




# **Calibration of Recreational Effort and Catch Survey Improvements**

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## Improved Survey Designs

### Fishing Effort Survey (FES)

- New mail survey of shore & private boat trips
- Replaces Coastal Household Telephone Survey (CHTS)
- Uses USPS database and angler registries
- Higher, more accurate estimates of trips

### Access Point Angler Intercept Survey

- aka APAIS
- New design for sampling catch
- Better time-of-day coverage
- More statistically sound



Shore

Private Boats

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And now a brief update on the Fishing Effort Survey, which replaces our old Coastal Household Telephone Survey, or CHTS. We moved away from the CHTS for a number of reasons, including low response rates and a coverage area limited to coastal counties. I want to stress that the FES is used **ONLY** to estimate fishing effort, not catch rate. Also, it only applies to **shore and private boat anglers** on the **Atlantic and Gulf coasts**.

Effort estimates for charter and party boats are made using the For-Hire Telephone Survey and are not affected by the FES.

The estimates from the FES are several times higher than those from the CHTS. Overall, the private boat estimates were almost 3 times higher, and in the shore mode, they were a little more than 5 times higher.

This varied by mode, state, and wave.

We also recently implemented an improved sampling design for our Access Point Angler Intercept Survey (APAIS) that is used to collect angler catch data.

- The APAIS uses a list of fishing access points, or sites, and 6-hour time intervals to draw a sample of site/time interviewing assignments. An interviewer goes to the assigned site

during the specified time interval to intercept and interview anglers who have completed a day of fishing.

- The new design provides more complete coverage of angler fishing trips ending throughout the day and night – complete 24-hour coverage
- The old design only collected data on angler trips ending during the most active time of day and missed collecting data on nighttime trips or off-peak daytime trips.
- The new design is also more statistically sound because it more strictly adheres to formal probability sampling protocols. We know the sample inclusion probabilities of all access points and time intervals that have been selected for interviewing.

*(ADDITIONAL BACKGROUND FOR CHARTER AUDIENCES: The For-Hire Telephone Survey uses a directory of charter boats to contact charter boat operators, so it is not subject to the same potentials for bias as the CHTS, which used random-digit-dialing of coastal households to contact anglers.*

*Instead of random-digit-dialing coastal households, the FES reaches anglers through a combination of the U.S. Postal Service address database, along with state-based license and registration information.)*



## Fishing Effort Survey

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We're reaching more anglers.
- 

Surveys get into the right hands.
- 

Much higher response rate.
- 

Improved questionnaire.
- 

More complete answers.

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Our research has shown that the FES provides MORE ACCURATE estimates of fishing effort than the CHTS. Let's look at a few reasons why.

- Using the combination of the Postal Service addresses and licensing information allows us to reach more angling households.
- The FES also tends to get into the hands of the people in the household doing the fishing. This helps overcome what we call the “gatekeeper effect” that can occur with phone surveys.
- With the FES we are getting more than three times the response rate we got with the telephone survey. This will likely come as no surprise to anyone with caller ID that fewer people are responding to phone surveys. The FES response rates have been 35-40%, and the CHTS response rates were less than 10%.
- By moving away from phone, the FES allowed us to improve our questionnaire, which makes it more likely that people will respond.
- The FES is also allowing us to get more complete information. A mail survey gives respondents more time to answer the questions and think through the number of trips they've taken.
- **The planned number of FES surveys to be mailed in 2018 is approximately 275,000. Based on**

**an average response rate of 34% during the benchmarking period (2015-2017), this should yield more than 90,000-100,000 responses (completed surveys) and should provide improved precision levels over those obtained during benchmarking period. The FES achieved a comparable level of precision to the CHTS during the benchmarking period with less than half its 2018 sample size. More than 2.98 million phone numbers were sampled by the CHTS annually during the same period, resulting in a response rate of < 7% (an average of 215,000 completed responses annually). The number of CHTS phone contacts needed is much higher because several attempts are made to reach valid phone numbers.**



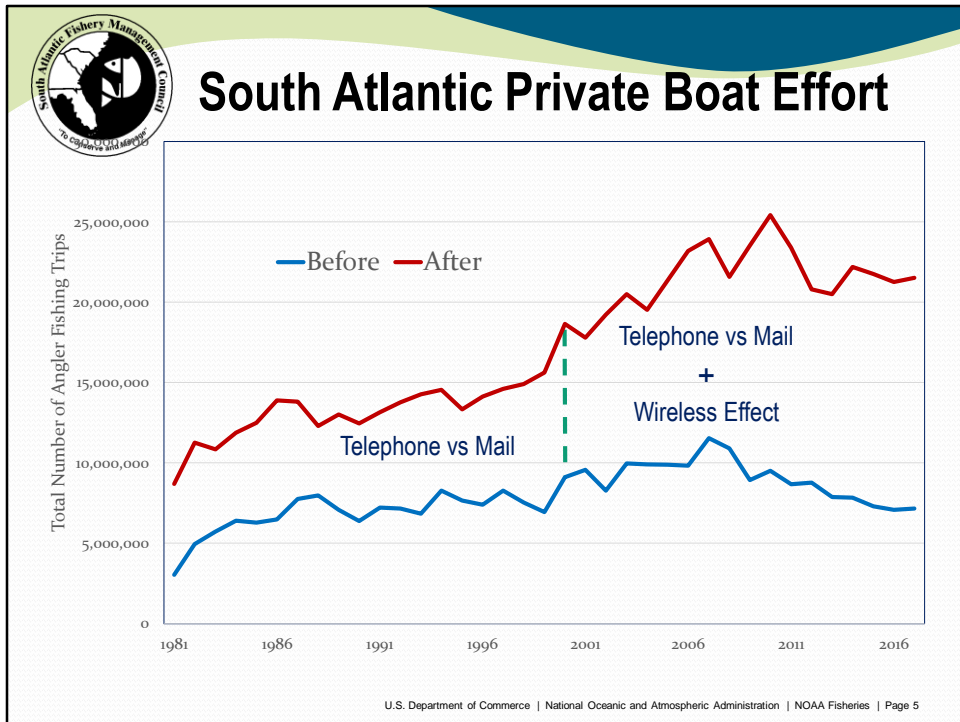
## MRIP Calibration Models

- Separate model for each survey (FES and APAIS).
- Both developed and tested using 3 years of side-by-side data.
- These calibrations replace several others.
  - Not a calibration of a calibration.
- Peer reviews completed and endorsed by reviewers.
- Each survey is now fully implemented.
  - CHTS and old APAIS design no longer exist.

Now I'd like to talk a little bit about how we got to the revised estimates.

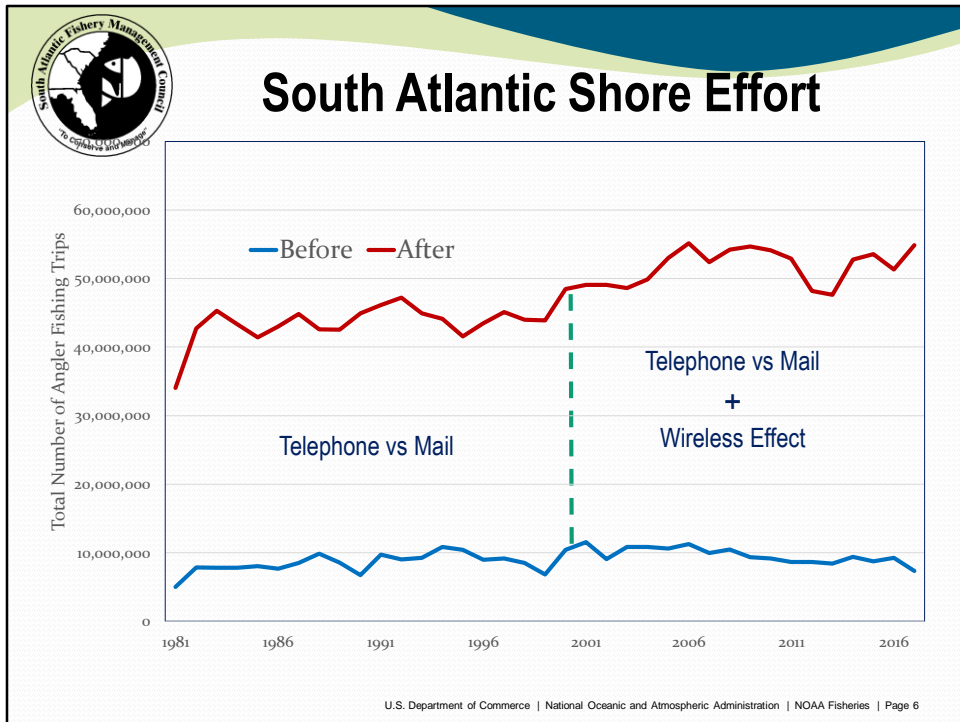
Working with independent consultants, we developed an FES calibration model, which underwent an extensive peer review process. The model allows us to have a common effort "currency" all the way back from 1981 until now. This is very important as we talk in later slides about how annual catch limits are calculated and how we will compare annual catch to those limits over the next few years. The important part here is how the calibration model will allow us to convert both directions between the two surveys.

