Tab B, No. 6(a)

Status Determination Criteria and Reference Points

What are they and why do we need them?

Mobile, Alabama
October 23, 2018
and
Orange Beach, AL
Jan 2019

Status Determination Criteria

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

Status Determination Criteria

So…How many fish can be harvested?

Goal: What & how to use them

Long-term

Values based on the biology of a stock that are constant through time

- Maximum Sustainable Yield (MSY)
  - Fishing Mortality at MSY (F_{MSY})
  - Biomass at MSY (B_{MSY})
- Optimum Yield (OY)

Short-term

Annual values that account for the current condition of a stock

- Overfishing Limit (OFL)
- Acceptable Biological Catch (ABC)
- Annual Catch Limit (ACL)

Evaluation criteria

Thresholds defined by the Council to identify the overfished and overfishing status of a stock

- Maximum Fishing Mortality Threshold (MFMT)
- Minimum Stock Size Threshold (MSST)

Long-term Criteria: 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, poor spawner-recruit relationship.

Why use an MSY proxy?

- MSY is difficult to estimate because it depends upon a reliable stock-recruitment relationship, for which data is often sparse and/or highly variable.
- Proxies such as % SPR are more reliably calculated since they only rely on the life history schedules at age.

What is Spawning Potential Ratio (SPR)?

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

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

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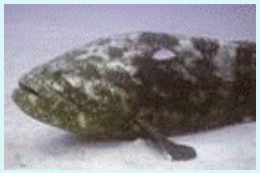
What Spawning Potential Ratio (SPR) is Best?

Life History of the species main consideration



Examples:

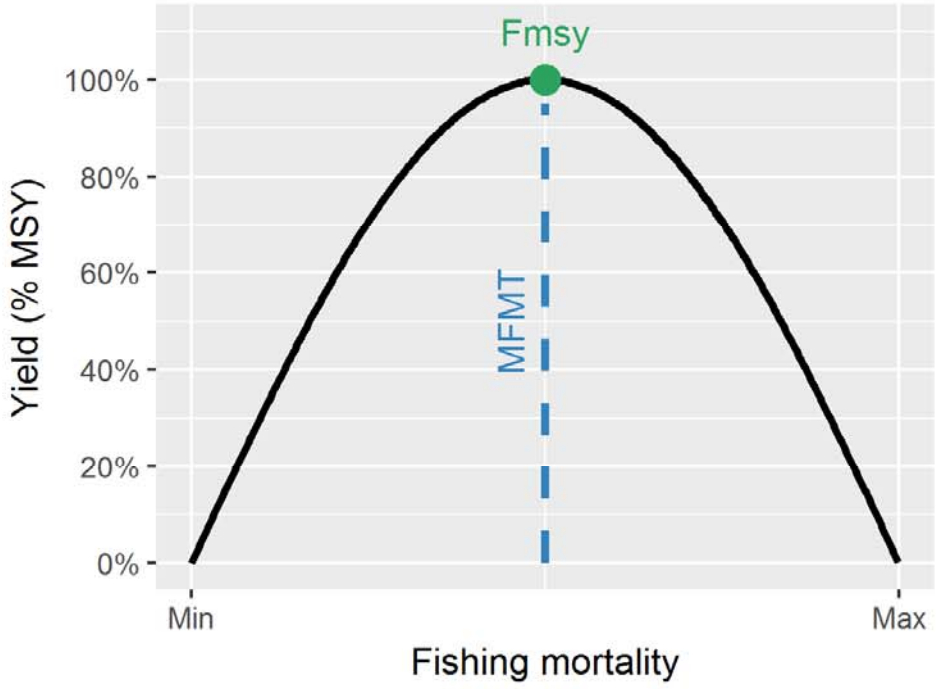
Long-lived, slow growing, late to reach reproductive maturity have a low resilience to fishing mortality (SPR = 40-60%)

