NOAA FISHERIES
NEFSC

# Black Sea Bass
# Management Track Assessment

## *Centropristis striata*

**July 2021**

# Background

Federally managed as a unit stock from New England to Cape Hatteras, NC.
Regional management in ASMFC (north of NJ; NJ; south of NJ)

Last assessed in 2019 through an operational assessment

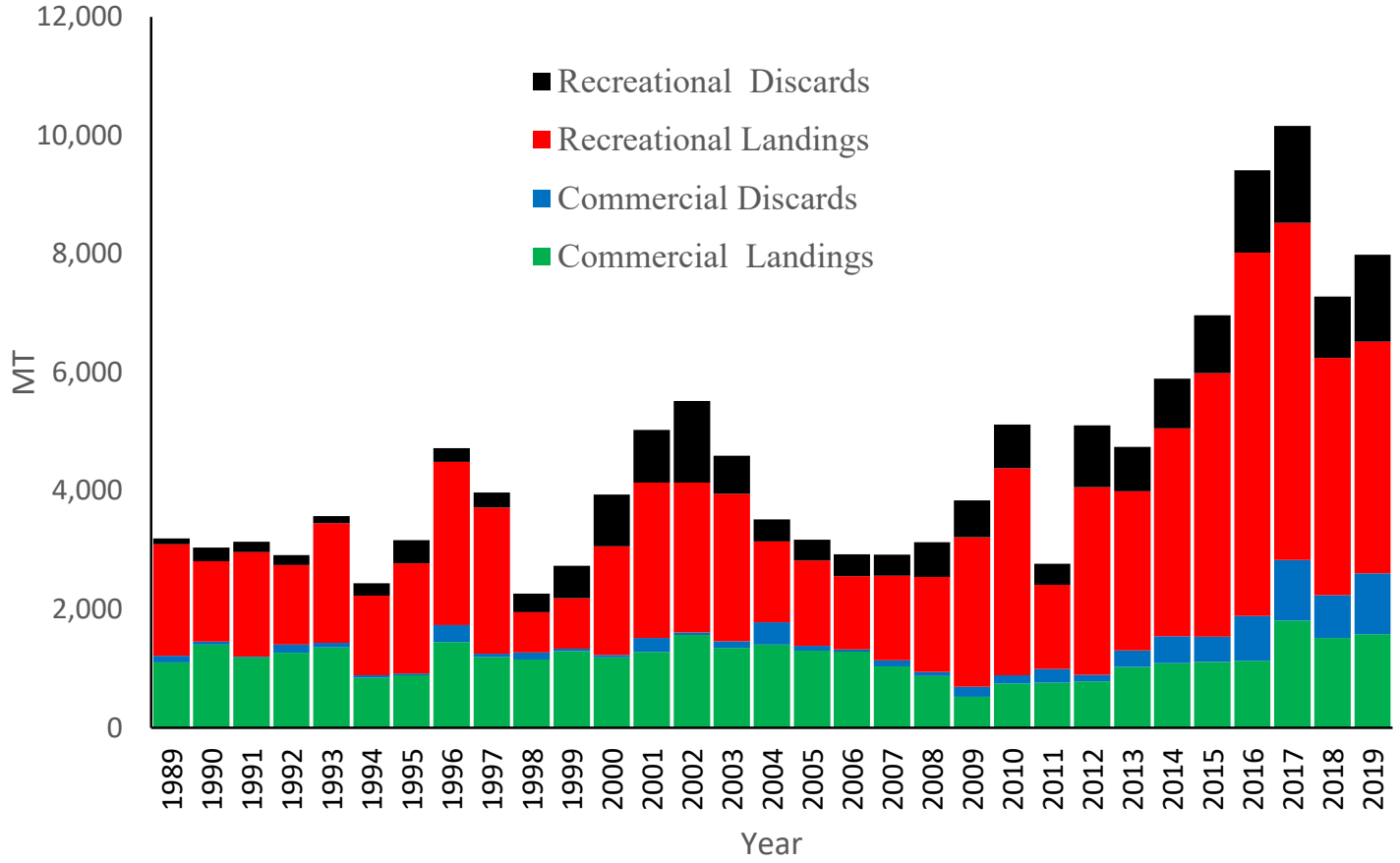
- 2018 terminal year, incorporated revised MRIP estimates
- Stock divided into North and South regions (Hudson Canyon split)
- Indices
  - Three NEFSC trawl survey series (*Bigelow* separate series)
  - Nine surveys from state agencies, university trawl surveys
  - Fishery-dependent recreational catch per angler
- Regional ASAP models (results combined for final stock status determination)
- YPR/SSBR BRP models (F40%)

**2019** Operational Assessment

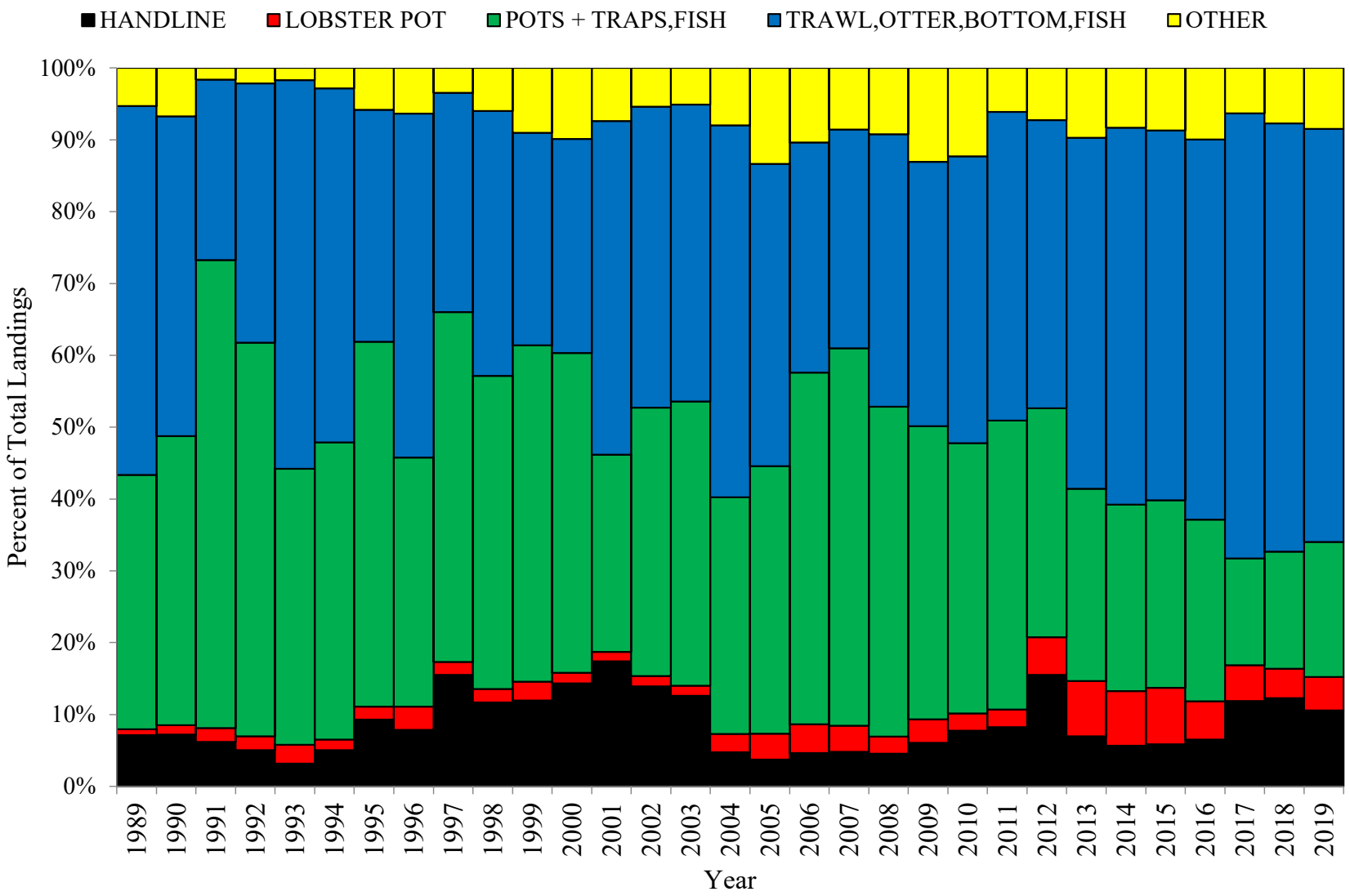
- Not Overfished and No Overfishing
- Historically large 2011 year class
- SSB in 2015 about 2.4x $B_{MSY}$ target
- F about 91% of $F_{MSY}$ threshold
- Minor internal retrospective for combined regions; large in northern region but opposite directions between regions
- Retro adjusted in each region prior to combining
- SSC accepted assessment and projections for OFLs/ABCs for combined regions through 2021

**Research track** assessment scheduled for peer review in November 2022

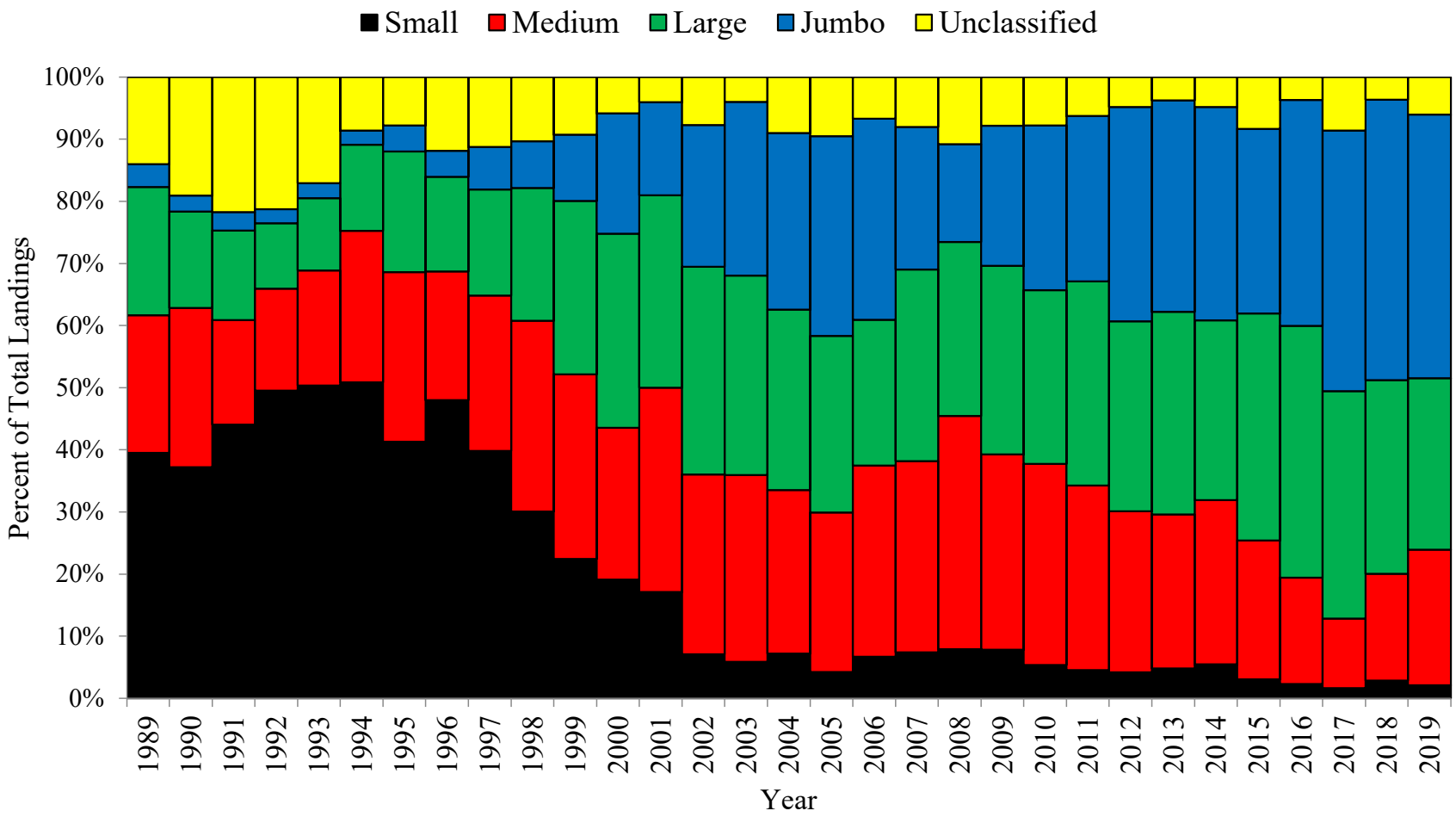
# Total Black Sea Bass Catch (mt) 1989-2019



# Commercial Black Sea Bass Landings by Gear



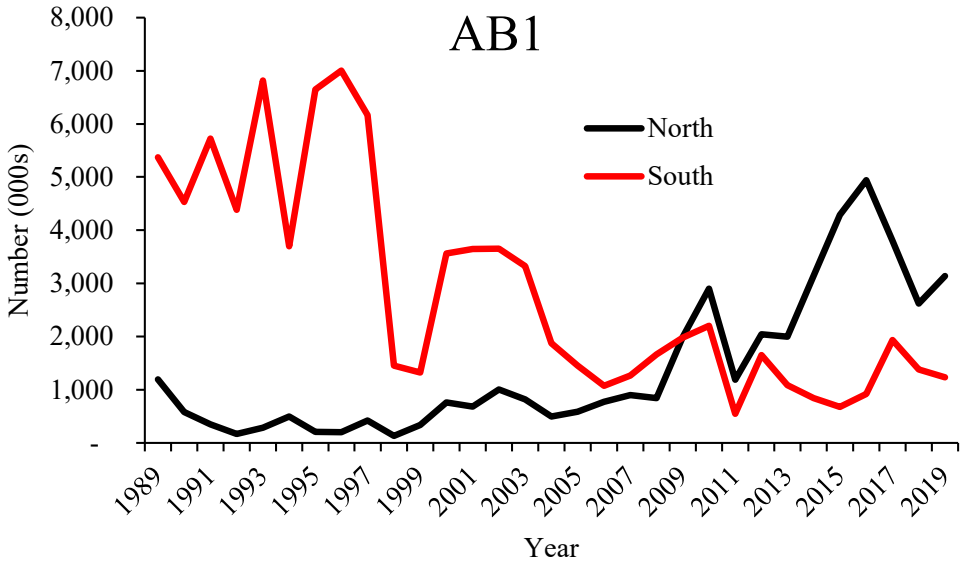
# Black Sea Bass Commercial Landings by Market Category

