What is MSE?

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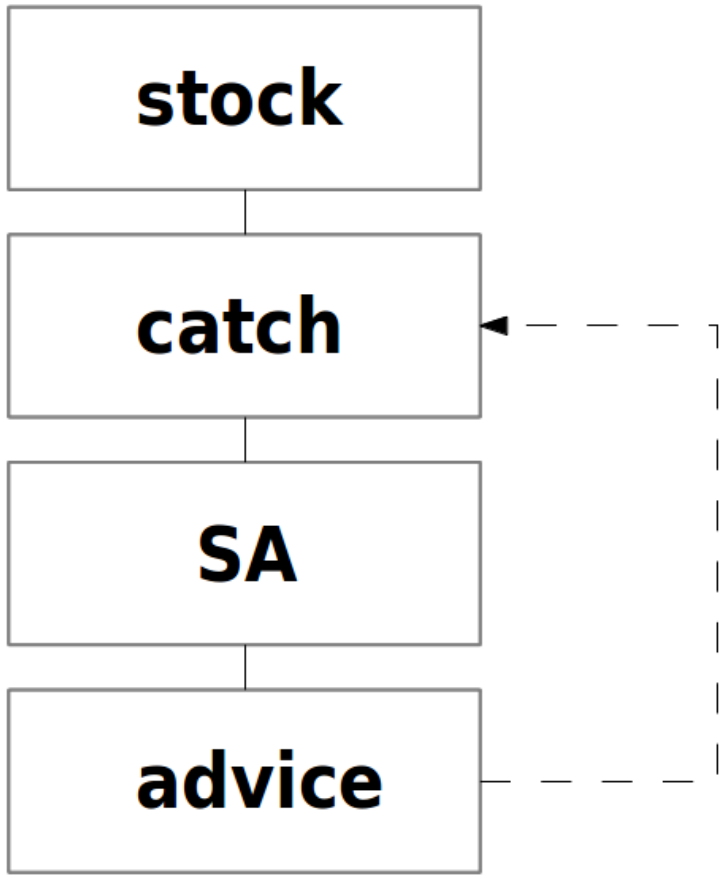
What is MSE?

Testing the **performance** of a **Management Procedure** to deliver a set of **objectives** under **uncertainty** and for a range of scenarios.

