Total Removals of red snapper (*Lutjanus campechanus*) in 2014 from the U.S. South Atlantic

SEFSC

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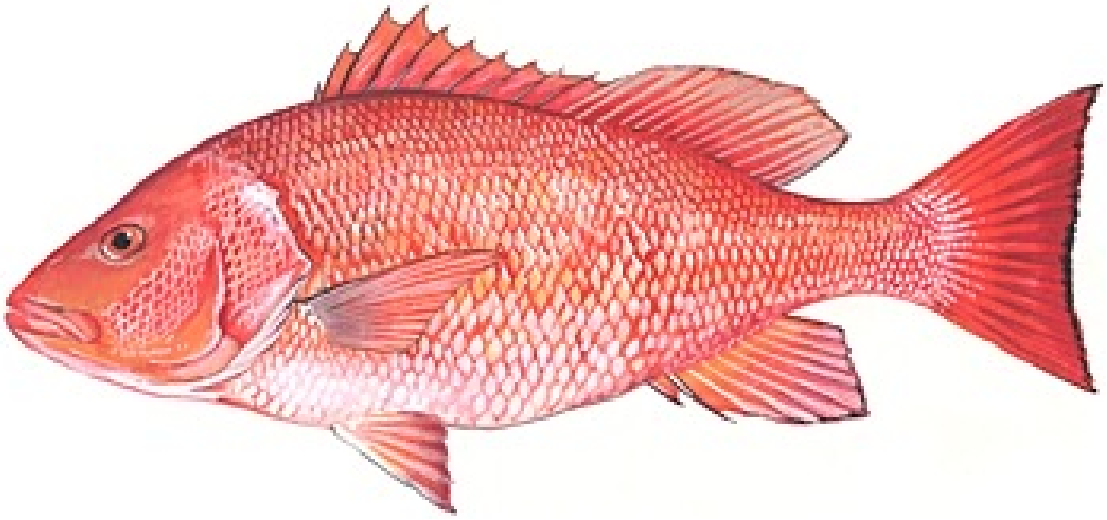

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Introduction

This report provides 2014 estimates of the total removals (landings and dead discards) of red snapper (*Lutjanus campechanus*) from the South Atlantic Fisheries Management Council's (SAFMC) jurisdiction. These estimates were compiled for the dominant commercial and recreational fleets in the fishery and from several data sources, as described below.

Assessment Analysis History

The last benchmark stock assessment for red snapper was completed as part of SEDAR 24 in October 2010 using the Beaufort Assessment Model (BAM). The Review Panel for SEDAR 24, which included Center for Independent Experts (CIE) reviewers, concluded that the model was adequate, appropriate, and applied correctly to the red snapper stock. The base run in the SEDAR 24 report was based on a headboat index likelihood component weight of 0.11. During the review of this stock assessment by the Scientific and Statistical Committee (SSC) at their November, 2010 meeting, the SSC selected a set of equally plausible runs that applied a range of likelihood component weights for the headboat index of 0.2-0.3. Increasing the weight on the headboat index resulted in more optimistic stock status outcomes, although all runs indicated the stock was severely overfished and undergoing overfishing. The SAFMC selected the projection analysis using the headboat index weight of 0.3 for management purposes.

The SAFMC manages red snapper using an F_{MSY} proxy of $F_{30\%SPR}$. This F proxy is higher than the $F_{40\%SPR}$ proxy recommended by the SEDAR 24 review panel and the SSC. Should the SAFMC's choices of headboat weight and F_{MSY} proxy turn out to be overly-optimistic, then acceptable biological catches (ABC) summarized in this document may result in a higher risk of overfishing.

Data Sources

The total removal (landings and dead discards) estimates for the U.S. South Atlantic federal fisheries come from several different survey sources. These sources focus on particular sectors of the overall snapper-grouper fishery. Landings and discard data sources are broken out by commercial, recreational headboat, recreational charter boat, and private boat. This report is structured along the lines of the representative data collection systems for each, with reports of additional or auxiliary data sources included as well.

Commercial Landings

Data were queried for 2014 to obtain the landings estimate for the states of Florida, Georgia, South Carolina, and North Carolina by month. These data by month or state are confidential, and therefore, only the total landings of 61,498 (lb whole weight) can be presented in this report. Based on the average weight (5.68 lb whole weight) used for computing the quotas, this commercial landings weight estimate equates to 10,827 fish.

