2016 MRIP Red Porgy Data Point Discussion Compiled by Mike Errigo

SSC MRIP Workshop August 2019

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# 2016 MRIP Red Porgy Data Point

**Minutes from the August 2019 MRIP Workshop**

Starting with red porgy, and this one is a little bit unusual. I will be talking about this point here in 2016, just because it has such a -- I guess a little bit of orientation. The landings in numbers, or the harvest in numbers, and these are total landings, A plus B1, and so it includes both the observed and the reported landings, and that's in the top panel, and these are for the South Atlantic, annual estimates for the entire region, 1981 to 2017, and the lower panel is releases, live releases, again, in numbers of fish, again annual and at the region level, and so this is across all modes, private boat, charter boat, and shore, if there are shore contributions.

For red porgy, I am going to focus on 2016, and this one is a little bit different than the others, the other cases we'll look at. Most of the others are usually in years prior to 2013, although there may be a couple of others in the more recent years, and you will see, in this one in particular, although it looks like this large increase is mostly between -- To finish describing the plot, the gray line with the open circles, that is the base series. That is the series of estimates prior to either of the calibrations being applied. The black-solid triangles, that's the ACAL, just the APAIS calibration, and then the black squares, solid squares, is the application of both calibrations.

In this case, we see a large increase going from the APAIS calibration to include both the APAIS and FES calibration, and so, really, that large increase is the effect of the FES calibration. However, you will notice, in both the landings and the releases, there is a large difference between the original estimate and the effort estimate after what I am calling here the APAIS calibration, and, as it turns out, in this case, they are sort of both important.

Here is a table that just summarizes the actual point estimates for the original estimates and how they increase with the APAIS calibration and then the final overall increase with both, and you can see the total change is calculated as the final estimates, the difference between the final estimates and the original base estimates, and then kind of the percentage of the overall change that can be attributed to the two different calibrations, and, really, I shouldn't have labeled this as FES. Well, I'm sorry. That is the percent changes for the FES calibration.

In general, this is the pattern we see. Usually the FES calibration accounts for the large majority of the difference. In many cases though, it's more like 90 percent or greater, but this is one case where the APAIS calibration is accounting for a somewhat larger percentage, and I mentioned this one is a little strange, and so you may remember 2016 is after we had implemented the new APAIS design, and so, in this case -- Well, let me finish with the APAIS calibration.

The way we can sort of see that the FES is -- How it's contributing is we can look at the ratio of the final calibrated estimate and the estimate that's just got the APAIS calibration, and we can see what the change is, again as FCAL divided by ACAL, and we see that for the landings here and also for the releases, and so it's 2.6 to 3.2. If we look at the ratio, the corresponding ratio, of the effort estimates, again, that reflect the calibration for FES and then that that just has what I'm calling the APAIS calibration, we can see that's close to three, and so that's falling right

in between these two, and this information I'm presenting is at a summarized level, and it would actually be -- The application of the calibrations is done at a much lower level, and so, if I had all of the individual cells listed out here, you would see the ratios sort of lining up exactly between the private boat effort for those cells, the change ratios, and the catch estimate change ratios.

That's why there is some discrepancy here, but, again, the overall change ratio in the effort is very close to the change ratios for the two catch estimates, and so that's getting us from the APAIS calibration then to include the FES. To dig into why the APAIS calibration had some effects, in this case, here, what we had to do for the more recent years is -- Because we were making, we continued to make, APAIS design changes, improvements, after we had implemented the sort of basic new design -- When we first implemented in 2013, Wave 2 2013, March/April, we took a pretty serious hit on productivity.

We had addressed all of the sort of deviations from probability sampling that had been present in the old design, but, in becoming more rigorous, from a statistical perspective, we had taken a fairly sizable hit, from a productivity standpoint, in terms of producing intercepts, and so 2013 was a fairly stressful year, and that was the start of this haggard beard for me, and it had just continued to grow ever since, but we had to make a number of changes, again all still consistent with design based sampling, but ways to improve the productivity of the survey throughout the course of 2013, and, really, into 2014 as well.

