

Improving Recreational Fisheries Data for Reef Fishes in Florida



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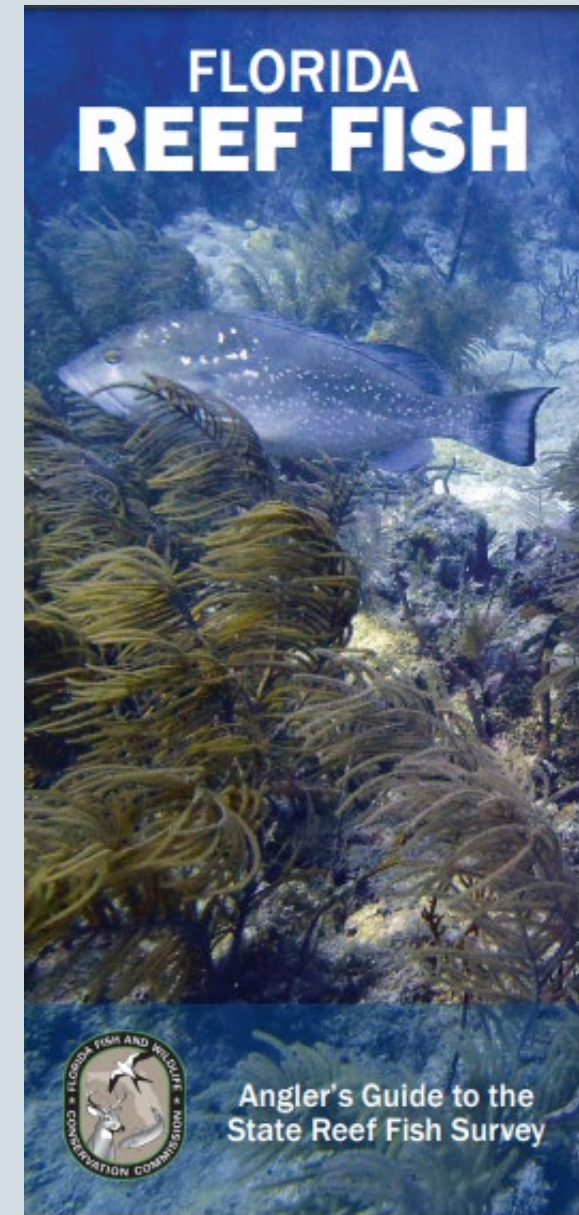
Florida's Investment in Reef Fish Surveys

- Recreational fisheries are important to the state
 - Vested in high quality assessment and sustainable mgt.
- Fishery-dependent investments:
 - For-Hire At-Sea Observer Survey
 - Cooperative research
 - Monitors discards from headboat and charter trips
 - Red Snapper Mini-Season Surveys (EFL)
 - Precise in-season landings for private boat and charter modes
 - State Reef Fish Survey (SRFS)
 - Precise year-round effort and catch from private boats



Outline

- State Reef Fish Survey (SRFS) background and methods
- Continuing efforts to improve survey and verify accuracy of estimates
- Results since SRFS was expanded to the Atlantic coast of Florida
- Return on investments



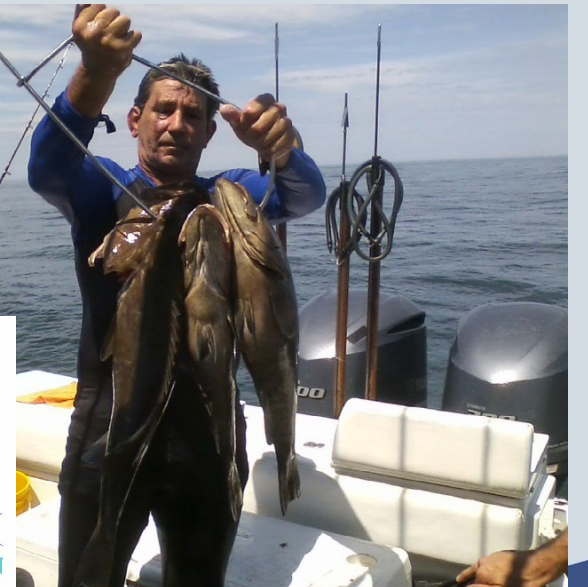
State Reef Fish Survey in Florida

- Focused on improving data for the private boat segment of the recreational reef fish fishery
 - Accounts for majority of recreational catch
- Most difficult segment to monitor and manage
 - Large number of participants, dispersed, open access
 - Reef trips small portion of overall rec. effort
 - Difficult to monitor with a general survey



Survey Development

- Three Gulf regional workshops 2013-2014
 - State surveys developed for more timely and precise data
 - Particularly to support Red Snapper management, and more in FL
- Florida's Gulf Reef Fish Survey
 - Implemented in May 2015
 - Peer review and NOAA certification in 2018
- Expanded statewide in July, 2020
 - Renamed State Reef Fish Survey
 - Runs concurrent with MRIP



Survey Design Certification

- Complementary survey methods
 - Mail survey of fishing effort
 - Separate from MRIP-FES
 - Angler intercept survey for CPUE
 - MRIP-AP AIS and SRFS combined
- Used together to produce year-round, monthly estimates
 - Effort, landings, and discards
- Peer-review findings
 - Approach is sound
 - Studied extensively by two National Academy panels



The FWC's

State Reef Fish Survey

There are two components to the State Reef Fish Survey:



MAIL

If selected, we will ask:

- How often you fish
- Where you fish
- Types of fish you target



DOCKSIDE

If interviewed, we will ask:

- Types of fish you caught
- How many reef fish you released and harvested
- If we can sample your fish

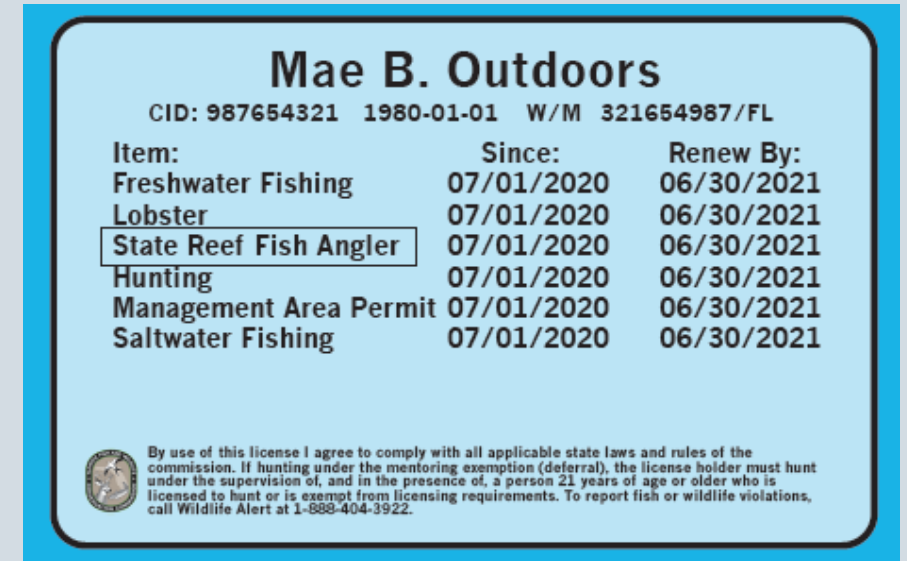


Together, these surveys tell us:

How many recreational reef fish trips are taken each month, and the total number of fish that are harvested and released.

State Reef Fish Angler Designation

- Florida saltwater fishing license
 - No way to distinguish offshore anglers
- State Reef Fish Angler designation
 - Required when fishing for reef fishes from a private boat
 - Sample universe for specialized survey
- Defining universe of offshore anglers for use in surveys endorsed by MAFAC*
 - Under consideration by regional Councils in Gulf and S. Atlantic



Provides a directory of participants in the reef fish recreational fishery



*Better Defining the Universe of Offshore Recreational Anglers

<https://www.fisheries.noaa.gov/national/partners/marine-fisheries-advisory-committee-reports-and-recommendations>

Do you fish for any of these species?

As a reef fish angler or spear fisher, you may be asked periodically to participate in voluntary mail and dockside surveys. These surveys provide important information needed to monitor the fishery and provide optimum recreational fishing opportunities in Florida.

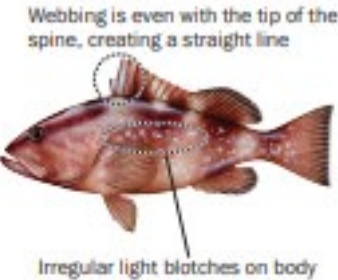
Beginning July 1, 2020, anglers 16 years of age and older are required to sign up as a State Reef Fish Angler if they fish from a private recreational boat for any of the 13 species described in this brochure. Signing up helps FWC reach out directly to people who fish for reef fish species and collect better data.

With your help, we can improve scientific data and management of these important recreational fisheries. To learn more about how to sign up as a State Reef Fish Angler, visit MyFWC.com/SRFS.

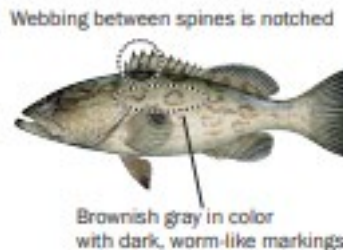
Black Grouper
Mycteroperca bonaci



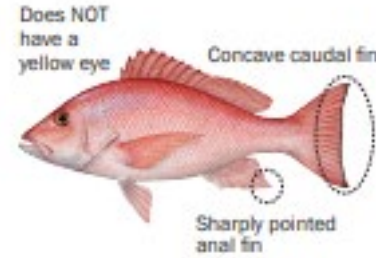
Red Grouper
Epinephelus morio



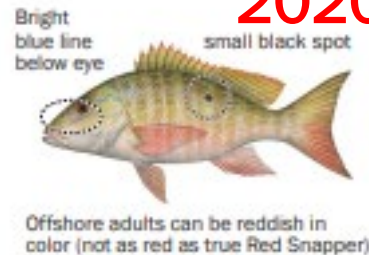
Gag Grouper
Mycteroperca microlepis



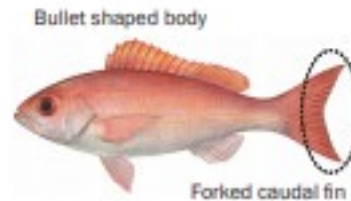
Red Snapper
Lutjanus campechanus



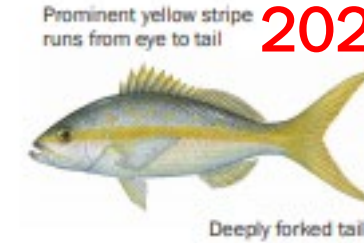
Mutton Snapper
Lutjanus analis



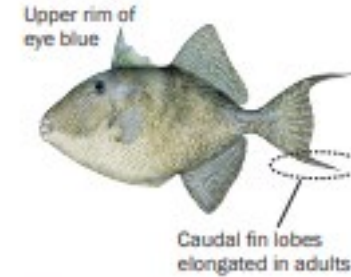
Vermilion Snapper
Rhomboplites aurorubens



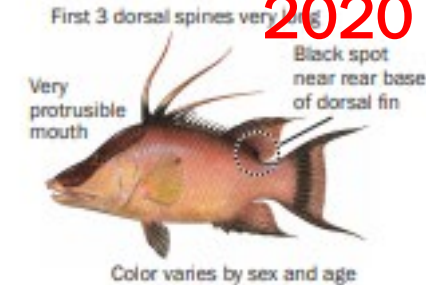
Yellowtail Snapper
Ocyurus chrysurus



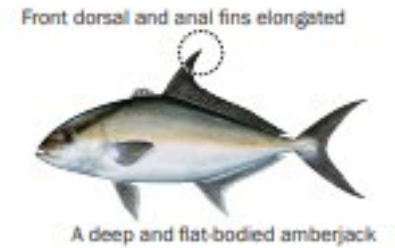
Gray Triggerfish
Balistes capricornis



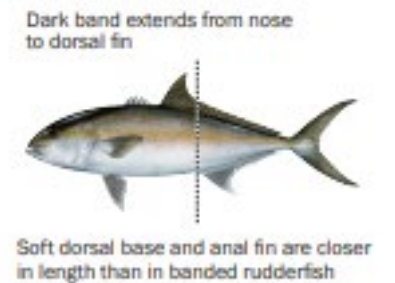
Hogfish
Lachnolaimus maximus



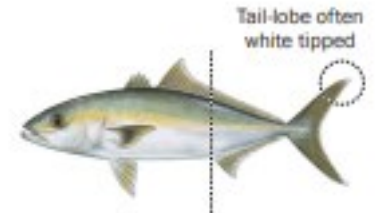
Almaco Jack
Seriola rivoliana



Amberjacks
(Greater, Lesser)



Banded Rudderfish
Seriola zonata



July
2020

July
2020

July
2020

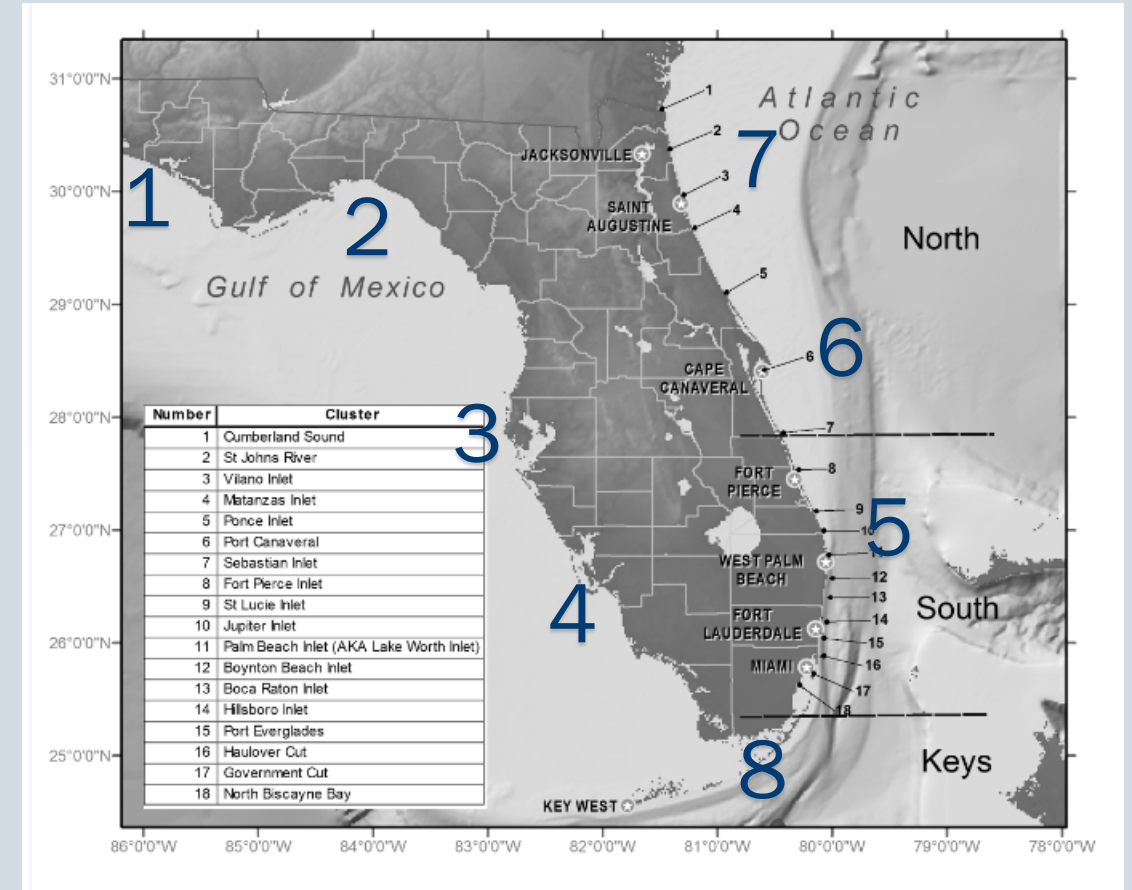
Survey Design Certification

- NOAA Fisheries, December 2018
 - Certified survey design as “appropriately developed and peer-reviewed and considered scientifically valid.”
 - Supported for use by other partner organizations
 - Contingent upon consistent survey design
- Peer review recommended minor improvements
 - Increase response rate for mail survey
 - Simplify mail survey questionnaire
 - Reduce oversubscription in mail survey
 - Explore potential biases in dockside intercept data collected only at public access sites



Integrated Approach

- Improve reef fish intercepts in MRIP's Access Point Angler Intercept Survey (APAIS)
 - Distribute sample among smaller regions
 - New offshore accessible site group
- State Reef Fish Survey
 - Supplement APAIS with specialized reef fish intercept survey
- Assignments for both drawn together
 - Compatible sample weights



Improved intercept survey stratification

Integrated Approach

- Catch estimates from SRFS include data from:
 - MRIP Access Point Angler Intercept Survey (APAIS)
 - Supplemental assignments at offshore access sites
 - Screen through parties fishing for non-reef fish species
- Intercept data also used to measure under-coverage for effort survey



*Increased intercepts
from reef fish trips*

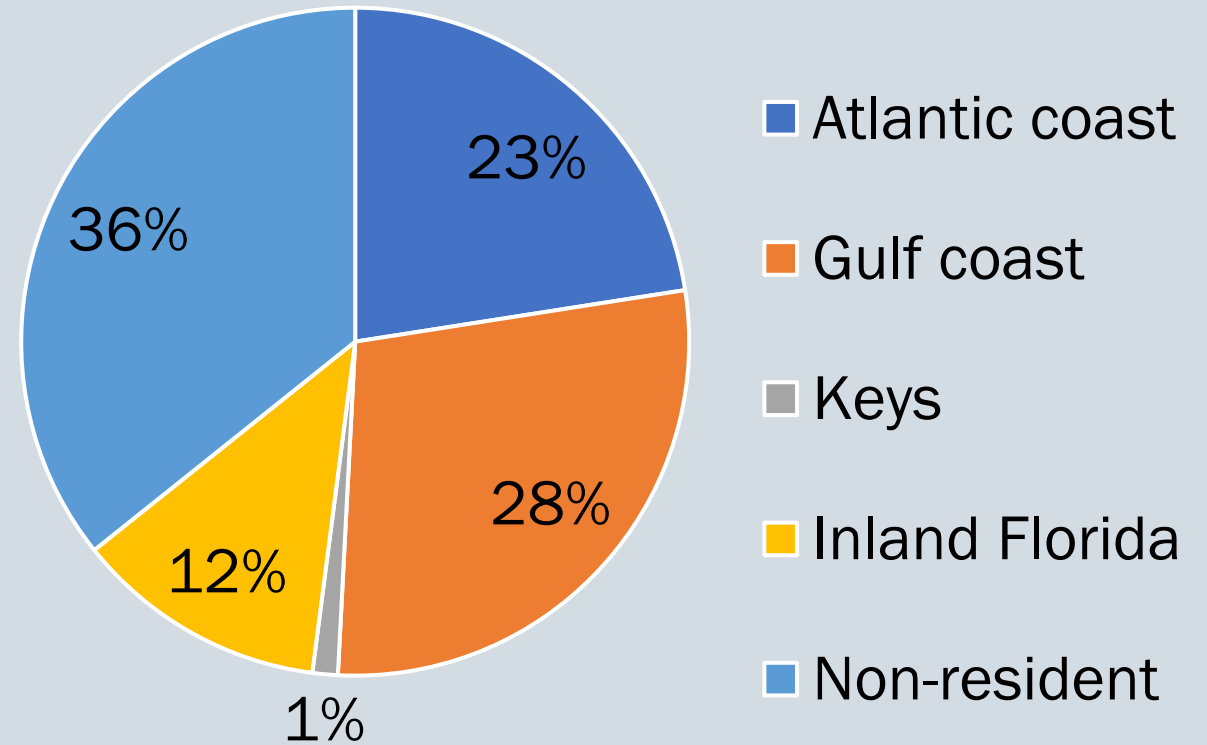


Potential sources of bias in effort estimates – public vs. private access

| Effort component | General MRIP survey | Specialized SRFS |
|--|---|---|
| Under-coverage | <ul style="list-style-type: none"> • Intercept data used to account for additional effort by out-of-state anglers that fish in Florida. • Unlicensed state residents included in effort survey. | <ul style="list-style-type: none"> • Out-of-state anglers included in effort survey. • Intercept data used to account for additional effort by private boat anglers fishing without State Reef Fish Angler designation. <ul style="list-style-type: none"> • Boats subject to enforcement checks on the water and dockside • Compliance unlikely to differ between public and private access sites |
| Region fished (Gulf vs. Atlantic) | Intercept data used to allocate total effort among the Atlantic and Gulf coasts in Florida | Estimated directly from effort survey |
| Area fished (state vs. EEZ) | Intercept data used to allocate total effort among EEZ and state waters | Estimated directly from effort survey |
| Reef fish trips | Intercept data used to allocate total effort among all trips for SW finfish | Estimated directly from effort survey |

