Gulf of Mexico Fishery Management Council
Scientific and Statistical Committee
Review of SEDAR 45: Gulf of Mexico Vermilion Snapper
June 1-2, 2016

Dr. Matt Smith reviewed the SEDAR 45 vermilion snapper stock assessment. Major changes from the previous assessments include converting from total length to fork length, restricting the growth curve to account for minimum size regulations, and use of a Lorenzen natural mortality function rather than a constant natural mortality rate over age groups. The Lorenzen function was scaled to a target of 0.25, which matches the constant natural mortality rate used in the SEDAR 9 update. Commercial landings were split by regions (east Gulf vs. west Gulf), and was split pre-and post-2007 in order to account for red snapper IFQ. Recreational landings were combined due to low sample sizes. Recreational landings showed some discrepancies for prior years with the 2011 update due to historic and Access Point Angler Intercept Survey (APAIS) recalibrations. Discards were not included due to low relative levels in comparison to landings and low assumed discard mortality. For shrimp trawl bycatch, a 'super-year' approach was implemented where the median was fit directly instead of assuming it was a constant catch in every year. Shrimp trawl bycatch estimates were based on all observer data and showed a sharp decline after 2004. The SEAMAP larval survey in numbers-per-area was an index of spawning stock biomass (SSB). The assessment was conducted using Stock Synthesis 3 (SS3), using data from 1950 through 2014. A bias adjusted Beverton-Holt stock-recruit function was used with estimated deviations for data rich period 1994-2012, but there was low confidence in the curve because most of the data points were concentrated in a narrow range of SSB (Figure 1). Therefore, a proxy for MSY was used to determine stock status.

> **Motion: The Committees accept the SEDAR 45 Vermilion Snapper Standard Assessment as the best scientific information available.**
>
> *Motion passed unanimously.*

Stock status results were calculated for F_{MSY} proxies of both $F_{30\% SPR}$ (used in SEDAR 9), and F_{MAX} (used in the SEDAR 9 update assessment). Results were also calculated for achieving maximum yield-per-recruit under existing selectivities (F_{CMAX}). The resulting F values were as follows:

F_{MAX} = 0.081
$F_{30\% SPR}$ = 0.103
F_{CMAX} = 0.246 (equivalent to 12% SPR)

After discussion, the SSC felt that $F_{30\% SPR}$ was the most appropriate proxy for F_{MSY}.

> **Motion: The Committees recommend that the MSY proxy be the yield at the fishing mortality rate of 30% SPR and the biomass at 30% SPR.**
>
> *Motion passed unanimously.*

Using 30% SPR as a proxy for MSY, the stock biomass status was below $SSB_{30\% SPR}$ prior to 2014, but it has never been below its overfished threshold (MSST). The stock fishing mortality rate was above the overfishing threshold (MFMT) in the mid-1990s and early 2000s, but as of 2014, the SSB was above $SSB_{30\% SPR}$ (not overfished) and fishing mortality rate was below $F_{30\% SPR}$ (not overfishing) (Figure 2).

>   **Motion: The Committee accepts that the SEDAR 45 Stock Assessment of Vermilion Snapper determination that the stock is not overfished and not undergoing overfishing.**
>
>   *Motion passed unanimously.*