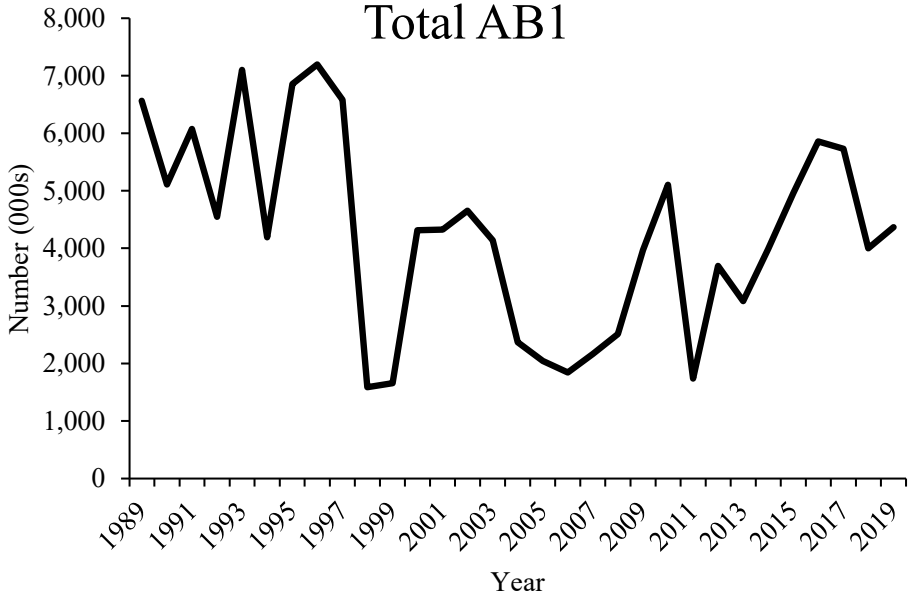


# Black Sea Bass Commercial Discards

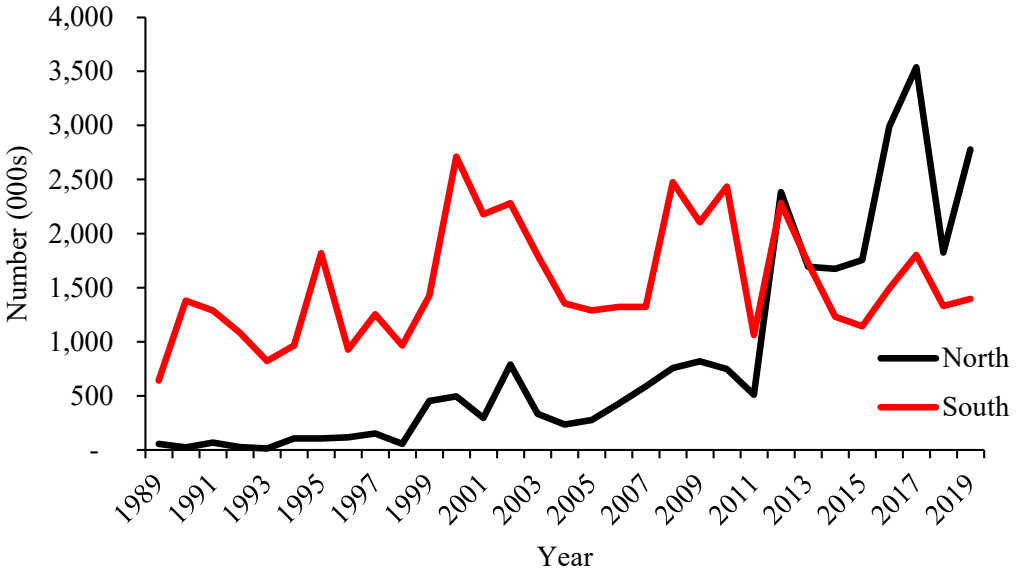
1989-2013 avg. of 119.8 mt = 10% of commercial landings and 3% of total catch in wt.
2015-2019 avg. of 791.3 mt = 36% of commercial landings and 9% of total catch in wt.
2017 totaled 1027.3 mt = 36% of commercial landings.
2018 totaled 721.7 mt = 32% of commercial landings.
**2019 totaled 1027.3 mt = 39.4% of commercial landings.**

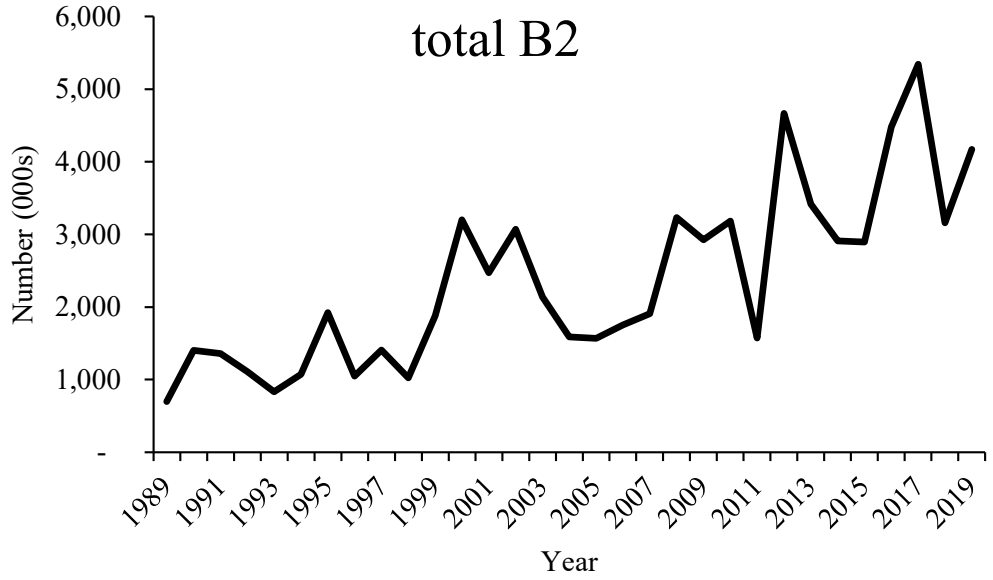
# Black Sea Bass Recreational Landings



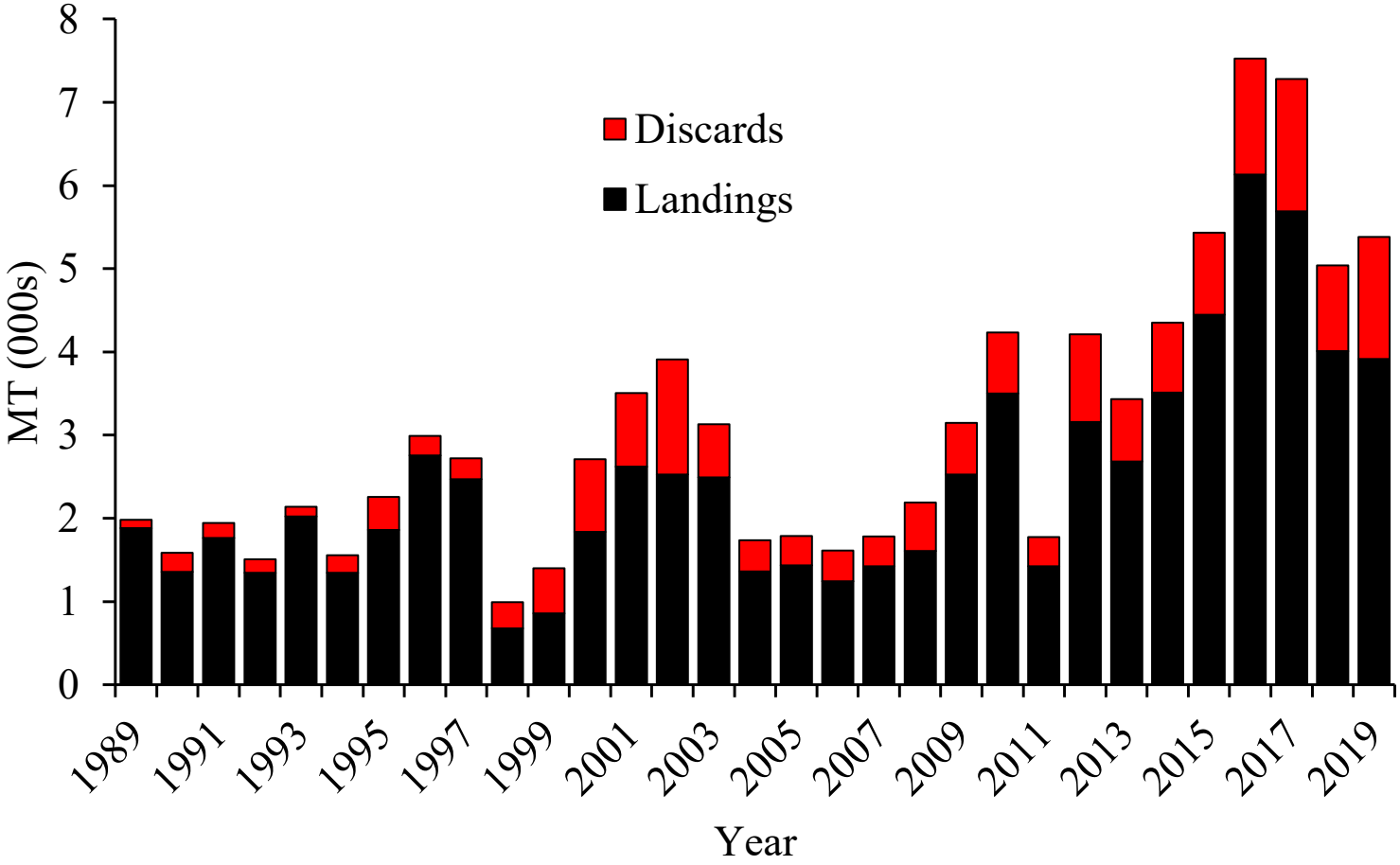



# Black Sea Bass Recreational Discards (15% mortality)

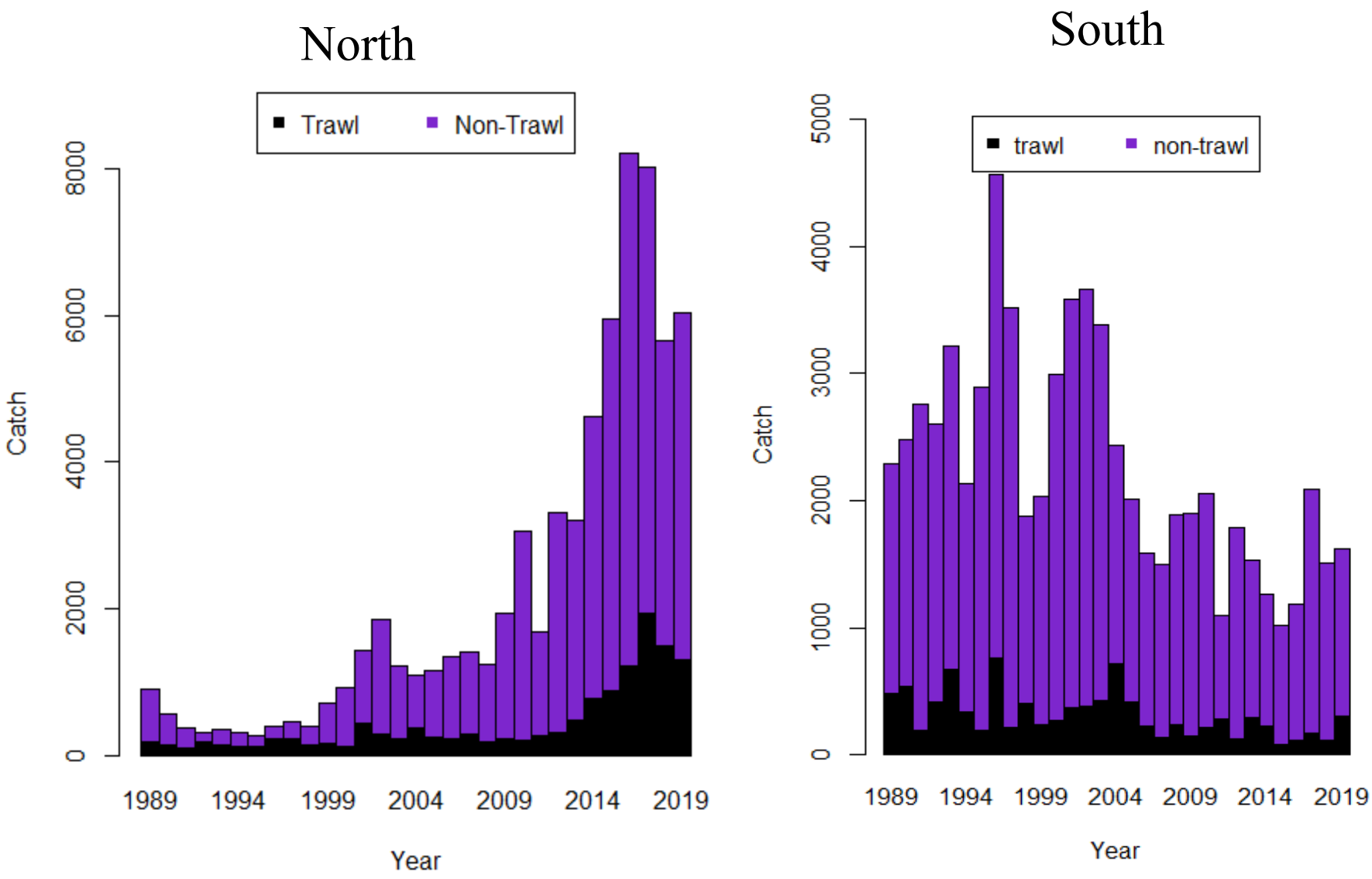


# Total Recreational Black Sea Bass Catch (weight) (removals only)




- B2's since 1997 average 43% of total removals by number
- 2016 and 2017 peaks driven by NY and NJ estimates

