Standing and Special Reef Fish SSC
Meeting Summary
Tampa, Florida
January 5-6, 2016

The meeting of the Standing and Special Reef Fish SSC was convened at 9:00 am on January 5, 2016. The agenda was approved with changes to the order of items in order to accommodate the meeting schedules of presenters (this summary is presented in the original order of the agenda). The minutes of the September 1-2, 2015 Standing and Special Reef Fish SSC meeting were approved as written.

Selection of SSC representative at January, 2016 Council meeting

Chairman Luiz Barbieri noted that due to a scheduling conflict he would be unable to attend the Council meeting. Dr. Will Patterson agreed to be the SSC representative.

Assessment prioritization process

Dr. Rick Methot described the prioritization process developed by NMFS. The process will be used at a regional level to guide the type and frequency of assessments for managed stocks. It establishes a score for each of 12 factors within the categories of fishery, stock abundance and mortality, ecosystem considerations, assessment information, and targeted frequency of assessments. Each factor is then given a weight, and the weighted factor scores summed to provide an assessment-priority list. The factor scores and weights will be developed by NMFS staff, SSC, and other Council advisors. While the process provides guidance, it is not meant to be prescriptive. Final decisions can deviate from this list and documentation of these deviations will improve the overall process.

The stock assessment prioritization process is one of three inter-related activities being conducted by the Regional Science Centers. The other two are a habitat assessment prioritization process, and a climate vulnerability assessment process. While the three processes address different areas of management, they overlap on several of the factors.

The next step following recent presentations to the South Atlantic and Gulf Council SSCs is to seek an agreement at the spring SEDAR Steering Committee meeting to have the southeast Councils use information from this process. NMFS is taking initial steps to assemble factor scores in coordination with SEDAR staff. However, in some cases workshops with SSC and/or advisory committee members may be helpful in scoring some factors.

Following the presentation, SSC members had several questions. In response to a question on whether politics might have an undue influence on the process, Dr. Methot noted that one of the factors, constituent demand, will help to account for this. In response to a question on how climate change fits in, Dr. Methot responded that climate change is a long-term process. Incorporating climate change will require better, but not necessarily more frequent, assessments. Because prioritization is short-term (approximately 5 years) and can change, climate can be considered to be in quasi-equilibrium over the short term. Several additional questions were asked regarding how the scoring process will be implemented, but overall, the process was well received by the SSC members.

Discussion of Best Scientific Information Available

NOAA General Counsel Mara Levy explained that, when reviewing certain stock assessments, the SSC is fulfilling two roles: 1) peer review of the assessment and 2) advisor to the Council regarding ABC. When the SSC makes motions stating that an assessment is the best scientific information available but is not adequate for management, it is inconsistent given the requirements of the MSA, and the SSC may be confusing those two roles. She suggested separating the roles, clearly defining which role is being conducted. She suggested that, after completing one role, the SSC take a break before assuming the next role.

Another issue is that when the SSC is acting as the peer review, the SSC may be reviewing an assessment that is determined to be the best scientific information available but contains information that supports only some advice, such as stock status determinations, and does not yet include the necessary information for providing other advice such as ABC projections. In this situation, rather than stating that the assessment is the best scientific information available but is not adequate for management, the SSC could specify that it agrees with the stock status determinations but that additional l action and information is needed for the SSC to provide catch level recommendations.

The SSC discussed what is meant by "best". Is it the best available? Best possible? Does it mean high quality science? Mara Levy advised that Congress has made a policy decision by virtue of the language in NS2, that it is the best available. Staff noted that the National Standard 2 guidelines were revised last year, and the SSC had been given a staff review of the revised guidelines. Given the time since that presentation, and that there are many new members on the SSC, a suggestion was made that Mara Levy return to the SSC to discuss the revised National Standard 2 language.

Dr. Methot noted that NMFS is working on a technical guidance document to describe the process for moving draft assessments through the review process to the making of status determinations and setting catch limits. He stated that the draft guidance would be presented initially at the second Council Coordination Committee in May, 2016, and NMFS would then solicit comments from the Regional Councils.

SEDAR 43 Gray Triggerfish Projections

Dr. Shannon Cass-Calay presented the results of analyses requested by the Council in order to establish rebuilding time frames and yield streams for a new gray triggerfish rebuilding plan. Specifically, the following analyses were requested by the Council:

1. Project $T_{REBUILD}$ (or T_{MIN}) in the absence of fishing mortality. This should be calculated under two projected recruitment scenarios:

    a. Assume low recruitment for the years 2014-2018 (5 years from 2013).

b. Assume low recruitment for the years 2014-2021 (5 years from 2016, 8 years total).

2. Project the annual overfishing levels (OFLs) associated with the constant fishing mortality rate that allows the stock to rebuild by 2026 ($F_{REBUILD}$), assuming the first year harvest levels can be set is 2017 and:

a. Low recruitment from 2014-2018 and subsequent recruitment determined by the stock-recruitment relationship in 2019-2026.

b. Low recruitment from 2014-2021 and subsequent recruitment determined by the stock-recruitment relationship in 2022-2026

3. Project the annual overfishing levels (OFLs) associated with the constant fishing mortality rate that allows the stock to rebuild by 2024 ($F_{REBUILD}$), assuming the first year harvest levels can be set is 2017 and:

a. Low recruitment from 2014-2018 and subsequent recruitment determined by the stock-recruitment relationship 2019-2024.

b. Low recruitment from 2014-2021 and subsequent recruitment determined by the stock-recruitment relationship 2022-2024.

If T_{MIN} under this recruitment scenario is 8 years, then calculate rebuilding to occur in 2025.