Some of those changes included mixed-mode sampling, and so no longer stratifying by mode, exactly, but creating the site groups, which were grouped based on primary mode at the sites, but, when sampling was actually conducted, samplers could collect interviews in any mode, and so that was one major change. Another major change was, initially, we had only the four six-hour non overlapping time intervals for assignments that cut the twenty-four-hour day, again, into four six-hour slices that didn't overlap.

That was very clean, from a design perspective and for calculating sample weights and estimation and all of that. The problem was that it wasn't productive enough for us, given the available funding we had for sampling, and so we had to create that fifth interval, the peak interval, that overlapped the two daytime intervals. It overlapped exactly three hours for each of those two daytime intervals.

When we created that overlap, we then had to account for that in the sample weighting, because, essentially, the trips that were occurring within that overlap window had a higher probability of being selected. They could have been selected from either of the two original time windows, or they could have been selected in that overlap six-hour time interval, and so we had to adjust the sample weights to correctly account for that increased probability of being selected for trips that were in that window, and so what I've got here, what I'm showing here, is the difference in the APAIS sample weights from when we applied the correction for this overlap sample window from what the original sample weights were, and so this plot gives you time of day binned to individual hours, and there is just a little jittering here, to sort of separate the data points, and this is a plot of all of the individual differences for the angler trip APAIS sample weights, again calculated as the new weight, the adjusted corrected weight, minus the original APAIS sample weight.

You can see the overlap is in the middle of the day, and so, essentially, it starts at 11:00, and it goes to just before 5:00 p.m. 5:00 p.m. starts the second half of the afternoon interval, and so what happened was weights from 11:00 to 1:00, essentially, were down-weighted, and weights from 2:00 to 4:00 were really sort of a mixed effect, and then weights from 5:00 to just before 8:00 were upweighted, and so trips that came in in this window had their sample weights increased, and trips that were intercepted in this window had their sample weights, on average, decreased, and then, here in the middle, it was just sort of kind of a mixed effect from this adjustment.

Why does this matter? Well, we can plot the same distribution of the differences in these sample weights after this weight correction against the distribution of red porgy intercepts, again, intercepted angler trips with catch of red porgy, and, again, they're lined up by hour, and so you can see that the bulk of the distribution of red porgy trips is sort of later in the day, late afternoon or early afternoon, and so a disproportionate amount of those trips, or a larger proportion of those trips, were upweighted after this correction, compared to a smaller fraction of those trips being down-weighted.

This led to an increase in the catch rate for red porgy, which was then multiplied by the corresponding effort estimate, and so, in this case, changes related to the APAIS actually made a noticeable impact in the change in the overall catch estimates. This is a little bit of an unusual situation. Most of the rest we'll see are more related directly to the calibrations as we've been describing them in the earlier presentations, and it's true -- This is the same explanation for both the landings changes related to APAIS and the release changes related to APAIS in 2016.

**SSC Conclusions**

**TOR 1a.** Describe for a set of SAFMC managed species currently in the SEDAR process how the sources of disparity between CHTS and FES affect the FES catch estimate time series, with attention on trends, uncertainty, and potential outliers.

i. Red Porgy, Greater Amberjack, King Mackerel, Golden Tilefish, and Gag.

