

# Reef Fish Amendment 48

## Red Drum Amendment 5

### Status Determination Criteria and Optimum Yield for Reef Fish and Red Drum

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April 17, 2018



# Actions

- Action 1 – MSY Proxies
- Action 2 – MSST
- Action 3 – MFMT
- Action 4 – OY



# Action 1 – MSY Proxies

- MSY - Largest long-term average catch or yield that can be taken from a stock or stock complex.
- “Maximum” is rarely known with certainty due to lack of data, uncertainty, poor spawner-recruit relationship.
- “Sustainable” is the focus under SPR-based management.



# MSY Proxies

- Intended to provide a sustainable yield within an acceptable level of risk.
- When SPR can be calculated, yields corresponding to 20% to 50% SPR are generally considered sustainable (lower SPR = higher risk)
- When SPR is unknown, yields based on past landings plus other biological data (if known) can be used to calculate a yield that has been sustained in the past.



# Action 1 Sub-actions

- Sub-action 1.1. Red snapper
- Sub-action 1.2. Assessed stocks
- Sub-action 1.3. Stock complexes
- Sub-action 1.4. Unassessed stocks



# Current MSY Proxies

■ Gag	Yield at $F_{MAX}$
■ Red grouper	Yield at $F_{30\% SPR}$
■ Red Snapper	Yield at $F_{26\% SPR}$
■ Vermilion Snapper	Yield at $F_{30\% SPR}$
■ Gray Triggerfish	Yield at $F_{30\% SPR}$
■ Greater amberjack	Yield at $F_{30\% SPR}$

The Council requested in 2014 that the red snapper proxy be re-visited. This is the only current proxy being reconsidered in this amendment.



# Sub-action 1.1. Red Snapper

**Alternative 1.** No action. MSY proxy remains the yield when fishing at  $F_{26\% \text{ SPR}}$ .

**Alternative 2.** Red snapper MSY proxy is:

**Option 2a.** The yield when fishing at  $F_{20\% \text{ SPR}}$

**Option 2b.** The yield when fishing at  $F_{30\% \text{ SPR}}$

**Option 2c.** The yield when fishing at  $F_{40\% \text{ SPR}}$

In January 2014, the Council voted to request an amendment to change the red snapper MSY proxy to the yield at  $F_{\text{MAX}}$ . This would correspond to  $F_{20.4\% \text{ SPR}}$  if based on total removals (including dead discards) or  $F_{22.4\%}$  if based on landed catch only.



# Sub-action 1.2. Assessed Stocks

**Alternative 1.** No action. MSY proxy remains undefined.

**Alternative 2.** Use the MSY proxy from the most recent SEDAR assessment.

Stock		MSY Proxy: Assessed Yield at
Grouper, Black (IFQ)	(SEDAR 19)	$F_{30\% SPR}$
Grouper, Yellowedge (IFQ)	(SEDAR 22)	
Snapper, Mutton	(SEDAR 15A update)	
Snapper, Yellowtail	(SEDAR 27A)	
Tilefish (IFQ)	(SEDAR 22)	





# Sub-action 1.2. Assessed Stocks

## Alternative 3.

MSY proxy for hermaphroditic species = yield at  $F_{50\% \text{ SPR}}$ .

MSY proxy for gonochoristic species = yield at  $F_{40\% \text{ SPR}}$ .

Alternative is based on recommendations in Harford et al. (2017) for stocks where S-R steepness is uncertain.

Alternative 3 only lists black grouper and yellowedge grouper as hermaphroditic, but Harford et al. (2017) listed all groupers as hermaphroditic.



# Sub-action 1.3. Stock Complexes

- The NS1 guidelines allow status determination criteria to be assigned to individual stocks or to stock complexes. When assigned to stock complexes, the criteria may be based on either an indicator stock, or on the complex as a whole.



# Sub-action 1.3. Stock Complexes

**Alternative 1.** No action. Do not establish stock complexes.



# Sub-action 1.3. Stock Complexes

**Alternative 2.** Establish an MSY proxy for the tilefishes stock complex.

**Option 2a.** Use golden tilefish as an indicator species (MSY = yield at  $F_{30\%SPR}$ )

**Option 2b.** Use MSY yield for golden tilefish plus OFLs from data-limited methods for other species (MSY = approximately 747,000 lbs gw)

Tilefishes Stock complex (IFO)
Tilefish (golden) (i)
Blueline tilefish
Goldface tilefish



# Sub-action 1.3. Stock Complexes

**Alternative 3.** Establish an MSY proxy for the other shallow-water grouper stock complex.

**Option 3a.** Use black grouper as an indicator species (MSY = yield at  $F_{30\%SPR}$ )

**Option 3b.** Use MSY yield for black grouper plus OFLs from data-limited methods for other species (MSY = approximately 710,000 lbs gw)

Other Shallow-water Grouper complex (IFO)
Black grouper (i)
Scamp
Yellowmouth grouper
Yellowfin grouper