4. The probability density function of each OFL (2a and b, 3a and b) will also be made available to facilitate the estimation of the acceptable biological catch (pending the Scientific and Statistical Committee's designation of P*).

The analyses were conducted using the Stock Synthesis 3 model used in the SEDAR 37 assessment but with updated 2014 and provisional 2015 landings data. The SEDAR 37 stock assessment used landings data through 2013. For these projections, finalized 2014 commercial and recreational landings were available at the time of the Council request. The 2015 provisional landings were available for the commercial sector and partially available for the recreational sector, with the remainder of the 2015 recreational landings estimated based on prior years landings. Total landings for 2016 were set at the combined commercial and recreational ACL of 305,300 lbs ww. Selectivity, discard, and retention functions were held constant for all years of the projections.

Selection of Recruitment Scenario

The initial decision for the SSC was which of the two recruitment scenarios to accept. Analysis shows that there is a 5-year auto-correlation recruitment indices, which suggests that there is information to support five years of low recruitment. Beyond that, there is no way to determine future recruitment. However, if the 5-year auto-correlation is part of a longer time-series, there is no support for assuming continued low recruitment. For this reason, the SSC decided that the 5-year low recruitment scenario was less arbitrary than the longer low recruitment scenario.

By a unanimous vote, the SSC accepts the low recruitment for 2014-2018 scenario as the basis for projections for gray triggerfish.

T_{MIN}

Using the selected recruitment scenario, with no fishing mortality beginning in 2017, the gray triggerfish stock is projected to recover to a biomass at 30% SPR (i.e., spawning biomass is 30% of virgin biomass) in 6 years, by 2022. This is T_{MIN}.

OFL

$F_{REBUILD}$ is the fishing mortality rate at which there is a 50% probability of rebuilding the stock within the desired time frame. However, this is not the OFL. OFL is the yield corresponding to the maximum fishing mortality threshold, which was defined in Amendment 30A as the yield corresponding to the F_{MSY} proxy of $F_{30\%\ SPR}$. The OFL at $F_{30\%\ SPR}$ is shown below in Table 1. The OFL is used to determine if overfishing is occurring annually.

ABC - Rebuilding Yield Streams

Because OFL is higher than the yield at $F_{REBUILD}$, the stock will not rebuild within 10 years under this fishing mortality rate. Therefore, the ABC was calculated as a reduction from the $F_{REBUILD}$ yield based on the P* (probability of overfishing) value determined by the SSC and the PDF constructed by the SEFSC.

Rebuilding yields streams ($F_{REBUILD}$) were constructed for 8, 9, or 10 year rebuilding scenarios. A 7-year rebuilding scenario could not be constructed in the model because, at any level of directed harvest, the accompanying discard mortality would increase overall fishing mortality above the levels needed to rebuild in that time frame.

P* was determined using the ABC control rule Tier 1 spreadsheet. This spreadsheet is used to assign scores to several factors regarding assessment information and characterization of uncertainty in the assessment. These scores are summed and scaled to a P* value between 0.3 and 0.5. The P* analysis for gray triggerfish, shown in Figure 1 resulted in a P* of 0.398, which the SSC rounded off to 0.40.

$$P^* = \exp\left[-a - b \sum_{i\ dimension} Dimension\ score_i\right]$$

P* = 0.398

Gray Triggerfish - 2016

Maximum Risk **0.50**
Minimum Risk **0.30**

S_{hi}= 3.998
a= 0.693
b= 0.1277703

$$a = -\ln(0.50) \qquad b = -\frac{a + \ln(0.30)}{S_{hi}} \qquad S_{hi} = highest\ possible\ score$$

Element scores are scaled from zero to a maximum.
In this example the maximum is 2.00, but this can be changed

Dimension	Dimension Wt	Tier No.	Tier Wt	Element Score	Element	Score it	Element Result	Tier Result	Dimension Result
Assessment Information	**1**	1	1	0.00	Quantitative, age-structured assessment that provides estimates of exploitation and biomass; includes MSY-derived benchmarks.		0.67	0.67	0.67
				0.67	Quantitative, age-structured assessment provides estimates of either exploitation or biomass, but requires proxy reference points.	x			
				1.33	Quantitative, non-age-structured assessment. Reference points may be based on proxy.				
				2.00	Quantitative assessment that provides relative reference points (absolute measures of status are unavailable) and require proxies.				
Characterization of Uncertainty	**1**	1	.333	0.0	The OFL pdf provided by the assessment model includes an appropriate characterization of "within model" and "between model/model structure" error. The uncertainty in important inputs (such as natural mortality, discard rates, discard mortality, age and growth parameters, landings before consistent reporting) has been described with using Bayesian priors and/or bootstrapping and/or Monte Carlo simulation and the full uncertainty has been carried forward into the projections.		1.33	0.4429	1.11
				0.67	The OFL pdf provided by the assessment model includes an approximation of observation and process error. The uncertainty in important inputs (such as natural mortality, discard rates, discard mortality, age and growth parameters, landings before consistent reporting) has been described with ***SENSITIVITY RUNS*** and the full uncertainty has been carried forward into the projections.				
				1.33	The OFL pdf provided by the assessment model includes an incomplete approximation of observation and process error. The uncertainty in important inputs (such as natural mortality, discard rates, discard mortality, age and growth parameters, landings before consistent reporting) has been described with ***SENSITIVITY RUNS*** but the full uncertainty ***HAS NOT*** been carried forward into the projections.	x			
				2.0	The OFL provided by the assessment ***DOES NOT*** include uncertainty in important inputs and parameters.				
		2	.333	0.0	Retrospective patterns have been described, and are not significant.	X	0.0	0	
				1.0	Retrospective patterns have been described and are moderately significant.				
				2.0	Retrospective patterns ***have not*** been described ***or*** are large.				
		3	0				0	0	
					NOT USED				
						z			
		4	.333	0.0	Known environmental covariates are accounted for in the assessment.		2.0	0.666	
				1.0	Known environmental covariates are **partially** accounted for in the assessment.				
				2.0	Known environmental covariates ***are not*** accounted for in the assessmen	x			

Figure 1 ABC control rule Tier 1 P* analysis for gray triggerfish.