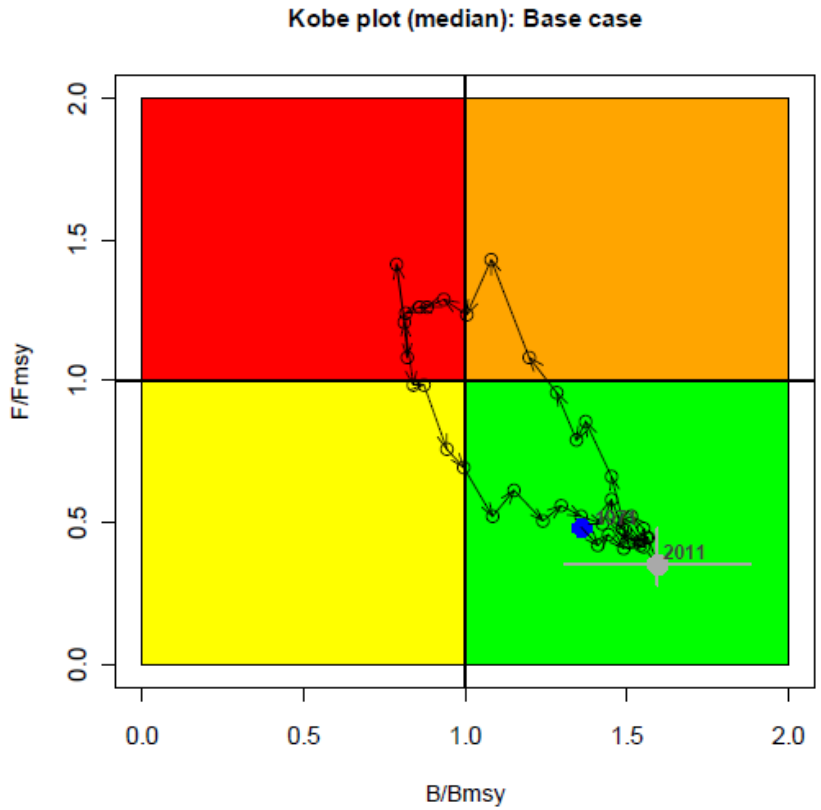
a.k.a. Management Procedure Approach

SA-based SC advice



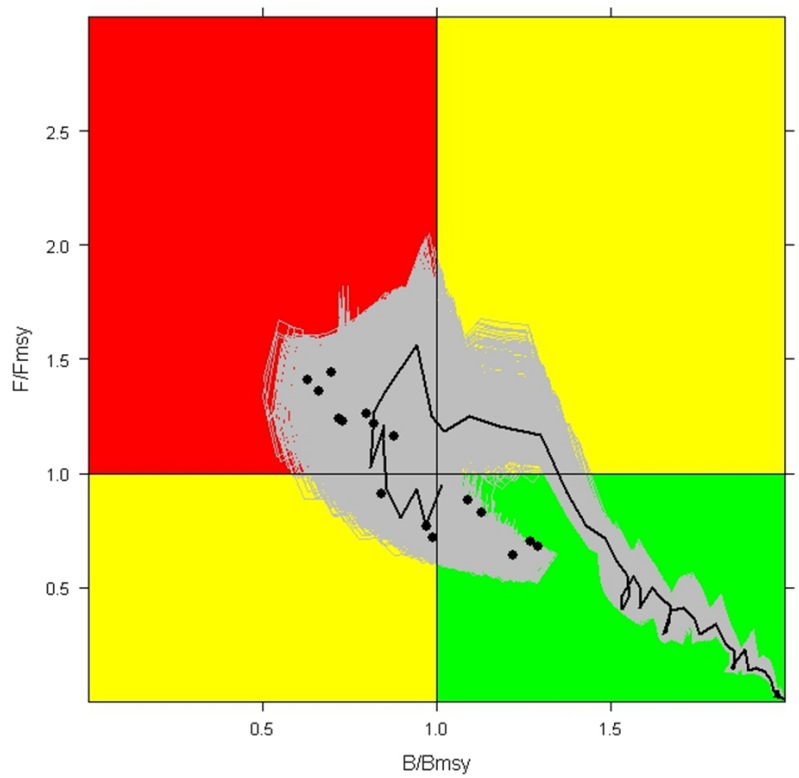
SA-based SC advice

- Best stock assessment
- Comparison with reference points
