6.1. SEDAR 19, Southeastern United States Black Grouper

Assessment discussions

Dr. Bob Muller (Florida Fish and Wildlife Commission, FWRI) presented the SEDAR 19 bla ck grouper assessment. The stock was found to be not overfished in 2008 ($SSB_{2008}/SSB_{30\%SPR}$ = 1.40) or undergoing overfishing ($F_{current}/MFMT = 0.50$, with the current F represented by the geometric mean for the period 2006–2008).

The SSC discussed different aspects of the assessment. Discussion topics included the use of a constant catchability coefficient, estimating dome-shaped selectivity in the largest fishery, potentially biased high M value, and lack of sex-specific information. These concerns are described below.

The assumption of constant catchability is a concern because in reef fisheries in the southeast it is well known that catchability has likely increased with improved fish finding technologies. Assuming constant catchability when catchability may have been increasing can result in higher population size estimates, which in turn may portray an overly optimistic estimate of the stock status.

Selectivities estimated within an assessment model can be biased; specifically, when larger fish drop out of the catch, the model can explain this either by increasing fishing mortality or lowered selectivity. Here, the model fit used a dome-shaped selectivity, which, if not true, results in a negatively-biased fishing mortality rate.

Model results were highly sensitive to natural mortality input values; a lower M value than the one used in the assessment could be justified given the catch curve results.

SSB was not sex-specific, and biomass of larger males may not be good predictor of recruitment.

Many of these concerns can cause a negative bias in F estimates (i.e., biased on the low side) and a positive bias in biomass estimates (i.e., biased towards higher estimates). This led to concerns that the assessment was potentially "overly optimistic".

Despite these discussions the SSC consensus was to accept the black grouper assessment. The SSC accepted the biological reference point values in Table 1 of the assessment summary and proceeded to make ABC recommendations.

<u>ABC discussions</u>

The use of $F_{30\%}$ as a proxy for F_{MSY} was intensely discussed. However, the SSC decided to keep $F_{30\%}$ as the F_{MSY} proxy since this was the proxy accepted by the SEDAR 19 Review Panel.

ABC was determined by applying the ABC control rule. A P of 0.325 was determined based on the following scoring: Dimension I = tier 2 (-2.5%), Dimension II = tier 3 (-5%), Dimension III – tier 1 (0%), Dimension IV = tier 3 (-10%).*

The original assessment projections were not influenced by different P values. This was due to relatively low variability in input parameters but, more importantly, a result of how projections were modeled.*

Discussion ensued about whether to use data poor (i.e., landings trends) approaches instead of data adequate approaches (e.g., P) given these concerns with projections, the F_{MSY} proxy, and the cumulative optimism. The SSC recommended that additional P* projections be performed with the following modifications:*

(1) SD = 0.5 for recruitment (0.5 recommended based on findings from Rick Deriso); and

(2) applying the variability in the MCMC F_{msy} values to $F_{30\%SPR}$ (recommendation from Kyle Shertzer)

<u>Additional P discussions and changes to tier rankings</u>*

Discussion on the appropriate P value was revisited given continued concern with the "cumulative optimism" in the assessment. Specifically, the tiers within dimensions II and III were discussed. With changes in input values that reduce cumulative optimism the output is closer to benchmark values. This was used as an argument to move to tier 2 within dimension III. There was additional discussion on the most appropriate tier within Dimension II (uncertainty characterization); the SSC concluded that the tier for this dimension should be changed from a 3 to a 4 given insufficient characterization of uncertainty. The new P* value was based on the following scoring: Dimension I = tier 2 (-2.5%), Dimension II = tier 4 (-7.5%), Dimension III – tier 2 (-2.5%), Dimension IV = tier 3 (-10%). P* = 0.275*

Additionally, the SSC concluded that the language in their ABC control rule document should be changed for Dimension II, tier 4. The word "lacking" should be changed to "insufficient".