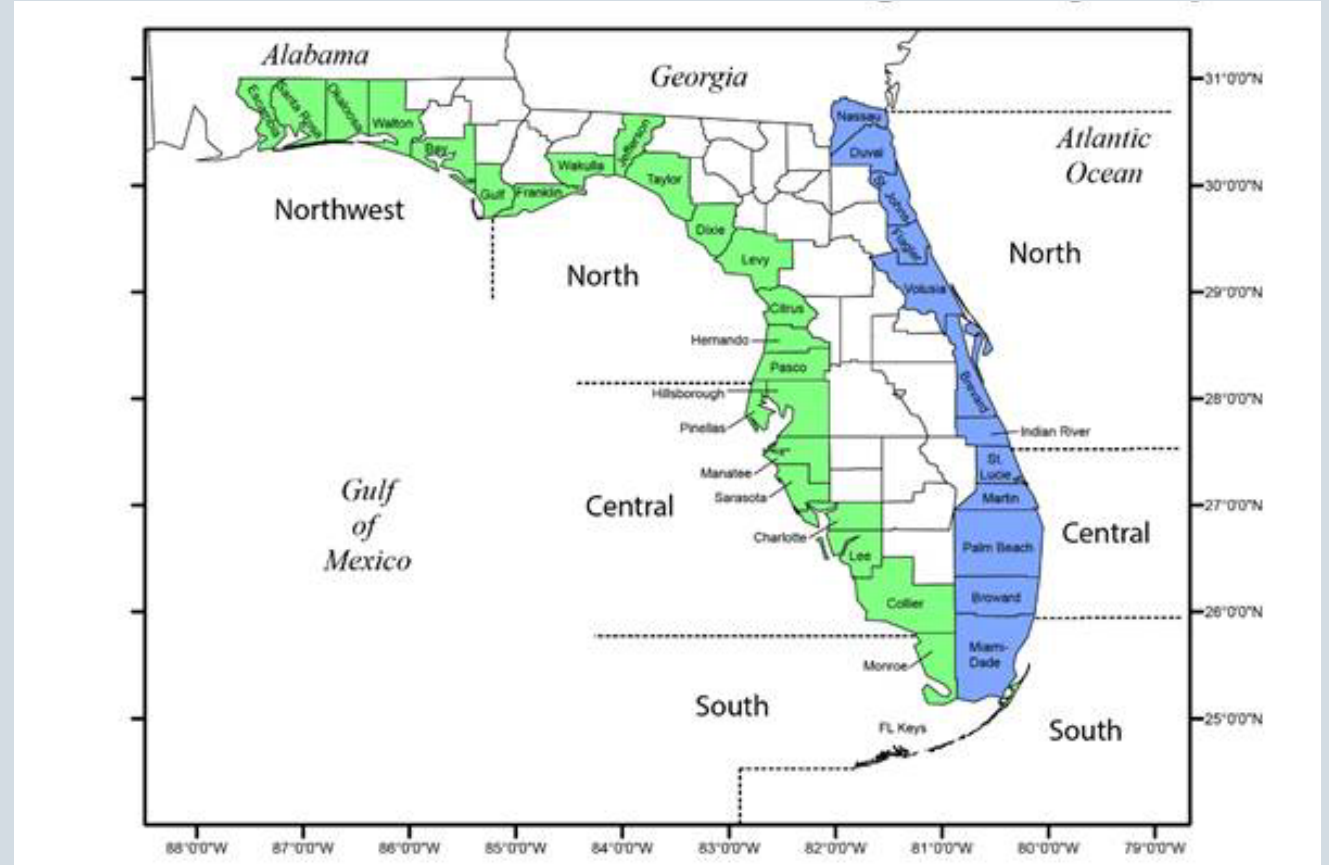
State Reef Fish Angler Designations

- Average 630,000/month
- 36% out-of-state residents
 - 8% live in AL or GA
 - 28% live in other states
- 64% Florida residents
 - 18% of state residents live in household with a registered recreational boat



Effort Survey

- Mail survey stratification
 - Non-residents
 - Georgia/Alabama
 - All other states
 - Florida residents
 - Northwest, North, Central, South Florida
 - Gulf, Atlantic, inland counties
 - Whether address matches a state boat registration

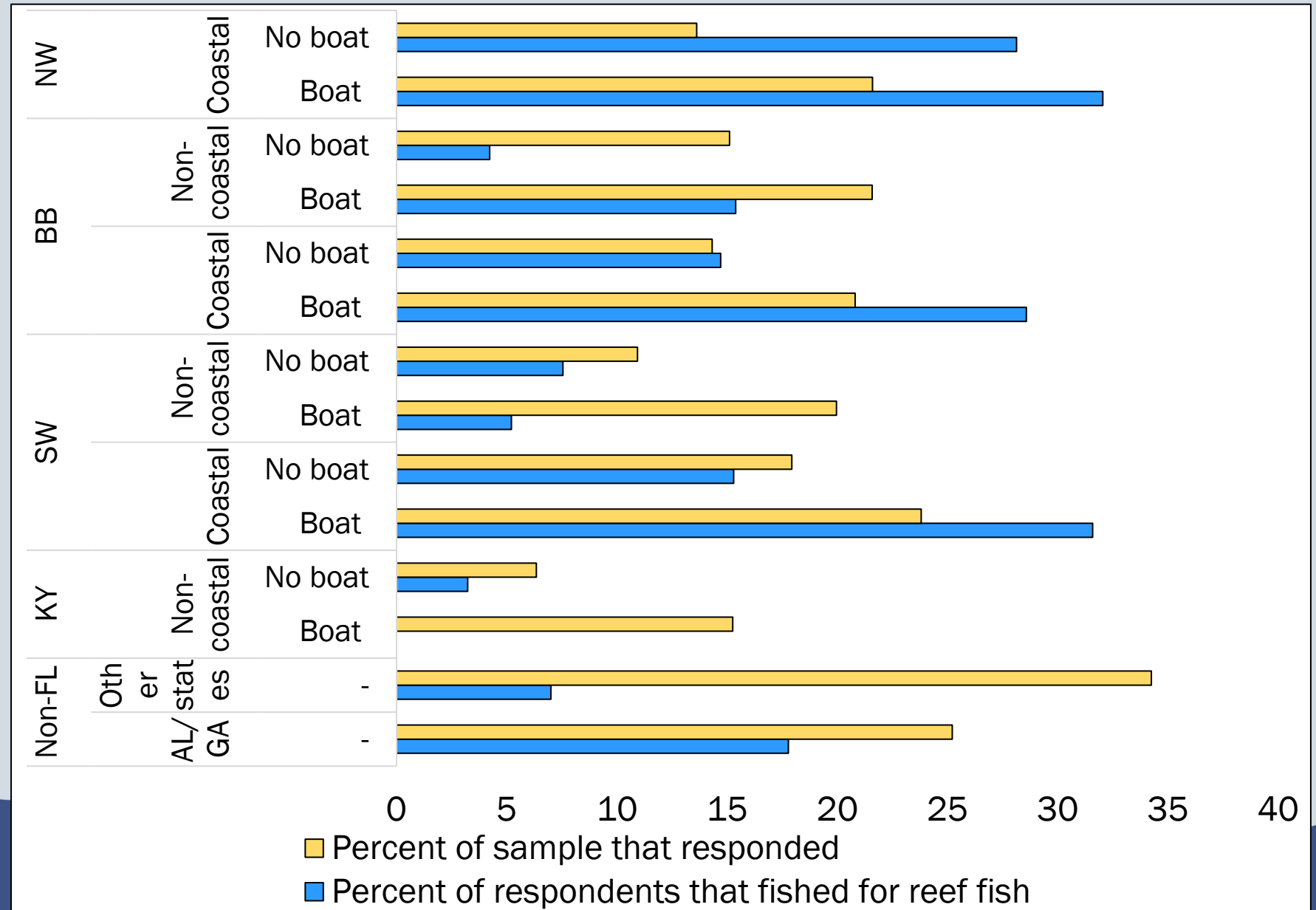


Accounts for varied response rates and avidities among different types of anglers



Results from Pilot Testing in Gulf

Stratification helps account for potential non-response bias



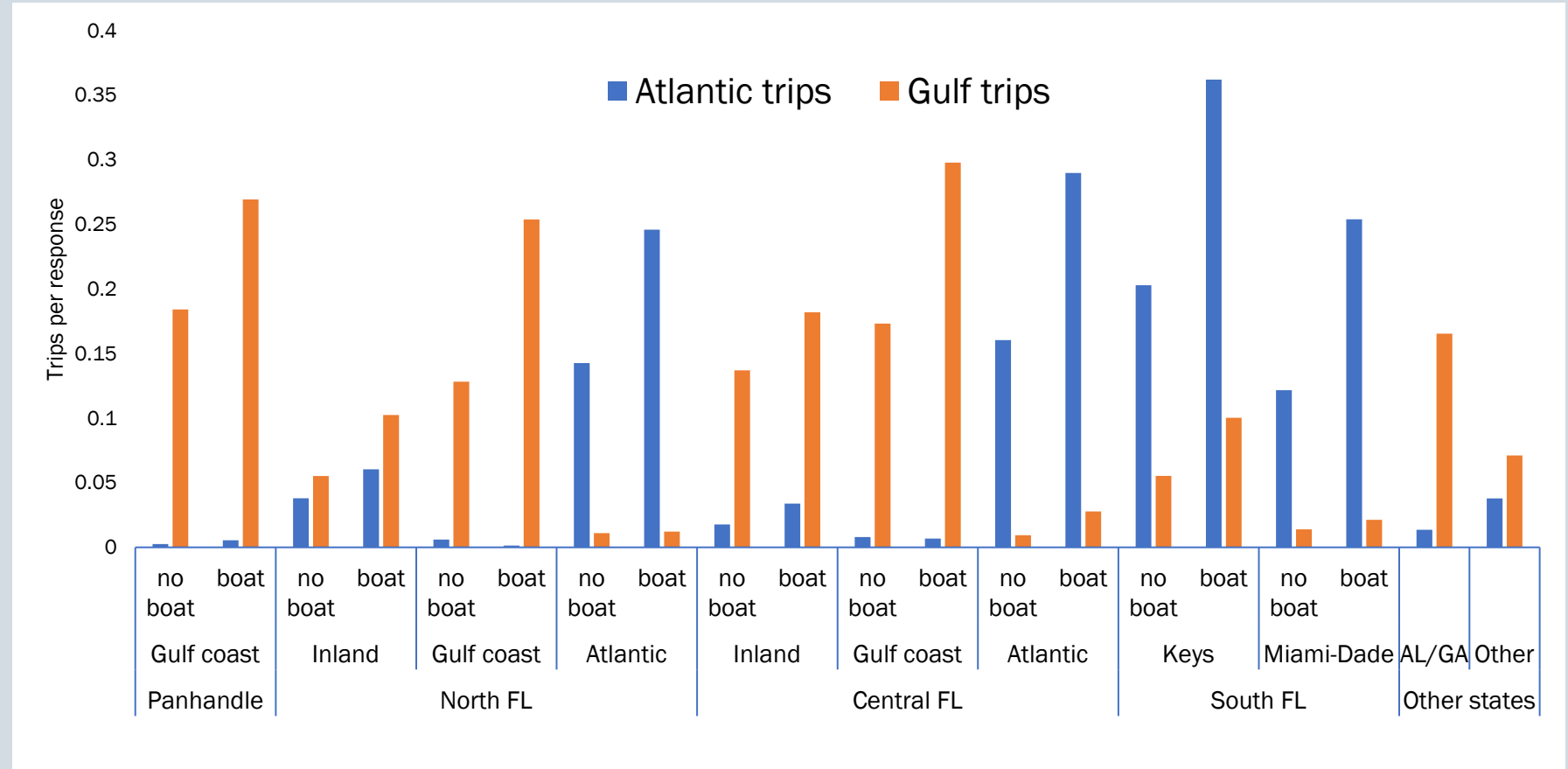
Mean reef fish trips per response (GRFS species)

More likely to fish in Atlantic:

- People that live on Atlantic coast and Keys

More likely to fish in the Gulf:

- People that live on Gulf coast
- People who travel from inland and out-of-state



Sample Size and Response Rates

| | General MRIP mail survey | Specialized SRFS mail survey |
|------------------------|---|---|
| Sample universe | >8 million residential households in Florida, average 2.5 persons per household. | <1 million individual registered state reef fish anglers |
| Sample size | 934 to 1,240 selected per wave 30% response rate = <400 per wave MRIP FES Statement of Work 2018-2022. Optional additional sample up to 30% may be requested. | 7,000 selected per month 20% response rate = 1,400 per month |

Larger, stratified sample allows for more granular effort estimates



Effort Questionnaire

Reduced recall period and potential recall error

Respondents asked to recall whether they fished from a private boat in FL over past month.

Use calendar for most recent month to mark each day they recall taking a trip.



Florida Saltwater Recreational Fishing Survey

SRFS
STATE REEF FISH SURVEY

This survey should be completed by **FIRST NAME LASTNAME** only.
Return this form even if you did not participate in saltwater recreational fishing.

For the purpose of this questionnaire:

- A **private boat** is defined as any boat that did not have a state or federal license to conduct professional for-hire recreational fishing trips. Do not report any trips taken from a licensed charter or large party boat.
- Please report only those trips where the boat launched from Florida and recreational fishing occurred in saltwater, even if no fish were caught.
- Use only a black ink pen to "X" the response boxes. Please **do not** use blue ink.
- Please report trips only for the month specified.

Q1. During the month of NOVEMBER, did you personally participate in a recreational fishing trip on a private boat that launched from Florida? (Check the box that corresponds to your answer)

☐ NO, I DID NOT FISH → THANK YOU - That is all the information we need. Please return the questionnaire in the enclosed postage-paid envelope.

☐ YES, I FISHED (Continue to Q2.)

☐ NOT SURE, DO NOT RECALL

Q2. On the NOVEMBER calendar below, please "X" the box for each date that you personally participated in a recreational fishing trip on a private boat that launched from Florida.

| NOVEMBER | | | | | | |
|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| Sun | Mon | Tues | Wed | Thurs | Fri | Sat |
| 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> | 5 <input type="checkbox"/> | 6 <input type="checkbox"/> | 7 <input type="checkbox"/> |
| 8 <input type="checkbox"/> | 9 <input type="checkbox"/> | 10 <input type="checkbox"/> | 11 <input type="checkbox"/> | 12 <input type="checkbox"/> | 13 <input type="checkbox"/> | 14 <input type="checkbox"/> |
| 15 <input type="checkbox"/> | 16 <input type="checkbox"/> | 17 <input type="checkbox"/> | 18 <input type="checkbox"/> | 19 <input type="checkbox"/> | 20 <input type="checkbox"/> | 21 <input type="checkbox"/> |
| 22 <input type="checkbox"/> | 23 <input type="checkbox"/> | 24 <input type="checkbox"/> | 25 <input type="checkbox"/> | 26 <input type="checkbox"/> | 27 <input type="checkbox"/> | 28 <input type="checkbox"/> |
| 29 <input type="checkbox"/> | 30 <input type="checkbox"/> | | | | | |

Q3. When you went recreational fishing in NOVEMBER, which of the following locations did the boat (or boats) that you fished on launch from:

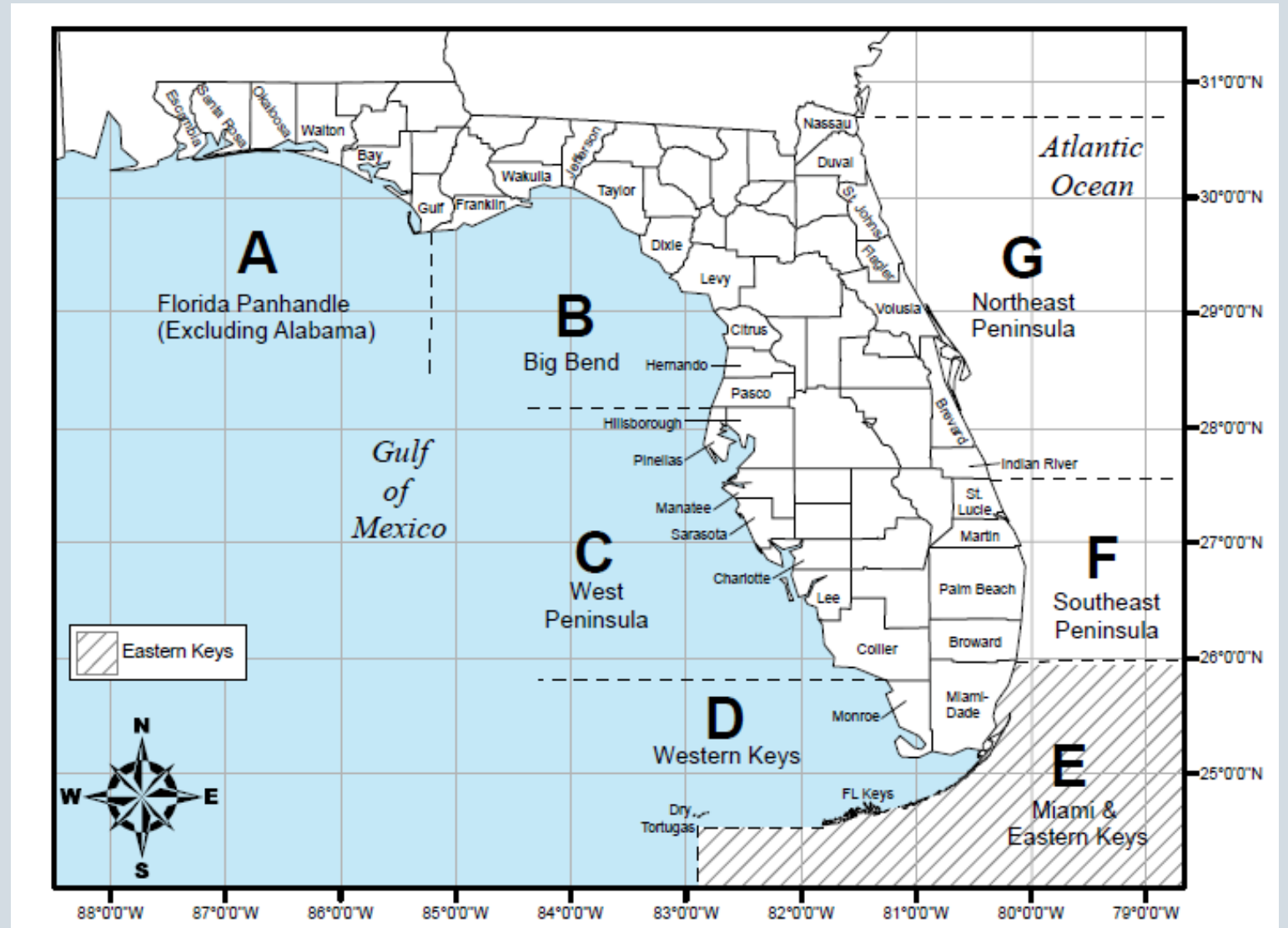
SELECT ALL THAT APPLY:

1 a residential boat slip (waterfront home, vacation rental, condominium or apartment complex)? ☐

2 other facilities for launching boats (public boat ramp, municipal marina, dry storage)? ☐

Please turn the page and tell us about your trips.

*Fishing area map
provided with
questionnaire*



Trip Level Reporting

Trip date

Region fished in
Gulf or Atlantic

% time, if any,
fished in EEZ

Species caught
or targeted

| | | | |
|--|--|--|---|
| <p>TRIP 1</p> <p>Please write in the day the boat departed:</p> <p>05 / DD / 2021</p> <p>Did you fish on an artificial reef during this trip?</p> <p>Yes <input type="checkbox"/> No <input type="checkbox"/> Not Sure <input type="checkbox"/></p> | <p>Select ONE region the boat spent the majority of time fishing: <i>See enclosed map</i></p> <p>Gulf of Mex. <input type="checkbox"/> A Florida panhandle <input type="checkbox"/> B Big Bend <input type="checkbox"/> C West Peninsula <input type="checkbox"/> D Western Keys</p> <p>Atlantic O. <input type="checkbox"/> E Miami & Eastern Keys <input type="checkbox"/> F Southeast Peninsula <input type="checkbox"/> G Northeast Peninsula</p> | <p>What percent of your time, if any, was spent fishing offshore in federal waters (select one):</p> <p>Gulf of Mex. more than 10 miles from shore? <input type="checkbox"/> 0% <input type="checkbox"/> 10% <input type="checkbox"/> 20% <input type="checkbox"/> 30% <input type="checkbox"/> 40% <input type="checkbox"/> 50% <input type="checkbox"/> 60% <input type="checkbox"/> 70% <input type="checkbox"/> 80% <input type="checkbox"/> 90% <input type="checkbox"/> 100%</p> <p>Atlantic O. more than 3 miles from shore? <input type="checkbox"/> 0% <input type="checkbox"/> 10% <input type="checkbox"/> 20% <input type="checkbox"/> 30% <input type="checkbox"/> 40% <input type="checkbox"/> 50% <input type="checkbox"/> 60% <input type="checkbox"/> 70% <input type="checkbox"/> 80% <input type="checkbox"/> 90% <input type="checkbox"/> 100%</p> | <p>Did anyone on the boat keep, release, or try to catch any of the following species? <i>See Species Guide</i></p> <p><u>Snappers & Groupers:</u> <input type="checkbox"/> Red snapper <input type="checkbox"/> Vermilion snapper <input type="checkbox"/> Mutton snapper <input type="checkbox"/> Yellowtail snapper <input type="checkbox"/> Gag, black or red grouper <input type="checkbox"/> Other snappers, groupers</p> <p><u>Other reef fish:</u> <input type="checkbox"/> Gray triggerfish <input type="checkbox"/> Hogfish <input type="checkbox"/> Amberjack <input type="checkbox"/> Almaco jack <input type="checkbox"/> Banded rudderfish <input type="checkbox"/> Other jacks</p> <p><u>Inshore species:</u> <input type="checkbox"/> Snook <input type="checkbox"/> Red drum <input type="checkbox"/> Seatrout <input type="checkbox"/> Bay Scallops</p> <p><u>Other species:</u> <input type="checkbox"/> Some other species</p> |
|--|--|--|---|

Artificial reef use

Allows for direct estimation of reef fish effort by region and area fished



Reef fish ID guide included with questionnaire



During each trip, did you either catch or try to catch any of the following species?