- Yearly assessment + advice



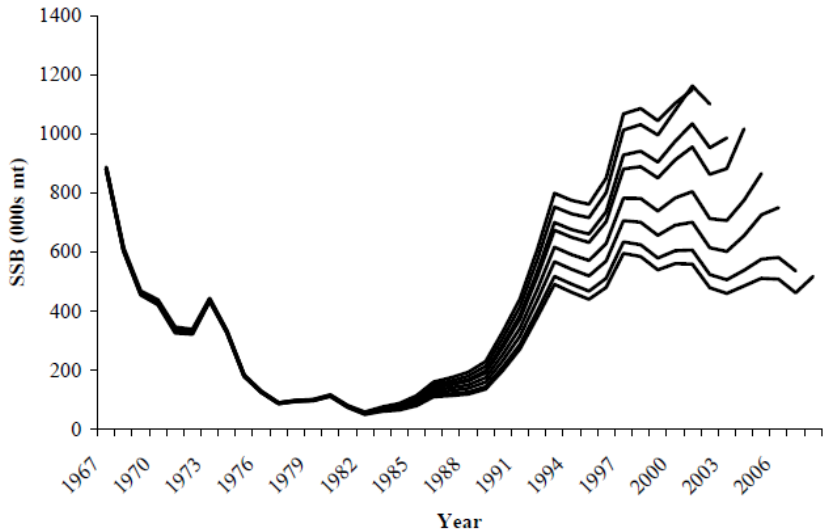
Problems with SA

- SA uncertain or wrong



Problems with SA

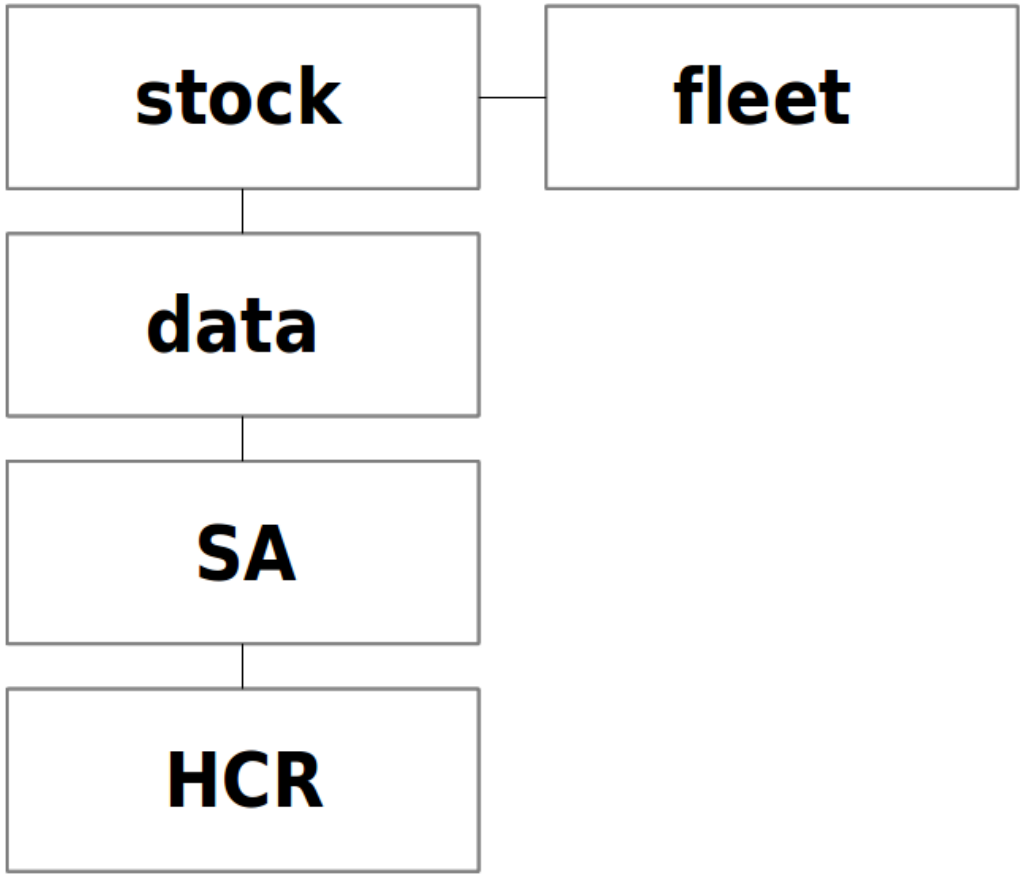
- SA uncertain or wrong
- Inter-annual changes in SA



