

Status Determination Criteria and Reference Points

What are they and why do we need
them?

New Orleans, Louisiana
August 12, 2019



Status Determination Criteria (SDC)

What are they?

- Criteria used to determine condition of fish stocks and the fishery

Why are they important to the Council?

- FMPs must define overfishing and overfished status
- Council must use measurable and objective criteria to do this



What is MSY?

- 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, and poor spawner-recruit relationship.
- MSY is difficult to estimate because it depends upon a reliable stock-recruitment relationship, for which data is often sparse and/or highly variable.



What is Spawning Potential Ratio (SPR)?

$$\text{Ratio} = \frac{\text{Production: Number of Eggs Produced Fished Stock}}{\text{Production: Number of Eggs Produced Unfished Stock}}$$

SPR assumes a certain number of fish survive and spawn

- “Sustainable” is the focus under SPR-based management
- SPR has a maximum of 1.0 and declines to 0 as fishing mortality (F) increases
- When is SPR typically used?
 - When MSY cannot be estimated due to limited information on the spawner recruit curve



What Spawning Potential Ratio (SPR) is Best?

Life History of the species main consideration

Examples:



Long-lived, slow growing, late to reach reproductive maturity have a low resilience to fishing mortality (SPR = 40-60%)



Short-lived, fast growing, early reproductive maturity have a high resilience to fishing mortality (SPR = 25-35%)

30% SPR is most frequently set for Gulf reef fish



Updates to Document

- Includes South Atlantic Council criteria for black grouper, mutton snapper, yellowtail snapper, and goliath grouper
- Tilefish (golden) removed as a potential indicator species
- Alternatives now address criteria definitions for stocks and stock complexes



Sub-Action 1.1 – MSY Proxies for Assessed Stocks

Alternative 1: No action. MSY undefined.

Alternative 2: Define MSY proxy as yield when fishing at 30% spawning potential ratio ($F_{30\%SPR}$).

Alternative 3: Define MSY proxy as yield when fishing at 30% spawning potential ratio ($F_{30\%SPR}$). For future assessments of these species MSY proxy equals the yield produced by F_{MSY} or F_{PROXY} recommended by the Council's SSC and subject to approval by the Council through a plan amendment.

Black grouper, yellowedge grouper, mutton snapper, and yellowtail snapper



Stock Complexes

- Defined during the 2011 ACL/AM Amendment
 - Landings Data (fishery-dependent)
 - Stock Assessment Surveys (fishery-independent)
 - Depth and Area Fished
 - Similar Life History Parameters
- Current Management
 - Complexes are important to IFQ Fisheries
 - Annual Catch Limits and Accountability Measures



Action 1.2 – MSY Proxies for Stock Complexes and Unassessed Stocks

Alternative 1: No action. MSY undefined.

Alternatives 2 and 3: Both include an option to assign an indicator species. Black grouper for the shallow-water groupers and yellowedge for the deep-water groupers. Both also include 3 options for a MSY proxy (yield at F of 20%, 30%, or 40% SPR) for a total of 4 options.

Alternatives 4-6: Include 3 options (yield at F of 20%, 30%, or 40% SPR) for a MSY proxy for each stock complex. The complexes are tilefish, jacks, and mid-water snapper.



Action 1.2 – Continued

Alternatives 7 and 8: Include 3 options (yield at F of 20%, 30%, or 40% SPR) for a MSY proxy for 2 individual stocks (cubera snapper and lane snapper).

Alternative 9: Includes 3 options for goliath grouper (yield at F of 30%, 40%, or 50% SPR).



Action 1.3 –MSY Proxy for Red Drum

Alternative 1: No action. MSY undefined.

