

Status Determination Criteria and Reference Points

What are they and why do we need
them?

Mobile, Alabama
October 23, 2018



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)?

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

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%)



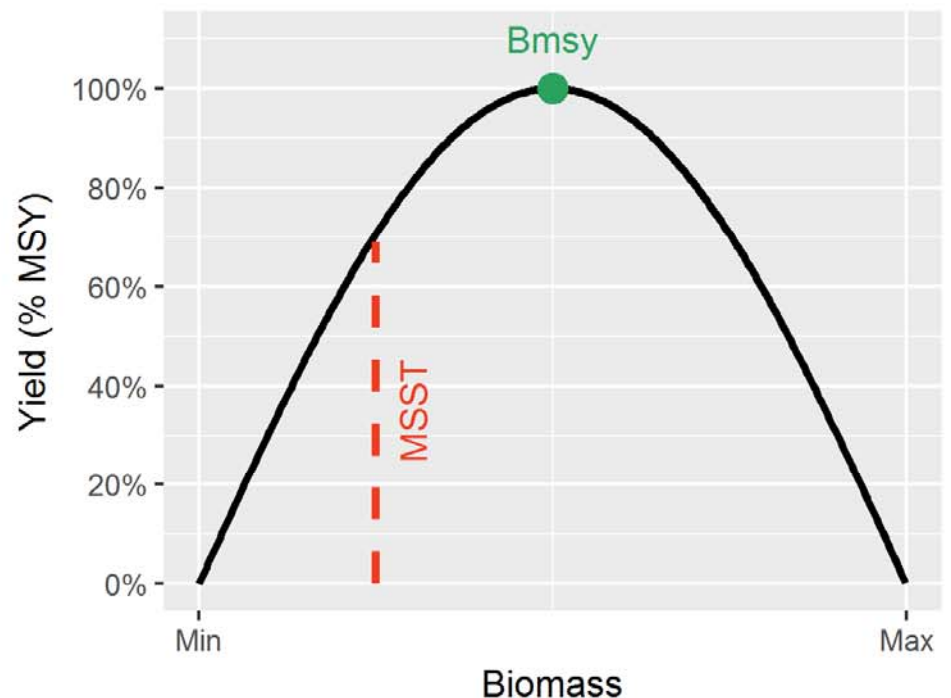
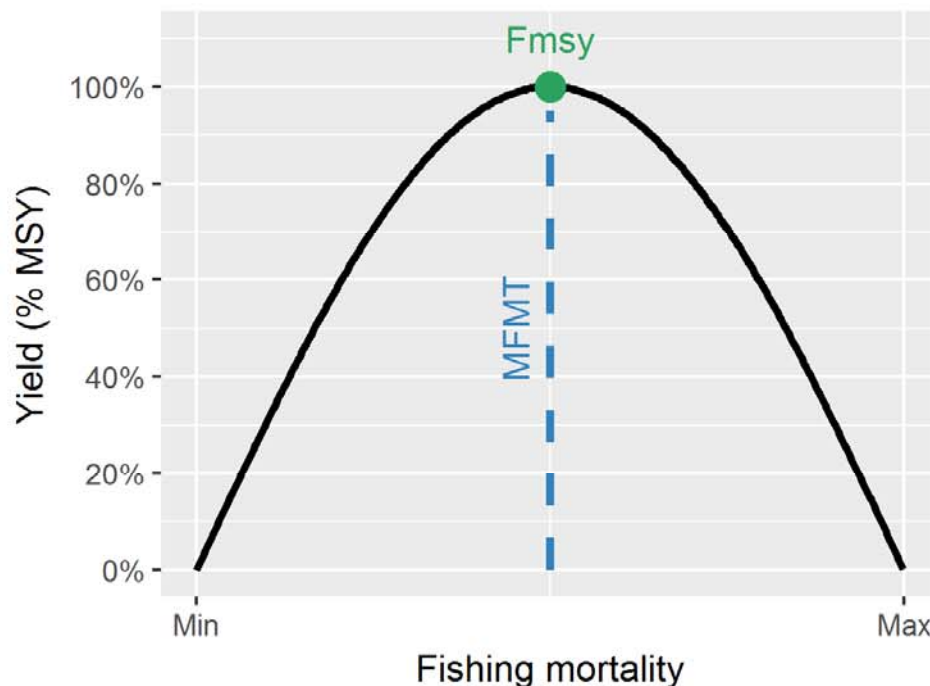
Short-lived, fast growing, early reproductive maturity have a high resilience to fishing mortality (SPR = 25-35%)

