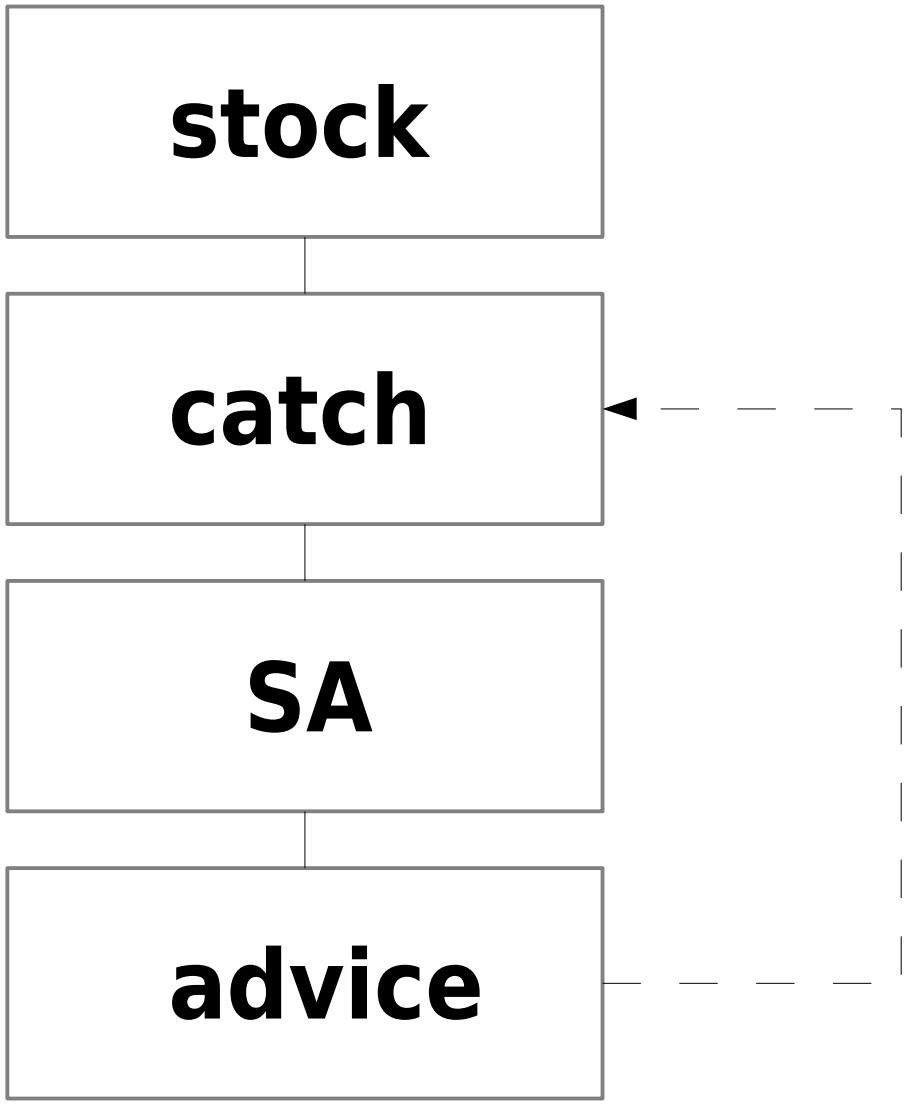
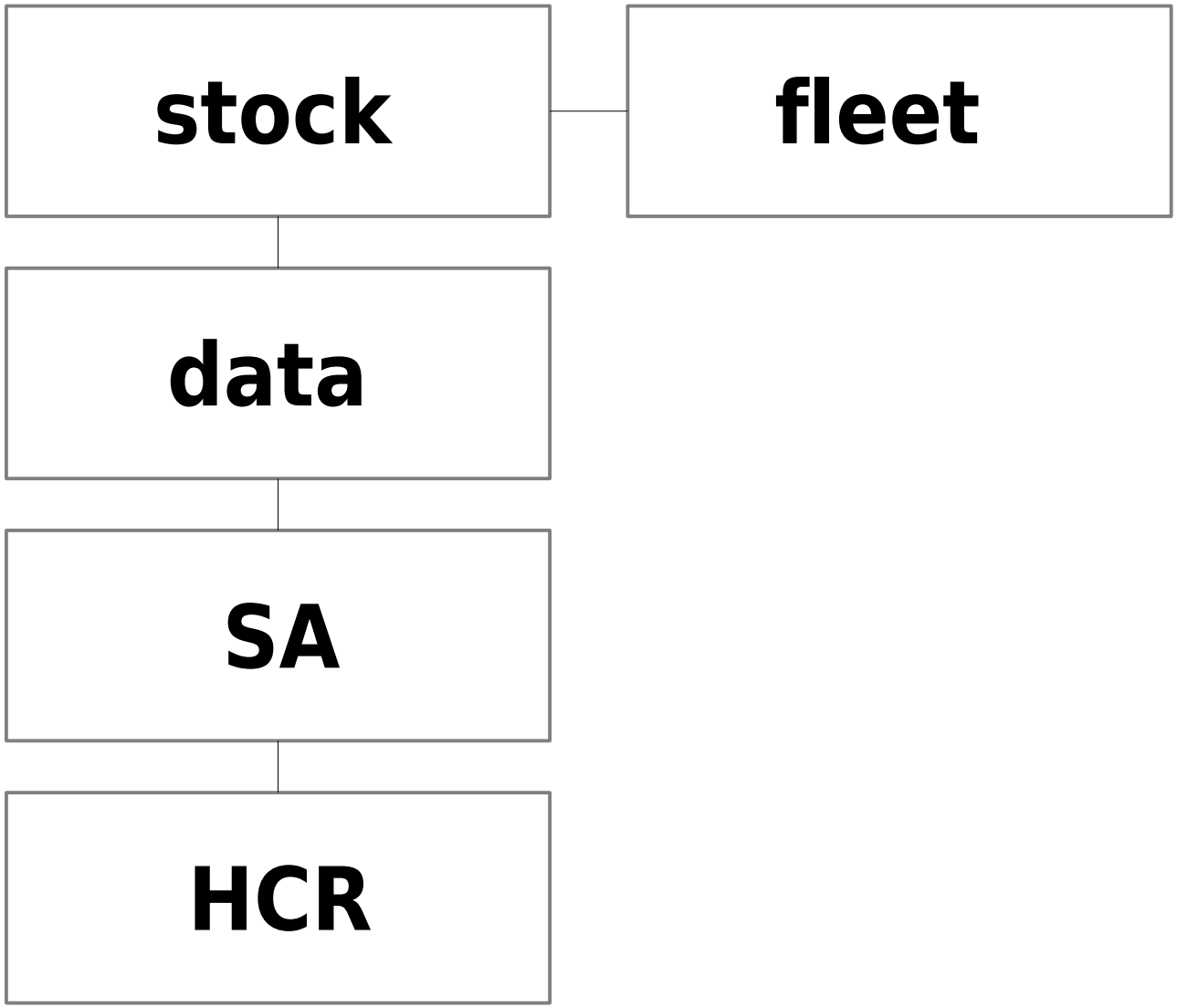
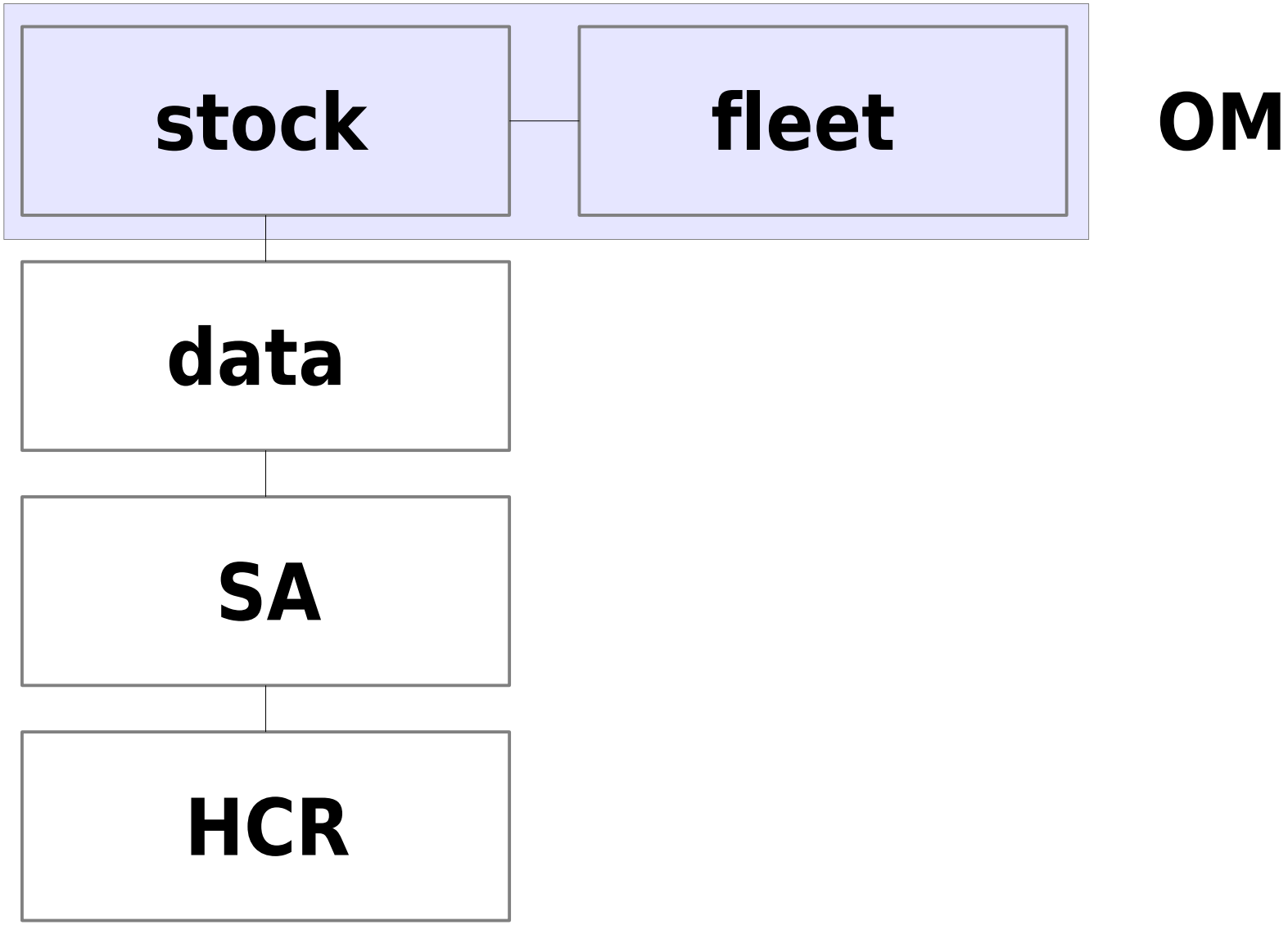
Working towards the evaluation of reference points and harvest control rules for IOTC stocks