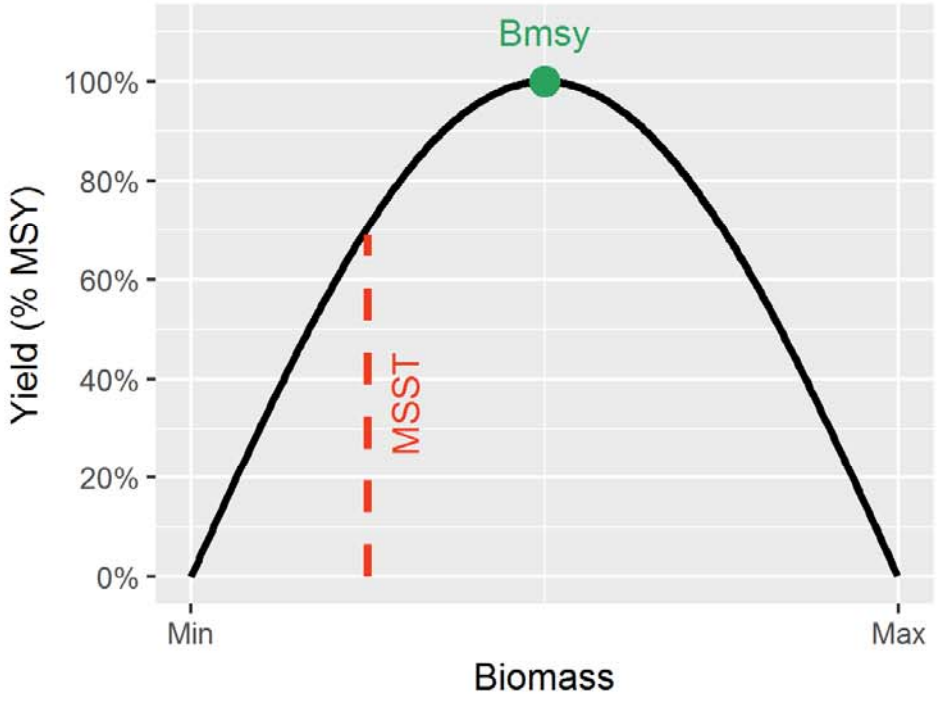
Short-lived, fast growing, early reproductive maturity have a high resilience to fishing mortality (SPR = 25-35%)