30% SPR is most frequently set for Gulf reef fish



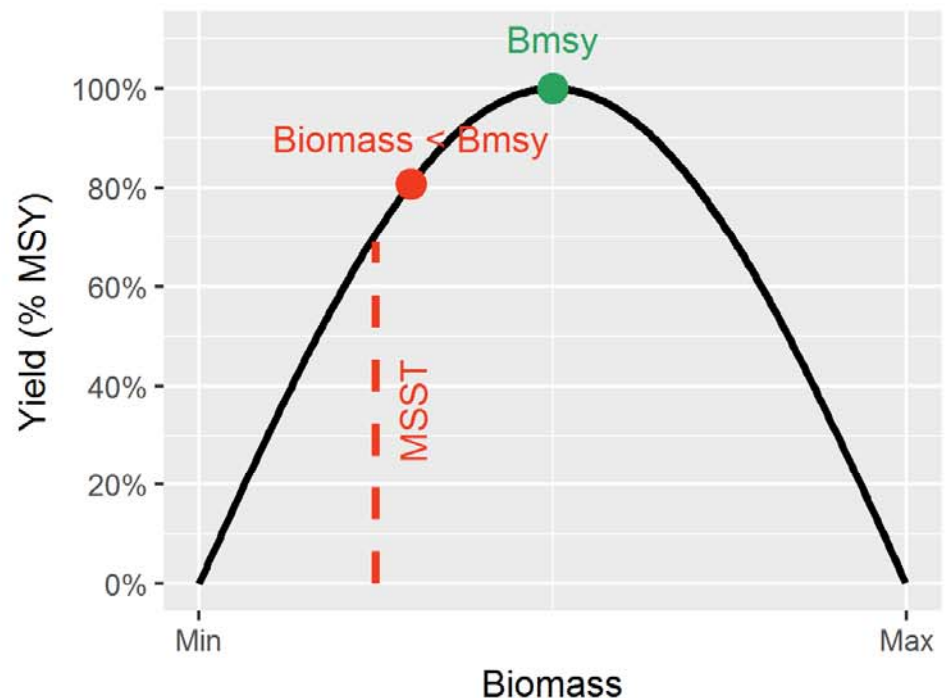
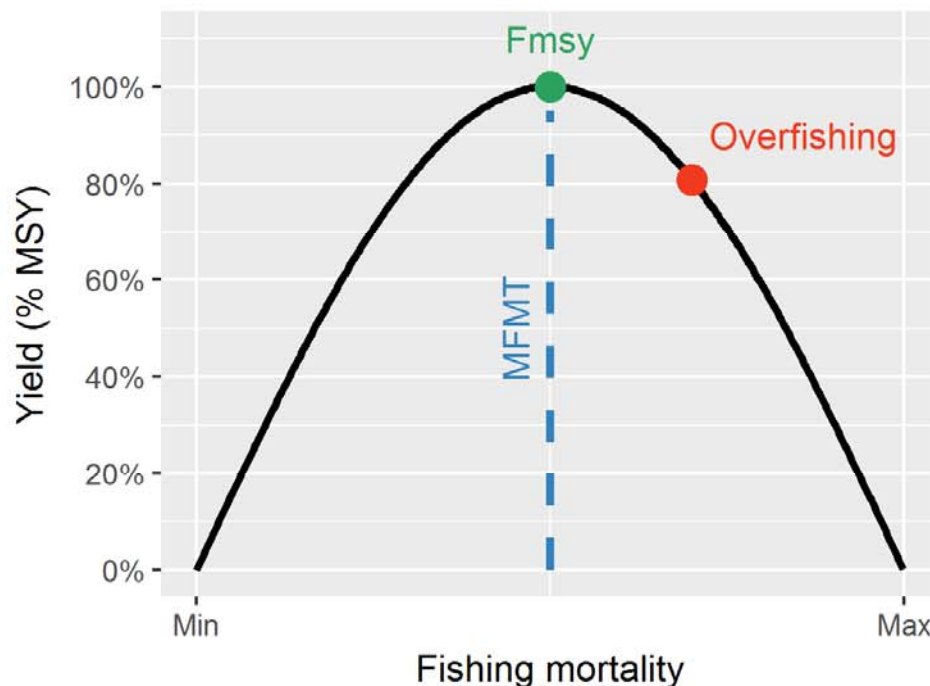
Thresholds: MFMT & MSST