By a unanimous vote, the SSC recommends a P* of .40 for gray triggerfish to be applied to the yield at $F_{REBUILD}$ PDF to compute the ABC.

ABC yield streams were constructed by applying the P* of 0.40 to the probability distribution functions (PDFs) constructed for the 8, 9, and 10-year rebuilding yield streams. The SSC discussed what value to use for the coefficient of variance (C.V.) in the PDF. The C.V. calculated for gray triggerfish is approximately 0.1, and was calculated as within model variability. An alternative C.V. of 0.37 was calculated by Ralston et al (2011) for the Pacific based on a pooled value for a large number of stocks. After discussion, the SSC decided to use the C.V. of 0.1, although some members felt that it does not adequately reflect scientific uncertainty. The resulting yields are shown in Table 1 below along with the OFL yield stream, which is the same for all rebuilding scenarios. The OFL yields are much higher than the ABCs because they are based on a fixed MFMT that is independent of rebuilding, and are much higher than the fishing mortality rates needed to rebuild. The stock will not rebuild to 30% SPR in 10 years if fished at OFL (Table 2).

Table 1. OFL and ABC in pounds whole weight, assuming low recruitment will continue through 2018. OFL was the 50th percentile of annual retained yield from a projection of $F_{SPR30\%}$ (MFMT). ABC values were computed from the three $F_{REBUILD}$ projections using a P* = 0.4.

Year	OFL	ABC_{2024} 8-year rebuild	ABC_{2025} 9-year rebuild	ABC_{2026} 10-year rebuild
2017	1,309,000	216,000	399,000	546,000
2018	1,287,000	227,000	412,000	554,000
2019	1,218,000	233,000	417,000	555,000
2020	1,187,000	237,000	421,000	558,000
2021	1,221,000	251,000	444,000	586,000
2022	1,344,000	283,000	498,000	656,000
2023	1,462,000	320,000	560,000	733,000
2024	1,560,000	357,000	620,000	808,000
2025	1,635,000		674,000	873,000
2026	1,696,000			928,000

Table 2. SPR if stock is fished at OFL (yield at $F_{30\%\ SPR}$)

Year	OFL	SPR
2017	1,309,000	19%
2018	1,287,000	18%
2019	1,218,000	17%
2020	1,187,000	17%
2021	1,221,000	18%
2022	1,344,000	19%
2023	1,462,000	19%
2024	1,560,000	20%
2025	1,635,000	21%
2026	1,696,000	21%

The SSC decided to recommend yield streams for all three of the possible rebuilding scenarios so that the Council could decide which target date to adopt. Initially, some SSC members suggested recommending the full rebuilding yield streams, but given the uncertainties in the assessment and projections, other SSC members felt that it would not be appropriate to recommend ABC for more than 3 years (2017-2019). If there is no new assessment by 2019, the SSC will reevaluate the ABC yield stream based on updated landings and whatever other new information is available. The yields in Table 1 were rounded to 3 significant digits.

By a vote of 18 to 2, the SSC recommends that the OFL for Gulf gray triggerfish for years 2017-2019 is 1.31, 1.29, and 1.22 mp ww, respectively. Annual ABC for these years will be computed as the 40th percentile of the $F_{REBUILD}$ PDF, which is contingent upon the Council specifying the duration of the rebuilding plan.

Year	OFL	ABC_{2024} 8-year rebuild	ABC_{2025} 9-year rebuild	ABC_{2026} 10-year rebuild
2017	1,310,000	216,000	399,000	546,000
2018	1,290,000	227,000	412,000	554,000
2019	1,220,000	233,000	417,000	555,000

Yield are in pounds whole weight.

Discussion on Best Approach for Stability of Management: Constant Catch or Constant F

Steven Atran noted that constant catch ABCs are sometimes equated with a constant management, but that is not always the case. To demonstrate, he displayed a table comparing the effects of a constant catch vs. a constant F strategy under various stock conditions (Table 3).

Table 3. Comparison of constant catch vs, constant F strategies.

Stock Condition	Constant Catch	Constant F
Rebuilding stock	F is initially high, declines as stock biomass increases. May result in increasing catch restrictions to maintain catch levels.	Catch is initially low, increases as biomass increases. If average size of fish (or average fecundity) remains constant or increases more slowly than stock biomass rate, may allow less restriction as stock rebuilds. If average size of fish (or average fecundity) increases more rapidly than stock biomass rate, may result in increasing catch restriction even with increased catch levels.
Stock above target biomass equilibrium level (B_{OY})	If fished at target equilibrium catch level, stock biomass will remain above target equilibrium. Catch restrictions can remain stable, but there will be foregone harvestable resource. If fished above target equilibrium catch level, stock biomass will decline, eventually requiring a reduced catch level and increased catch restrictions.	If fished at $F_{equilibrium}$ stock biomass will decline toward equilibrium biomass level, may result in increasing catch restriction as stock biomass approaches equilibrium.
Stock at target biomass equilibrium level, but fluctuating	If fished at target equilibrium catch level, stock will generally fluctuate around $B_{equilibrium}$ with stable catch restrictions. A persistent change, such as multiple years of low recruitment could lead to a reduction in biomass levels requiring a reduced catch level and increased catch restrictions.	If fished at $F_{equilibrium}$, catches will remain at sustainable levels, but catch levels and harvest restrictions will fluctuate year-to-year.

