MSE in a nutshell

MSE with FLR/a4a course. JRC (Ispra) 25-29 November 2019

Iago MOSQUEIRA

Wageningen Marine Research (WMR), IJmuiden, The Netherlands.

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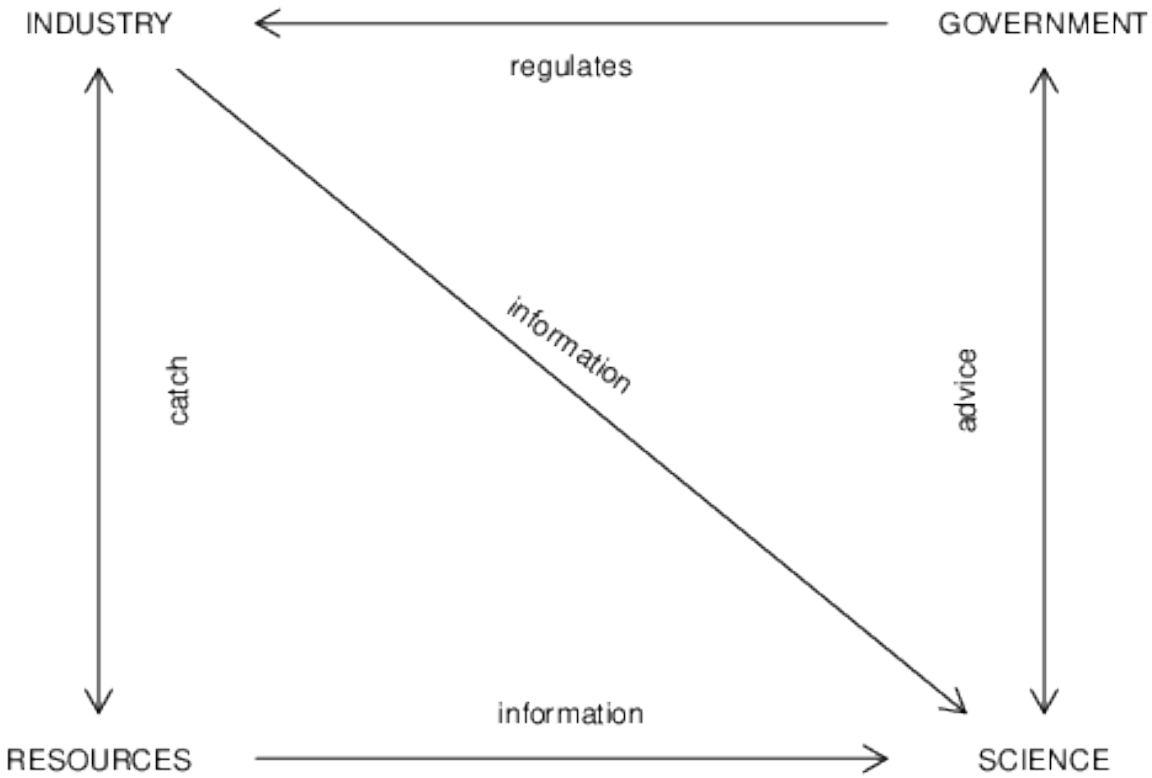
100years
1918 — 2018

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
- Quantifiying uncertainty in status andn dynamics
- Making decisions acknowledging risks

How to deal with all this? MSE

Assessing 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

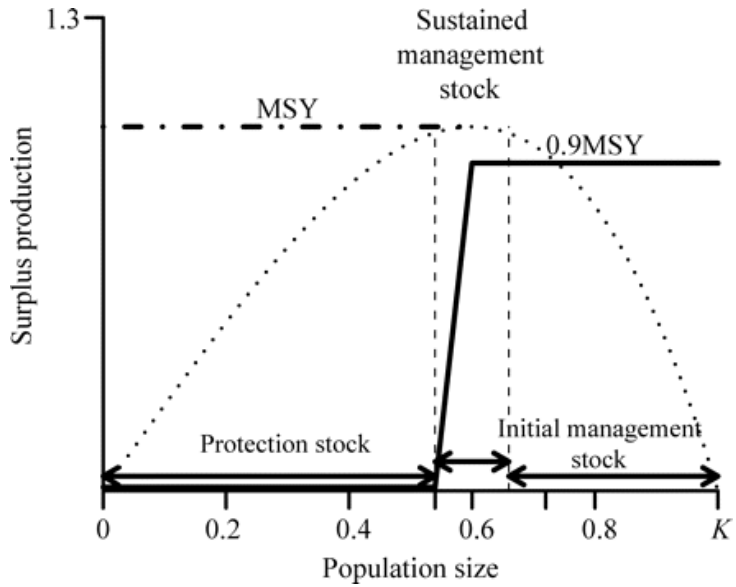
1. Robustness against uncertainty.
2. Compare relative performance of alternative MPs.
3. Simulation-test MPs under a wide(r) range of realities.

