

Tab B, No. 4a
SSC Webinar: October 4, 2023
MRIP-FES Pilot Study

Summary for:
Data Collection Committee
Gulf of Mexico Fishery Management Council
October 23, 2023

FES Pilot Studies Report

- Report includes two separate studies to evaluate potential sources of bias in FES:
 1. One-month fishing activity questions (one-month waves)
 2. Question order changes to the 2-month and 12-month fishing activity questions

One-Month Wave Key Points

- Compared FES design to two options for one-month fishing activity questions:
 - Asking about a single month
 - Asking about two months individually
- Single month questionnaire resulted in consistently **higher** estimates compared to the current design
- The two individual months questionnaire produced estimates that were **similar to** the current FES
- Limitations: Conducted in four states over six months with smaller sample sizes compared to the FES

Question Order Change Key Points

- Changing order of questions identified telescoping bias in FES, resulting in an overestimation of fishing effort and landings
- Resulting effort estimates generally **lower** than current FES design
 - 32 to 39 percent lower for shore and private boat modes, respectively
 - Results varied by state, wave and fishing mode
- Limitations: Conducted over 6 months, smaller sample size than full FES administration
 - Study estimates had low precision

Next Steps and 2024 Pilot Study

- To be administered concurrently with current FES over full course of 2024 (larger sample size over longer duration)
- Revised design includes both questionnaire changes *and* increasing the administration of the survey from every two months to monthly
- Study will determine combined effects, which allows for a more efficient calibration process
- Revised survey design expected no earlier than 2026

Update on SEDAR 81 Sensitivity Runs with Respect to the MRIP-FES Pilot Study



SEDAR 81: Spanish Mackerel

Reminders:

- Not overfished, not undergoing overfishing as of 2021
- Stock still healthy but biomass estimated to be declining
- Gulf of Mexico fishery is largely recreational (~90%)

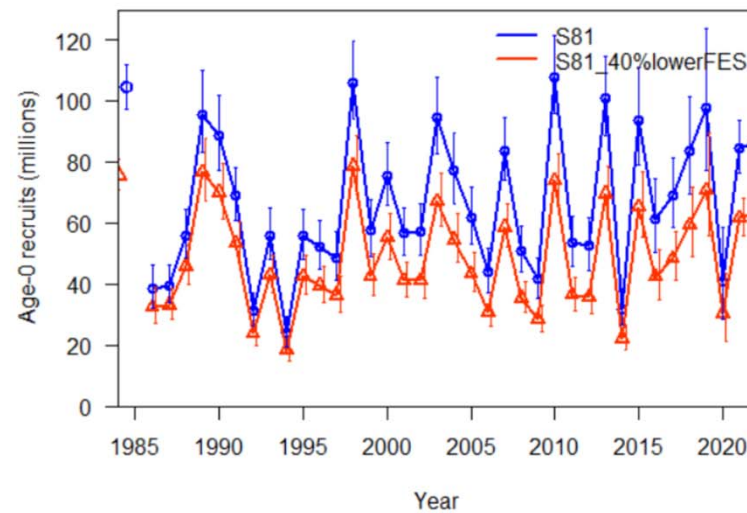
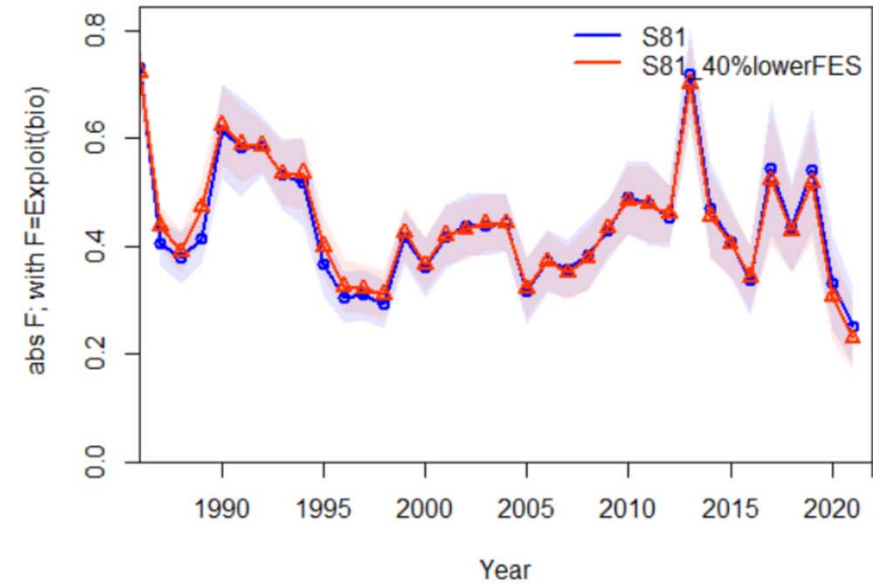
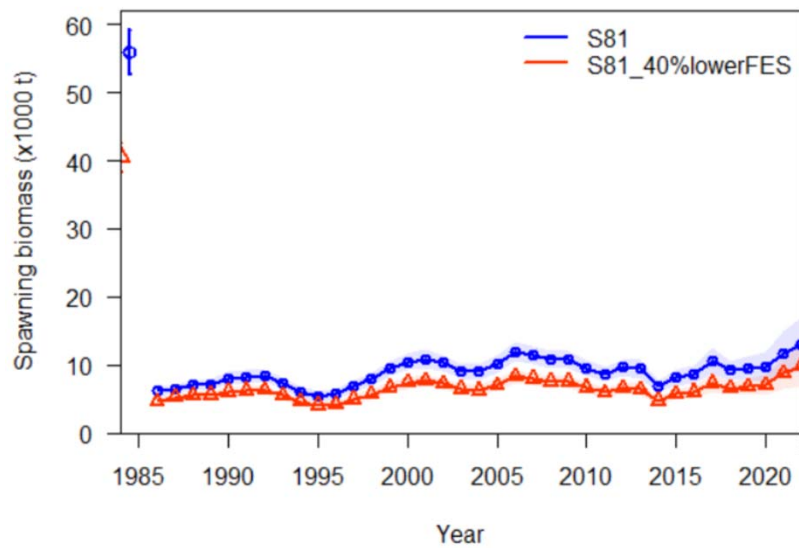


SEDAR 81: FES Sensitivity Run

- Used SEDAR 81 base model run
- Sensitivity run using decreased private vessel and shore landings, per the 2023 MRIP-FES pilot study
 - Multiplied private and shore catches and discards by 0.6
- Compared results to SEDAR 81 base run
- Ran projections and compared stock status and OFL/ABC recommendations with SEDAR 81



Comparison of model runs



SEDAR 81: FES Sensitivity Run

- Key Point: The sensitivity run showed similarities in trends and estimates
 - Reduction in SSB and recruitment
- No change in stock status:
 - Remains not overfished and not undergoing overfishing
- Catch limit projections would decrease by ~25%



Projection Results Comparison



| Year | OFL SEDAR81 | OFL FES sens. | % change in OFL | OY SEDAR 81 | OY FES sens. | % change in OY |
|-------------------------|-------------|---------------|-----------------|-------------|--------------|----------------|
| 2022 | 7.131 | 4.575 | -36 | 7.131 | 4.575 | -36 |
| 2023 | 10.371 | 6.828 | -34 | 10.371 | 6.828 | -34 |
| 2024 | 10.385 | 6.854 | -34 | 10.385 | 6.854 | -34 |
| Mgmt year → 2025 | 12.293 | 9.512 | -23 | 9.007 | 6.918 | -23 |
| 2026 | 12.037 | 9.014 | -25 | 9.686 | 7.218 | -25 |
| 2027 | 11.892 | 8.71 | -27 | 10.196 | 7.436 | -27 |
| 2028 | 11.807 | 8.531 | -28 | 10.549 | 7.585 | -28 |
| 2029 | 11.754 | 8.421 | -28 | 10.789 | 7.684 | -29 |

| Constant | OFL SEDAR 81 | OFL FES sens. | % change in CC OFL | OY SEDAR 81 | OY FES sens. | % change in CC OY |
|-------------------|---------------|---------------|--------------------|-------------|--------------|-------------------|
| Catch (CC) | | | | | | |
| 3 yr | 12.074 | 9.079 | -25 | 9.63 | 7.191 | -25 |
| 5 yr | 11.957 | 8.838 | -26 | 10.045 | 7.368 | -27 |

