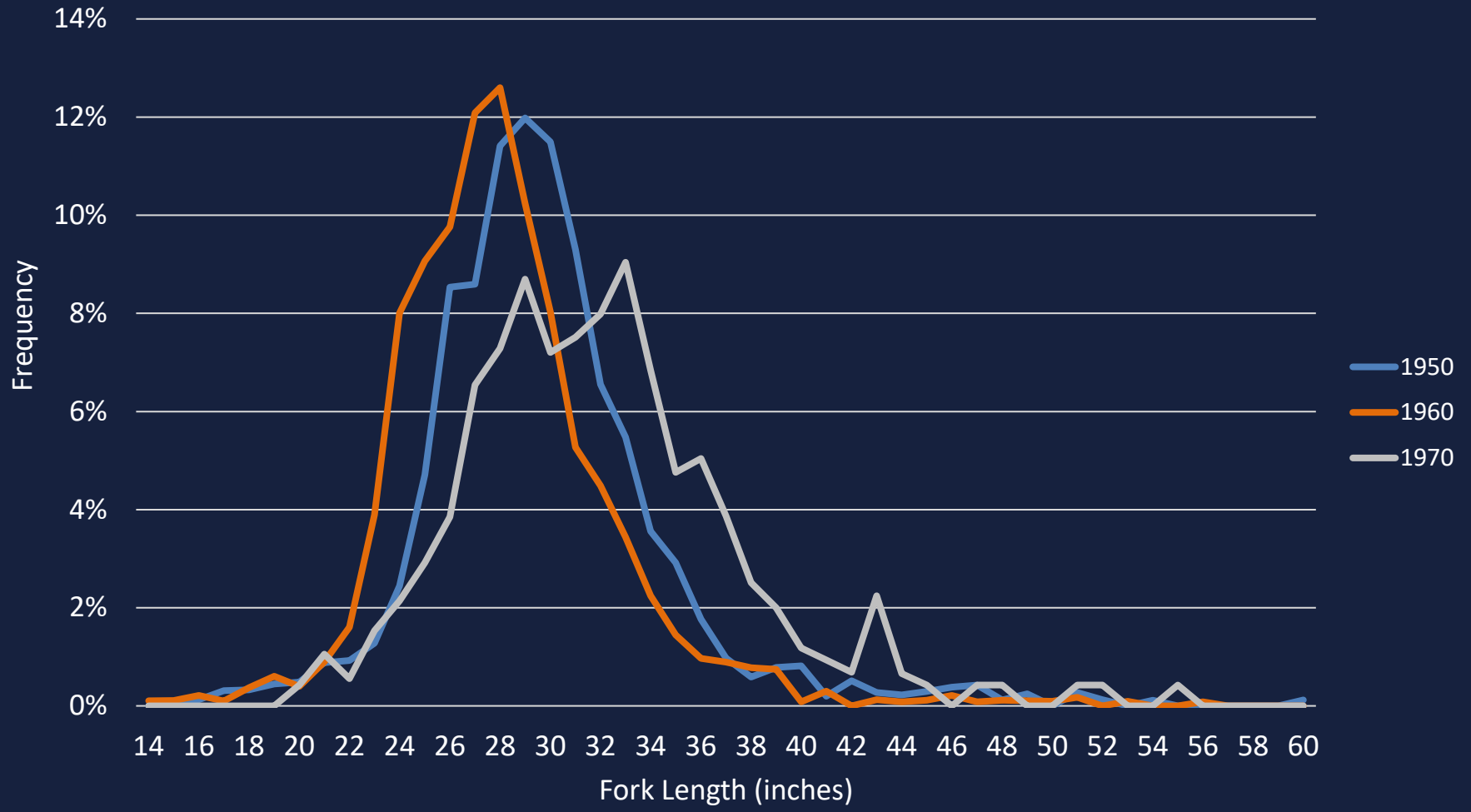
Digitizing & archiving historic fishing photos

Estimating for-hire catch composition using the online crowdsourcing platform Zooniverse

Developing method to estimate fish length in historic photos and estimating size composition for key species

PC: Rusty Hudson

FISHstory pilot project: length compositions by decade



How can best fishing practices be incorporated into stock assessments and management?

Discard Mortality Estimates	Discard mortality rate Number of discarded fish
Selectivity in Stock Assessments	Gear modifications Management action Fisher behavior
Citizen Science Data	Fill data gaps Additional data sources
Management Actions	Post stock assessment

Challenges for Integration

- Prevalence of use: BFP and descending devices
- Sampling strata limitations: depth, season, area
- Stationarity of estimates through time
- Experimental/Sampling biases
- Other?