

# Running MSE analysis with the a4a platform

Management Strategies Evaluation with FLR and a4a  
25-29 November 2019, Ispra, Italy,

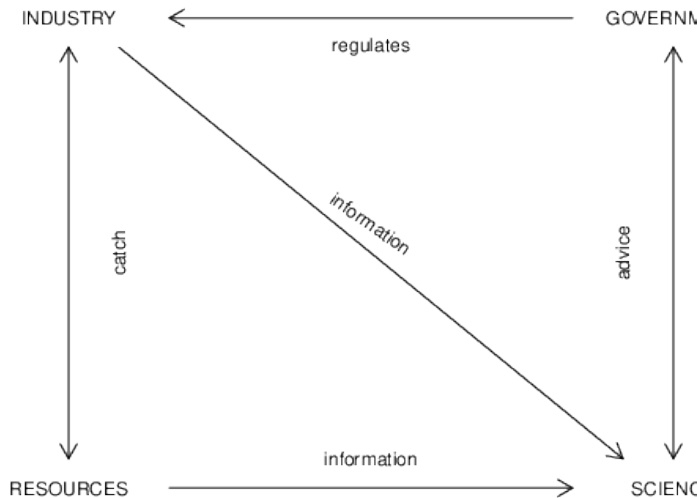
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European Commission

June 23, 2025

# Fisheries management



# Goals of fisheries management

- ▶ Goals
  - ▶ Sustainable benefits from harvesting
  - ▶ Conserve stock(s) productivity
  - ▶ Minimise impacts on ecosystem
- ▶ Requirements
  - ▶ Set of clear management objectives
  - ▶ Indication of proper harvest and/or stock level
  - ▶ Means to monitor status
  - ▶ Measures to control fishing on advice

# Challenges of fisheries management

- ▶ Objectives set to be operational
- ▶ Trade-offs between short and long term
- ▶ Monitoring impact to ecosystem
- ▶ Quantifying uncertainty in status and dynamics
- ▶ Making decisions acknowledging risks

# How to deal with all this? MSE

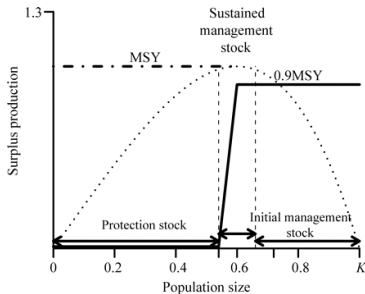
*the consequences of a range of different management strategies to determine which one will be the most appropriate to meet the operational objectives of the fishery*

## ► Goals

- Robustness against uncertainty.
- Compare relative performance of alternative MPs.
- Simulation-test MPs under a wide(r) range of realities.

# Where does this come from?

- IWC
- New Management Procedure




- Revised Management Procedure
- Catch Limit Algorithm (CLA)

# IWC: Uncertainties in RMP<sup>1</sup>

- Alternative population models.
- Initial population size from 5-99-
- Rates of productivity and changes over time.
- Uncertainty and bias in the estimated population size.
- Frequencies of abundance surveys (every 1, 5 or 10 years).
- Changes in carrying capacity (climate change, habitat degradation).
- Errors in historic records of catches.
- Occurrence of catastrophes simulating unpredictable (major disease).
- Uncertainty about stock structure.