The monthly landings estimates indicated landings occurred from May through November during 2014. Of all our fishery-dependent data, the commercial landings are thought to be the most accurate. Despite that fact, there remains the possibility of some unknown amount of unreported or misreported catch that may have occurred.

Commercial Discards

Commercial discards were calculated for vertical line (handline and electric reel) vessels in the U.S. South Atlantic using the commercial logbooks. These self-reported logbooks are largely unverified. The annual discard estimate from these logbooks is computed using a delta-lognormal model to compute year-specific discard rates, which were then applied to total effort to calculate annual discards for the period 2002-2014. The value of total discards computed for 2014 is 29,167 red snapper. Data included in the calculation were filtered to remove records from fishers who reported "no discards" of any species for 75% or more of reported trips during years with four or more trips reported by the fisher. This data filter was necessary due to consistent non-reporting of discards by some fishers. The fact that this step is necessary indicates the potential bias due to under-reporting, particularly for discard information from self-reported data.

A potential rationale for under-reporting discards lies in the management regulations themselves. In the case of red snapper, the ABC was based on total removals and the management accountability measures are based on the ABC. This establishes a link between reported discards and the accountability measures, which dictate the opening and closing of the fishery, creating an incentive for under-reporting discards. That incentive may be enhanced by the lack of appropriate validation or verification. The degree to which this potential incentive for under-reporting might be affecting red snapper data is unclear. Despite the filtering of data to remove consistent non-reporting of discards, concerns about the potential bias of the remaining records still remain. In addition, there are other commercial fishing gears (e.g. longline and traps) that likely capture red snapper that are not considered in this discard summary. For those reasons, it is likely that estimates of commercial discards in this report represent a lower bound for the true value.

The SEDAR 24 report contains fleet-specific discard mortality rates that were used to compute the number of dead fish based on total releases. In the case of commercial caught fish the discard mortality rate of 0.48 was used. When applied to the data in this report, the estimate of total dead discards is 0.48 * 29,167 = 14,000 dead fish.

Recreational Headboat Landings and Discards

The Southeast Region Headboat Survey (SRHS) estimates landings and discards for headboats in the U.S. South Atlantic and Gulf of Mexico. The estimates are computed from required, self-reported logbooks. The estimates of landings from the SRHS are not verified by dockside sampling, although occasionally red snapper were observed during the SRHS biological

sampling on trips for which the captain has reported "none" in their logbook; in those instances the catch reports are edited to reflect the observed landing. Discard estimates are partially verified by at-sea observers. The best estimate of total landings from headboats is 2,952 fish (22,450 pounds whole weight) and the best estimate of total discards from headboats is 46,612 fish. Using the SEDAR 24 discard mortality rate of 0.41 on for-hire vessels, the best estimate of dead discards from headboats is 0.41 * 46,612 = 19,111 dead fish.

Recreational Charter Boat and Private Boat: Landings and Discards

During SEDAR 24, Marine Recreational Fisheries Statistics Survey (MRFSS) estimates for charter boats and private recreational boats were used in the stock assessment and projections. For consistency with SEDAR 24, the Marine Recreational Information Program (MRIP) estimates have been converted to "MRFSS" equivalent estimates and are reported here for 2014. The conversion of MRIP to MRFSS estimates only takes into account the MRIP re-estimation change and does not account for the Access-Point Angler Intercept Survey (APAIS) change. The MRIP covers coastal Atlantic states from Maine to Florida and provides estimated catch per unit effort, total effort, landings, and discards for six two-month periods (waves) each year. The survey provides estimates for three recreational fishing modes: shore based fishing, private and rental boat fishing, and for-hire charter and guide fishing, though shore mode estimates are excluded for SA red snapper (SEDAR 24 and 41). The MRFSS equivalent estimates in this report were provided by the SEFSC Miami Laboratory.

The MRIP design incorporates three complementary survey methods for estimating catch and effort. Catch data are collected through dockside angler intercept surveys of completed, recreational fishing trips. Effort data are collected using two telephone surveys. The Coastal Household Telephone Survey (CHTS) obtains detailed information from anglers about the previous two months of recreational fishing trips. The weekly For-Hire Survey interviews charter boat operators (captains or owners) to obtain the trip information with a one-week recall period. These effort data and estimates are aggregated to produce the wave estimates. Catch rates from dockside intercept surveys are combined with estimates of effort from telephone interviews to estimate total landings and discards by wave, mode, and area fished (inland, state, and federal waters). Because the MRIP collects information at the wave level, a short duration (e.g. two extended weekends) opening is not ideal for accurate estimation of catch.