Problems with SA

- SA uncertain or wrong
- Inter-annual changes in SA
- Short time horizon
- Management objectives unclear
- Stakeholder distance

MSE in a nutshell



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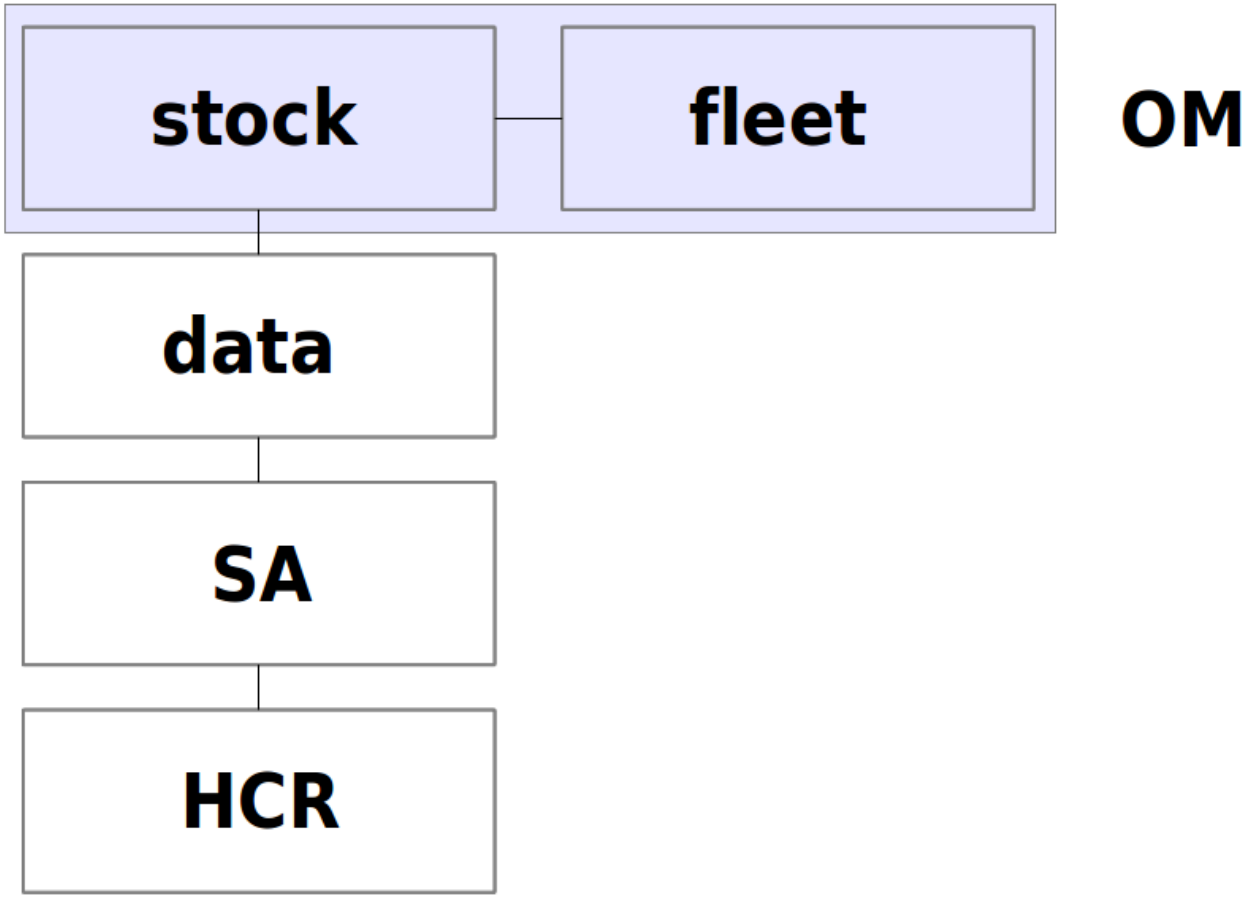
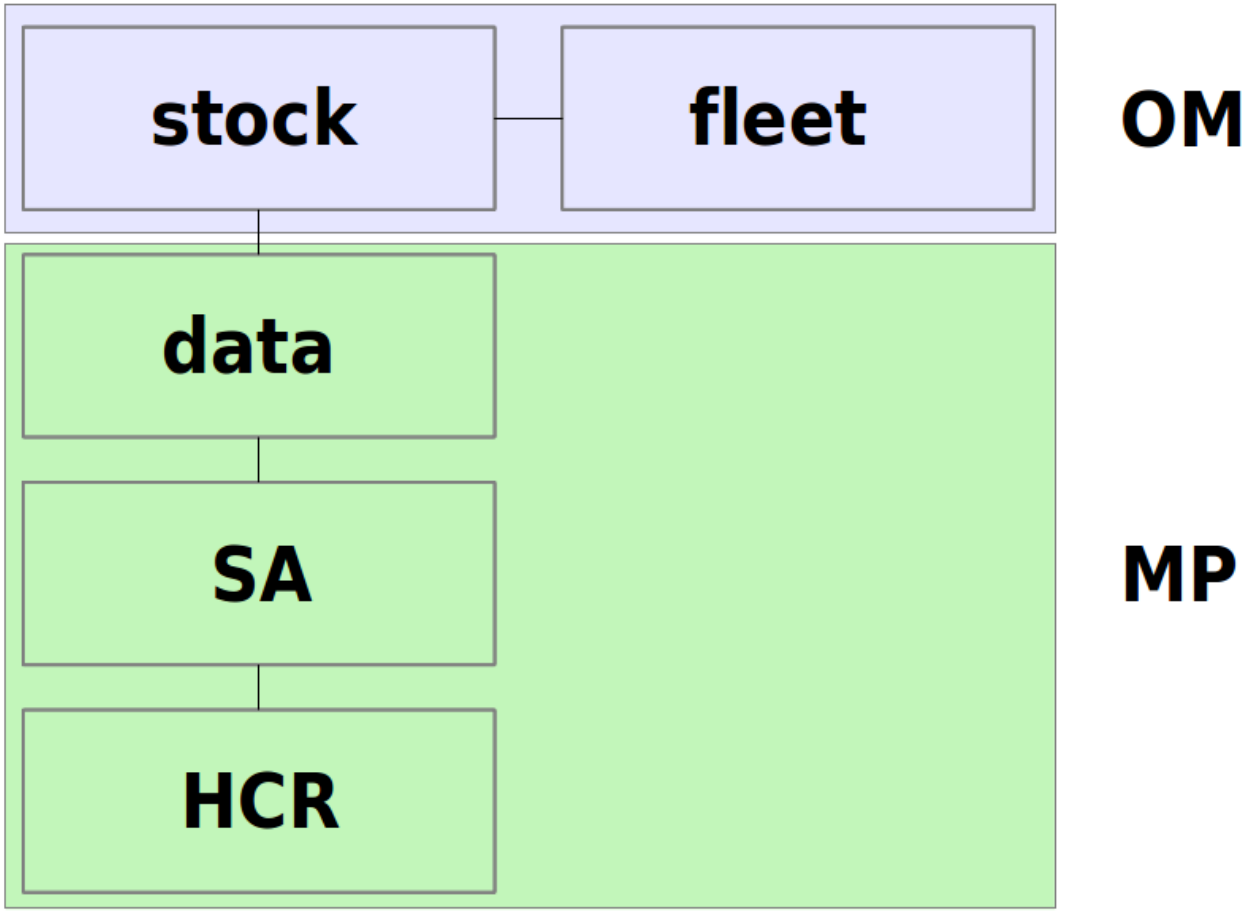