Our improved dockside survey ensures the way we collect data complements the way we use it to produce estimates of catch. Our sampling methods had previously focused on maximizing the number of completed fishing trips sampled. We now focus our efforts on maximizing the number of site days sampled. A calibration was needed to account for any consistent effects of the redesign on catch rate estimates produced by APAIS. A different calibration was done in 2013.



This slide shows how applying the calibrations has changed historical estimates of private boat angler fishing trips for the South Atlantic subregion (NC-EFL).

- The orange line represents the uncalibrated estimates and the blue line represents the calibrated estimates.
- The changes in private boat effort vary in magnitude among subregions and among states within each subregion, but overall we see the same pattern throughout the time series:
  - The proportional change is relatively constant from 1981 to 2000 due to the Telephone vs. Mail Factor. (Ratio of calibrated/uncalibrated = 1.93 -- Close to a doubling of angler trips.)
    - The changes become increasingly greater as you go from 2001 to 2017 due to the “wireless effect” (increasing use of wireless phones, reducing the coverage of the CHTS relative to the FES). (Ratio of calibrated/uncalibrated in 2015-2017 = 3.00 -- more than 100% greater than in 1981-2000)
  - This pattern is what we expected to see as a result of applying the peer reviewed FES/CHTS calibration model.



This slide shows how applying the calibrations has changed historical estimates of shore angler fishing trips for the South Atlantic subregion (NC-WFL).

- The orange line represents the uncalibrated estimates and the blue line represents the calibrated estimates.
  - Note that the changes in shore fishing effort are proportionally much greater than the changes in private boat fishing effort throughout the time series. This is what we expected to see based on the side-by-side benchmarking of the two surveys in 2015-2017.
- The changes in shore fishing effort vary in magnitude among subregions and among states within each subregion, but overall we see the same pattern throughout the time series:
  - The proportional change is relatively more constant from 1981 to 2000 due to the Telephone vs. Mail Factor. (Ratio of calibrated/uncalibrated = 5.10 -- more than 5 times the original estimated number of angler trips)
  - The changes are increasingly greater as you go from 2001 to 2017 due to the “wireless effect” (increasing use of wireless phones, reducing the coverage of the CHTS relative to the FES). (Ratio of calibrated/uncalibrated in 2017 = 6.30 – as much as 6 times greater)
- This pattern is what we expected to see as a result of applying the peer reviewed FES/CHTS calibration model.





## Calibration Effects

- Effects on catch fall into 1 of 5 main categories:
  1. Catch is about the same.
    - Species with few intercepts and in areas with lower expansion factors.
  2. Catch trend is about the same, more variable.
    - Species with very few intercepts, occasionally in areas with high effort expansion factors.
  3. Catch is shifted up, same trend.
    - Species intercepted more regularly, occur in areas of both high and low effort expansion factors regularly.



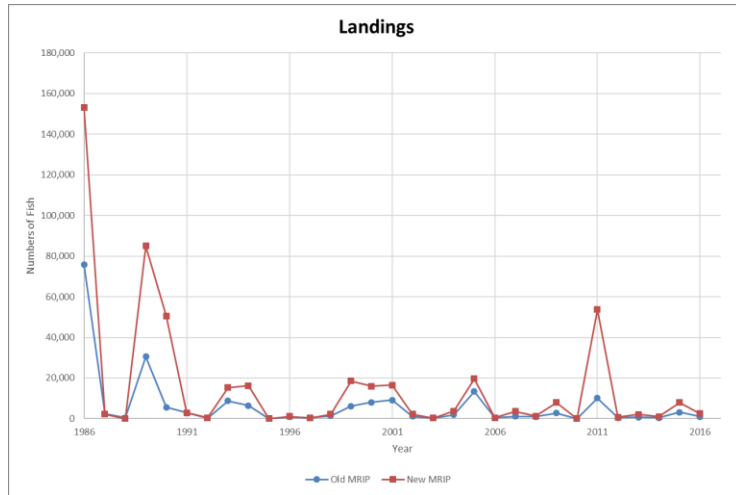
## Calibration Effects (cont)

4. Larger changes in early part of time series.
  - Higher average effort expansion factors.
  - Possibly due to changes in targeting, how fishery operated, or the proportion of catch by mode.
5. Larger changes in later part of time series.
  - Mostly due to wireless effect, decreasing response rates.



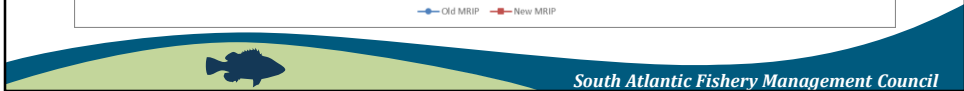
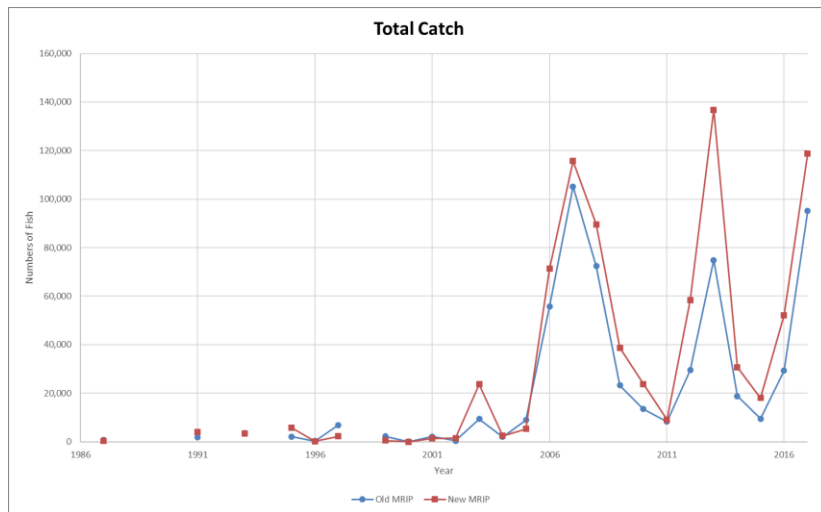
# About the Same

# Bar Jack



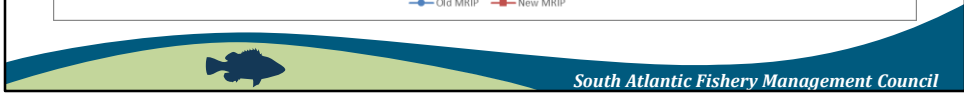
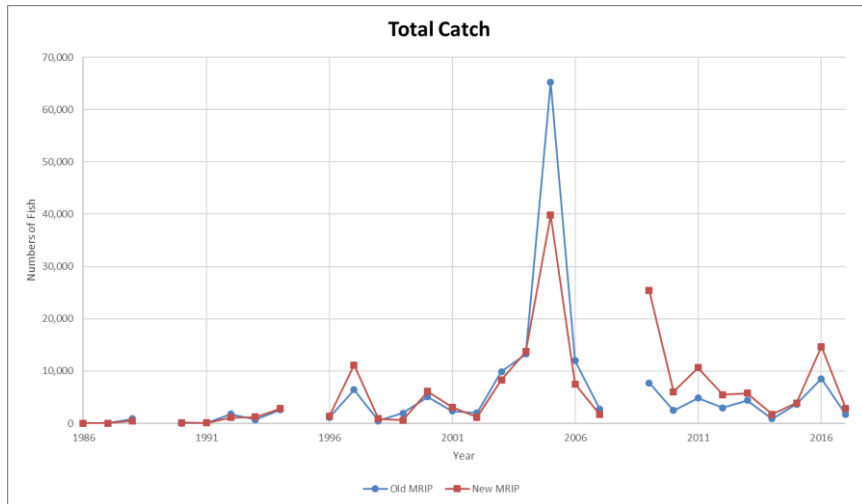
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# Blueline Tilefish



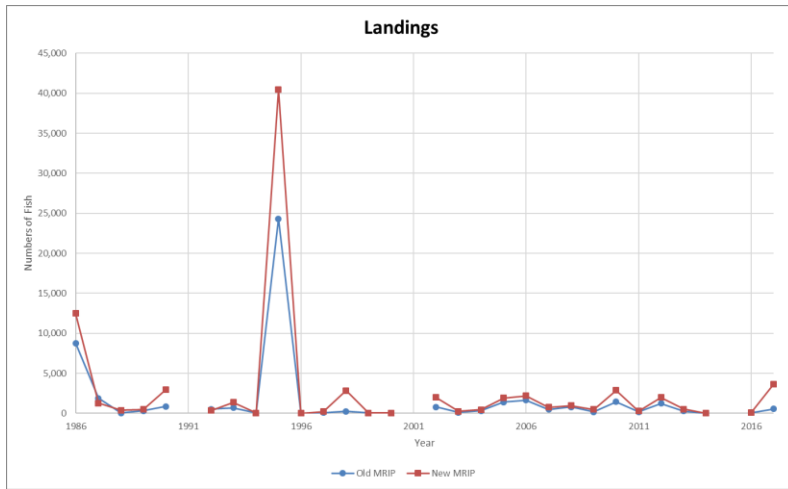
Total Catch used because discards deemed negligible in assessment, therefore total catch was used for removals.