In order to project yield streams, since the assessment only included landings through 2014, provision landings for 2015 (2.31 mp) were included and an average of landings during 2012-2014 was used for 2016 (2.73 mp). Yield stream projections therefore began with 2017.
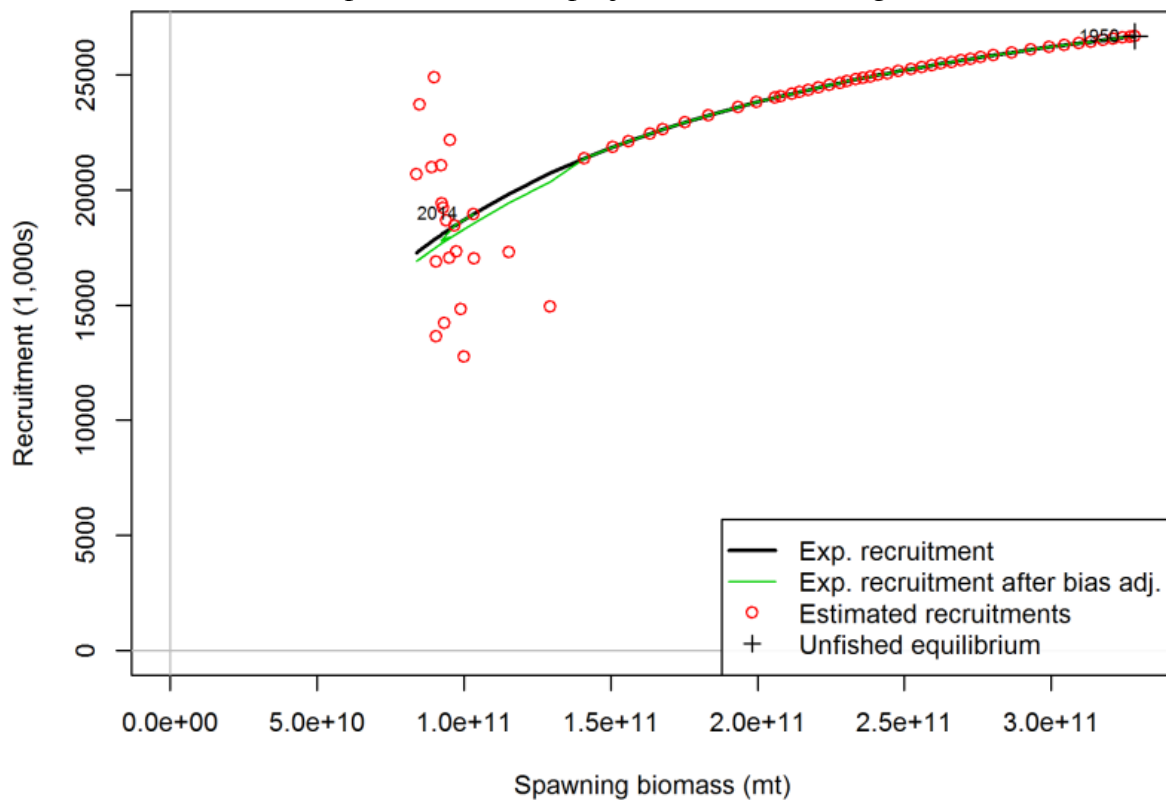

Figure 1. Beverton-Holt stock-recruit curve for vermilion snapper from SEDAR 45
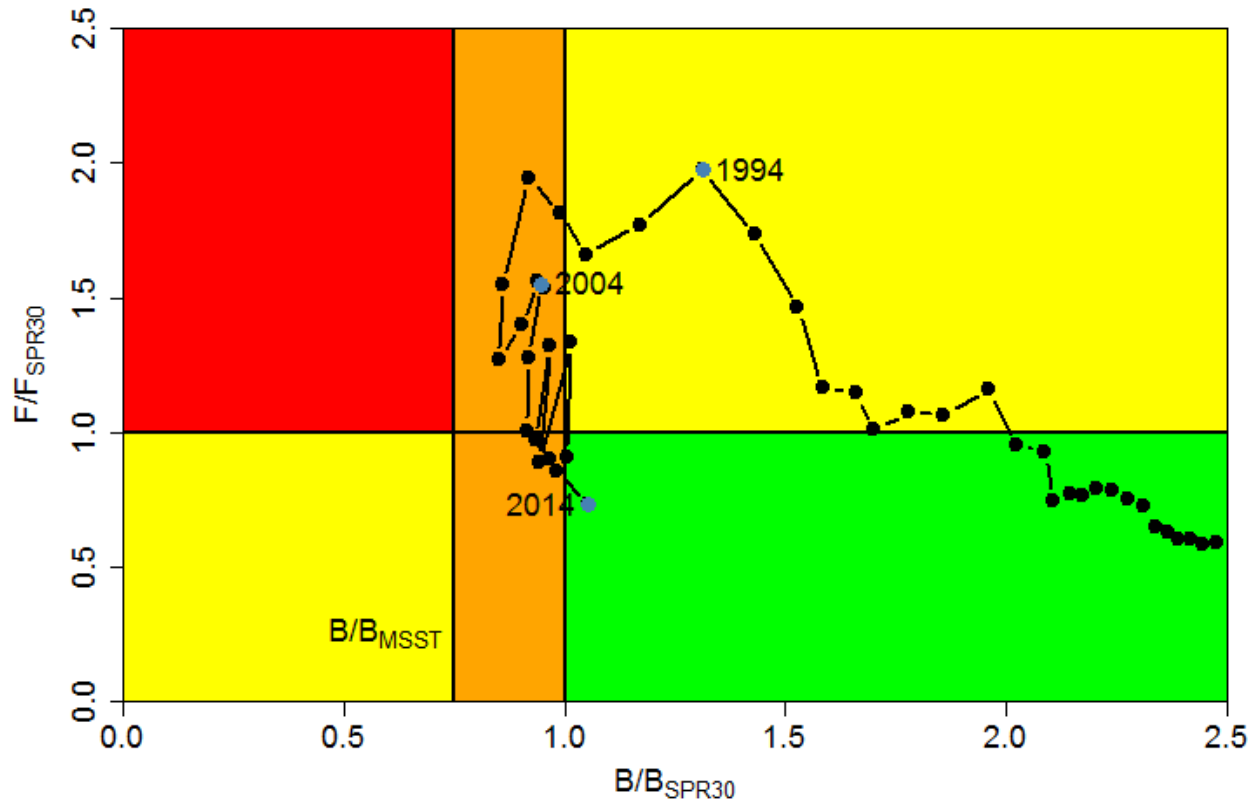
Figure 2. Vermilion snapper fishing mortality rate relative to MFMT and spawning stock biomass relative to MSST and B_{MSY} using a 30% SPR proxy, 1971-2014.