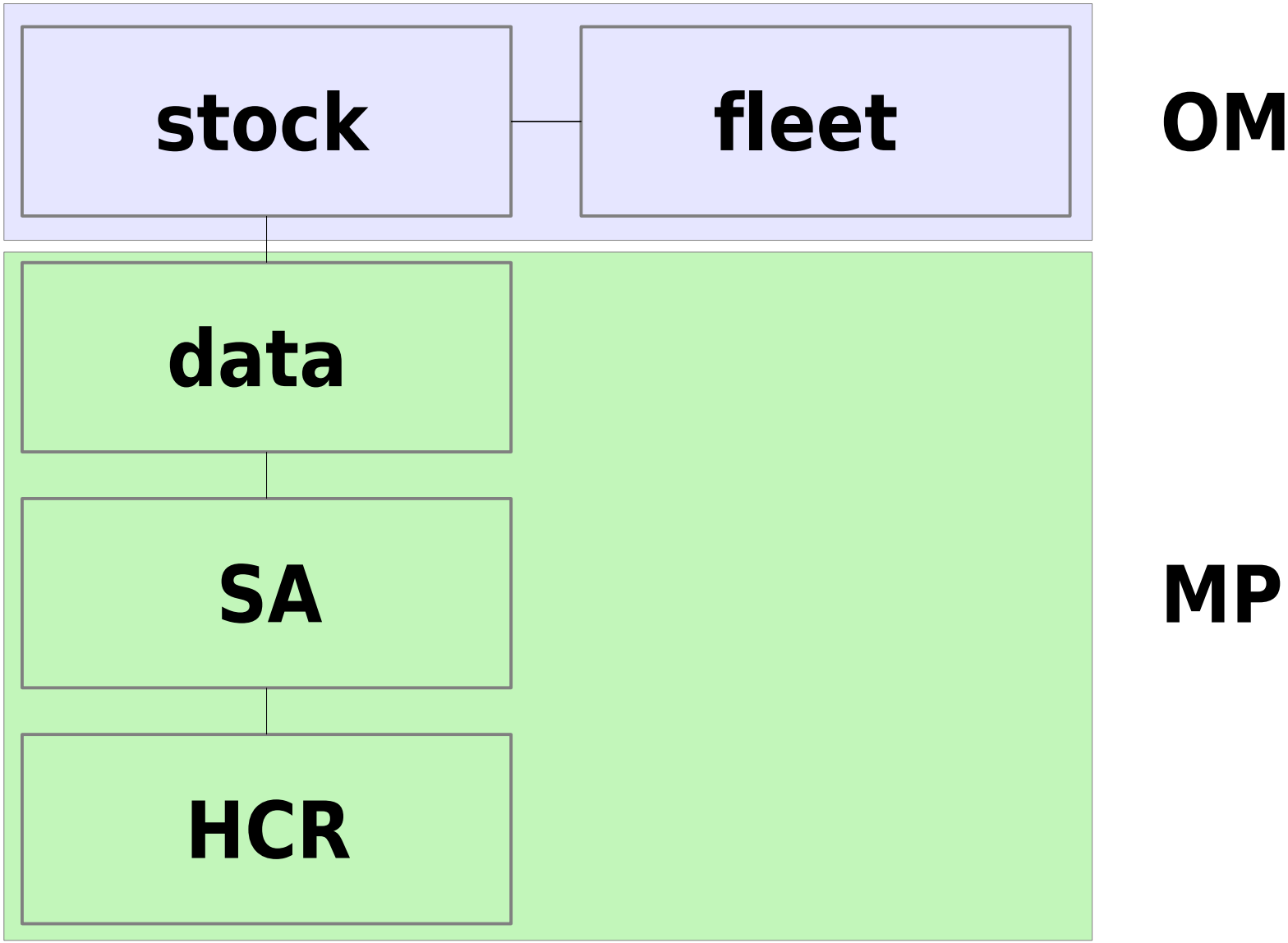
I. Mosqueira, T. Kitakado

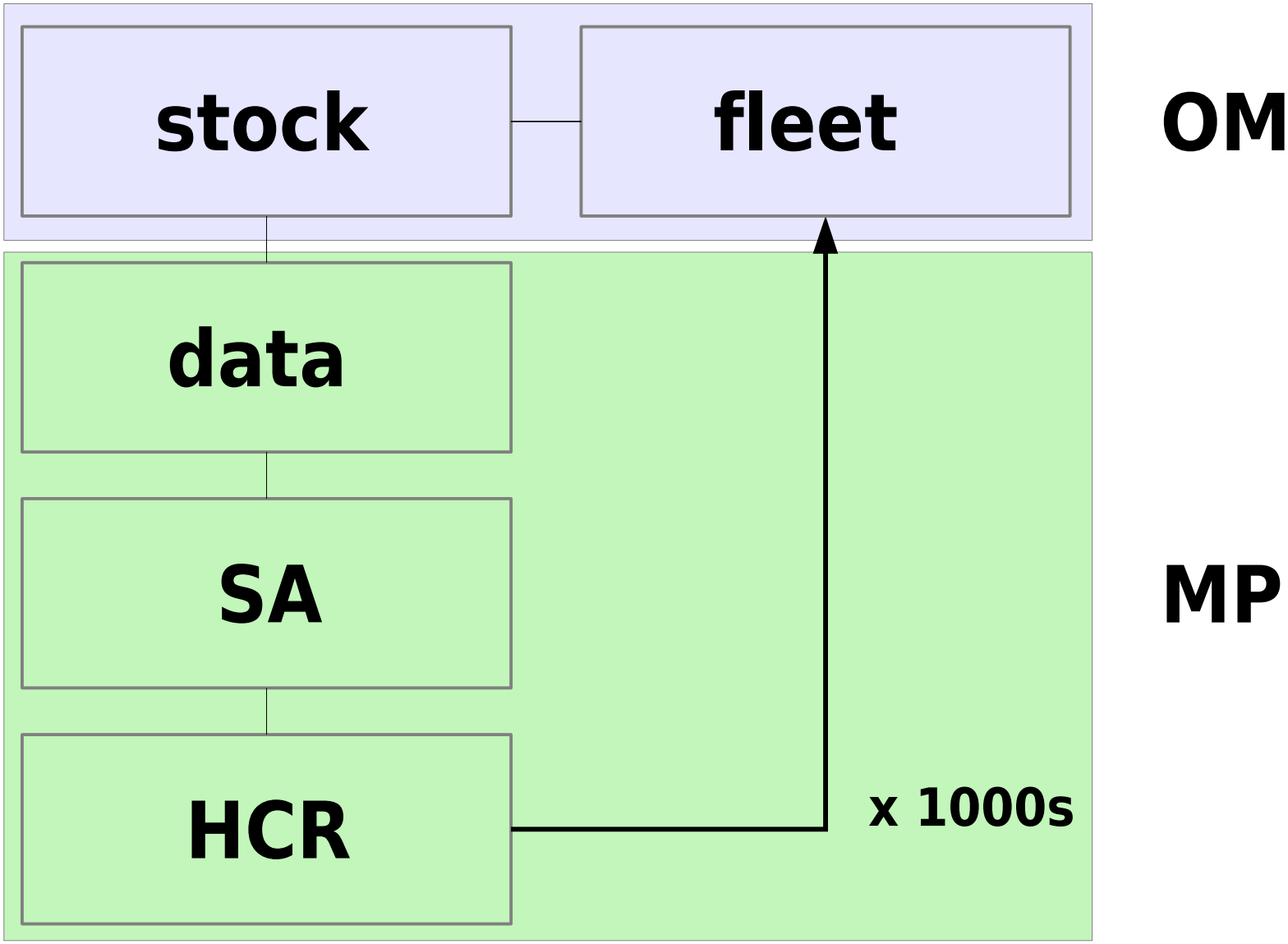
IOTC WPM04 - OCT 2012


stock
catch
SA
advice

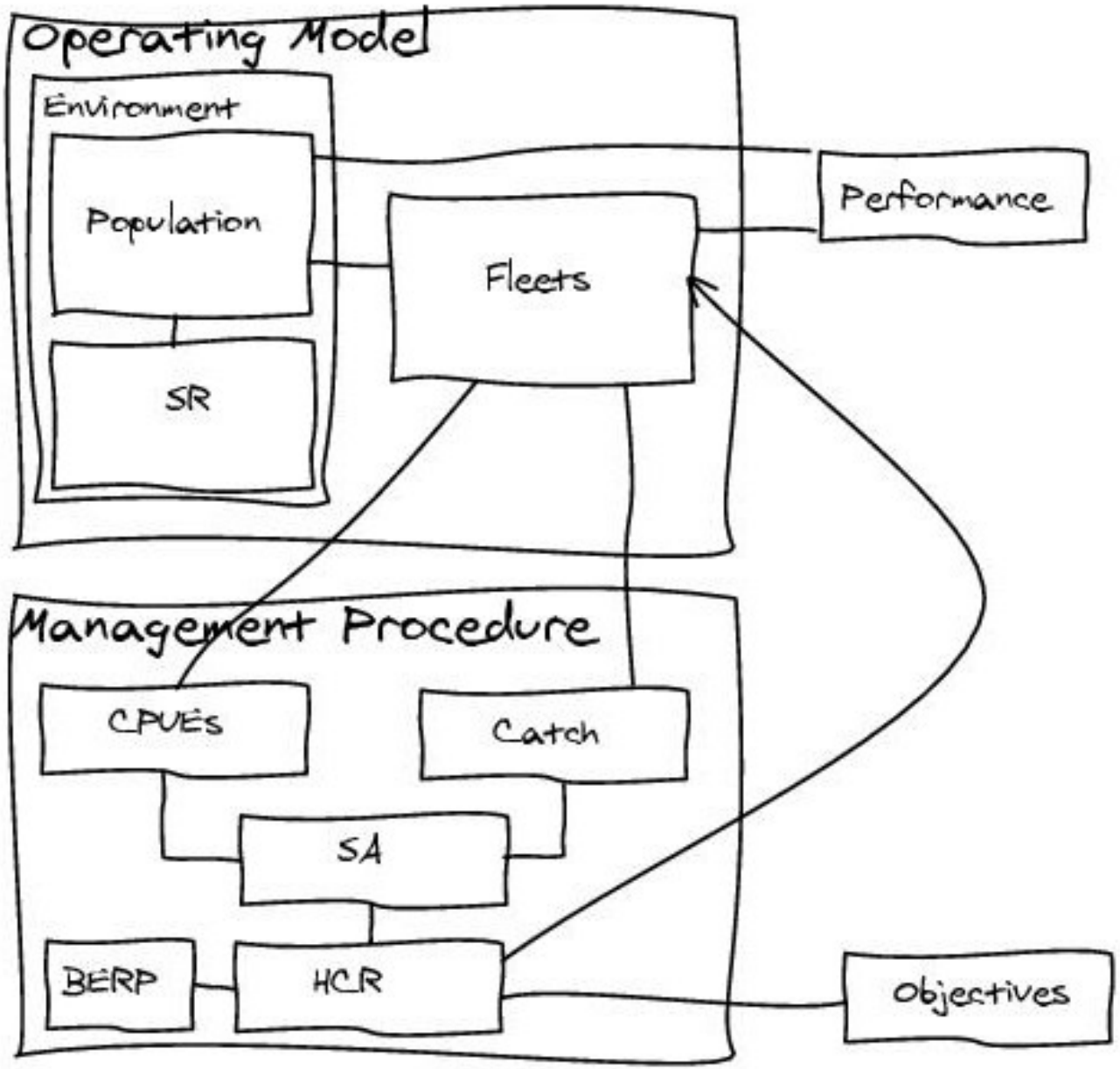

stock
fleet
data
SA
HCR


stock
fleet
OM
data
SA
HCR


stock
fleet
OM
data
SA
HCR
MP


stock
fleet
OM
data
SA
MP
HCR
x 1000s

MSE


Operating Model
Environment
Population
SR
Fleets
Performance
Management Procedure
CPUEs
Catch
SA
BERP
HCR
Objectives

Current setting at IOTC

- IOTC convention
- UNCLOS, UNFSA, FAO CoC
- IOTC Resolution 12/01 on PA
- Targets & limits
- Decision rules

Reference points

- MSY as de facto target
- IOTC Recommendation 12/04
  - Targets: BMSY & FMSY
  - Limits: 40% BMSY, 140% FMSY
  - *BET*: 30% BMSY, 130% FMSY
- Missing risks and time frame

a 70% probability of rebuilding the stock to the interim rebuilding target reference point of 20% of the original spawning stock biomass by 2035. (CCSBT, 2010)

- *How good are they?*
- *Can they be estimated?*

Development of MSE

1. Specify and prioritize **objectives**, qualitative/quantitatively
2. Translate objectives into **performance measures**
3. Develop **operating models**
4. Identify possible **management procedures**
5. **Simulate** the application of management procedures
6. **Compare** management procedures performance and **robustness** to uncertainty
7. **Select** management procedure that best fits performance criteria

Objectives

- CPCs and stakeholders to agree
- 2013 TCAC + workshop on objectives
- Only SSB and F targets specified
- Assumed objective: to keep stocks around target, within limits
- No probability, time span for recovery
- *Interim* objectives
- Role of SC on objectives discussion