OFL (F = F30%SPR) and ABC (F = 75%F30%SPR) set by the SSC July 2023



SSC Comments on SEDAR 81 FES Sensitivity

- Caution needed for stocks with high proportion of recreational landings
- Fishing mortality appears consistent
- A 25% change in catch limit projections is considerable
 - Trends are similar, but magnitude of difference is impactful
- Consideration of state survey data may be warranted where available
- SEFSC developing plan for handling results of the 2023 MRIP-FES pilot study
- SSC will be discussing options for accounting for this added uncertainty re. recreational landings



Tab B, No. 4a

SSC Summary Presentation

September 27 – 28, 2023 Meeting

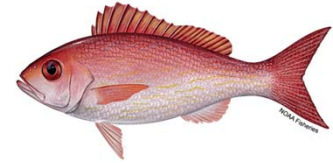
Summary for:
Reef Fish Committee
Gulf of Mexico Fishery Management Council
October 23 – 24, 2023

Tab B, No. 4a

Interim Analysis for Gulf of Mexico Vermillion Snapper



Vermilion Snapper Interim Analysis



- Last assessed in SEDAR 67, with data through 2017
 - Healthy
 - ACL for 2023+ = 6.615 mp ww in FES units
- IA uses G-FISHER combined video index
 - Combo of Panama City (shallow water), Pascagoula (deep water), and FWRI (WFL Shelf) video surveys
 - Survey coverage varies by survey, but combined, covers from offshore of Mobile Bay to west of Dry Tortugas

G-FISHER Survey



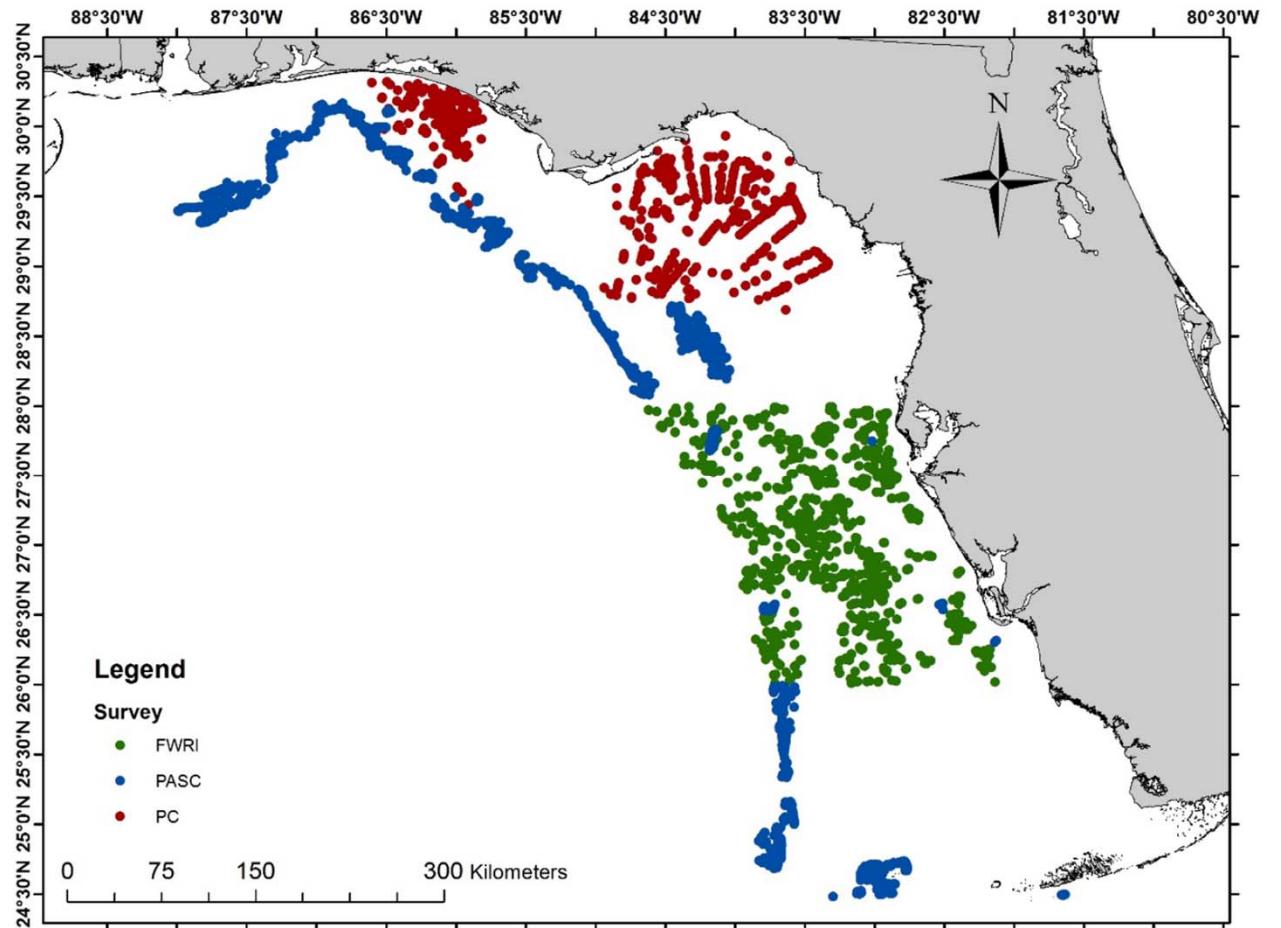
Florida Fish
and Wildlife
Conservation
Commission



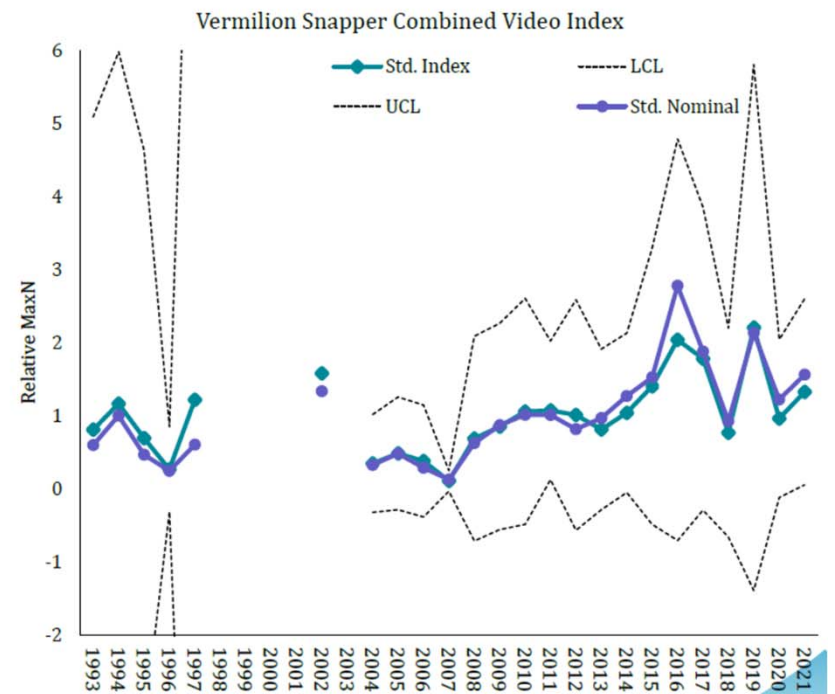
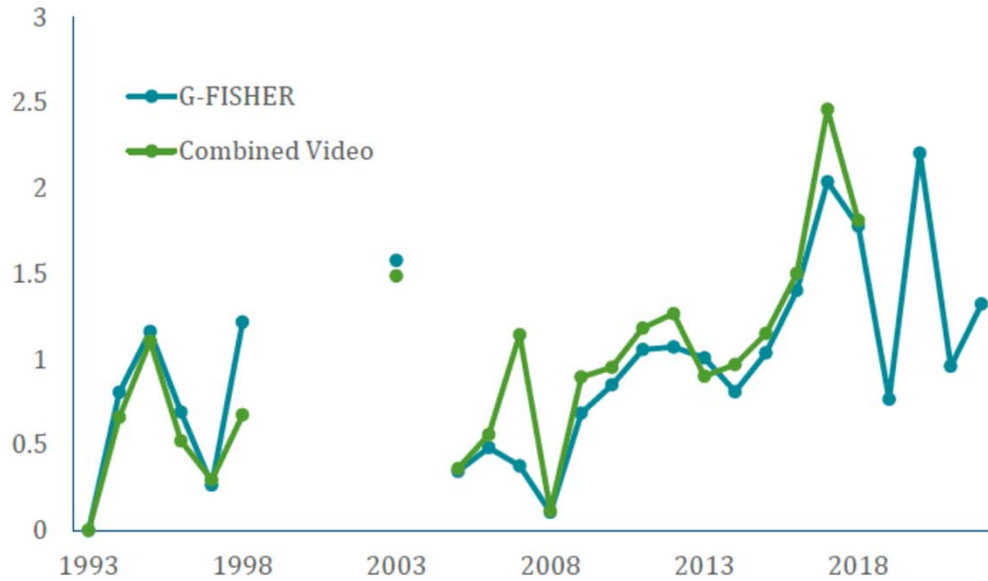
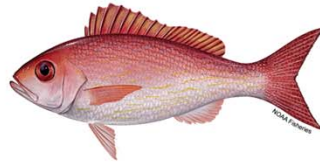
NOAA
FISHERIES