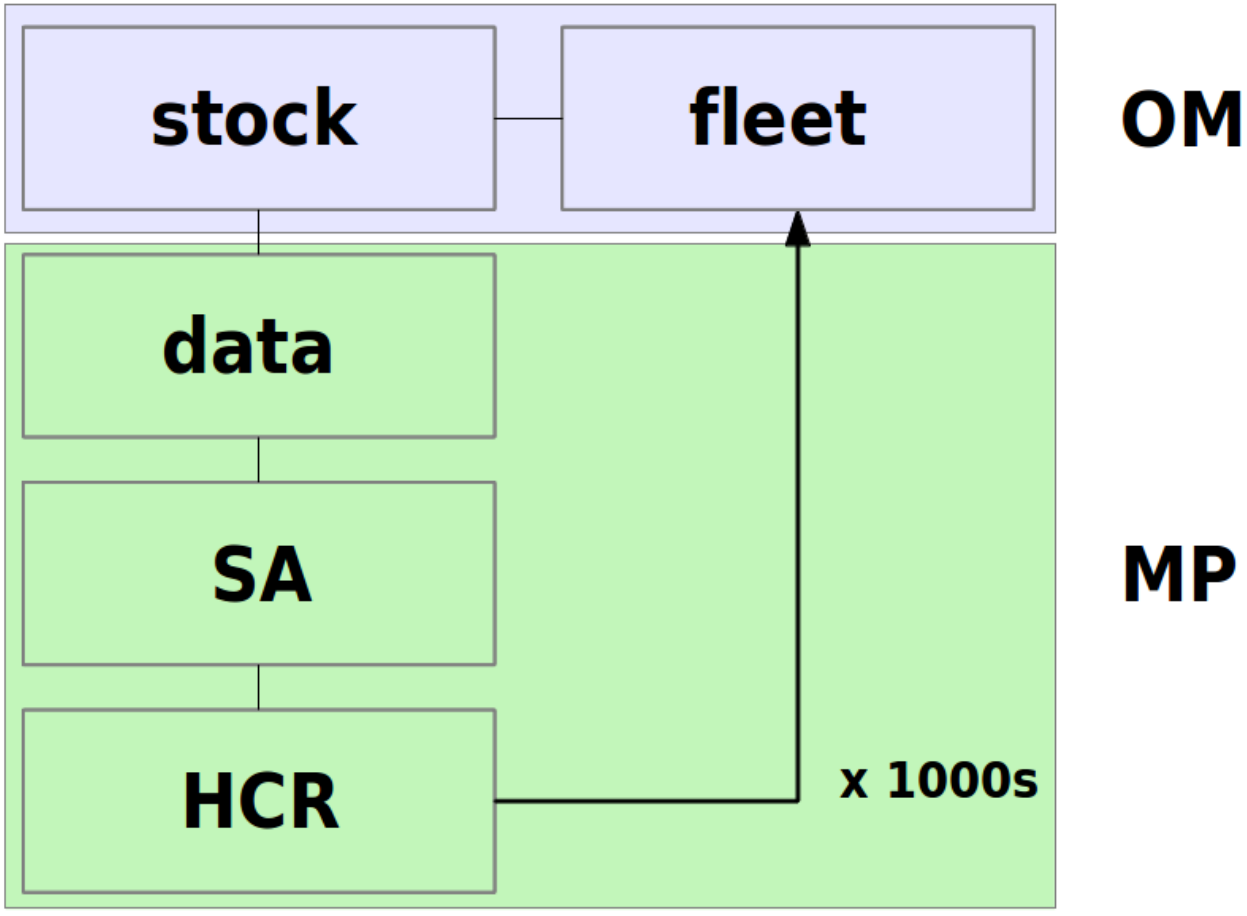
MSE in a nutshell

iotc ctoi



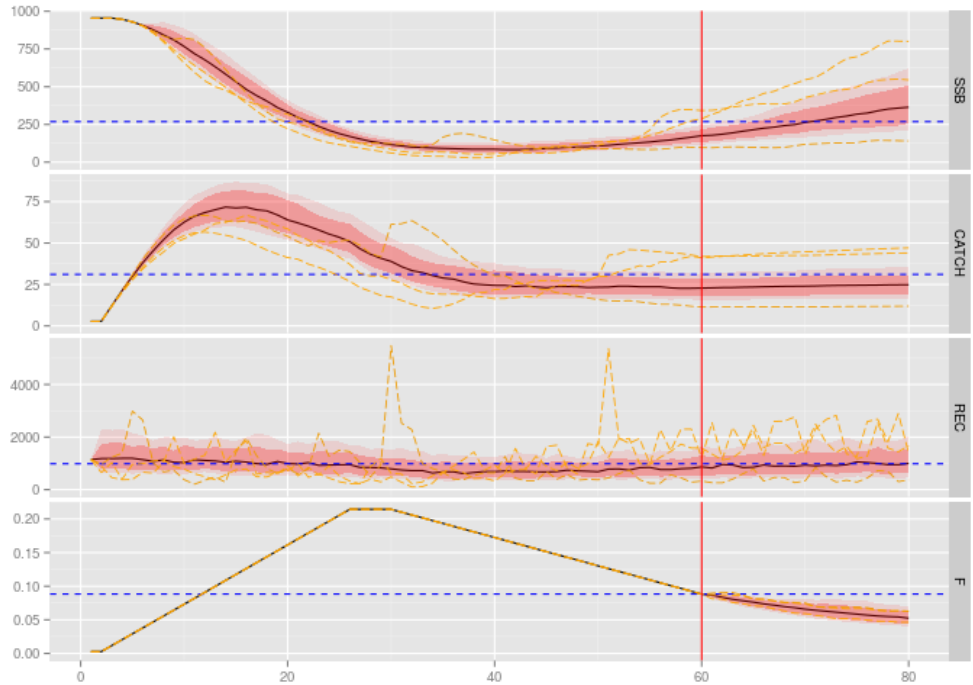
Joint Research Centre

MSE in a nutshell



MSE output

- Relative comparison of performance of different Management Systems under uncertainty
  - Is Plan A riskier than Plan B?
- Contribution of each source of data to ability to manage
  - What does the MP need as input?
  - Value of fisheries-independent data, e.g. tagging



The 7 STEPS

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1. Specify & prioritize objectives
2. Quantify them as performance measures
3. Develop a set of OMs
   - Condition on data
4. Identify candidate MPs (SA + HCR)
5. Simulate the future
   - Generate data
   - Determine management action
   - Apply to fleet and stock
6. Summarize performance of MPs
7. Select best MP

MSE Advantages

- Evaluation of risk
- Robust performance over tracking noise in data
- Limits catch variability
- Consistent with PA
- Interaction among scientists, managers & stakeholders
- Default management if no agreement
- Less haggling for short term benefits

MSE Disadvantages

- Lengthy complex development (but less and less so)
- Overly rigid
- Autopiloting?
- Poor data, poor models
- Choosing scenarios, test cases
- Not all possible scenarios covered

MSE Limitations

- Need for quality data
- Does not remove hard decisions about quota allocations or overcapacity
- Exceptional circumstances
- Managers unwilling to give up negotiation option?