Specify & prioritize **objectives ...**

Specify & prioritize **objectives & limits**

Joint Research Centre

Specify & prioritize **objectives & limits**

B = BMSY

B < Blim

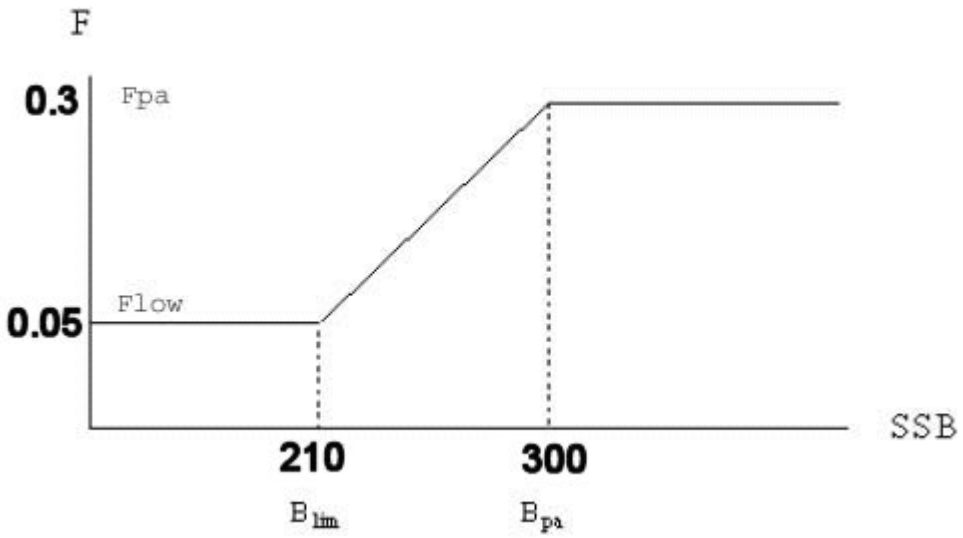
Joint Research Centre

Quantify **performance** measures

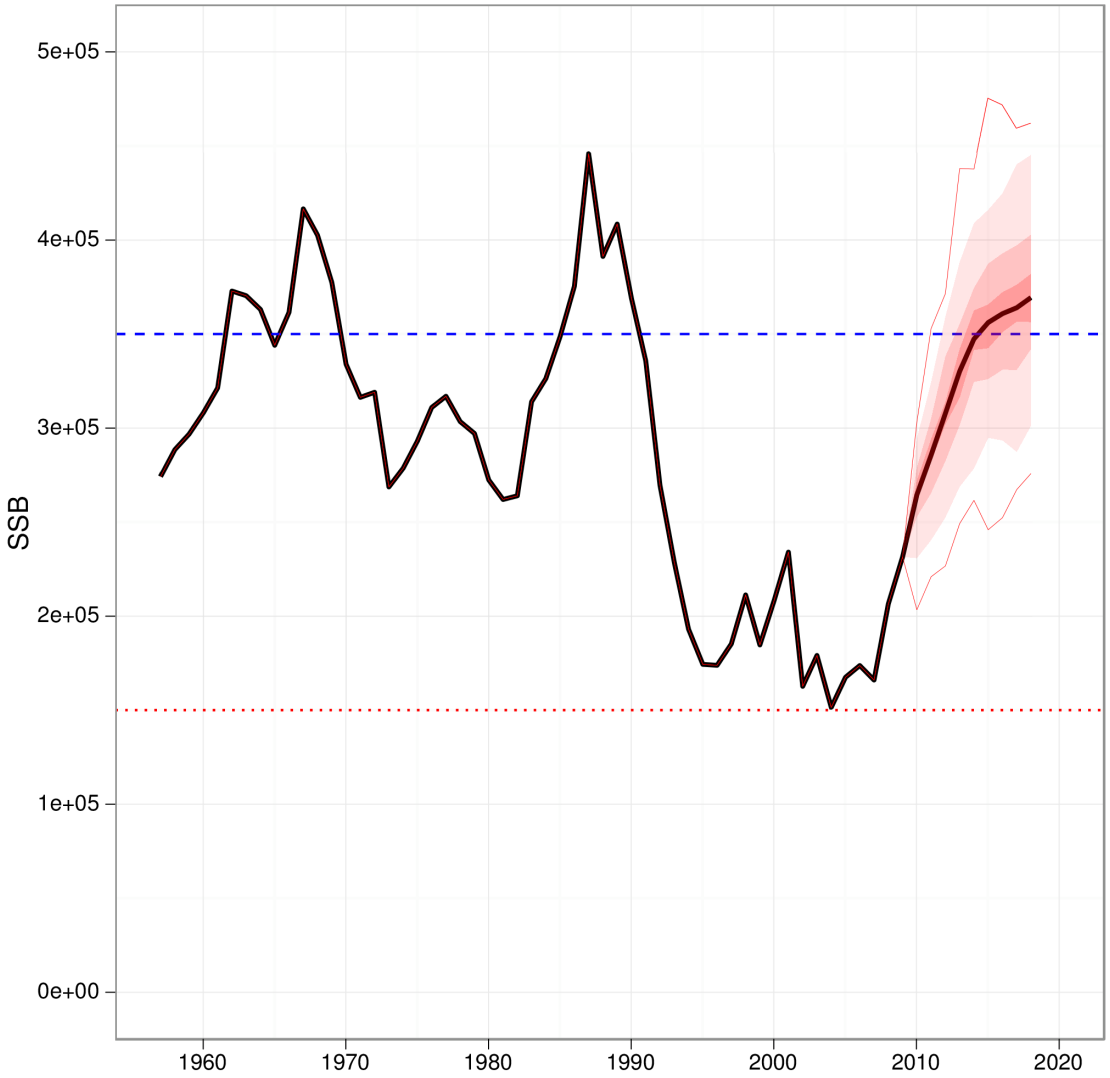
%
B = BMSY

%
B < Blim

Identify **Management Procedures**

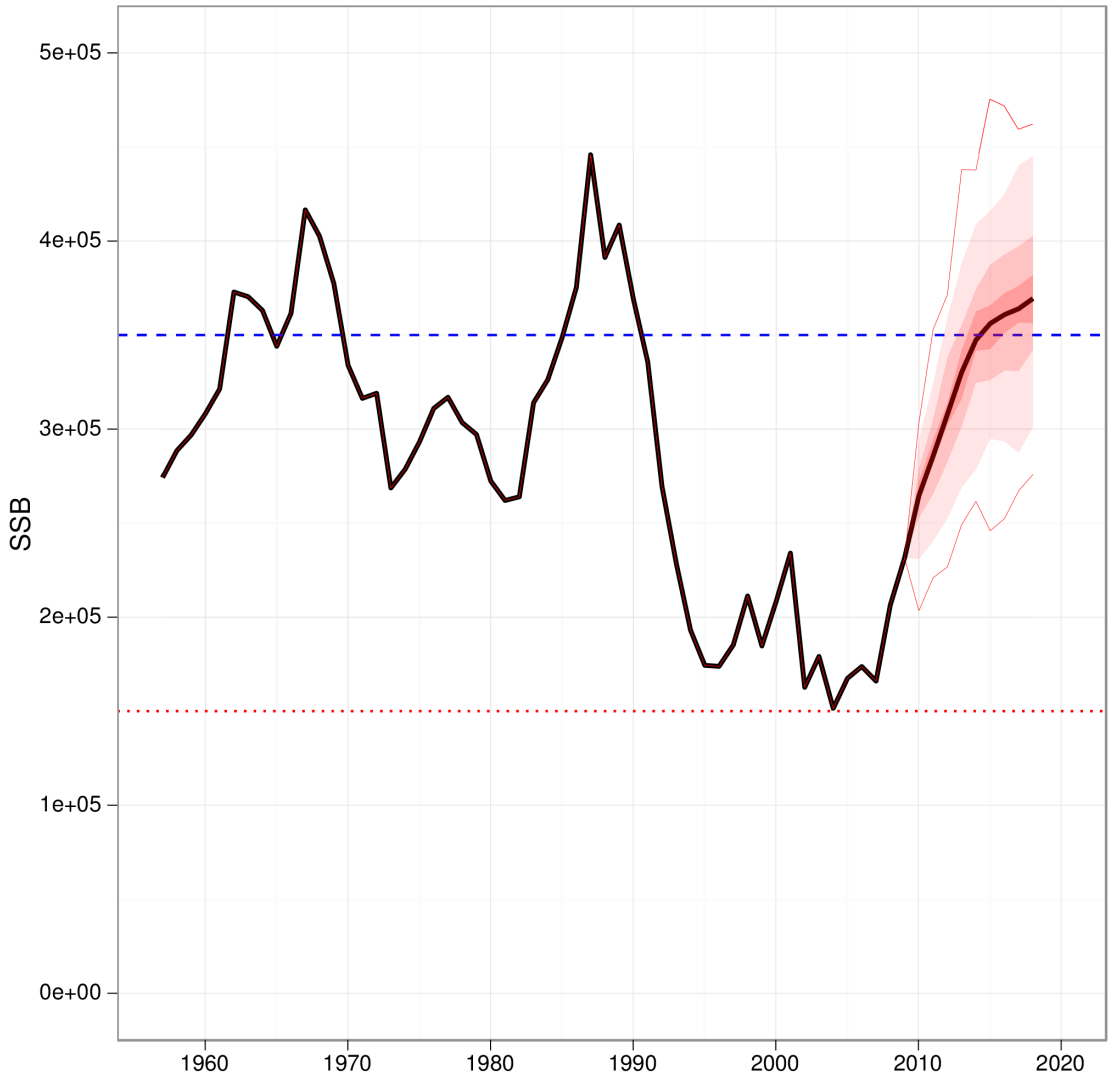


Conduct **simulations**



Joint Research Centre

Conduct **simulations**



69%

B > BMSY

0%

B < Blim

Performance measures & indicators

- % $SSB > SSB_{MSY}$
- % $F < F_{MSY}$
- WPM/SC to suggest initial risk levels?
  - 5-10% risk of $SSB < SSB_{MSY}$

Operating Models

- Best possible representation of reality
- As complex as feasible
  - Spatial
  - Fleets
- SA as basis for OM: SS3, MFCL
- What processes are relevant?
- How to incorporate that uncertainty?