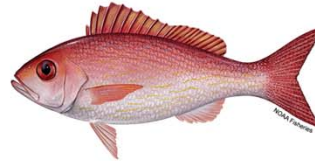
RESTORE
SCIENCE PROGRAM



Vermilion Snapper



Vermilion Snapper



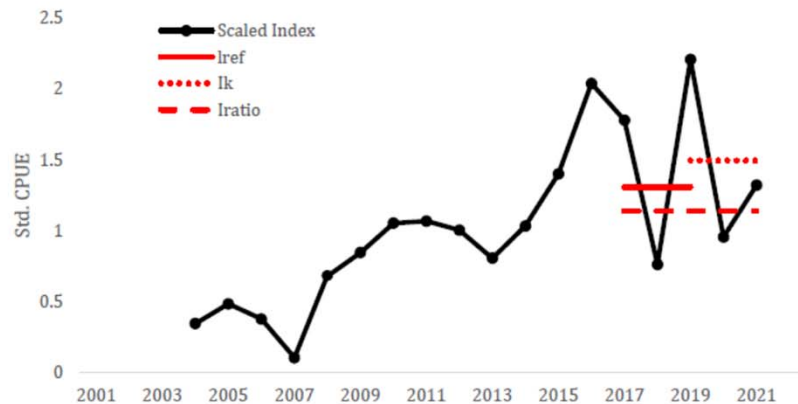
Adjust ABC

3 yr. moving avg:

5 yr. moving avg:

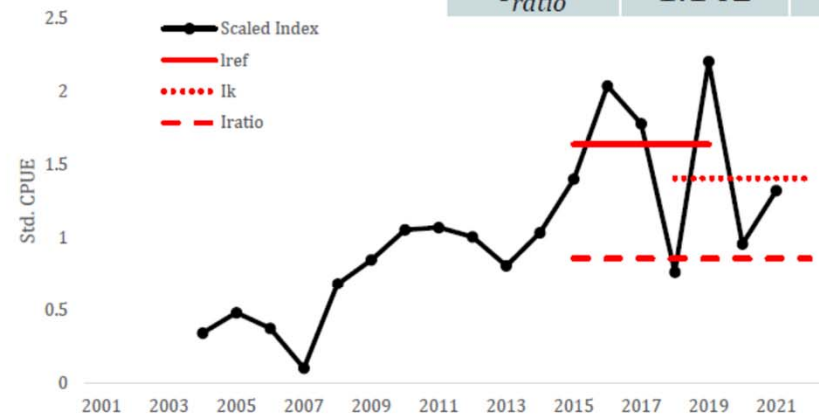
| Value | 3 yr avg | 5 yr avg |
|-------------|----------|----------|
| I_{ref} | 1.309 | 1.637 |
| I_k | 1.495 | 1.406 |
| I_{ratio} | 1.142 | 0.859 |

G-FISHER



* C_{ref} = 5.88 million pounds whole weight (FES)
 = 3.11 million pounds whole weight (CHTS)

G-FiSHER



* C_{ref} = 5.88 million pounds whole weight (FES)
 = 3.11 million pounds whole weight (CHTS)

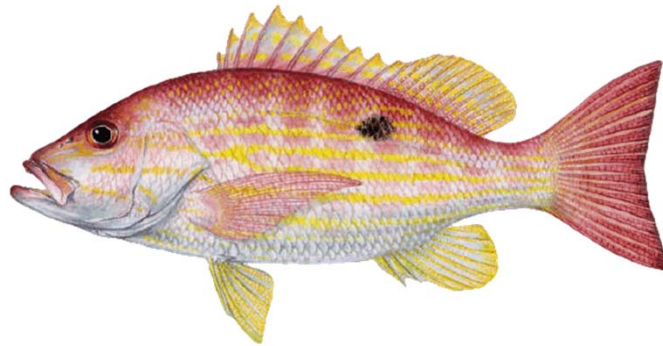
C_{ref} 3-yr adjust = 6.712 million pounds ww (FES) C_{ref} 5-yr adjust = 5.049 million pounds ww (FES)

Vermilion Snapper IA: SSC Recommendations

- **Motion: The SSC accepts the 2023 vermilion snapper interim analysis as consistent with the best scientific information available. The SSC recommends the OFL at the estimated 5-year average in FES units at 5.805 million pounds whole weight and the ABC at the estimated 5-year average in FES units at 5.049 million pounds in whole weight.**
- *Motion failed 4 – 16, with 4 absent*
- SSC recognized that vermilion snapper IA methodology was scientifically sound but had concerns recommending updated catch advice given the data issues identified (VS schooling behavior, high variability in the G-FISHER index)

Tab B, No. 4a

Interim Analysis for Gulf of Mexico Lane Snapper

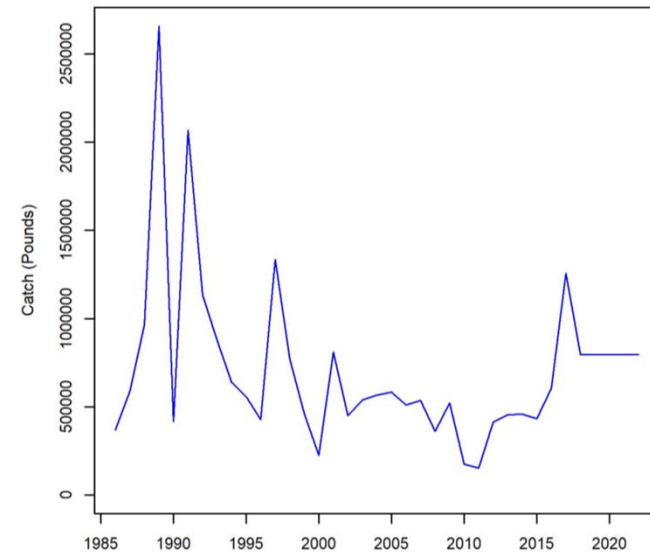
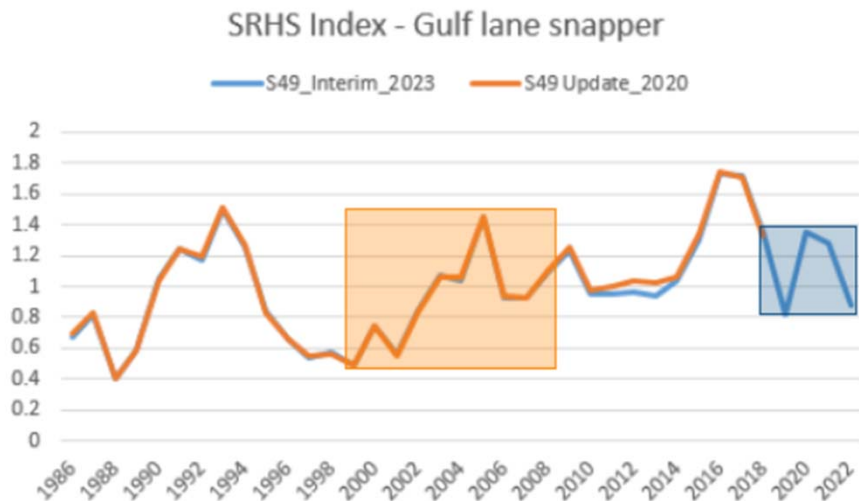