One SSC member stated that the question was where to set catch levels under different scenarios (rebuilding vs. stock above target levels) so that it would not be necessary to reduce catch levels in future years. For stocks above target levels, he suggested a constant catch at equilibrium MSY that would allow biomass to remain above the threshold. However, a new assessment could result in a change on long-term productivity.   For rebuilding stocks, short-term vs. long-term catch levels are two different issues. Under this scenario, constant catch projections should extend only over a short time period such as three years. When a constant catch projection is made for the entire rebuilding period, as was done for red snapper in the early 1990s, the result is to borrow from future yield to set catches in the near term. Over the long-term, a constant F approach would provide more stability.

It was also noted that for several stocks the recent assessments have shown a transient spike in abundance followed by a decline. A constant catch strategy would level the catch during this period for a short-term, but can result in foregone yield.

A constant catch strategy can be applied to a temporarily declining stock as described above, but for a stock with increasing yield streams it could result in overfishing in the first year, if the average annual catch was used. For an increasing yield stream, it could also result in foregone yield if the lowest (first-year catch level) were used. A constant catch strategy should therefore only be used in declining yield stream scenarios. In a rebuilding scenario, constant catch would require no changes to allocations, and that the P* probability of overfishing not be exceeded. Calculating a constant catch for rebuilding stocks using SS3 is computationally intensive, and if catch levels are exceeded in any year, then the assumptions for all future years are violated.

SSC members generally agreed that constant catch should only be implemented over a short period of 3 to 5 years, and periodically adjusted when new assessments are conducted.

Constant Catch OFL and ABC for wFL Shelf Stock of Hogfish

FWRI was unable to coordinate with the SEFSC to compute a constant catch OFL and ABC using the previously suggested method, which is computationally intensive. A suggestion was made to instead use either the lowest ABC in the 3-year yield stream or mean or geometric mean of the recommended yield streams. However, it was noted that averaging the ABCs would exceed the OFL in one of the years. Staff suggested that the OFL be averaged as well, but an SSC member responded that OFL was the F_{MFMT} applied to a single year.

The SSC reviewed their previous OFL and ABC recommendations and the means of those recommended OFLs and ABCs (Table 4).

Table 4. OFL & ABC Recommendations for wFL Shelf Stock of Hogfish from May 2015

Year	**OFL**	**ABC**
2016	257	240
2017	229	217
2018	211	200
Mean	**232**	**219**

Dr. Cass-Calay recalled that the iterative approach had been used once before, for red snapper. The results at that time were:

Table 5. Mean vs. Iterative Constant Catch ABC for Red Snapper

Year	**OFL**	**ABC**
2013	15.7	13.5
2014	13.3	11.9
2015	11.6	10.6
Mean	**13.5**	**12.0**
Iterative		**11.3**

After reviewing the red snapper results, and given the uncertainties about the assumptions required for the iterative approach, SSC members felt that the results from averaging the ABCs gave results very similar to those obtained from the iterative approach. Given that the iterative approach is very labor intensive compared to averaging the ABCs, SSC members felt that averaging the ABCs was an acceptable approach to determine a multi-year constant catch ABC. The mean ABC exceeds the 2018 OFL of 211,000 lbs. The SSC considered recommending that the constant catch ABC be set at the lowest annual ABC (200,000 lbs) or at the lowest annual OFL (211,000 lbs). The question was raised again as to whether OFL could be averaged. Dr. Methot noted that anytime projections are done they involved averaging multiple factors such as recruitment and selectivity. Consequently, the OFL projections are averages to begin with. He added that the proposed revisions to the National Standard 1 guidelines consider phasing in new results and using multi-year averages as long as it didn't result in a negative effect. As a result, the SSC concluded that applying an average of OFLs over a series of 3 to 5 years was a reasonable approach and had little likelihood of causing harm to the stock.

> **By a unanimous vote, under a constant catch scenario for 2016-2018, the SSC recommends that for wFL Shelf hogfish constant catch consideration to use the mean of the OFL and ABC for the constant F yield streams.**
> **OFL mean=232,000 lbs ww**
> **ABC mean=219,000 lbs ww**

SEDAR 42 Red Grouper Benchmark Assessment

Dr. Meaghan Bryan presented the SEDAR 42 red grouper assessment. Fishery-dependent data inputs included the NMFS headboat survey, MRFSS/MRIP, commercial longline, commercial vertical line, and headboat observer discard data. The 2005 red tide event was modeled as a fishing fleet which differed from the previous assessment, when it was modeled as a transient natural mortality event. Fish trap catches were also included, but fish traps were prohibited after 2006. Fishery-independent data included SEAMAP Summer Groundfish, NMFS bottom longline, SEAMAP video, Panama City Laboratory video, Panama City laboratory trap survey, FWRI trap survey, and Dry Tortugas reef visual census. The start year for the assessment was 1993, and the terminal year for the data was 2013. A new method for estimating discards was used, which led to larger estimates of discards than in the previous 2009 assessment. Discard mortality rates used in the assessment were recreational - 11.6%; commercial handline - 19%; commercial longline - 43.6%. The assessment model was run using Stock Synthesis 3.