Black Grouper
Mycteroperca bonaci

Box-like patches on body



Copper spots on face and body

Red Snapper
Lutjanus campechanus

Does NOT have a yellow eye



Concave caudal fin

Sharply pointed anal fin

Yellowtail Snapper
Ocyurus chrysurus

Prominent yellow stripe runs from eye to tail



Deeply forked tail

Almaco Jack
Seriola rivoliana

Front dorsal and anal fins elongated



A deep and flat-bodied amberjack

Red Grouper
Epinephelus morio

Webbing is even with the tip of the spine, creating a straight line



Irregular light blotches on body

Mutton Snapper
Lutjanus analis

Bright blue line below eye



Small black spot

Offshore adults can be reddish in color (not as red as true Red Snapper)

Gray Triggerfish
Balistes caprisus

Upper rim of eye blue



Caudal fin lobes elongated in adults

Amberjacks (Greater, Lesser)

Lesser Amberjack not pictured here. Lesser Amberjack grow up to 12 inches in length.

Dark band extends from nose to dorsal fin



Soft dorsal base and anal fin are closer in length than in banded rudderfish

Gag Grouper
Mycteroperca microlepis

Webbing between spines is notched



Brownish gray in color with dark, worm-like markings

Vermilion Snapper
Rhomboplites aurorubens

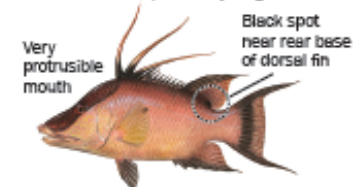
Bullet shaped body



Forked caudal fin

Hogfish
Lachnolaimus maximus

First 3 dorsal spines very long



Very protrusible mouth

Black spot near rear base of dorsal fin

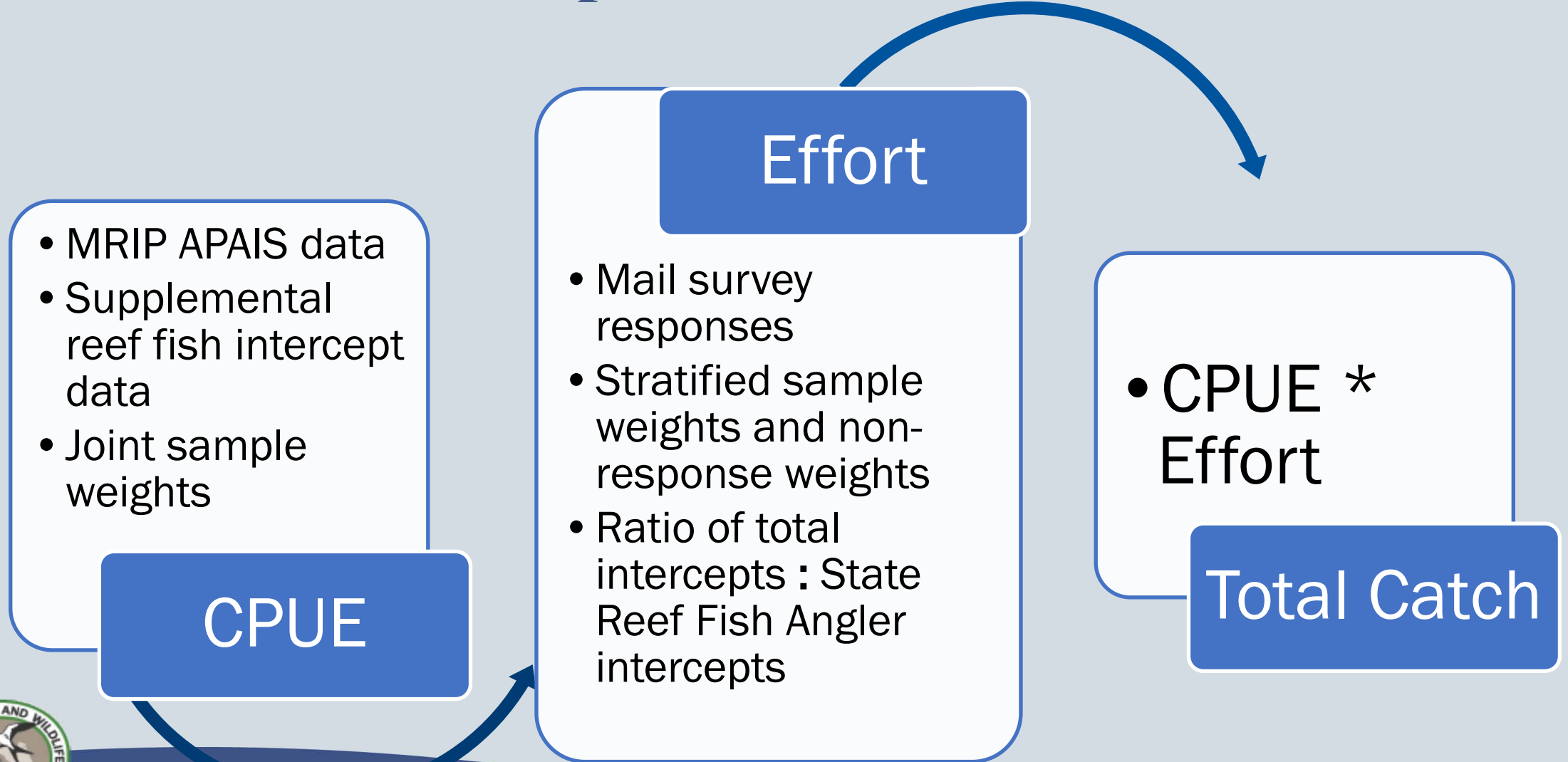
Color varies by sex and age

Banded Rudderfish
Seriola zonata

Tail-lobe often white tipped



Data Inputs for Estimation



Evaluating the Accuracy of SRFS Estimates



Note: Good time to pause for questions on previous slides



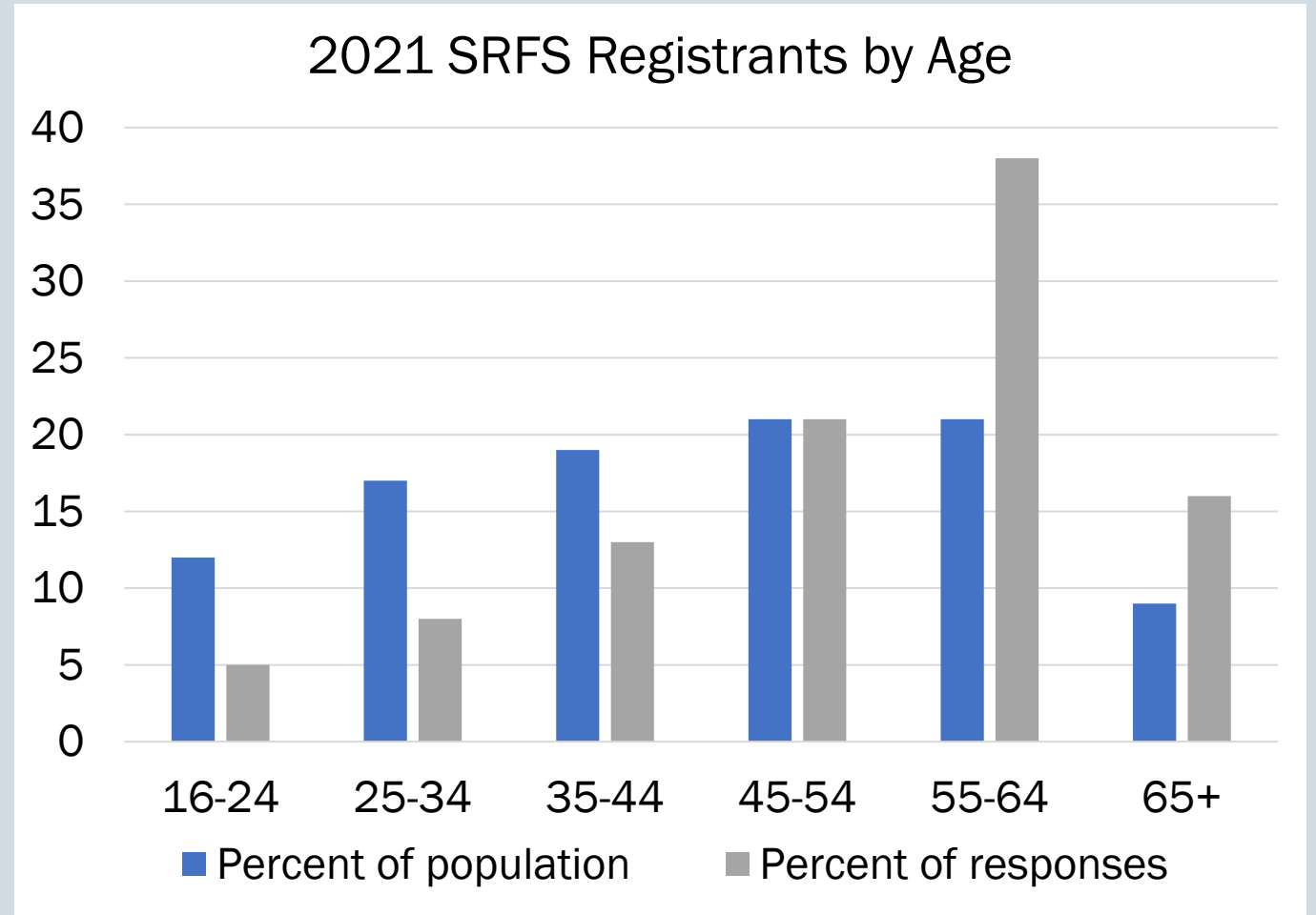
Research Focus

- Research focused on the following:
 - Non-response bias
 - Oversubscription
 - Improving response rates
 - Sample size and stratification
 - Cognitive recall
 - Effort validation



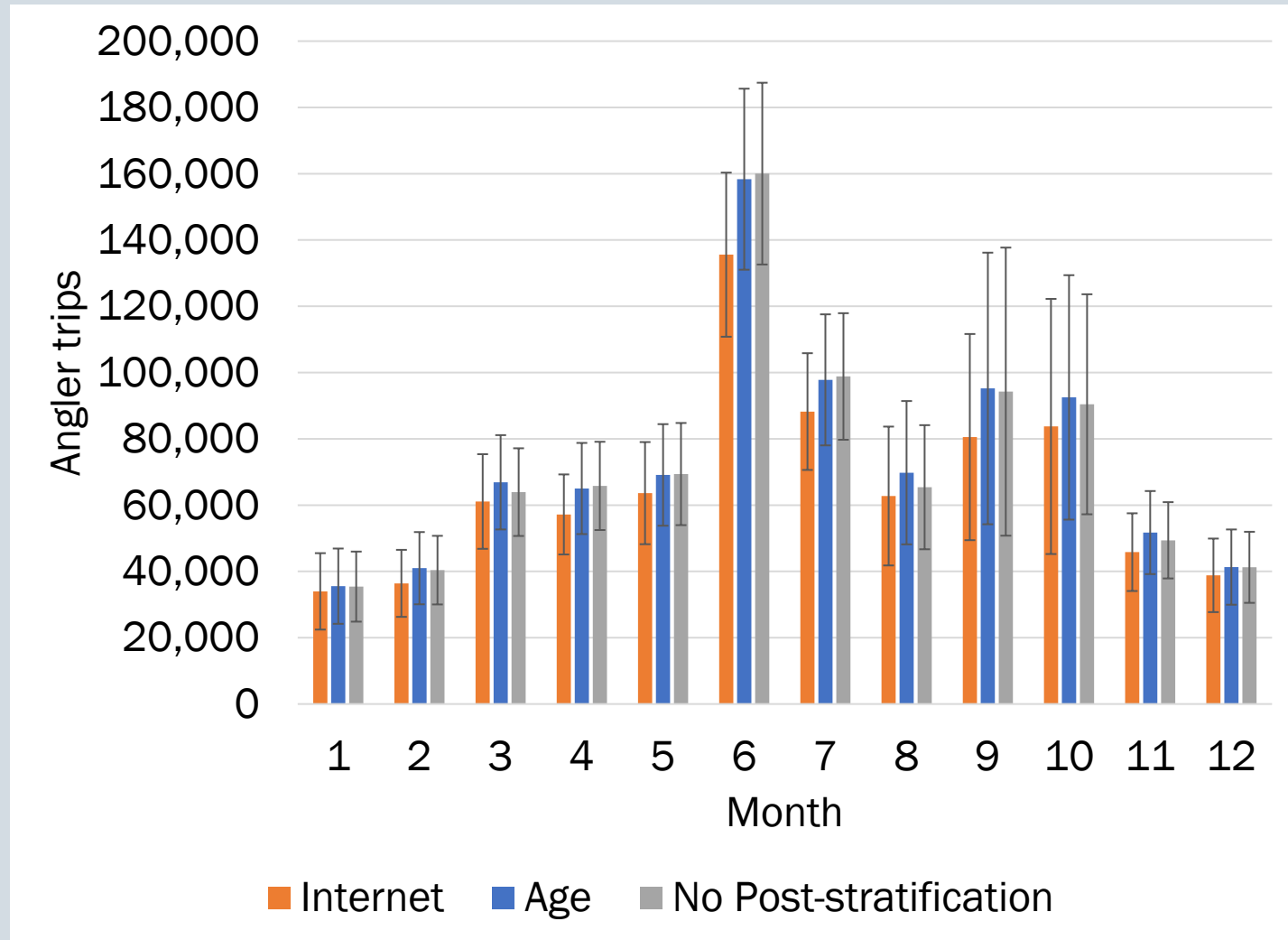
Non-response bias

- Explored demographics of respondents
 - Found lower response rates by younger anglers.
- Helps better focus our efforts to improve overall response rates.
- Explored age as a potential source of non-response bias.



Accounting for Non-Response Bias

- Post-stratification based on age
 - No effect on effort
- Anglers that purchase license online must “self-select” State Reef Fish Angler designation.
 - Post-stratification reduced effort estimates
 - Accounts for non-response bias from potential over-subscribers
 - Less likely to respond
 - Less likely to fish



Improving Response Rate and Adapting to a Moving Target

- Response rates and how to maintain them
 - One of the biggest challenges for list-based surveys
 - 20% considered acceptable
 - $\geq 30\%$ desirable
- Technology effects how people receive and respond to surveys
 - Caller ID, cell phones, internet, smart phones
- Administrators of long-term surveys have to adapt to a moving target
 - Not everyone adapts to technology the same...



Improving Response Rates for SRFS Mail Survey

Conducted series of side-by side tests using different methods to contact selected survey participants and receive their responses:

- Original (OG) – Mail Packet -> Mail Reminder -> Mail Packet
- Mixed Mode (MM) – Mail Invite (QR) -> Invite Reminder (QR) -> Mail Packet
- 2 Packet (2packet) – Mail Packet (QR) -> Mail Reminder (QR) - > Mail Packet (QR)
- Text (SMS) – Text Message -> Text Reminder -> Text Reminder



Electronic Reporting Option



Florida Saltwater Recreational Fishing Survey

Please log in.

Please enter the unique passcode provided on your survey invitation letter.

This survey should be completed by Chloe Ramsay only.

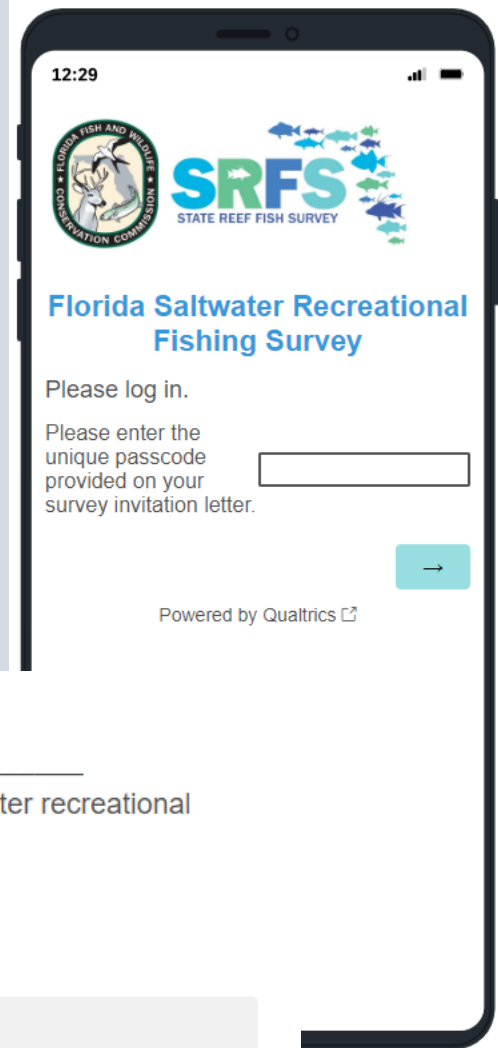
During the month of AUGUST, did you personally participate in a saltwater recreational fishing trip on a private boat that launched from Florida?

- Don't report paid charter or guide trips.
- Do report trips even if no fish were caught.