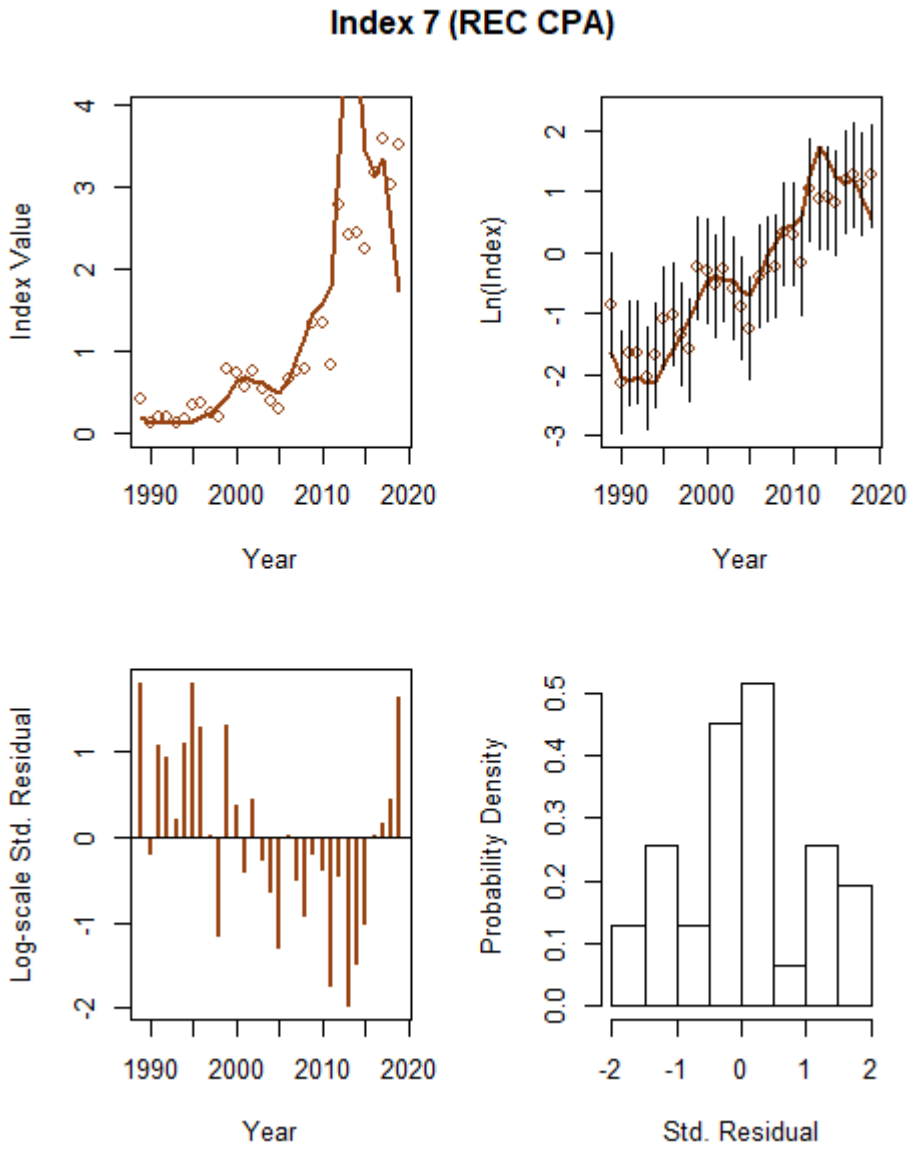


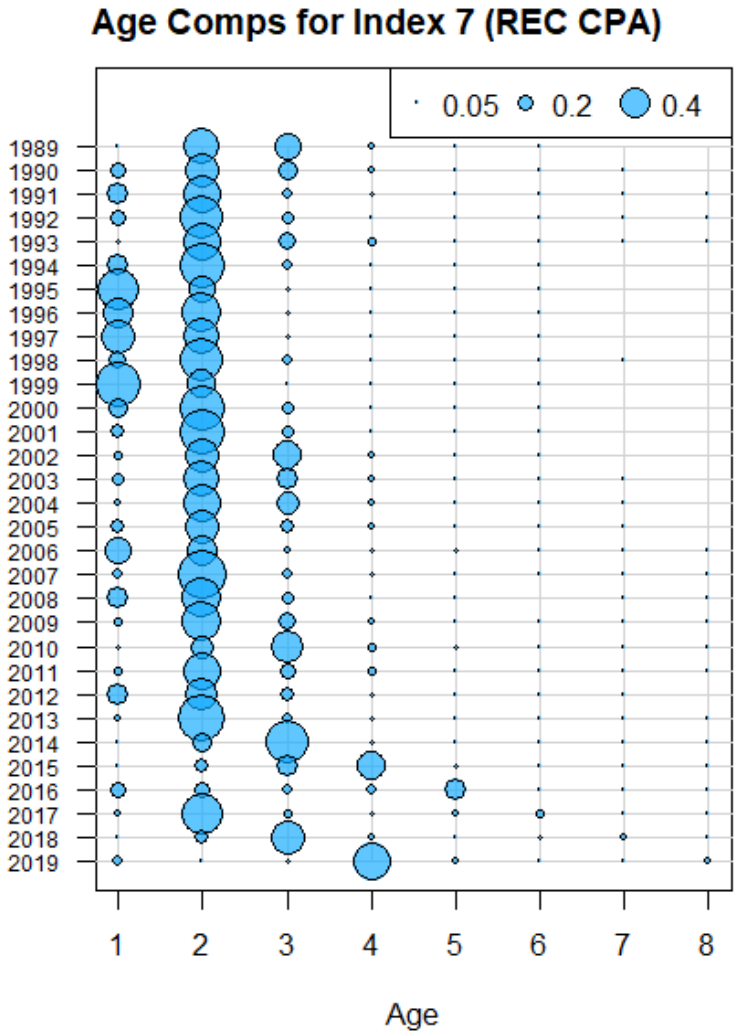

Non-trawl catch includes recreational and commercial hook and line, fish pot and lobster pot catches

# Black Sea Bass Survey Indices of Abundance

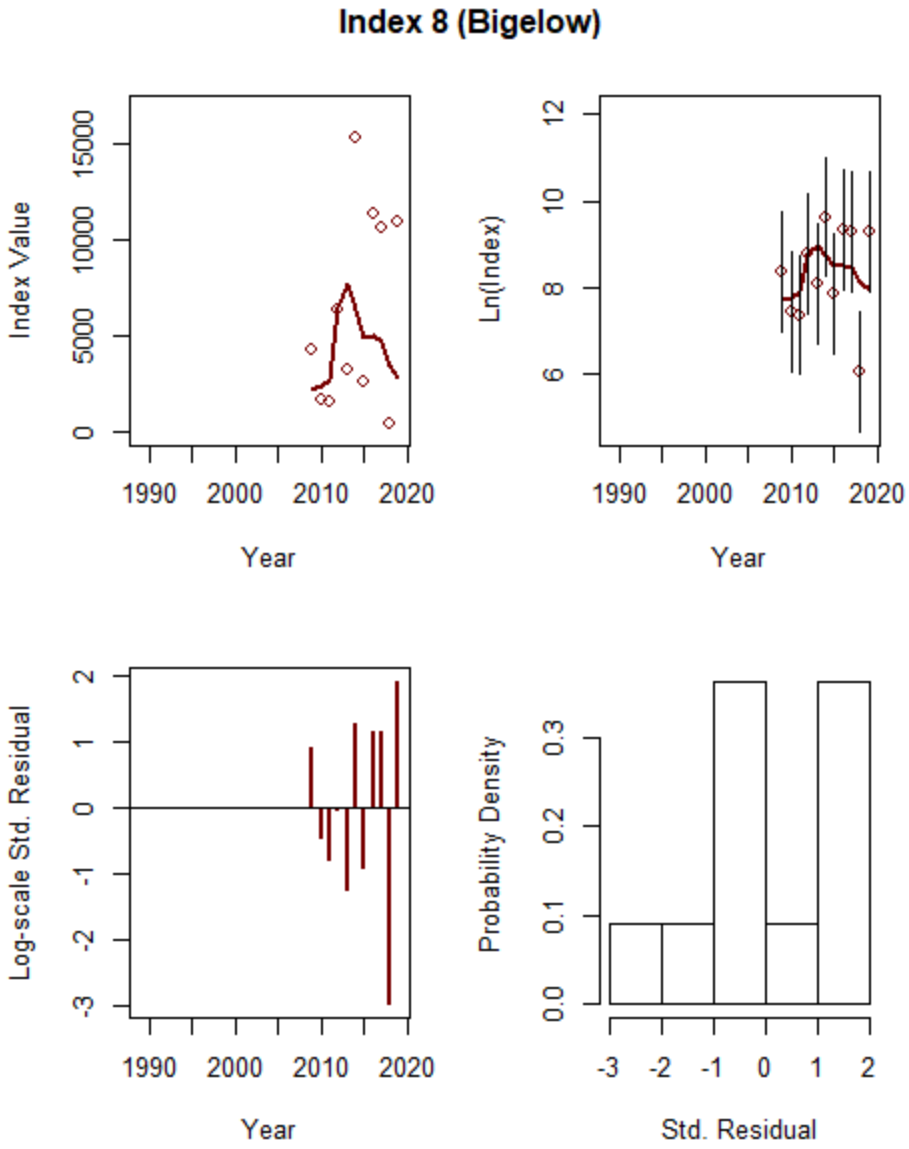
- NEFSC spring trawl survey Albatross 1989- 2008: age 1-8+ (split north and south)
- NEFSC spring trawl survey Bigelow 2009-2019: age 1-8+ (split north and south)
- NEFSC winter trawl survey Albatross 1992- 2007: age 1-8+ (south)
- NEAMAP trawl survey 2008-2019: ages 1-8+ (north), age 1 (south)
- MADMF trawl survey 1989-2019 (standardized indices): age 1-8+ (north)
- RI DEP trawl survey 1989-2019 (standardized indices): age 1-8+ (north)
- CT LIS trawl survey 1989-2019 (standardized indices): age 1-8+ (north)
- NY DEC seine survey 1990-2019 (standardized indices): age 1(north)
- NJ trawl survey 1989-2019 (standardized indices): age 1-8+ (south)
- DE trawl survey 1989-2019 (standardized indices): age 1(south)
- MD coastal bay trawl survey 1989-2019: age 1(south)
- VA Bay trawl survey 1989-2019: age 1(south)
- Recreational CPA 1989-2019 (standardized indices): age 1-8+ (split north and south)

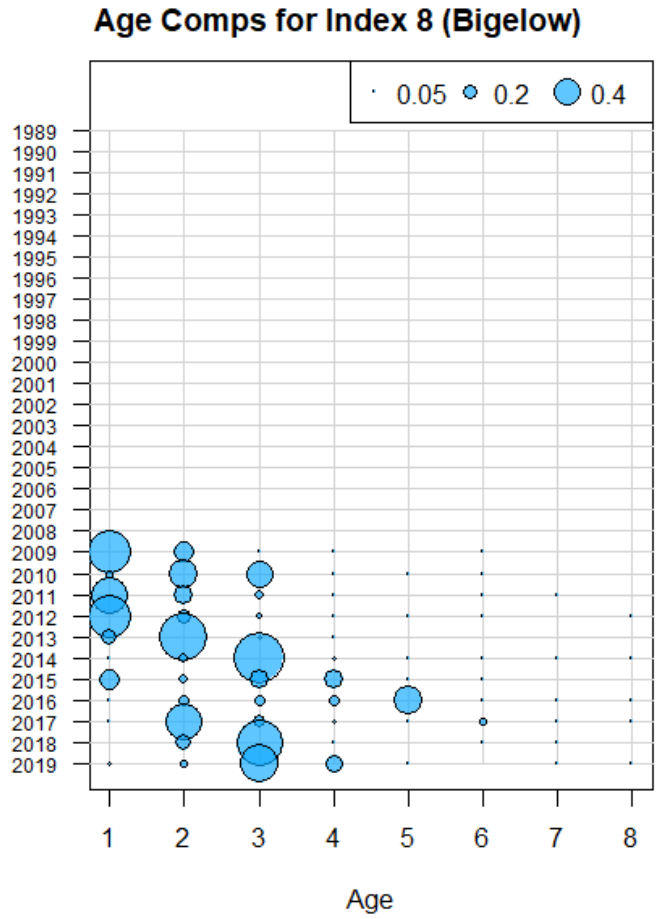
# North


Index 7 (REC CPA)
Index Value
Year
Ln(Index)
Year
Log-scale Std. Residual
Year
Probability Density
Std. Residual


