

**NOAA**  
**FISHERIES**

# Proposed Interim Analysis for Red Grouper



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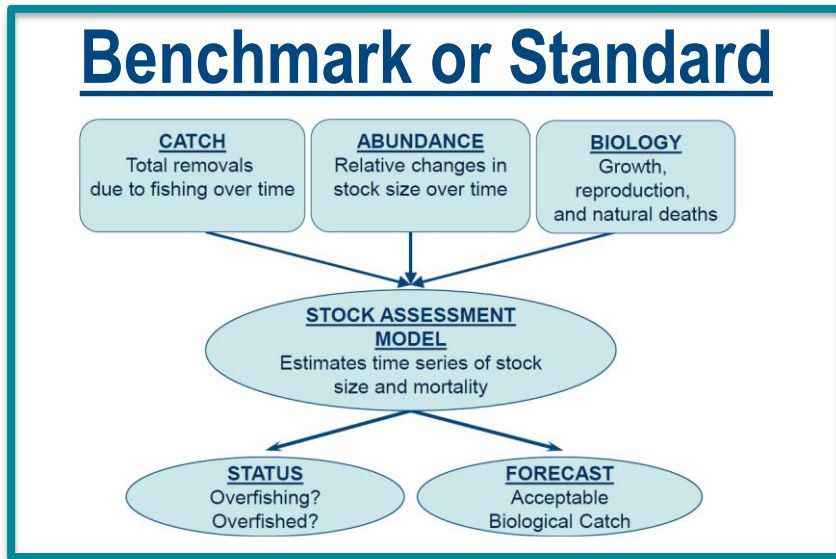
**Prepared for the Gulf of Mexico Fishery  
Management Council,  
SSC Meeting**

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# Presentation Contents and Goals

