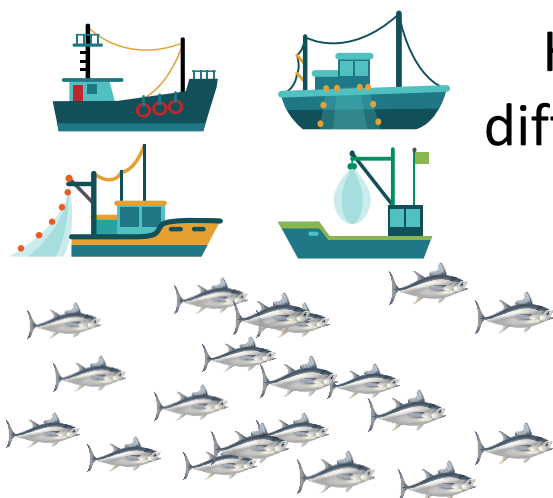




ICCAT CICTA CICAA



# How is MSE-based MPs different from current stock assessment practice?

**Bruno Mourato, PhD**

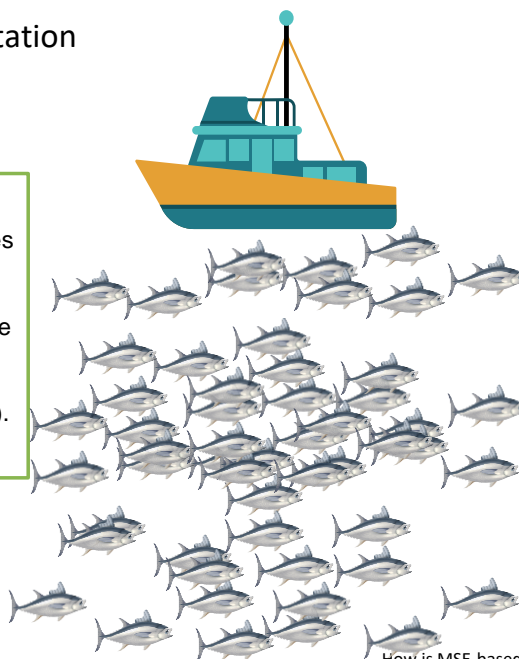
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**October 2024**

## Outline of this presentation

This presentation examines the differences between traditional Fish Stock Assessments and the more comprehensive, forward-looking Management Strategy Evaluation (MSE).



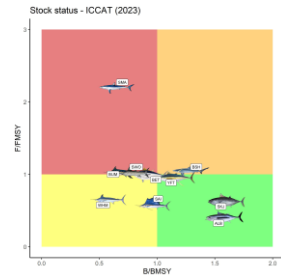
We will explore a side-by-side comparison of MPs and stock assessment-based management. This comparison will allow us to realize that the MSE-based MP approach outperforms traditional assessment-based management in all aspects

How is MSE-based MPs different from current stock assessment practice?

## Stock assessment



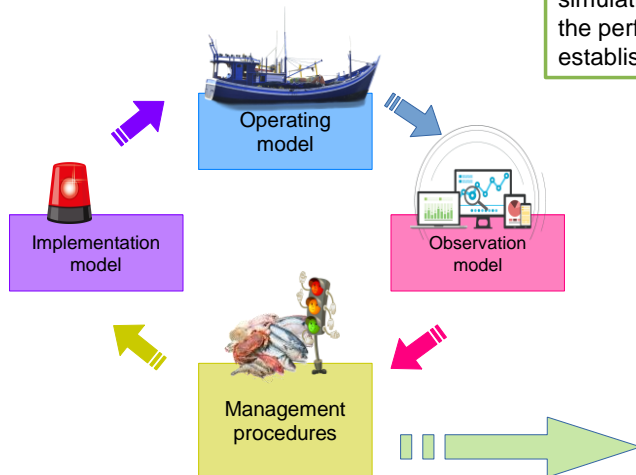
Fish Stock Assessments provide short-term (1-3 years) estimates of stock status based on catch data, effort, and population dynamics models. These assessments focus on the current state of the fishery and provide advice on TACs or fishing effort.



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
1	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390	400	410
2	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390	400	410	420
3	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390	400	410	420	430
4	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390	400	410	420	430	440
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How is MSE-based MP different from current stock assessment practice?