Discussion of revised black grouper projections

Bob Muller provided the SSC with updated projections. The SSC pointed out a minor technical issue with the new projections: the new runs were supposed to be done using a SD of 0.5 and Bob used a CV of 0.5. It was concluded that this would not change results too much so there was no need to re-do the analyses (in log space a CV of 0.5 would give a SD of 0.47).

There was discussion about whether or not to provide the Council with a single year recommendation for 2011, and then revisit to see landings, or to provide projections to 2020. It was determined that the projection should be provided so the Council could see where the population was headed, with the caveat that the SSC reserves the right to revisit ABC recommendations annually. The final SSC recommendation was to move forward with an ABC for 2011 using a P = 0.275.*

After acceptance of ABC values, discussions regarding "cumulative optimism" were revisited. The committee recalled that attempts were made to handle both optimism and uncertainty by adjusting the P value. However, it was pointed out that small adjustments in P* will have little effect if the P*-based projections since they do not capture all of the assessment uncertainty.*

Table 2. Summary of stock status determination criteria for black grouper.

Criteria	Recommended Values from SEDAR 19	
	Definition	Value
M (Instantaneous natural mortality; per year)	Average of Lorenzen M (if used)	0.136
F_{2008} (per year)	Fishing mortality in 2008	0.108
$F_{current}$ (per year)	Geometric mean of the directed fishing mortality rates on fully selected ages from 2006 - 2008	0.096
F_{MSY} proxy (per year; if used)	$F_{30\%SPR}$	0.216
SSB_{2008} (million pounds)	Spawning stock biomass in 2008	8.29
$SSB_{MSY\ (or\ proxy)}$ (million pounds)	$SSB_{F30\%SPR}$	5.92
MSST (million pounds)	(1-M)*$SSB_{F30\%SPR}$	5.12
MFMT (per year)	$F_{30\%SPR}$	0.216
MSY (million pounds)	Yield at 30%SPR	0.520
OY (million pounds in 2011)	Yield at F_{OY}	OY (65% F_{30SPR})= 0.461 OY (75% F_{30SPR})= 0.530 OY (85% F_{30SPR})= 0.596
F_{OY} (per year)	F_{OY} = 65%,75%, 85% $F_{F30\%SPR}$	65% F_{30SPR}= 0.141 75% F_{30SPR}= 0.162 85% F_{30SPR}= 0.185
Biomass Status	$SSB_{2008}/SSB_{F30\%SPR}$	1.40
Exploitation Status	$F_{current}$/MFMT	0.50

***All weights are whole weight in pounds.

6.2. SEDAR 19, South Atlantic Red Grouper

Dr. Kyle Shertzer (NMFS-SEFSC, Beaufort Laboratory) gave a presentation summarizing South Atlantic red grouper assessment results. The stock was found to be overfished ($SSB_{2008}/MSST$ = 0.92) and overfishing occurring (F/F_{MSY} = 1.35, with the current F represented by the geometric mean for the period 2006–2008). Estimated time series of stock status ($SSB_{2008}/MSST$) showed declining biomass until the mid-1980s, and then steady increase since, but with a decrease in the terminal assessment year (2008). The estimated time series of F/F_{MSY} suggests that overfishing has been occurring throughout the assessment period. The F/F_{MSY} series peaked during the 1980s, decreased to its lowest levels during 1991-2005, but has been increasing ever since.

The SSC discussed different aspects of the assessment. The issue of whether red grouper's discontinuous distribution between North Carolina and south Florida indicates a two-stock structure was identified as a significant source of uncertainty. The SSC recommends a possible two-stock scenario be considered for the next assessment. Other relevant uncertainties discussed: 1) catchability (constant vs. time-varying), 2) release mortality (all sectors), and 3) the magnitude and composition of early catches. Additional questions and discussion points included: 1) differences in model structure between the Beaufort Assessment Model (base model used for this assessment) and Stock Synthesis 3, 2) differences on how uncertainties were treated in the mixed Monte Carlo and bootstrap approach (MCB) versus in projections, and 3) the fact that assessment results suggest $F_{30\%}$ may represent an appropriate proxy for F_{MSY} for South Atlantic red grouper (F_{MSY} = 0.221; $F_{30\%}$ = 0.189; $F_{40\%}$ = 0.127).

