EFIMAS: Expanding the Role of Modelling in Decision Support

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Operational evaluation tools for fisheries management options

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EFIMAS Objectives

- Biologists and economists developing common modeling framework for fisheries: contribution to the development the Fisheries Library in R (FLR) framework
- Social scientists investigating how best to make use of models to faciliate fisheries management

EFIMAS Social Science Activities

- 5 kinds of groups: catching sector, onshore sector, women in fisheries, local managers and environmentalists
- Greece, Spain, UK, Ireland and Denmark
- Outcome: Twenty-two focus groups with 122 total particants
- Fifty-four individual interviews

Some reactions to modelling

Thanks to Ditte Degnbol for the following three slides

Modelling is often Alienating

Excuse me, what? Model what? You should ask it another way, or move on to the next question, because this makes no sense to us.

But many see models as useful…

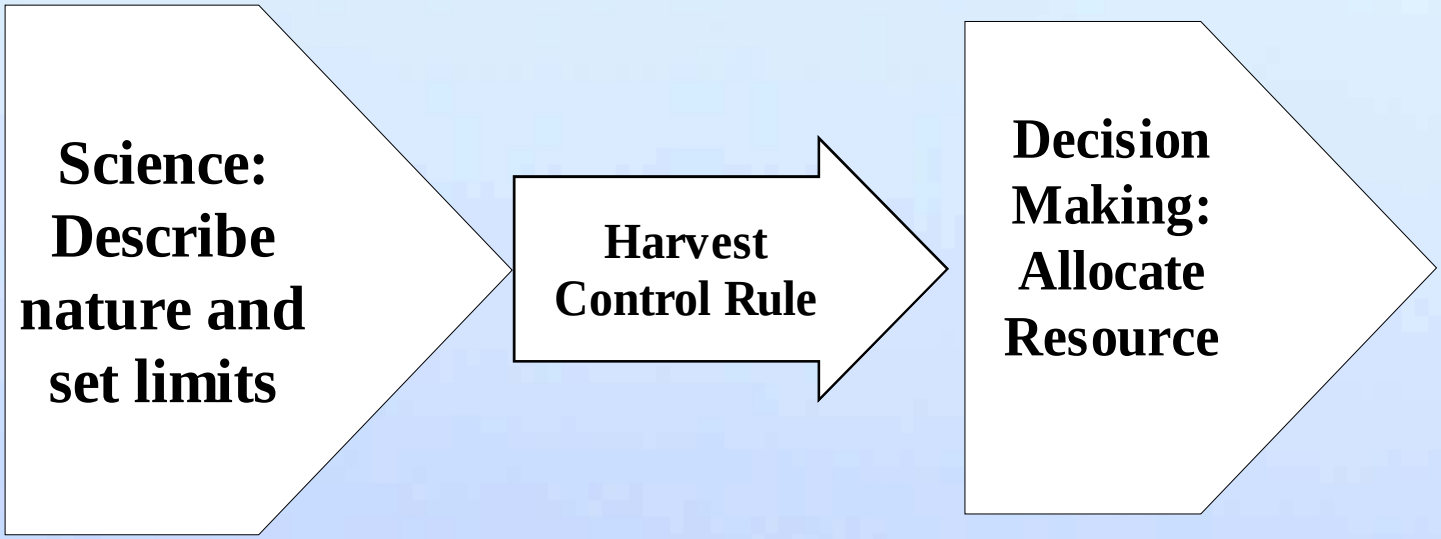
…for forecasting the effects of different scenarios.

Concerns about models

- A model is only as good as what goes into it
- Models are theoretical desk-work not allowing for experience-based inputs
- Models tend to be ascribed too much authority
- Models lack transparency