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

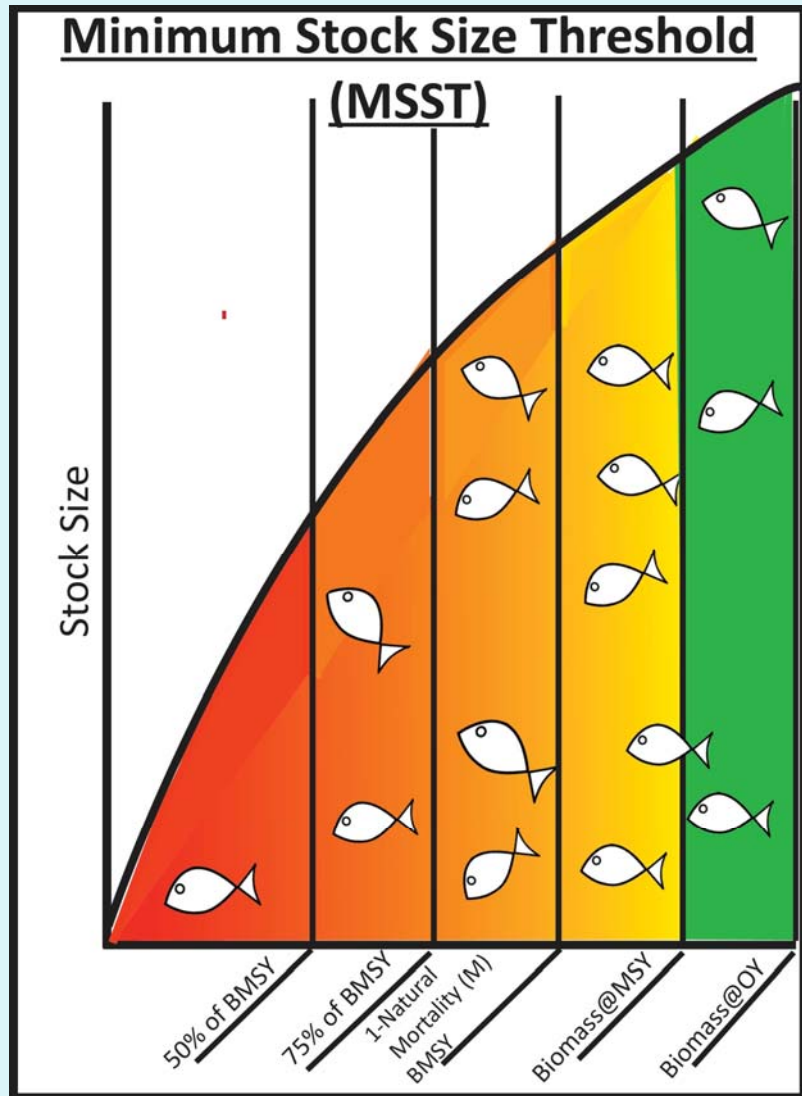


Thresholds: MFMT & MSST

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



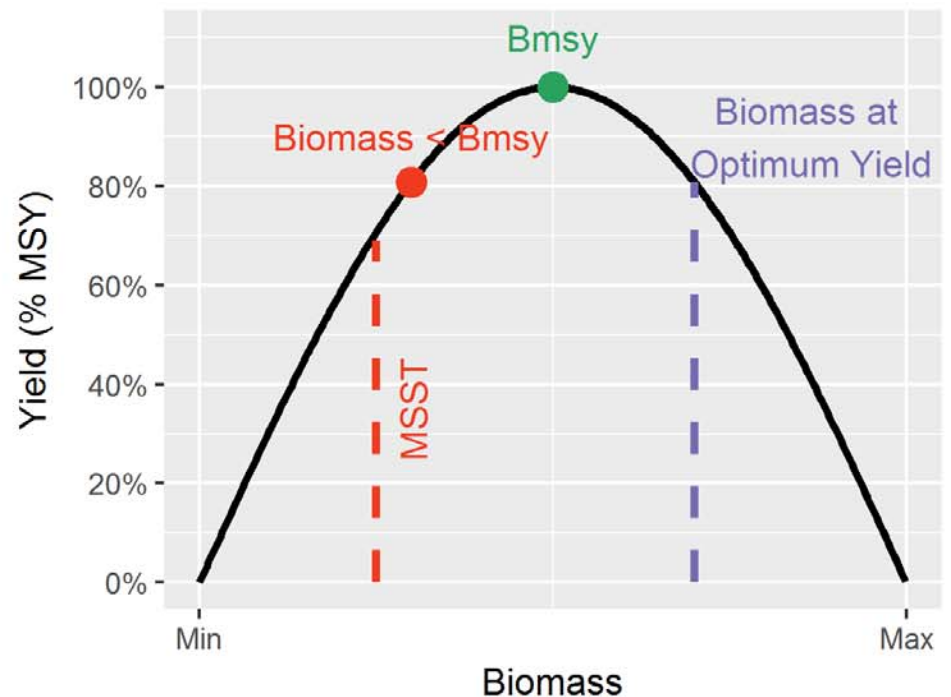
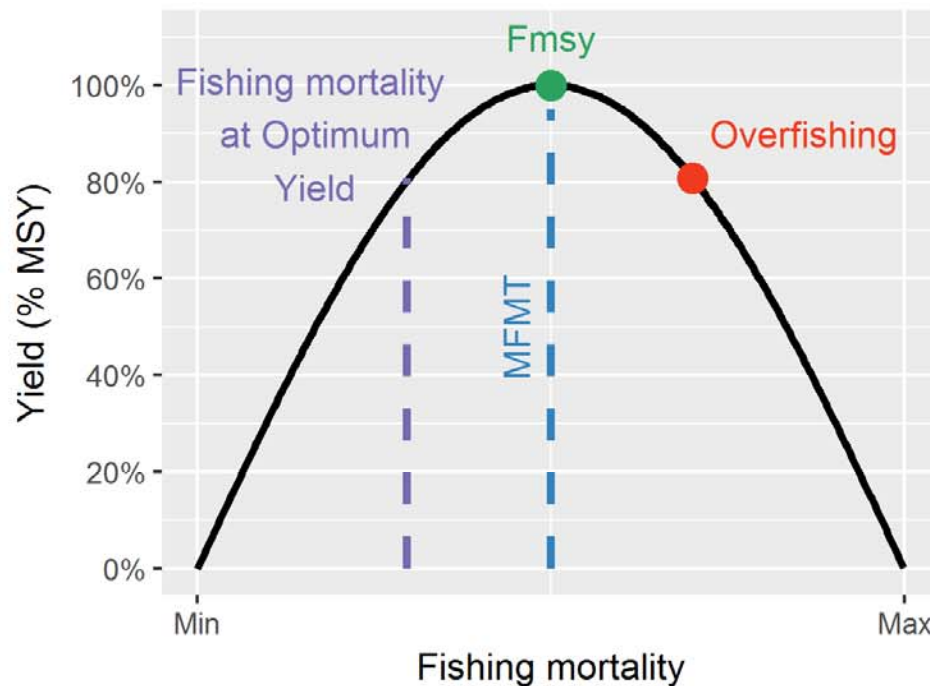
Evaluation Criterion: MSST