NO, I DID NOT FISH

YES, I FISHED

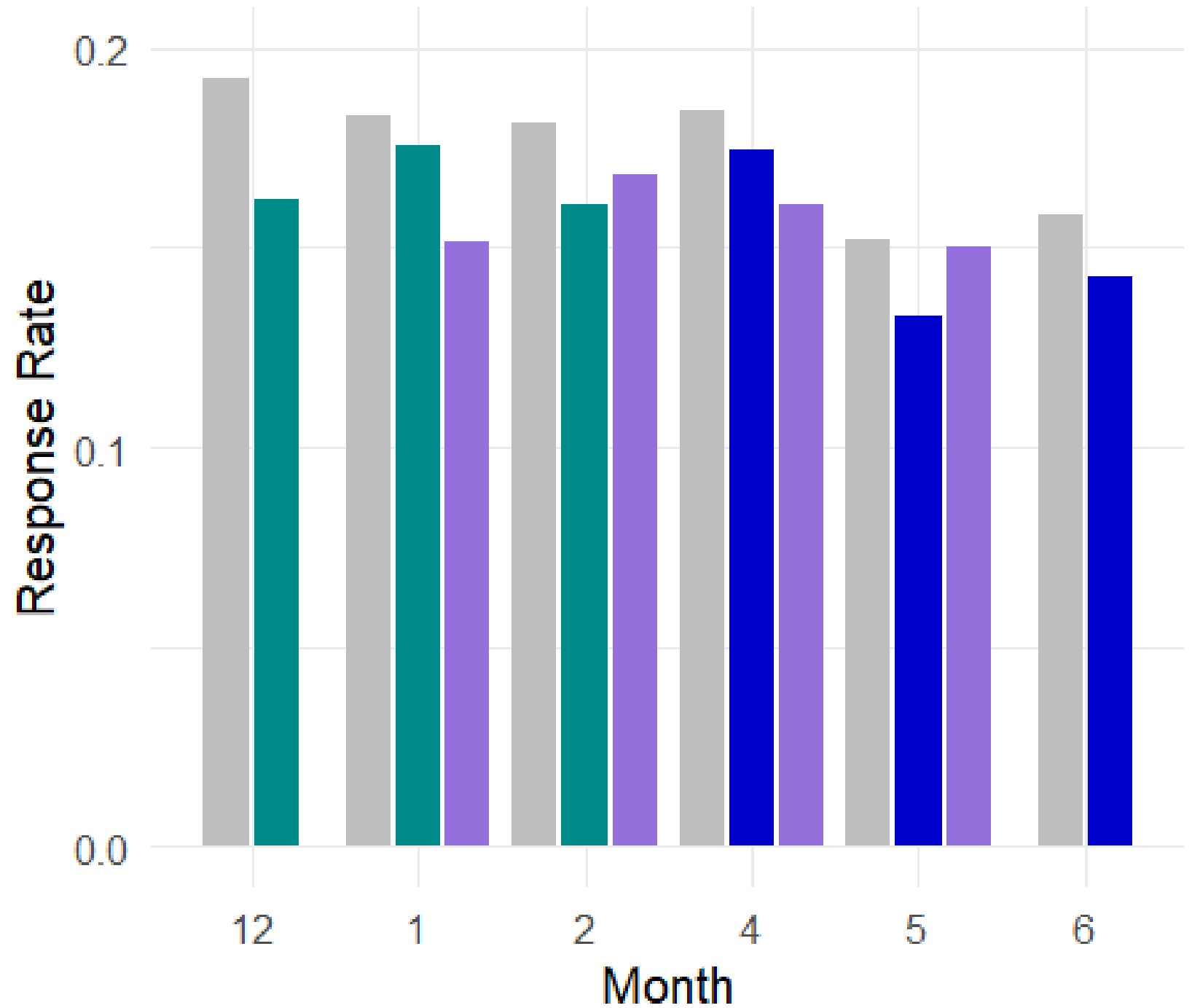
NOT SURE, DO NOT RECALL



Response Rate

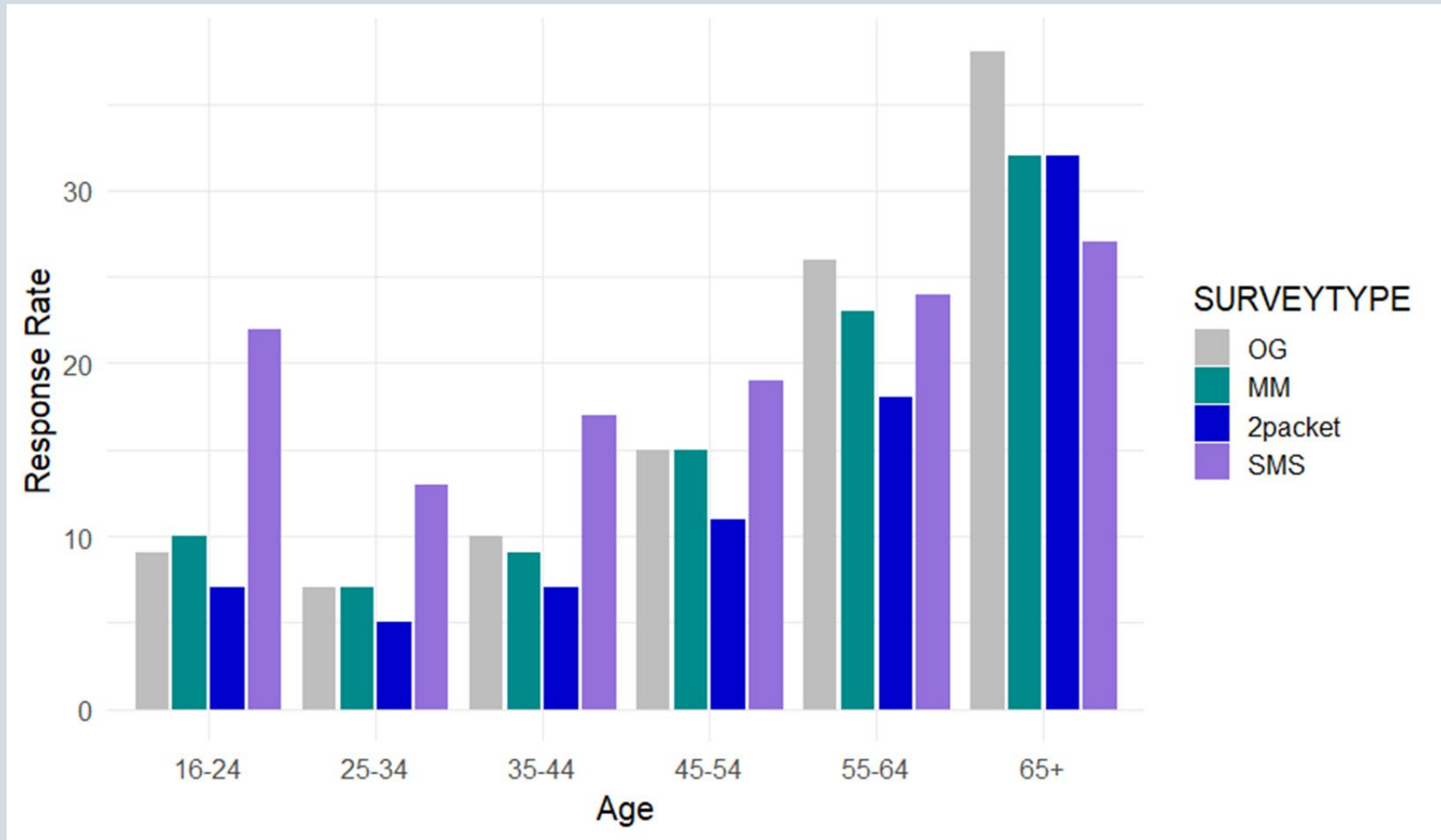
Overall results were disappointing☹

SURVEYTYPE



Silver lining...

Increased response rates by younger age classes contacted via text message (SMS)



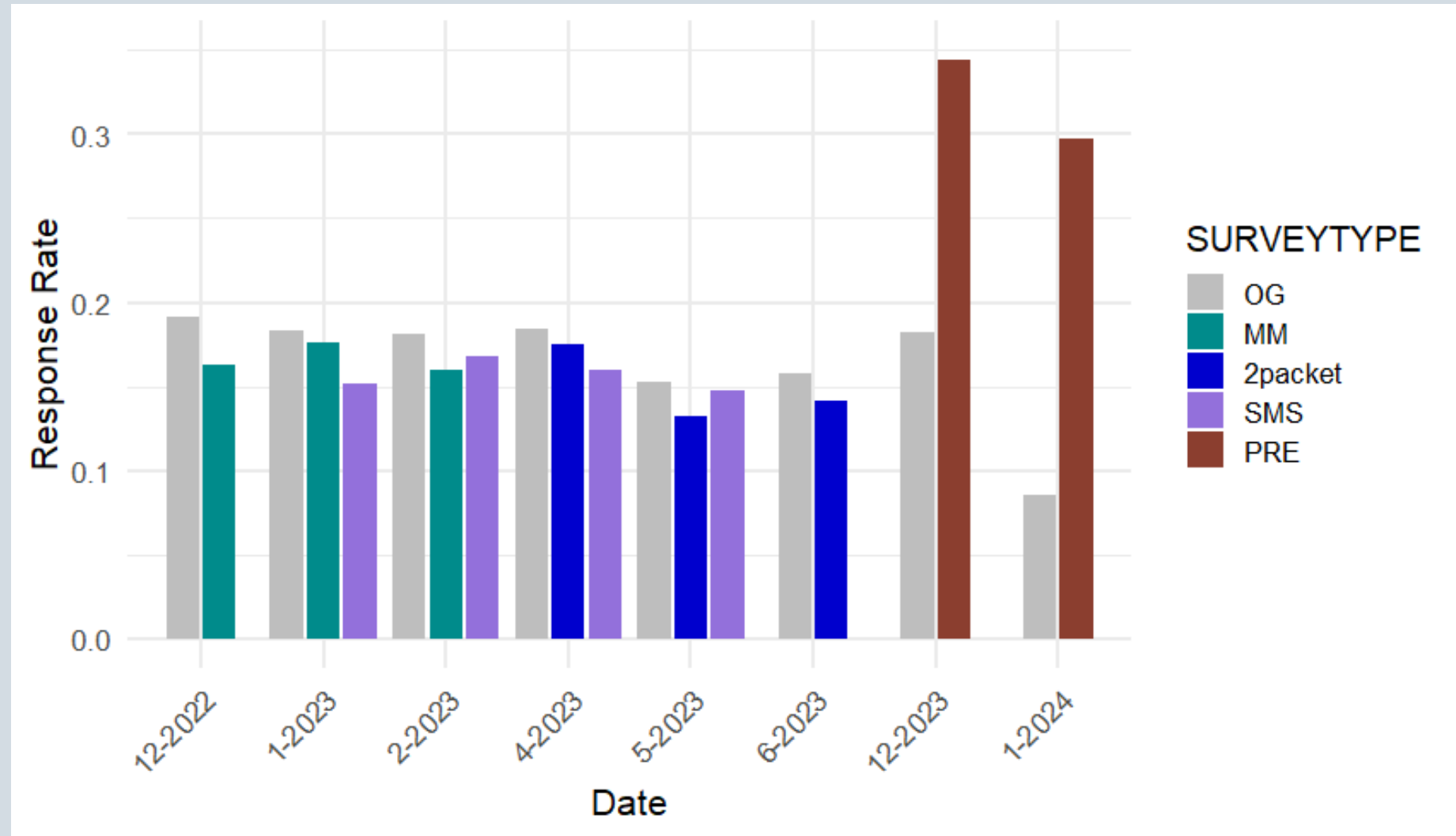
New Test : All Modes

Pre-contact (PRE) = Text & Email Message -> Text & Email
Reminder -> Text & Email Reminder -> Mail Packet (QR) ->
Mail Reminder (QR) -> Mail Packet (QR)



Early results are promising!

Note: 1/2024 responses still coming in.



Effects of questionnaire length, memory cues, recall period

- Peer review recommended testing a shorter questionnaire to improve response rates.
 - MRIP-FES has ~30% response rate
 - Asks for less detail, over 2 month waves
- Questions we sought to answer with side-by-side test:
 - Could a shorter SRFS questionnaire improve response rate?
 - Are the calendar and trip-level reporting serving as memory cues to help with recall?
 - How important is the recall period?
 - How important is it to discern shellfish vs. finfish trips?



Shortened SRFS Questionnaire

- Side-by-side testing of the SRFS and simplified questionnaires
 - Sent to residents in northern Gulf during waves 4 and 5 in 2021
 - Fewer questions
 - No calendar
 - No trip-level reporting

Anglers asked to report total trips over 1 or 2 month period

Q1. How many saltwater recreational fishing trips on a private boat that launched from Florida did you personally participate in during the month of OCTOBER? (Clearly write the number (#) of trips in the box)

Number of saltwater recreational fishing trips taken from a private boat in OCTOBER: ← If the answer is 0, please skip to Q5.

Q2. Of the trips reported in Q1 above, how many were taken in each of the following locations: (see Map on reverse side; Clearly write the number (#) of trips taken in each location in the boxes)

West coast of Florida? East coast of Florida? ← Gulf or Atlantic coast (map included)

Q3. Of the trips reported in Q1 above, how many were targeting or harvesting: (Clearly write the number (#) of trips in the boxes)

Shellfish only (e.g. bay scallops, crabs, lobster, shrimp, etc.)? Finfish only? Both shellfish and finfish? ← Finfish vs. shellfish effort

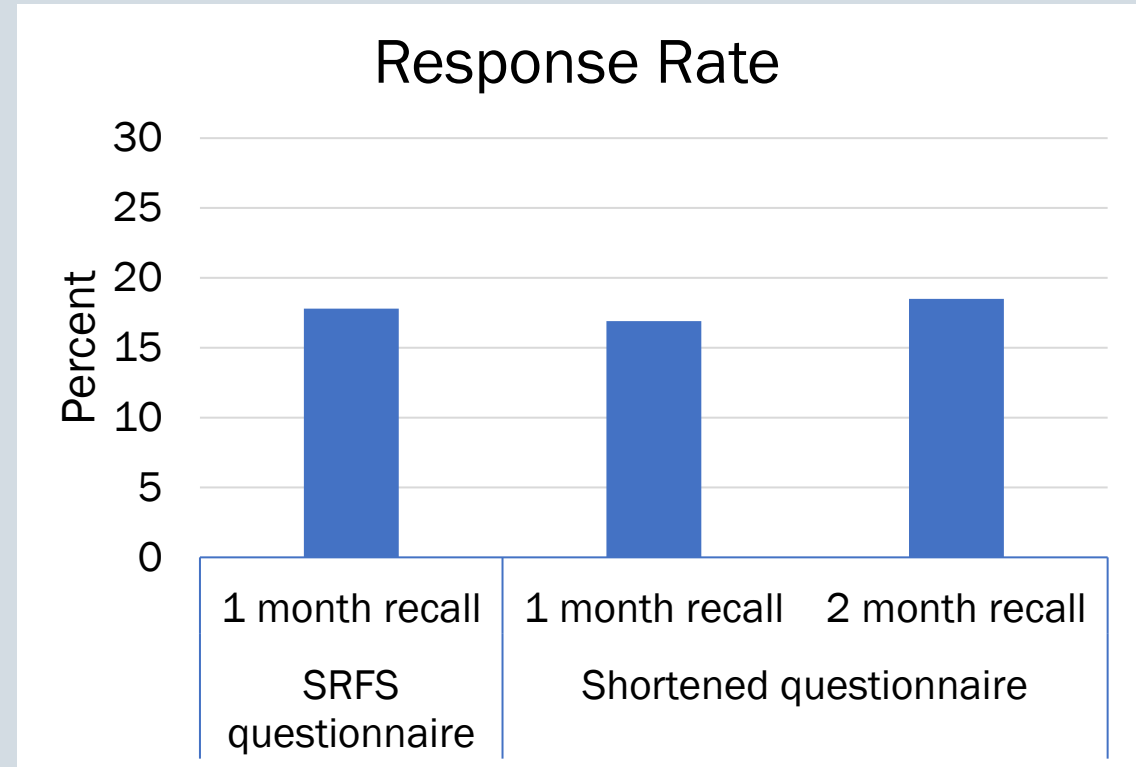
Q4. Of the trips reported in Q1 above, how many were targeting or harvesting: (Clearly write the number (#) of trips in the box)

Reef fish? (see species guide included) ← Any reef fish species (ID guide included)

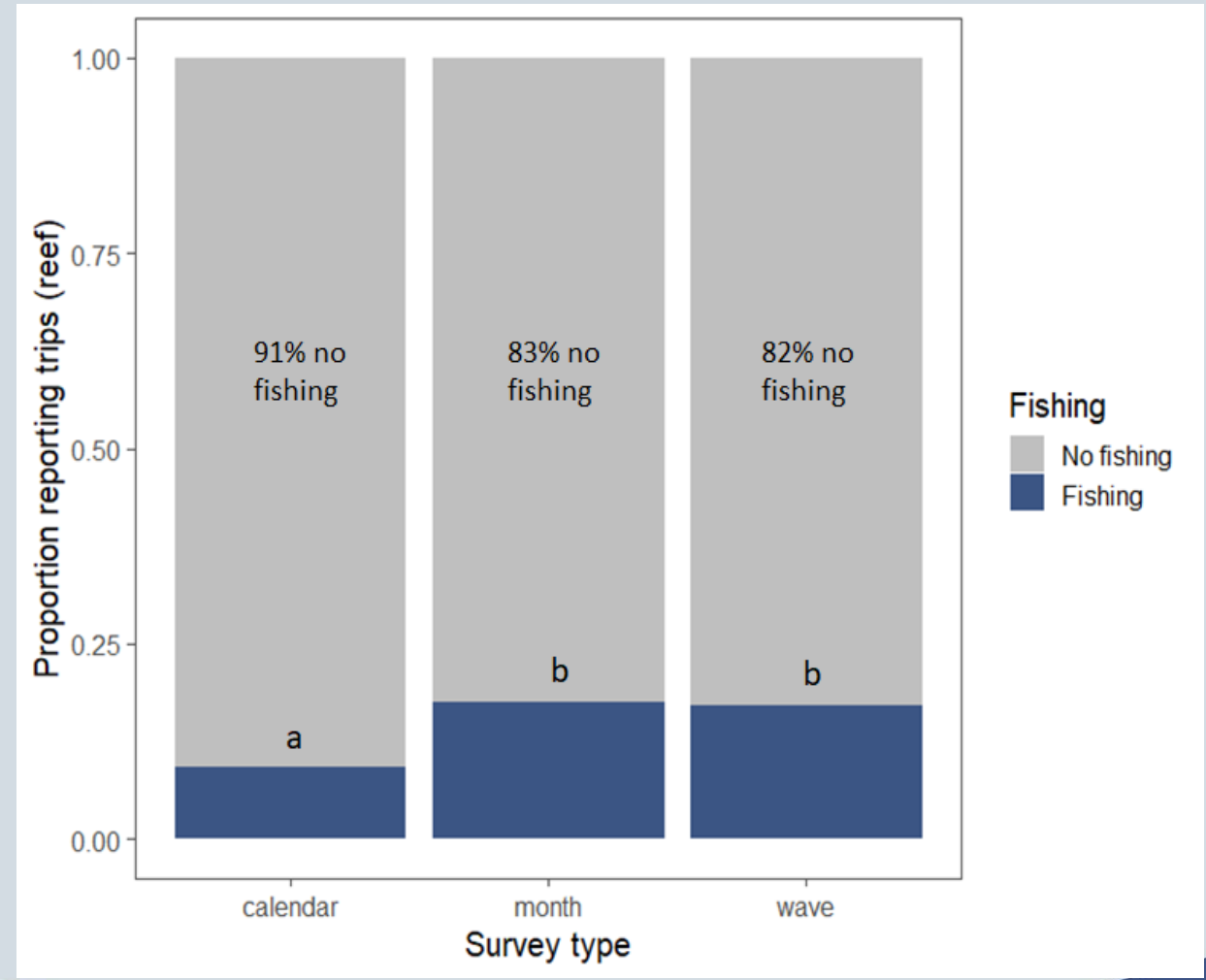
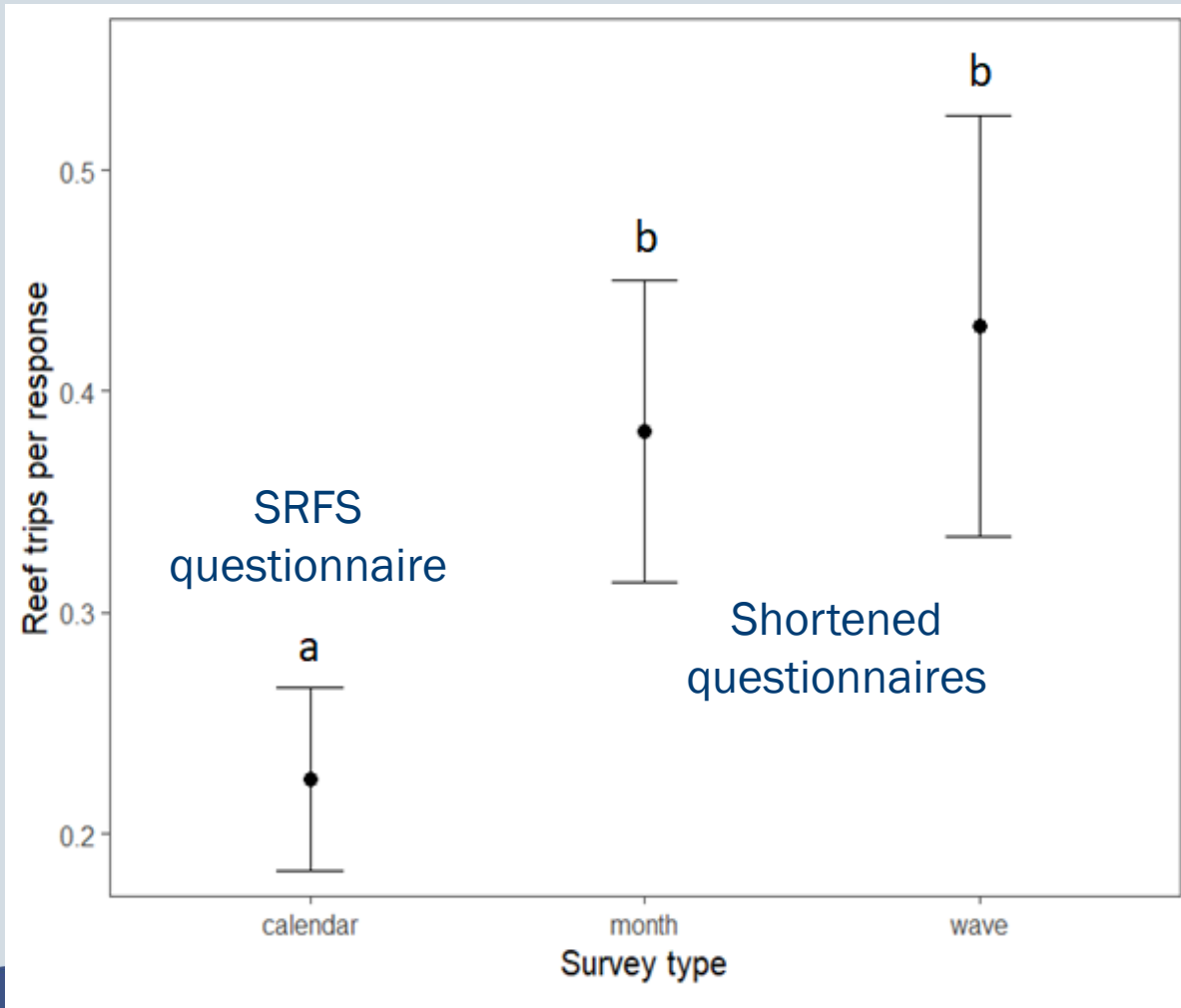


Does Questionnaire Length Impact Response Rates?