Recognizing the limitations of MRIP to provide reliable catch estimates for short openings, data from state specific surveys conducted by North Carolina Department of Marine Fisheries (NCDMF), South Carolina Department of Natural Resources (SCDNR), Georgia Department of Natural Resources (GADNR), and Florida Fish and Wildlife Conservation Commission (FWC) were used in this report (Table 1).

On April 27, 2015, a red snapper mini-season ad-hoc group call and webinar was held to determine the best estimates to use to characterize the recreational catch (see attached call summary, Appendix 1) for use in the upcoming SEDAR 41 Data Workshop. Note that on the call MRIP estimates were used in discussions, but estimates in the tables of this report reflect the "MRFSS" equivalent converted numbers. Choices between MRIP and state survey results were

made based on decision tree approach used in the 2014 data workshop to determine landings and discards for the 2012 and 2013 mini seasons. Clarifications were made to Option 3.

Option 1: Use State number if no MRIP number is available, making note of any potential bias
Option 2: Use MRIP number if no State number is available
Option 3: Use the estimate/number (MRIP or State) that is more reliable (taking into account sample sizes, CV's, and/or biases associated with the survey) when both MRIP and State numbers were available.

For MRIP estimates it is clear that some of the estimates are biased low due to few or no intercepts. At the same time an estimate based on a single intercept, scaled up by the effort from that wave, may be too high. It is unclear for a given intercept which way the mis-estimation may go. The FWC study was limited to just the fishery opening, and hence their estimates of discards are certainly an underestimate for wave 4 and to the degree that out of season harvest occurs, may represent an underestimate of landings as well.

It should be noted that the MRIP is in practice an unbiased survey and that any error we see in the data is simply observation error likely due to low sample sizes. We used the SEDAR 24 discard mortality rates of 0.41 on charter vessels and 0.39 for private boats to compute the number of dead discards.

Summary of Landings and Discards

Based on the methods discussed above from the various data collection programs and accounting for sector specific discard mortality rates, the final estimates are summarized in Table 2 below.

The uncertainty from all these data sources is considered to be quite high. Confidence intervals are not reported here because of the difficulty in combining data sources from different estimation designs. We simply note that the uncertainty is high, and likely higher than estimates typically seen for other snapper-grouper species. What may be of more concern for these estimates is possible bias, which unfortunately is largely unknown.

Table 1. Summary of MRIP (converted to MRFSS equivalent) and state survey estimates of red snapper landings and discards from 2014 from the charter and private boat sectors. Cells highlighted in yellow were selected for estimating the final landings and discards in Table 2.

		LANDINGS (N) AB1				DISCARDS (N) B2			
		CHARTER		PRIVATE		CHARTER		PRIVATE	
		"MRFSS"	State Survey	"MRFSS"	State Survey	"MRFSS"	State Survey	"MRFSS"	State Survey
State	Wave								
NC	1								
	2								
	3					371			
	4	173	41		14	747		5073	
	5								
	6								
NC Total		**173**	**41**	**0**	**14**	**1118**	**0**	**5073**	**0**
SC	1								
	2						29		
	3		3				242	1565	
	4		46	596	76		184	1675	
	5						73		
	6						53	334	
SC Total		**0**	**49**	**596**	**76**	**0**	**581**	**3574**	**0**
GA	1								
	2					42		447	
	3					166		11367	
	4	328	150	1195	106		75	1948	265
	5								
	6								
GA Total		**328**	**150**	**1195**	**106**	**208**	**75**	**13762**	**265**
FLE	1			1356		33		18463	
	2					1725		1836	
	3			735		5923		48006	
	4	6635	2377	93824	22213	16190	2871	157006	9960
	5					3870		1477	
	6			393		13863		38927	
FLE Total		**6635**	**2377**	**96308**	**22213**	**41604**	**2871**	**265715**	**9960**

Table 2. Summary of estimates of U.S. South Atlantic landings and discards for red snapper in the 2014 calendar year.