Age Comps for Index 7 (REC CPA)
0.05
0.2
0.4
Age

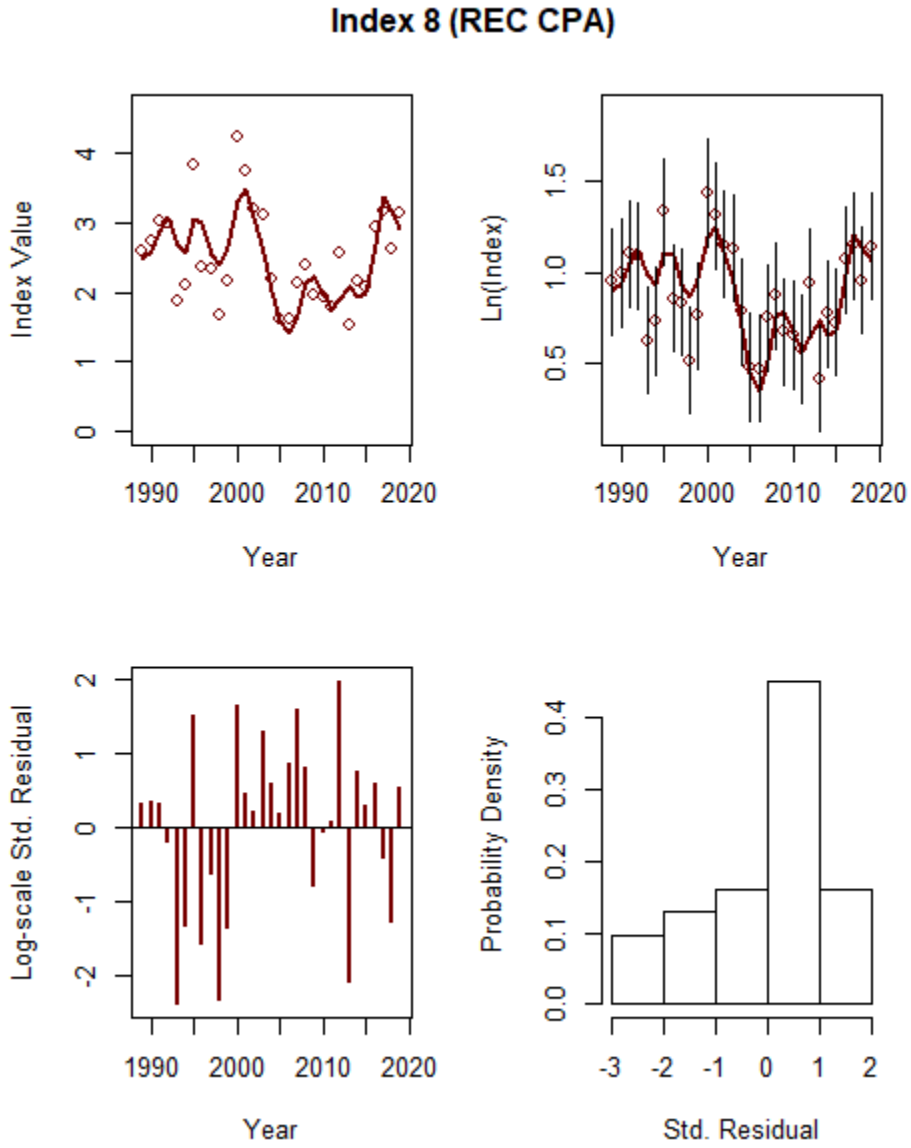
# North

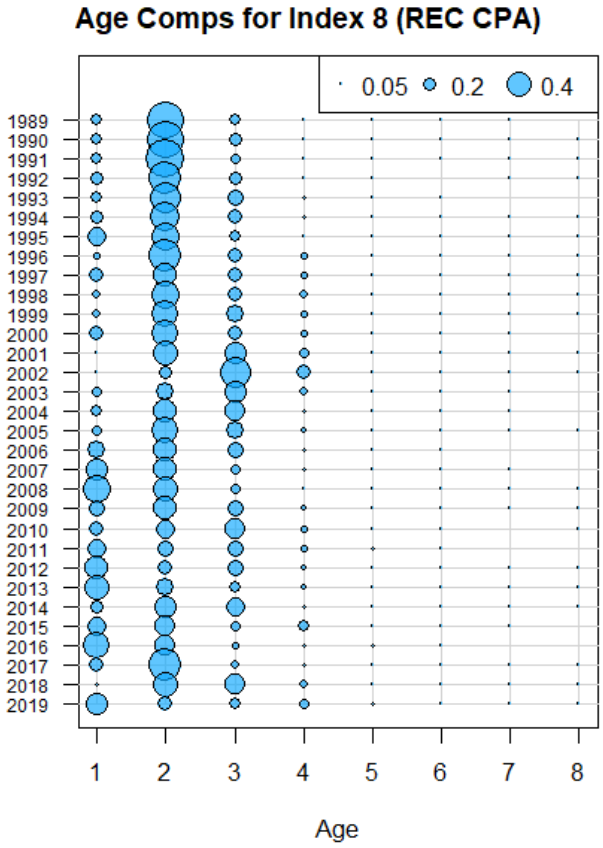


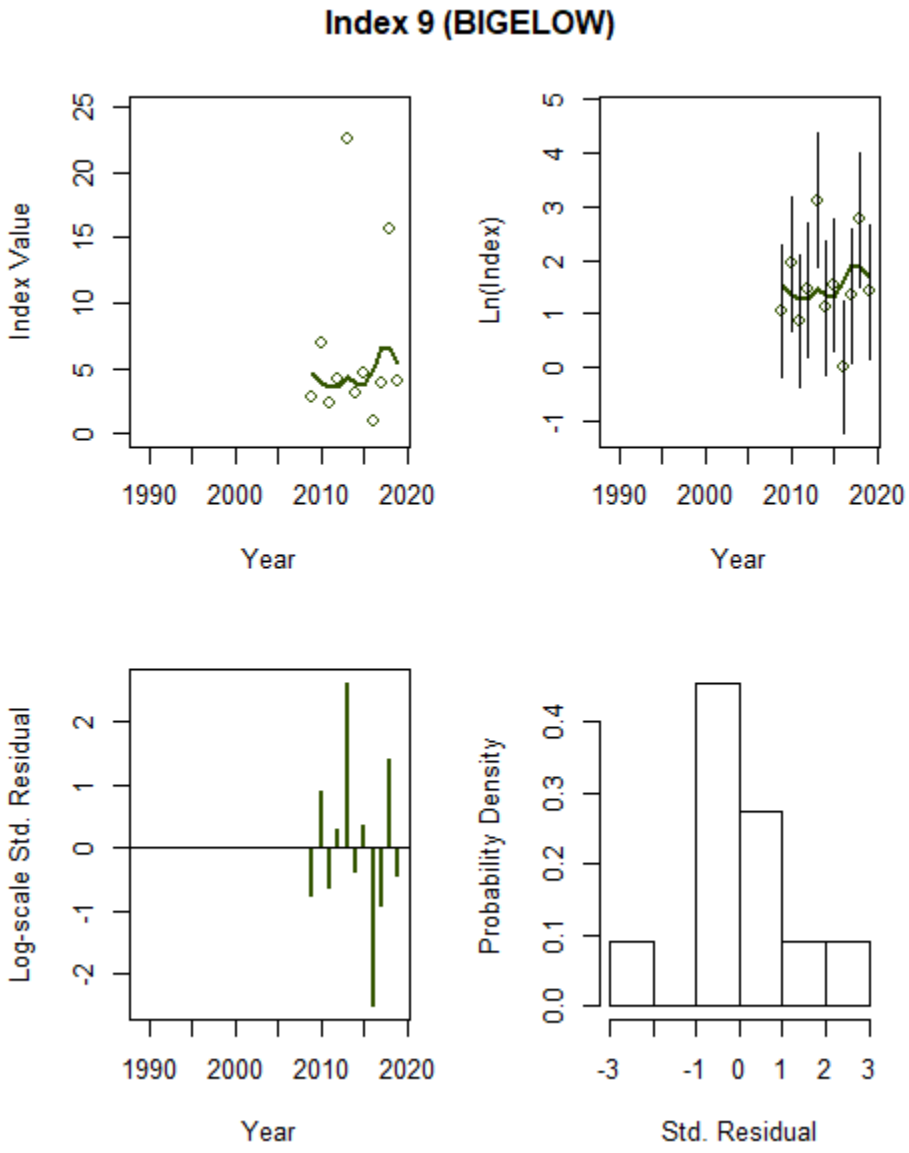

Reduced ESS for 2019 Bigelow index due to influence of single tow

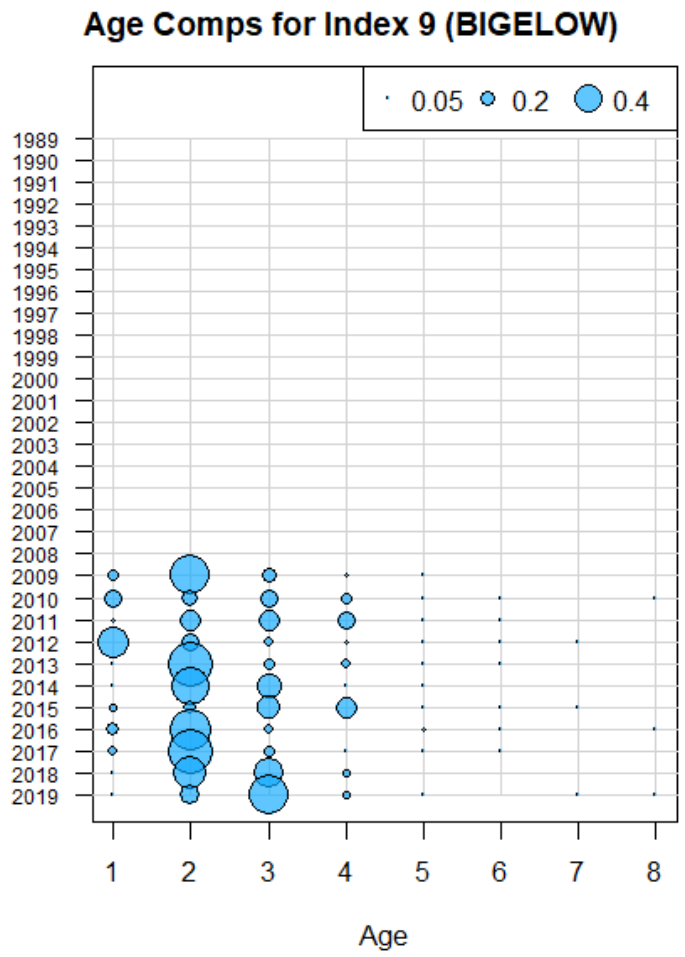
# South


Index 8 (REC CPA)
Index Value
Year
Ln(Index)
Year
Log-scale Std. Residual
Year
Probability Density
Std. Residual


Age Comps for Index 8 (REC CPA)
0.05
0.2
0.4
Age

# South

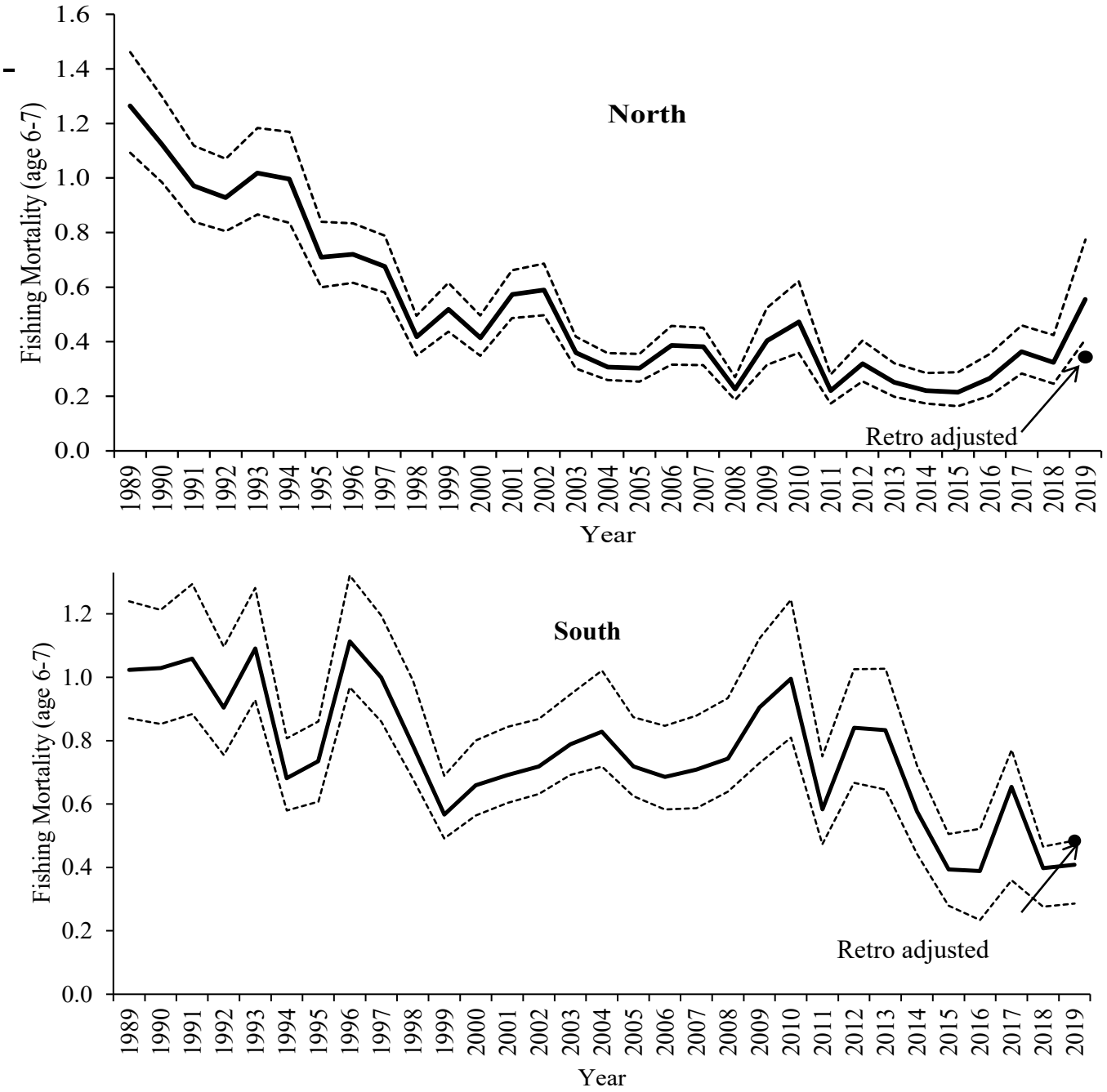

Index 9 (BIGELOW)
Index Value
Year
Ln(Index)
Year
Log-scale Std. Residual
Year
Probability Density
Std. Residual