# Golden Tilefish



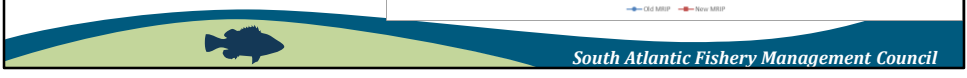
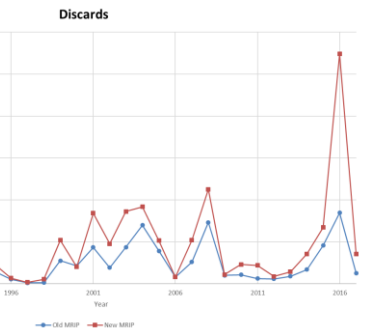
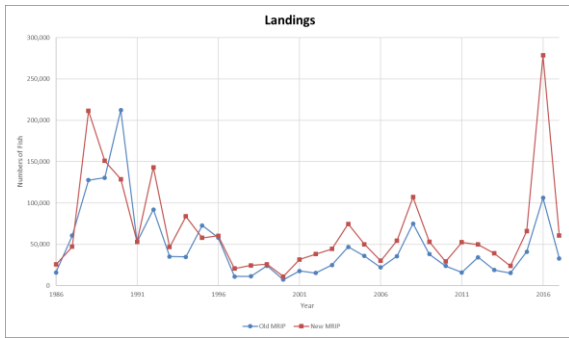
Total Catch used because discards deemed negligible in assessment, therefore total catch was used for removals.

# GA-NC Hogfish



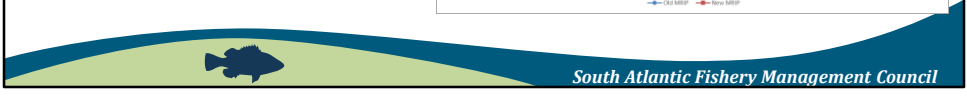
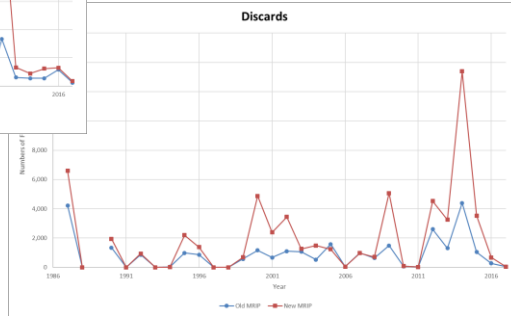
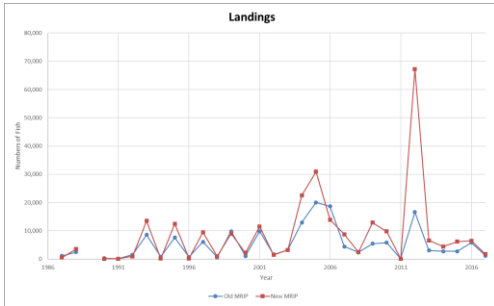
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# Red Porgy

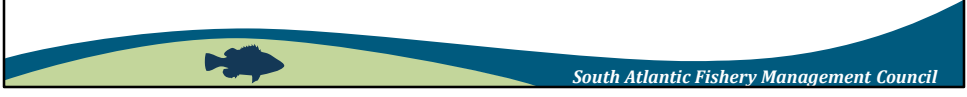
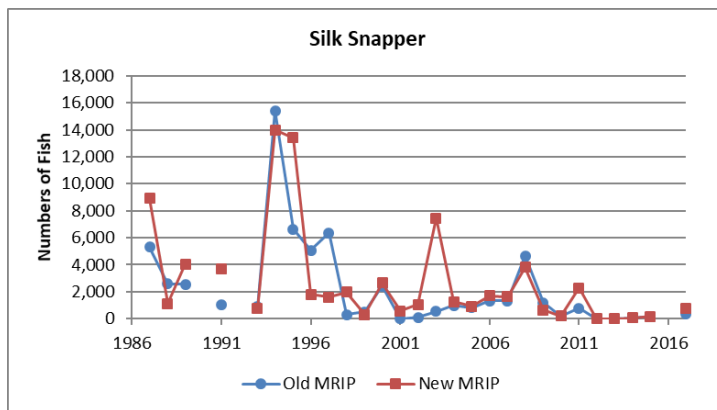




# Snowy Grouper



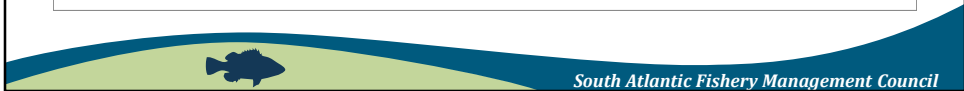
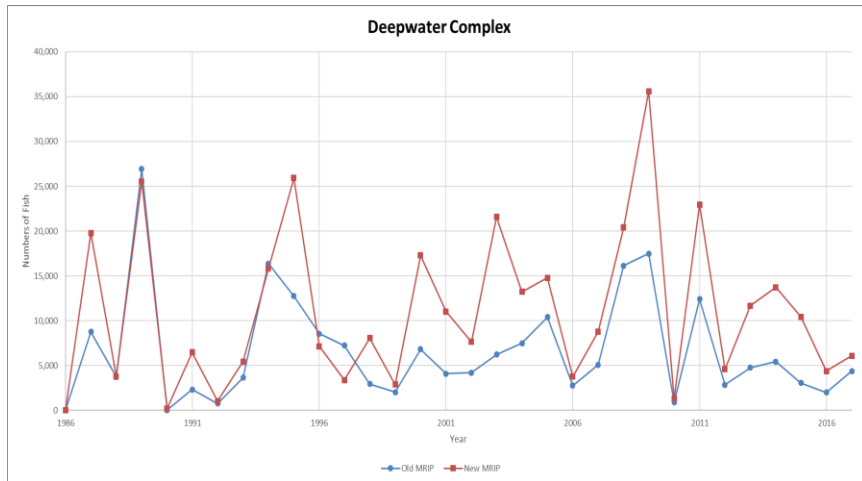
# Silk Snapper (Deepwater Complex)





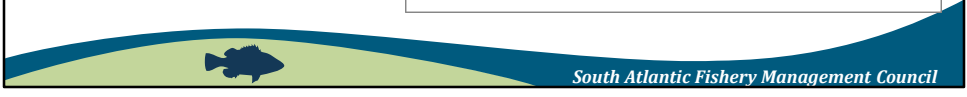
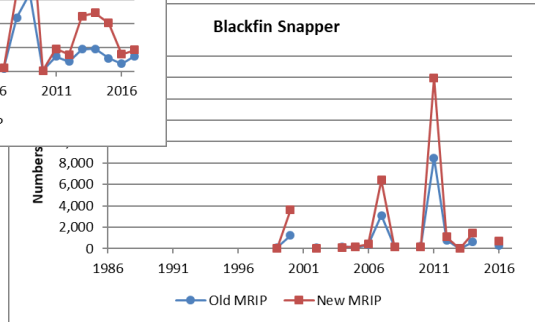
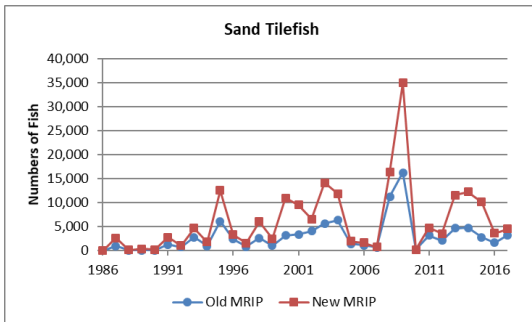
# Same Trend More Variable

# Deepwater Complex Landings

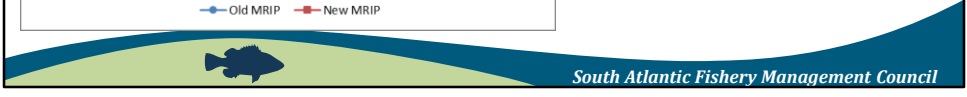
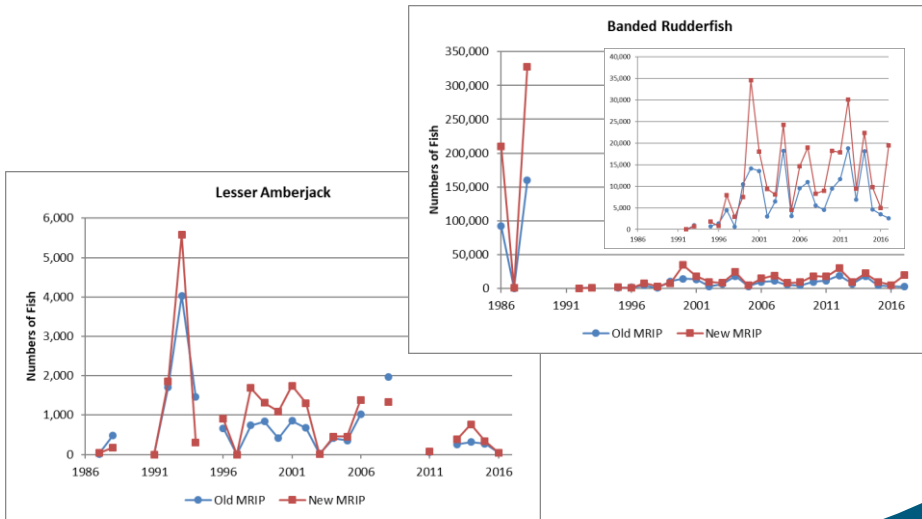


Earlier looks about the same. Mostly driven by Silk Snapper. From about 2000 on, higher variability trend driven mostly by Sand Tilefish and Blackfin Snapper. Queen Snapper, Misty Grouper, and Yellowedge Grouper have very spotty landings and contribute very little to the overall trend.