- *Information addressing this TOR is available in the briefing materials for this workshop in extensive detail.*
- *Overall, the SSC did not identify any one factor that contributed to the disparity in the estimates between the two surveys. Several factors working in concert (differently for each species or even each data point) contributed to the disparities.*
- *As an example, the panel had an extended discussion of Red Porgy outliers in the estimated catch time series, particularly the estimated landings in 2016. Based on the discussion, we learned that while the FES calibration was responsible for most of the difference from the previous survey estimates, the weighting approach used in the APAIS sampling methodology up-weighted samples landed in the afternoon. Since most Red Porgy were landed in the afternoon in 2016, this led to a large estimate of Red Porgy catch in 2016. For other species examined during the workshop (e.g., Greater Amberjack), the FES calibration was also responsible for*

*most of the difference between the new survey design and the CHTS design, but the APAIS weighting methodology also contributed to some degree in most cases. The large effects of the FES calibration were often driven by a single state, fishing mode, or temporal wave, while the APAIS effects were most often driven by fishing pressure at a specific site and also by day type (weekend, holiday, etc.).*

- *In summary, the sources of outliers were species-dependent and often caused by higher estimates of effort and/or catch in unique combinations of location, time of year, or fishing mode.*

# Red Porgy

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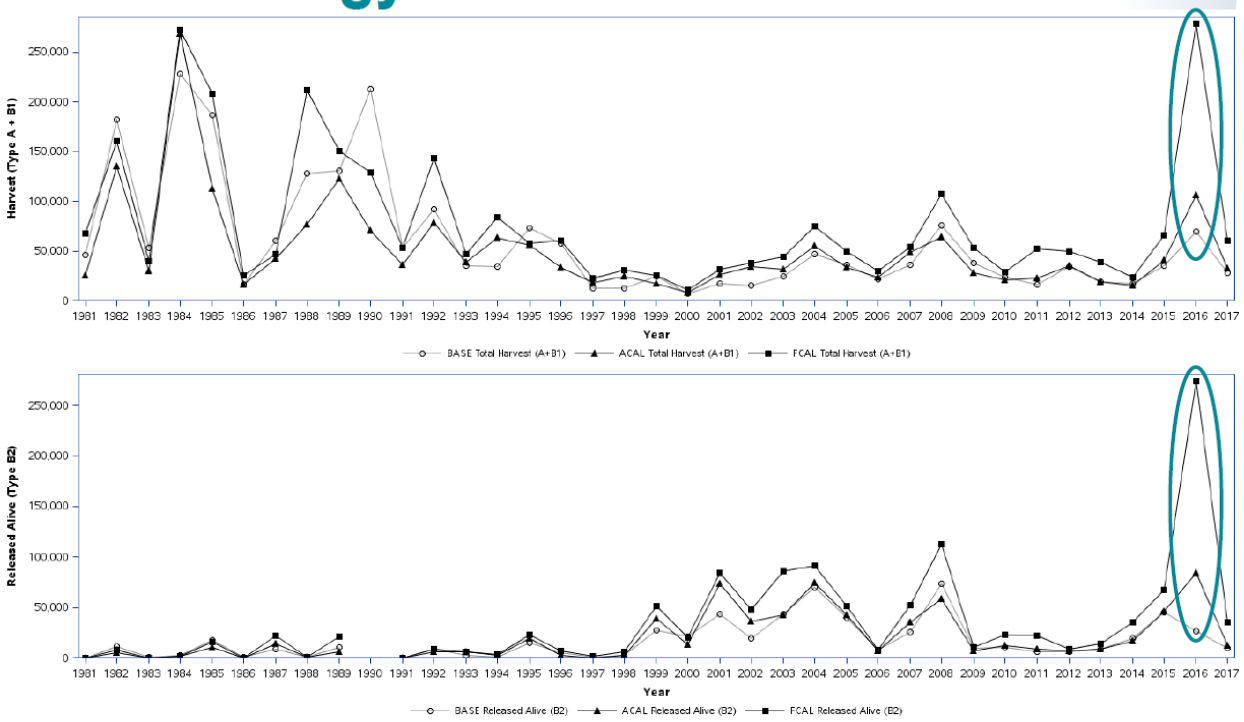
# Red Porgy – South Atlantic









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# Red Porgy – 2016 S Atl Catch