By consensus the SSC accepted the red grouper assessment. Since the stock was found to be overfished ABC was determined by applying the ABC control rule for rebuilding stocks, i.e., probability of rebuilding equals (100% - P). The P* value for this assessment was 30%, so ABC is the projected yield stream with a 70% probability of rebuilding success.*

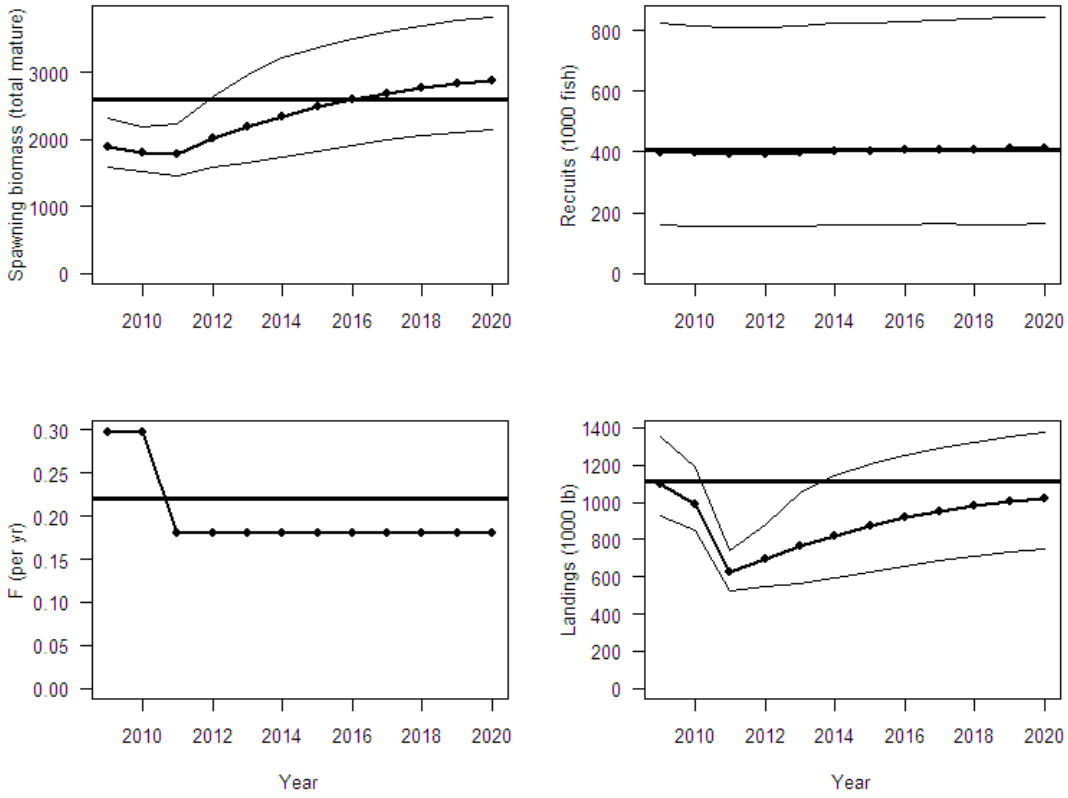
Table 3. Summary of stock status determination criteria for red grouper.