Sector	Landings (numbers)	Landings (whole pounds)	Discards (numbers)	Dead Discards (numbers)	Total Removals (numbers)
Commercial	10,827	61,498	29,167	14,000	24,827
Recreational Headboat	2,952	22,450	46,612	19,111	22,063
Recreational Charter Boat	2,749	-	43,586	17,870	20,619
Recreational Private Boat	25,982	-	288,124	112,368	138,350
Total	42,510	-	407,489	163,349	205,859

Appendix 1.

SEDAR 41 Red Snapper Mini-Season Ad-hoc Group Call
4/27/2015

Attendees: Vivian Matter, Beverly Sauls, Chris Wilson, Dawn Franco, Kathy Knowlton, Eric Hiltz, Erik Williams, Kelly Fitzpatrick, Ken Brennan, Tom Sminkey

The purpose of the Mini-season Ad-hoc conference call was to determine which landings and discards to report for the South Atlantic recreational red snapper mini season in 2014 (July 11-13, 18-20, 25-26). The key issue is that MRIP was not designed to capture short pulses of fishing, but rather to capture 2-month intervals (waves) of landings, discards, and effort. When a short opening occurs in a fishery, it is unlikely that MRIP will capture the event during its random sampling. If MRIP does happen to capture the event in terms of catch rate, that event will be scaled up by effort in that wave. Choices between MRIP and state survey results were made based on decision tree approach used in the 2014 data workshop to determine landings and discards for the 2012 and 2013 mini seasons. Clarifications were made to Option 3.

The sources of mini-season data that were reviewed for potential use are as follows:

- Marine Recreational Information Program (MRIP)
- North Carolina Department of Marine Fishers (NCDMF) state survey
- South Carolina Department of Natural Resources (SCDNR) state survey
- Georgia Department of Natural Resources (GADNR) state survey
- Florida Fish and Wildlife Conservation (FWC) Commission state survey

Option 1: Use State number if no MRIP number is available, making note of any potential bias
Option 2: Use MRIP number if no State number is available
Option 3: Use the estimate/number (MRIP or State) that is more reliable (taking into account sample sizes, CV's, and/or biases associated with the survey) when both MRIP and State numbers were available.

Issue 1: *How to characterize the recreational landings during mini-seasons in 2014 for each state, mode, and wave.*

Decision(s): Option1.

- State Charter (CH) – SC (Wave 3 and 4)
- State Private (PR) – NC (wave 4)

Discussion and notes of potential bias/error: The CH landings from SC were self-reported through the logbook program without methods to validate the reported landings. The PR landings from NC were based on number of donated carcasses and are therefore not considered to be a random sample.

Option 2.

- MRIP (PR) – FLE (Wave 1,3, and 6)

Discussion and notes of potential bias/error: Estimates for MRIP based on 1 angler trip for each wave with high CV (>1.0) and therefore could be an overestimate of actual landings. These intercepts were verified by looking at the field data sheets.

Option 3.

- MRIP (CH) – NC (Wave 4)
- State (PR) – SC (Wave 4)
- State (CH) – GA (Wave 4)
- MRIP (PR) – GA (Wave 4)
- State (CH) – FLE (Wave 4)
- State (PR) – FLE (Wave 4)

Discussion and notes of potential bias/error: The MRIP estimates were selected for CH in NC (wave 4) due to fact that the state survey number was based on carcass donations and was likely to be an underestimate of statewide landings and had a larger associated bias compared with the MRIP survey methodology. The SC state survey also relied solely on carcass donations but the state survey number was determined to be a more accurate representation, in this case, due to the fact that the MRIP estimate was derived from only one angler trip. The number of angler trips was not reported from the SC state survey, only conclusion was the value was greater than 1. The number of angler trips for NC was only slightly higher (3) but the group felt that there was less potential for bias in the MRIP survey than the NC state survey. The GA state CH number was selected over MRIP because the state survey was a census of all active captains that held federally permitted snapper grouper licenses and also had a larger sample size (180) than MRIP (1). The MRIP PR estimate was chosen over the GA state survey because the state survey information was voluntary angler reported data with no way of validating information or accounting for non-reporting. The FLE state CH and PR estimates (wave 4) were selected over MRIP due to larger sample sizes, lower CV values, and robust survey methodology that included randomly selected intercept sites and weighted estimates. However, it was noted that the FLE state survey could likely be an underestimate of recreational landings since there was no accounting for any fishing that may have occurred outside of the season. There were reported landings through MRIP on the day following the end of the season, Sunday July 27. The CV value of 0.73 (FLE Wave 4) was presumed to be a misprint since the high number of angler reporting should have produced a lower CV value.

