Gulf of Mexico Fishery Management Council
Standing, South Atlantic, and Special Reef Fish SSC Meeting Summary
Review of SEDAR 27A – Yellowtail Snapper
Tampa, Florida
October 10-11, 2012

SEDAR 27 Yellowtail Snapper Benchmark Assessment

This session consisted of a mixed in person and webinar meeting, with several of the South Atlantic SSC participants participating via webinar. Due to technical problems, the webinar participants were unable to speak, and had to participate via the function to ask a written question or the raise hand icon of GoToWebinar. The transmitted sound quality was also poor during part of the assessment presentation, but improved over the course of the meeting.

Joe O'Hop presented a summary of the 2012 Stock Assessment Report for Yellowtail Snapper in the South Atlantic and Gulf of Mexico, which was prepared by Florida FWC. Yellowtail snapper in the U.S. comprises a single stock, and the South Atlantic and Gulf of Mexico regions are combined for the assessment. The previous yellowtail snapper assessment in 2003 (SEDAR 3) used a release mortality estimate of 30%. The current assessment uses a lower bound for release mortality of 10% for the recreational sector, and 11.5% for the commercial sector, based on observer data. Yellowtail snapper live to a maximum observed age of 23 years. Females reach 50% maturity at 9.1 inches total length and 1.7 years. The assessment was conducted with a statistical catch-at-age model (ASAP2). Fishery-dependent data included commercial logbooks, MRFSS, and the headboat survey. Fishery-independent data came from the NMFS/University of Miami Reef Visual Census. Results from the assessment indicate that, as of 2010, the yellowtail snapper stock is neither overfished nor experiencing overfishing. Using $F_{30\% SPR}$ as a proxy for F_{MSY}, the ratio $F_{2010}/F_{30\%} = 0.153$, and the ratio $SSB_{2010}/SSB_{F \text{ at } 30\% SPR} = 3.357$.

Independent reviewers accepted the assessment, but noted some concerns, including:

- The commercial CPUE index was not fit well by the model, which could be an indication that there have been changes in catchability for which the model was not accounting
- Patterns in the retrospective analyses may be affected by the model structure, particularly the inability of the model to fit the commercial index might indicate some effect like changing catchability in that fishery.
- Age-length keys were fit externally from the model.
- Concerns about the iterative re-weighting of the indices and age compositions

SSC members noted that there was a difference in fishing mortality rate values between the $F_{30\% SPR}$ proxy ($F = 0.295$) and the assessment's empirical estimate of F_{MSY} ($F = 0.240$). They felt that the fits to the indices were good (other than the commercial CPUE index concern expressed above), and that the spawner-recruit function appeared to be reasonable and had a good fit to the data. For these reasons, the SSC felt that the empirical estimates of F_{MSY} and MSY were viable and should be used rather than the $F_{30\% SPR}$ proxy.

The South Atlantic SSC, acting individually, by consensus accepted the use of MSY as OFL. The joint SSC then passed the following motion.

> **The South Atlantic and Gulf SSCs jointly move to accept the Yellowtail Snapper Assessment as the best available scientific information and set OFL as the yield at the model derived estimate of F_{MSY}.**
>
> *Motion passed unanimously by consensus.*

The SSC next discussed whether to set OFL equal to the annual yield at MSY, which changes annually, or equilibrium MSY, which is a long-term average value that does not change. For this discussion, the SSC used annual yield projection analysis contained in Table "xx3" of the file "Table xx YTS PStar rev.doc", plus equilibrium yield estimates provided in slide 54 of the PowerPoint presentation. Given that the stock biomass is well above its equilibrium MSY level, fishing at the annual MSY level would initially set OFL at a high level (5.58 mp in 2013), but would drive the stock biomass and annual yield down to equilibrium. The SSC felt that this was a risk prone approach to setting OFL, and that setting OFL at the equilibrium level would be a more sustainable and risk neutral approach. Based on the empirical F_{MSY}, the equilibrium MSY yield is 4.6039 million pounds. Given the previous practice of the SSC, this value was rounded to three digits. All yield values are in whole weight.

> **The South Atlantic and Gulf SSCs jointly move to recommend the equilibrium MSY value of OFL = 4.61 mp (total removals: landings plus dead discards) as the OFL for yellowtail snapper fisheries in the South Atlantic and Gulf of Mexico.**
>
> *Motion passed unanimously by consensus.*

Note: the above OFL is in terms of total removals (landings plus dead discards). **In terms of landed catch, OFL = 4.51 mp** (see below).

The SSC next discussed where to set ABC. This is the yield in a probability distribution function (PDF) corresponding to a given P* value. The FWC assessment scientists prepared a PDF with an adjusted coefficient of variation (CV) of 0.30 in order to account for scientific uncertainty and provide a wider distribution and somewhat lower OFL and ABC for a given P*. The South Atlantic SSC and Gulf SSC individually discussed where to set P* since each had a different ABC control rule to use.

Under the South Atlantic control rule, P* = 0.40. The control rule spreadsheet producing this result is shown below.