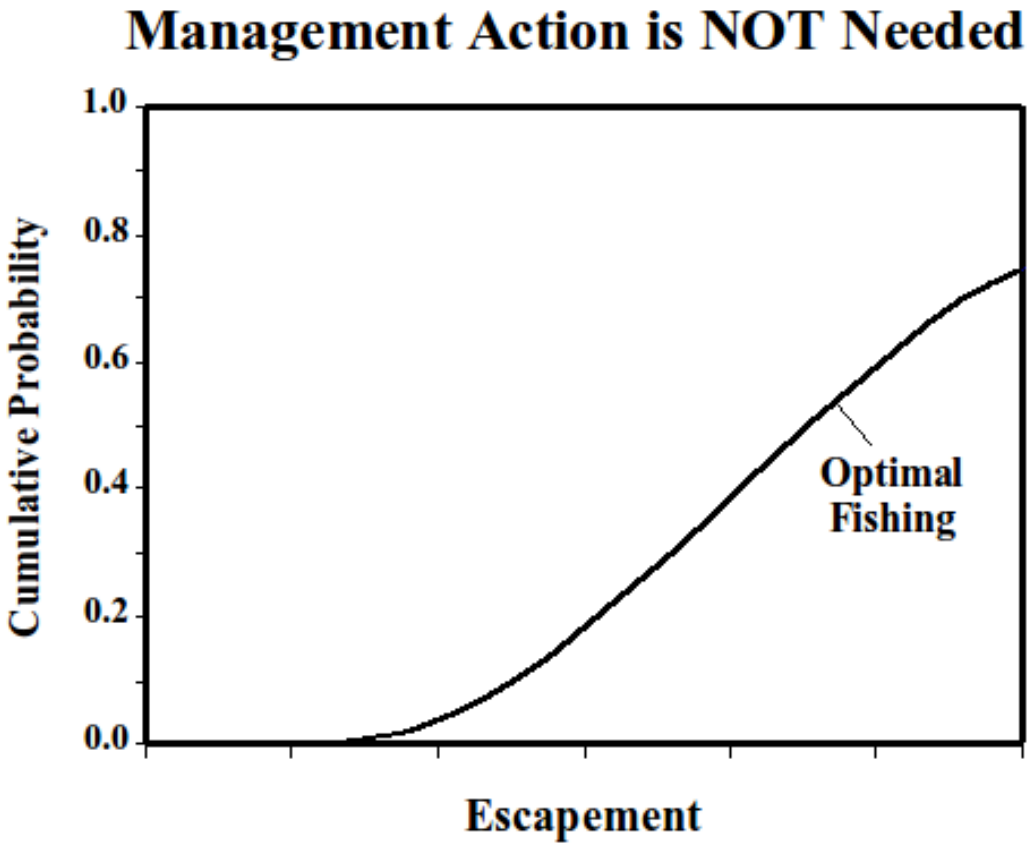
Risk

- Probability of some undesirable event happening
- Farmer: sell your crop or sell later at (possibly) higher price?
- Investment: Keep shares while they rise or sell before they fall?

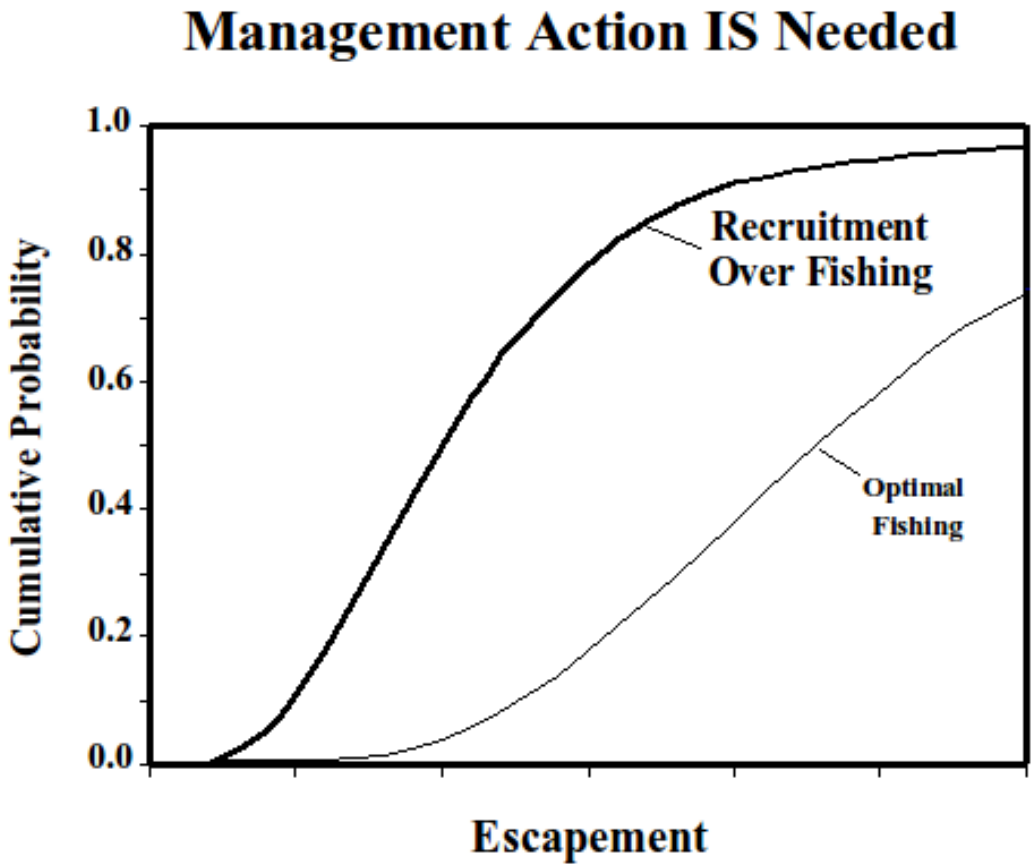
Dilemma of low biomass

- Low SSB for last 2 years:
  - Weak year class (no action), or
  - Start of overfishing
- Risk for manager:
  - Restrict fishery without need, vs
  - Not protecting overfished stocks