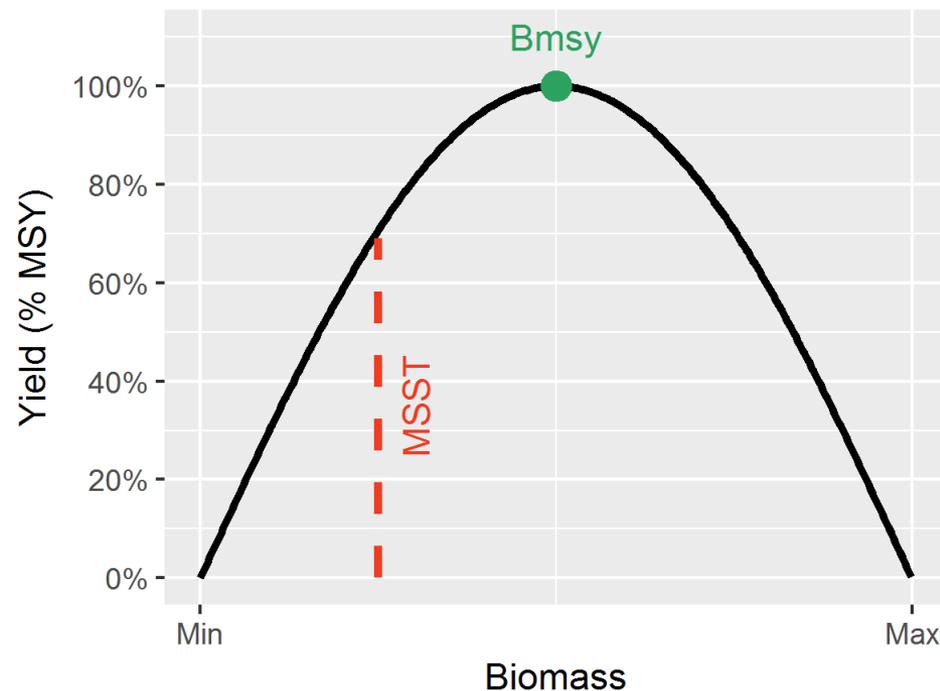
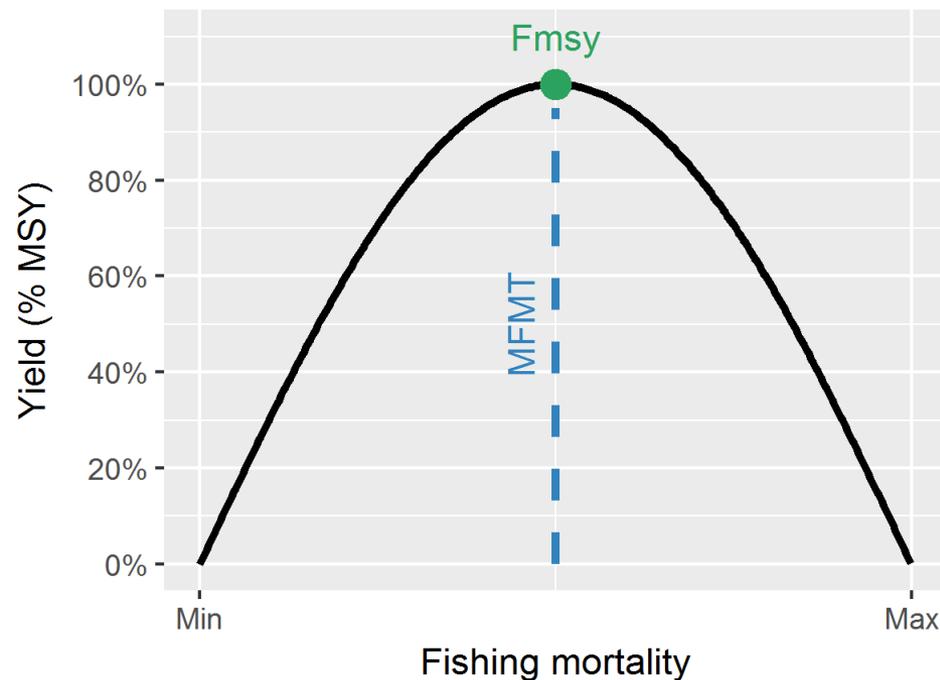
Alternative 2: The MSY proxy for red drum is the yield that provides for an escapement rate of juvenile fish to the spawning stock biomass (SSB) equivalent to 30% of those that would have escaped had there been no inshore fishery.

Alternative 3: The MSY proxy for red drum is the yield when fishing at $F_{30\%SPR}$.