Operating Models structure

1. Stock structure and spatial dynamics, relationship with effort distri- bution and environmental processes
2. The technical and trophic interactions among target and related species
3. Error and bias in fishery-dependent and (possibly) independent measures of stock abundance or fishing mortality
4. Robustness of stock assessment to uncertainties in both data and model structure
5. Effect of assumptions on biological processes
6. Stationarity of biological parameters
7. Quality and completeness of data

Candidate MPs

- Existing management
  - Capacity limitation: overall max effort
  - Time-area closure: too small
- Catch lmits
- Extension time-area closure
- Current/improved data collection
- Current(?)/simple SA

Simulations

- Infrastructure available
  - JRC cluster (260 CPU)
  - Grid services on cloud (AWS)
- Agreed schedule, avoid re-runs

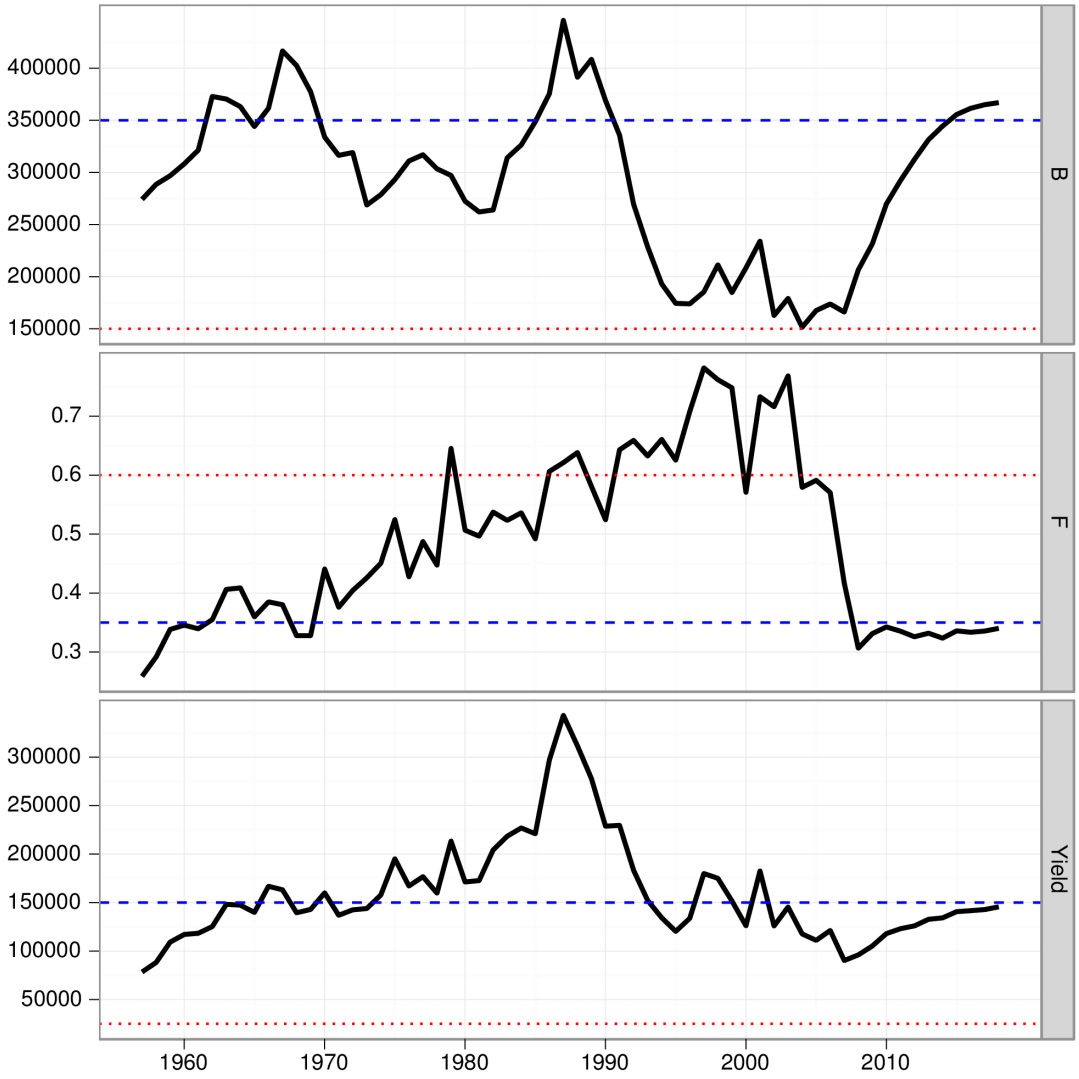
Team and expertise

- Core Team: 4-5 developers
- Gatekeeper
- Workplan in man/months

Workplan

- WPM to agree
- SC to endorse
- Realistic with resources
- Budget considerations
- Inter-sessional meeting(s)

Summarize performance of MPs



69%

B > BMSY

32%

F > FMSY

56%

Y >= MSY

Joint Research Centre