Dilemma of low biomass



Dilemma of low biomass



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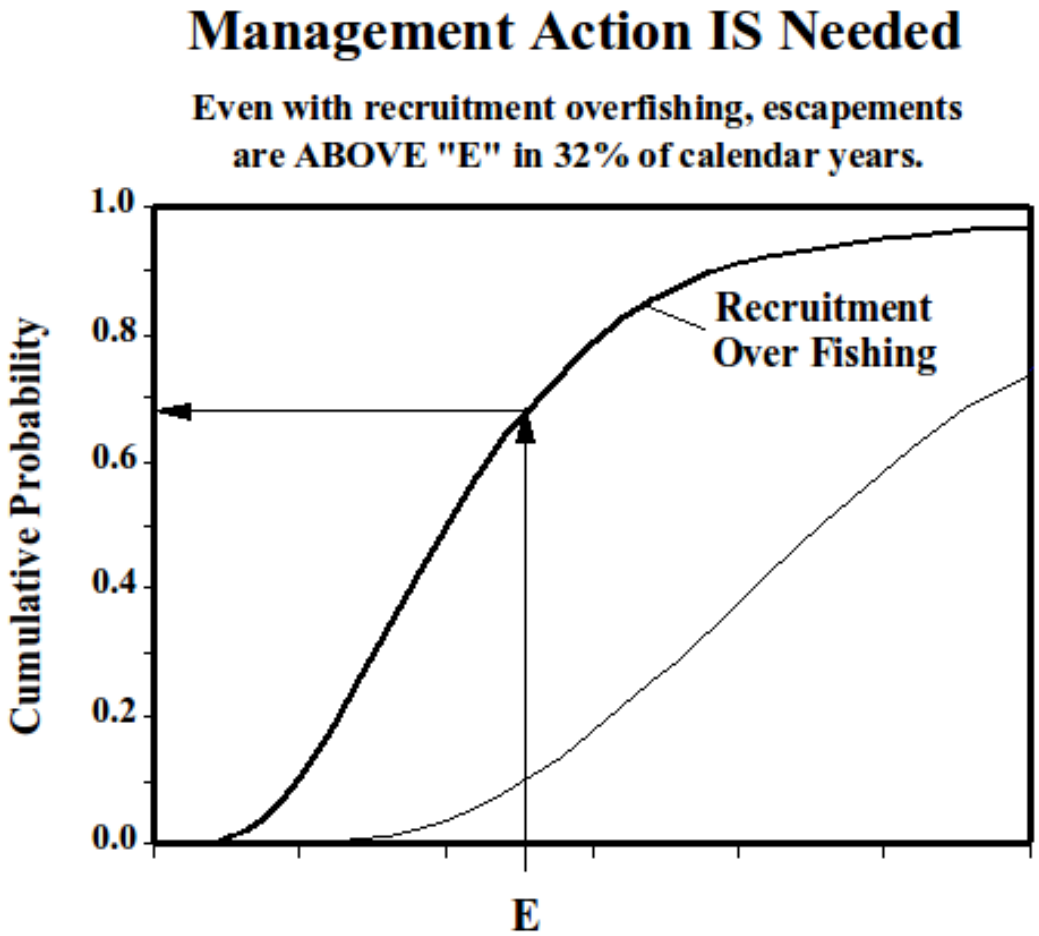
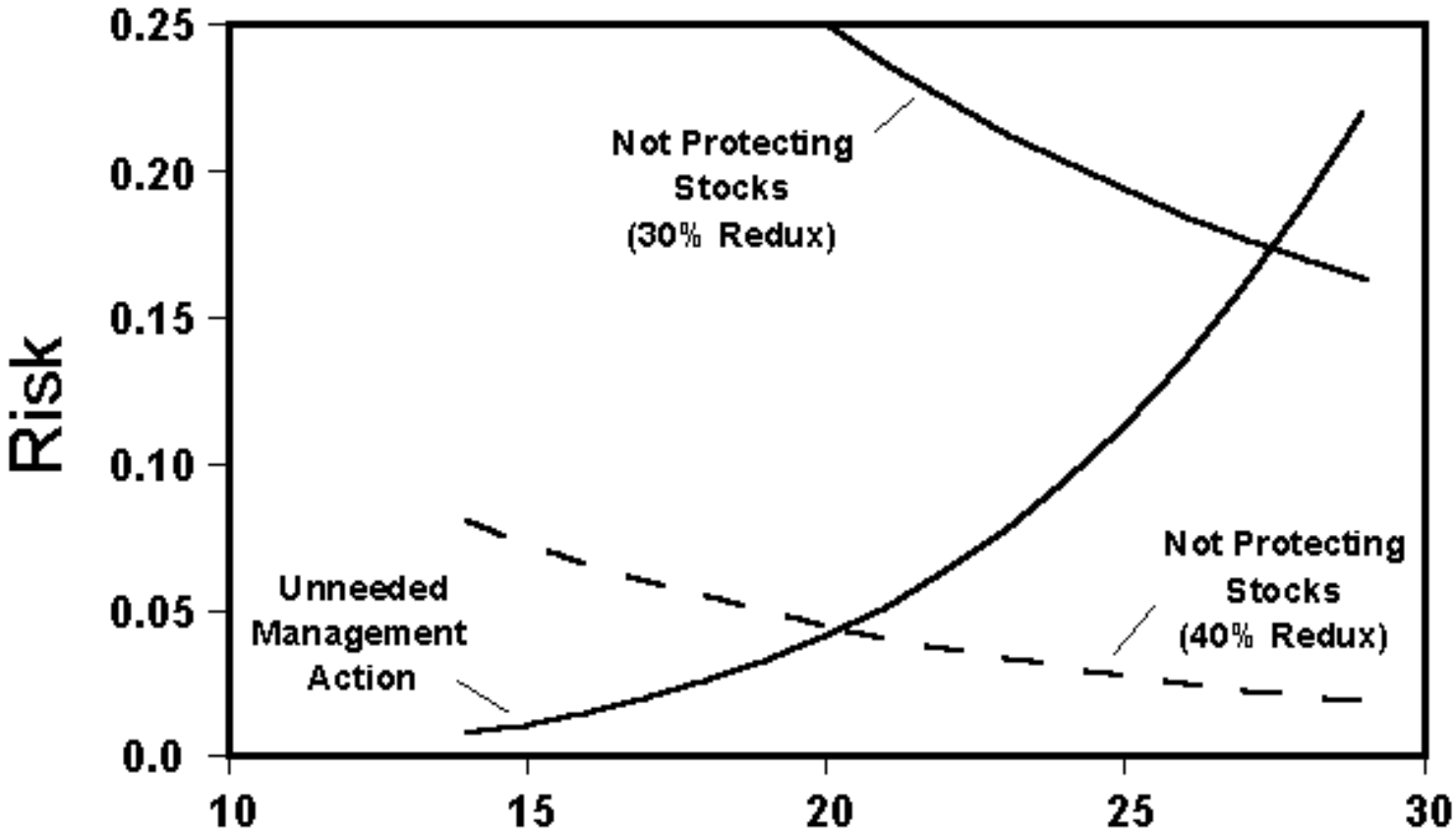