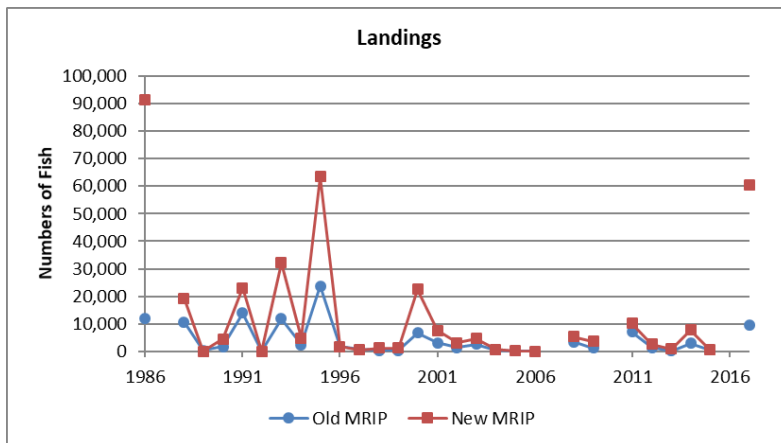
# Deepwater Complex Components



# Jacks Complex Components

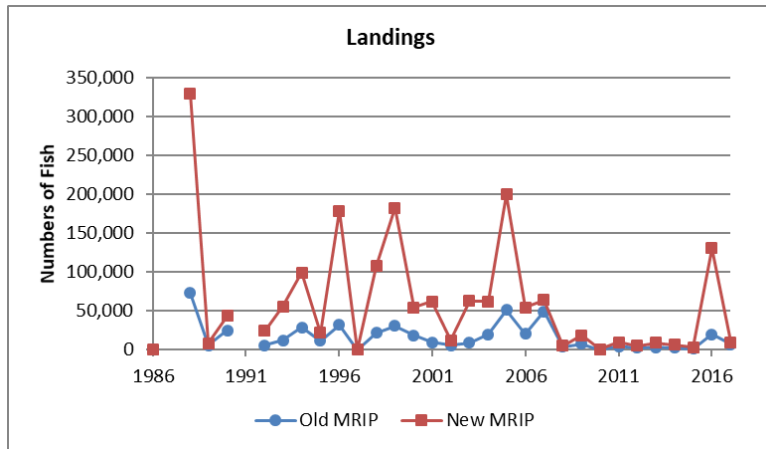


# Cubera Snapper (Snappers Complex)



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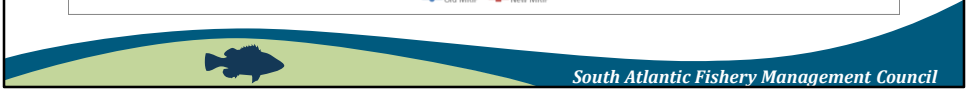
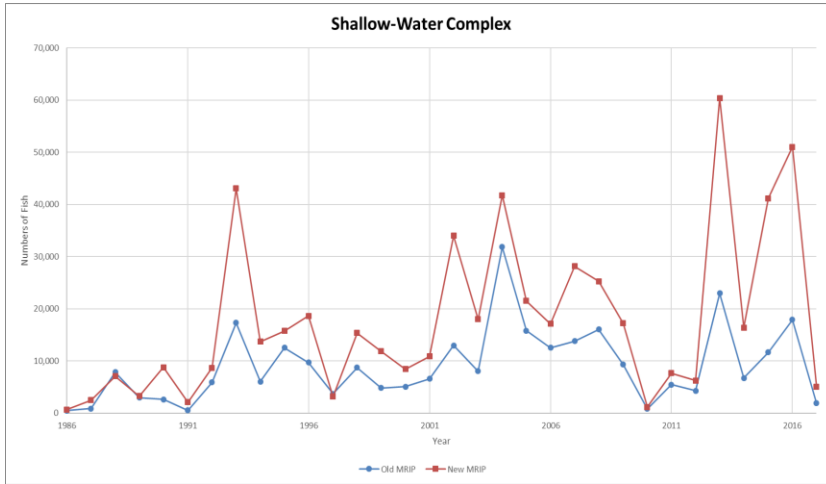
# Margate (Grunts Complex)



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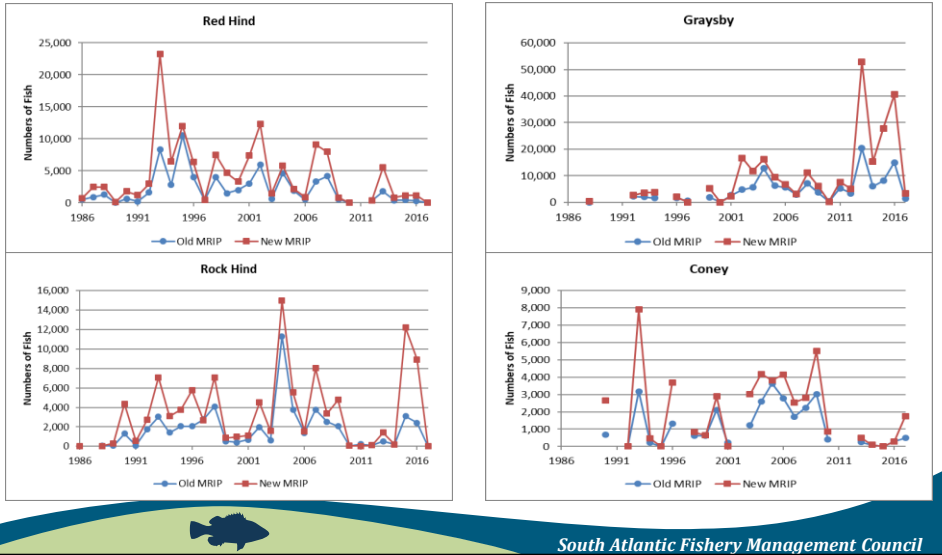


# Shallow-Water Complex Landings



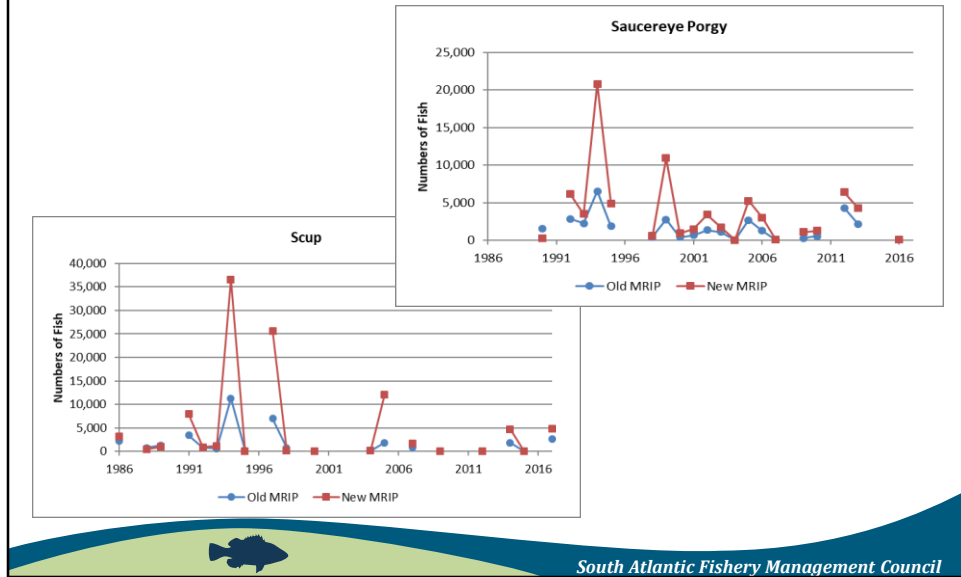
All components more variable. Together may seem like a shift, but it isn't.

# Shallow-Water Complex Components



Examples from Shallow-Water Complex. Species with biggest contributions. Yellowmouth and Yellowfin Grouper had very minimal landings in only a few years.