Age Comps for Index 9 (BIGELOW)
0.05
0.2
0.4
Age

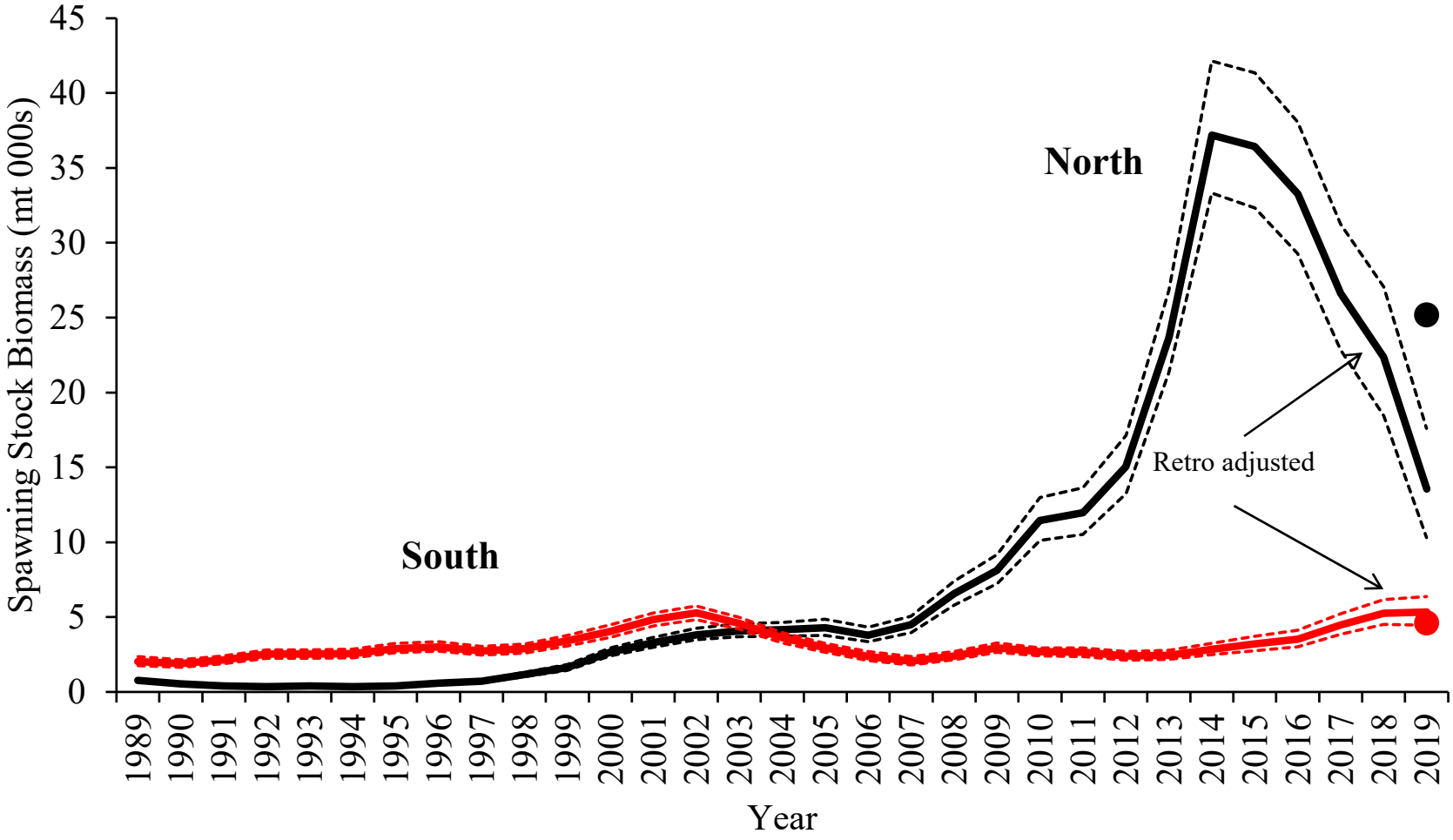
# 2021 Management Track Assessment

- Add 2019 fishery and index data to previous assessment update
- ASAP models for each region. Similar structure north and south.
- Ages 1-8+, constant M = 0.40
- Two fleets – Trawl Catch and Non-Trawl Catch (rec, pots, hook and line, other)
- Fishery selectivity modeled with logistic function: 4 time blocks – Trawl (fleet 1) 1989-1997, 1998-2019; Non-trawl (fleet 2) 1989-2008, 2009-2019
- Full F (F mult) at age 6-7 (ages 4-7 in SAW62)
- SV selectivity modeled with at-age estimation; constant over full time series

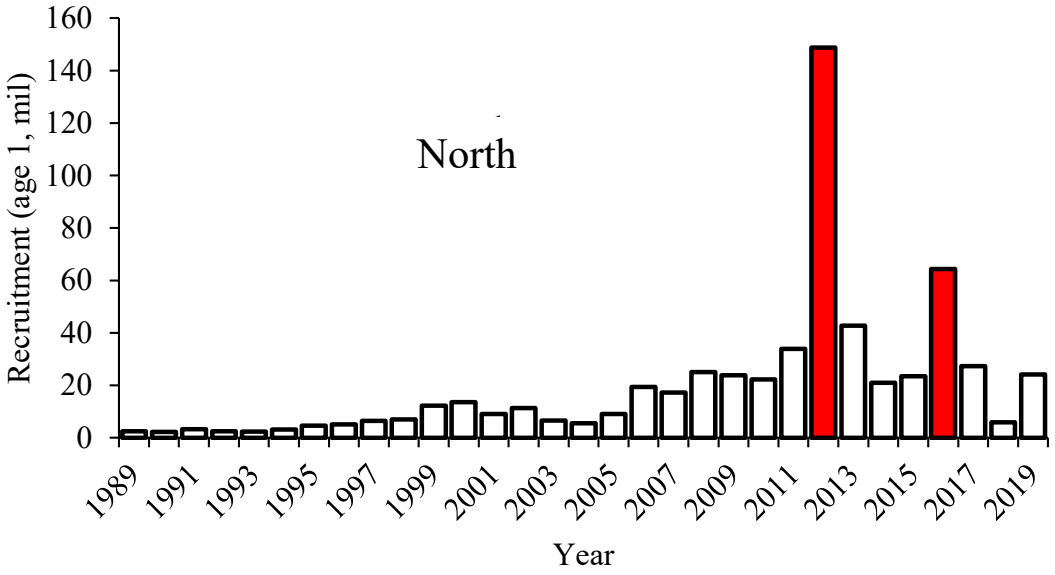
**Final** ASAP results - Fishing Mortality

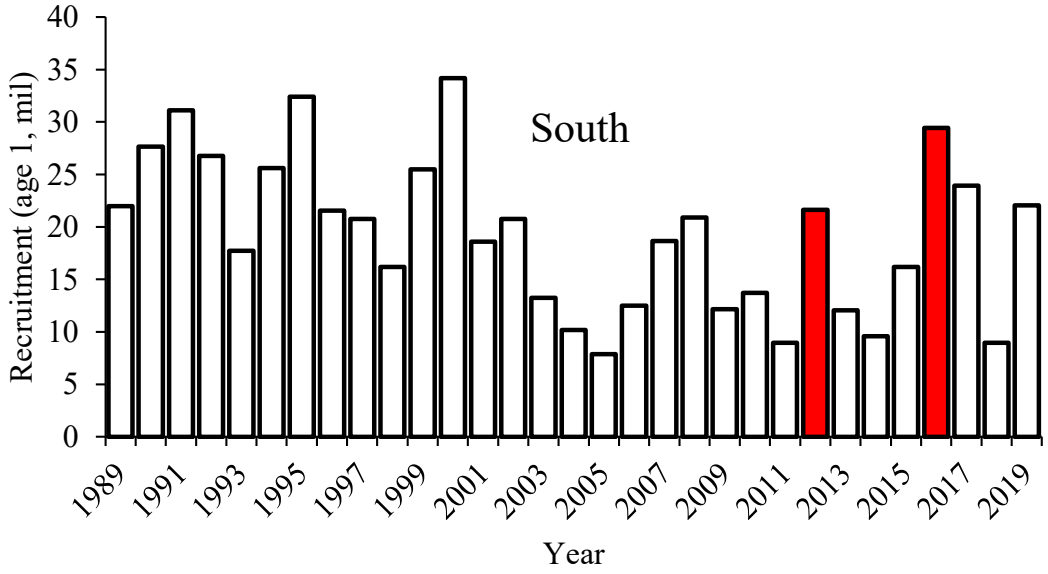


**Final** ASAP results – Spawning Stock Biomass



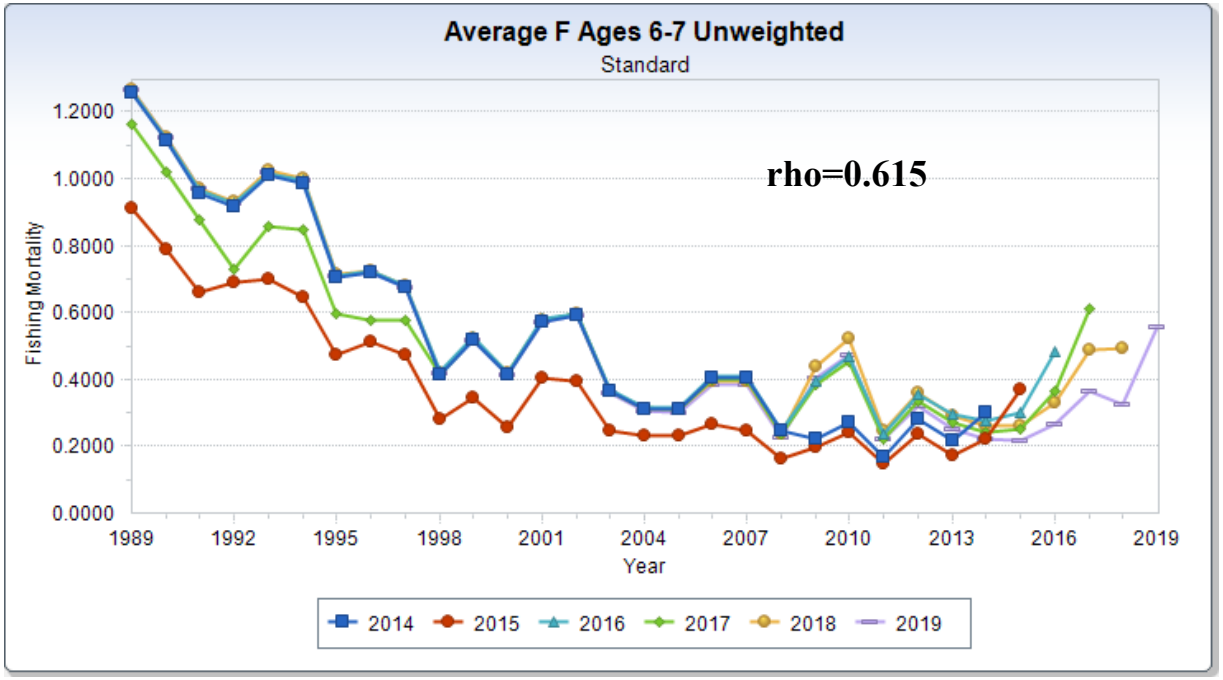
**Final** ASAP results-
Recruitment (age 1)