## MSE – based MPs



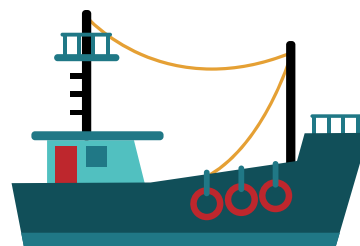
Performance of MPs tested through simulation

Management Strategy Evaluation (MSE) is essentially a simulation-based analytical framework used to examine the performance of different MPs in relation to pre-established management objectives

## Side-by-side comparison: Purpose

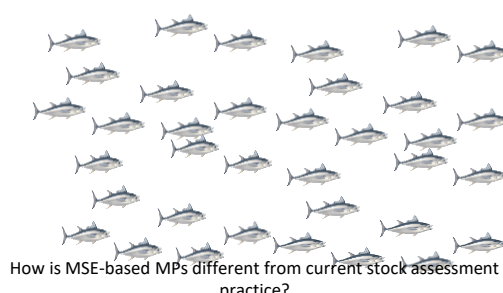
### Stock assessment-based management

- Stock assessments offer management advice derived from the “best” interpretation of the available data, but we don’t know how reliable this advice is



### MSE – based Management procedure

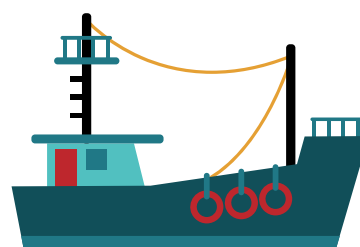
- MSE identifies a robust way for providing management advice through a pre-agreed MP that can achieve management objectives despite uncertainties related to the fish stock, fishery, and environment (including climate change).



## Side-by-side comparison: Main result

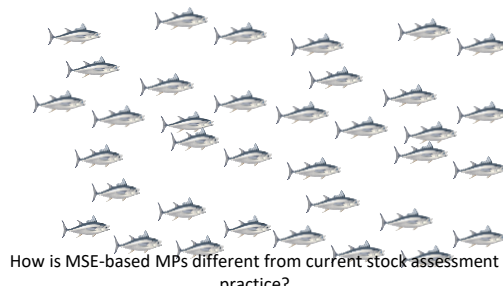
### Stock assessment-based management

- Current status of overfishing and overfished conditions, along with future projections relative to reference points.



### MSE – based Management procedure

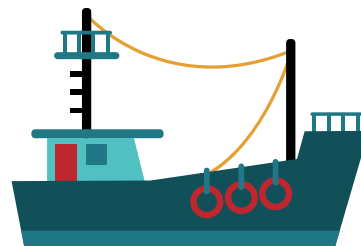
- Time dynamic status relative to reference points and other objectives; fishing opportunities over various time periods; stability of fishing opportunities; account for ecosystem impacts (e.g., bycatch).



## Side-by-side comparison: Projections

### Stock assessment-based management

- Linear, assuming perfect, fixed implementation of management each year. Relatively simple.



### MSE – based Management procedure

- Cyclical, building on prior year's performance, management varies in response to stock status indicator with a feedback loop. More complex.

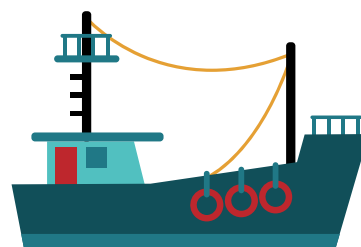


How is MSE-based MPs different from current stock assessment practice?

## Side-by-side comparison: Adherence to scientific advice

### Stock assessment-based management

- Managers may diverge from assessment-based advice in response to other factors such as allowable catch.



### MSE – based Management procedure

- Method for developing advice is pre-agreed by managers in MP and therefore should always be followed.

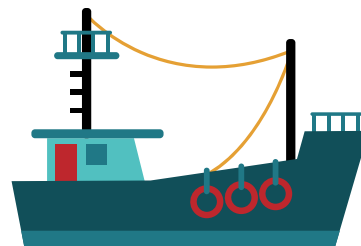


How is MSE-based MPs different from current stock assessment practice?

## Side-by-side comparison: Inputs & Methodology

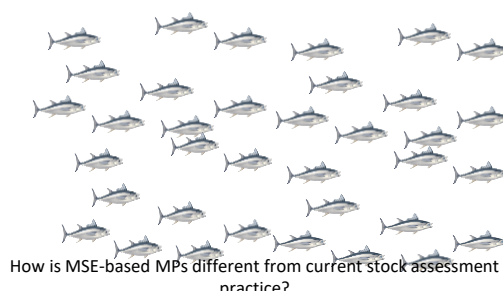
### Stock assessment-based management

- Input data and model (type, assumptions, structure, etc.) might change each assessment.