Dilemma of low biomass



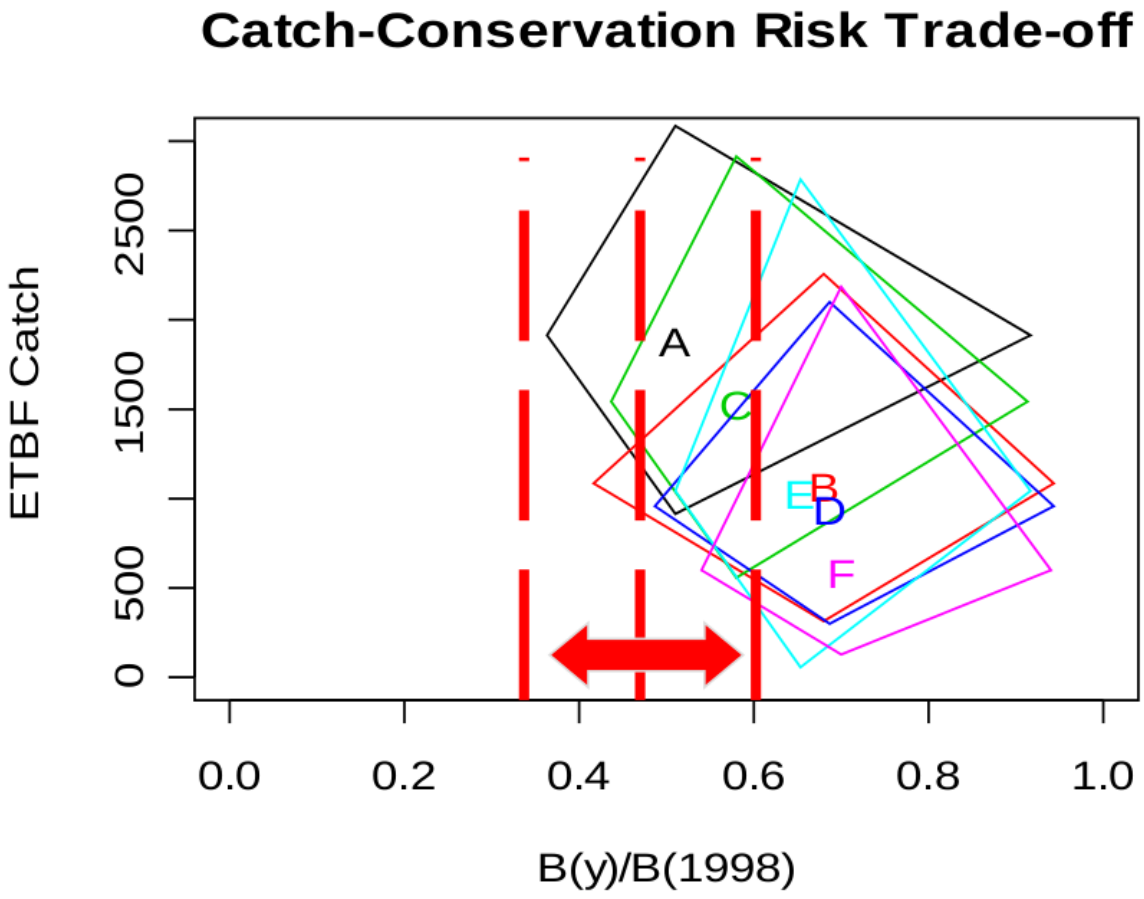
Trade-offs

- High catch, low variability, high SSB: compatible objectives?

Common trade-offs

- Higher Catch = Lower CPUE
- Higher Catch = Higher conservation risk
- For a given level of conservation risk:
  - Higher Catch = Higher Variability in Catch
  - Higher Catch = More Expensive Research

Trade-offs


Catch-Conservation Risk Trade-off
ETBF Catch
0
500
1500
2500
0.0
0.2
0.4
0.6
0.8
1.0
B(y)/B(1998)
A
C
E
B
D
F

Objectives

Conservation

- Safe SSB levels
- Ecosystem considerations
- Avoid recruitment and growth overfishing

Fisheries

- Economically and socially viable catch levels
- Stability in expected catches

Objectives

Risks

- x % (e.g. 10%) risk of unnecessarily restricting fisheries
  - P(F $>$ F@MSY) $<$ 10%
- y% (e.g. 5%) risk of not protecting overfished stocks
  - P(SSB $<$ SSB@LIM) $<$ 5%

Wrap Up

- Objectives: to best manage we need direction
- Risk: need to think about them
- Management System: Data + Decision rule + Management tools
- Dialogue with managers: objectives, risks
- MSE not magic wand, but powerful tool for helping decision making

Prediction is very difficult, specially if it is about the future

– Niels Bohr

QUESTIONS?