- No difference in response rates between the SRFS questionnaire and the shortened questionnaires.



Does asking for less information influence what anglers recall?



Parallel Research

- Recent tests of MRIP FES questionnaire found:
 - No difference between 1 and 2 month questionnaires.
 - Respondents recall trips taken outside the period of interest and include them in their reporting (telescoping error)

Source: NOAA Office of Science and Technology, May 2023



15 How many days did this person go recreational saltwater fishing from the SHORE In Maryland?

The shore includes docks, bridges, causeways, beaches, banks, or any other shore-based place or area. Do not include freshwater fishing.

☐ Did not recreational saltwater fish from shore in last 12 months → Go to question 16

Number of days saltwater shore fishing in January and February of 2018

Number of days saltwater shore fishing in last 12 months, including January and February

16 How many days did this person go recreational saltwater fishing from a private or rental BOAT that returned to shore In Maryland?

Do not include freshwater trips or trips where a paid captain or crew helped locate and catch fish.

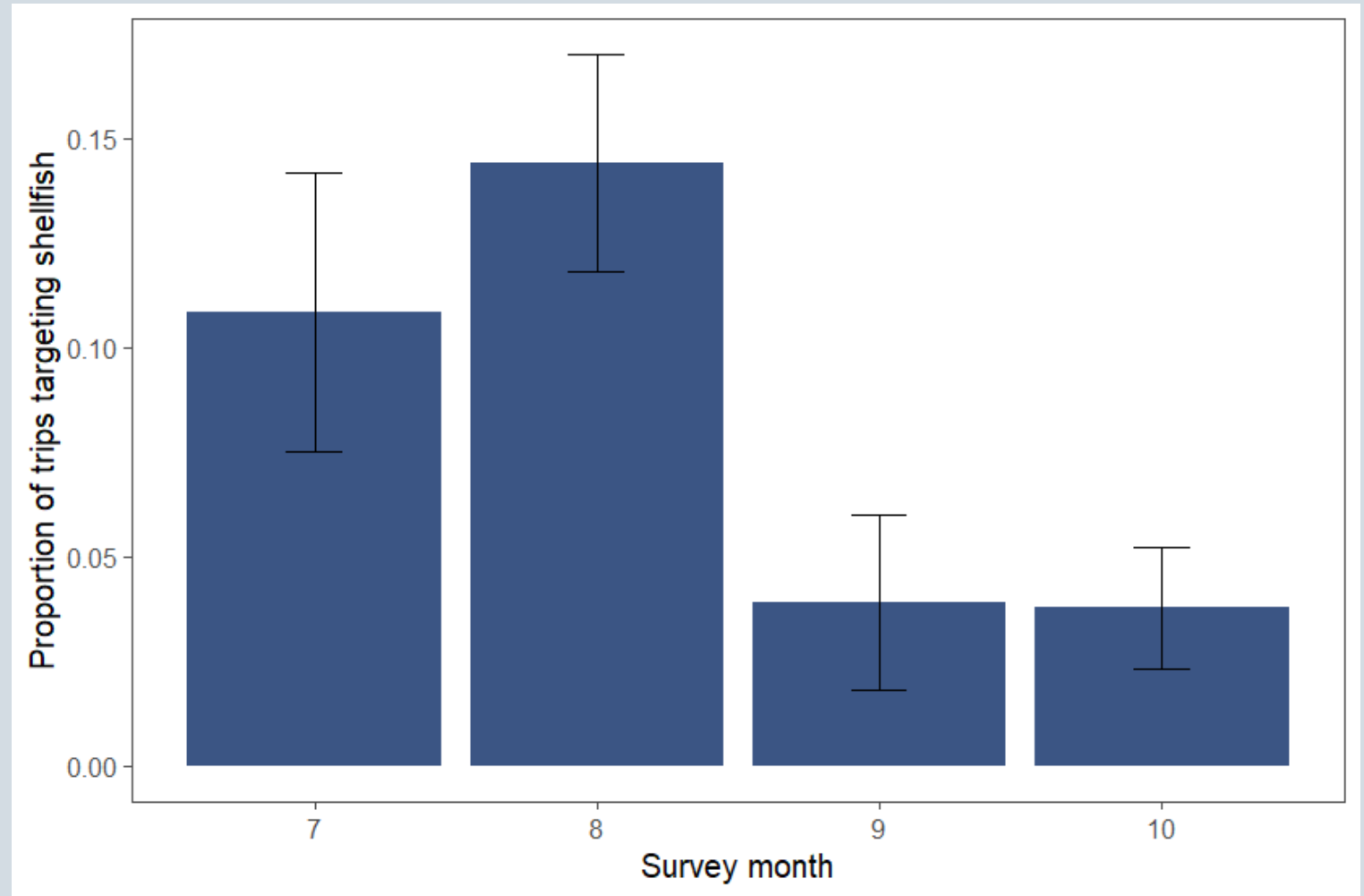
☐ Did not recreational saltwater fish from private boat in last 12 months

Number of days saltwater boat fishing in January and February of 2018

Number of days saltwater boat fishing in last 12 months, including January and February

Is it important to discern between shellfish and finfish trips?

- Up to 15% of trips reported targeted shellfish only.
 - Varied by month
- Study conducted in region where recreational scalloping is popular in summer.
- More testing needed in regions where other shellfish are targeted



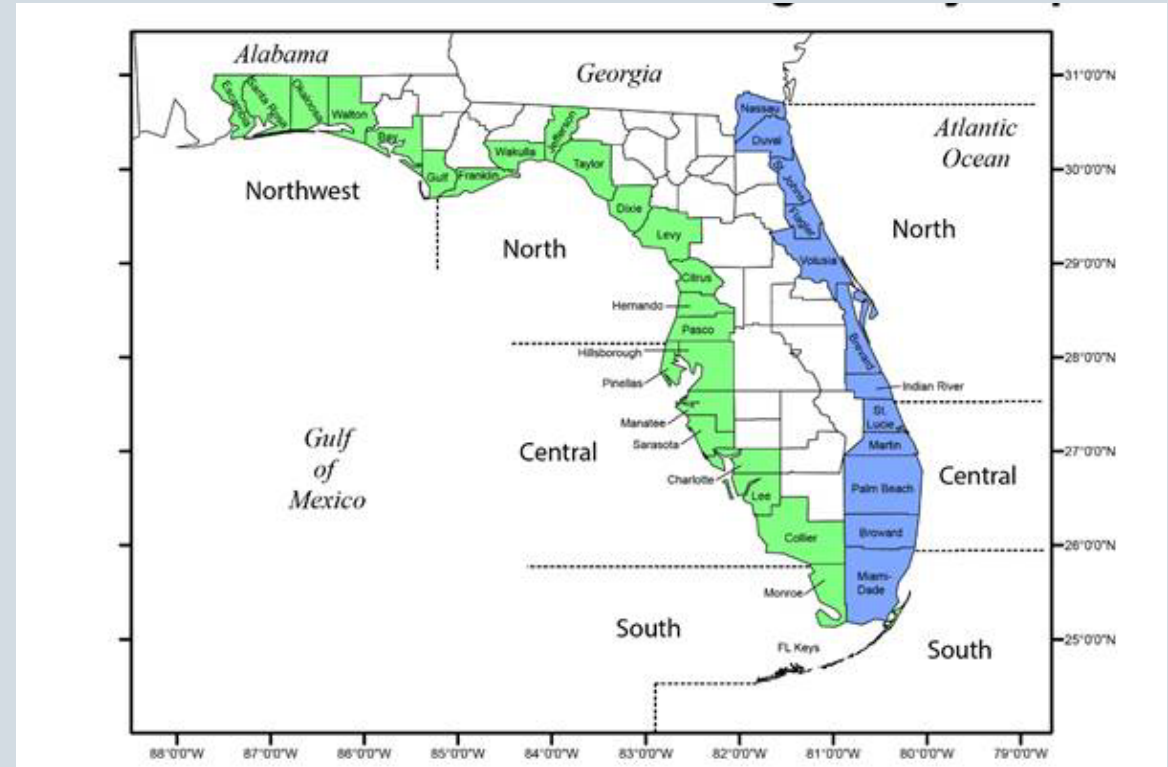
Sample Size and Stratification

- Constructed a fictitious Florida population using:
 - Number of households (American Community Survey)
 - Number of saltwater fishing license households (FWC)
- Assigned fishing effort to households in each county using:
 - MRFSS Coastal Household Telephone Survey data (1991-2011)
- Produced a population with known fishing effort that could be re-sampled and used to produce effort estimates off Gulf coast of Florida
 - Compare estimates to known values



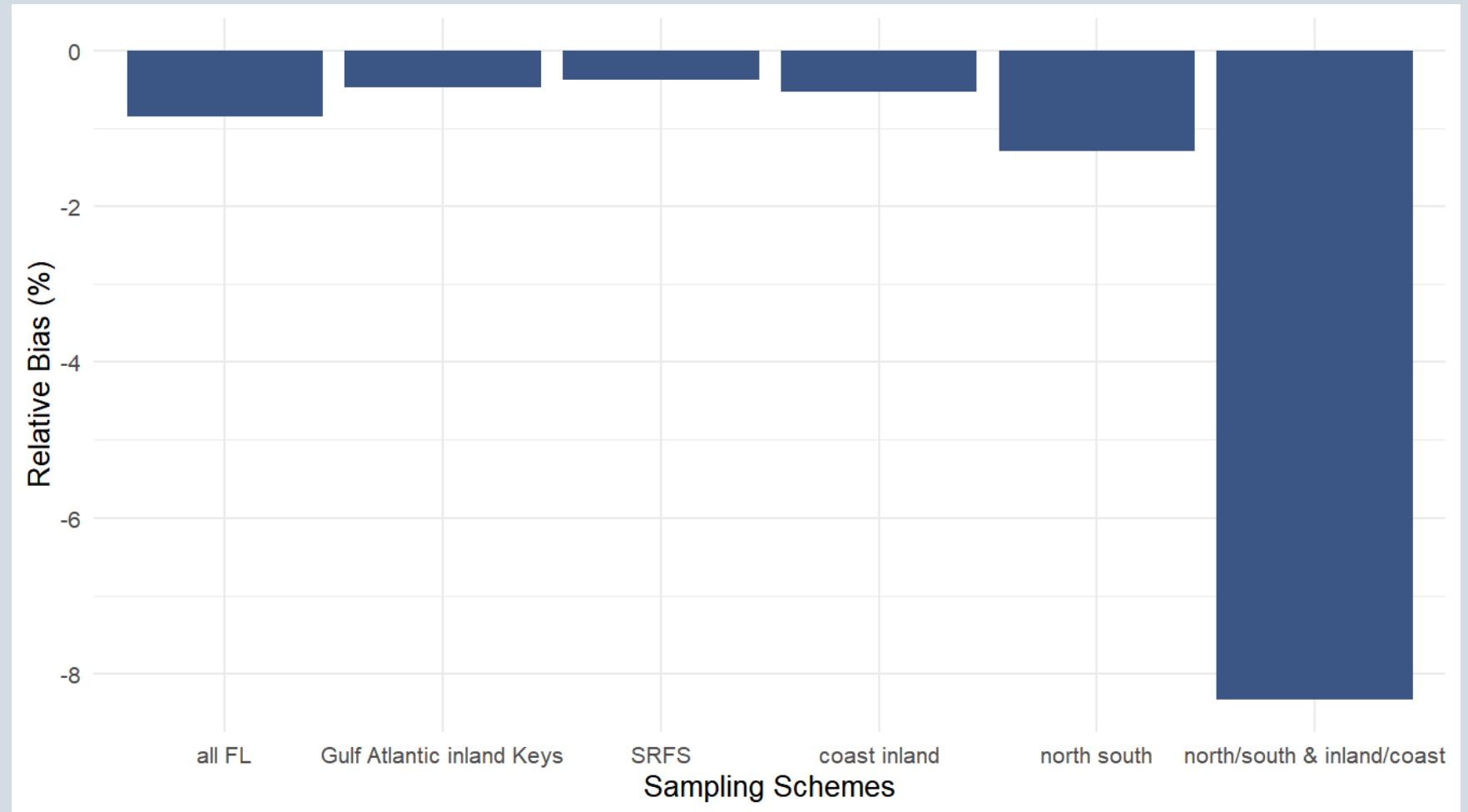
Simulations

- Stratification designs:
 - None: all households in Florida
 - 4 strata: Gulf, Atlantic, inland, Keys
 - 9 strata: SRFS regions
 - 2 strata: coastal, inland
 - 2 strata: north, south
 - 4 strata: north/south & inland/coast
- Sample sizes:
 - 1,000 to 14,000 households per wave



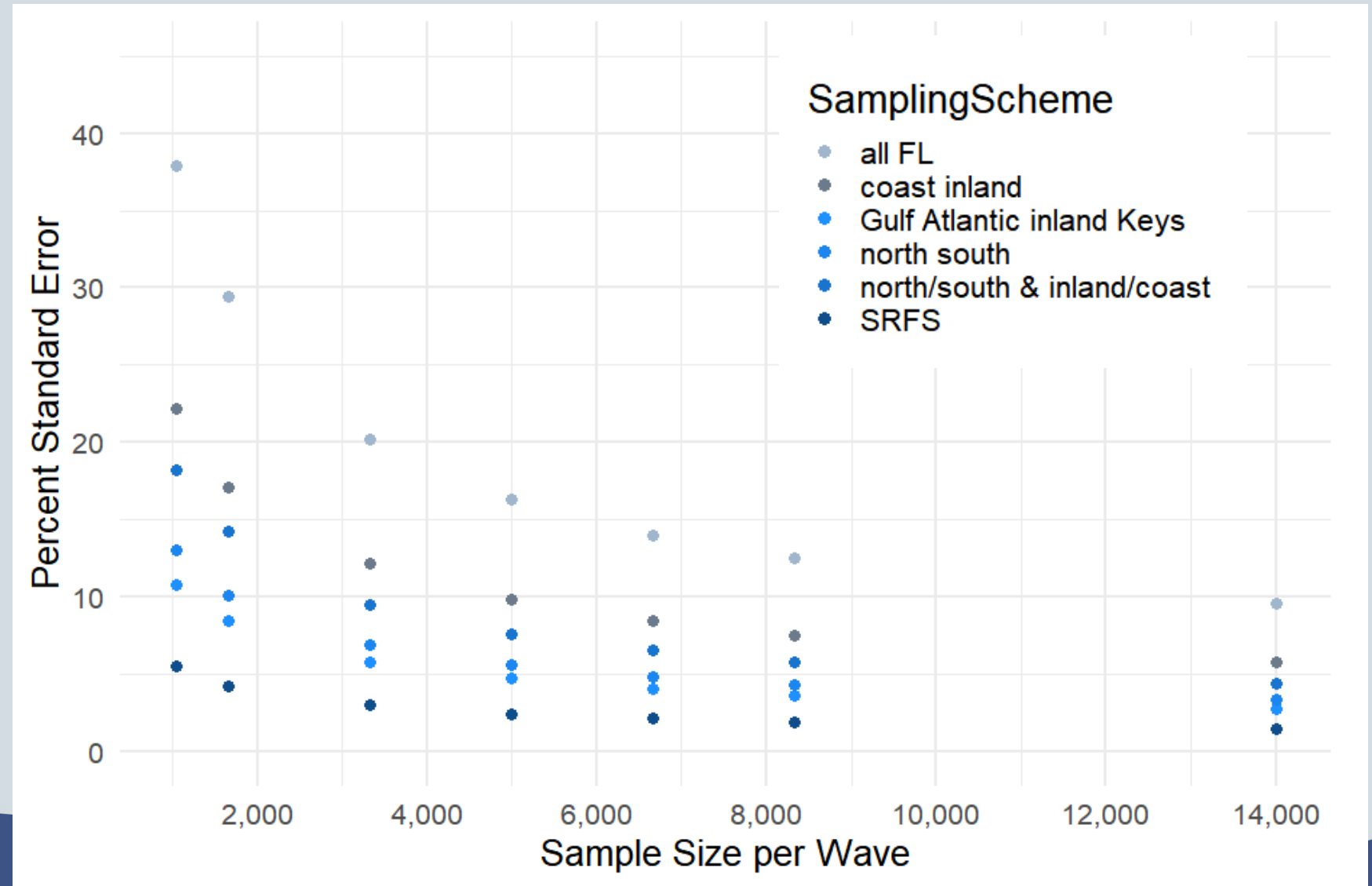
Regional Stratifications

- 0 = no bias
- Negative value = under-estimation
- None of the methods evaluated exhibit a high degree of bias



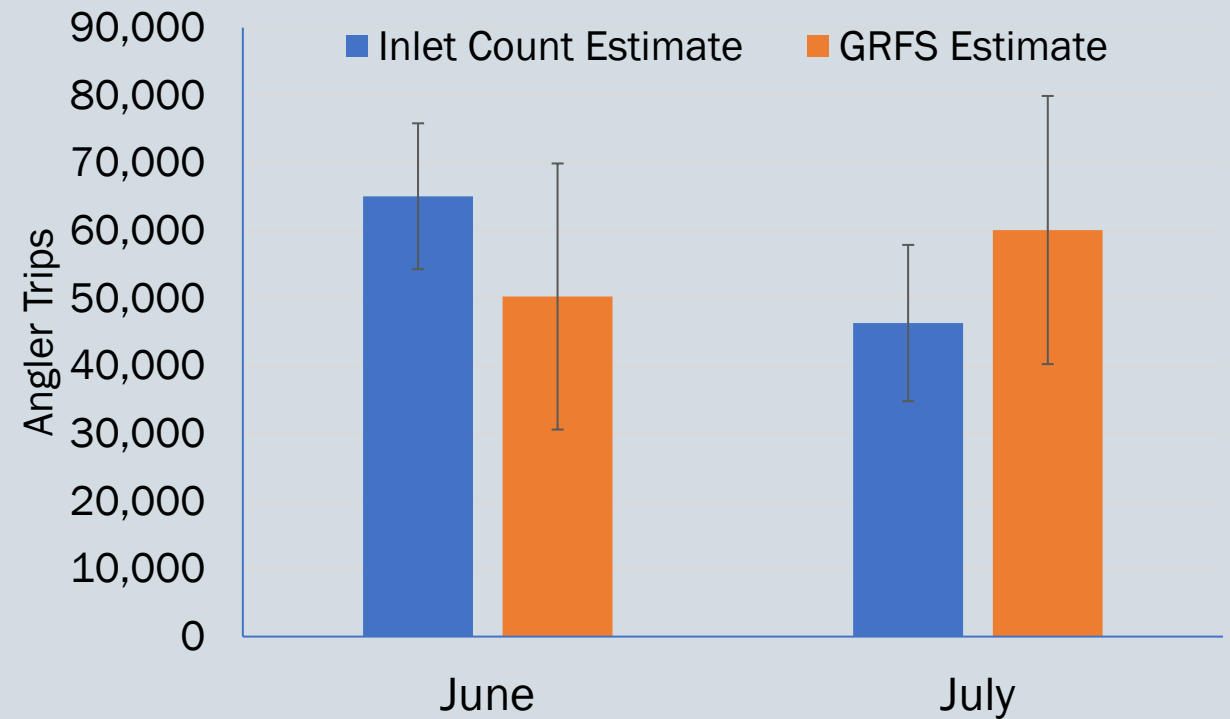
Sample Size and Precision

- Higher stratification
 - Improves precision of effort estimates
 - Reduces sample size needed to achieve good precision



Effort Validation

- Observers counted recreational boats entering Gulf of Mexico
 - Four inlets in panhandle
 - June and July 2019
- Dockside interviews with private boat parties

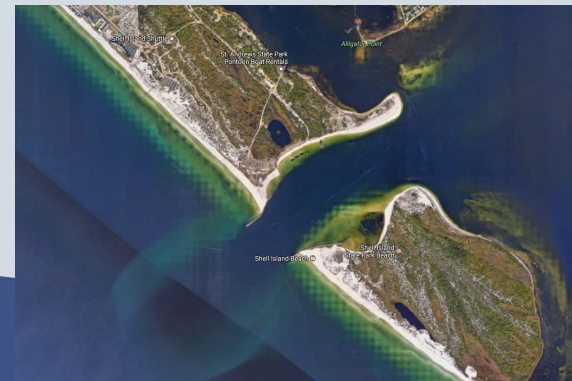
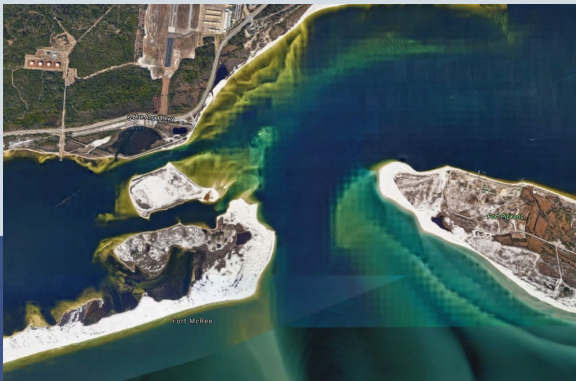


