MSAB Meeting #5

May 27-28, 2015

Agenda

<u>Wednesday May 27, 2015</u>

12:30 PM: Welcome, introductions, meeting objectives and questions.

Summary review from MSAB Meeting 4 (October 20-21, 2014).

1:00 PM: MSAB governance

- Briefly recap MSAB interests and purpose, discuss
- MSAB governance – Chairs, deliverables, deadlines, meeting format

2:00 PM: BREAK

2:15 PM: Fishery goals and objectives

- Affirm goals and draft, ranked fishery objectives

3:15 PM: Operating model updates

- Introduction to spatial equilibrium models for harvest policy analysis
- Tractable questions for coast wide model vs. spatial operating model

4:15 PM: Management procedures

- Review management procedure tactics from meeting 4, discuss alternatives
- Review research priorities and relationship to policy variables

5:00 PM: ADJOURN

Agenda

<u>Thursday May 28, 2015</u>

8:00 AM: COFFEE & PASTRIES

8:30 AM: Recap from previous day, questions & discussion.

9:00 AM: Management procedures

- Preliminary evaluation of management procedures
  - o Evaluating current harvest policy (Clarke and Hare, 2006)
  - o Exploration of discard mortality rates
  - o Scorecard and tuning management procedures
  - o Using the MSE web-based interface to explore alternative procedures

10:00 AM: BREAK

10:15 AM: Management procedures (con't)

12:00 PM: LUNCH

1:00 PM: Operating model scenarios

- Review proposed scenarios – natural mortality, stock-recruitment, growth, average recruitment, etc.

2:00 PM: MSAB outreach

- Suggestions for sharing results, engaging with constituents, forums for providing feedback

3:15 PM: ADJOURN

Meeting objectives (revised)

- Review MSAB governance, deliverables, meeting logistics and facilitation.
- Affirm fishery goals and draft objectives.
- Review and evaluation alternative management procedures.
- Introduction to spatial equilibrium models.

Outline

- Review (Meeting #4)
- MSAB Governance
- Tractable Questions
- Coastwide operating model
    - Performance measures & tuning MP's to achieve objectives.

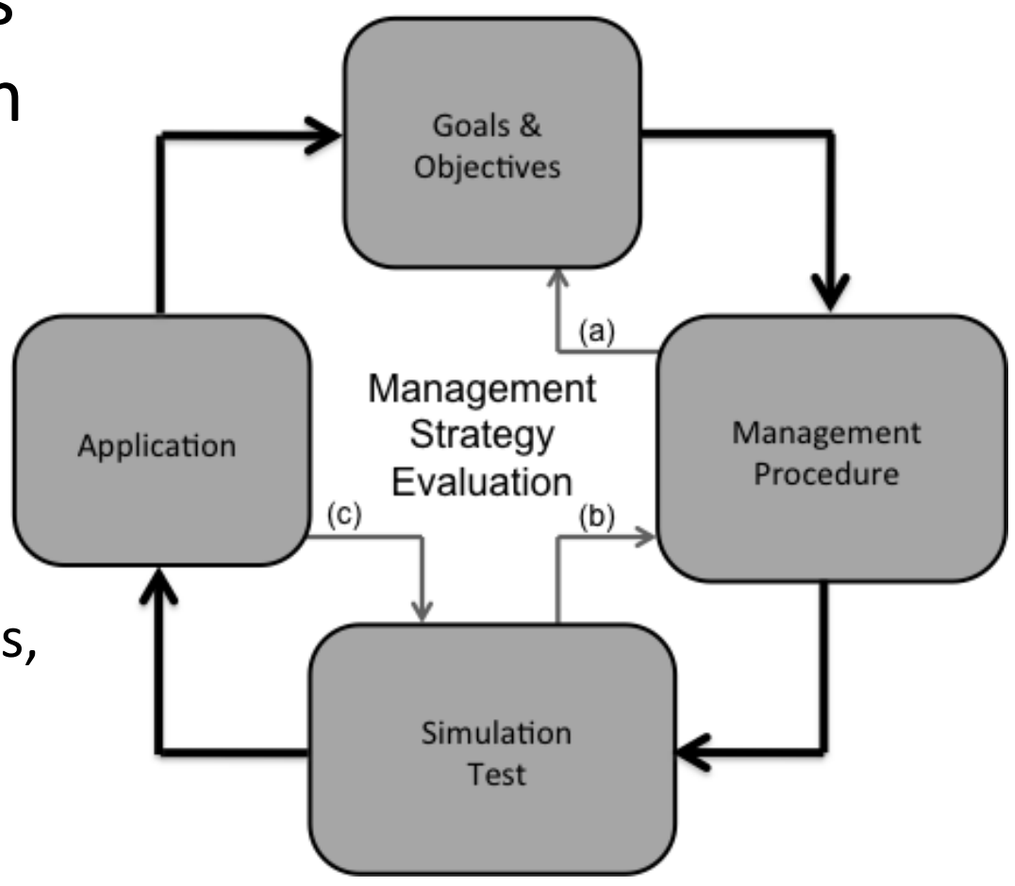
Review MSAB Meeting #4

- Lessons from Pacific hake (Allan Hicks).
- Tools: empower MSAB & stakeholders to design their own harvest policies.
    - Need for immediate feedback.
    - “Understand how all the moving parts interact”
- MSE Priorities & Objectives
- MSAB Governance