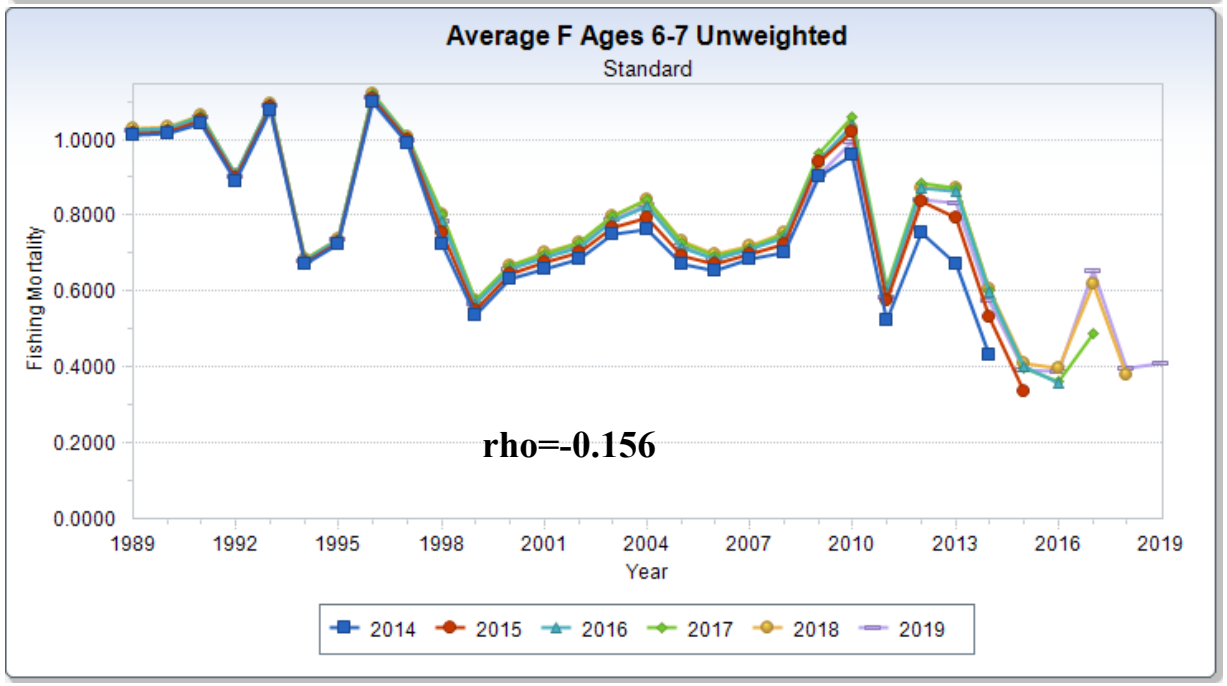



**Retrospective analysis:**
Fishing mortality

North

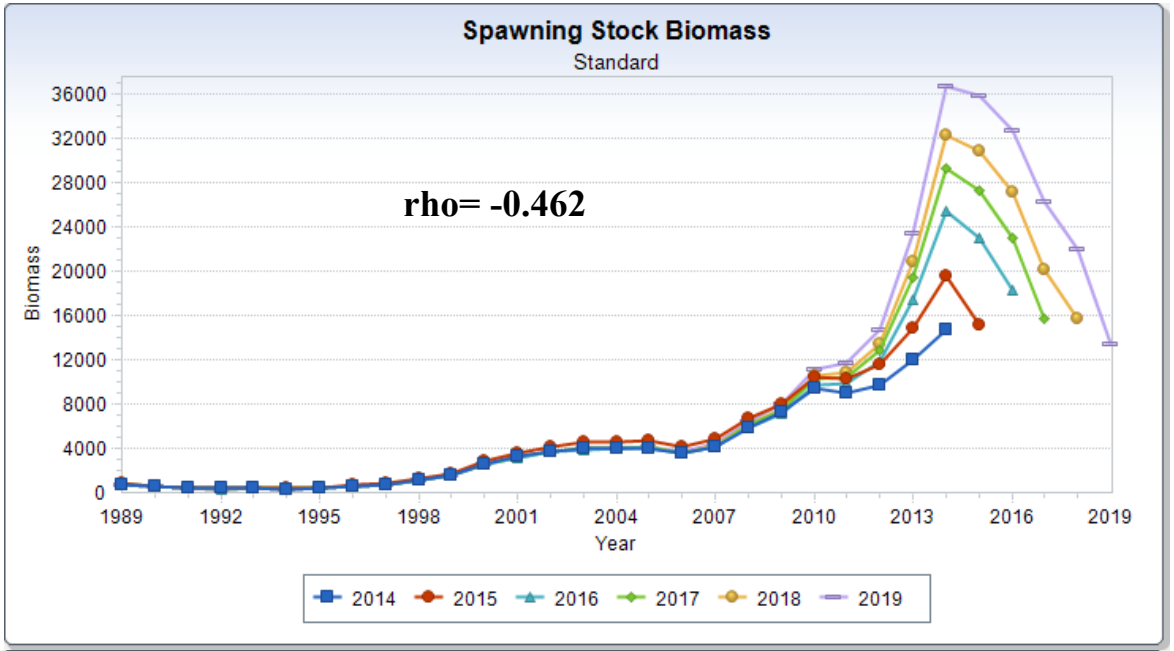



South

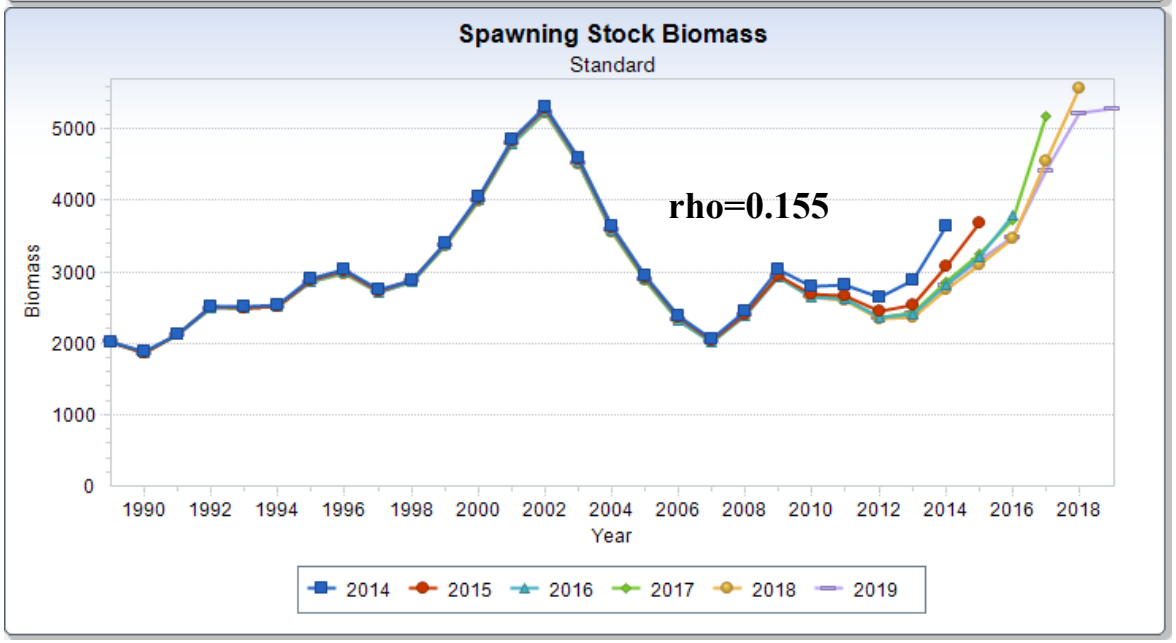


**Retrospective analysis:**
SSB

North

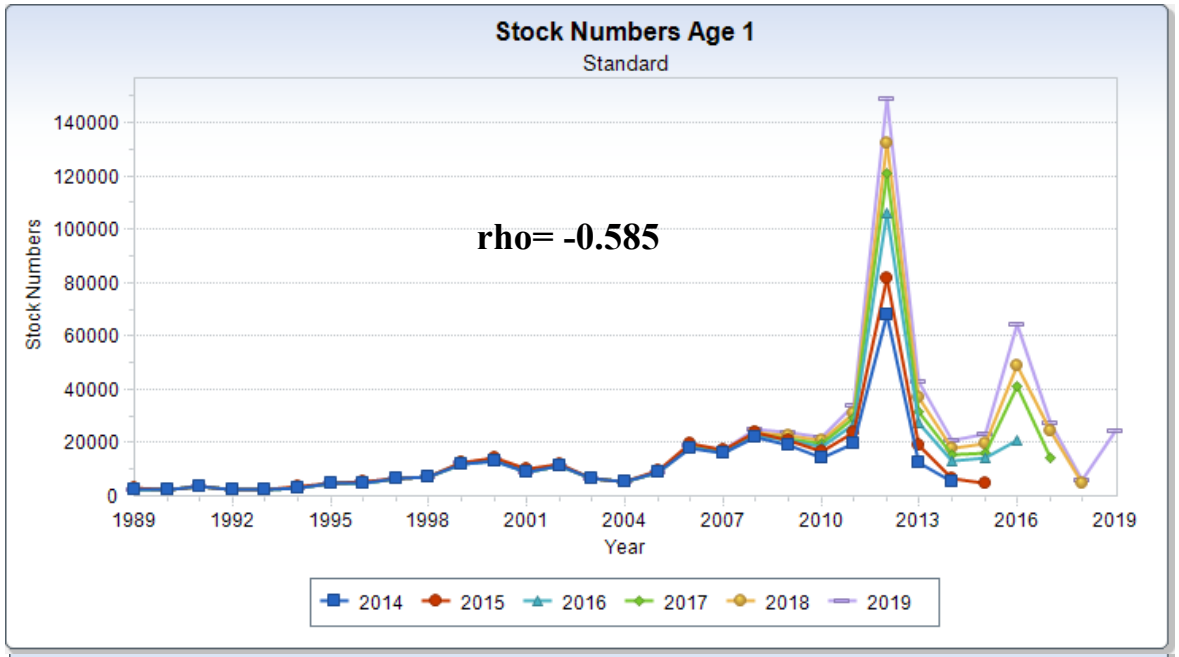



South

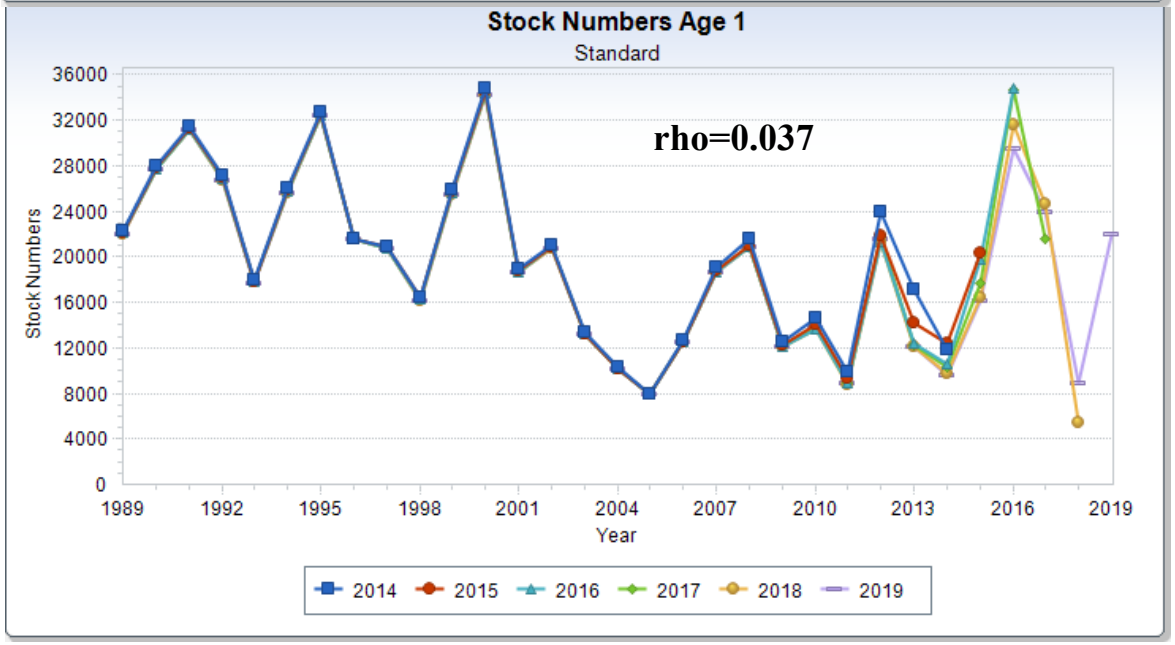


**Retrospective analysis:**
Recruitment

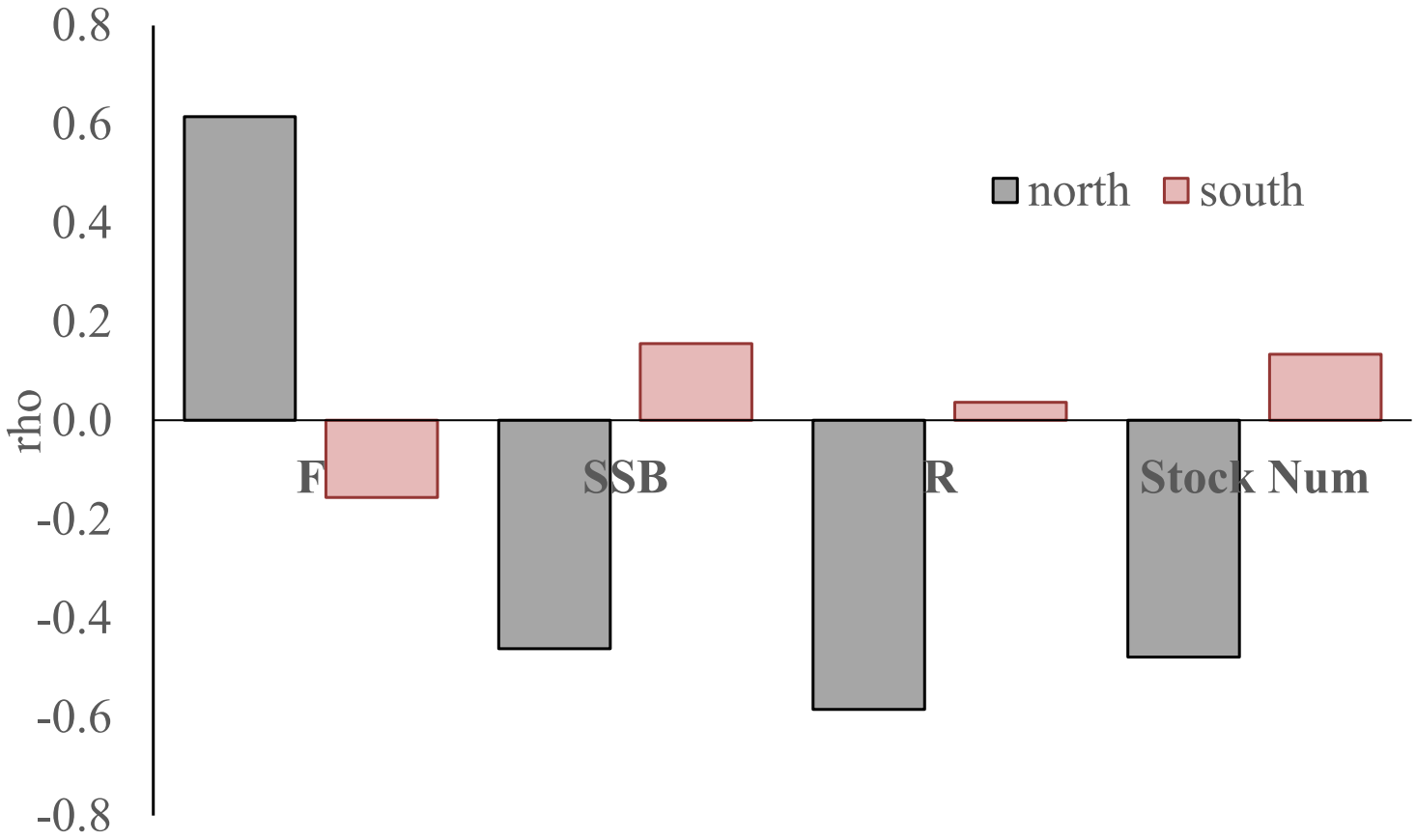
North



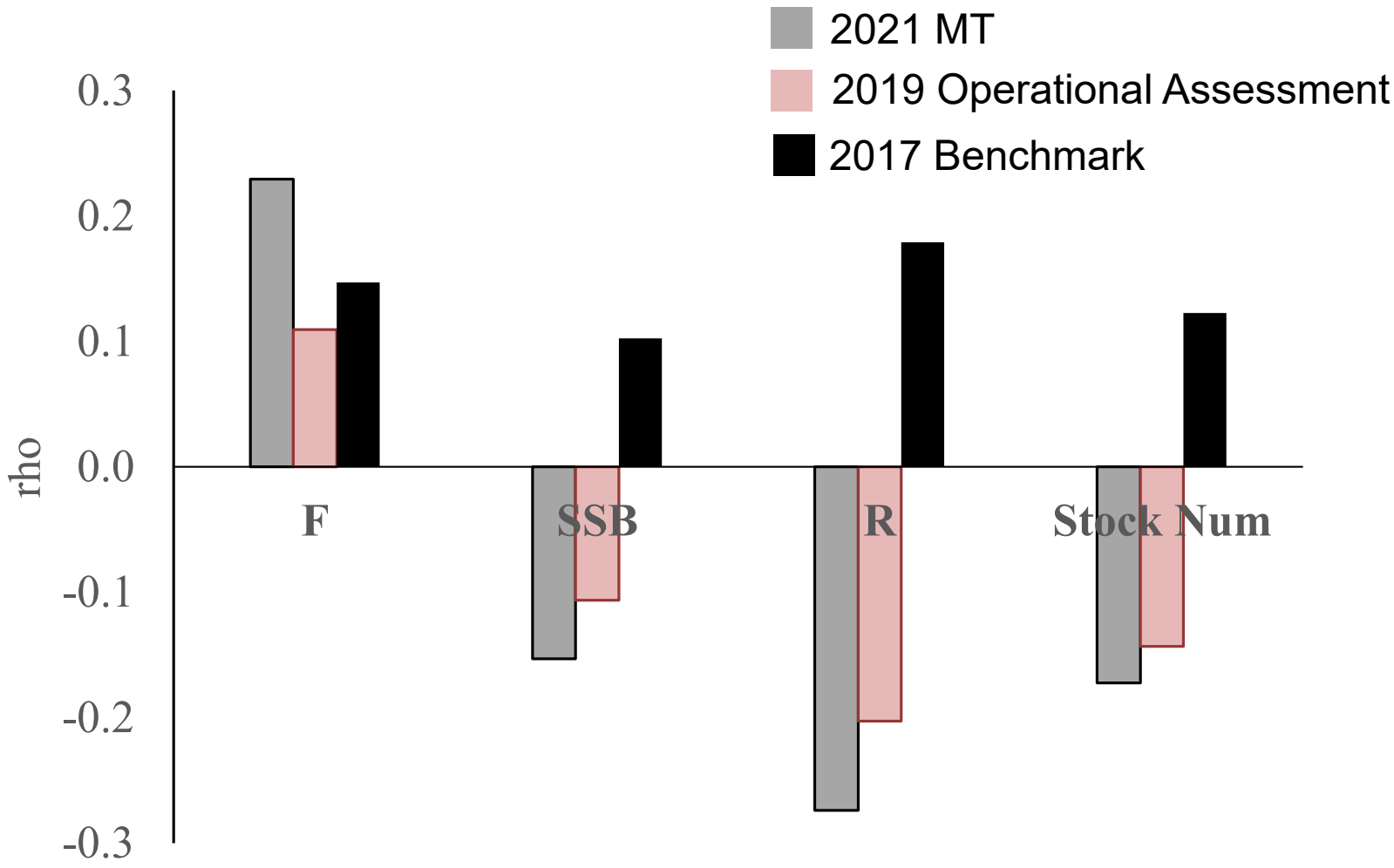

South



**Final** model:
rho values for North and South



# rho values for 2016 and 2018 vs 2019 **Final** model



# Reference Points and Stock Status

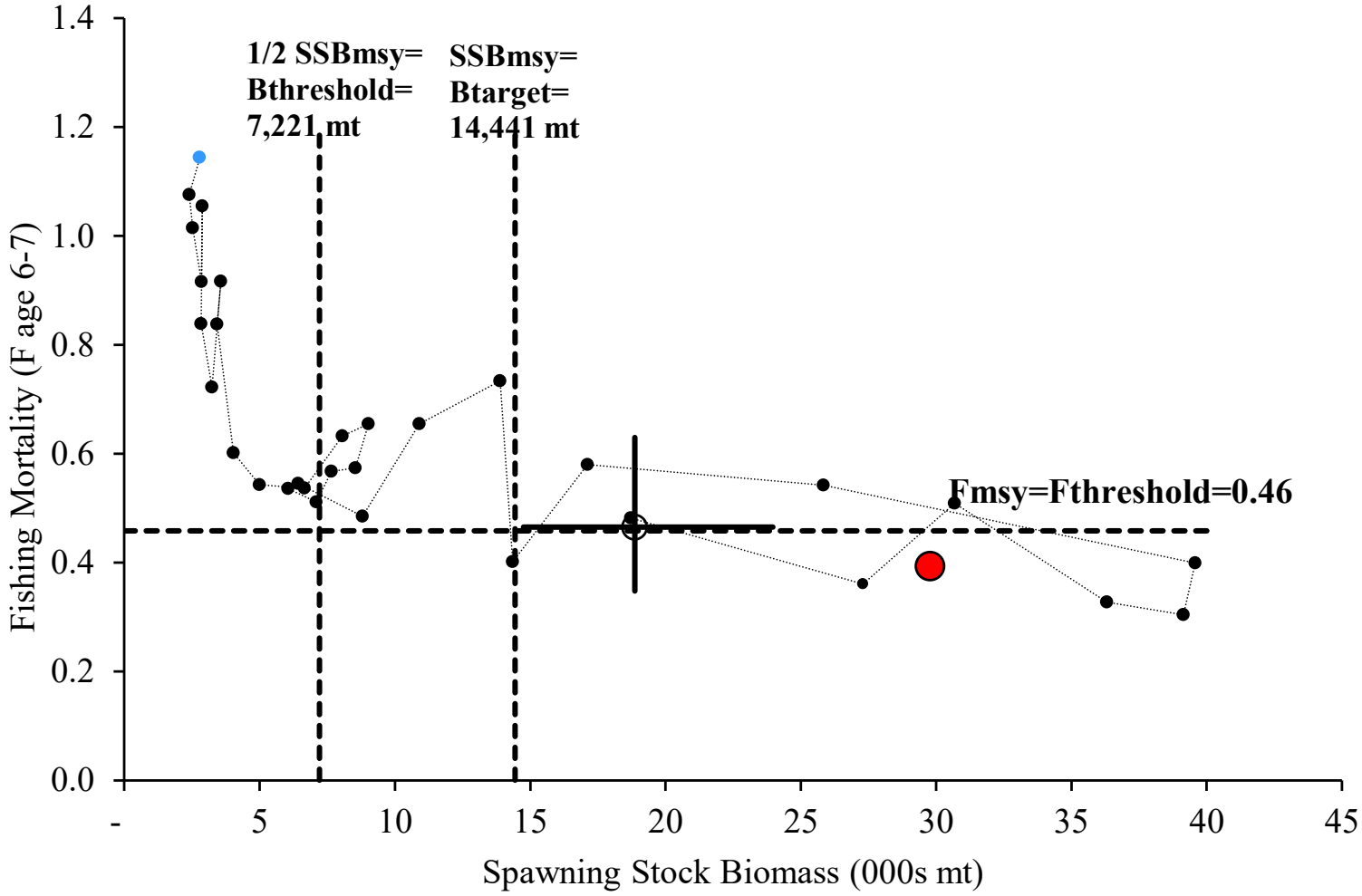
| **2021 MT** | SSBmsy | Bmsy | Fmsy | MSY | 1/2 SSBmsy | 1/2 Bmsy |
|---|---|---|---|---|---|---|