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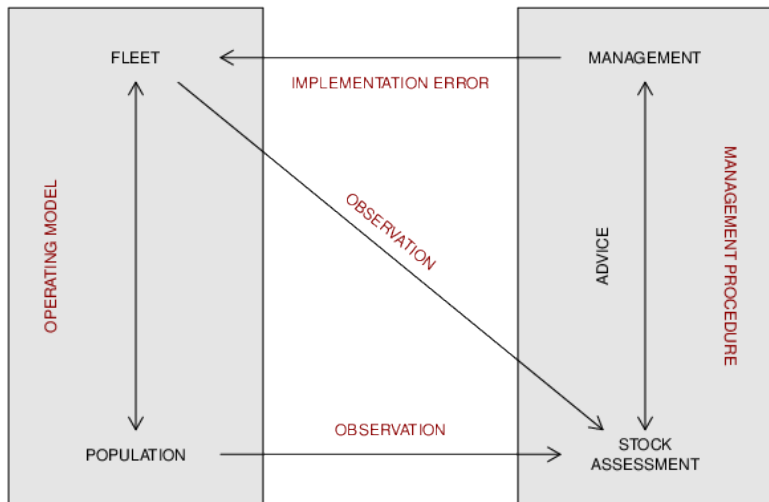
<sup>1</sup><https://iwc.int/rmp2>, <https://doi.org/10.1093/icesjms/fsm035> 

## MSE now

- IWC Revised Management Procedure - South African pelagics - Australian fisheries - CCSBT - STECF Management Plans - ICES Management Plans - ICCAT, IOTC - Add your own ...



# A model of the fishery system



## Six steps to MSE<sup>2</sup>

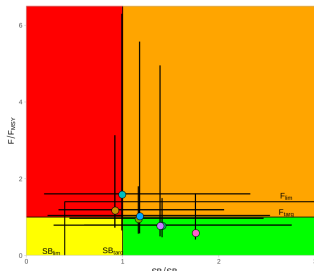
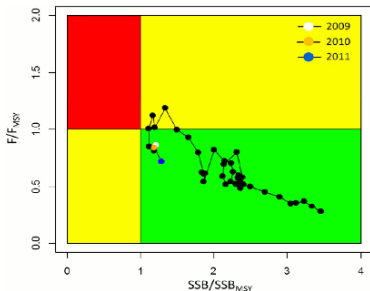
- Define and agree on objectives & limits - Identify appropriate Management Procedures - Define a set of Operating Models - Conduct simulations - Summarize performance - Select best MP

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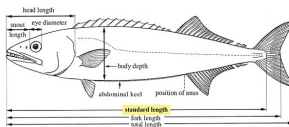
<sup>2</sup>Punt, A. E., Butterworth, D. S., de Moor, C. L., De Oliveira, J. A. and Haddon, M. (2016), Management strategy evaluation: best practices. Fish Fish, 17: 303-334. doi:10.1111/faf.12104

## Define objectives & limits

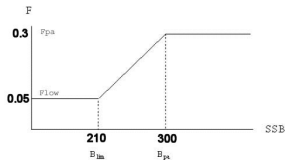
- IOTC: target= $B_{MSY}$ , limit= $0.40 \cdot B_{MSY}$ , also  $P(\text{Green}) > 60\%$ , over next 20 years.