Uncertainty concerning data sources

There was extensive discussion about which data source to choose when both MRIP and state survey data were available for an individual mode and wave. The merits and deficiencies of each data source were discussed at length for the red snapper mini-seasons in 2014. Each state survey was unique and there was little similarity in methods used. The only consistent method was each state had a carcass program in place for anglers to donate their red snapper carcasses. The SC logbook was a census of all charter captains that would have been targeting Snapper/Grouper species during the mini-season, but it was also noted that these data are self-reported without validation and that there may be some recall bias when logs are handed in one month after the fishing occurred. The GA CH telephone survey was a census of all active CH captains that held federal permits for Snapper/Grouper species, with minimal recall bias because phone calls were

made the Monday following the end of the mini-season, but like SC, these are all self-reported data without validation. The FLE CH telephone survey attempted to reach all captains that would have targeted red snapper during the mini-season, data were expanded to account for all captains that were not reached, recall bias was minimal because phone calls were made the week following each weekend opening, but was not a representation of any fishing that might have occurred outside of the mini-season. The SC State Survey data for PR was based on number of carcass donations. The GA state online survey used to determine PR landings was self-reported information that included number of fish harvested and/or released and number of anglers but could not be used to expand data into an estimate. A consistent comment concerning voluntary angler reported data was that it was likely to produce an underestimate since not all anglers who caught fish will participate. The FLE private boat intercept survey directly targeted the mini-season and should be an accurate estimate of total catch and effort during the mini-season, but as stated above is not a representation of any harvest that might have occurred outside the mini-season. The red snapper mini season ad-hoc group took all of these points under consideration when deciding which data to use and felt confident in the choices that were made.

Issue 2: *How to characterize the recreational discards during mini-seasons in 2014 for each state, mode, and wave.*

Option 1: Use State number if no MRIP number is available, making note of any potential bias
Option 2: Use MRIP number if no State number is available
Option 3: Use the estimate/number (MRIP or State) that is more reliable (taking into account sample sizes, CV's, and/or biases associated with the survey) when both MRIP and State numbers were available.

Decision(s): Option1.

- State Charter (CH) – SC (Wave 2 through 6)
- State Charter (CH) – GA (Wave 4)

Discussion and notes of potential bias/error: The CH discards from SC were self-reported data through the logbook and therefore lacked method of validation and had a high potential for recall bias. The CH discards for GA were also self-reported through telephone census of charter captains that held a federal snapper/grouper permit with no method of validation but a lower potential recall bias since numbers were submitted immediately after the mini-season. These discards are raw numbers (i.e. not an estimate).

Option 2.

- MRIP (CH) – NC (Wave 3 and 4)
- MRIP (CH) – GA (Wave 2 and 3)
- MRIP (CH) – FLE (Wave 1, 2, 3, 5 and 6)
- MRIP (PR) – NC (Wave 4)
- MRIP (PR) – SC (Wave 3, 4 and 6)
- MRIP (PR) – GA (Wave 2 and 3)
- MRIP (PR) – FLE (Wave 1,2,3,5 and 6)

Discussion and notes of potential bias/error: Some of the estimated discards are based on a fairly low number of angler trips (e.g. 1 or 2 trips).

Option 3.

- MRIP (PR) – GA (Wave 4)
- MRIP (CH) – FLE (Wave 4)
- MRIP (PR) – FLE (Wave 4)

Discussion and notes of potential bias/error: MRIP estimated discards was preferred over state surveys because MRIP encompassed the entire two month period (i.e. complete wave).

Uncertainty concerning data sources

In most cases, only MRIP or state survey information, but not both, were available for each individual wave. The main concern of potential bias with state survey information was that data were self-reported without means of validation. In cases with overlap between the two surveys, MRIP was always chosen because the estimate encompassed the entire two month period (i.e. complete wave). The red snapper mini season ad-hoc group took all of these points under consideration when deciding which data to use and felt confident in the choices that were made.