Where does this come from?

- International Whaling Commission (IWC)

Where does this come from?

- IWC
- New Management Procedure



- Revised Management Procedure
- Catch Limit Algorithm (CLA)

IWC: Uncertainties in RMP[1]

- Alternative population models.
- Initial population size from 5-99% of unexploited (initial, pre-whaling).
- Rates of productivity and chnages 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 degragation).
- Errors in historic records of catches.
- Occurrence of catastrophes simulating unpredictable (major disease).
- Uncertainty about stock structure.

MSE now

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

ICES Guidelines MSE 2

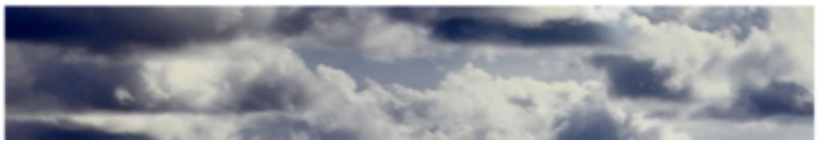
ICES CIEM

WORKSHOP ON GUIDELINES FOR MANAGEMENT STRATEGY EVALUATIONS (WKGMSE2)

VOLUME 1 | ISSUE 33

ICES SCIENTIFIC REPORTS

RAPPORTS SCIENTIFIQUES DU CIEM



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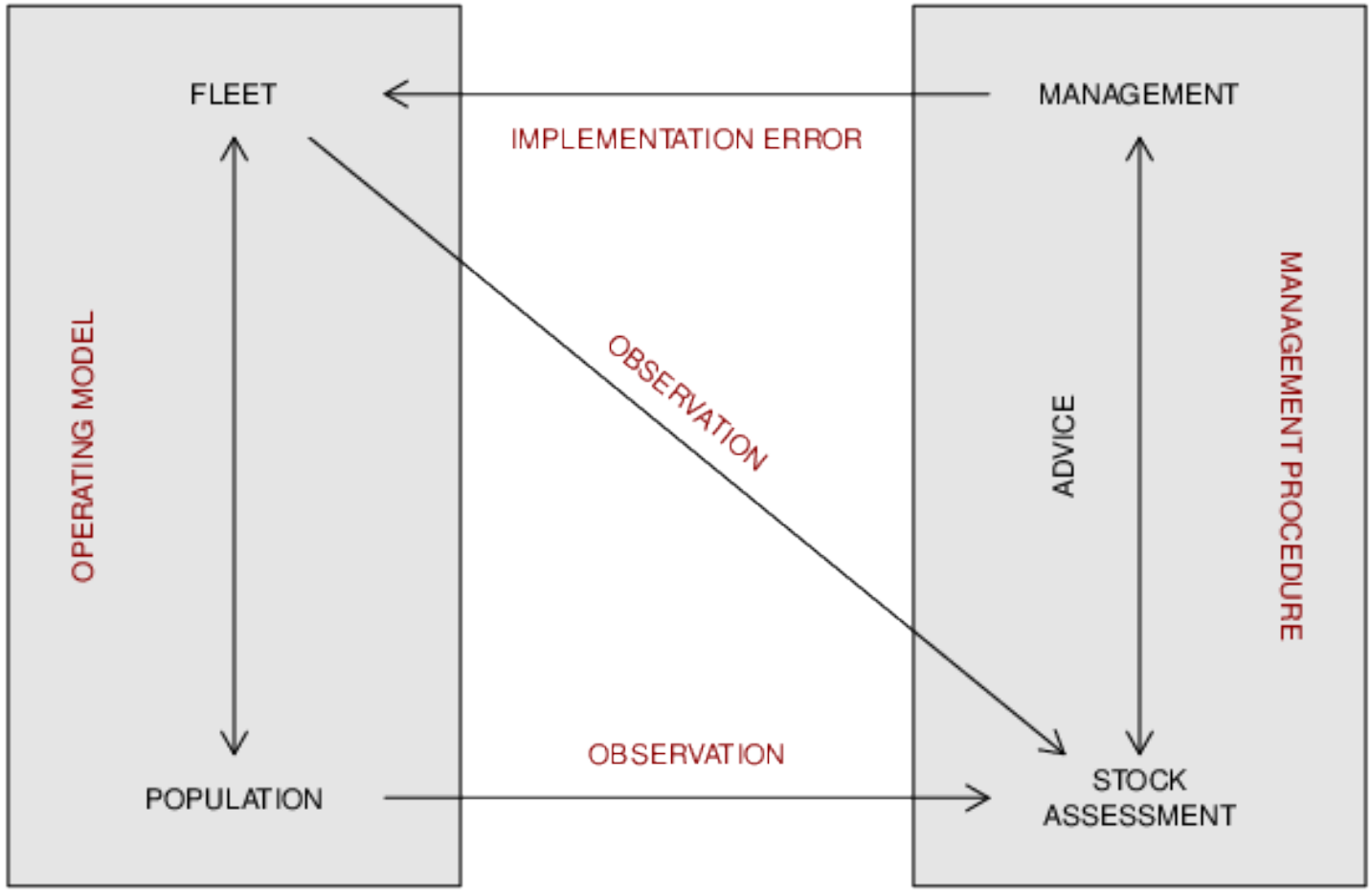
100years 1918 — 2018