30% SPR is most frequently set for Gulf reef fish

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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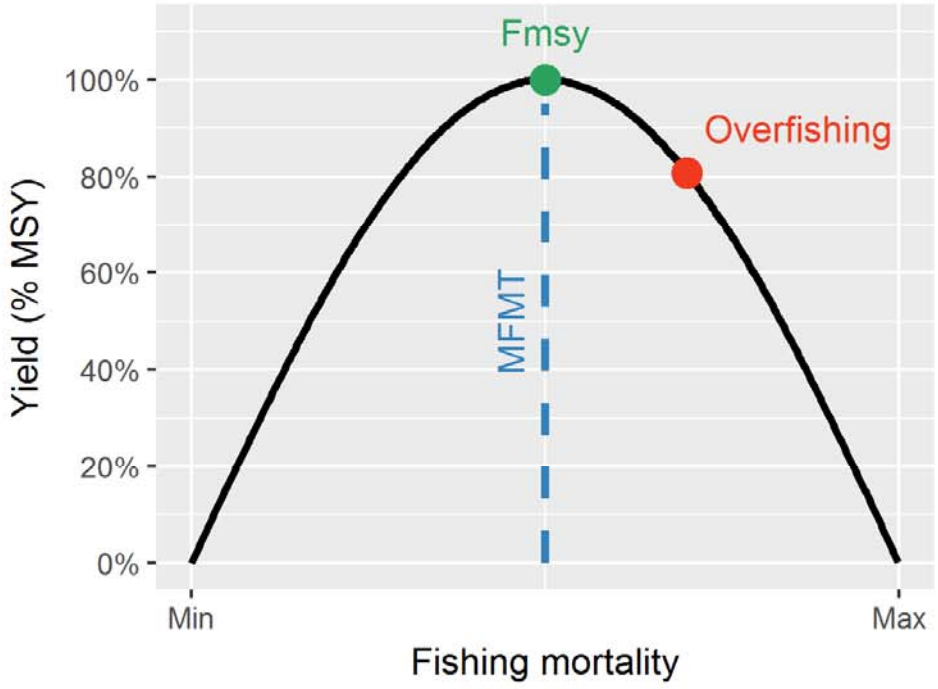
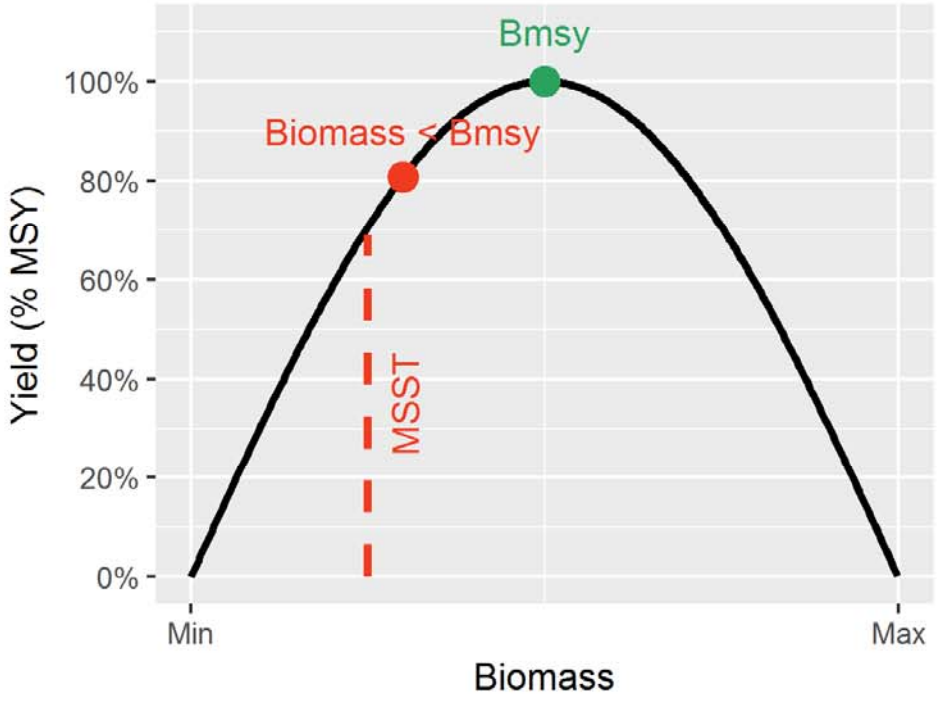
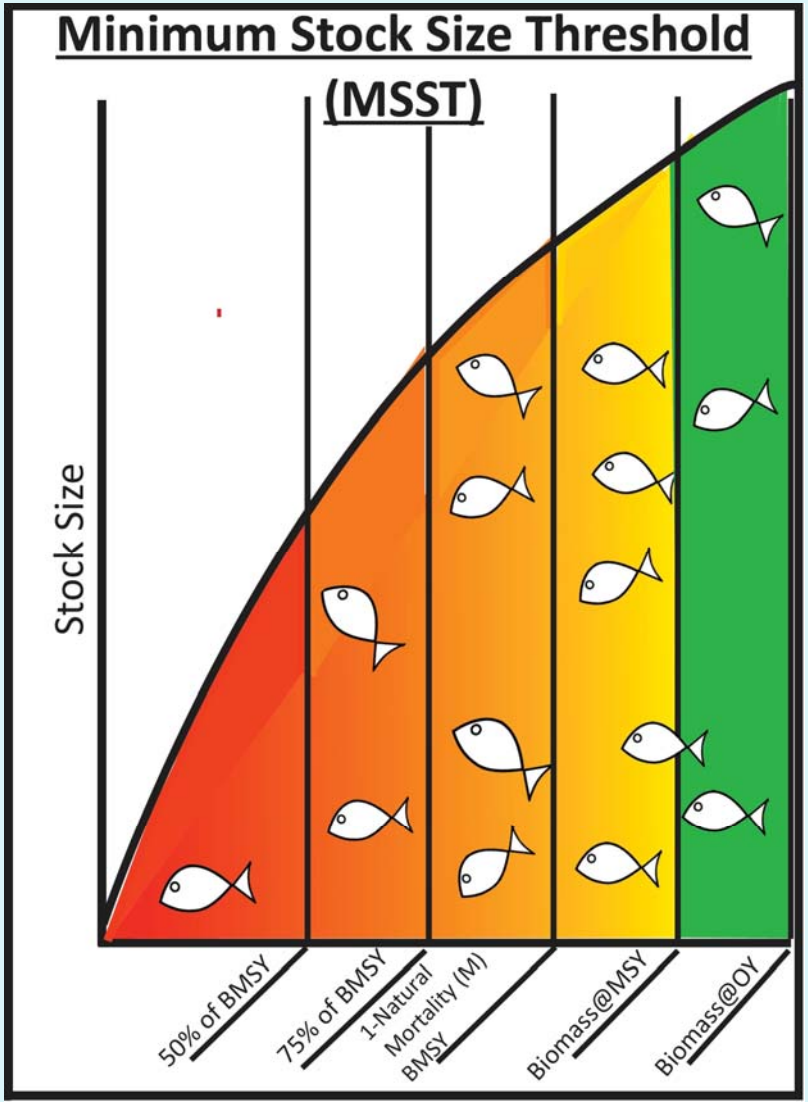