The age of 50% female maturity was estimated at 2.8 years, and the age of 50% male transition was estimated at 11.2 years. Natural mortality at age was modeled using the Lorenzen function with a maximum age of 29 years and an overall natural mortality of M = 0.14. The steepness value of the stock-recruitment relationship was fixed at 0.99, with spawning stock measured as spawning stock biomass in metric tons, and recruits measured as 1,000s of age-0 fish. The stock biomass level has fluctuation above and below MSST since 1993 but is currently above both MSST and the MSY proxy (Figure 2). Fishing mortality rate has been below MFMT since 1996 except for 2005, due to the red tide event (Figure 3). The results of the assessment are shown in Table 6.

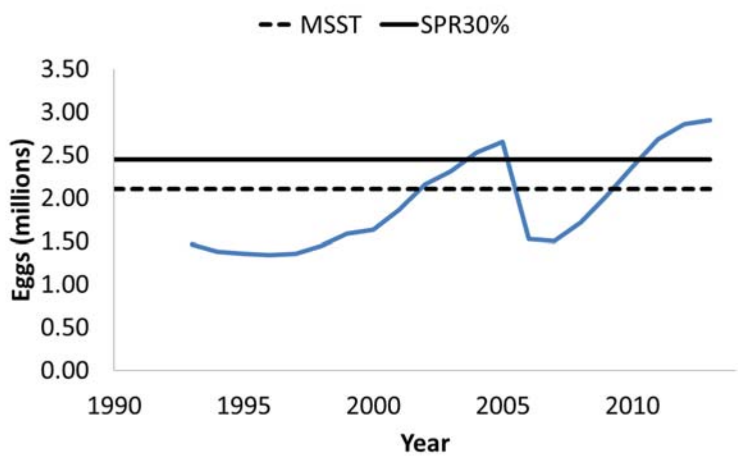

Figure 2. Red grouper SSB relative to MSST and MSY proxy 1993-2013

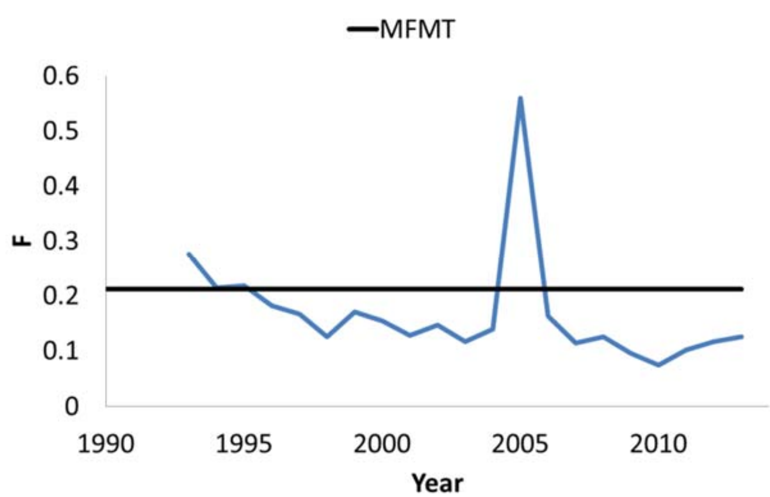

Figure 3. Red grouper fishing mortality rate relative to MFMT 1993-2013

Table 6. SEDAR 42 Red Grouper Assessment Results

Criteria	Definition	Value
Base M		0.144
	Mortality rate criteria	
Fmsy or proxy	F30%	0.212
MFMT	F30%	0.212
Foy	75% of F30%	0.164
Fcurrent	F2013	0.126
Fcurrent/MFMT		**0.594**
Fcurrent/Foy		**0.766**
	Biomass criteria	
SSBmsy (Eggs)	SSB at F30%	2,447,900
MSST	(1-M)*SSB30%	2,095,402
SSBoy		3,081,890
SSBcurrent (Eggs)	Eggs	2,905,630
SSBcurrent/SSB30%		**1.187**
SSBcurrent/MSST		**1.387**
SSBcurrent/SSBoy		**0.943**

Following the recommendation made during the discussion on best scientific information to separate the SSC's functions of peer reviewer and management advisor, the SSC separately passed the following two motions.

> **By a unanimous vote, the SSC accepts the SEDAR 42 Gulf Red Grouper Assessment, including responses to review workshop comments, as the best available science which is sufficient for estimating stock status.**
>
> **By a unanimous vote, the SSC accepts the stock status determination for Gulf red grouper as not overfished and not experiencing overfishing, as of the terminal year of the assessment (2013).**

In order to develop ABC projections, the SSC determined P* using the ABC control rule Tier 1 spreadsheet. The P* analysis for red grouper, shown in Figure 4 resulted in a P* of 0.427, which the SSC rounded off to 0.43.

Given that the red grouper stock is neither overfished nor experiencing overfishing (as of 2013), SSC members felt it was appropriate to provide OFL and ABC recommendations for a 5-year period beginning in 2016. However, a decision was needed on how to handle landings for the years 2014-2015, which are not in the assessment. For 2014, final landings are available and will be used. For 2015 the SSC recommended that the assessment group use landings estimates based on the current quotas and ACLs.

> **By a unanimous vote, the SSC recommends that the annual OFL for Gulf red grouper for years 2016-2020 be set at the 50th percentile of the OFL PDF, assuming estimated landings for 2014 and 2015 fishing years. The annual ABC for years 2016-2020 will be computed as the 43rd percentile of the OFL PDF. Under a constant catch scenario, the mean of these time series for OFL or ABC would be utilized.**

SSC members also asked that the SEFSC provide the equilibrium MSY and OY yields.

The SEFSC will compute the OFL and ABC yield streams and equilibrium yields based on the criteria established by the SSC.