Implications for Decision making and Science

Classical Role of Science in Decision Making



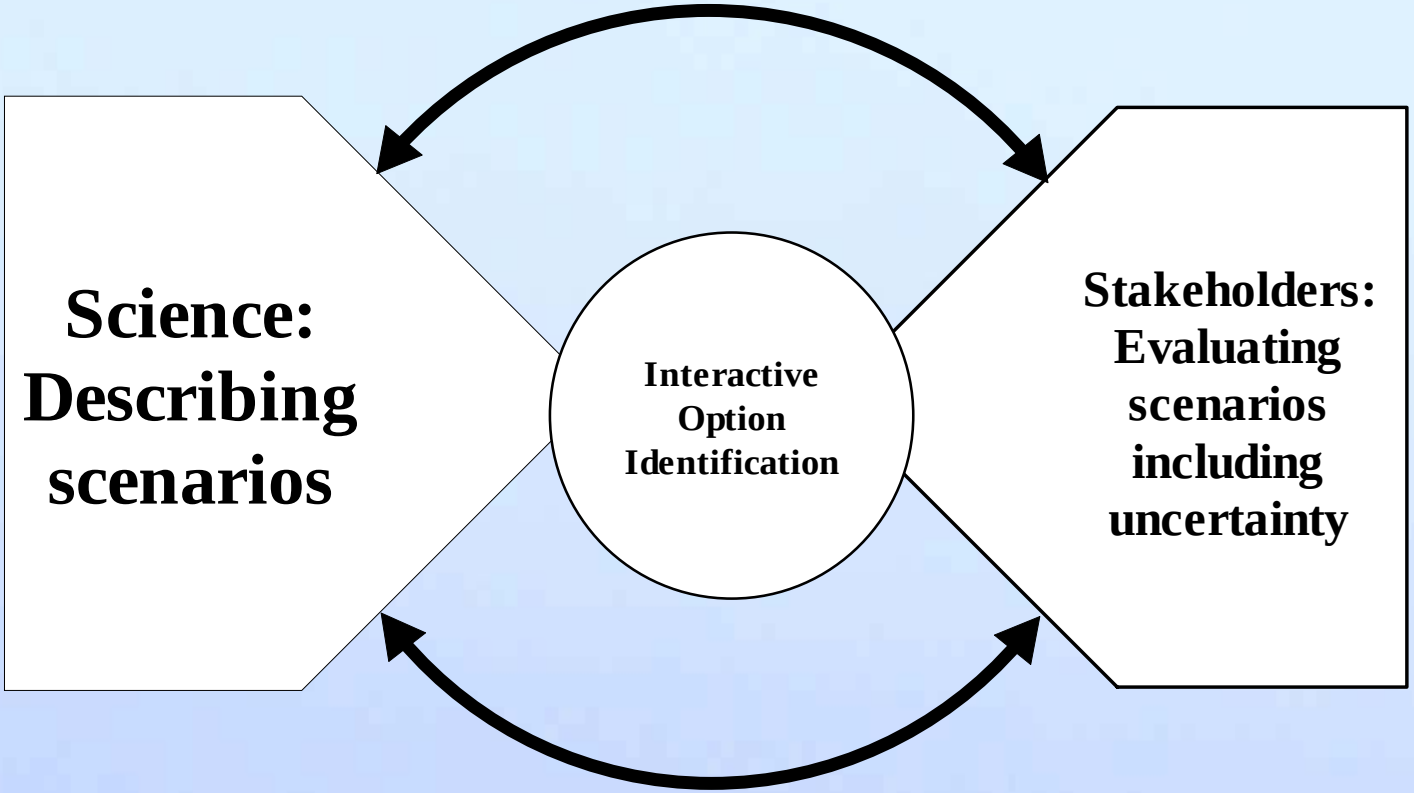
Basic Requirement: Objectivity (great simplicity)

Fisheries Management cannot function without identifying some objective view of nature that defines exploitation levels

High Stakes and High Uncertainty Undermine the Classical Role of Science

- Stakeholders use the political flexibility that uncertainty creates
- Scientists lose credibility from constant recourse to the precautionary approach
- Managers turn political problems into technical ones

The Faciliation Role of Science



Basic Requirement: Transparency

Participatory modelling facilitates science-based decision making under high stakes and high uncertainty

An example from another world:

The New England Project

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- **New Englands Power grid was suffering dozens of times more failures than ever before**
- **Because of continual *political paralysis* over power generation policy**

Less pollution!
More conservation!

More Reliable Power!

Power Companies

Environmentalists

Consumers

Less Expensive Power!

- **The power companies wanted the Seabrook Nuclear Power Station**

•The environmentalists and the public were opposed!!

•Gov. John Sununu went to the Massachusetts Institute of Technology to ask the scientists to show that Seabrook was the right thing to do

•And the MIT scientists said……

Lets do some modelling….