1. Review interim analysis proposal
2. Discuss framework for interim analysis
3. Identify and review next steps

# Proposed Interim Analysis Process



## Data Collection & Analyses:

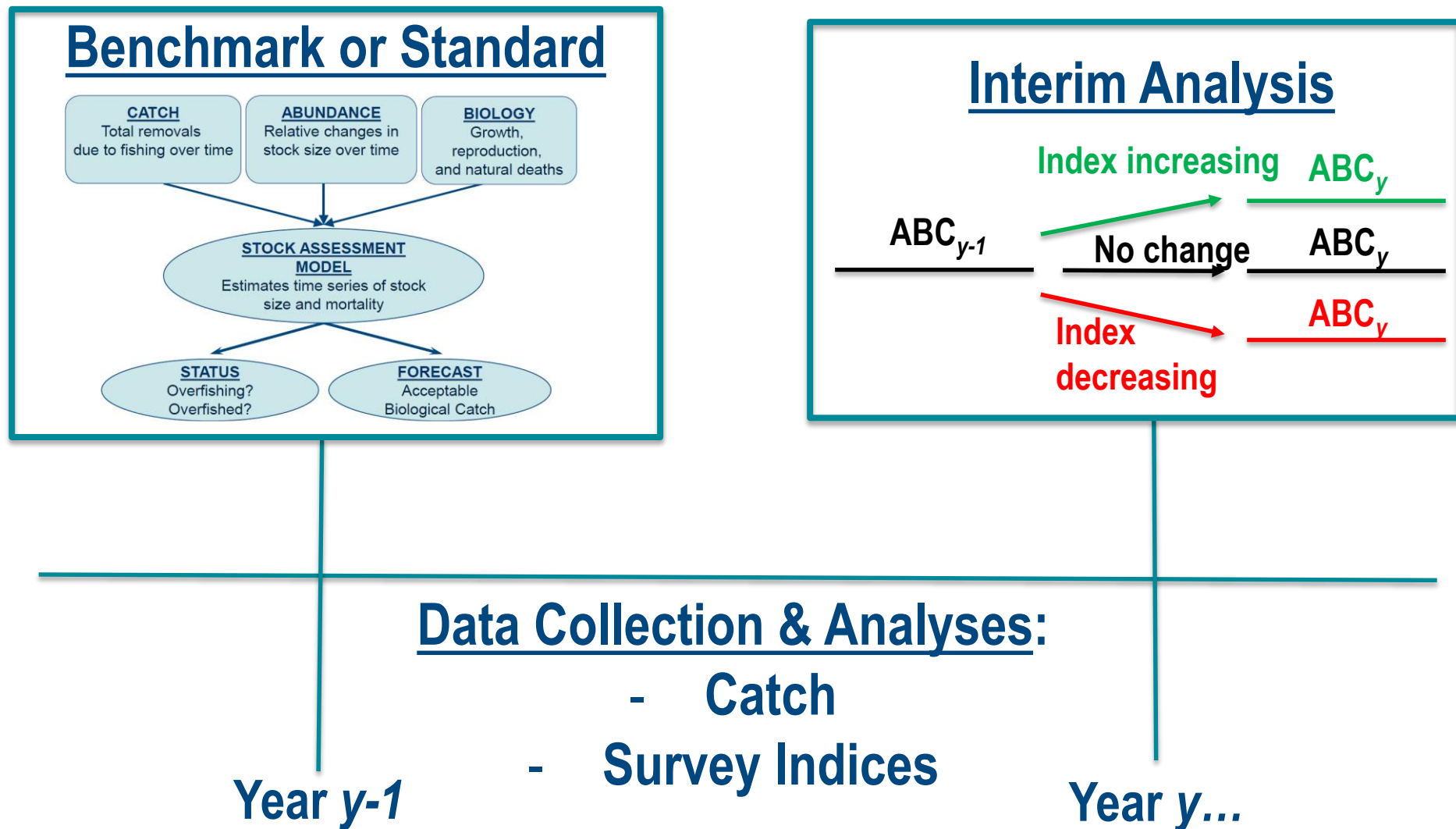
- Catch
- Survey Indices

Year  $y-1$

Year  $y...$



# Proposed Interim Analysis Process



# Proposed Framework for Interim Analysis

- **Step 1: Define interim approach**
  - Use empirical management procedure to adjust ABC based on updated/new data

**Management Procedure** = set of formal actions used to make short-term harvest decisions

Data Collection:

- Fishery
- Survey,
- Etc.

Estimation Method:

- Stock assessment OR
- Analysis (e.g., CPUE standardization)

Harvest rule

- If ..., then what?

# Proposed Interim Analysis: Example

From Assessment:  $C_{ref} = F_{target}N_{ref}$

- $C_{ref}$  = recommended ABC
- $F_{target}$  = recommended fishing mortality rate (e.g.,  $F_{MSY}$ )

Interim Analysis:  $C_y = F_{target}N_y$

- $C_y$  = recommended catch in future year  $y$
- $N_y$  = average abundance of fishable population