# Porgy Complex Components

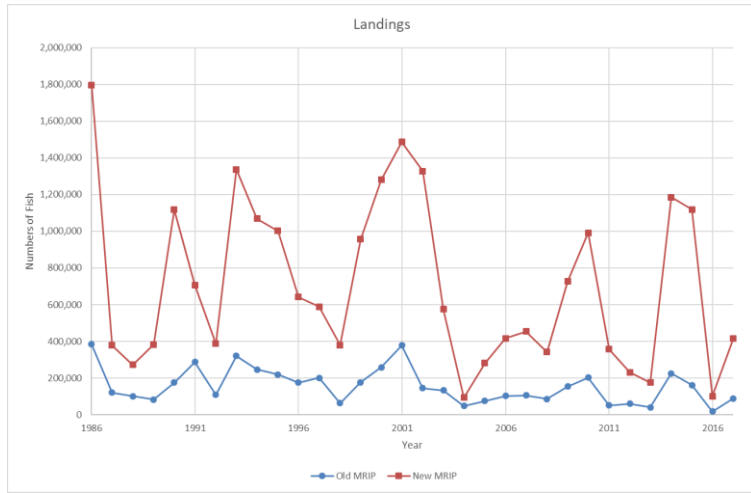


As a complex, categorized as “Same Trend, Shifted UP”. These species are just more variable.

# Catch Shifted Up Same Trend

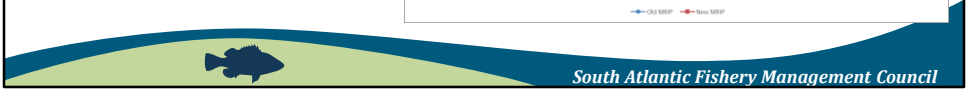
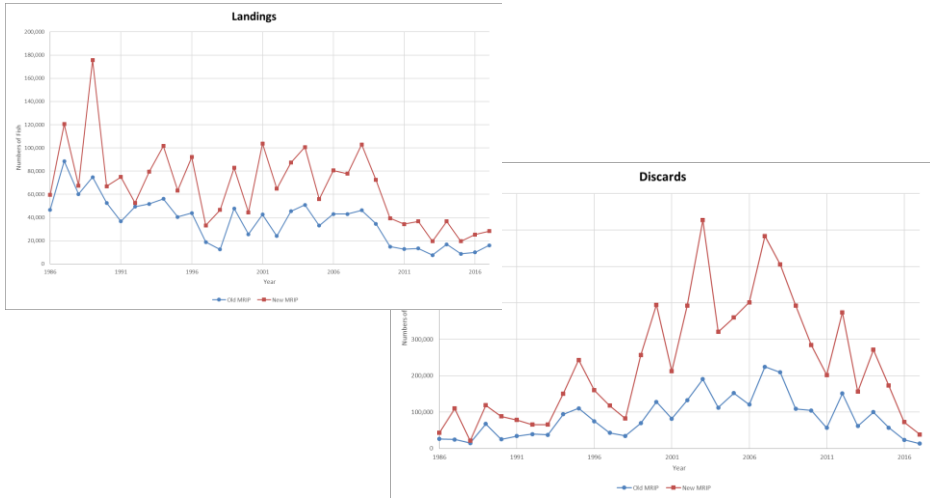


# Atlantic Spadefish

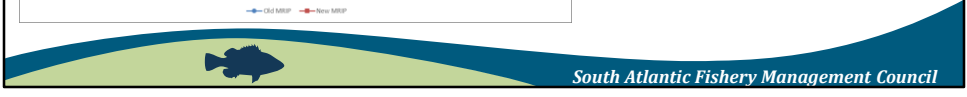
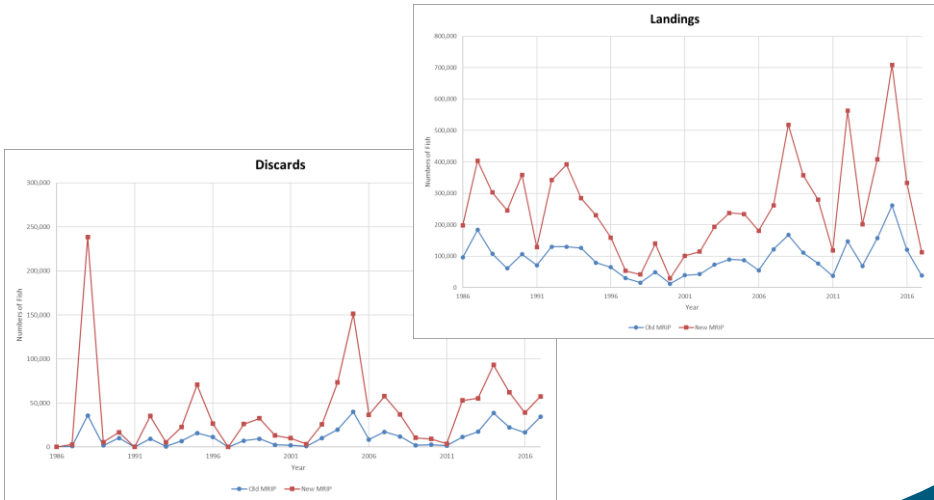


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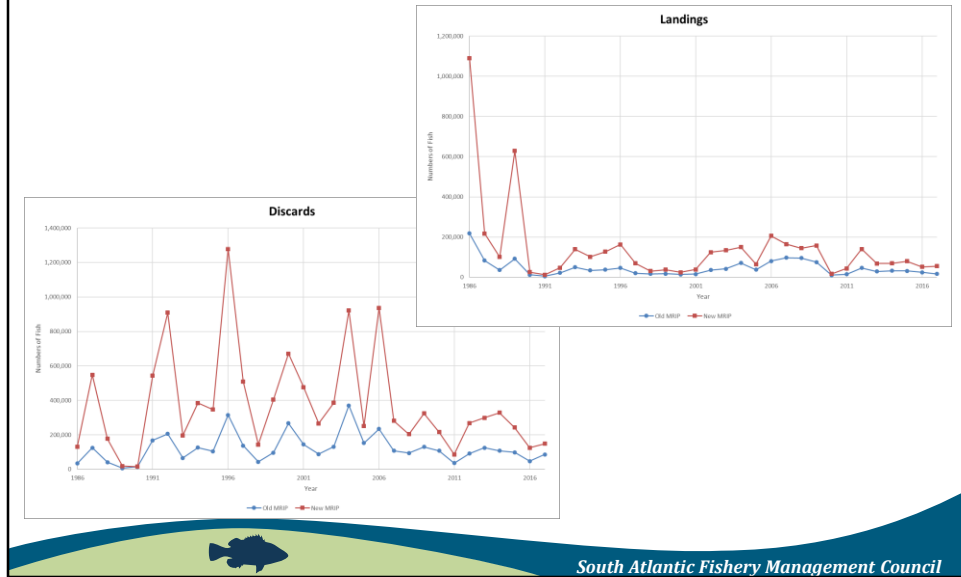
# Gag



# FLK/EFL Hogfish



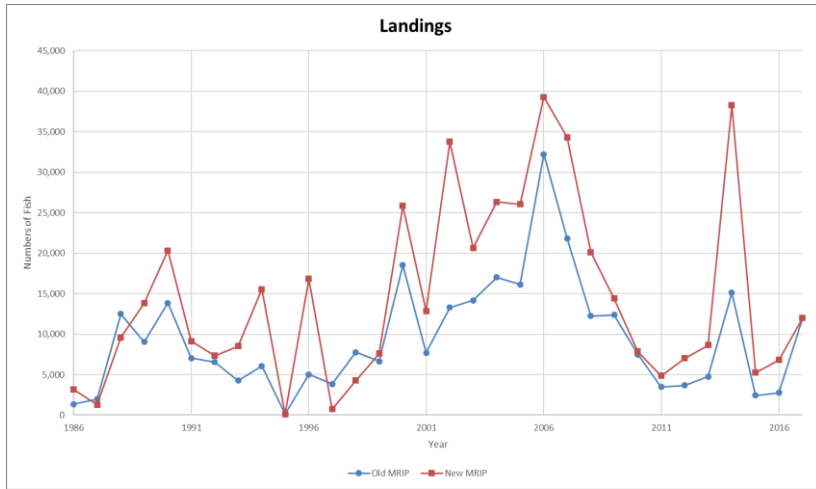
# Red Grouper



Huge increase in landings in early years caused by higher % Priv + Shore and very high effort expansion factors.