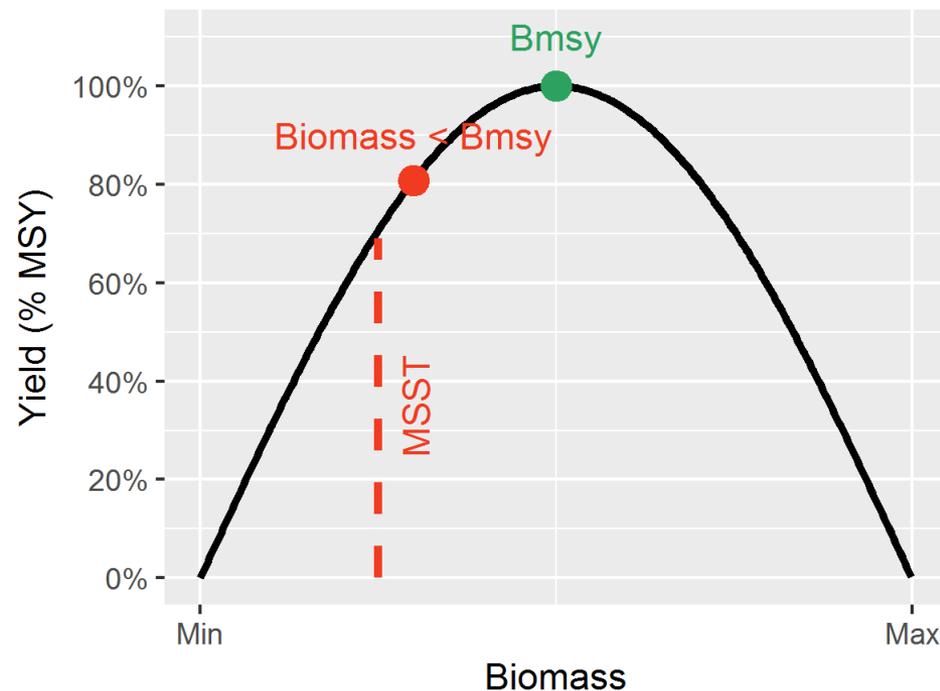
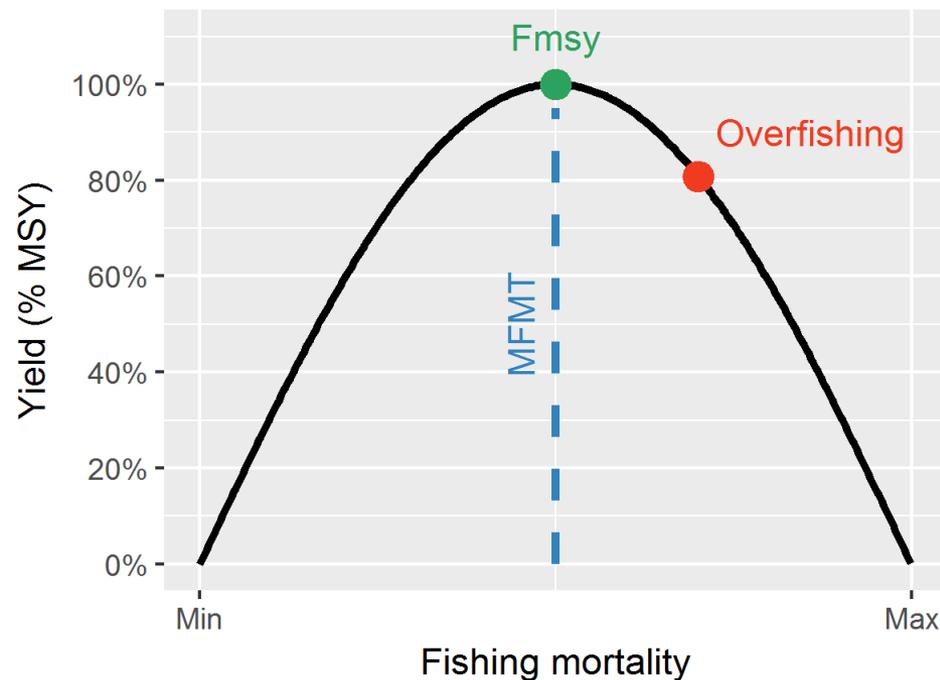
Thresholds: MFMT & MSST

- Maximum Fishing Mortality Threshold (MFMT): Fishing mortality $>$ MFMT is considered overfishing
- Minimum Stock Size Threshold (MSST): Minimum allowable stock size without being considered overfished