# Sub-action 1.3. Stock Complexes

**Alternative 4.** Establish an MSY proxy for the deep-water grouper stock complex.

**Option 4a.** Use yellowedge grouper as an indicator species (MSY = yield at  $F_{30\%SPR}$ )

**Option 4b.** Use MSY yield for black grouper plus OFLs from data-limited methods for other species (MSY = approximately 1,110,000 lbs gw)

Deep-water Grouper complex (IFO)
Yellowedge grouper (i)
Warsaw grouper
Snowygrouper
Speckled hind



# Sub-action 1.3. Stock Complexes

**Alternative 5.** Establish an MSY proxy for the jacks stock complex.

For the MSY yield, use the sum of the OFLs from data-limited methods for each species (MSY = approximately 372,000 lbs ww)

Jacks complex
Lesser amberjack
Almaco jack
Banded rudderfish



# Sub-action 1.3. Stock Complexes

**Alternative 6.** Establish an MSY proxy for the mid-water snappers stock complex.

For the MSY yield, use the sum of the OFLs from data-limited methods for each species (MSY = approximately 209,000 lbs ww)

Mid-water Snappers complex
Silk snapper
Wenchman
Blackfin snapper
Queen snapper





# Sub-action 1.4. Unassessed Stocks

**Alternative 1.** No action. MSY proxy remains undefined.

**Alternative 2.** The MSY proxy for each unassessed stock will be selected from the table below. Stocks selected for a stock complex in Sub-action 1.3 will not be included.



# Sub-action 1.4. Unassessed Stocks

## Alternative 2 continued.

Stock	Yield at				Tier 3 or DLM OFL
	$F_{20\% \text{ SPR}}$	$F_{30\% \text{ SPR}}$	$F_{40\% \text{ SPR}}$	$F_{50\% \text{ SPR}}$	
Grouper, Goliath					
Snapper, Queen					
Snapper, Blackfin					
Snapper, Cubera					
Snapper, Gray					
Snapper, Lane					
Snapper, Silk					
Wenchman					
Speckled Hind					
Grouper, Warsaw					



# Sub-action 1.4. Unassessed Stocks

## Alternative 2 continued.

Stock	Yield at				Tier 3 or DLM OFL
	$F_{20\% \text{ SPR}}$	$F_{30\% \text{ SPR}}$	$F_{40\% \text{ SPR}}$	$F_{50\% \text{ SPR}}$	
Grouper, Snowy					
Grouper, Yellowmouth					
Scamp					
Grouper, Yellowfin					
Tilefish, Goldface					
Tilefish, Blueline					
Amberjack, Lesser					
Almaco Jack					
Banded Rudderfish					



# Action 2. Minimum Stock Size Threshold (MSST)

## What is MSST?

- Stock level below which a stock is declared overfished, at some level below  $B_{MSY}$  (or proxy).
- If biomass falls below MSST, a plan to rebuild to  $B_{MSY}$  (or proxy) must be established.
- When rebuilding achieves a level above MSST, stock is no longer declared overfished, but rebuilding continues until  $B_{MSY}$  (or proxy) is reached.



# Action 2. Minimum Stock Size Threshold (MSST)

## Two Schools of Thought for MSST Rationale

1. To allow stock biomass level to temporarily drop below  $B_{MSY}$  (or proxy) due to natural fluctuations.
2. To avoid recruitment collapse. Reproductive capability is generally considered impaired below 50%  $B_{MSY}$  (Myers et al. 1994)

The NS1 guidelines do not allow MSST to be set below 50%  $B_{MSY}$  (or proxy).



# Action 2. Minimum Stock Size Threshold (MSST)

## Concerns

### **MSST is too close to $B_{MSY}$**

- It may not allow for natural fluctuations
- It may not be detectably different from  $B_{MSY}$

### **MSST is too far from $B_{MSY}$**

- Stock could become in danger of recruitment collapse due to uncertainty about the 50%  $B_{MSY}$  level.
- A stock that drops below MSST will require a more restrictive rebuilding plan.



# Action 2. Minimum Stock Size Threshold (MSST)

## Recently (2017) Changed MSSTs

Stock	Previous MSST	Amendment 44 MSST
Gag	$(1-M)*B_{MAX}$ (M = 0.13)	50% of $B_{MAX}$
Red grouper	$(1-M)*B_{30\% SPR}$ (M = 0.20)	50% of $B_{30\% SPR}$
Red snapper	$(1-M)*B_{26\% SPR}$ (M = 0.09)	50% of $B_{26\% SPR}$
Vermilion snapper	$(1-M)*B_{30\% SPR}$ (M = 0.25)	50% of $B_{MSY}$
Gray triggerfish	$(1-M)*B_{30\% SPR}$ (M = 0.27)	50% of $B_{30\% SPR}$
Greater amberjack	$(1-M)*B_{30\% SPR}$ (M = 0.28)	50% of $B_{30\% SPR}$
Hogfish	$0.75*B_{30\% SPR}$	50% of $B_{30\% SPR}$

MSST for these stocks will NOT be affected by this amendment.



