Gulf of Mexico Fishery Management Council
Standing and Special Reef Fish SSC
Review of SEDAR 22 – Yellowedge Grouper
Tampa, Florida
May 17-19, 2011

Acting Chair Dr. Sean Powers opened the meeting at 8:30 a.m.

SEDAR 22 Yellowedge Grouper Assessment

John Walter gave a presentation reviewing the yellowedge grouper benchmark assessment. Landings were available from the start of the fishery, which was assumed to be about 1977. There was a good estimate of natural mortality, and a good contrast from the high peak of landings in 1984. However, there are no juvenile indices of abundance. Yellowedge grouper are protogynous hermaphrodites, but the importance of males to the spawning stock biomass is unknown. Therefore, both males and females are included in the spawning stock biomass estimates. Two stock assessment models were used. The primary model was Stock Synthesis 3 (SS3), but Stock Reduction Analyses (SRA) was used for comparison. Including the base run and sensitivity runs, 25 model runs were made. Six models were used for deterministic projections (base run, increased weight on indices, low M, high M, low landings, and low steepness). Three were selected for Markov chain Monte Carlo (MCMC) simulations to establish probability distributions (base run, low M, and fit to indices). Fishing mortality rates were not reported directly, but were reported as proxies relative to current F, where current F = 1.

Status determination depends on which level of spawning potential ratio (SPR) to use for the MSY proxy. A proxy is needed because there is not a reliable estimate of MSY. The three CIE reviewers each recommended a different SPR level, 20%, 30% or 40%. The MSY estimates converge at around 20% SPR, but in the absence of information about the dynamics of spawning, 40% SPR would be the most conservative MSY proxy. A level of 30% SPR has typically been used by the Council, and most of the analyses forwarded by the Review Panel was centered around that value. Therefore, the SSC decided to use 30% SPR as the basis for the MSY proxy.

The SSC reviewed the steepness estimates of the spawner-recruit curve. The base run estimated a steepness of 0.94, which is on the high side, but not too far out of line with steepness estimates of around 0.9 for other demersal species with similar life history characteristics. A model run using a fixed low steepness value of 0.7 produced a different value than the other runs.

After reviewing the assessment, the SSC passed the following motion:

> **The SSC moves to accept the SEDAR 22 Yellowedge Stock Assessment Report as the best available scientific information. Further, the SSC concludes that the report provides sufficient guidance to make management recommendations.**
>
> **Motion passed unanimously**.

The SSC and NOAA General Counsel Shepherd Grimes had a discussion about determinations of best available scientific information and adequacy of the information to make management decisions. Mr. Grimes felt that accepting an assessment as best available information meant that it should be used for management decisions. However, SSC members felt that there could be situations where an assessment might be the best available scientific information as required by the Magnuson-Stevens Act, but not adequate for management purposes. SSC members felt that they needed to be able to make both determinations in order to protect themselves.

In deciding which model run to use for management advice, the SSC examined the short term projections of several of the runs (Figure 1). These projections assumed that the entire deep-water grouper quota would be caught in 2011, with yellowedge grouper comprising 70% of the quota. With the exception of the low steepness run, all of the runs appeared to converge toward a narrow range of MSY estimates. The "base" run fell in the middle of the results, so the SSC decided to base their advice on the "base" run using the output parameters in Table 14 of the presentation.

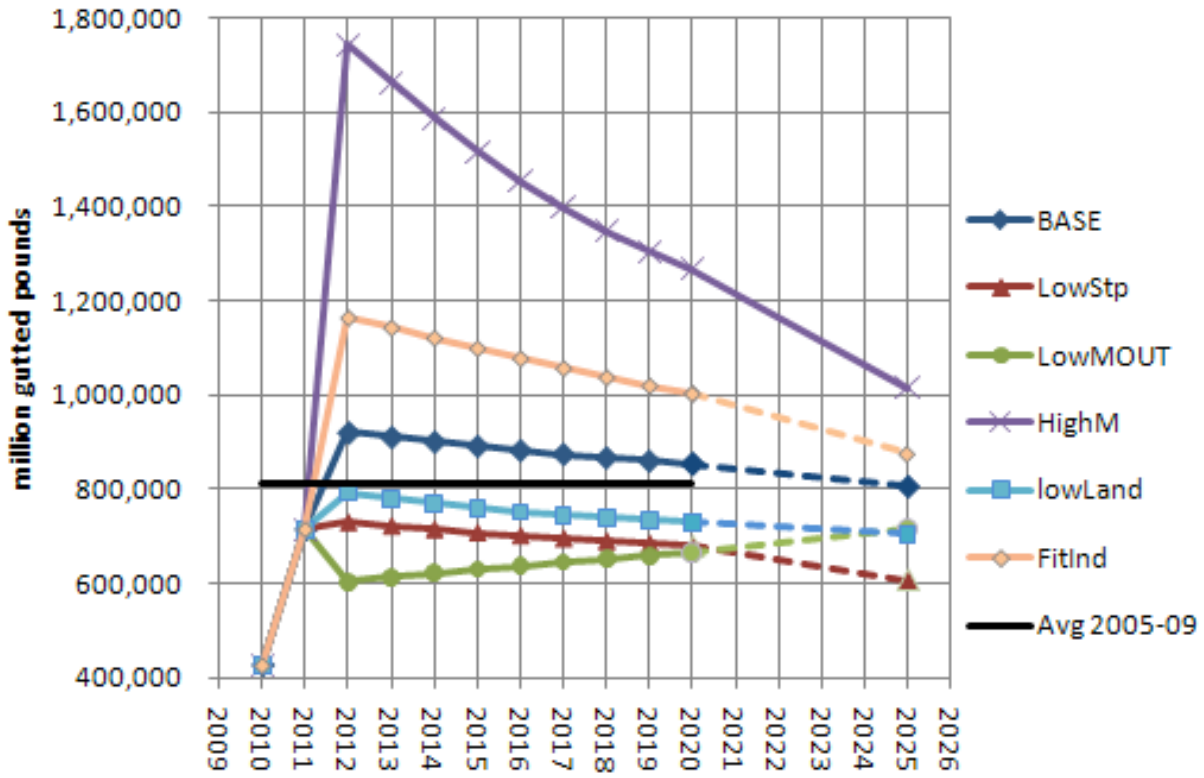

Figure 1

Table 14. SFA and MSRA evaluations using SPR 30% reference points for 3 models.