A model of the fishery system



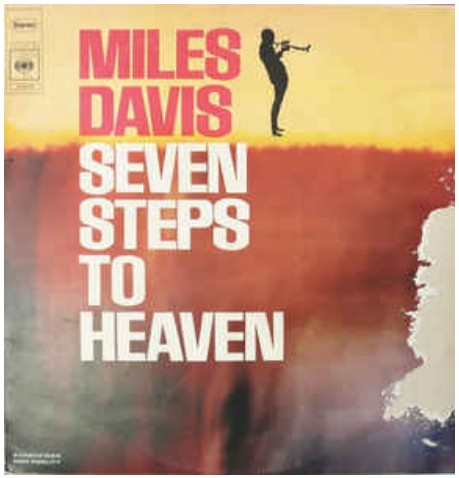
Six steps to MSE [1]

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

[1] 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

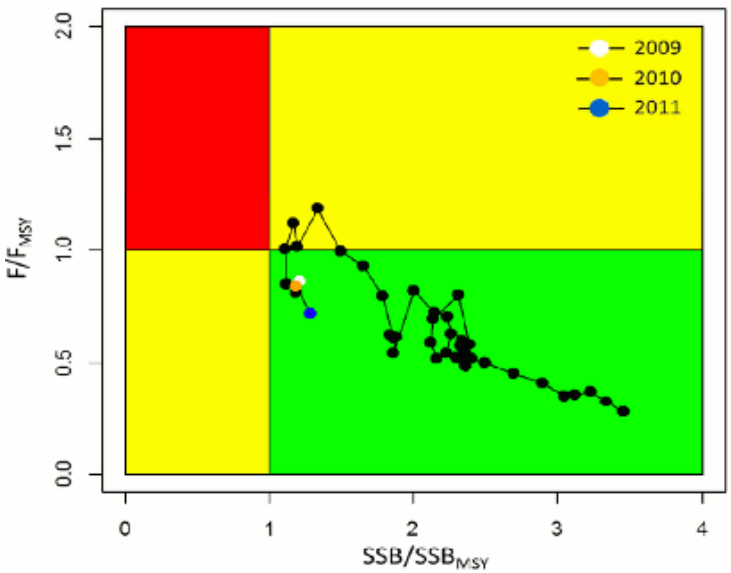
Seven steps to MSE

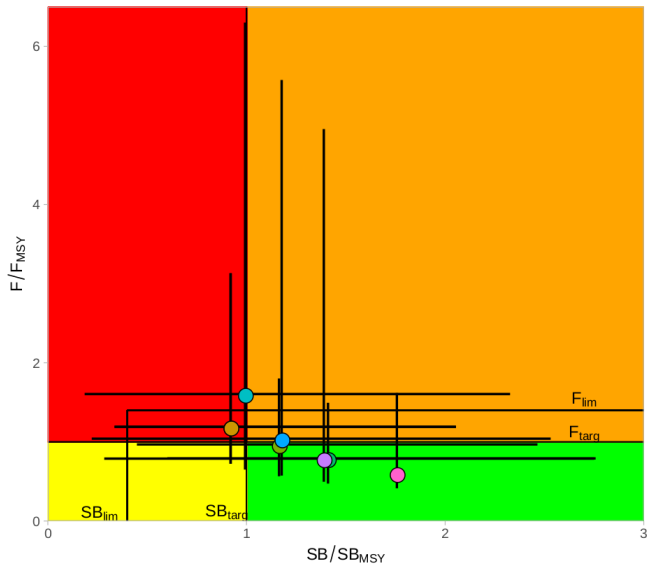
- Define and agree on **objectives** & **limits**
- Identify appropriate **Management Procedures**
- Define a set of **Operating Models**
- Conduct **simulations**
- Summarize **performance**
- Select best **MP**
- Identify **limits** of application



Define **objectives** & **limits**

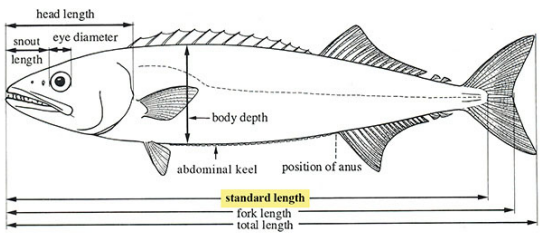
- IOTC: target=B_{MSY}, limit=$0.40 \cdot B_{MSY}$, also $P(Green) > 60\%$, over next 20 years.