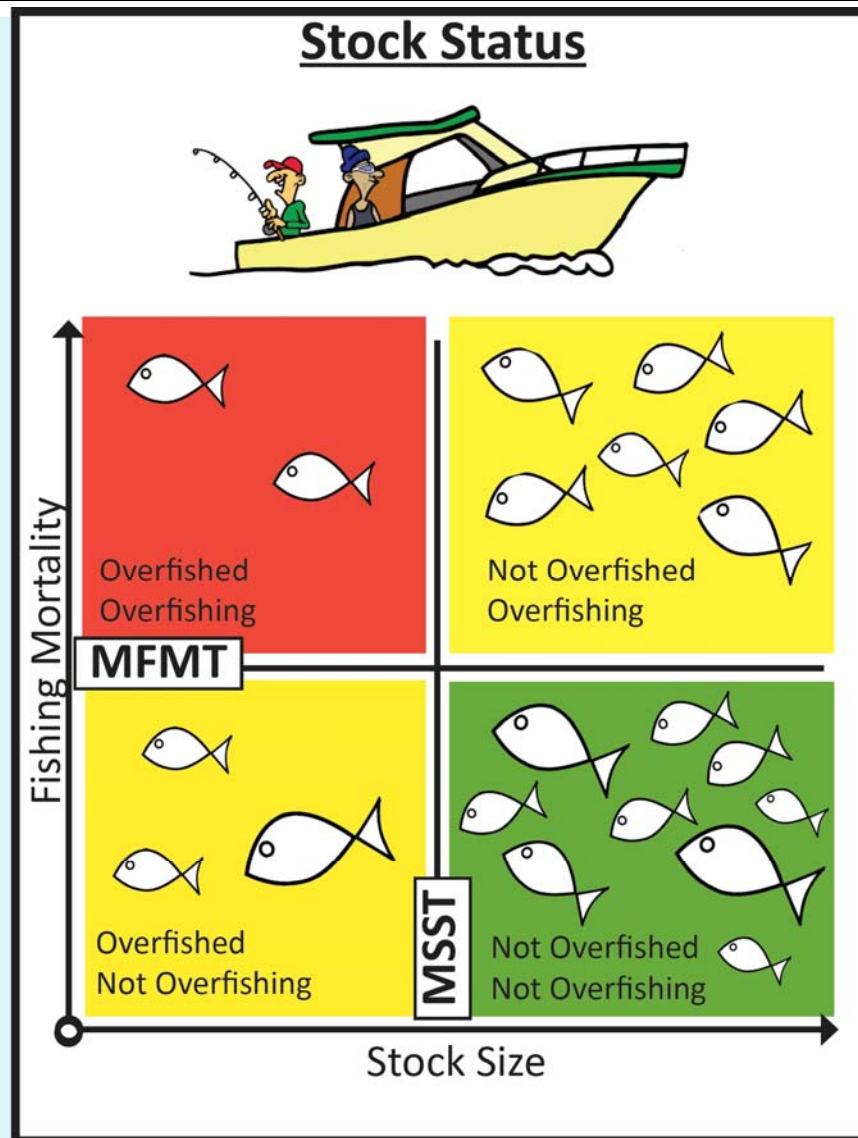
- Ideally, the MSST would be at biomass at MSY.
- The Council can set MSST below biomass at MSY to account for variability in recruitment or environmental conditions
- The lower MSST is set, the harder it is to rebuild the stock