- Large changes in 2016 landings and releases due to FES calibration and APAIS calibration

| Estimate | Total BASE | Total ACAL | Total FCAL | Total Change | % Change APAIS | % Change FES |
|---|---|---|---|---|---|---|
| Landings | 69,574 | 106,060 | 278,494 | 208,920 | 17 | 83 |
| Releases | 26,428 | 84,737 | 273,961 | 247,533 | 24 | 76 |



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# Red Porgy – 2016 S Atl Catch

- FES calibration effects

| Estimate Type | Total ACAL | Total FCAL | Change Ratio |
|---|---|---|---|
| Landings (no. fish) | 106,060 | 278,494 | 2.63 |
| Releases (no. fish) | 84,737 | 273,961 | 3.23 |
| Private Boat Effort (no. angler-trips) | 7,152,265 | 21,252,299 | 2.97 |

- Summary information calculated at regional, annual levels
- FES calibrations calculated at more detailed levels



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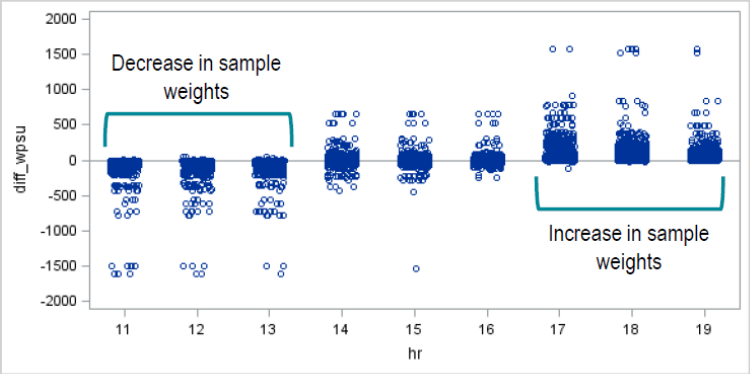
# Red Porgy – 2016 S Atl Catch

- APAIS calibration effects
  - Adjust sample weights to account for overlapping sample time intervals implemented in 2014




Jittered differences between adjusted and original APAIS sample weights by trip end hour for all intercepted trips in the South Atlantic, 2016



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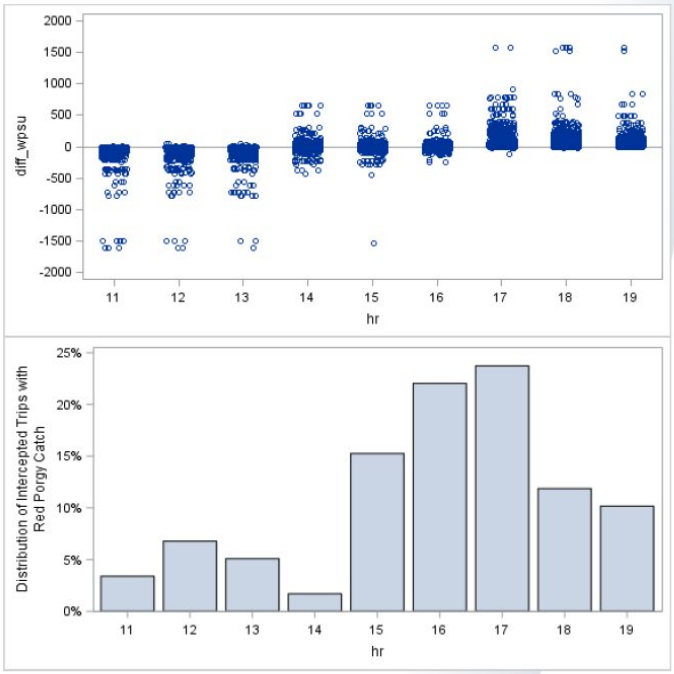
# Red Porgy – 2016 S Atl Catch

- Larger percentage of red porgy intercepts were obtained in the later afternoon hours (sample weights increased) compared to mid-day hours (sample weights decreased)



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