Lane Snapper Interim Analysis



- Last assessed in SEDAR 49, with data through 2014
 - Uses NOAA Data Limited Toolkit (iTarget)
 - Catch advice twice updated using this method (2017, 2020)
- Uses Headboat Catch-Per-Unit-Effort (CPUE) index
 - Terminal year of 2022
 - Tracks headboat landings relative to effort

Lane Snapper: Changes in index over time



- Index trend is relatively flat
- CPUE may not track total population trends
- Lane snapper landings have increased in recent years



Lane Snapper: SSC Recommendations



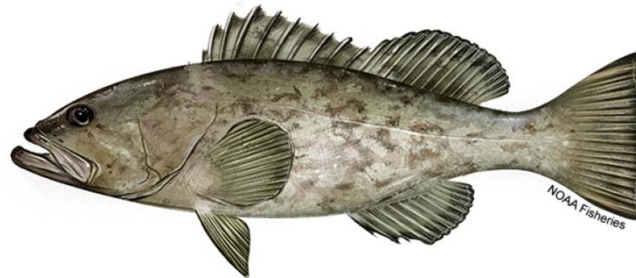
| | ABC | | OFL | SD | SE | CV |
|------|-----------|-----------|-----------|--------|-----|-------|
| | 30% | 40% | | | | |
| 2023 | 1,088,873 | 1,102,732 | 1,116,331 | 51,819 | 518 | 0.046 |
| 2020 | 1,028,973 | 1,041,873 | 1,053,834 | 50,102 | 501 | 0.046 |

- **Motion: The SSC recommends to update catch advice for lane snapper using the 2023 SEDAR 49 interim analysis. The OFL is 1.116 mp ww (in MRIP-FES data units). The ABC is 1.088 mp ww (in MRIP-FES data units)**

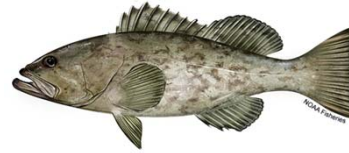
Motion carried with one opposed

Tab B, No. 4a

SSC Discussions on Recent Gag Grouper Research and Implications for Management



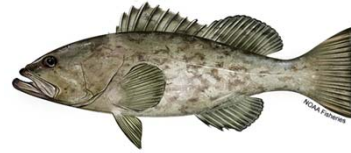
Gag Research Overview



SSC received presentations in September 2023:

- *Reproductive Resilience in the Protogynous Gag Grouper*
– Dr. Sue Lowerre-Barbieri
- *Effects of Recreational Catch and Release Angling on the Survival of Gag, and Gear and Strategies Designed to Reduce Barotrauma*
– Dr. Angela Collins
- *Age-specific Mortality of Gag from Red Tide on the West Florida Shelf*
– Dr. Dave Chagaris
- *Discard Mortality of Gag on the West Florida Shelf*
– Ms. Beverly Sauls

Gag Research Overview

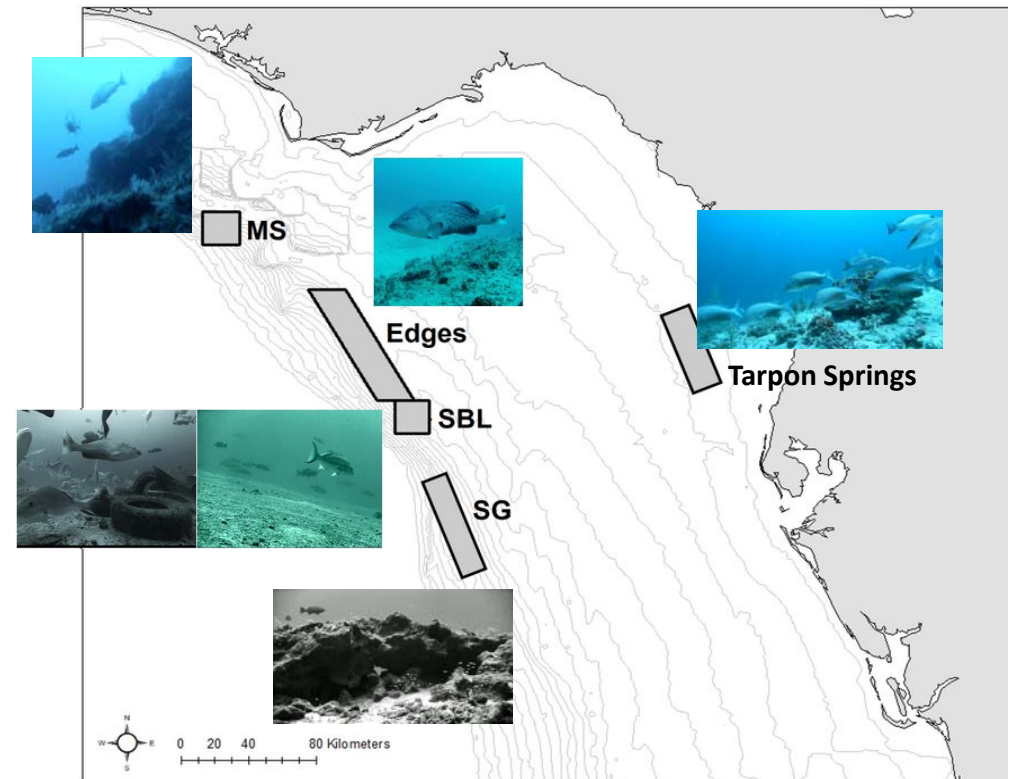


SSC discussion guided by Council goals for gag:

- Reduce fishing mortality on male gag
- Constrain future harvests to the ACL
- Increase the probability of rebuilding the stock
- Avoid increasing discards
- Reduce vulnerability of gag during spawning to increase spawning success