Evaluation Criterion: MSST



- 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

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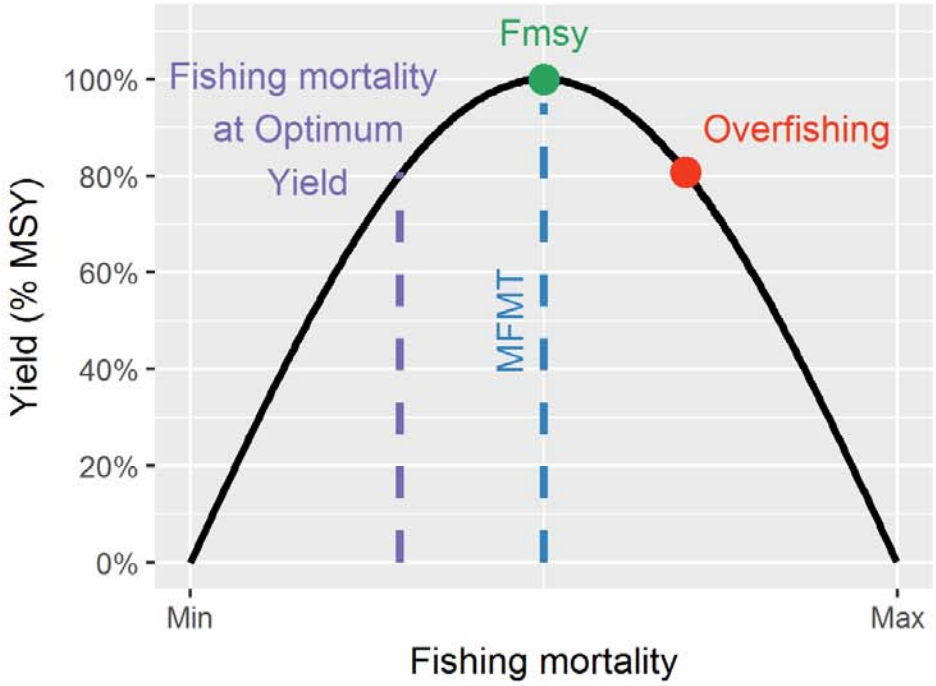
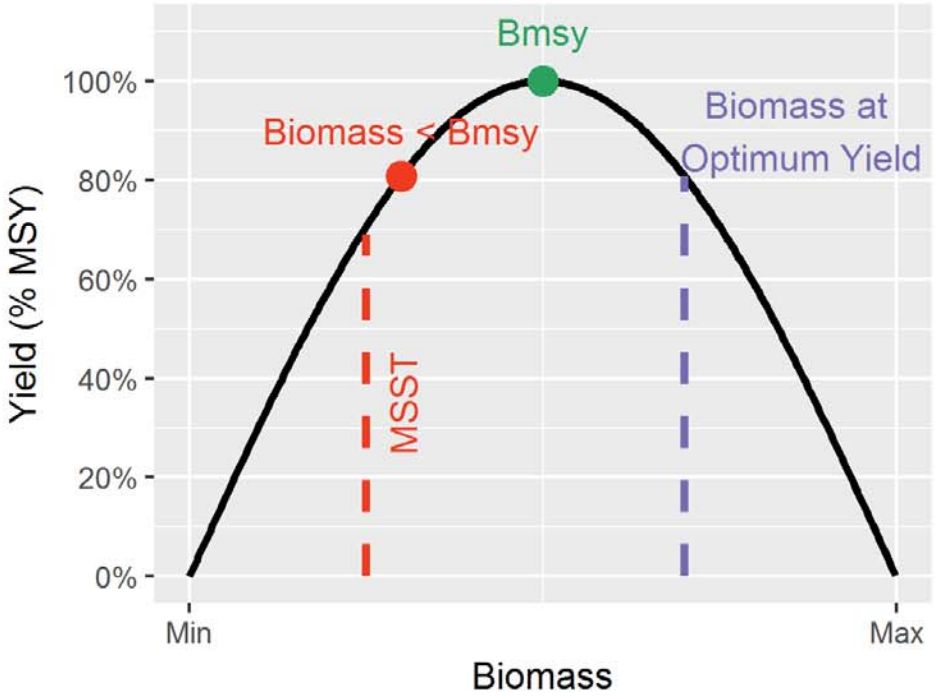
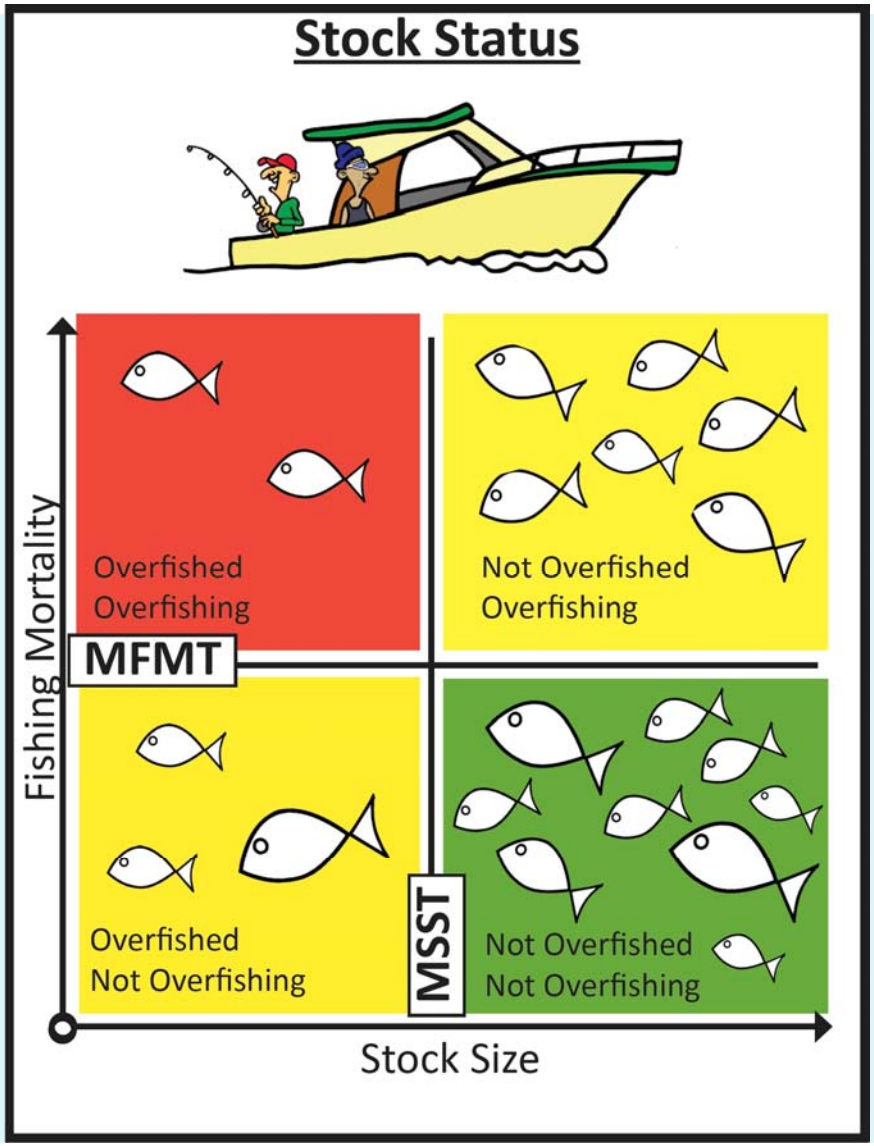
What is Optimum yield?