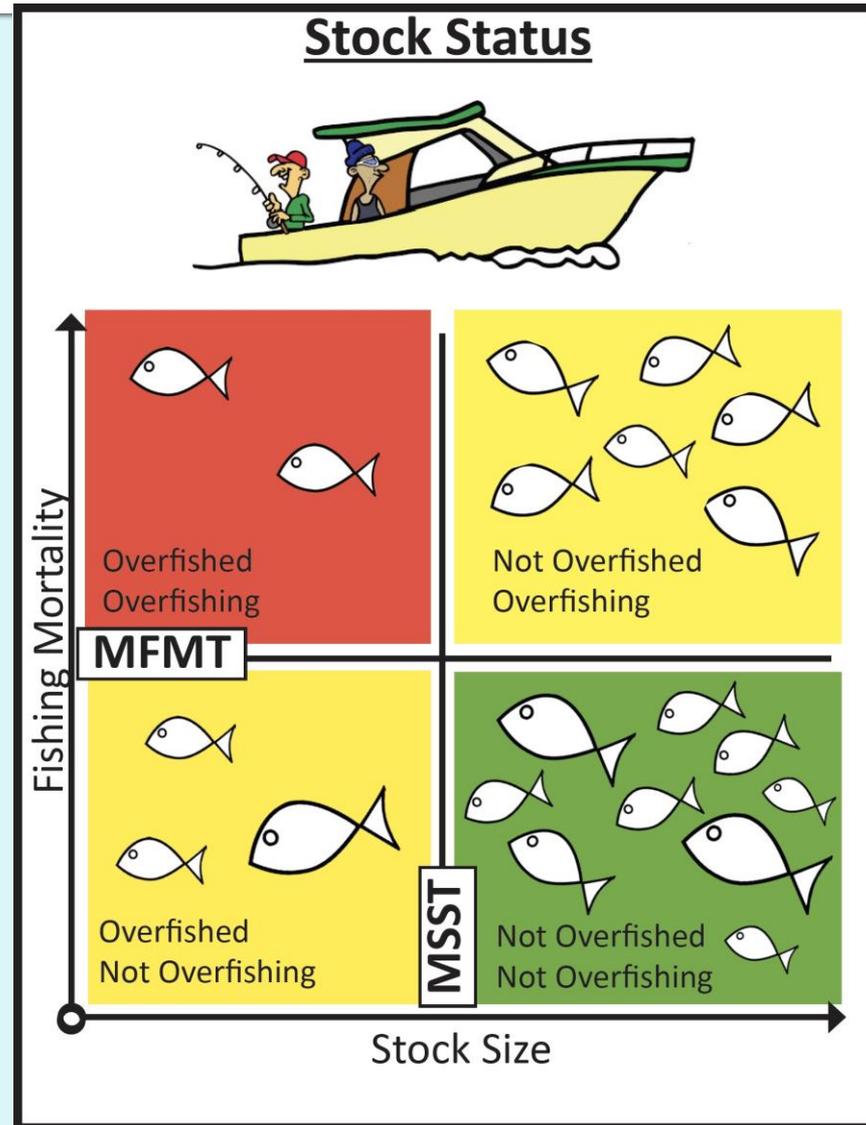


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Putting it All Together



Action 2 – Defining MFMT

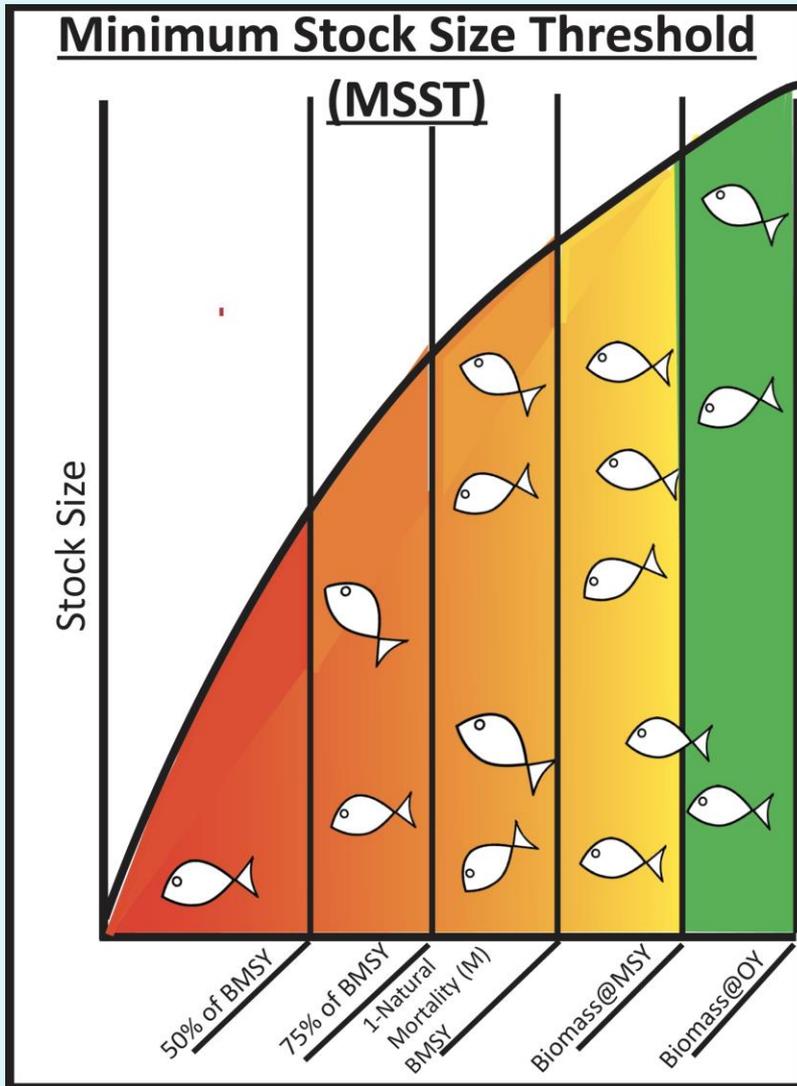
Alternative 1: No action. Maintain current definitions of MFMT. These are $F_{26\%SPR}$ for red and gray snapper, $F_{50\%SPR}$ for goliath grouper, F_{MAX} for gag (where MAX is maximum yield per recruit), and $F_{26\%SPR}$ for all other reef fish stocks and red drum.

Alternative 2: For stock where an MSY proxy has not been defined, set the MFMT equal to the fishing mortality at the MSY proxy for each stock or stock complex as determined in sub-actions 1.1, 1.2, and 1.3

Alternative 3: If a stock is in a rebuilding plan, set the MFMT equal to the fishing mortality rate that is projected to rebuild the stock to B_{MSY} within the rebuilding time period ($F_{Rebuild}$). After the stock has recovered, the MFMT is equal to the fishing mortality at the stock's MSY proxy.



Evaluation Criterion: MSST



- Ideally, the MSST would be at biomass at MSY
- The Council can set MSST below biomass at MSY to account for variability in recruitment or environmental conditions
- The lower MSST is set, the harder it is to rebuild the stock

Action 3 – Defining MSST

Alternatives apply to stocks and stock complexes in sub actions 1.1-1.3

Alternative 1: No action. Do not define MSST. Stocks with established MSST will be retained for gag, gray triggerfish, greater amberjack, hogfish, red grouper, red snapper, vermillion snapper, and gray snapper.

Alternative 2: $MSST = (1-M)*BMSY$ (or proxy) where M is the natural mortality rate

Alternative 3: $MSST = 0.75*BMSY$ (or proxy)