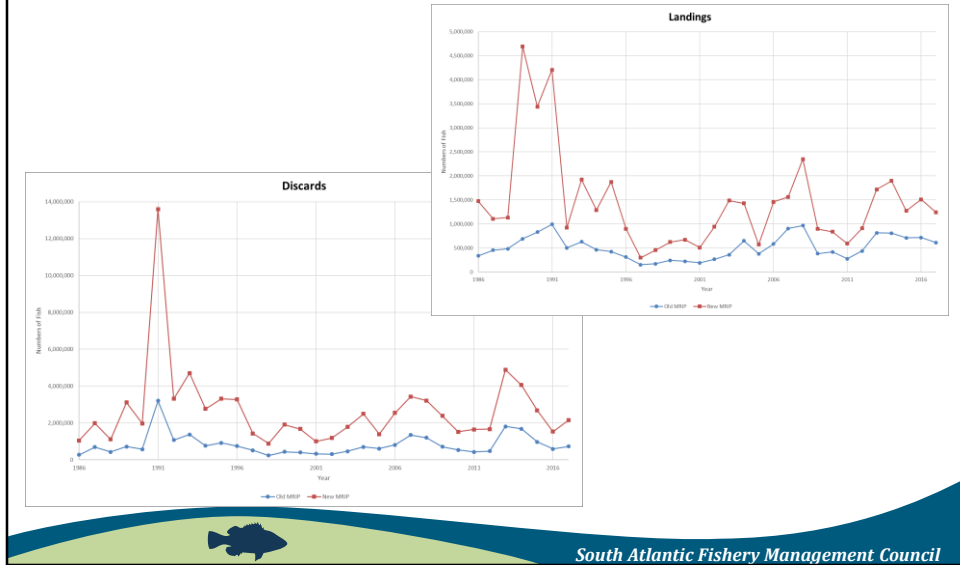


# Scamp



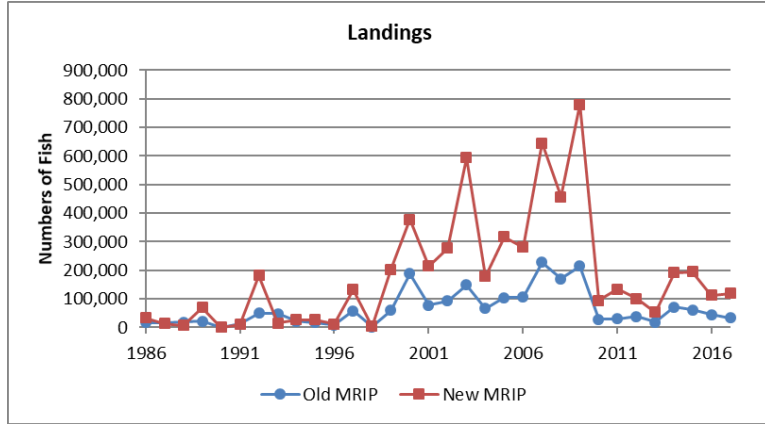
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# Yellowtail Snapper

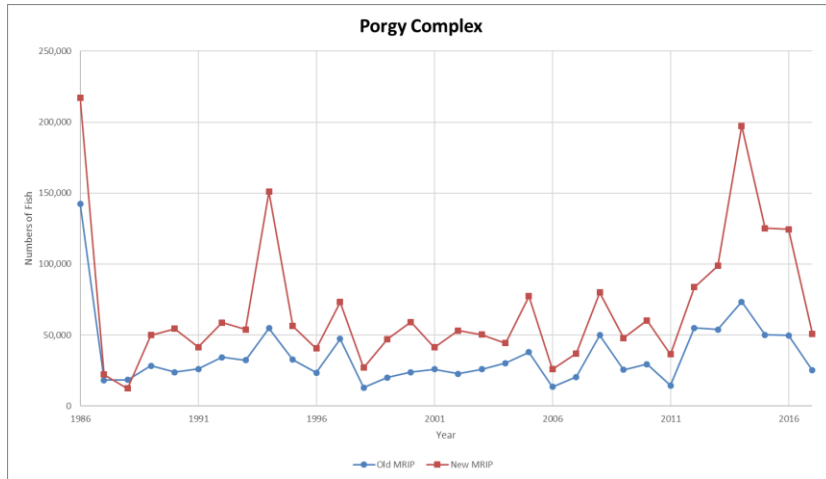


Large changes in early years due to high % Charter landings.

# Tomtate (Grunts Complex)

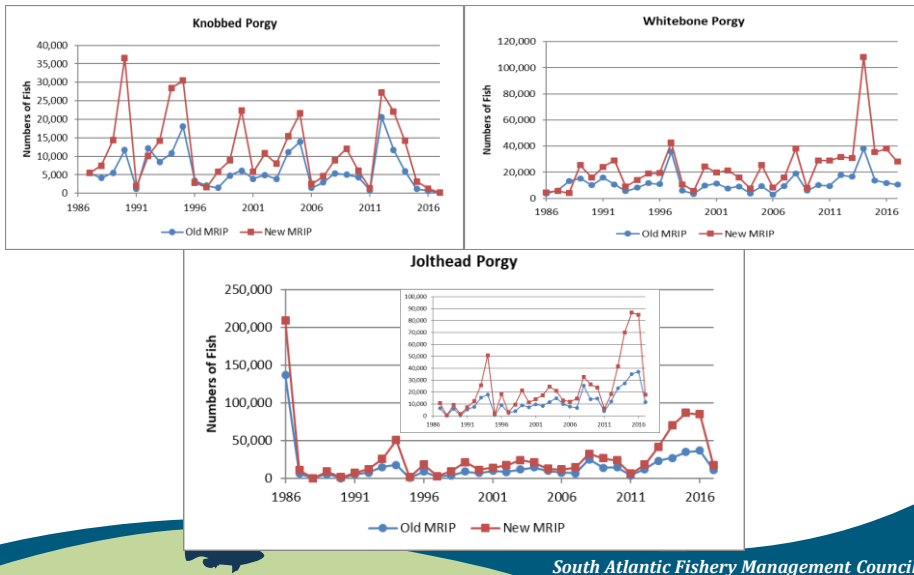


# Porgy Complex Landings



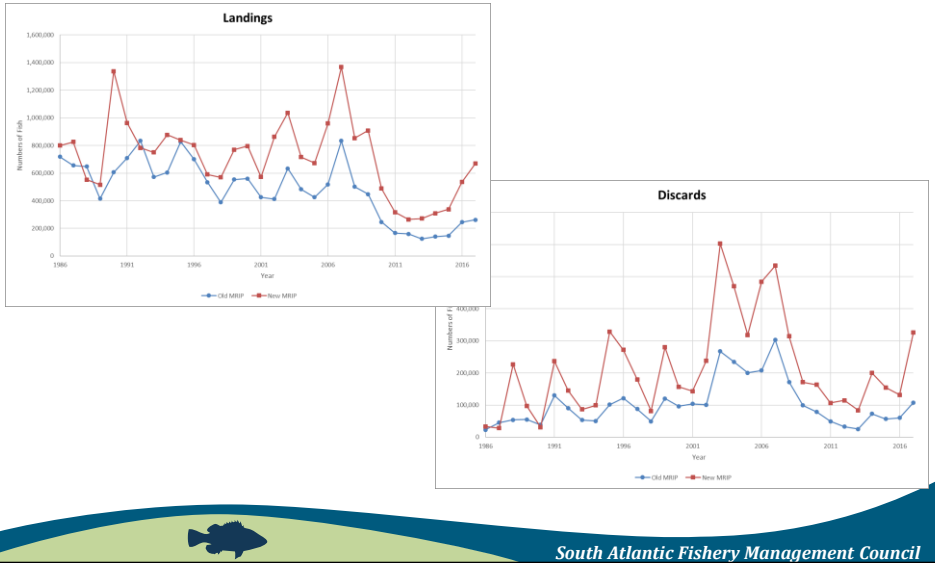
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# Porgy Complex Components



Mix of shift and increased variability

# King Mackerel

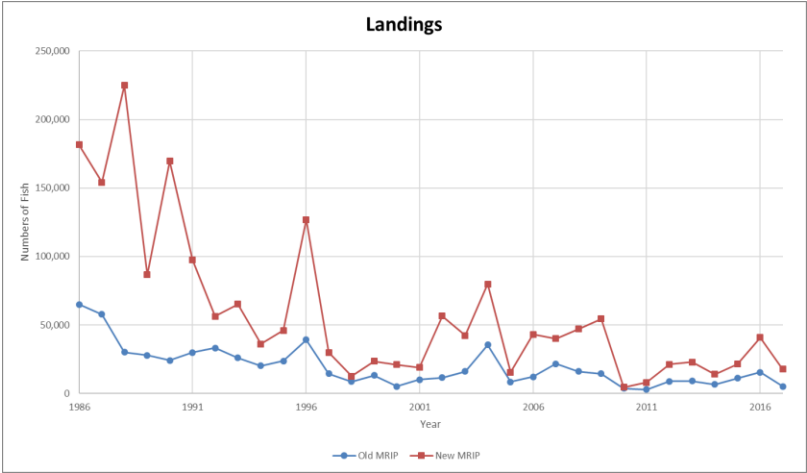


Shift caused by % Charter:% Priv going from 50:50 to 20:80.