South Atlantic Fishery Management Council - ABC Control Rule		
Yellowtail snapper - October 2012		
Dimension	**Tier**	**Penalty Score**
I. Assessment Information (10%)		
	1. Quantitative assessment provides estimates of exploitation and biomass; includes MSY-derived benchmarks (0%)	0%
	2. Reliable measures of exploitation or biomass; no MSY benchmarks, proxy reference points. (2.5%)	
	3. Relative measures of exploitation or biomass, absolute measures of status unavailable. Proxy reference points (5%)	
	4. Reliable catch history. (7.5%)	
	5. Scarce or unreliable catch records. (10%)	
II. Uncertainty Characterization (10%)		
	1. Complete. Key Determinant – uncertainty in both assessment inputs and environmental conditions are included (0%)	5%
	2. High. Key Determinant – reflects more than just uncertainty in future recruitment. (2.5%)	
	3. Medium. Uncertainties are addressed via statistical techniques and sensitivities, but full uncertainty is not carried forward in projections. (5%)	
	4. Low. Distributions of Fmsy and MSY are lacking. (7.5%)	
	5. None. Only single point estimates; no sensitivities or uncertainty evaluations. (10%)	
III. Stock Status (10%)		
	1. Neither overfished nor overfishing. Stock is at high biomass and low exploitation relative to benchmark values. (0%)	0%
	2. Neither overfished nor overfishing. Stock may be in close proximity to benchmark values. (2.5%)	
	3. Stock is either overfished or overfishing. (5%)	
	4. Stock is both overfished and overfishing. (7.5%)	
	5. Either status criterion is unknown. (10%)	
IV. Productivity and Susceptibility – Risk Analysis (10%)		
	1. Low risk. High productivity, low vulnerability, low susceptibility. (0%)	5%
	2. Medium risk. Moderate productivity, moderate vulnerability, moderate susceptibility. (5%)	
	3. High risk. Low productivity, high vulnerability, high susceptibility. (10%)	
	Penalty Score sum	-10%
	P* (50 - penalty score)	**40%**

Under the Gulf control rule, P* = 0.416. The Tier 1 spreadsheet producing this result is shown below.

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

P* = 0.416

S_{hi}= 3.998

Maximum Risk **0.50** a= 0.693

Minimum Risk **0.30** 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.	x	0	0	0.00
				0.67	Quantitative, age-structured assessment provides estimates of either exploitation or biomass, but requires proxy reference points.				
				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	1.44
				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.		1.0	0.333	
				1.0	Retrospective patterns have been described and are moderately significant.	x			
				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 assessment.	x			

The resulting P* values from the two control rules were very close, but the South Atlantic value was slightly more conservative and did not require interpolation between the values in the table provided by FWC. At P* = 0.40 and based on equilibrium MSY, the ABC yield is 4.1289 million pounds. In keeping with the practice of rounding to three digits, this resulted in an equilibrium ABC of 4.13 million pounds.

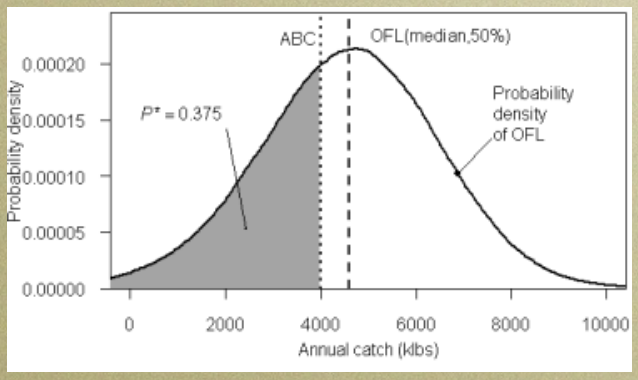
The following are in total removals (landings plus dead discards), not landed catch.

> **The South Atlantic and Gulf SSCs jointly move to have a P* of 0.40 for the South Atlantic and Gulf yellowtail snapper fisheries, this corresponds to an equilibrium yield of 4.13mp. (total removals: landed catch plus dead discards)**
>
> *Motion passed unanimously by consensus.*

Note: the above ABC is in terms of total removals (landings plus dead discards). **In terms of landed catch, ABC = 4.05 mp** (see below).

OFL and ABC – P [Yellowtail Snapper] new 10/15/2012*

Projections using F_{MSY} (empirical distribution) $F_{MSY} = 0.240$



P*		Landings and discards (klbs)**	Landings only (klbs)
30%		3611.59	3539.36
35%		3879.40	3801.81
37.5%		4006.35	3926.22
40%	ABC	4128.88	**4046.30**
45%		4368.33	4280.96
50%	OFL	4603.92	**4511.84**

** Total removals were reduced by 2% to account for the estimated percentage of removals represented by discards.

The yellowtail snapper ABC is apportioned 75% to the South Atlantic and 25% to the Gulf. Therefore, the new ABCs in landed catch for each region are:

South Atlantic: **3.0375 million pounds**
Gulf of Mexico: **1.0125 million pounds**

The SSC noted that the South Atlantic yellowtail snapper fishery is currently under an emergency rule to avoid a closure under the existing ACL. Steven Atran noted that, since the SSC has the authority to set ABC, the value is in effect as soon as the SSC makes the recommendation and its report is accepted by the Council. However, the ACL is set by the Council, and a revision to the ACL requires action by the Council.

The South Atlantic and Gulf SSCs jointly move to recommend that the new values of OFL and ABC be implemented immediately in the South Atlantic and Gulf of Mexico yellowtail snapper fisheries.

Motion passed unanimously by consensus.