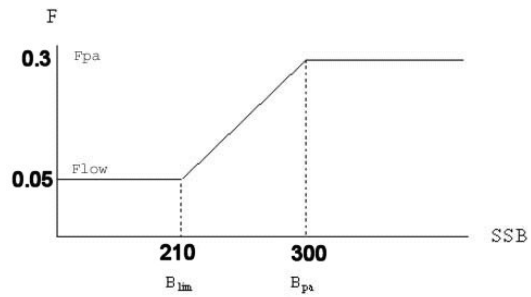


Identify **Management Procedures**

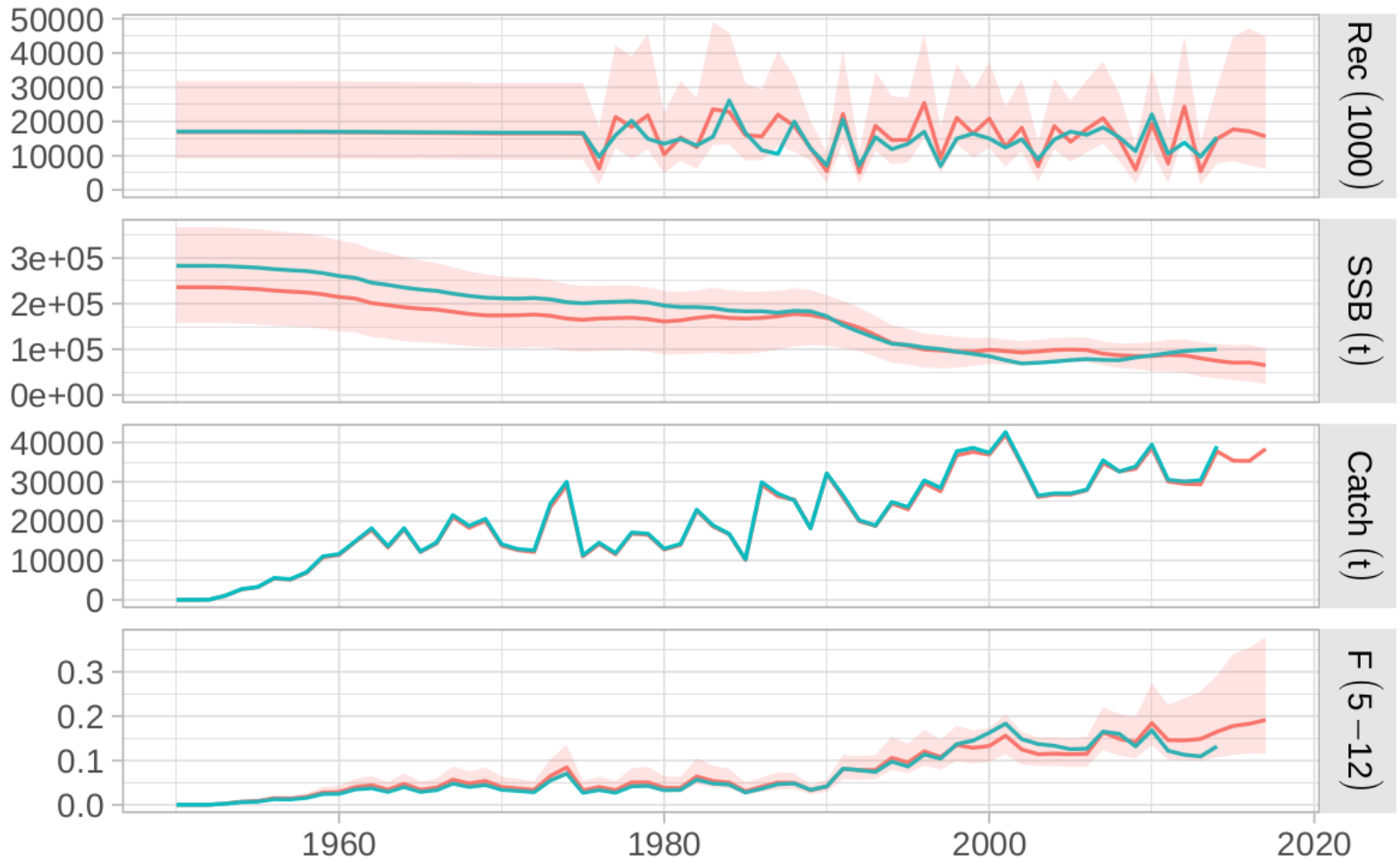
Data collection + Estimator + Harvest Control Rule