What is Optimum yield?

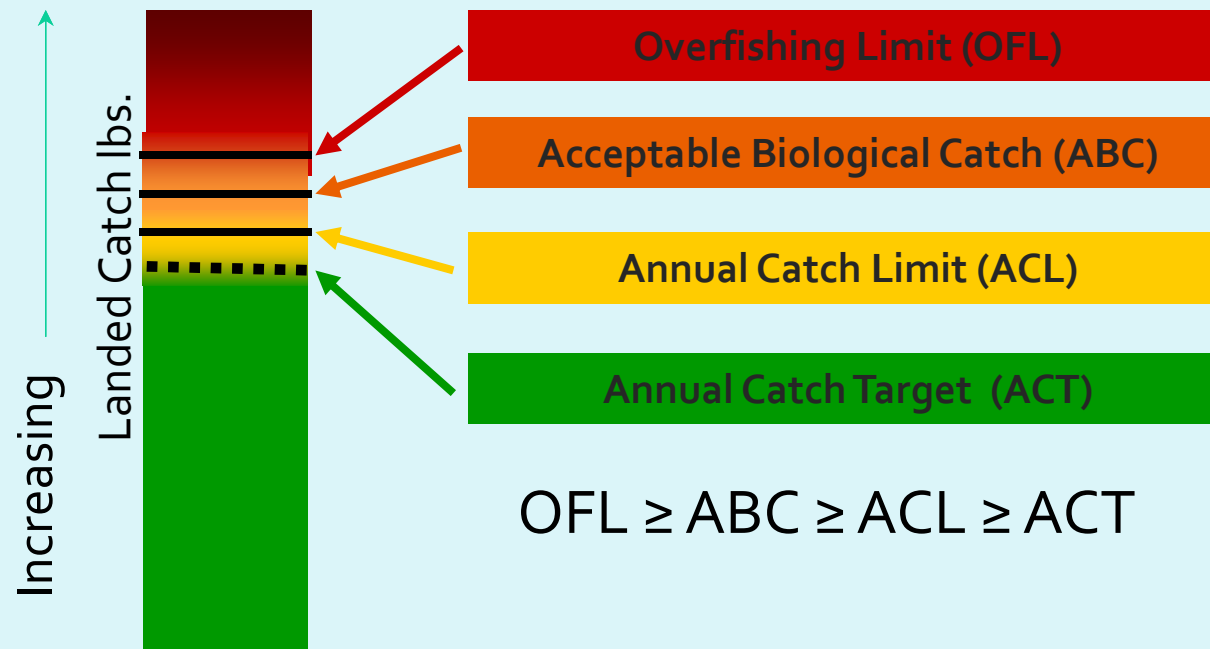
- Allowable harvest that will provide the greatest overall benefit to the Nation.
- Based on MSY as reduced economic, ecological or social factors.
- Maintains the long-term biomass near or above B_{MSY}



Putting it All Together



Short Term Criteria



$$\text{OFL} \geq \text{ABC} \geq \text{ACL} \geq \text{ACT}$$

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	$F_{30\% SPR}$
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?