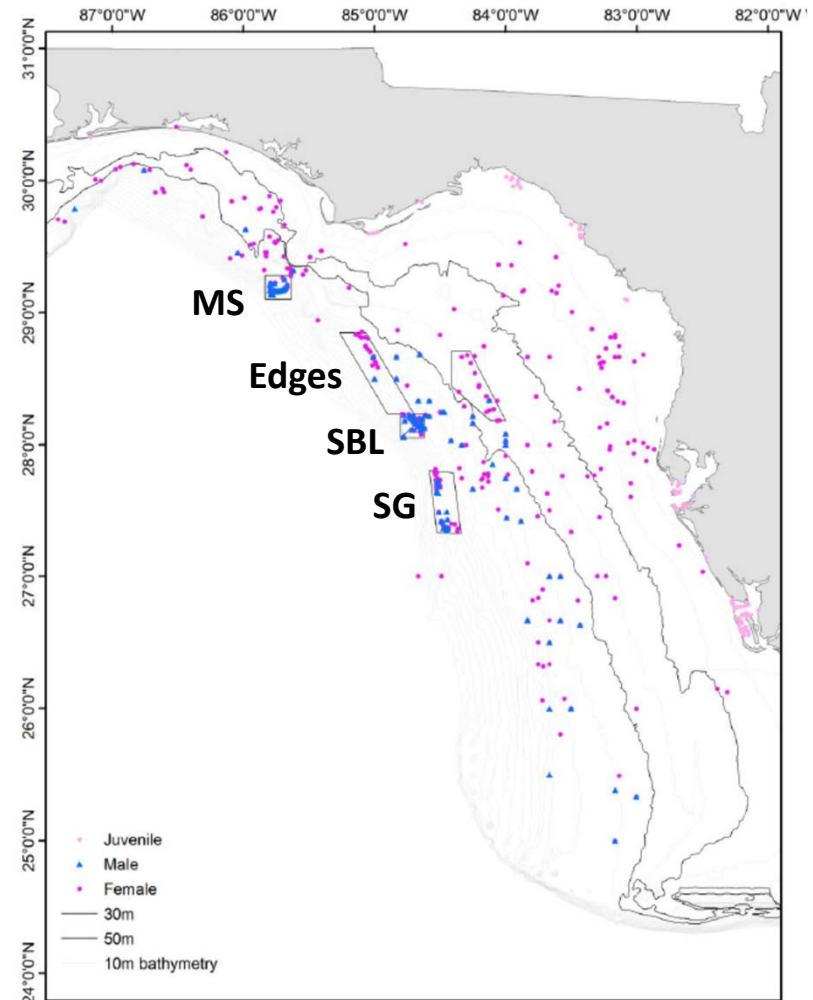
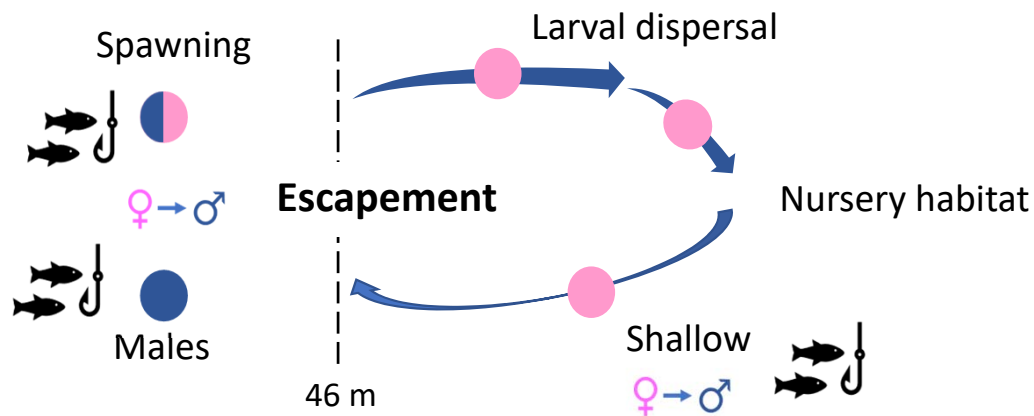
Reproductive Resilience in the Protogynous Gag Grouper

- Two completed studies (2016-2021), used video and hook and line sampling (chartered fishermen)
- In: both MPAs, the seasonally-closed Edges, & the high relief Sticky Grounds
- Preliminary sampling in nearshore Tarpon Springs
- Pooled with reproductive samples from FDM and FIM (n=2,874 fish)



Reproductive Resilience in the Protogynous Gag Grouper

- Start life as female, transition to male later in life (protogynous hermaphrodites)
- Complex spatial ecology:
 - Nursery habitat: seagrass and estuaries
 - Immature females only < 20 m
 - Spawning females found 65-138 m
 - No males < 46 m
 - No large spawning aggregations



Reproductive Resilience in the Protogynous Gag Grouper

Research results:

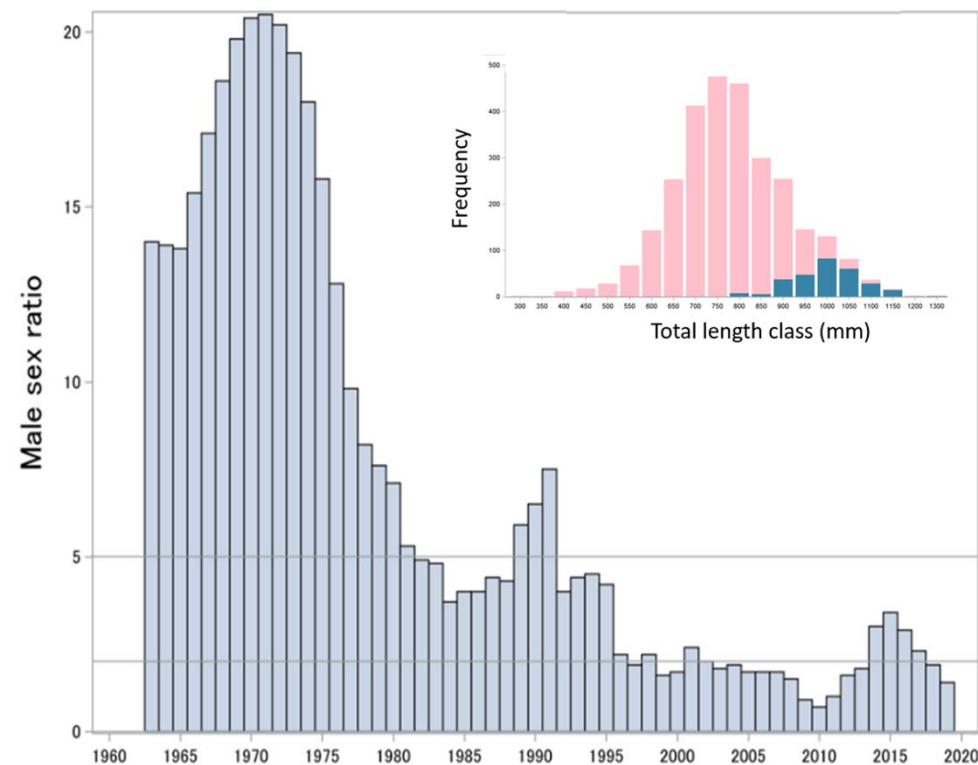
- Male sex ratios ranged from ~0%-6%
- Sex ratios did not recover in either MPA, ~5% male
- 32%-41% skipped spawning
- Males are bigger and older than females

SEDAR 72:

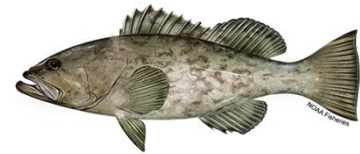
- < 2% male sex ratio based on A50 of 11.6 years
- At $F_{SPR40\%}$ sex ratio estimated as ~20%

Hood and Schlieder (1992) paper:

- 1977-1980 sex ratio = 17%



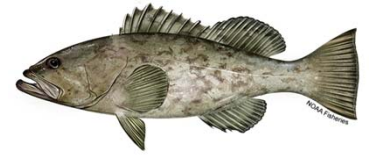
Effects of Recreational Catch and Release Angling on the Survival of Gag Grouper on the West Florida Shelf



- Regulations are effective only if fish survive release
- Cooperative research with fishermen (2014-2017)
 - Comparison of release methods by depth, by experienced anglers
 - 90 gag acoustically tagged (to 40 m), ranging in size from 17-32 inches TL
 - Used acoustic tags to track fate of released gag
 - Evaluated effects of venting, descending (*only if needed*)



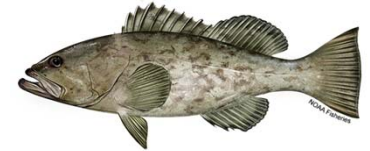
Effects of Recreational Catch and Release Angling on the Survival of Gag Grouper on the West Florida Shelf