# Larger Changes in Early Years

# Black Grouper





# Grunts Complex Components

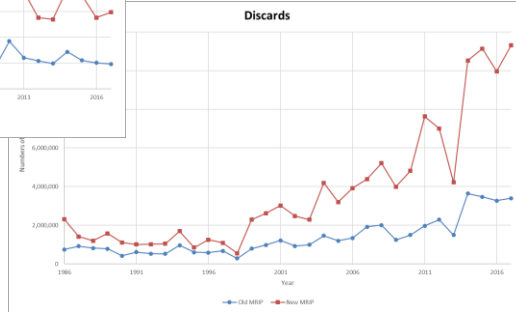
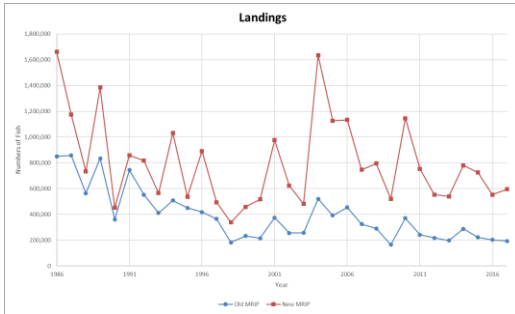


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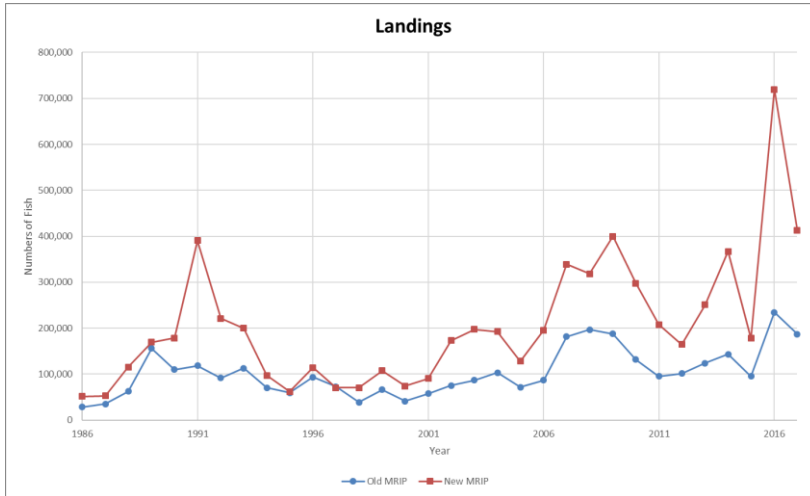
# Larger Changes in Recent Years

# Black Sea Bass



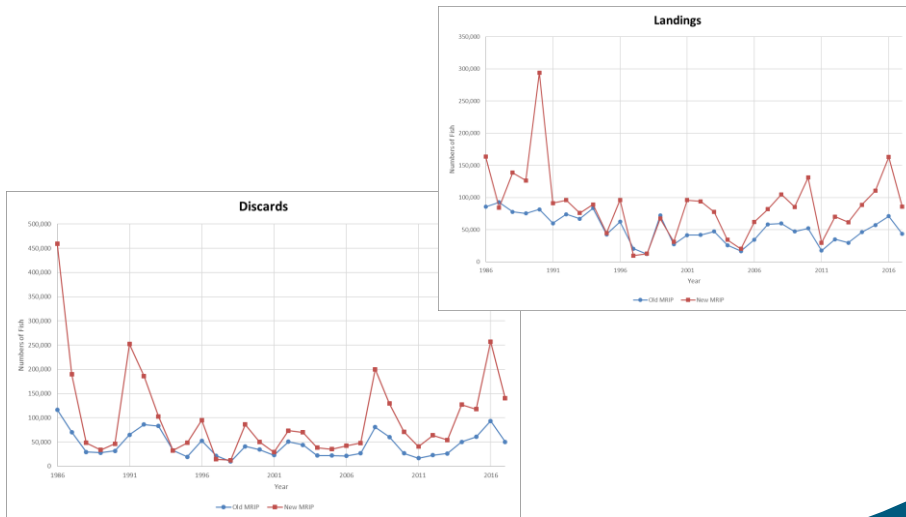
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# Gray Triggerfish



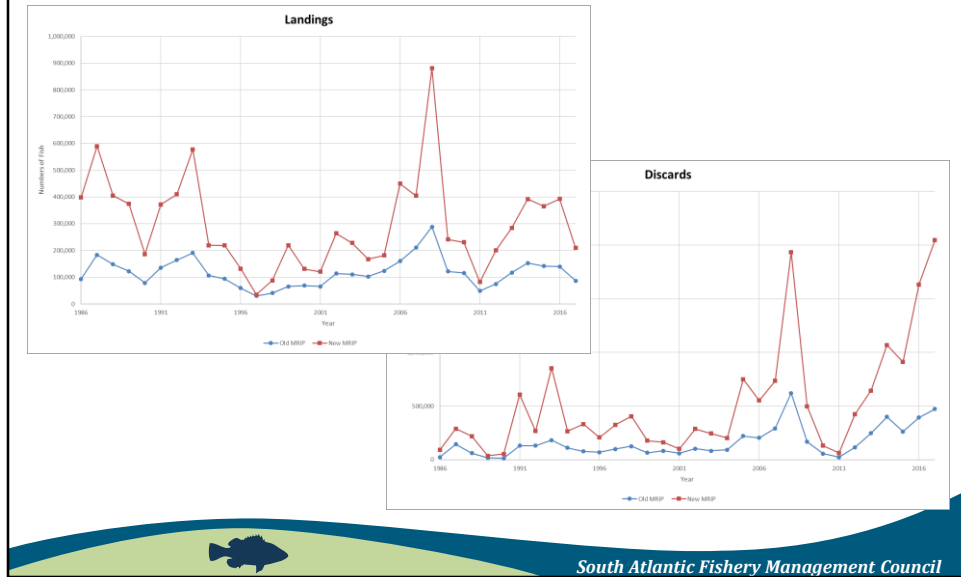
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# Greater Amberjack



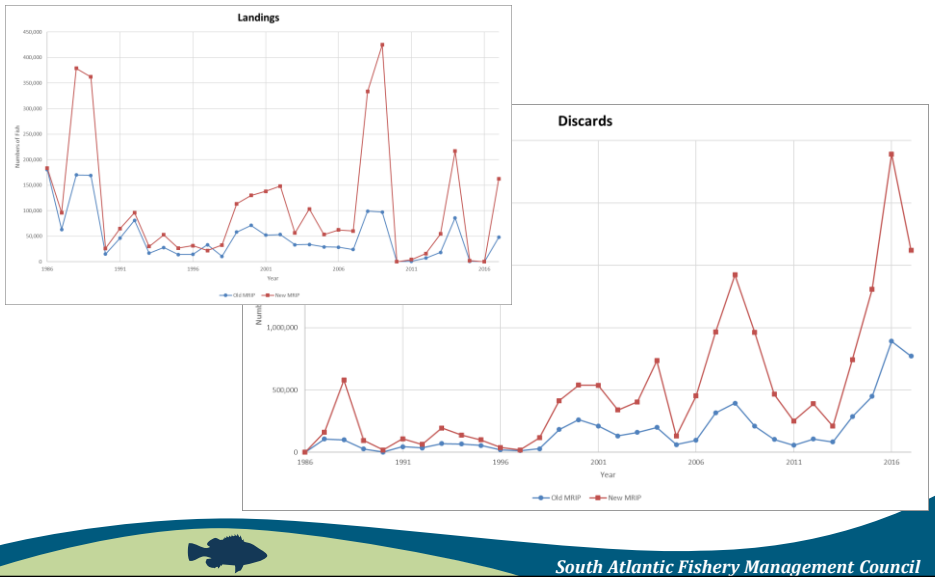
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# Mutton Snapper



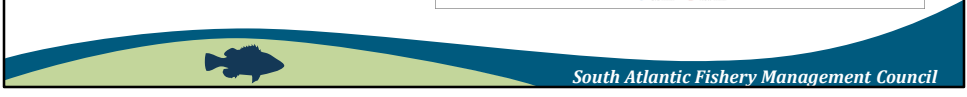
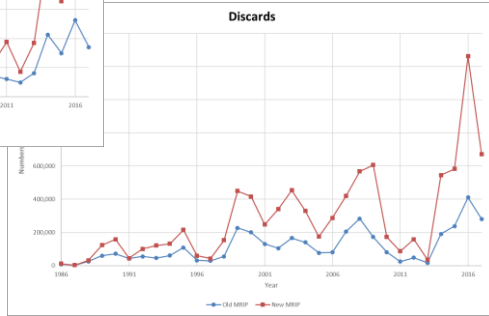
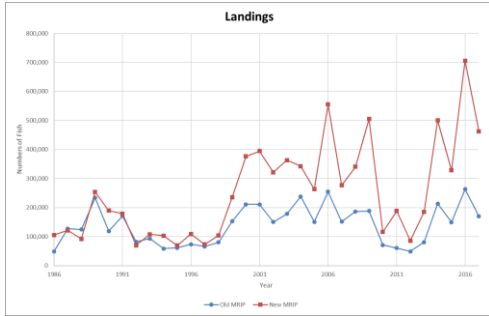
Higher % Priv and Shore in early years causes larger increase in landings. Dip in 2011 caused by huge spike in % Charter landings.