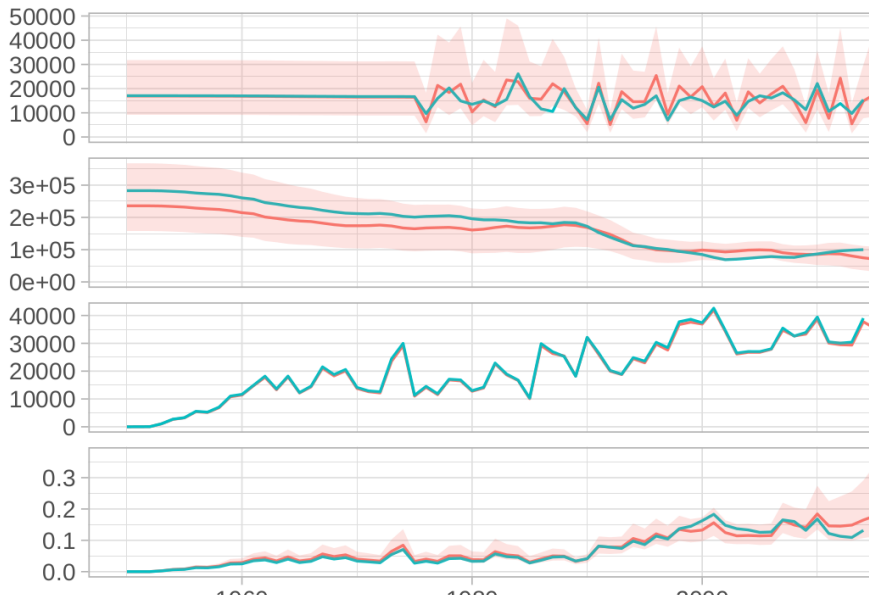
# Identify Management Procedures



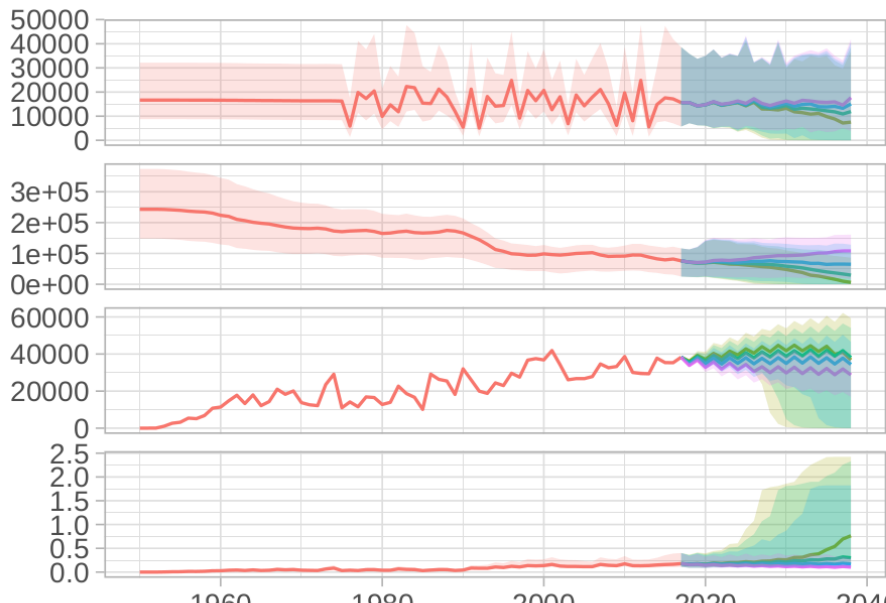
Pella-Tomlinson  
 SAM  
 XSA CPUE  
 VPA<sup>a4a</sup>  
 JABBA  
 SS3



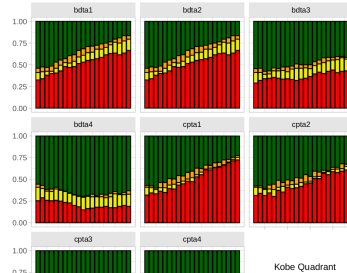
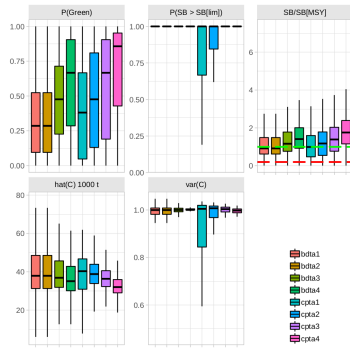
# Define Operating Models



# Conduct simulations



# Summarize performance



Select best MP

## **Resolution on the Adoption of a Ma**

*(adopted at the Eighteenth Annual Meeting -*

The Extended Commission for the Conservation of

*Seized* by the need to ensure the conservation and o  
bluefin tuna based on the best available scientific a

*Taking account* of the current status of the stock an  
stock assessment from the Extended Scientific Com  
stock biomass is between 20% and 70% of the origin



# What are the advantages?

- Avoid being driven by yearly variability in SA - Long-term trade-offs made clear - Less haggling - No wrong best assessment - Default decision - Risk on board - Consistent with PA - Interaction across the table

## And disadvantages?

- Results dependent on model (as usual) - Lengthy development (less and less so) - Data still essential (indeed) - Overly rigid (up to you) - Autopilot (exceptional circumstances)