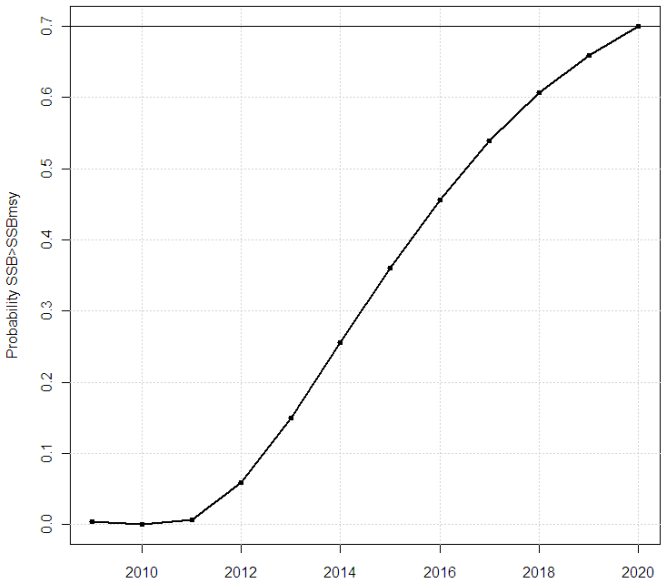
Quantity	Units	Estimate	SE
F_{MSY}	y^{-1}	0.221	0.030
$85\%F_{MSY}$	y^{-1}	0.188	0.026
$75\%F_{MSY}$	y^{-1}	0.166	0.023
$65\%F_{MSY}$	y^{-1}	0.144	0.020
$F_{30\%}$	y^{-1}	0.189	0.029
$F_{40\%}$	y^{-1}	0.127	0.019
$F_{50\%}$	y^{-1}	0.088	0.012
B_{MSY}	mt	3680	569
SSB_{MSY}	mt	2592	519
MSST	mt	2229	487
MSY	1000 lb	1110	102
D_{MSY}	1000 fish	27	8
R_{MSY}	1000 age-1 fish	407	58
Y at $85\%F_{MSY}$	1000 lb	1103	101
Y at $75\%F_{MSY}$	1000 lb	1089	99
Y at $65\%F_{MSY}$	1000 lb	1064	96
F_{2008}/F_{MSY}	—	1.35	0.26
$SSB_{2008}/MSST$	—	0.92	0.25

Projection results under scenario with fishing mortality rate fixed at F=Frebuild, to achieve 0.7 probability of rebuilding in 2020.

Year	F(per yr)	Pr(SSB>S	SSB(mt)	R(1000)	D(1000)	D(klb)	L(1000)	L(klb)	Sum L(klb)
2009	0.298	0	1888.74	399	32	61	107	1098	1098
2010	0.298	0	1800.36	396	35	70	94	985	2083
2011	0.181	0.01	1783.42	394	21	43	62	622	2705
2012	0.181	0.06	2015.42	394	21	44	70	693	3398
2013	0.181	0.15	2188.42	399	22	44	77	762	4160
2014	0.181	0.26	2343.64	402	22	44	82	822	4982
2015	0.181	0.36	2477.94	404	22	45	86	873	5855
2016	0.181	0.46	2592.02	406	22	45	89	915	6770
2017	0.181	0.54	2686.78	407	22	45	91	951	7721
2018	0.181	0.61	2764.29	408	22	45	93	980	8701
2019	0.181	0.66	2827.41	409	22	46	95	1004	9705
2020	0.181	0.7	2878.51	410	22	46	96	1023	10728

F = fishing mortality rate (per year), Pr(SSB>SSBmsy) = proportion of stochastic projection replicates exceeding SSBmsy,
SSB = spawning stock (mt), R = recruits (1000 age-1 fish),
D = discard mortalities (1000 fish or 1000 lb whole-fish weight),
L = landings (1000 fish or 1000 lb whole-fish weight),
Sum L = cumulative landings (1000 lb).
For reference, estimated benchmarks are Fmsy=0.22 (per yr), SSBmsy=2592 (mt), and MSY=1110 (1000 lb).
Expected values presented are from deterministic projections (klb=1000 lb).




Probability SSB>SSBmsy
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
2010
2012
2014
2016
2018
2020