| Combined (mt) | 14,441 | 22,156 | 0.46 | 5,334 | 7,221 | 11,078 |
| -2 SD | 9,332 | 14,842 | | 3,492 | 4,666 | 7,421 |
| +2 SD | 25,874 | 37,486 | | 9,502 | 12,937 | 18,743 |

| | | SSB | Biomass | F | Catch |
|---|---|---|---|---|---|
| retro adj. **avg** | 2019 | 29,538 | 47,671 | 0.41 | |
| unadjusted **avg** | 2019 | 18,716 | 31,768 | 0.48 | |
| retro adj **median** | 2019 | 29,769 | 48,960 | 0.39 | |
| unadjusted **median** | 2019 | 18,865 | 33,012 | 0.47 | |
| 2019 catch (mt) | | | | | 7,990 |

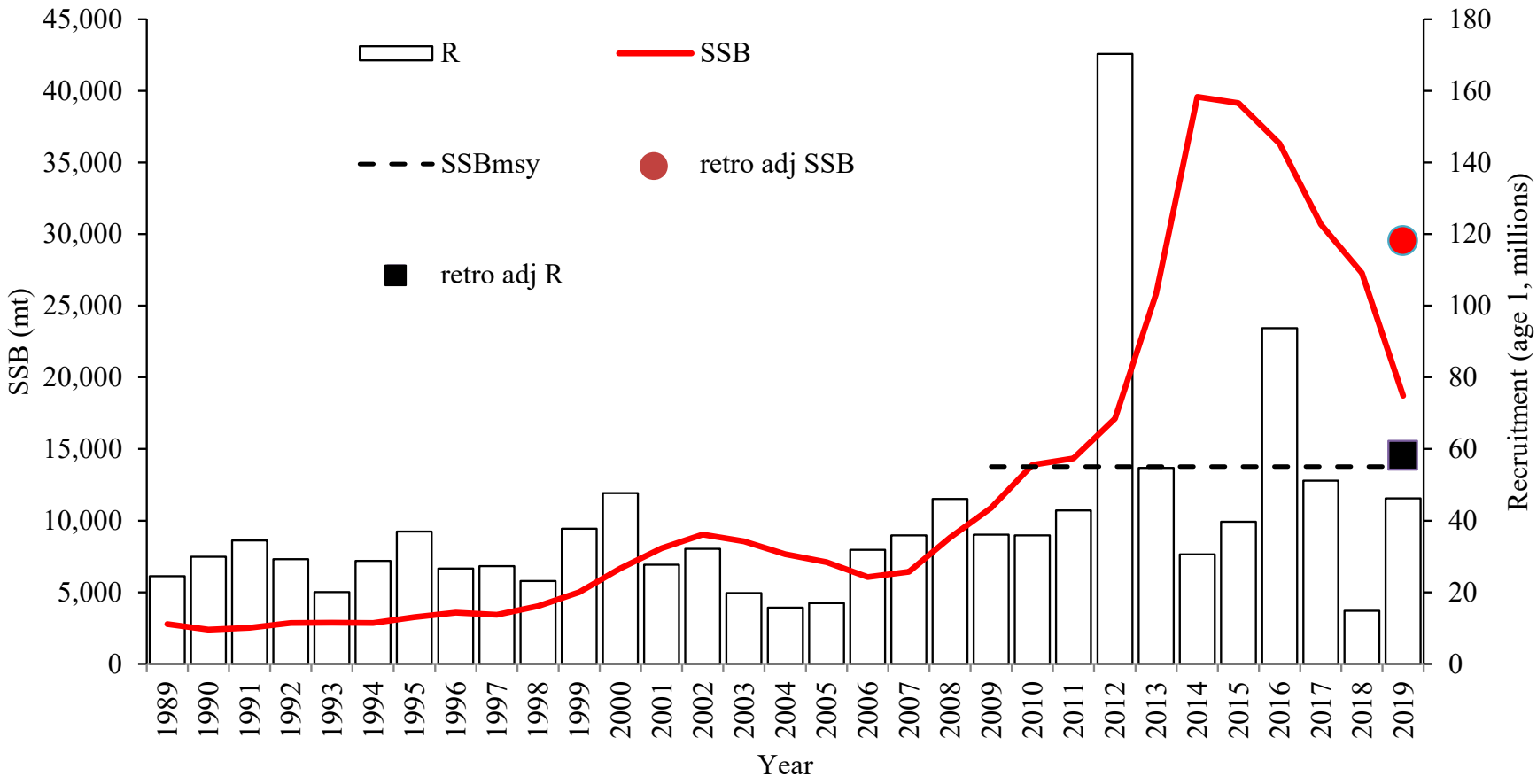
$SSB_{2019} > SSB_{MSY}$ $F_{2019} < F_{MSY}$

## 2019: Not Overfished and No Overfishing

# Black sea bass spawning stock biomass (SSB) and fully-recruited fishing mortality ($F_{ages\ 6\text{-}7}$) with updated BRPs