OFL was projected as the yield at $F_{30\% SPR}$. For ABC, the SSC felt that the P* method used in tier 1 of the ABC control rule and used in recent SEDAR assessments has indicated unexpectedly small uncertainty estimates in the OFL, which also occurred in SEDAR 45. The SSC felt that a more conservative ABC should be used, and after discussion, agreed to use the yield when fishing at 75% of $F_{30\% SPR}$ as the ABC yield.

> **Motion: The Committee recommends that the yield stream at 75% of $F_{30\% SPR}$ be used to determine the ABC and the yield at $F_{30\% SPR}$ be used to determine the OFL of Vermilion Snapper.**

> *Motion passed unanimously.*

The resulting yield streams are declining, so a 5-year constant catch ABC was also provided as the average of the annual ABCs for 2017-2021. A constant catch OFL was not needed because the annual OFL remained above the constant catch ABC for the 5-year period. However, under a constant catch ABC, the risk of exceeded OFL would become greater each year as the buffer between OFL and ABC becomes smaller. The following yield streams for both constant F and constant catch ABC were provided by the assessment team.

Table 1. Vermilion snapper OFL and ABC projections under constant F and constant catch scenarios. Units are millions of pounds whole weight.

Year	Constant F		Constant Catch
	OFL (yield at $F_{30\% SPR}$)	ABC (yield at 75% of $F_{30\% SPR}$)	ABC (ave. of 2017-201 ABCs
2017	4.17 mp	3.21 mp	3.11 mp
2018	3.91 mp	3.15 mp	3.11 mp
2019	3.71 mp	3.10 mp	3.11 mp
2020	3.58 mp	3.05 mp	3.11 mp
2021	3.49 mp	3.03 mp	3.11 mp
2022	3.44 mp	3.01 mp	
2023	3.41 mp	3.00 mp	
2024	3.39 mp	2.99 mp	
2025	3.37 mp	2.98 mp	
2026	3.37 mp	2.98 mp	

The SSC needed to decide how many years to include in their OFL/ABC recommendation. Given that the stock is currently neither overfished nor undergoing overfishing, but there are concerns about long-term recruitment and low confidence in the stock-recruit curve, the SSC chose to recommend a 5-year yield stream.

> **Motion: The Committee recommends that the time frame be 5 years (2017-2021) for the yield stream of OFL and ABC for Vermilion Snapper.**
>
> *Motion passed unanimously*.

The SSC did not make a recommendation between either the 5-year constant F ABC or the 5-year constant catch ABC. Both yield streams are presented, and the Council may decide which it chooses to use for management.

Table 2. Vermilion snapper OFL and ABC projections under constant F and constant catch scenarios. Units are millions of pounds whole weight.

Year	Constant F		Constant Catch
	OFL (yield at $F_{30\% SPR}$)	ABC (yield at 75% of $F_{30\% SPR}$)	ABC (ave. of 2017-201 ABCs
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Staff reminded the SSC that it had previously passed a motion stating that "if at the end of the projection period no new assessment is available, and the equilibrium ABC is below the ABC of

the constant catch yield stream, ABC should revert to the equilibrium ABC". This motion would apply to the vermilion snapper ABC unless the SSC moved otherwise. The SSC Chairman stated that it was his intent that the SSC was making no statement about what the ABC should be after 2021.