Note: The OFL and ABC yield streams will be attached as an addendum.

$$P^* = \exp\left[-a - b \sum_{i\ dimension} Dimension\ score_i\right]$$

P* = 0.427

		S_{hi}=	3.998
Maximum Risk	**0.50**	a=	0.693
Minimum Risk	**0.30**	b=	0.1277703

$a = -\ln(0.50)$ $b = -\frac{a + \ln(0.30)}{S_{hi}}$ $S_{hi} = highest\ possible\ score$

Element scores are scaled from zero to a maximum. In this example the maximum is 2.00, but this can be changed

Dimension	Dimension Wt	Tier No.	Tier Wt	Element Score	Element	Score it	Element Result	Tier Result	Dimension Result
Assessment Information	**1**	1	1	0.00	Quantitative, age-structured assessment that provides estimates of exploitation and biomass; includes MSY-derived benchmarks.		0.67	0.67	0.67
				0.67	Quantitative, age-structured assessment provides estimates of either exploitation or biomass, but requires proxy reference points.	x			
				1.33	Quantitative, non-age-structured assessment. Reference points may be based on proxy.				
				2.00	Quantitative assessment that provides relative reference points (absolute measures of status are unavailable) and require proxies.				
Characterization of Uncertainty	**1**	1	.333	0.0	The OFL pdf provided by the assessment model includes an appropriate characterization of "within model" and "between model/model structure" error. The uncertainty in important inputs (such as natural mortality, discard rates, discard mortality, age and growth parameters, landings before consistent reporting) has been described with using Bayesian priors and/or bootstrapping and/or Monte Carlo simulation and the full uncertainty has been carried forward into the projections.		0.67	0.22311	0.56
				0.67	The OFL pdf provided by the assessment model includes an approximation of observation and process error. The uncertainty in important inputs (such as natural mortality, discard rates, discard mortality, age and growth parameters, landings before consistent reporting) has been described with ***SENSITIVITY RUNS*** and the full uncertainty has been carried forward into the projections.	x			
				1.33	The OFL pdf provided by the assessment model includes an incomplete approximation of observation and process error. The uncertainty in important inputs (such as natural mortality, discard rates, discard mortality, age and growth parameters, landings before consistent reporting) has been described with ***SENSITIVITY RUNS*** but the full uncertainty ***HAS NOT*** been carried forward into the projections.				
				2.0	The OFL provided by the assessment ***DOES NOT*** include uncertainty in important inputs and parameters.				
		2	.333	0.0	Retrospective patterns have been described, and are not significant.	X	0.0	0	
				1.0	Retrospective patterns have been described and are moderately significant.				
				2.0	Retrospective patterns ***have not*** been described ***or*** are large.				
		3	0				0	0	
					NOT USED				
						z			
		4	.333	0.0	Known environmental covariates are accounted for in the assessment.		1.0	0.333	
				1.0	Known environmental covariates are **partially** accounted for in the asses	x			
				2.0	Known environmental covariates ***are not*** accounted for in the assessment.				

Figure 4. ABC control rule Tier 1 P* analysis for red grouper

Framework Action to Adjust Recreational Red Snapper ACT Buffer

Staff reviewed an options paper for a possible framework action to change the annual catch target (ACT) buffer for the recreational red snapper sector. Nick Farmer gave a presentation on the NMFS methodology for setting the recreational red snapper season. In the three years prior to the use of an ACT buffer (2011-2013), recreational landings exceeded the quota by 19%, 47%, and 80% respectively. In 2014, a 20% ACT buffer was implemented. That year, landings were 29% below the ACL and 9% below the ACT. For 2015, current projections are that landings will be 17% below the ACL and 3% above the ACT. There are numerous sources of uncertainty in projecting season length, including:

- Prediction of state season lengths
- Prediction of state catch rates

- Effort compression during federal season
- Catch rates vs. rebuilding
- Fuel prices, economy, angler behavior
- Weather conditions
- States managing toward unofficial “ACLs” vs. “ACTs”
- Time-lag in receiving recreational landings estimates
- Fall re-openings uninformed by Wave 3 data
- Challenges estimating fall catch rates
- Precision issues with landings data
- Changes in recreational surveys
- Multiple sources for landings data, often with different estimates

For 2014, Federal season catch rates (lbs/day) associated with various confidence limits generated from bootstrap forecasts, which were then used to project season length. Based on the confidence limits, a 20% buffer was projected to have a 15% probability of exceeding the ACL. The underage in 2014 was due in part to overestimating some state catch rates. For 2015, four catch rate and average weight scenarios were evaluated using regression-based approaches on different input time series and predictor variables. Several other scenarios were also evaluated, but the season length was based on the mean of the four scenarios.

Several approaches could be used to evaluate a possible change in the ACT buffer. These include:

1. Regression-based confidence limits (2014 approach)
2. Mean ± SE of “realistic scenarios” to generate confidence limits (could be applied to 2015 approach)
3. Management retrospective analysis

However, all of the methods have uncertainties associated with them. Major uncertainties included weather conditions, and not accounting for variability in the data (i.e. percent standard error). In addition, there is only one year of landings data under separate quotas for the for-hire and private vessel components.

SSC members felt that, due to the numerous sources of uncertainty, there were too many moving parts to be able to establish a scientific justification for either changing or retaining the 20% buffer. In addition, with only one year of sector separation, there is little data on which to base any analysis. SSC members suggested that the buffer be re-evaluated in 3 or 4 years when there will be more landings data under sector separation.