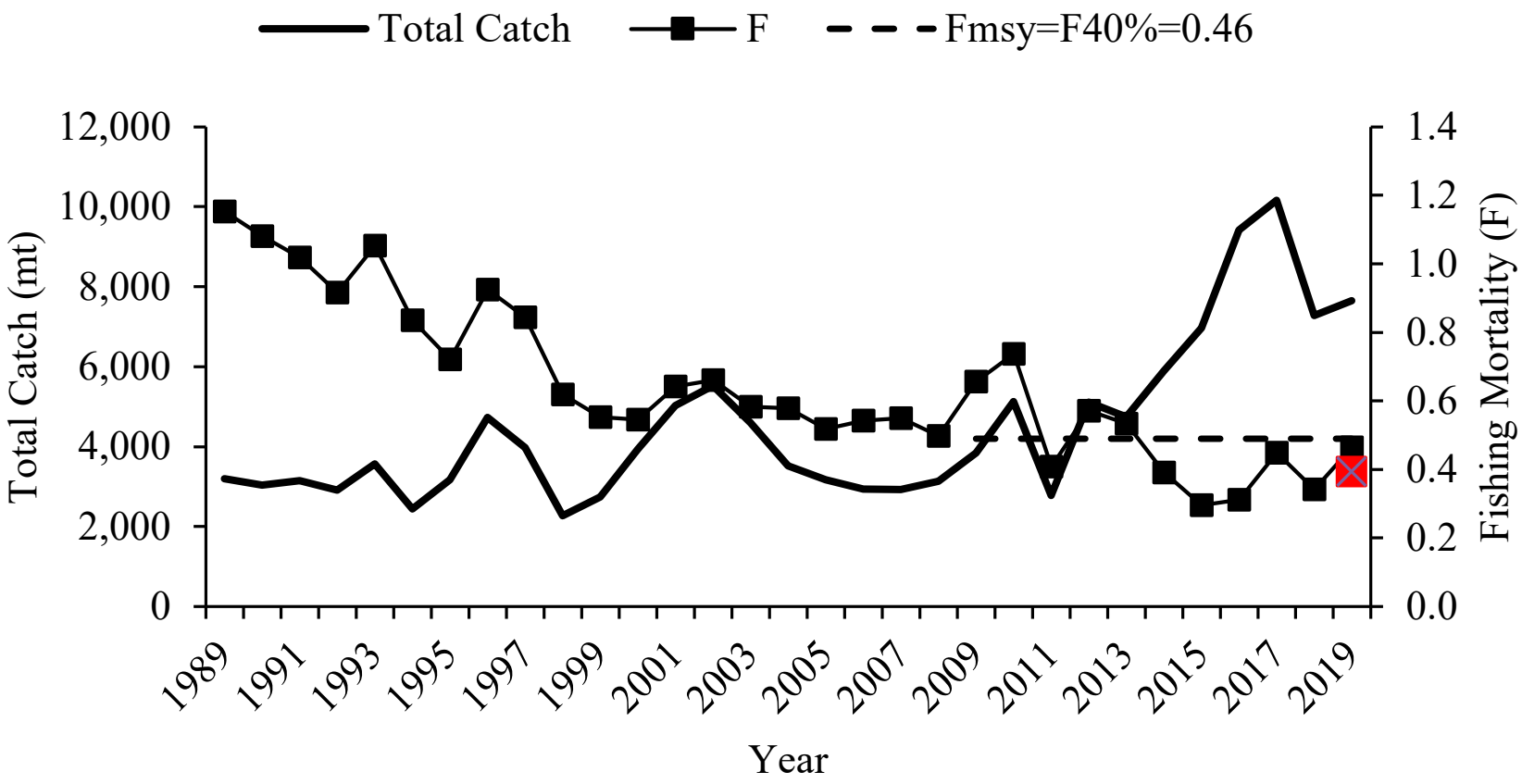


# Spawning Stock Biomass and Recruitment




Retrospective adjusted points indicated in terminal year

# Total Catch and Fishing Mortality




Retrospective adjusted points indicated in terminal year

# Simple Metrics of Stock Status

- Increased biomass in northern region resulted from large 2011 cohort. Increasing biomass in south due to large 2015 cohort.
- Most survey indices in north declining from recent time series high
- Recent recruitment indices and model results indicate very poor recruitment of 2017 cohort but above average in 2018

# Short-term projections

- Use cumulative distribution of recruitment since 2000
- Projections for 2022-2023 OFLs using Combined $F_{MSY}$ = 0.46 (north = 0.465 and south = 0.451)
- Interim catch assumptions
  - 2020: ABC for commercial catch and Rec B2, Estimated harvest for Rec AB1 → north =6,623 mt , south=1,687 mt
  - 2021:
    - ABC (north = 6,309 mt, south = 1,607 mt)
    - 2021 Rec AB1 = 2020 Rec AB1, ABC for commercial catch and Rec B2 (north = 7,291 mt, south = 1858 mt)
- Apply age-specific retro adjustments per region
- Stock-wide OFL equals sum of regional estimates
- P* approach then applied to combined OFL to obtain ABC

# P*, 100% CV: 2021 Rec AB1 = 2020 Rec AB1

## Varying ABCs

| Year | Catch | OFL | ABC | ABC p* | F | SSB | B/Bmsy |
|---|---|---|---|---|---|---|---|
| 2020 | 8,310 | 8,795 | 6,835 | N/A | 0.33 | 26,375 | 1.83 |
| 2021 | 9,149 | 8,021 | 7,916 | N/A | 0.40 | 25,057 | 1.74 |
| 2022 | 8,555 | 8,735 | 8,555 | 0.490 | 0.41 | 22,637 | 1.57 |
| 2023 | 7,557 | 7,716 | 7,557 | 0.490 | 0.41 | 19,538 | 1.35 |

## Average ABC

| Year | Catch | OFL | ABC | ABC p* | F | SSB | B/Bmsy |
|---|---|---|---|---|---|---|---|
| 2020 | 8,310 | 8,795 | 6,835 | N/A | 0.33 | 26,375 | 1.83 |
| 2021 | 9,149 | 8,021 | 7,916 | N/A | 0.40 | 25,057 | 1.74 |
| 2022 | 8,055 | 8,735 | 8,056 | 0.461 | 0.38 | 22,897 | 1.59 |
| 2023 | 8,055 | 7,865 | 8,056 | 0.511 | 0.43 | 19,683 | 1.36 |

# P*, 150% CV: 2021 Rec AB1 = 2020 Rec AB1

## Varying ABCs

| Year | Catch | OFL | ABC | ABC p* | F | SSB | B/Bmsy |
|---|---|---|---|---|---|---|---|
| 2020 | 8,310 | 8,795 | 6,835 | N/A | 0.33 | 26,375 | 1.83 |
| 2021 | 9,149 | 8,021 | 7,916 | N/A | 0.40 | 25,057 | 1.74 |
| 2022 | 8,401 | 8,735 | 8,500 | 0.490 | 0.40 | 22,718 | 1.57 |
| 2023 | 7,553 | 7,762 | 7,554 | 0.490 | 0.41 | 19,668 | 1.36 |

## Average ABC

| Year | Catch | OFL | ABC | ABC p* | F | SSB | B/Bmsy |
|---|---|---|---|---|---|---|---|
| 2020 | 8,310 | 8,795 | 6,835 | N/A | 0.33 | 26,375 | 1.83 |
| 2021 | 9,149 | 8,021 | 7,916 | N/A | 0.40 | 25,057 | 1.74 |
| 2022 | 8,028 | 8,735 | 8,027 | 0.469 | 0.38 | 22,911 | 1.59 |
| 2023 | 8,028 | 7,874 | 8,027 | 0.507 | 0.43 | 19,723 | 1.37 |

# P*, 100% CV: 2021 Catch = ABC

## Varying ABCs

| Year | Catch | OFL | ABC | ABC p* | F | SSB | B/Bmsy |
|---|---|---|---|---|---|---|---|
| 2020 | 8,310 | 8,795 | 6,835 | N/A | 0.33 | 26,375 | 1.83 |
| 2021 | 7,916 | 8,021 | 7,916 | N/A | 0.34 | 25,683 | 1.78 |
| 2022 | 8,913 | 9,101 | 8,913 | 0.490 | 0.41 | 23,448 | 1.62 |
| 2023 | 7,774 | 7,938 | 7,774 | 0.490 | 0.41 | 20,013 | 1.39 |

## Average ABC

| Year | Catch | OFL | ABC | ABC p* | F | SSB | B/Bmsy |
|---|---|---|---|---|---|---|---|
| 2020 | 8,310 | 8,795 | 6,835 | N/A | 0.33 | 26,375 | 1.83 |
| 2021 | 7,916 | 8,021 | 7,916 | N/A | 0.34 | 25,683 | 1.78 |
| 2022 | 8,344 | 8,735 | 8,344 | 0.478 | 0.38 | 23,745 | 1.64 |
| 2023 | 8,344 | 8,110 | 8,344 | 0.514 | 0.43 | 20,177 | 1.40 |

# P*, 150% CV: 2021 Catch = ABC

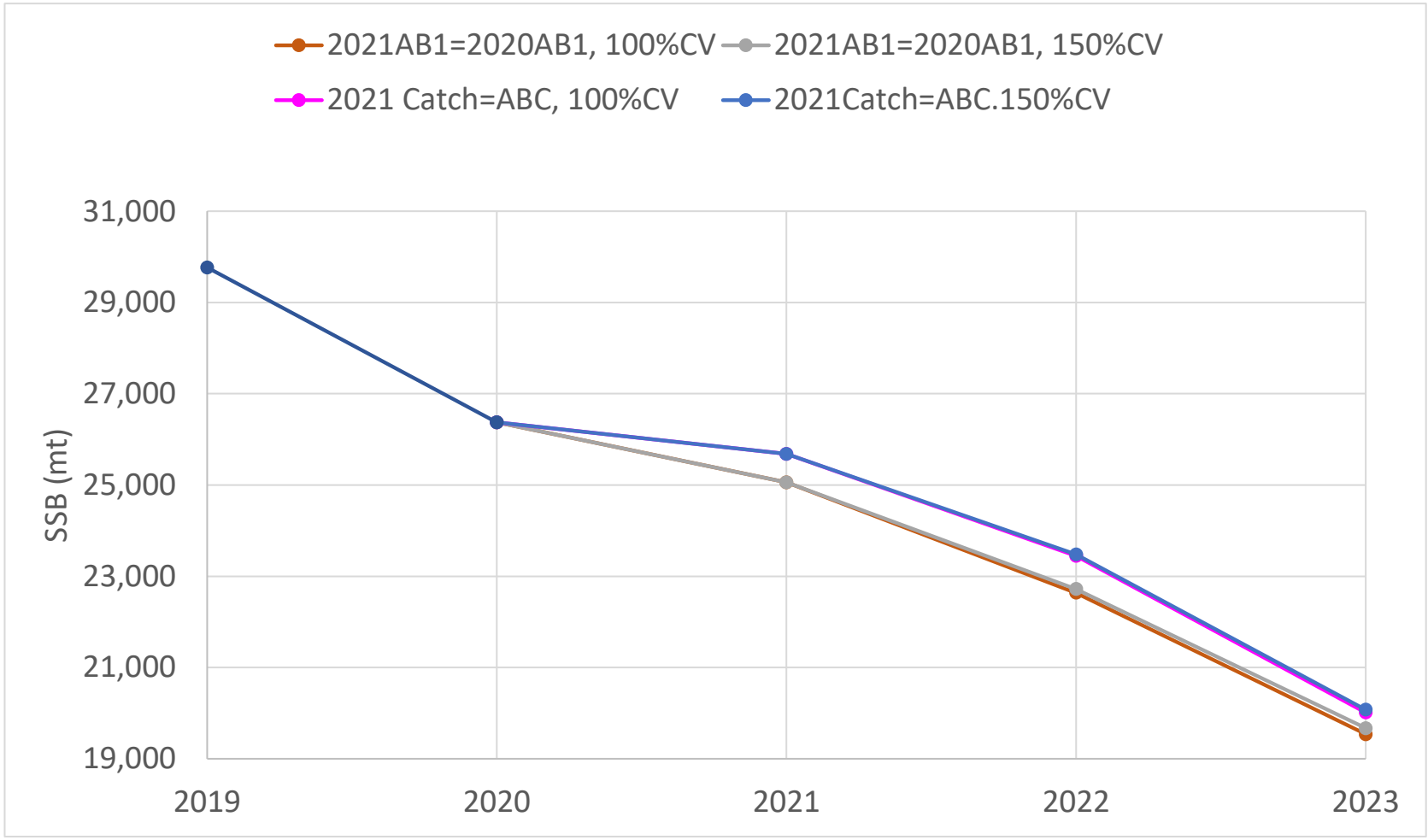
## Varying ABCs

| Year | Catch | OFL | ABC | ABC p* | F | SSB | B/Bmsy |
|---|---|---|---|---|---|---|---|
| 2020 | 8,310 | 8,795 | 6,835 | N/A | 0.33 | 26,375 | 1.83 |
| 2021 | 7,916 | 8,021 | 7,916 | N/A | 0.34 | 25,683 | 1.78 |
| 2022 | 8,857 | 9,101 | 8,857 | 0.490 | 0.41 | 23,477 | 1.63 |
| 2023 | 7,742 | 7,955 | 7,741 | 0.490 | 0.41 | 20,076 | 1.39 |

## Average ABC

| Year | Catch | OFL | ABC | ABC p* | F | SSB | B/Bmsy |
|---|---|---|---|---|---|---|---|
| 2020 | 8,310 | 8,795 | 6,835 | N/A | 0.33 | 26,375 | 1.83 |
| 2021 | 7,916 | 8,021 | 7,916 | N/A | 0.34 | 25,683 | 1.78 |
| 2022 | 8,299 | 8,735 | 8,299 | 0.481 | 0.38 | 23,767 | 1.65 |
| 2023 | 8,299 | 8,123 | 8,299 | 0.508 | 0.43 | 20,236 | 1.40 |

# Projected SSB



Questions?