- **Previous power generation models had been poorly developed and ignored uncertainties**
- **The MIT scientists felt more knowledge was needed and their modelling skills could help**
- **They met with a group of 20 stakeholders to discuss using models to find solutions**

And they developed models tools that..

- **Analyzed multiple scenarios..**
- **Were designed to examine trade-offs where values differed**

New England Project Results

- **Continued for nearly 10 years**
- **Was “Spectacularly effective in reorienting the stalled regional policy debate away from polarization around single options such as ’conservation only’ or ’nuclear only’, moving it toward considerations of multi-component strategies”.**
- **Never succeeded as a forum for direct negotiations on policy matters. No consensus documents emerged.**

Participatory Modelling in Fisheries requires:

- Scenarios of multiple options
- Various values defining these options
- Uncertainty front and centre
- Flexible procedures able to respond to stakeholder creativity

A Compliment to the Classical Role of Science

- Participatory modelling is not a substitute
- Modelling forces stakeholders to ***clarify their objectives*** and explicitly ***address the trade-offs*** implied by various strategies

This work suggests that the institutional framework for Long Term Management should be

Results Based Co-management:

- Public sets limits – classical science with wide stakeholder participation in setting precautionary levels
- Industry develops a plan – facilitated by scientists through participatory modelling
- Science helps industry to meet the burden of proof

to show that the plan meets the limits set by the public

Closer to certification programmes than current management

EFIMAS and facilitative science: Developing **Fisheries Libarary in R (FLR)** for use in participatory **Management Strategy Evaluations (MSE)**

Thanks to Laurie Kell for the following five slides

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Modelling Approaches:

Two Different Roles in Results Based Co-management

Stock Assessment Modelling:

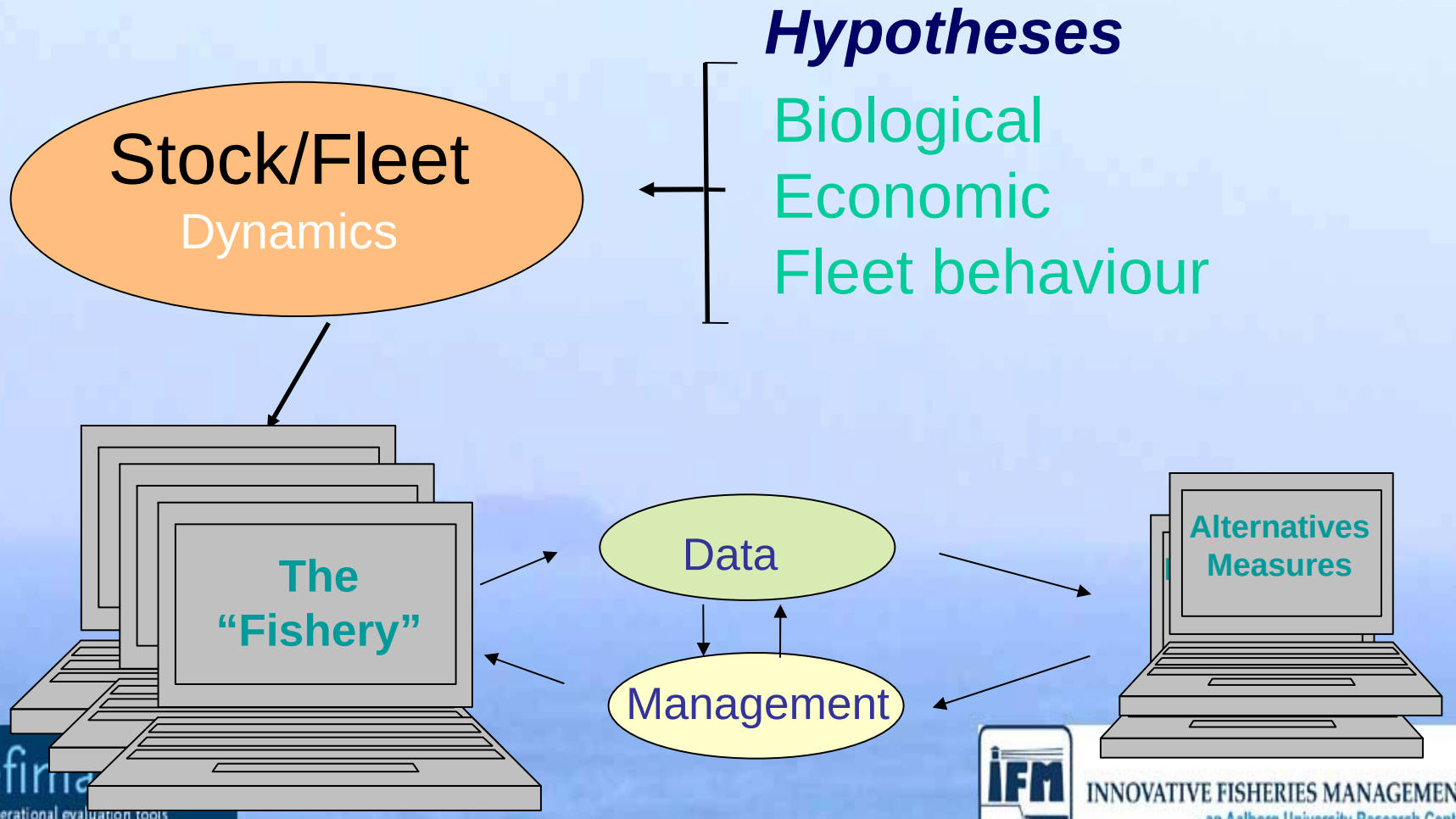
- **Single species stock assessment models**
- **Problem: getting the best data and/or finding the perfect model**
- **Uncertainty: acknowledged but not fully addressed**
- **Economics: separate**
- ***Sets the limits* on exploitation**