# Red Snapper



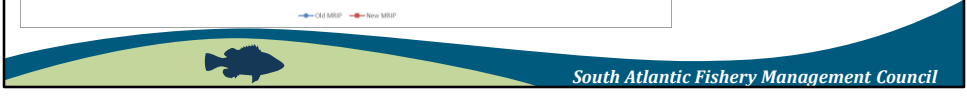
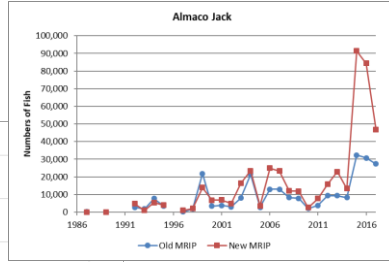
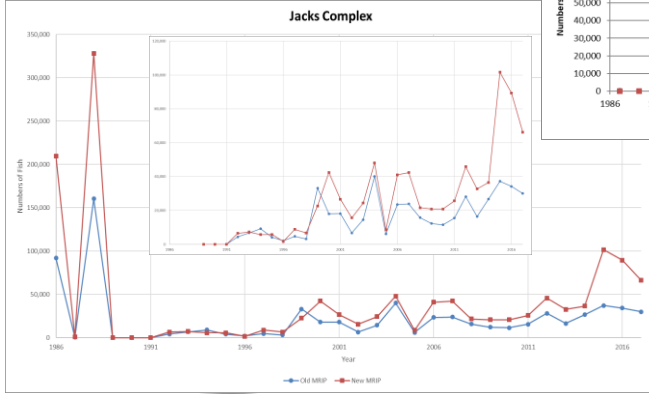
Landings just more variable due to much fewer intercepts happening in high effort areas.

# Vermilion Snapper

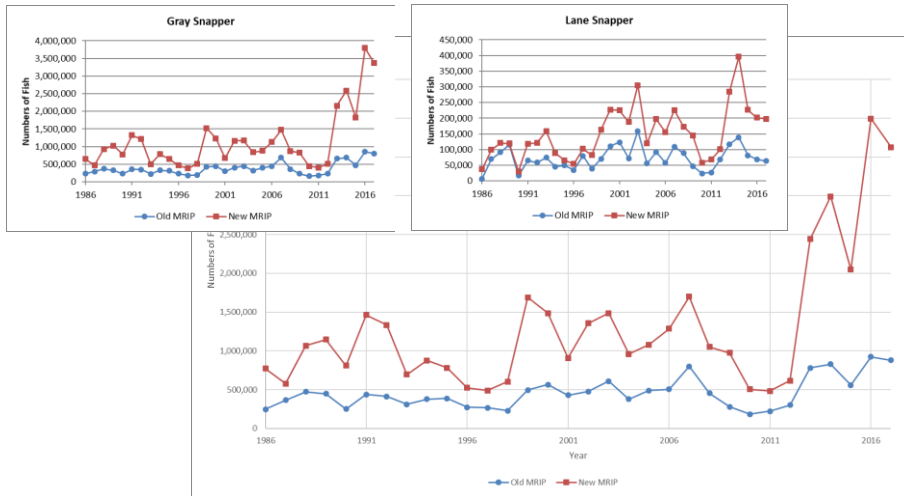




# Jacks Complex Landings

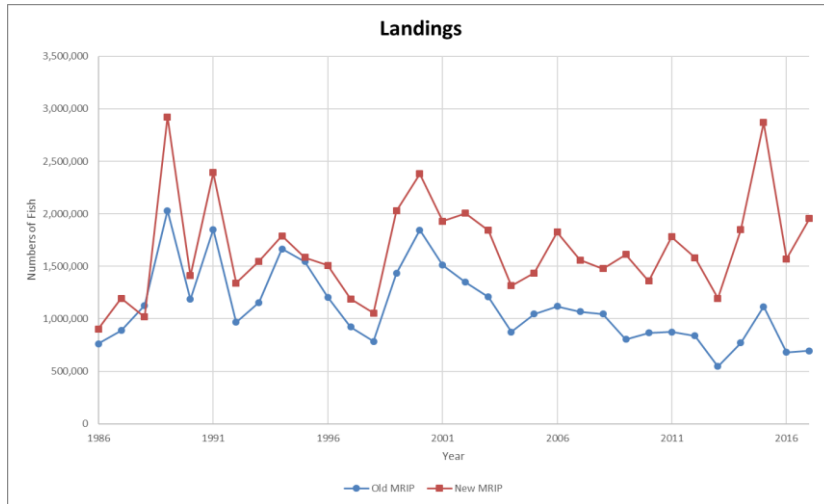


# Snappers Complex Landings



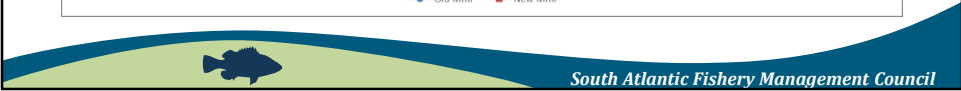
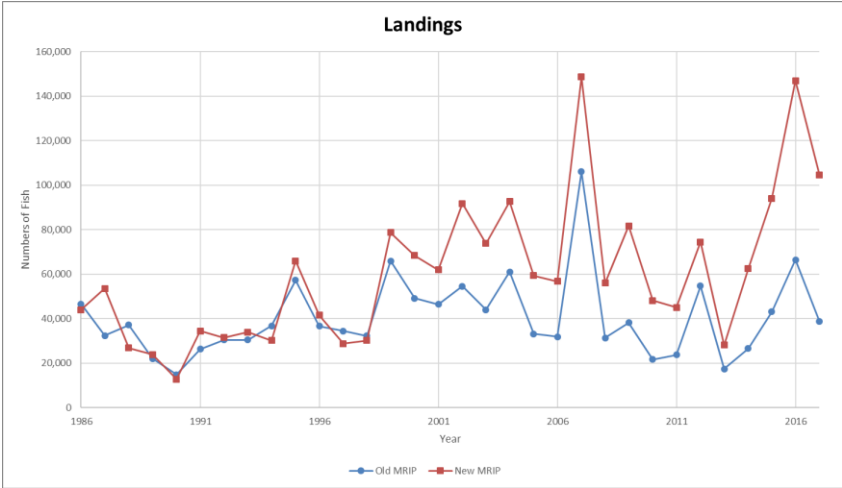
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# Dolphin

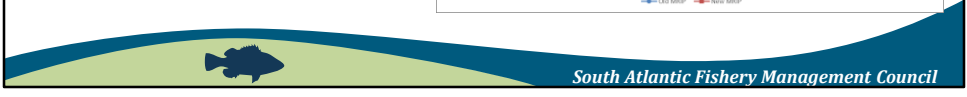
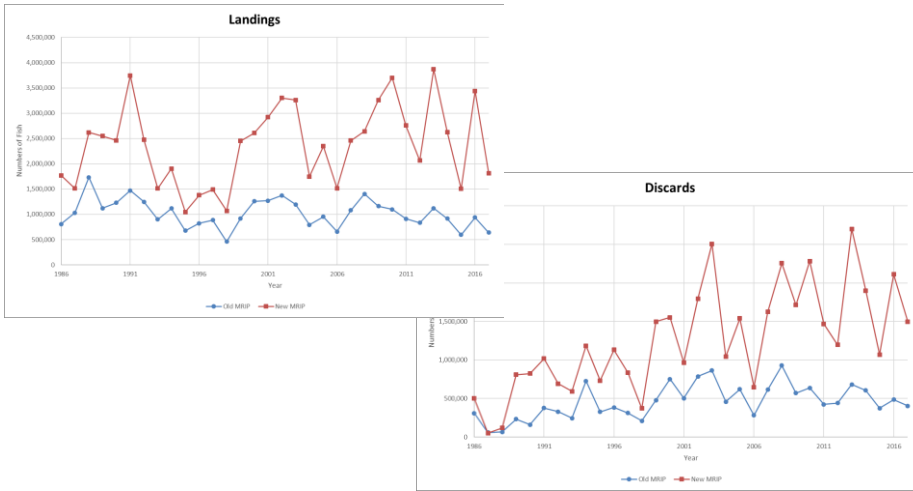


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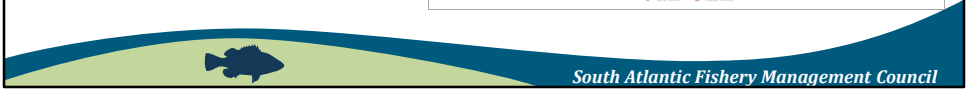
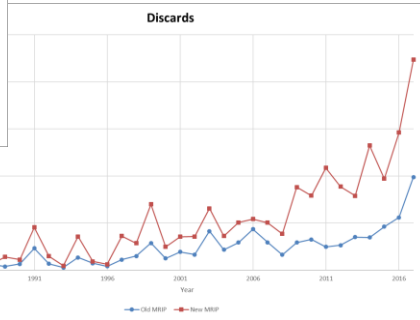
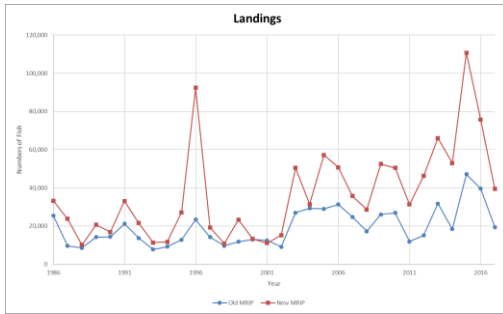
# Wahoo



# Spanish Mackerel



# Atlantic Cobia



# East Florida Cobia