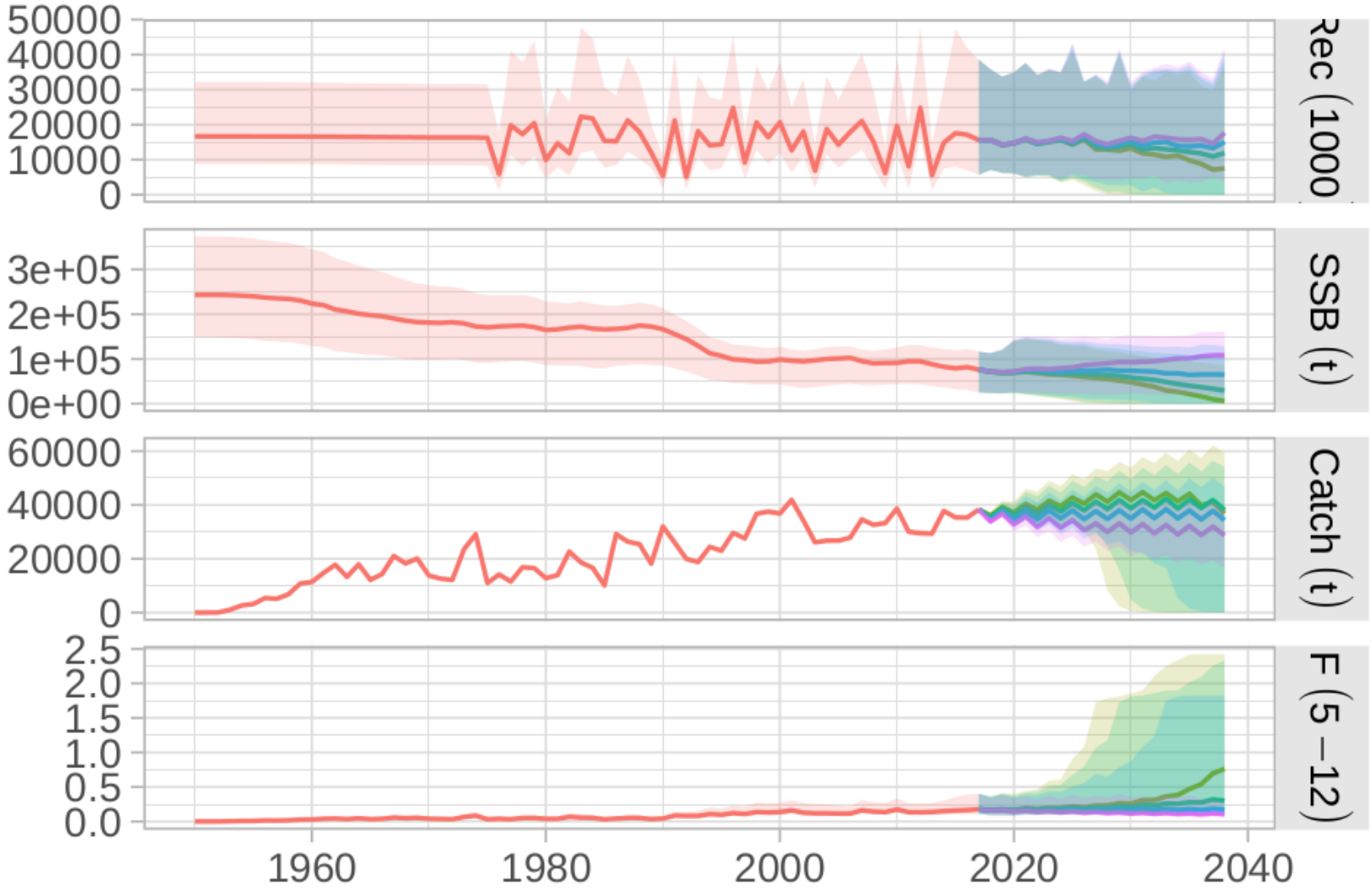
Pella-Tomlinson
SAM
XSA CPUE
VPA a4a
JABBA
SS3