- Tagged fish (size range 17-32 inches TL) showed high site fidelity
- No relationship between barotrauma and fish length was observed
- Barotrauma increased with depth (<20 m, 20-30 m, and >30 m)
- Inside 40 m:
 - Discard mortality of gag after C&R was < 10%
 - Both release methods (Venting or Descending) are effective for gag, if done properly



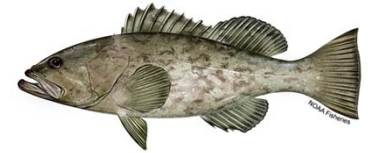
Gag discard mortality on the West Florida Shelf



- Cooperative research conducted by FWC-FWRI during 2009-2012 on the West coast of Florida
- Recruited >160 for-hire vessels
- Vessels selected year-round to carry an FWC observer
 - Observe fish as they are caught
 - Discards assessed for release condition (severity of hook injury and barotrauma), whether vented or unvented, and then marked with dart tags
 - FWC tag return hotline with reward for returns
- Mark-Recapture model developed to better assess results



Gag discard mortality on the West Florida Shelf

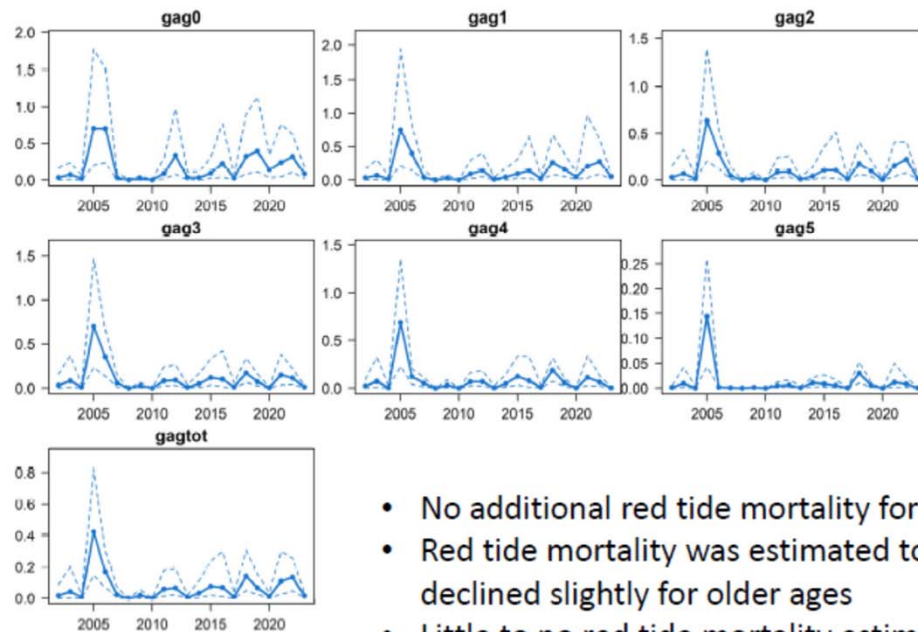
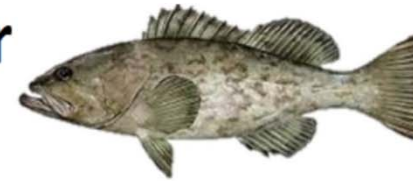


- Majority of gag:
 - Caught in <30m
 - Submerged without venting
 - Released in good condition
- For gag not released in good condition:
 - Caught in deeper depths
 - More frequently vented
- Discard mortality increased significantly with depth
- SRFS and for-hire at-sea observer programs granted recurring state funding in 2020:
 - Evaluate impacts of changes in fishing regulations
 - Provide additional data and analyses for assessments



An update on the West Florida Shelf ecosystem model and red tide mortality estimation

Red Tide Mortality on Gag Grouper Jan 2002- June 2023



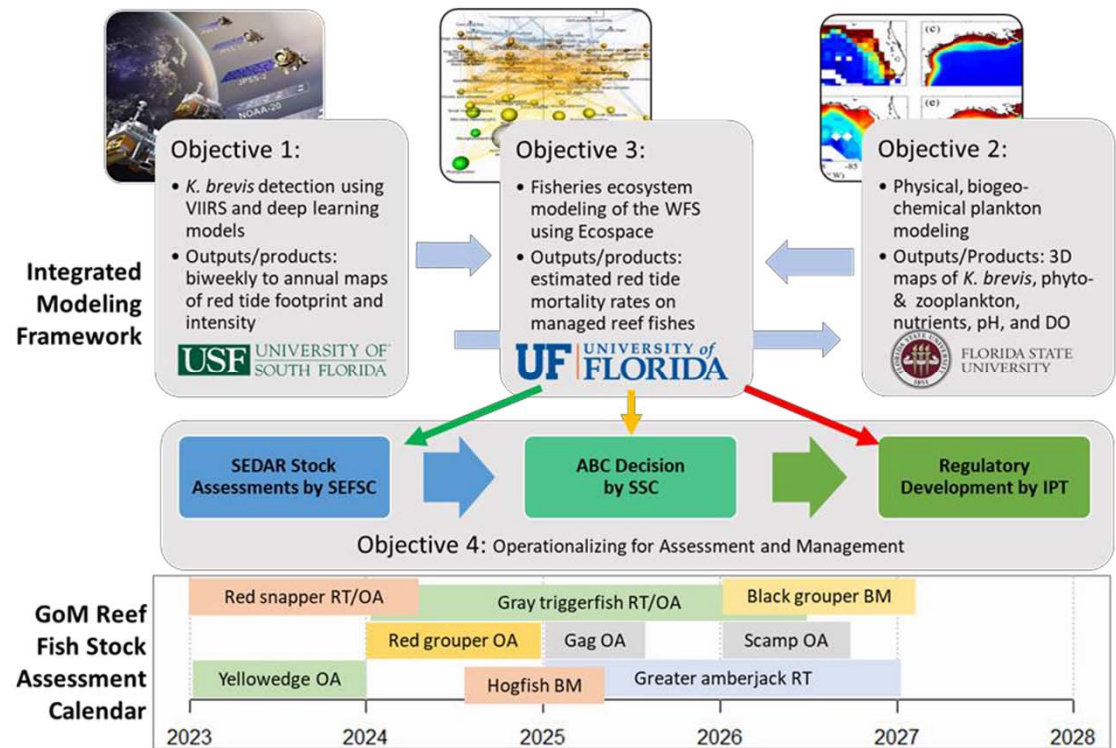
| Year | age-0 mean | combined ages mean |
|--------------|------------|--------------------|
| 2005 | 0.707 | 0.424 |
| 2006 | 0.706 | 0.168 |
| 2012 | 0.338 | 0.067 |
| 2016 | 0.228 | 0.070 |
| 2018 | 0.328 | 0.140 |
| 2019 | 0.395 | 0.068 |
| 2020 | 0.141 | 0.013 |
| 2021 | 0.242 | 0.109 |
| 2022 | 0.324 | 0.133 |
| to June 2023 | 0.084 | 0.017 |

- No additional red tide mortality for 2021 after the November SSC meeting
- Red tide mortality was estimated to be higher in 2022 than 2021 ages 0-2, but declined slightly for older ages
- Little to no red tide mortality estimated for 2023

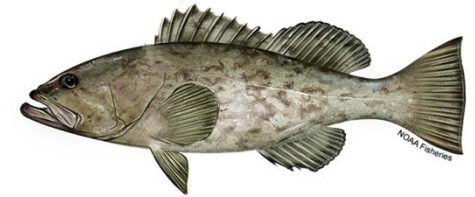
An update on the West Florida Shelf ecosystem model and red tide mortality estimation

Future Work

- Operationalizing WFS Ecospace model
- Integrates stakeholder input
- NOAA Restore Funding: October 2023-September 2028
- Overall goal is to account for red tide mortality when assessing GoM reef fishes and setting their ABCs