$$C_y = C_{ref} \frac{N_y}{N_{ref}} = C_{ref} \frac{I_y}{I_{ref}}$$

- $I_y$  = index of abundance

Assuming  $q$  between index and abundance is constant over time

# Proposed Interim Analysis: Reality

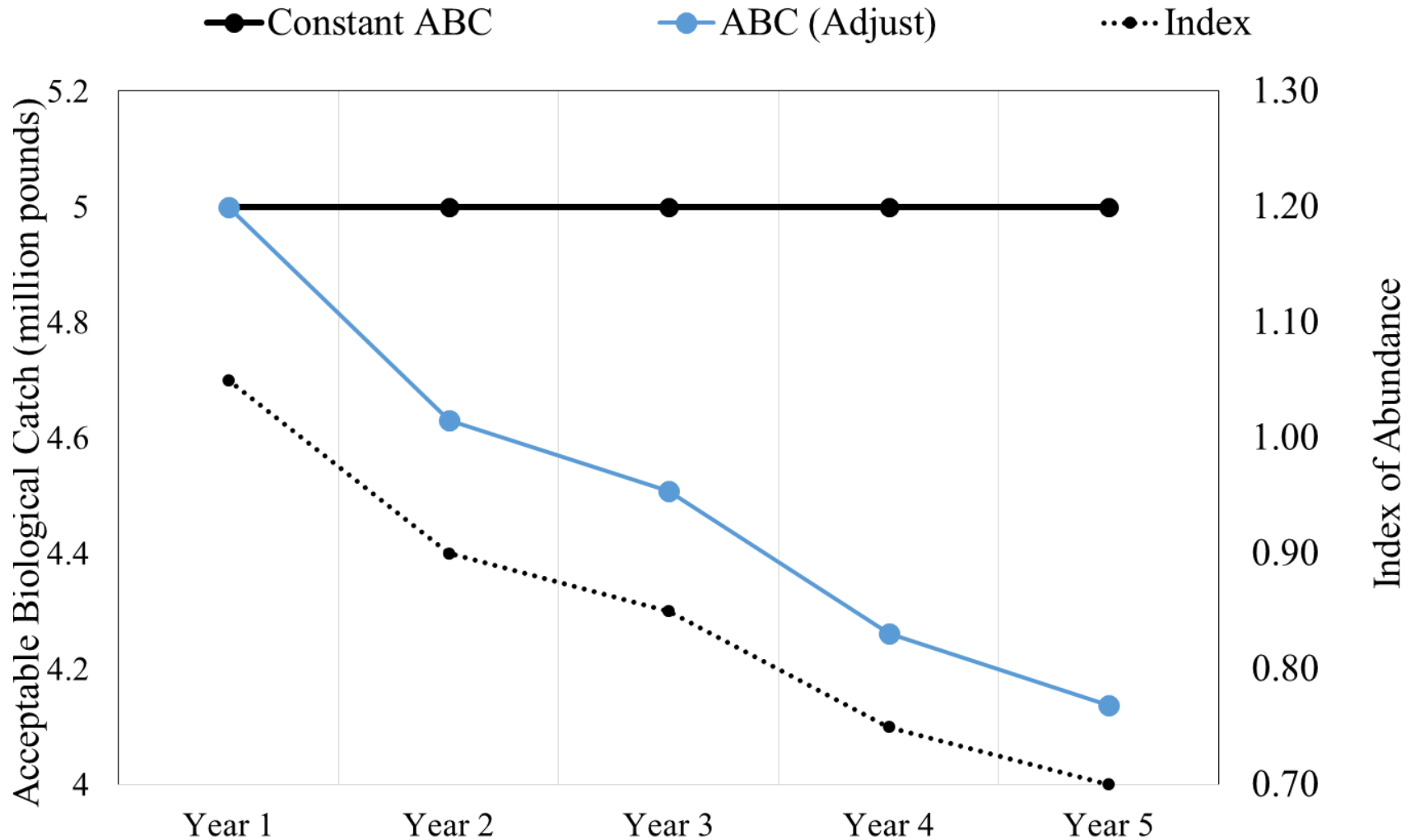
- Index of abundance is uncertain (has both observation and process error)
- To reduce potential impact of noise in index, could **buffer** change

$$C_y = C_{ref} \frac{I_y + b\sigma}{I_{ref} + b\sigma}$$


- $b$  = controls tolerance for changing quotas under uncertainty (e.g., informed by confidence intervals)
- $\sigma$  = standard error of the index