# Action 2. Minimum Stock Size Threshold (MSST)

**Alternative 1:** No Action. Stocks with MSST will retain the MSST. For stocks with undefined MSST, the MSST will be defined as needed for each stock by plan amendment.

For stocks where MSST is currently undefined:

**Alternative 2:** For stocks where MSST is currently undefined,  $MSST = (1-M) \cdot B_{MSY}$  (or proxy)

**Alternative 3:**  $MSST = 0.75 \cdot B_{MSY}$  (or proxy), for all stocks.

**Alternative 4:**  $MSST = 0.50 \cdot B_{MSY}$  (or proxy), for all stocks.





# Action 3. Maximum Fishing Mortality Threshold (MFMT)

What is MFMT?

- A rate of fishing mortality above which a stock is declared to be experiencing overfishing.
- Cannot be higher than  $F_{MSY}$  (or proxy).
- Magnuson-Stevens Act states that if a stock is determined to be approaching an overfished condition or is overfished, conservation and management measures are needed to prevent overfishing or end overfishing and rebuild the fishery.



# Action 3. Maximum Fishing Mortality Threshold (MFMT)

**Alternative 1.** No action. The current definitions for MFMT will be retained.

These are:

- $F_{26\% \text{ SPR}}$  for red snapper
- $F_{50\% \text{ SPR}}$  for goliath grouper
- $F_{\text{MAX}}$  for gag
- $F_{30\% \text{ SPR}}$  for all other reef fish and red drum



## Action 3. Maximum Fishing Mortality Threshold (MFMT)

**Alternative 2.**  $MFMT = F_{PROXY}$  for all stocks, where Proxy is the MSY proxy for each stock as determined in Action 1. If the MSY proxy is expressed as a biomass yield rather than an  $F_{PROXY}$ , the MFMT is a harvest rate that results in the annual yield equal to the biomass MSY proxy.

This alternative assures that both MSST and MFMT are related to the MSY proxy, which has not always been the case in the past. This also provides an overfishing threshold for data poor stocks.



# Action 3. Maximum Fishing Mortality Threshold (MFMT)

**Alternative 3.** Same as Alternative 2 with the addition that:

- $MFMT = F_{REBUILD}$  for stocks that are in a rebuilding plan.

This alternative assures that the overfishing threshold is consistent with a rebuilding plan for overfished stocks.  $F_{REBUILD}$  is usually lower than  $F_{MSY}$ . Consequently, if MFMT is set equal to  $F_{MSY}$ , a stock may fail to rebuild within the designated time frame even if MFMT has not been exceeded.



# Action 4. Optimum Yield (OY)

## What is OY?

- Amount of fish that will provide the greatest overall benefit to the Nation.
- Based on MSY as reduced by any relevant economic, social, or ecological factor.
- In the case of an overfished fishery, that provides for rebuilding to a level consistent with producing the MSY in such fishery.
- Maintains the long term average biomass near or above  $B_{MSY}$



# Action 4. Optimum Yield (OY)

## Two Types of OY

### Long-term (equilibrium) OY

- Average desired yield on a continuing basis.
- Yields may periodically exceed OY, but long-term average catch should equal OY.

### Annual OY (optional)

- The annual yield when fishing at  $F_{OY}$ .
- Can vary from year to year, but must be consistent with achieving long-term OY.
- Appears superfluous with the use of ACL and ACT.

This action focuses on the long-term OY.



# Action 4. Optimum Yield (OY)

**Alternative 1.** No action. For stocks with undefined OY, the reference point will be defined as needed for each stock by plan amendment.



# Action 4. Optimum Yield (OY)

**Alternative 2.** OY is set equal to the yield at

**Option 2a.** 50% of  $F_{\text{MSY Proxy}}$   
or 50% of MSY when  $F_{\text{MSY Proxy}}$  cannot be determined.

**Option 2b.** 75% of  $F_{\text{MSY Proxy}}$   
or 75% of MSY when  $F_{\text{MSY Proxy}}$  cannot be determined.

**Option 2c.** 90% of  $F_{\text{MSY Proxy}}$   
or 90% of MSY when  $F_{\text{MSY Proxy}}$  cannot be determined.

This alternative sets a fixed buffer between MSY and OY. It is the simplest approach, and it assumes that relevant economic, social, and ecological factors are implicitly accounted for.





# Action 4. Optimum Yield (OY)

**Alternative 3.** OY is the equilibrium yield that explicitly accounts for relevant economic, social, or ecological factors by the use of a decision tool that considers such factors when reducing OY from MSY.

This alternative requires an additional step to construct a decision tool that explicitly accounts for relevant economic, social, and ecological factors.



# Next Steps

- Revise amendment to reflect Council's preferred alternatives.
- Public hearing (via webinar)
- Final action (at June Council meeting).