SSC Discussions on Recent Gag Grouper Research and Implications for Management

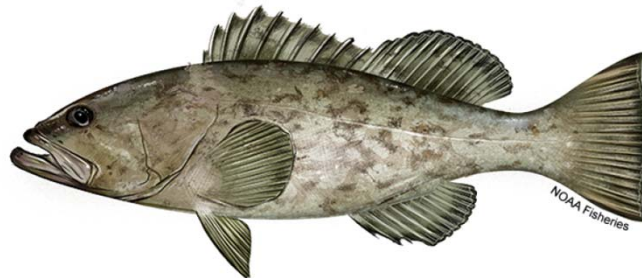


Main Takeaways:

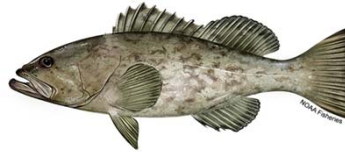
- Male sex ratios are low: ~2% in SEDAR 72
 - On average, it takes a decade to make a male
 - The 30%-40% levels of observed skipped spawning are concerning
- Sex ratios did not recover to the expected 15% in either MPA
 - Transition occurs both in shallow and deep water
- Could intense fishing effort in shallow, nearshore waters be preventing enough escapement to the spawning population?
- Inside of 40 m, gag discard mortality seems to be < 10%
- Discard mortality increases significantly with depth (> 35% in deep water)
- Red tide mortality has not been a major concern since late 2021 but continues to be a factor to be monitored

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Interim Analysis for Gulf of Mexico Gag Grouper

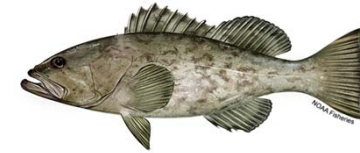


Gulf Gag Grouper



- Last assessed in SEDAR 72, with data through 2019
 - Overfished, undergoing overfishing
 - RF Am 56 creates rebuilding plan, changes SDC, changes allocation and catch limits, shifts rec season opening date
- IA uses same indices used in SEDAR 72
 - Combo of Panama City (shallow water, ages 0-3), Pascagoula (deeper water, ages 3+), and FWRI (seagrass, ages 0+) surveys
 - Video surveys updated through 2021 (data processing lag)
 - Age-0 index updated through 2022

Gag Grouper: Panama City Survey



Shallow water, ages 0-3

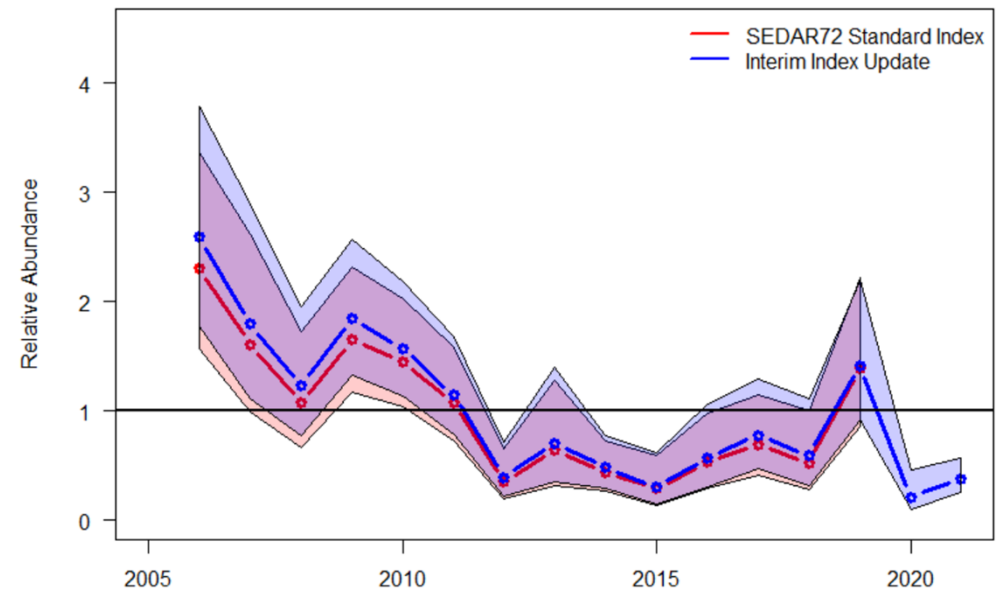
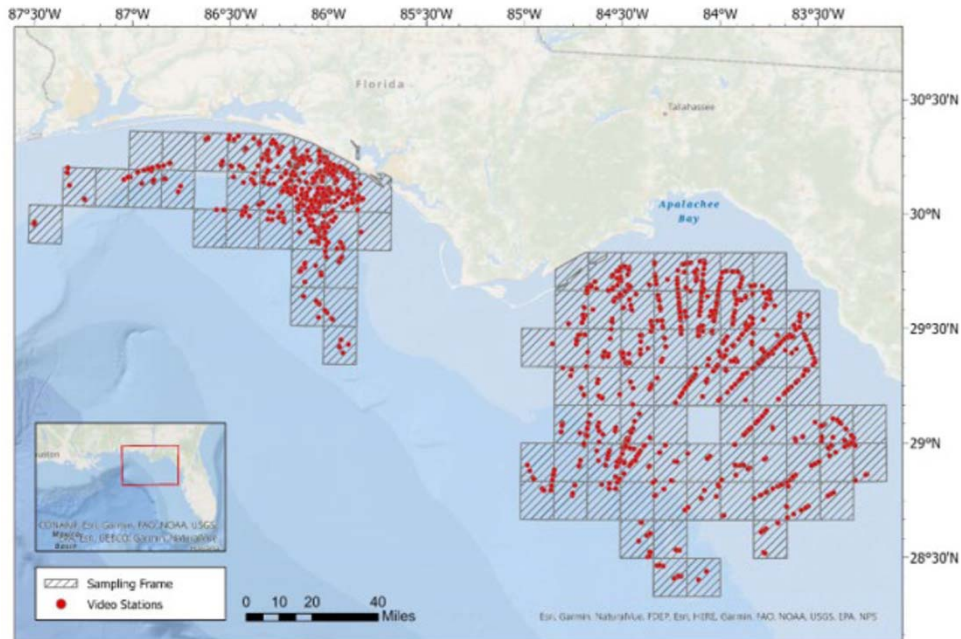
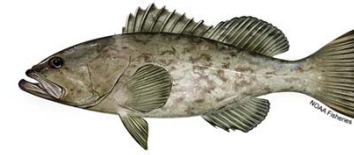
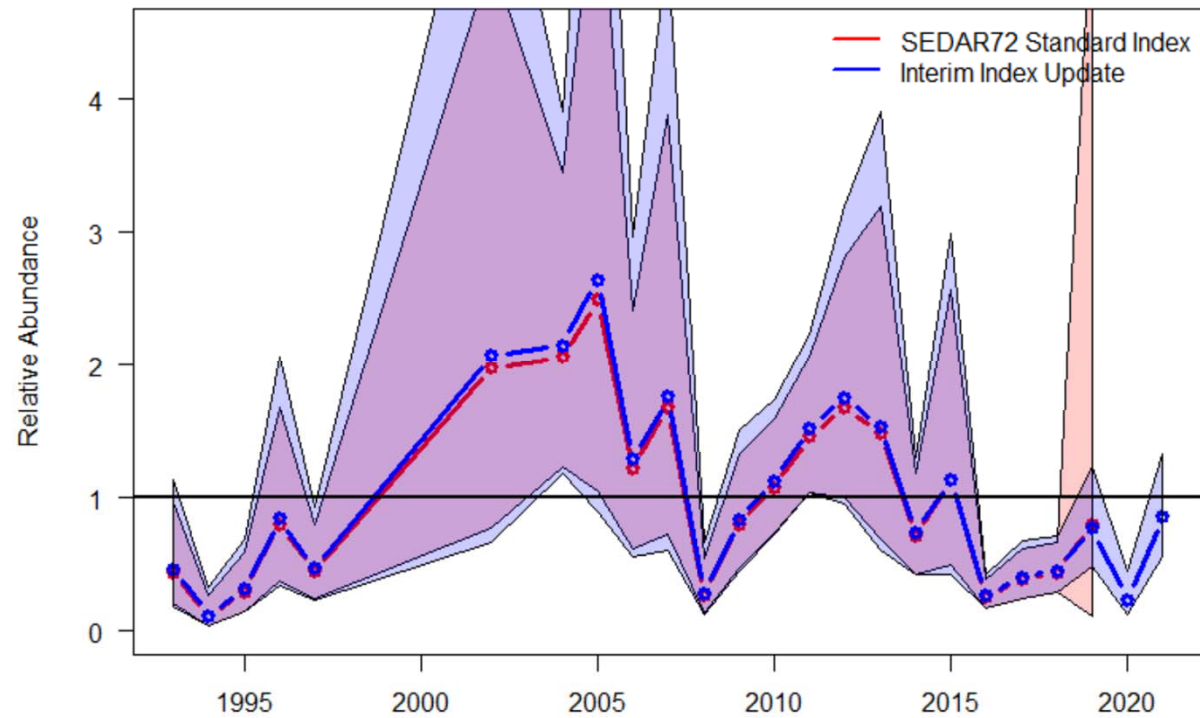
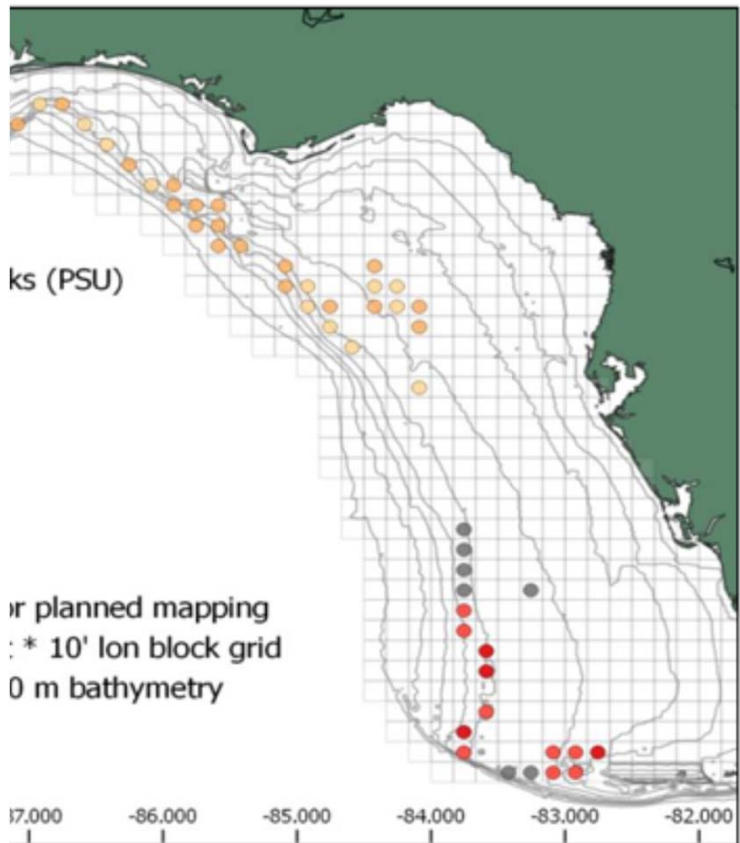


