

Minimum Stock Size Threshold (MSST) and Maximum Sustainable Yield (MSY) Proxies for Reef Fish Stocks



Options Paper for October 2015 meeting
Gulf of Mexico Fishery Management Council

When is a Stock Overfished?

- Scientific definition: A stock's biomass (or egg production potential) has been reduced below the level needed to produce MSY (B_{MSY} or proxy) on a continuing basis.
- Legal definition: A stock's biomass (or egg production potential) has been reduced a minimum stock size threshold (MSST) level established by the Council.

What is Minimum Stock Size Threshold (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.
- So why allow the stock to drop to a level below B_{MSY} (or proxy) before declaring it overfished?

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).

Current De Facto MSST Definition

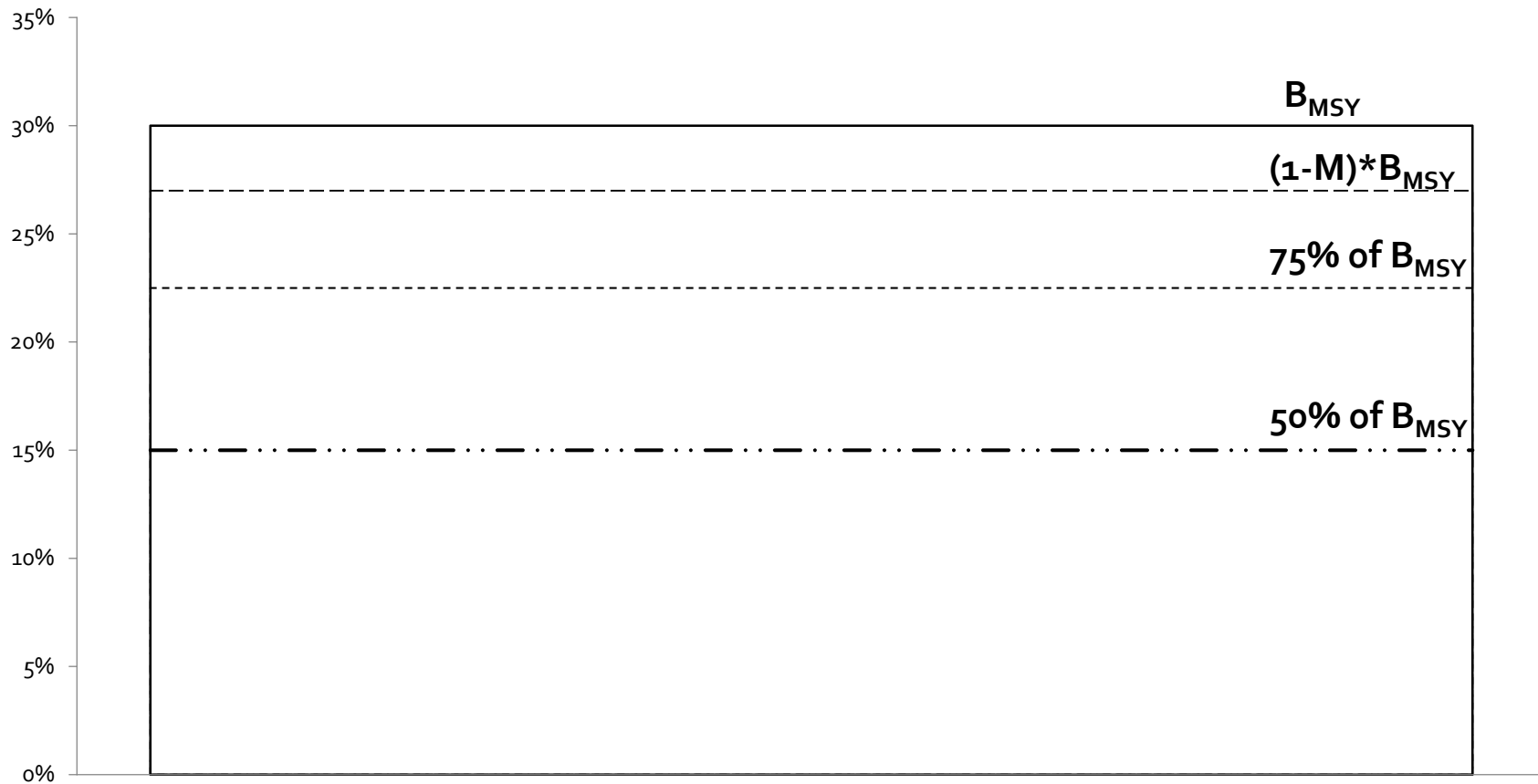
- Current Definition of MSST:
Biomass (or egg production) at $(1-M)*B_{MSY}$
(or proxy)
- Results in MSST close to B_{MSY} (or proxy) for low M stocks, may trigger spurious overfished determinations.