Management Strategy Evaluation Using the Individual-Based Multi-Species Model OSMOSE-WFS

Dr. Arnaud Grüss demonstrated the application of management strategy evaluation (MSE) red tide implications on red grouper using the individual-based multi-species model OSMOSE-WFS. MSE is a framework that can be used to simulate alternative management strategies. It can be used to identify strategies robust to uncertainties and natural variation, and that balance conservation and socio-economic objectives (Figure 5). In its simplest form, MSE provides feedback between an operating model that simulates dynamics in the real world and a management model that prescribes management actions based on decision rules.

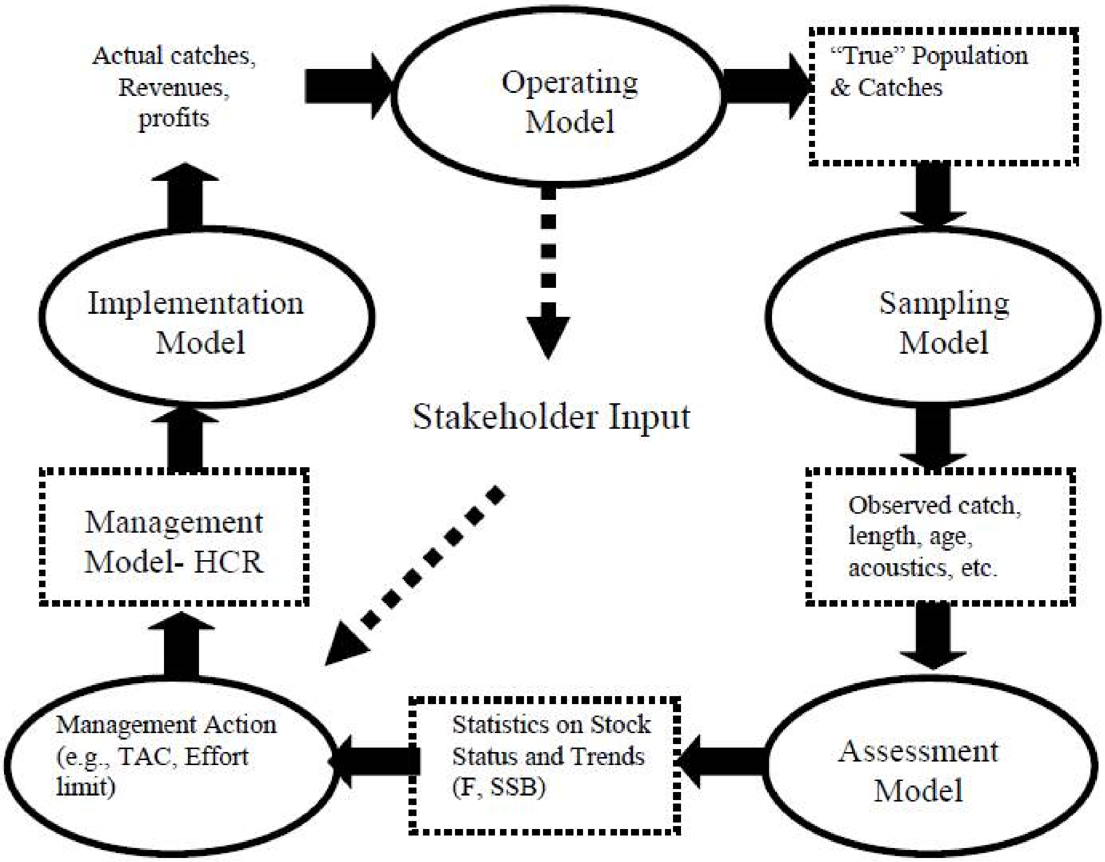

Figure 5. Conceptual management strategy evaluation framework. (Holland 2010[1])

MSE models can be tactical (provide practical management advice and focus on short-term impacts), or strategic (explore a diversity of what-if models to inform management and evaluate long-term impacts). The presentation presented a simplified demonstration of a strategic MSE applied to red grouper that included as metrics the probability of avoiding overfishing, the probability of a stock collapse, stability of the catch, net present value of the catch, plus four other metrics.

The model found that, in the absence of episodic events of natural mortality, all ABC strategies resulted in significant initial decrease in catch, but allowed the red grouper catch to exceed its initial level in medium term (i.e., after 10 to 20 years of simulations). In general, higher P* values resulted in higher catch-related metrics, while smaller P* values resulted in higher biomass-related metrics. When episodic events of natural mortality occurred in the model, higher P* values eventually resulted in lower catches. The frequency of ABC updates did not have a significant impact on performance of ABC strategies.

[1] Holland, D. S. (2010), "Management Strategy Evaluation and Management Procedures: Tools for Rebuilding and Sustaining Fisheries", OECD Food, Agriculture and Fisheries Working Papers, No. 25, OECD Publishing. doi: 10.1787/5kmd77jhvkjf-en http://www.oecd.org/greengrowth/fisheries/45497984.pdf

SSC members noted that net present value of revenue vs. profits often move in different directions, and suggested that the economic metrics in the model should include measures other than net present value of revenue if the data is available. Metrics should also address the different user groups, which may behave differently from each other.

Dr. Grüss noted that this presentation was a simple implementation of MSE. It will eventually be developed into a more comprehensive model that will be more useful to management.

One SSC member suggested that the trade-offs be evaluated between applying the MSE approach to single species management vs. an ecosystem based management approach.

Dr. Cass-Calay noted that the SSC had previously discussed the possibility of creating a committee to review the MSE evaluations. The SEFSC will eventually have a position for someone to conduct MSE evaluations within the SEFSC. That person will be informed by a committee of persons within the SEFSC with stock assessment expertise, but expanding that to include Council, stakeholder, and SSC members might be useful.