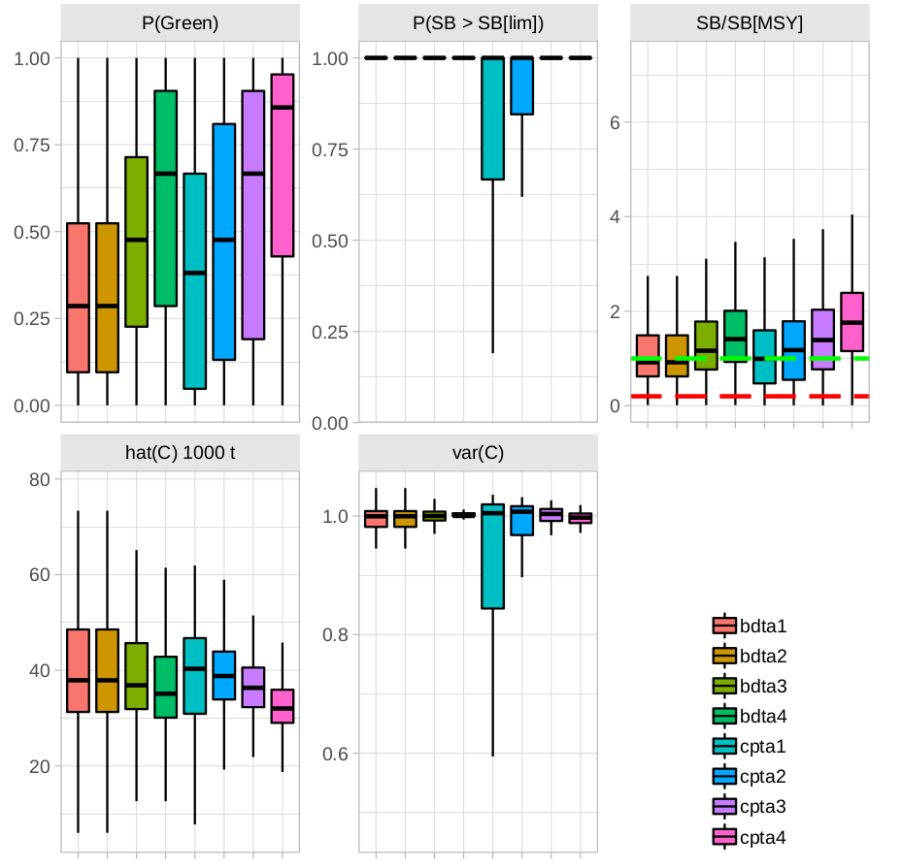
Define **Operating Models**

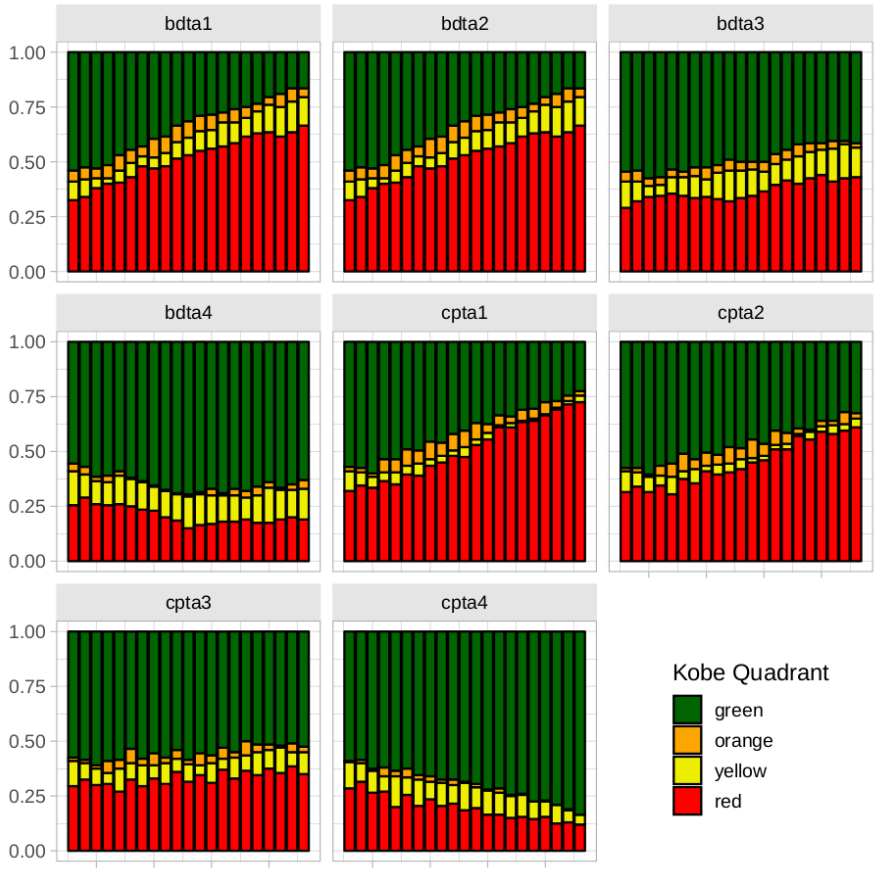


Conduct **simulations**



Summarize **performance**





Select best **MP**

Resolution on the Adoption of a Management Procedure

(adopted at the Eighteenth Annual Meeting – 10-13 October 2011)

The Extended Commission for the Conservation of Southern Bluefin Tuna

Seized by the need to ensure the conservation and optimum utilisation of southern bluefin tuna based on the best available scientific advice,

Taking account of the current status of the stock and, in particular, the most recent stock assessment from the Extended Scientific Committee advising that the spawning stock biomass is between 3% and 7% of the original spawning stock biomass,

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)

MSE as a process

- Request (initial) management objectives
- Managers think about them
- OM + MPs + Runs
- Present to managers & stakeholders
- Rinse & repeat
- Process can be long: CCSBT 10 years, IOTC 7 years (so far)
- Buy in and engagement for aceptance

MSE tools can also be used to

- Evaluate value of information and value of control.
- Simulation test indicators and assessment models.
- Evaluate economic performance and outcomes.

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