- 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}

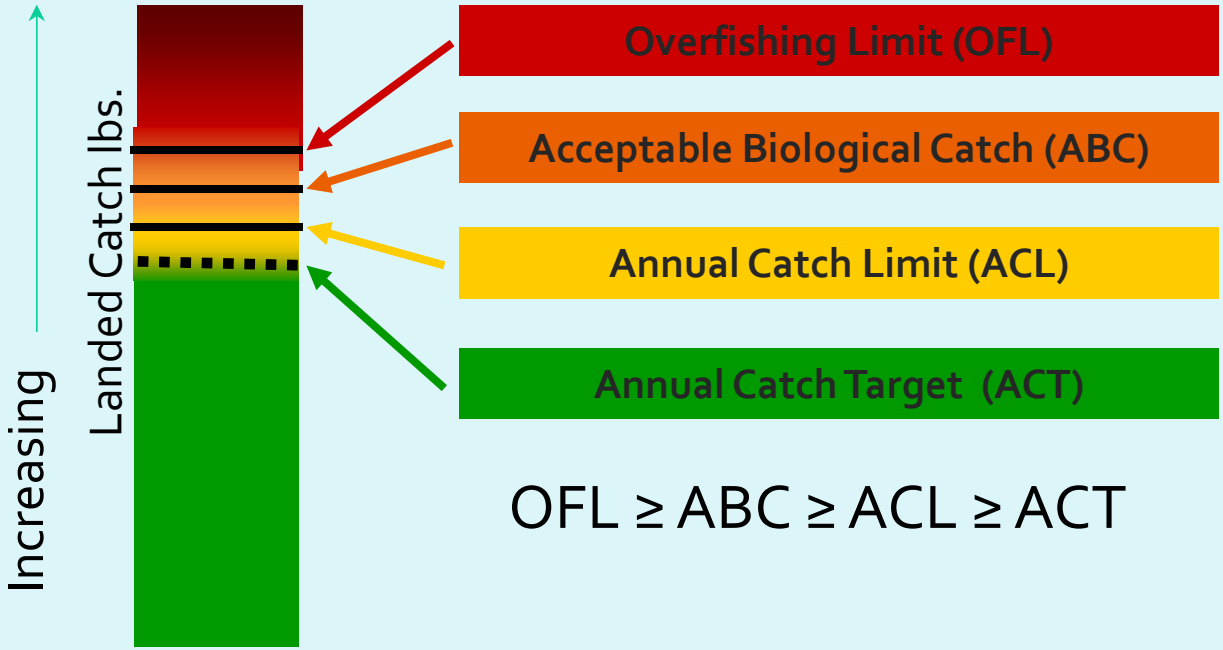




Putting it All Together



Short Term Criteria



$$OFL \geq ABC \geq ACL \geq ACT$$

Establishing SDCs: Progress to Date

Criteria	Reef Fish Stocks	Gray Snapper
Stock Assessment	15	SEDAR 51
MSY	7	Not defined
MSST	7	Not defined
MFMT	31	$F_{30\% \text{ SPR}}$
OY	6	Not defined

Status Determination Criteria have been defined for most stocks as part of a rebuilding plan.

Next Steps: Gray Snapper

- Action 1: Maximum Sustainable Yield (MSY)
- Action 2: Maximum Fishing Mortality Threshold (MFMT)
- Action 3: Minimum Stock Size Threshold (MSST)
- Action 4: Optimum Yield (OY)
- Action 5: Modify ACLs for Gray Snapper

Questions?