Figure 1. Video sampling locations 2005 - 2021. |

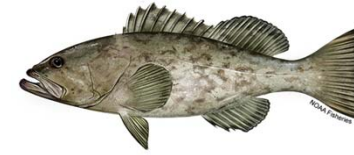
Gag Grouper: Pascagoula Survey



Deeper water, ages 3+



Gag Grouper: FWRI Age-0 Survey



Shallow water, age 0

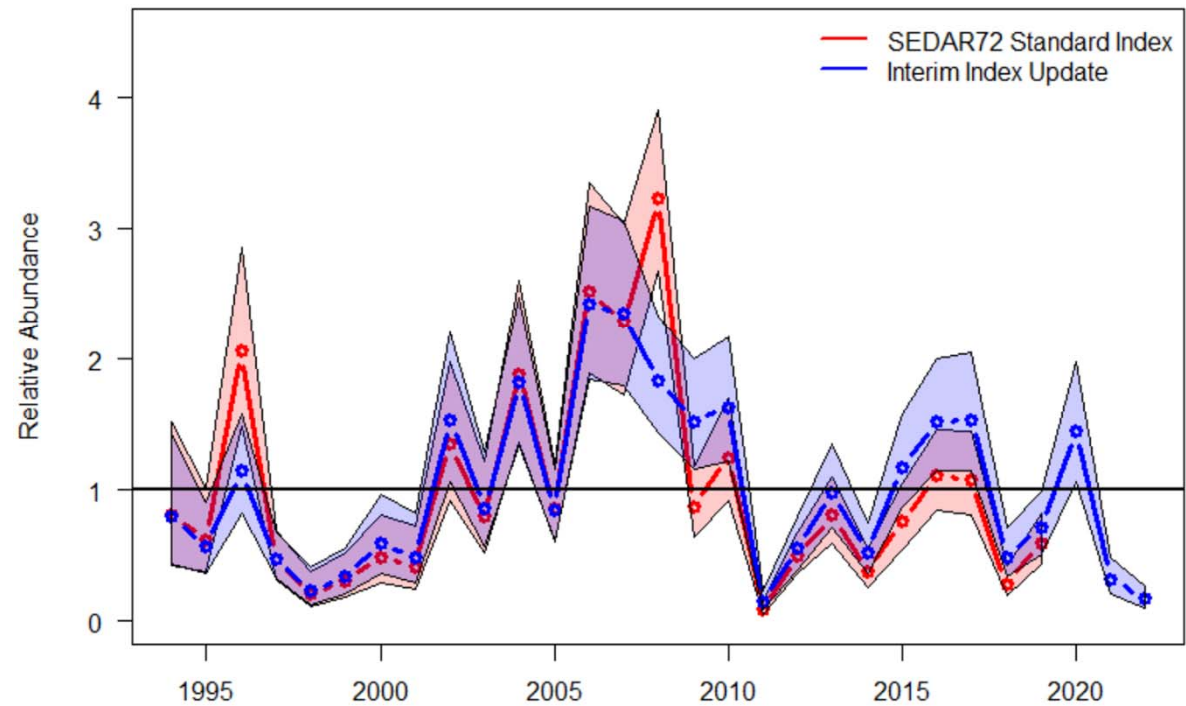
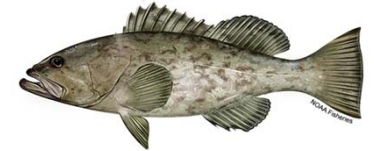


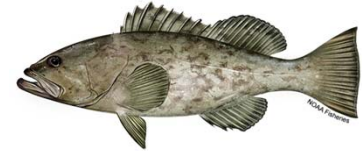
Figure 1.1. Nine sampling regions used in this study. The green areas indicate seagrass coverage between 0 and 6 feet of water depth. Seagrass coverage in acres for each region is listed.

Gag Grouper: Changes in indices over time



| Year | PC Index | % difference from 2019 | SEAMAP Index | % difference from 2019 | Age-0 Index | % difference from 2019 |
|-------------|-----------------|-------------------------------|---------------------|-------------------------------|--------------------|-------------------------------|
| 2019 | 1.41 | 0 | 0.77 | 0 | 0.71 | 0 |
| 2020 | 0.21 | -85 | 0.24 | -69 | 1.45 | 103 |
| 2021 | 0.38 | -73 | 0.86 | 11 | 0.32 | -55 |
| 2022 | | | | | 0.17 | -77 |

Gag Grouper IA: SSC Recommendations



- The SSC accepts the 2023 gag IA as consistent with the best scientific information available
- Encouraged continued monitoring of gag stock
- Requested consideration of full G-FISHER video index for next gag IA
- Encouraged Council to work with SEFSC and FWC on timing of the next IA to lessen gap between last year of data and time of review
 - Ability to process video data dependent on available staff time, which can vary throughout the year