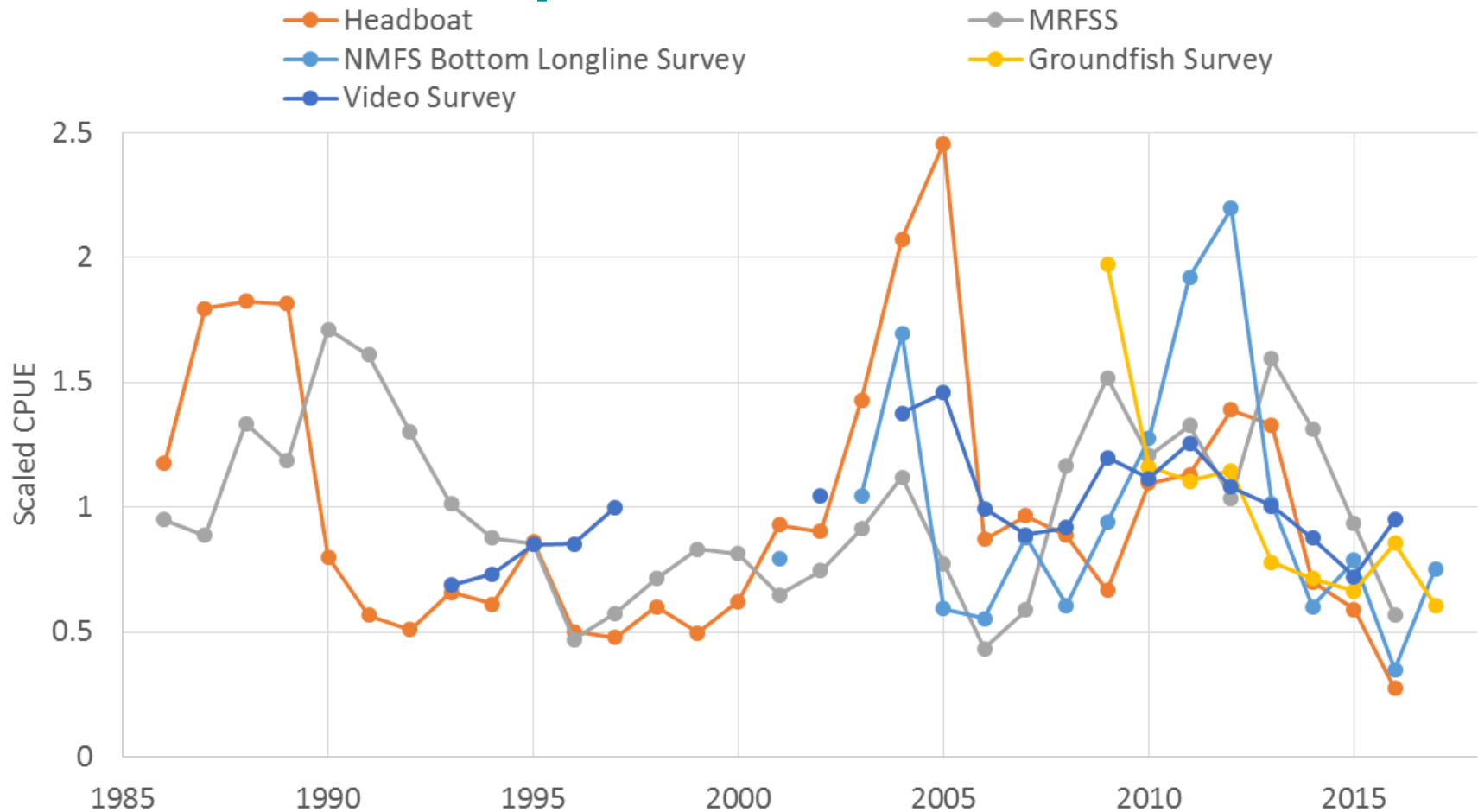
# Hypothetical Example

b	1.96 (95% confidence interval)
sigma	0.5



- ABC set in Year 1 from stock assessment

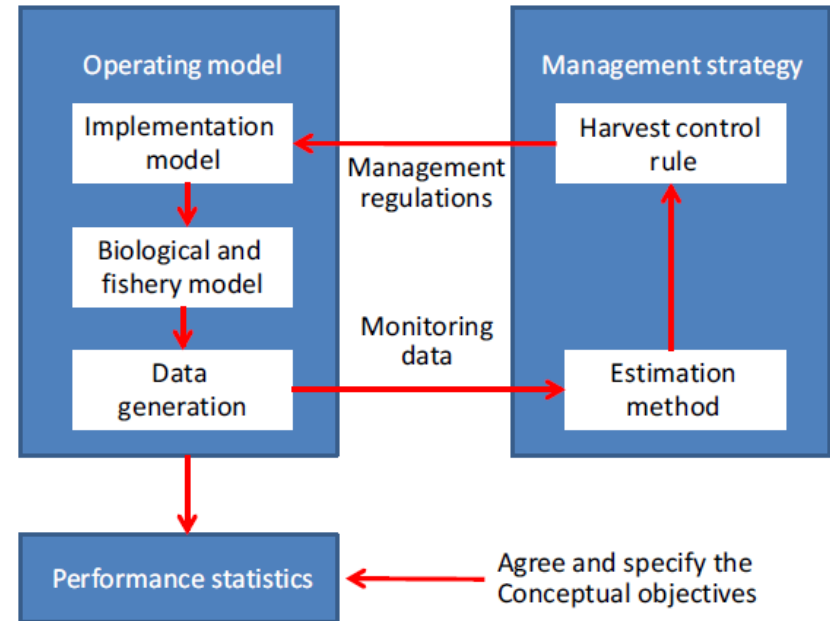
# Updated Red Grouper Indices



- Intent is to identify which survey indices are most informative for empirical management procedures

# Proposed Framework for Interim Analysis

- **Step 2:** Compare interim approach with status quo through management strategy evaluation to test robustness of proposed approach
- Explore performance in terms of yield (e.g., stability), MSA criteria (e.g., overfished, overfishing), efficiency



**Figure 1** Conceptual overview of the management strategy evaluation modelling process.

**Figure:** Punt et al. 2014 – MSE Best Practices

# Next steps

- Develop MSE framework
- Identify index-based management procedures, explore available indices, and tune methods as needed
  - Index selection (e.g., select one or use a combination?)
  - Acceptable levels of change
  - Length of time series for recent index

# Thanks for your Attention

## Questions?