Concerns

- If MSST is too close to B_{MSY}
 - It may not allow for natural fluctuations
 - It may not be detectably different from B_{MSY}
- If 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.

Relative MSST for $M=0.1$

MSST Levels for a 30% SPR MSY Proxy



Options Paper Actions and Alternatives

Action 1 – Define (or re-define) Minimum Stock Size Threshold for Species in the Reef Fish Fishery Management Unit

- **Alternative 1:** No Action. MSST for species that have a defined specification will not be changed. MSST will remain undefined for species that do not have a definition specified.
- **Alternative 2:** $MSST = (1-M) * B_{MSY}$ (or proxy)
- **Alternative 3:** $MSST = (1-M) * B_{MSY}$ (or proxy) or $0.75 * B_{MSY}$ (or proxy), whichever is less.
- **Alternative 4:** $MSST = 0.75 * B_{MSY}$ (or proxy), for all stocks.
- **Alternative 5:** $MSST = 0.50 * B_{MSY}$ (or proxy), for all stocks.

Stocks With $M \leq 0.25$

MSST affected by Alt. 3, 4, and 5

- Yellowedge grouper ($M=0.073$)
- Red snapper ($M=0.094$)
- Mutton snapper ($M=0.11$)
- Lane snapper ($M=0.11-0.24$)
- Goliath grouper ($M=0.12$)
- Tilefish ($M=0.13$)
- Gag ($M=0.134$)
- Black grouper ($M=0.136$)
- Red grouper ($M=0.14$)
- Hogfish ($M=0.179$)
- Yellowtail snapper ($M=0.19$)
- Vermilion snapper ($M=0.25$)

Under Alternative 3, Stocks using $(1-M) * B_{MSY}$

- Gray triggerfish ($M=0.27$)
MSST = 73% of B_{MSY}
- Greater amberjack ($M=0.28$)
MSST = 72% of B_{MSY}

Stocks With No Gulf Estimate of Natural Mortality

These stocks will be treated as low M stocks until a Gulf assessment is conducted.

- Queen snapper
- Blackfin snapper
- Cubera snapper
- Gray snapper
- Silk snapper
- Wenchman
- *Lessor amberjack
- *Almaco jack
- Banded rudderfish
- Scamp
- Speckled hind
- Snowy grouper
- Yellowfin grouper
- Warsaw grouper
- Yellowmouth grouper
- *Goldface tilefish
- Blueline tilefish

Estimates of M from other regions range 0.08 – 0.86.
Goldface tilefish, lessor amberjack, and Almaco jack have no estimate of M

Action 2 – MSY proxies

- **Alternative 1:** No Action. Continue to establish MSY proxy on a case-by-case basis.
- **Alternative 2:** MSY proxy = the yield when fishing at $F_{30\% SPR}$, except for those stocks listed in Alternative 4 (if selected).
- **Alternative 3:** MSY proxy = the yield when fishing at $F_{40\% SPR}$, except for those stocks listed in Alternative 4 (if selected).
- **Alternative 4:** Regardless of the alternative selected above, the following stocks shall have MSY defined as shown below.

Action 2 – Alternative 4 Exceptions to a default MSY proxy

The following stocks already have established MSST definitions, and would not be subject to the default MSST:

- Gag: = the yield when fishing at F_{MAX}
- Red grouper: = the yield when fishing at $F_{30\% SPR}$
- Red snapper: = the yield when fishing at $F_{26\% SPR}$
- ~~■ Vermilion sp: = the yield when fishing at F_{MSY}~~
- Gray trigger: = the yield when fishing at $F_{30\% SPR}$
- Greater amb: = the yield when fishing at $F_{30\% SPR}$
- Goliath grp: = the yield when fishing at $F_{50\% SPR}$

Staff recommends removing vermilion snapper from list. Amendment 23 specified F_{MSY} , but SEDAR assessments used $F_{30\% SPR}$.



Questions?