Pensacola Pass

Destin Pass

St. Andrews Pass

Mexico Beach Pass



Video Monitoring of Atlantic Coast Inlets



Ponce Inlet screen shot



Effort Validation - Ongoing work

- Working with CVision AI to automate boat counts
- Logistical issues have caused delays. Still training AI.
 - Long distance counts
 - Night counts
- 2024 plan to supplement study with human observers to validate effort in NE Florida



Results Since Statewide Expansion

Note: Good time to pause for questions on previous slides



Results Since Statewide Expansion

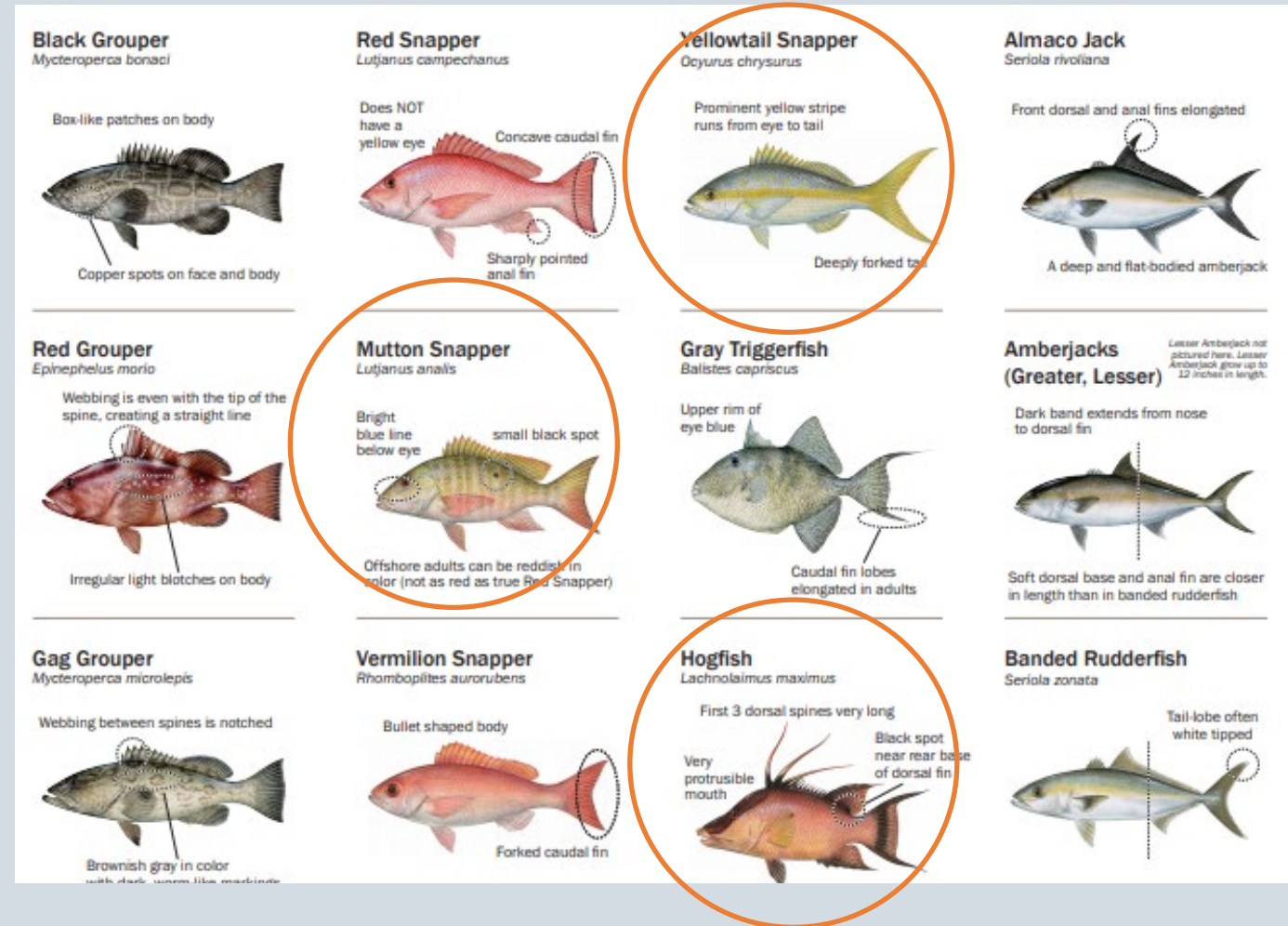
Separate estimates for:

1. Original species:

- Frequently caught together in Gulf and NE Florida
- Maintains continuity in Gulf coast time-series

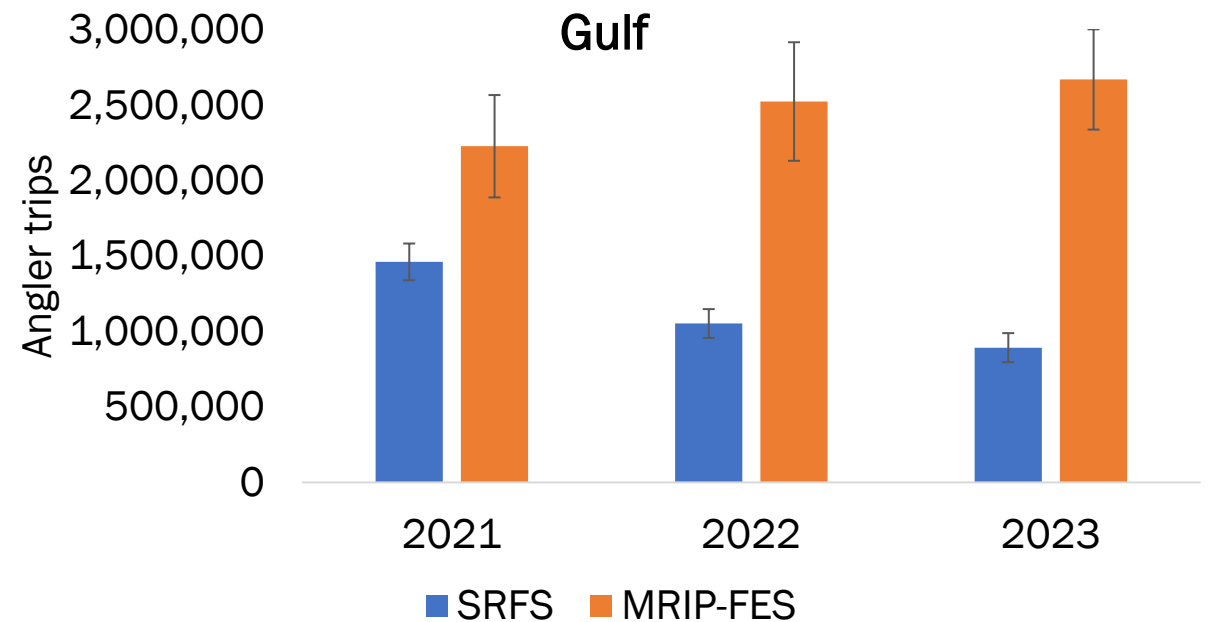
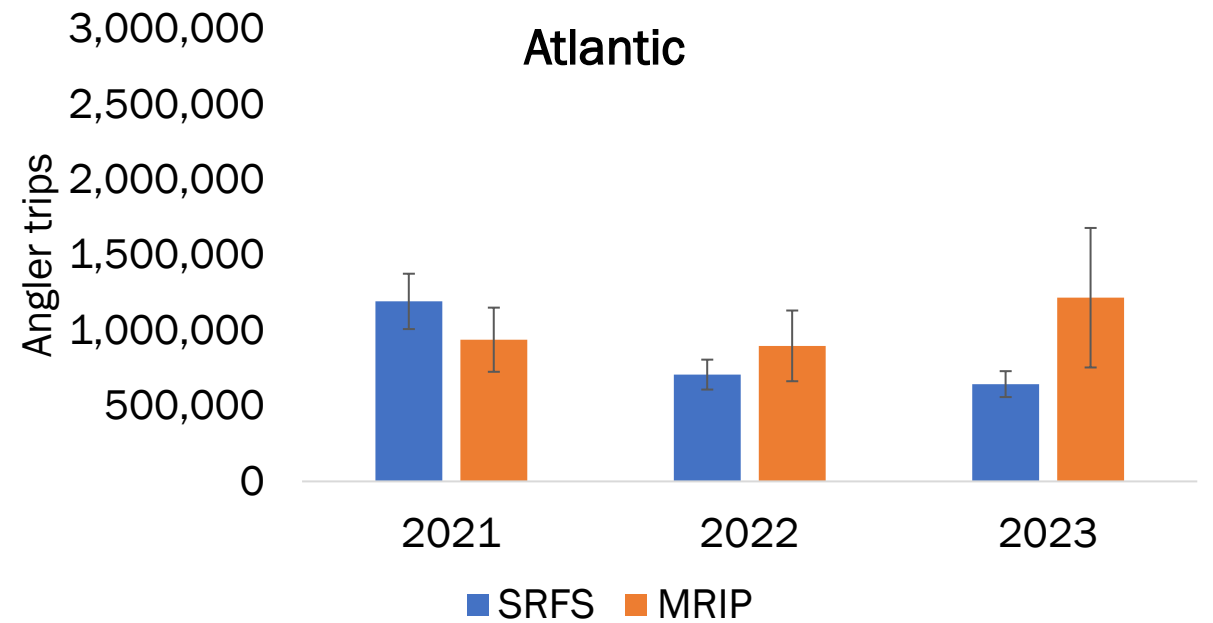
2. New species added in 2020 (circled in orange)

- Frequently caught in SE Florida, including the Keys
- Hogfish also targeted in Gulf



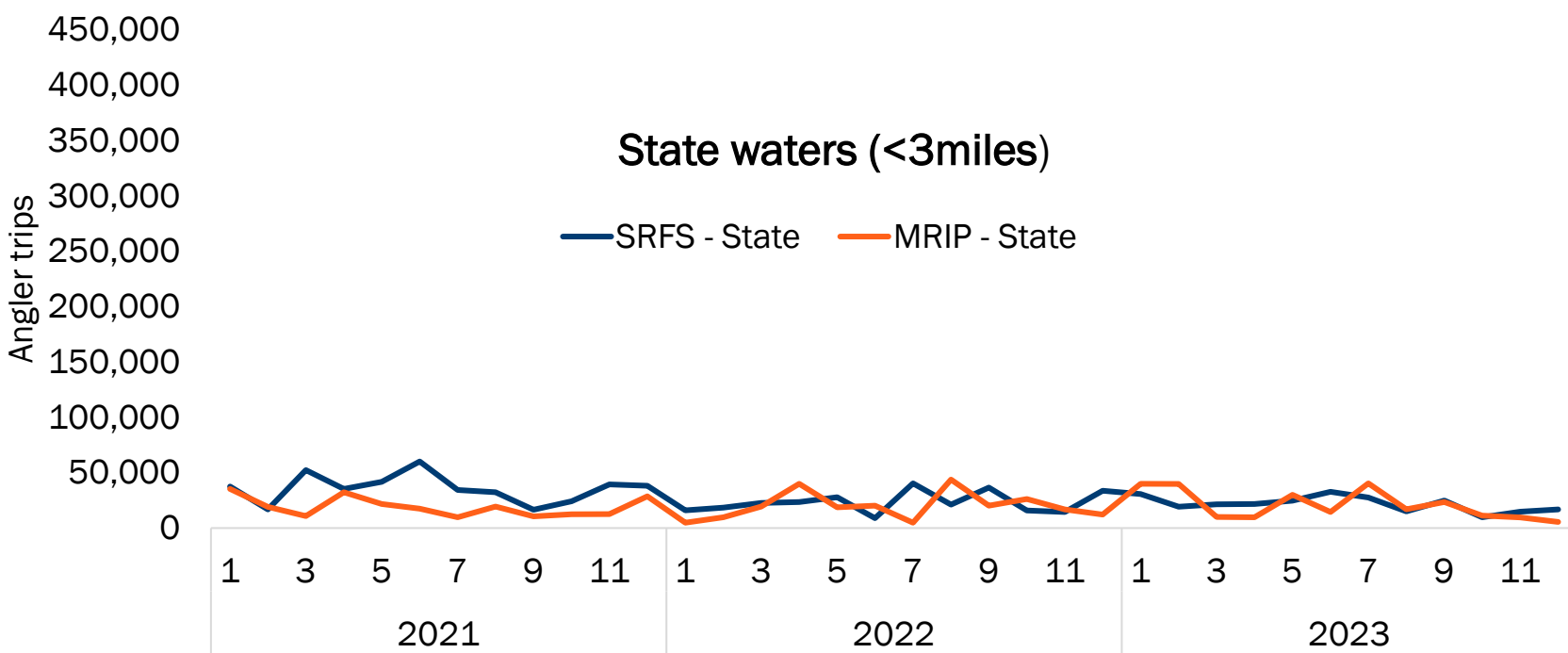
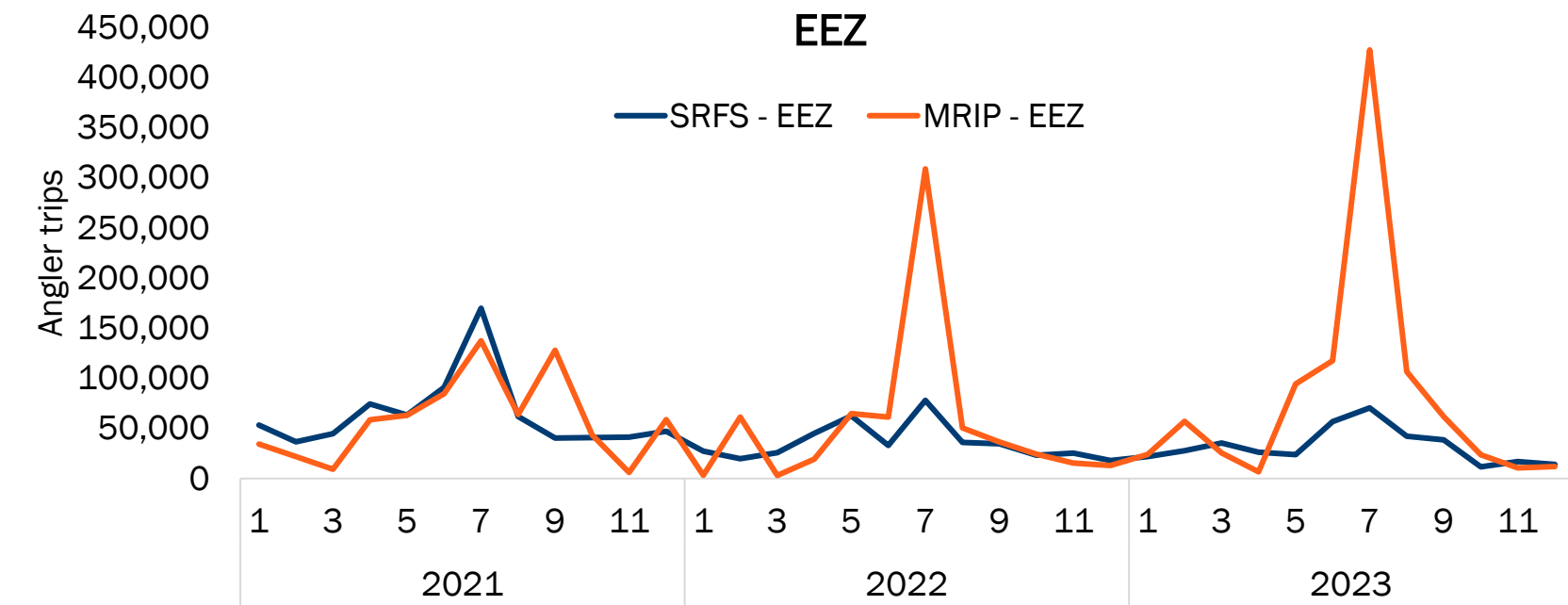
Effort – Original Species

- 3 full years of accumulated comparisons between MRIP-FES and SRFS
 - SRFS estimates for Gulf coast consistently lower than MRIP
 - First three years of Atlantic coast estimates track more closely
- SRFS: 43% Atlantic, 57% Gulf
- MRIP: 29% Atlantic, 71% Gulf



Atlantic: monthly effort

- EEZ peaks in MRIP-FES coincide with Red Snapper season
- Low reef fish effort in state waters

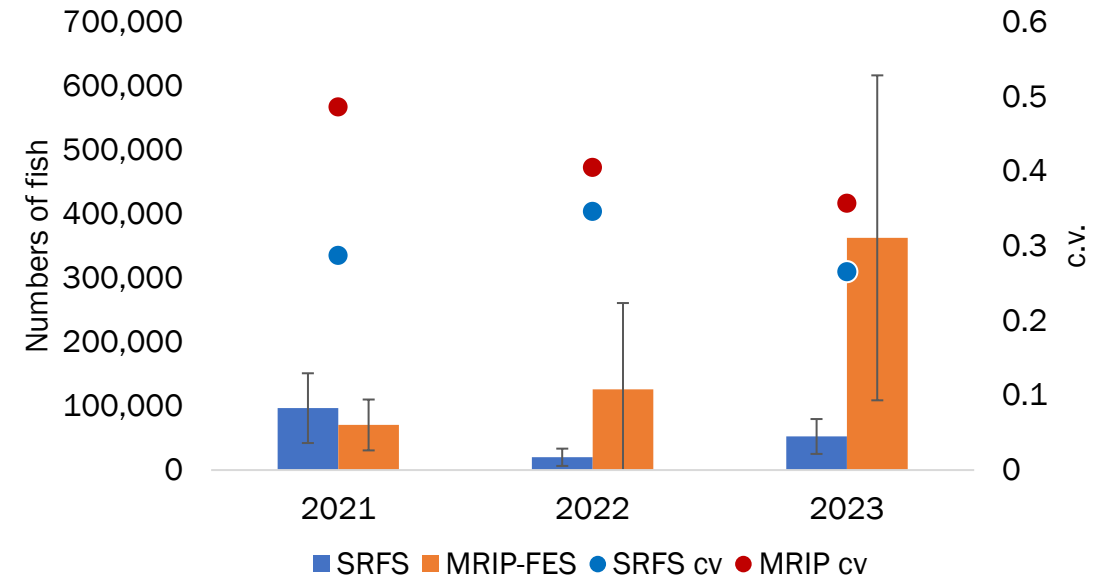


Red Snapper

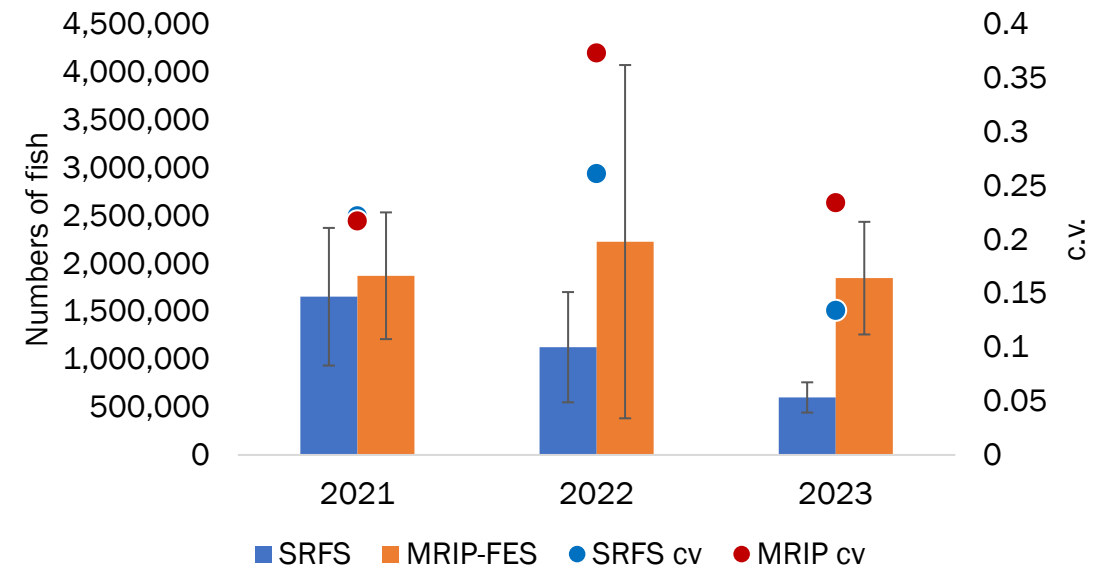
- Pulse fishery during July harvest season
 - 2021 – 3 days
 - 2022 – 2 days
 - 2023 – 2 days