### MSE – based Management procedure

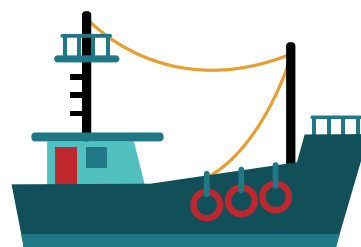
- Input data and method for analyzing those data to estimate stock status indicator are pre-agreed in the MP.



## Side-by-side comparison: Expected management performance

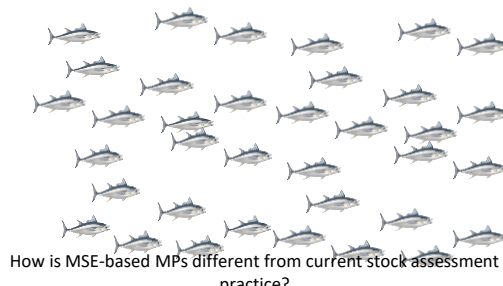
### Stock assessment-based management

- Varies. Unpredictable.



### MSE – based Management procedure

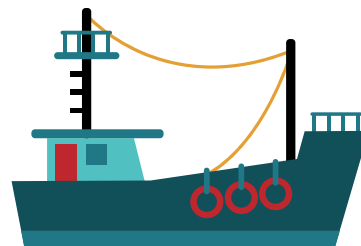
- Tested by simulation and quantifiable. Gives confidence in management approach.



## Side-by-side comparison: **Uncertainty**

### Stock assessment-based management

- Uses sensitivity analyses to investigate uncertainty in the estimated stock status and fishing mortality. Results in management with unknown robustness to uncertainties.



### MSE – based Management procedure

- Uses multiple scenarios for the 'true' fishery system as a tested for MPs. Don't need to know which scenario is more likely, but rather only to find the MP that performs well across all uncertainties.

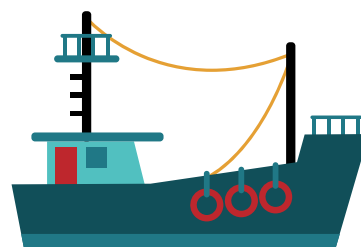


How is MSE-based MPs different from current stock assessment practice?

## Side-by-side comparison: **Fishery stability**

### Stock assessment-based management

- Typically not considered as an output or provided from stock projections.



### MSE – based Management procedure

- Can be evaluated as an objective and prioritized.

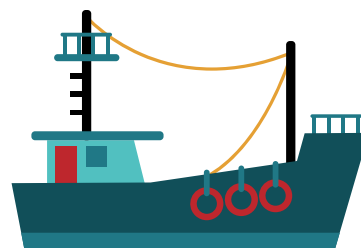


How is MSE-based MPs different from current stock assessment practice?

## Side-by-side comparison: **Managers and stakeholder involvement**

### Stock assessment-based management

- Little to none. Scientists develop the assessments; managers consider the outputs.



### MSE – based Management procedure

- Stakeholders are central to the process, involved at each stage from development of objectives to MP design and adoption.

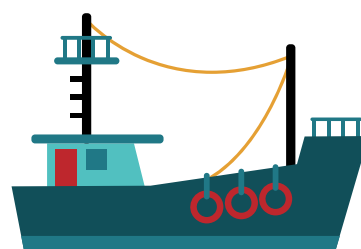


How is MSE-based MPs different from current stock assessment practice?

## Side-by-side comparison: **Transparency**

### Stock assessment-based management

- Since management performance of assessments is unknown, it is not clear how decisions regarding modelling and data were made.



### MSE – based Management procedure

- MSE process (e.g., objective-setting, balancing tradeoffs) makes it clear why an MP is chosen.

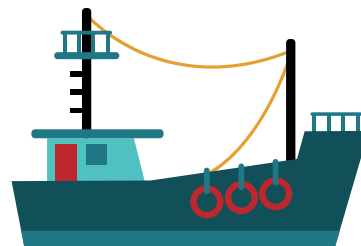


How is MSE-based MPs different from current stock assessment practice?

## Side-by-side comparison: Typical target

Stock assessment-based  
management

- 1-3 years.



### MSE – based Management procedure

- 5-20 years.