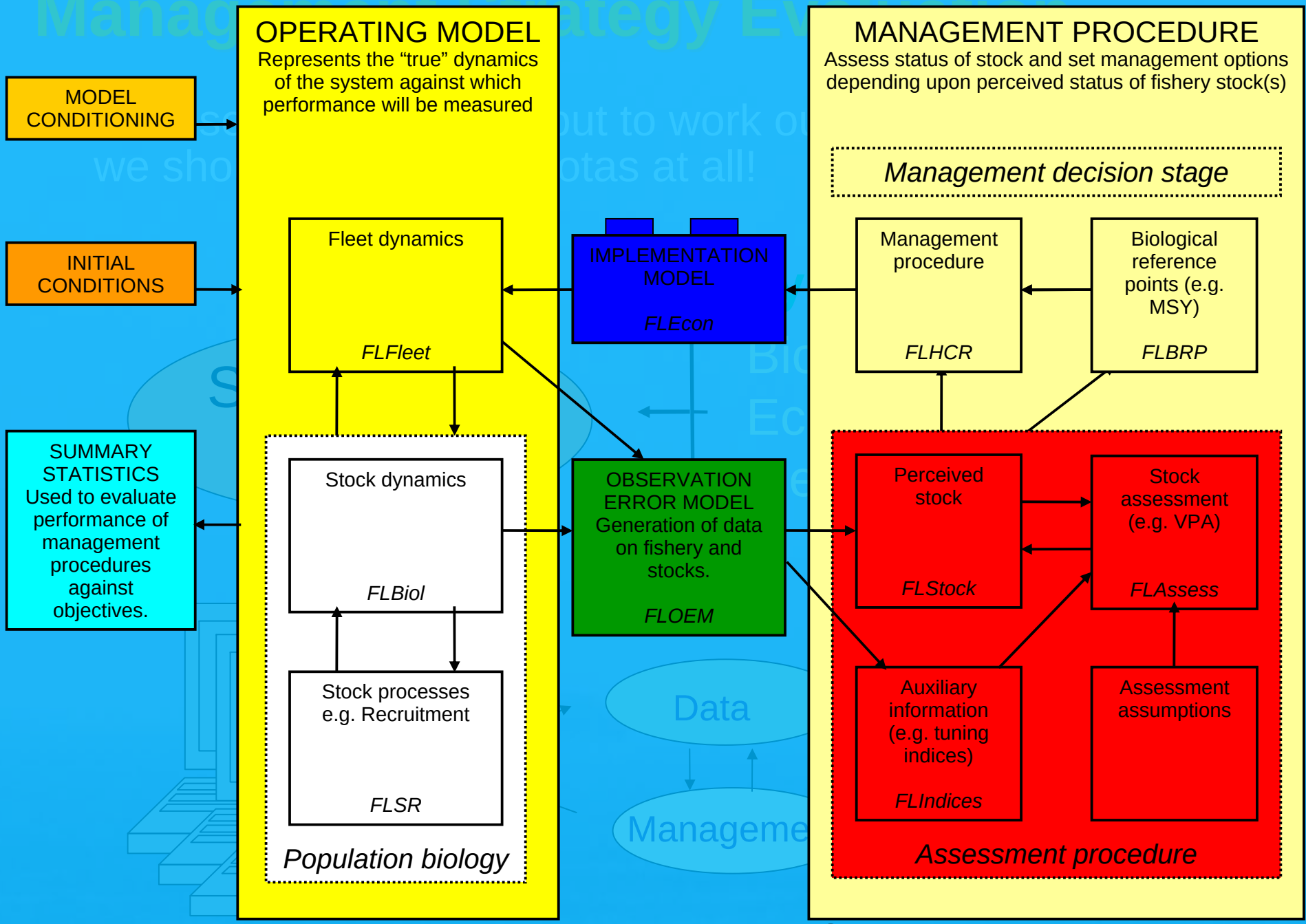
Management Strategy Evaluation Modelling:

- **Bio-economic simulation models for evaluating alternative scenarios**
- **Problem: identifying plausible scenarios**
- **Uncertainty: explicitly addressed e.g. by scenarios**
- **Economics: integrated**
- **Builds the plans for *meeting the limits***

Management Strategy Evaluation

Not used to set quotas but to work out whether
we should be setting quotas or taking another approach

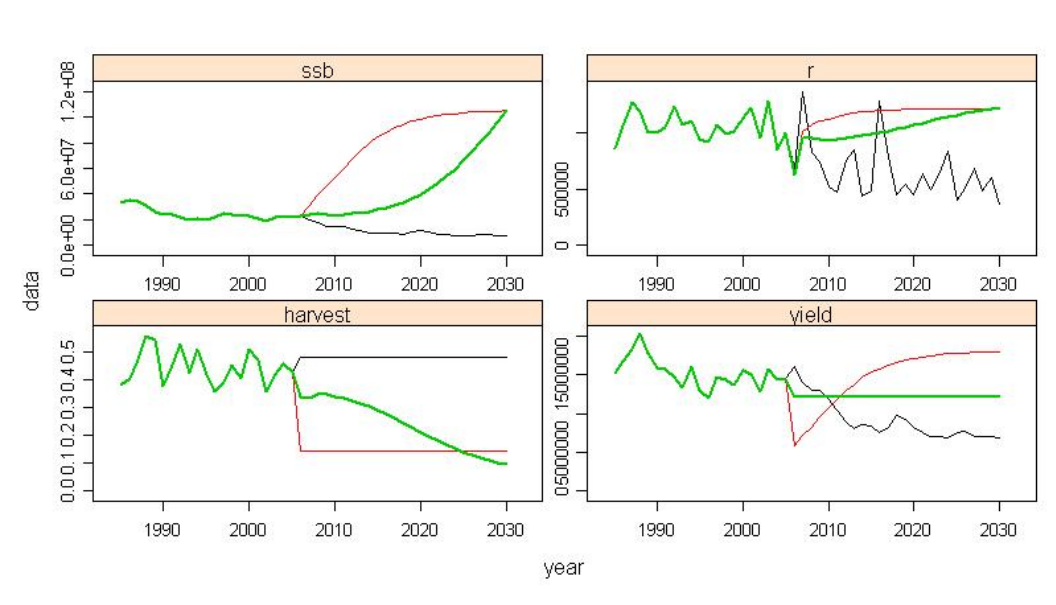




Building blocks of FLR

Evaluation

An example in an evaluation of Mediterranean swordfish first a projection for a constant fishing mortality equal to current effort levels was made.



A variety of management plans were evaluated to try and recover the stock to BMSY by 2030;

red shows the expected outcome for a constant fishing mortality strategy and

green for a constant catch strategy.

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A few other examples of Participatory Management Strategy Evaluations with FLR

- Mediterranean swordfish also looked at interactions between the kinds and duration of the fishery closures, the SSB and net revenue
- North Sea flat fish:
  - (1) spatial models with NSRAC
  - (2) Mixed fishery models with DG MARE
- Long term plan for hake with SWW + NWW RACs
  - AZTI developed a Visual tool
- More coming with JAKFISH! What about your RAC?

Thanks for Your Attention