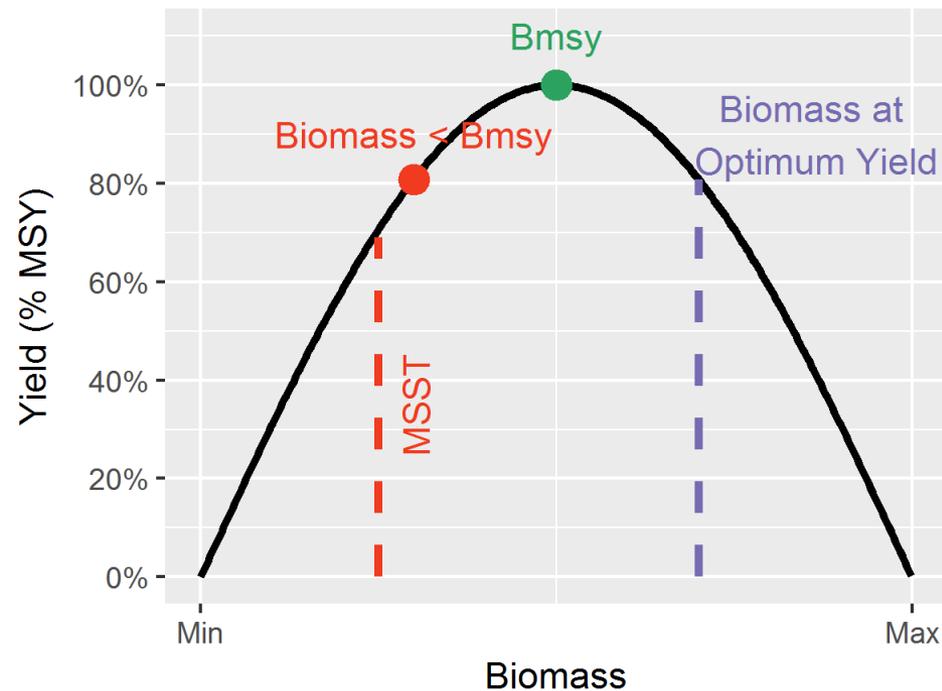
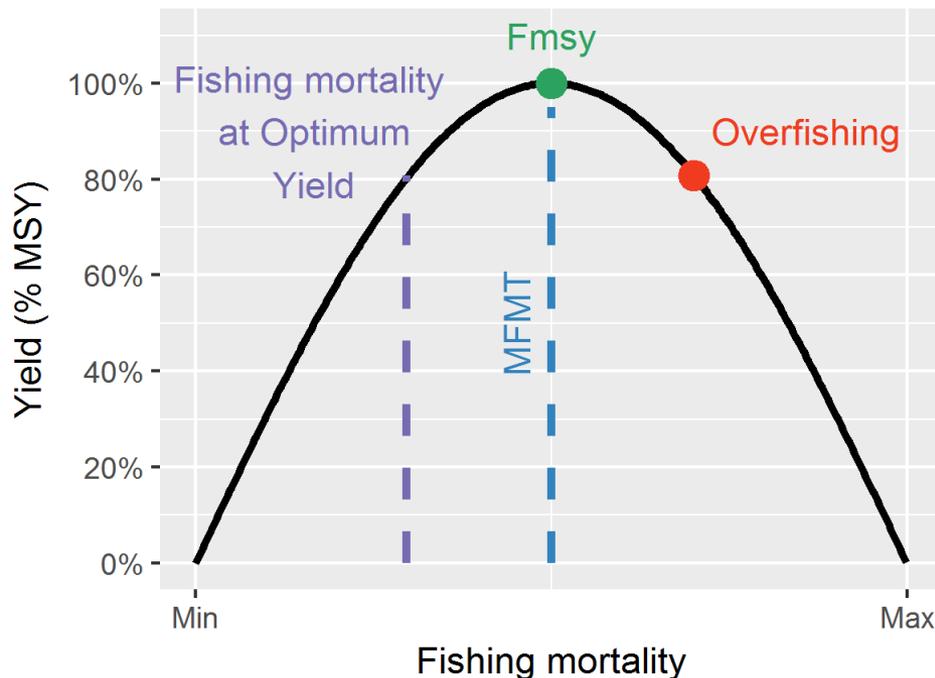
Alternative 4: $MSST = 0.50*B_{MSY}$ (or proxy)

Alternative 5: $MSST = 0.50*B_{MSY}$ (or proxy) for all stocks and stock complexes in sub-actions 1.1-1.3 with the exception of stocks assessed across the South Atlantic and Gulf Council's jurisdictions (Goliath grouper, mutton snapper, yellowtail snapper, and black grouper). MSST for these species would use existing definitions of MSST defined by the South Atlantic Council



What is Optimum yield?

- Allowable harvest that will provide the greatest overall benefit to the Nation
- Based on MSY as reduced economic, ecological or social factors
- Maintains the long-term biomass near or above B_{MSY}



Action 4 – Defining OY

Alternative 1: No action. Do not define OY for stocks and stock complexes in sub-actions 1.1-1.3. For hogfish and other reef fish stocks not listed above, Amendment 1 (GMFMC 1989) established OY as the yield when fishing is 20% SSBR (later 20% SPR).

Alternatives 2-6: Each alternative has 3 options for defining OY (50%, 75%, or 90% of F_{MSY} [or MSY proxy]) for each stock complex: shallow-water grouper, deep-water grouper, tilefish, jacks, and mid-water snapper.

Alternatives 7-13: Each alternatives has 3 options for defining OY (50%, 75%, or 90% of F_{MSY} [or MSY proxy]) for each individual stock: cubera snapper, lane snapper, goliath grouper, mutton snapper, yellowtail snapper, hogfish, and red drum.



Next steps

- Council to review actions and alternatives
- Discuss and Take Any Necessary Action to Incorporate SSC suggestions
- Bring updated draft to October Council meeting



Questions?