Dr. Barbieri noted that Dr. Kai Lorenzen had previously expressed an interest in participating in such a process, and suggested that Dr. Lorenzen take the lead in the process of determining the SSC's role. Dr. Lorenzen agreed, and Dr. Barbieri states that a sub-committee of volunteers would be formed by e-mail to develop the parameters that the SSC would use to work with the SEFSC. This sub-committee would report its findings to the SSC at its next meeting.

SEDAR Issues

Proposed revisions to the SEDAR process

Council and SEDAR staff presented proposed changes to the SEDAR assessment process, as they were presented to SEDAR cooperators at the last SEDAR Steering Committee meeting in September of 2015. Council staff reviewed the current SEDAR assessment process for reference. The proposed revision would result in the institution of a two-part species-specific assessment process, with a "research-track" component and an "operational-track" component. A research-track assessment would be similar to the benchmark assessment, in that it would be comprised of both in-person workshops and webinars. Life history data, landings data, indices of abundance, discard mortality information, and episodic events would all be considered, with all analytical methods being thoroughly tested and vetted prior to adoption. The differences between the research-track assessment and the benchmark assessment are that the former will not yield management advice upon its completion, and will take approximately 18 months to complete. A research-track assessment would be valid for approximately five years, unless new information suggests one should be conducted for a given species sooner. In order to develop management advice (OFL/ABC recommendations, yield projections, etc.), an operational-track assessment would need to be completed after the culmination of the research-track assessment. Operational-track assessments could, in theory, be conducted more frequently than the rate at which species are currently assessed, and would take approximately three months to complete. SEFSC staff have developed and endorse the proposed changes, stating that the new methodology will allow for more through analyses and testing of different methods, which will help to develop better standardized practices. Some concern was expressed about the increased amount of time which would be necessary to migrate all of the Gulf species through this new process, and the short-term delays in assessment throughput which would result. SEFSC staff thought that over time, the proposed changes would result in increased throughput, especially if current manpower bottlenecks at the data compilation and synthesis steps of the process could be alleviated.

SEDAR 49 – Gulf of Mexico Data-limited Species

Dr. Julie Neer presented the concept behind the data-poor stock assessment which will be conducted in the Gulf of Mexico in 2016. The Gulf Council will have eight species assessed as part of this effort: red drum, lane snapper, wenchman, yellowmouth grouper, speckled hind, snowy grouper, almaco jack, and lesser amberjack. SEDAR 49 will follow the model developed during a similar assessment effort in the Caribbean, whereby each of the eight stocks will be assessed, using the information available for each, by as many model environments as possible. The most parsimonious model for each species will be selected and put forth for consideration for developing management advice.

The schedule and terms of reference were reviewed, with which the SSC had no general objections. It was noted by SEDAR staff that the terms of reference for SEDAR 49 differed from those of other SEDARs, in that the data poor terms of reference generally compel the assessment panels to find and incorporate available data to the best extent practicable. This differs from more "data-rich" assessments, where a larger suite of data and accompanying analyses are required for inclusion in the more complex Stock Synthesis modeling environment.

SEFSC Staff noted that the data poor assessment process is greatly helped by the establishment of clear management objectives for the species to be assessed. Council staff obliged to query the Council for those objectives at the next available opportunity.

Council staff requested that the SSC solicit volunteers from its membership for participation in the SEDAR 49 workshops. The following members volunteered for the noted workshops:

Data Workshop	**Assessment Process**	**Review Workshop**
Jim Tolan	Jim Tolan	Ben Blount
Jeff Isely	Jeff Isely	Luiz Barbieri
Bob Gill	Bob Gill	Kai Lorenzen
Mary Christman	Mary Christman	Joe Powers
Jason Adriance	Harry Blanchet	
Marcus Drymon		

Review of SSC Meeting Schedule for 2016

Staff noted that the original dates for the March 2016 SSC meeting conflicted with the GSMFC meeting, so the March SSC meeting was moved to the week before, March 8-10, 2016. Dr. Neer stated that, under the new dates, the vermilion snapper stock assessment that is currently underway would only be available one week before the SSC meeting rather than the normal two weeks.

Other Business

There was no other business.

SSC Members Present

Standing SSC

Luiz Barbieri, Chair
Joe Powers, V. Chair
Harry Blanchet
Benjamin Blount
Mary Christman
Bob Gill
David Griffith
Jeff Isely
Walter Keithly
Kai Lorenzen
Paul Mickle
William Patterson
Sean Powers
Ken Roberts
James Tolan

Special Reef Fish SSC

Jason Adriance
Marcus Drymon
Robert Ellis
Jennifer Herbig
John Mareska

Council Staff

Steven Atran
John Froeschke
Doug Gregory
Morgan Kilgour
Ava Lasseter
Phyllis Miranda
Ryan Rindone
Clair Roberts
Bernadine Roy
Charlotte Schiaffo
Carrie Simmons

Others

Meaghan Bryan, NMFS/SEFSC
Roy Crabtree, NMFS/SERO
Shannon Cass-Calay, NMFS/SEFSC
Richard Cody, FWC
Jason de la Cruz, Gulf of Mexico Reef Fish Shareholder's Alliance
Michael Drexler, Ocean Conservancy
Nick Farmer, NMFS/SERO
Arnaud Grüss, NMFS/SEFSC
Chad Hanson, Pew Environment Group
Mara Levy, NMFS/GC
Patrick Lynch, NMFS/HQ
Rich Malinowski, NMFS/SERO
Rick Methot, NMFS/NWFSC
Julie Neer, SEDAR

Council Representative

John Greene