Red Snapper Landings

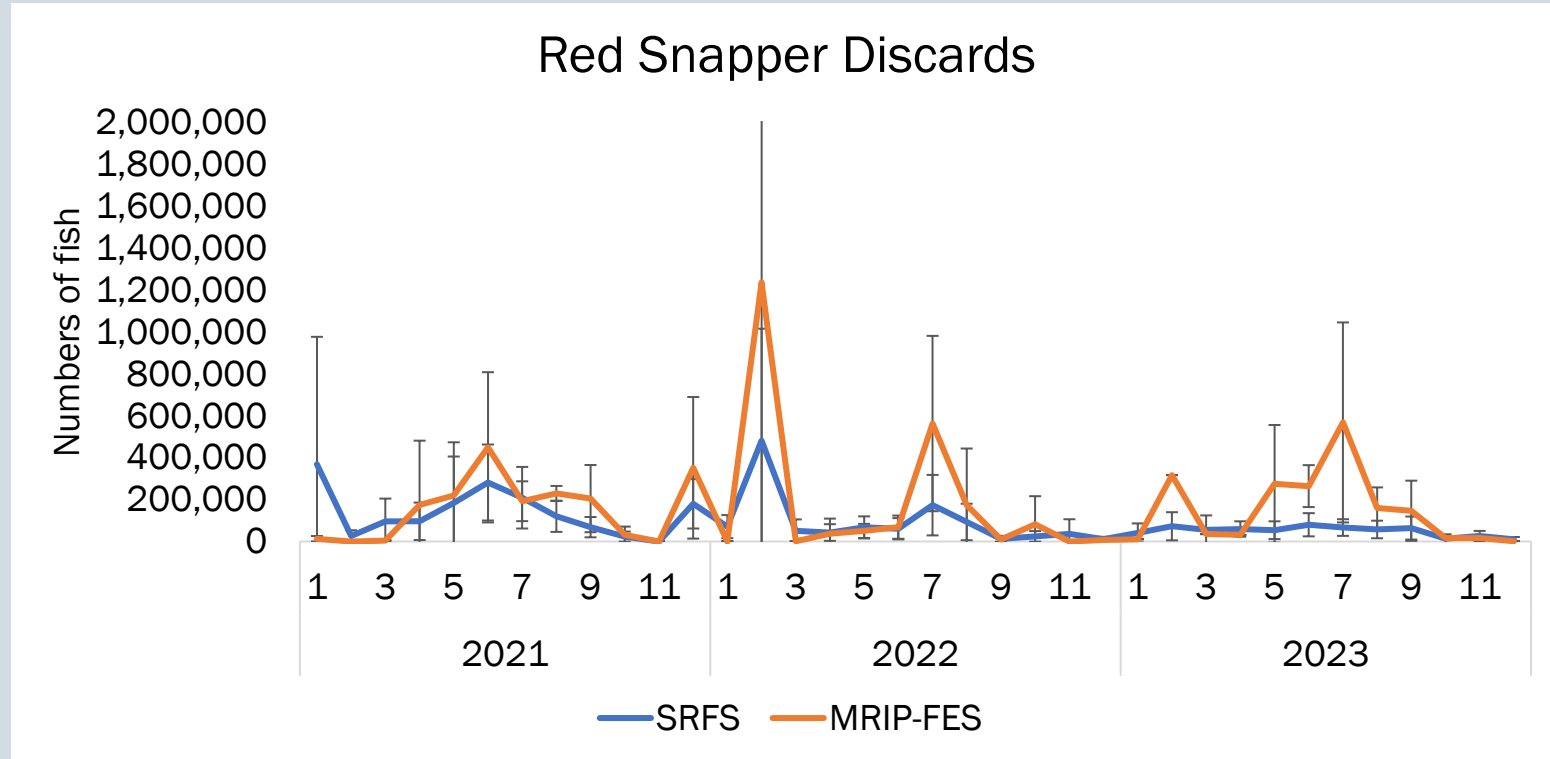


Red Snapper Discards



Monthly Red Snapper Discards

- MRIP peaks coincide with pulse red snapper fishery in July
- >1.2 million MRIP discards in Feb. 2022
 - Greater than all other waves combined

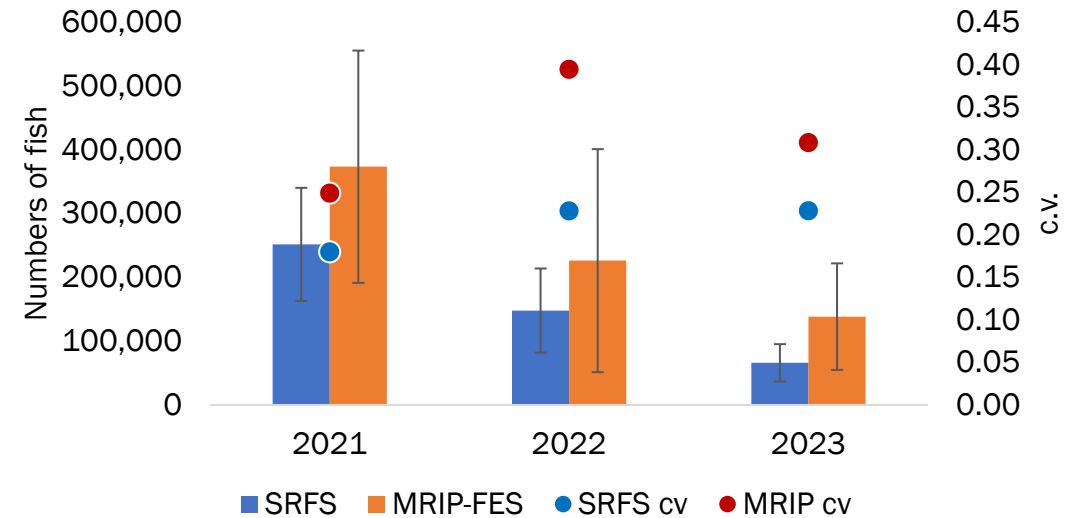


Gray Triggerfish

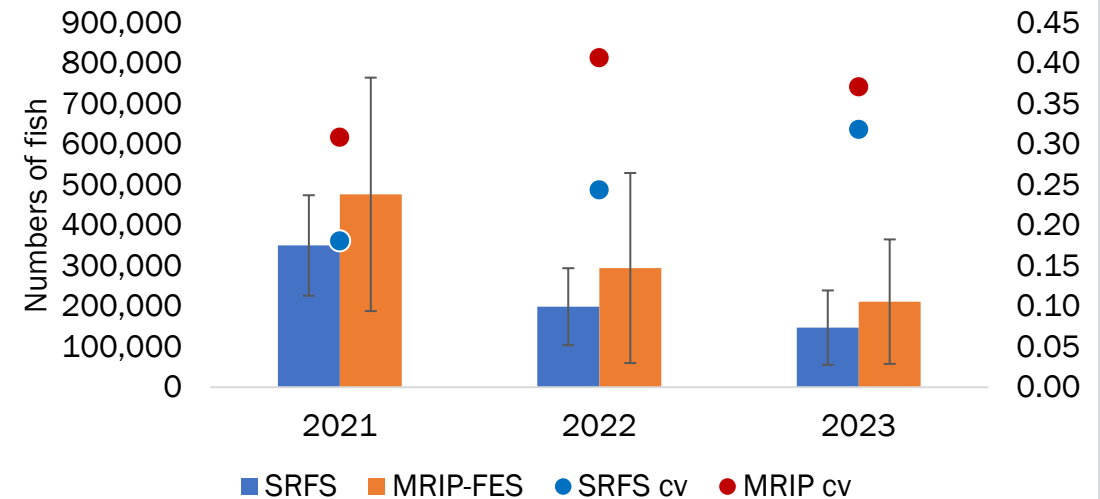
- Aggregated estimates
 - Estimates close, confidence intervals overlap
 - c.v.'s around SRFS annual estimates lower



Gray Triggerfish Landings

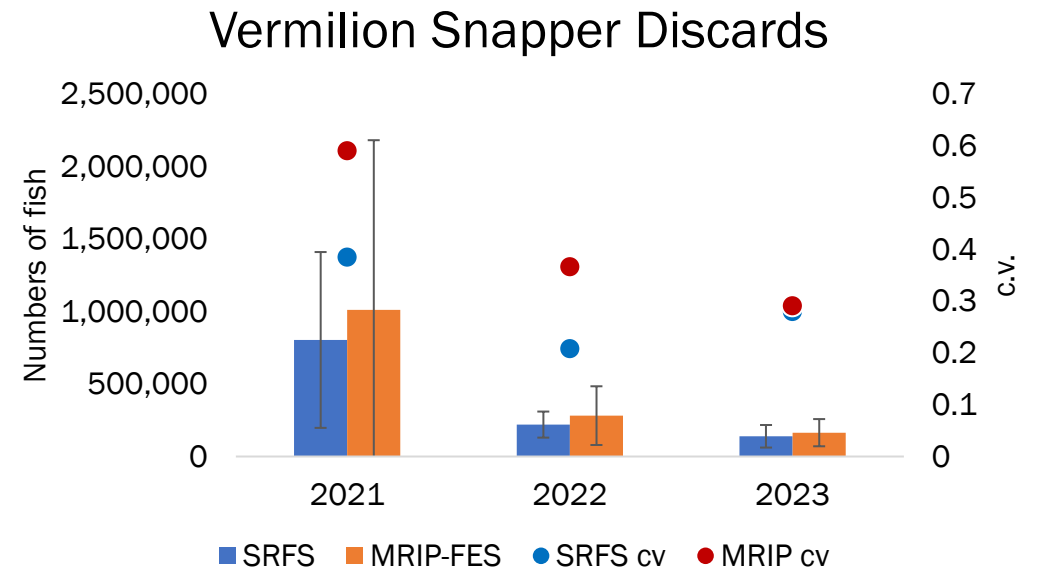
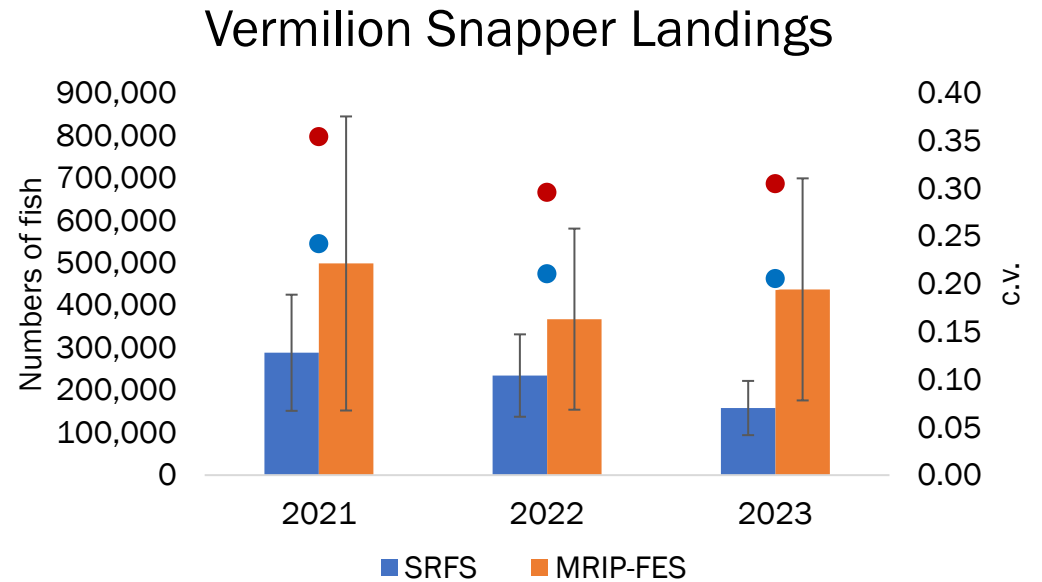


Gray Triggerfish Discards



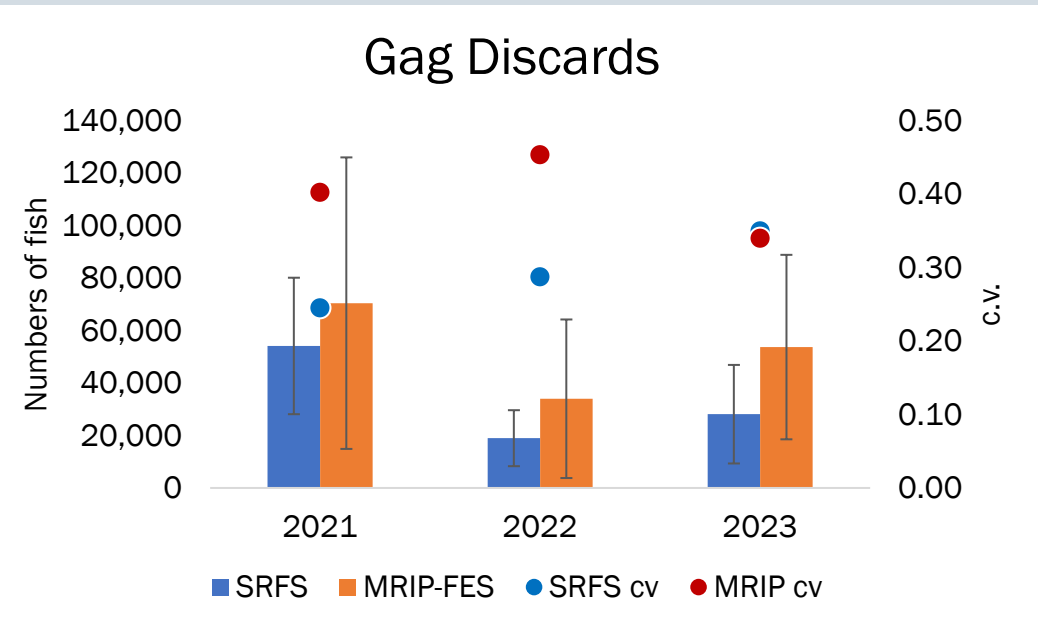
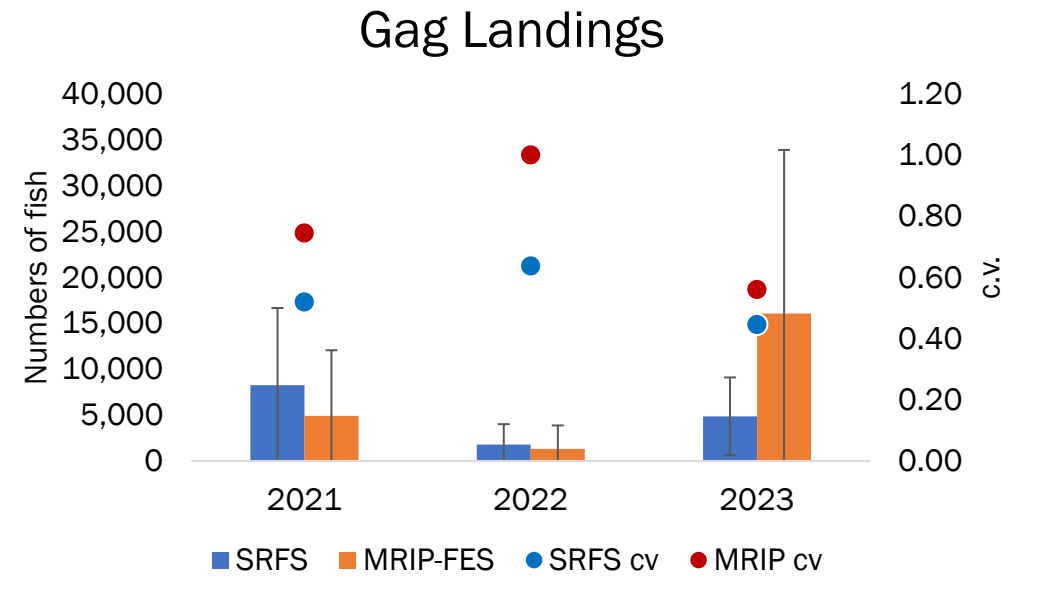
Vermilion Snapper

- MRIP landings trend higher, confidence intervals overlap
- Discards similar
- SRFS c.v.s lower



Gag

- Landings
 - SRFS c.v.'s lower, but are high for both surveys
- Discards
 - Lower c.v.'s for SRFS



New SRFS Species

- SRFS expanded statewide in July 2020
- Added three new species important to Keys and Southeast Florida
- Separate effort estimates generated for this suite of species

Yellowtail Snapper

Ocyurus chrysurus

Prominent yellow stripe runs from eye to tail



Deeply forked tail

Mutton Snapper

Lutjanus analis

Bright blue line below eye

small black spot



Offshore adults can be reddish in color (not as red as true Red Snapper)

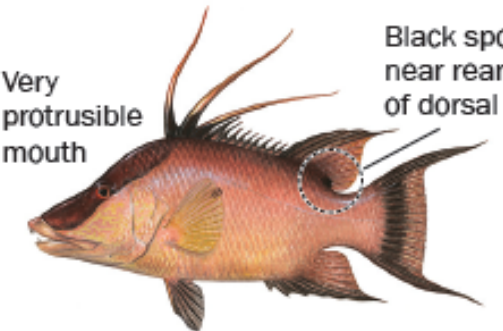
Hogfish

Lachnolaimus maximus

First 3 dorsal spines very long

Very protrusible mouth

Black spot near rear base of dorsal fin

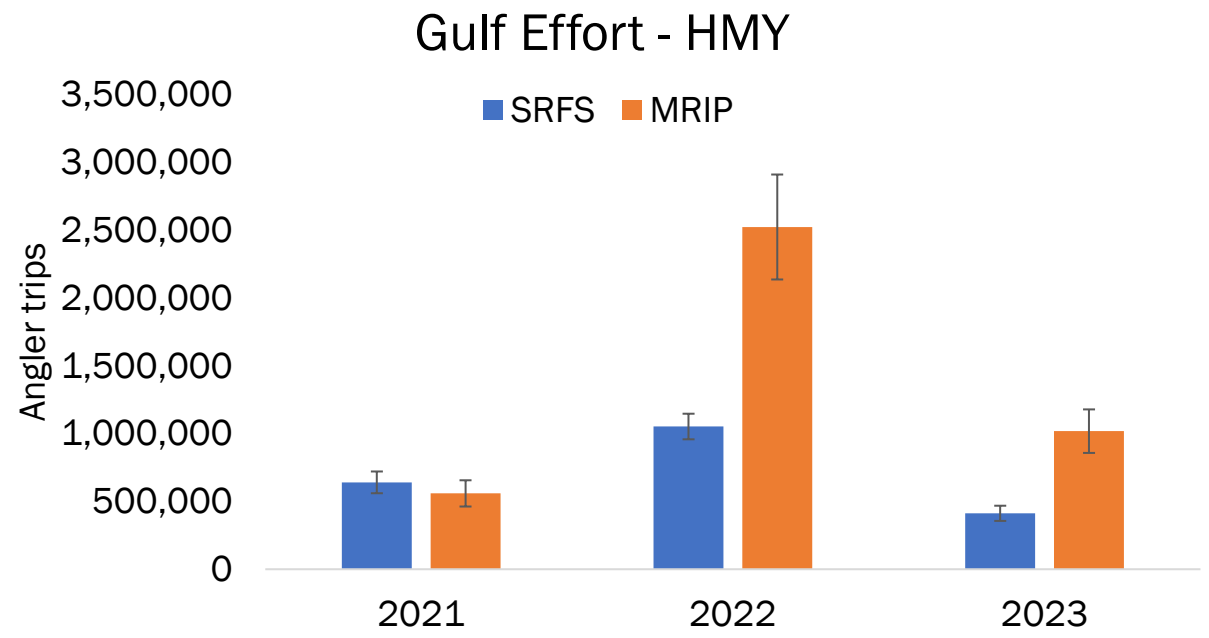
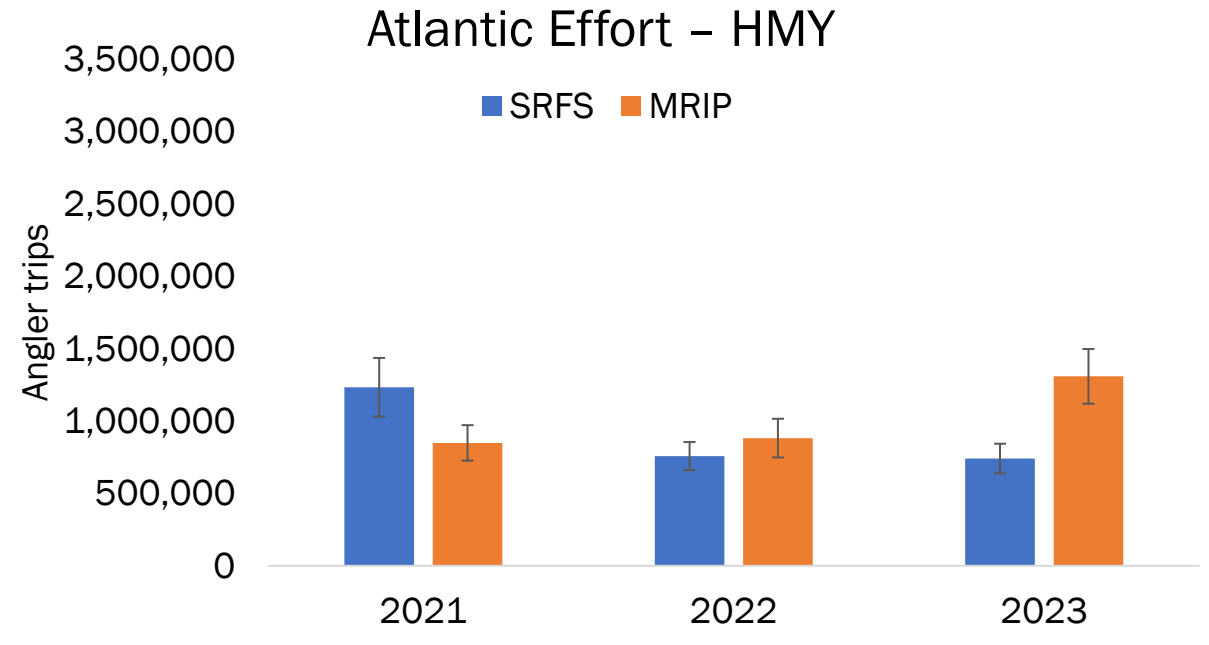