yield & ssb in million gut. lbs

Criteria	Definition	30% BASE	30% LowM	30% Fit Indices
	Mortality Rate Criteria			
$F_{MSY\ or\ proxy}$	$F_{SPR30\%}$	1.06	0.778	1.301
MFMT	$F_{SP30\%}$	1.06	0.778	1.301
F_{OY}	75% of $F_{SPR30\%}$	0.795	0.584	0.976
$F_{CURRENT}$	Avg. F 2007-2009	1	1	1
$F_{CURRENT}$/MFMT	**$F_{CURRENT}$**/MFMT	0.949	1.292	0.774
Base M	Base M	0.073	0.073	0.073
	Biomass Criteria			
$SSB_{MSY\ or\ proxy}$	Equilibrium SSB @ $F_{SPR30\%}$	8.621	8.700	8.920
MSST	(1-M)*$SSB_{SPR30\%}$ M=0.13	7.992	8.065	8.269
$SSB_{CURRENT}$	SSB_{2009}	9.533	7.711	11.222
$SS_{CURRENT}$/MSST	SSB_{2009}	1.193	0.956	1.357
Equilibrium MSY	Equilibrium Yield @ $F_{SPR30\%}$	0.788	0.724	0.854
Equilibrium OY	Equilibrium Yield @ F_{OY}	NA	NA	NA
OFL	Annual Yield @ FMFMT			
	Actual 2010 landings	0.424	0.424	0.424
	Est. 2011 landings	0.714	0.714	0.714
	OFL 2012	0.913	0.669	1.148
	OFL 2013	0.903	0.674	1.127
	OFL 2014	0.893	0.678	1.106
	OFL 2015	0.883	0.682	1.083
Annual OY (ACT)	Annual Yield @ F_{OY}			
	OY 2012	0.692	0.506	0.870
	OY 2013	0.698	0.519	0.872
	OY 2014	0.703	0.531	0.871
	OY 2015	0.707	0.543	0.870

Under the "base" run at a 30% SPR MSY reference, the current F is below the maximum fishing mortality threshold (MFMT), and spawning stock biomass is above the minimum stock size threshold (MSST). Therefore, under this run, the stock is neither undergoing overfishing nor is it overfished. The stock biomass is also above its MSY level. Therefore, the annual estimate of the overfishing limit (OFL) is currently above equilibrium MSY and will drive the stock down to its equilibrium MSY level. In order to prevent the stock from being driven below its equilibrium MSY level, the SSC recommended an annual OFL yield stream through 2015, with OFL from 2016 onward to be at the equilibrium OFL using 30% SPR as the MSY proxy.

The SSC accepts the "base" model run at SPR 30% and recommends that OFL for yellowedge grouper be:

2012 - 0.913mp (gw)
2013 - 0.903mp (gw)
2014 - 0.893mp (gw)
2015 - 0.883mp (gw)

For 2016 forward, the OFL should be 0.788 mp (gw) equilibrium yield at $F_{SPR\ 30\%}$ estimate.

Motion passed unanimously.

In order to determine ABC, the SSC applied Tier 1 of the ABC control rule. In the P* spreadsheet the SSC selected the following settings:

- Assessment Information Tier 1: second element: Quantitative, age-structured assessment provides estimates of either exploitation or biomass, but requires proxy reference points.

- Characterization of Uncertainty Tier 1: third element: The OFL probability density function (pdf) provided by the assessment model includes an incomplete approximation of observation and process error.

- Characterization of Uncertainty Tier 2: second element: Retrospective patterns have been described and are moderately significant.

- Characterization of Uncertainty Tier 4: third element: Known environmental covariates are not accounted for in the assessment.

The resulting P* value was 38.2%. However, there was not a consensus on how to characterize whether the BP oil spill was a known environmental covariate. In addition, some SSC members felt that the P* table did not capture all of the scientific uncertainty. The SSC felt that the alternative state of nature (different model runs) need to be more formally included in the estimates of uncertainty. However, the methodology for doing this remains unresolved. Using the probability distribution function provided for a "base" model run using 30% SPR proxy, a tentative ABC yield stream was extrapolated, but since the motion was to accept the methodology if using a probability distribution function to set ABC for each year at the yield corresponding to a P* of 38.2%, the Science Center provided exact numbers. For 2016 and beyond, the OFL and ABC are based on equilibrium MSY.

The SSC recommends that the ABC for yellowedge grouper be:
2012- 0.891 mp gw *(extrapolated value was 0.869mp gw)*
2013- 0.882 mp gw *(extrapolated value was 0.861mp gw)*
2014- 0.873 mp gw *(extrapolated value was 0.850mp gw)*
2015- 0.864 mp gw *(extrapolated value was 0.843mp gw)*
2016+ 0.780 mp gw

Motion passed 6-4.