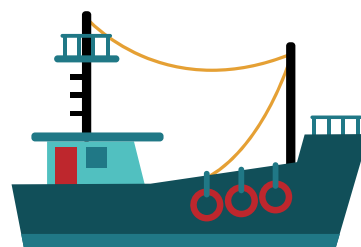


How is MSE-based MPs different from current stock assessment practice?

## Side-by-side comparison: Time and fundings needs

Stock assessment-based  
management

- Consistent funding requirements.



### MSE – based Management procedure

- Initial development of an MSE framework and MP adoption is generally more arduous and technical. Implementation of adopted MP is much easier.



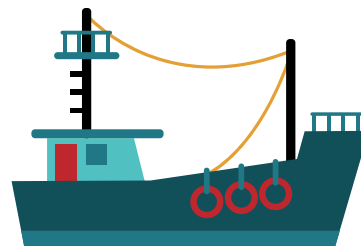
How is MSE-based MPs different from current stock assessment practice?



## Side-by-side comparison: Response to unforeseen circumstances

### Stock assessment-based management

- Conduct another stock assessment (with or without emergency management measures), revise the models and re-run, conduct a peer review.



### MSE – based Management procedure

- Exceptional Circumstances Protocols are developed to guide rapid response.

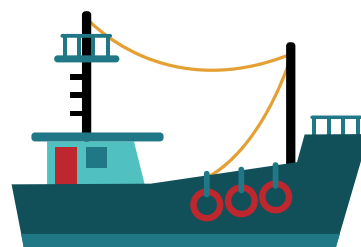


How is MSE-based MPs different from current stock assessment practice?

## Side-by-side comparison: Role of stock assessment

### Stock assessment-based management

- Serves as the basis for management advice.



### MSE – based Management procedure

- Used as a “health check” for the MP; not used to provide advice.

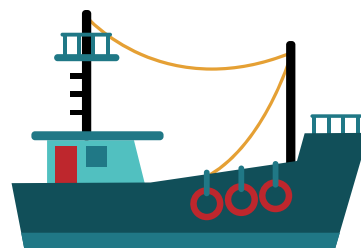


How is MSE-based MPs different from current stock assessment practice?

## Side-by-side comparison: Management output

### Stock assessment-based management

- Catch/effort limit, etc., not pre-agreed, more open to protracted negotiations.



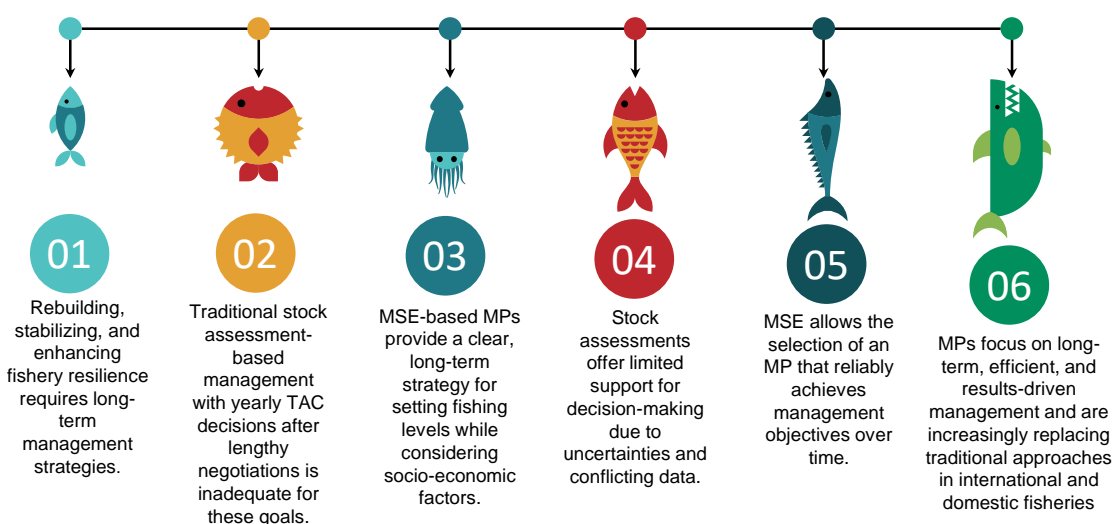
### MSE – based Management procedure

- MP (HCR, data collection method, stock status estimator), catch/effort limits are clearly specified, MP is pre-agreed.



How is MSE-based MPs different from current stock assessment practice?

## Take-home message





Thank you !

**Bruno Mourato**

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