Color varies by sex and age



Effort – New Species

- Hogfish
 - Gulf coast, Keys, SE Florida
- Mutton and yellowtail snapper
 - Keys and SE Florida
- SRFS: 56% Atlantic, 44% Gulf
- MRIP: 43% Atlantic, 57% Gulf
- NOTE on the Keys:
 - SRFS: Gulf & Atlantic coasts are split
 - MRIP: all Keys included in Gulf

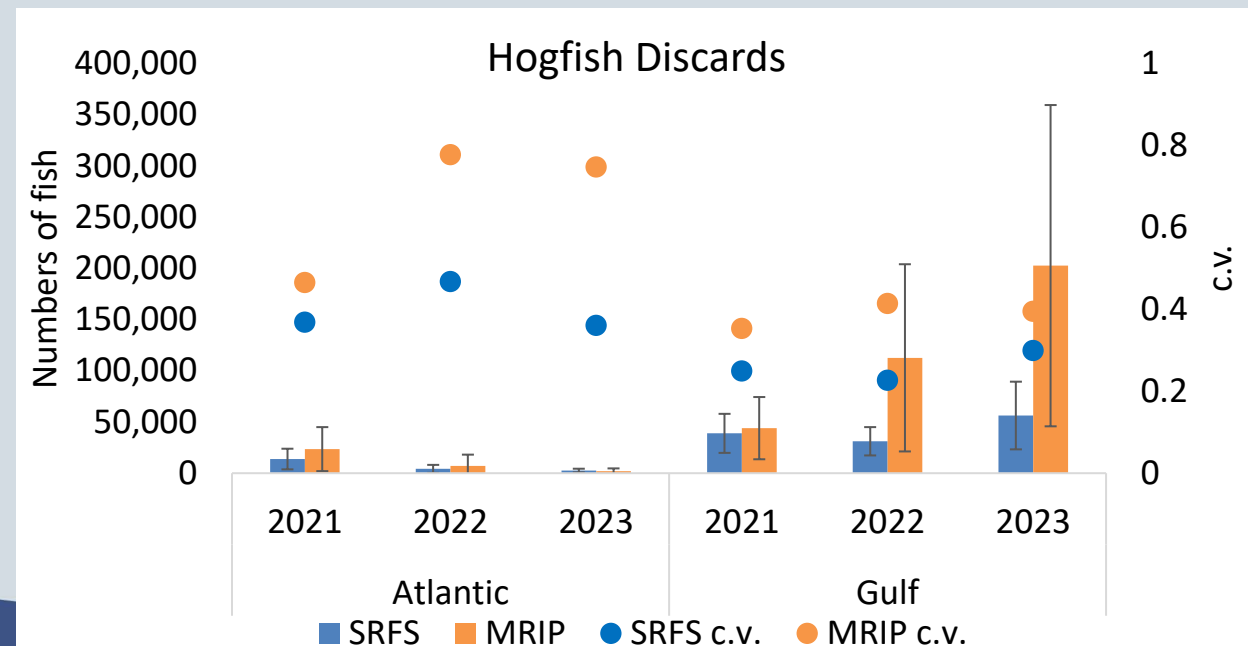
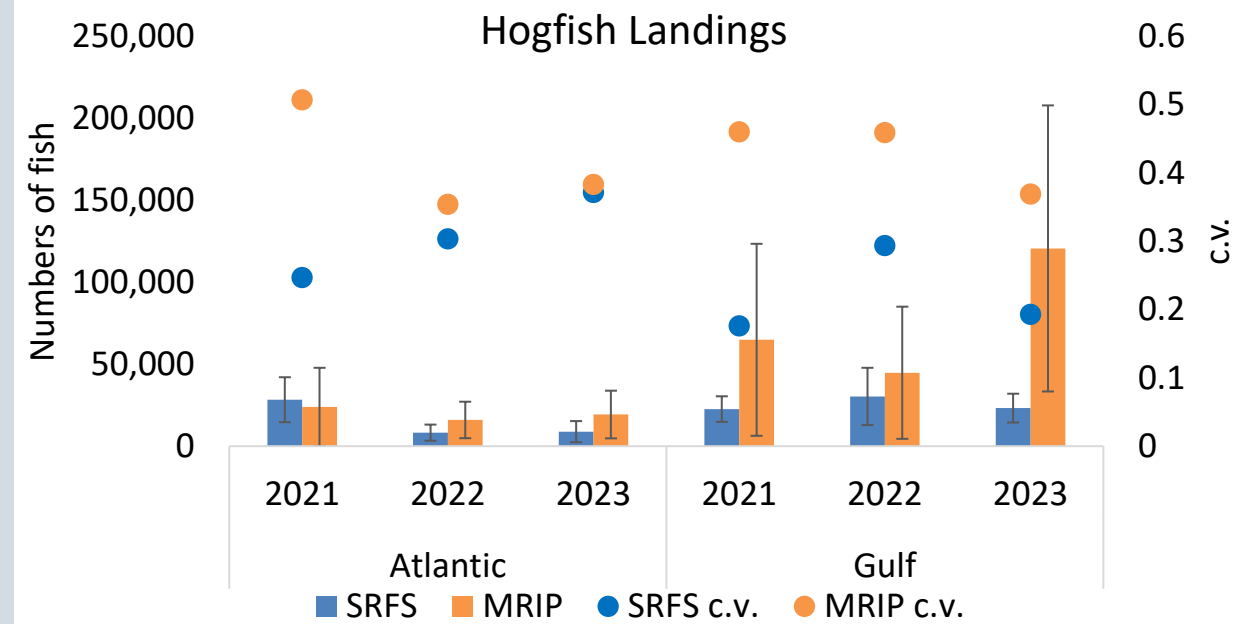


Hogfish

Notes on precision:

- c.v.'s of 0.30-0.50
 - MRIP recommends caution
- c.v.'s above 0.5
 - MRIP does not support use
 - Recommend higher level of aggregation

Source: <https://www.fisheries.noaa.gov/data-tools/recreational-fisheries-statistics-queries>

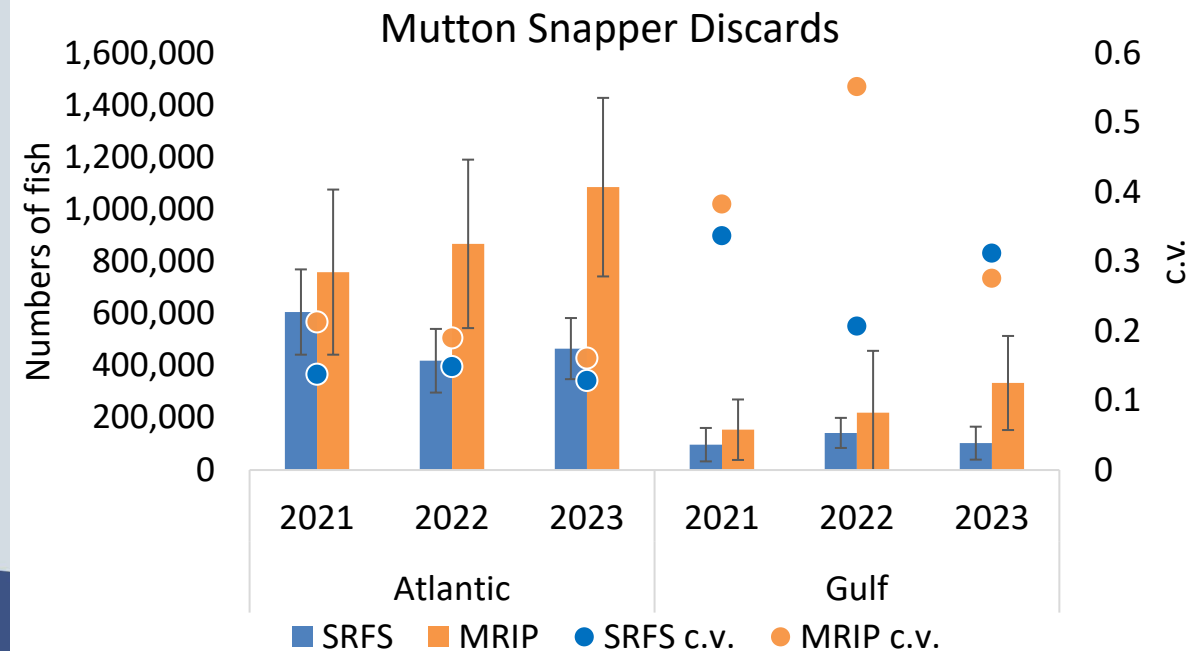
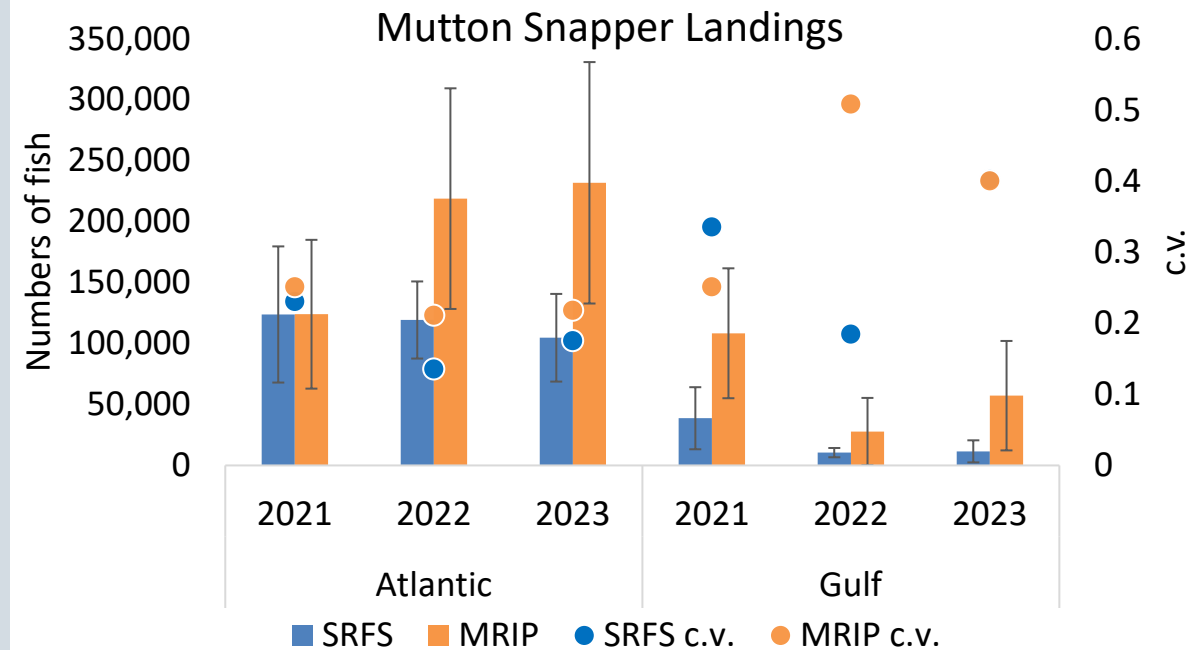


Mutton Snapper

Notes on precision:

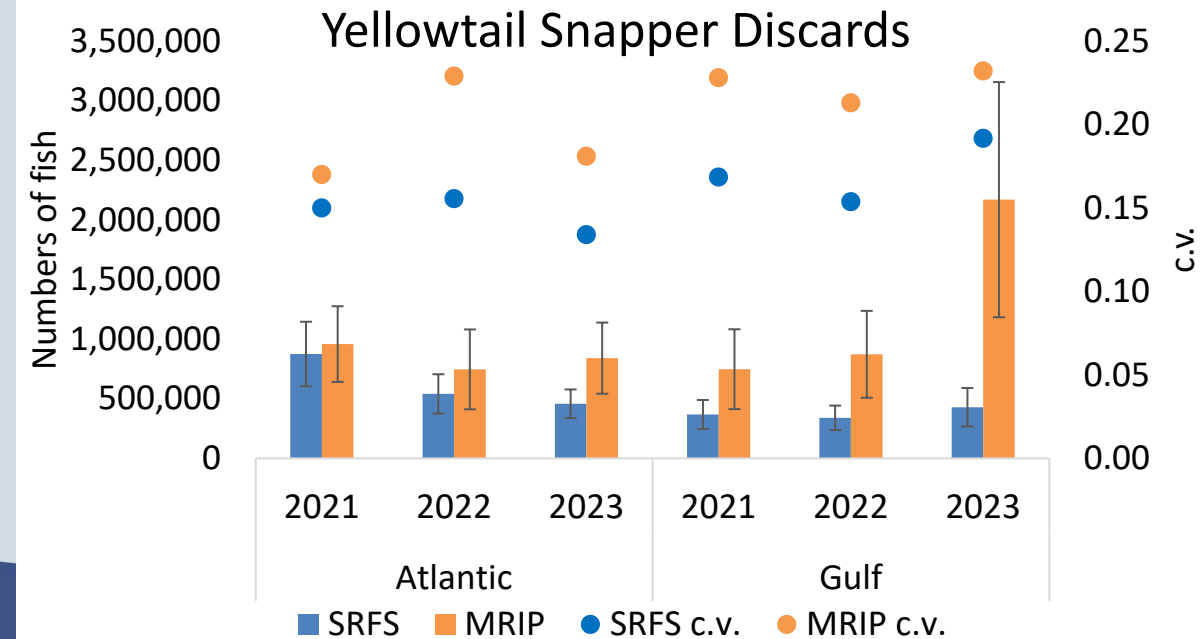
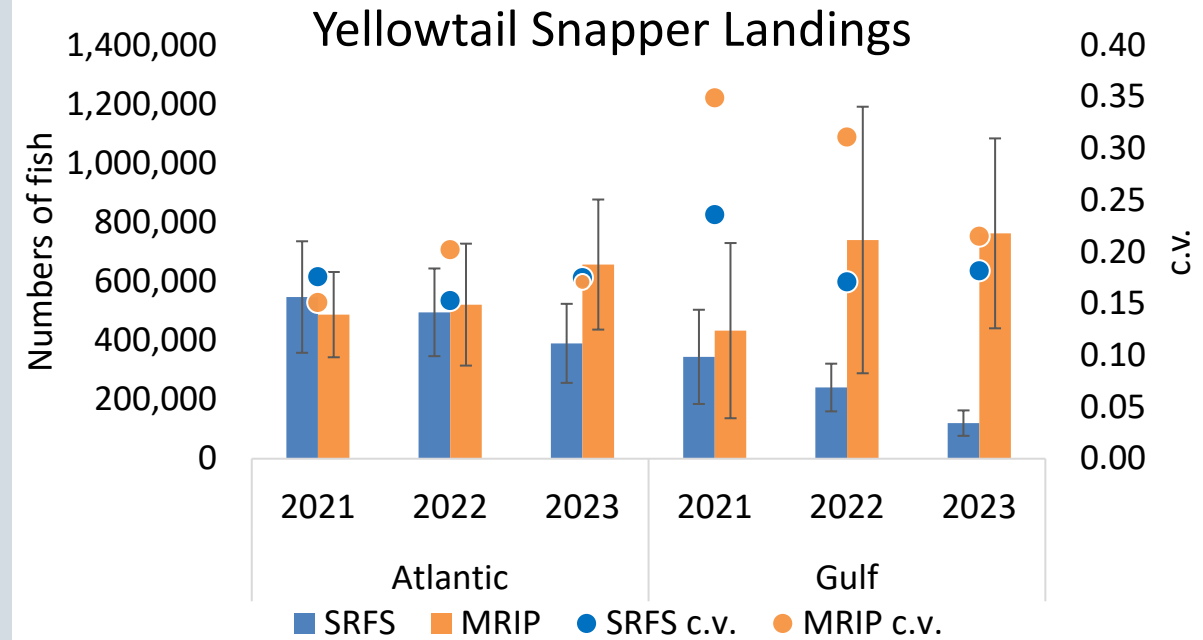
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Source: <https://www.fisheries.noaa.gov/data-tools/recreational-fisheries-statistics-queries>



Yellowtail Snapper

SRFS estimates lower in Gulf

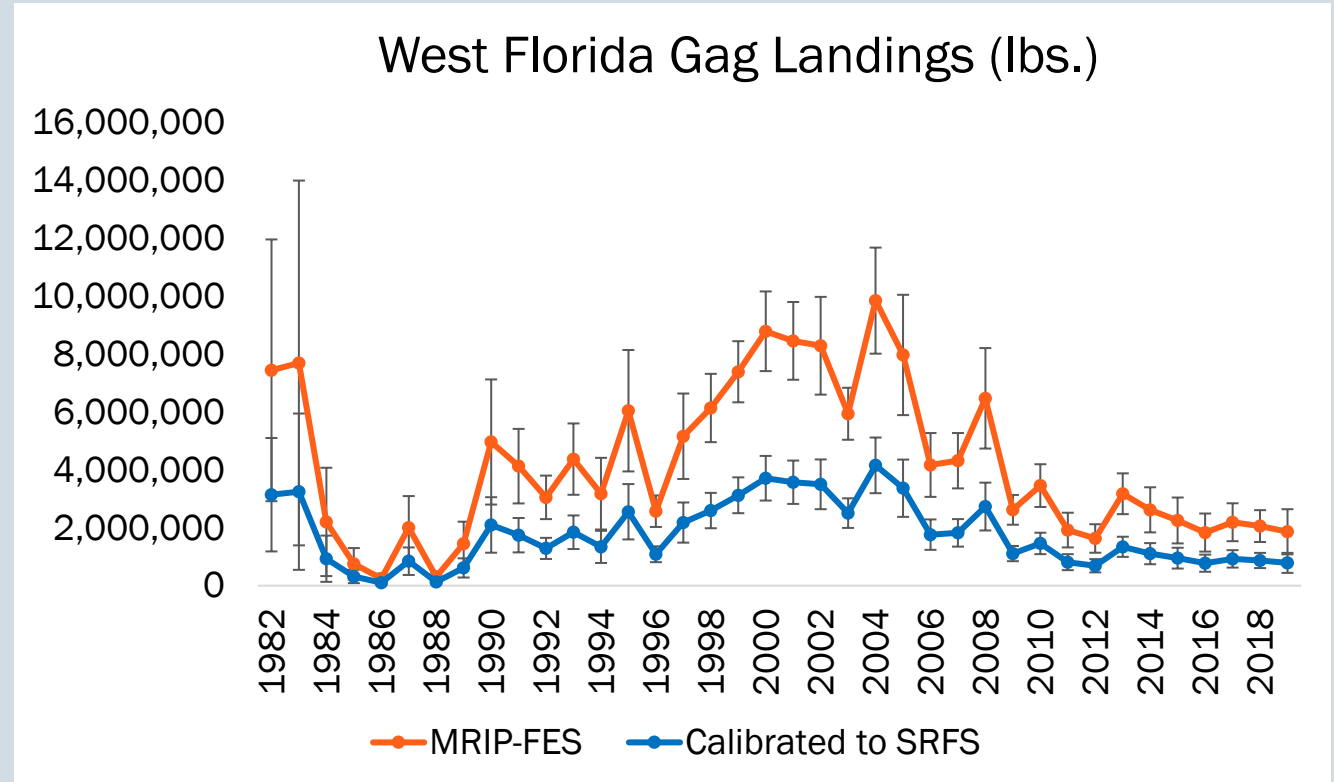


Use of SRFS estimates in SEDARs



SRFS Use in SEDARs

- First used in SEDAR72 Gulf Gag
- Ratio calibration applied to MRIP estimates to convert historic time-series to SRFS currency
 - Method peer-reviewed prior to use in SEDAR72 Gulf Gag
 - Documented in working paper SEDAR72-WP04 (link below)



[SEDAR 72 WP-04: A ratio-based method for calibrating GRFS and MRIP-FCAL estimates of total landings \(numbers and pounds of fish\), and releases \(numbers of fish\)](#)



SRFS Use in SEDARs

- SEDAR88 – Gulf Red Grouper (NOAA)
 - Underway
- SEDAR79 – Mutton Snapper (FWC)
 - Postponed following MRIP results released in 2023
 - Peer review of calibration method planned April 2024
- SEDAR96 – Yellowtail Snapper (FWC)
 - Moved up following MRIP results released in 2023
 - Peer review of calibration method, planned jointly with SEDAR79



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Tiffanie Cross



Chloe Ramsay