Pacific hake Example

Another lesson learned

- I learned that MSE is a larger process than I originally thought
  - Solicit input,
  - define objectives,
  - build models,
  - choose scenarios,
  - define harvest strategies,
  - test harvest strategies,
  - report results,
  - repeat?



source: Allan Hicks

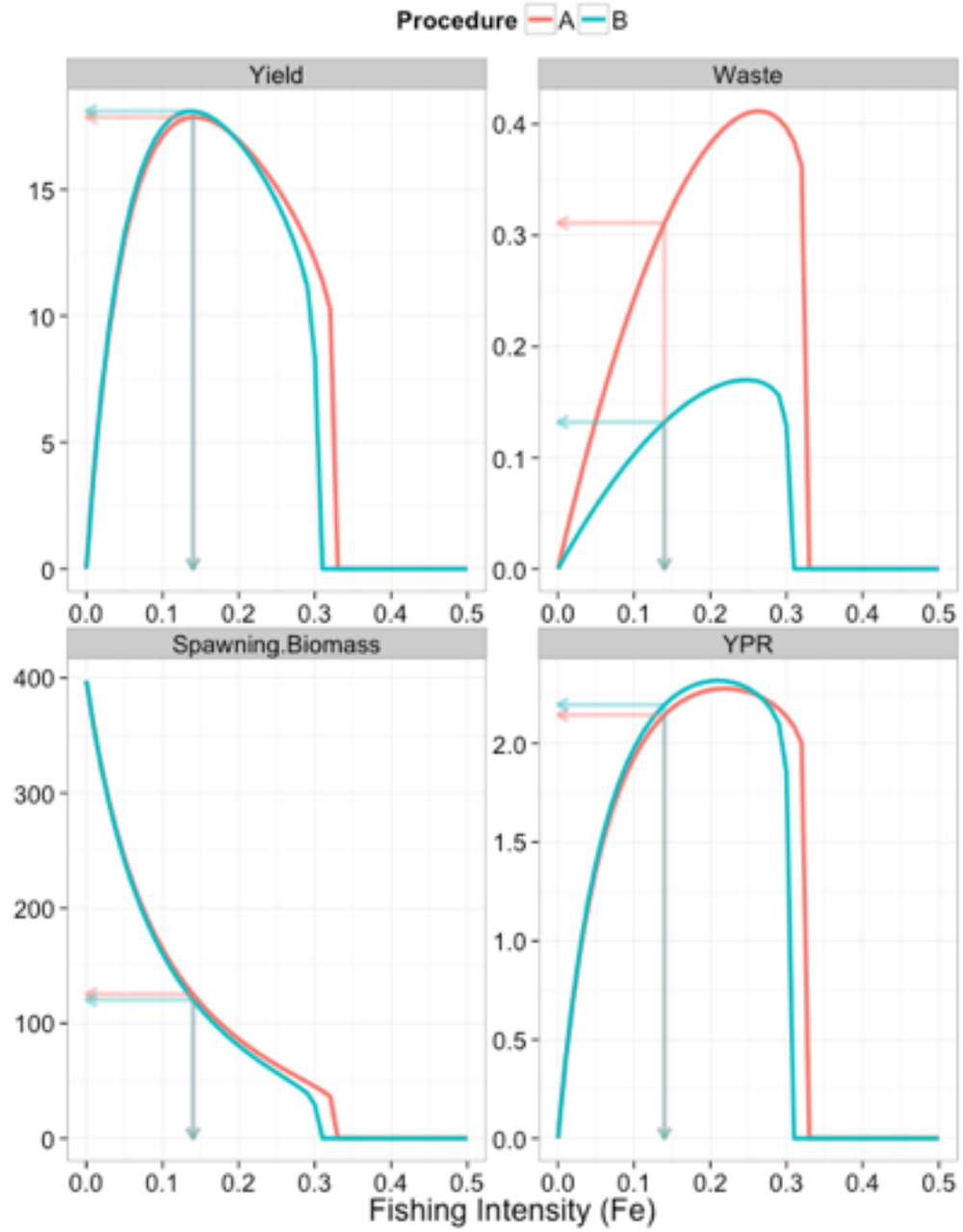
Tools

Equilibrium Model

Equilibrium model

- Akin to retirement planning:

- long-term projection of the average population response to changes in the management procedure.

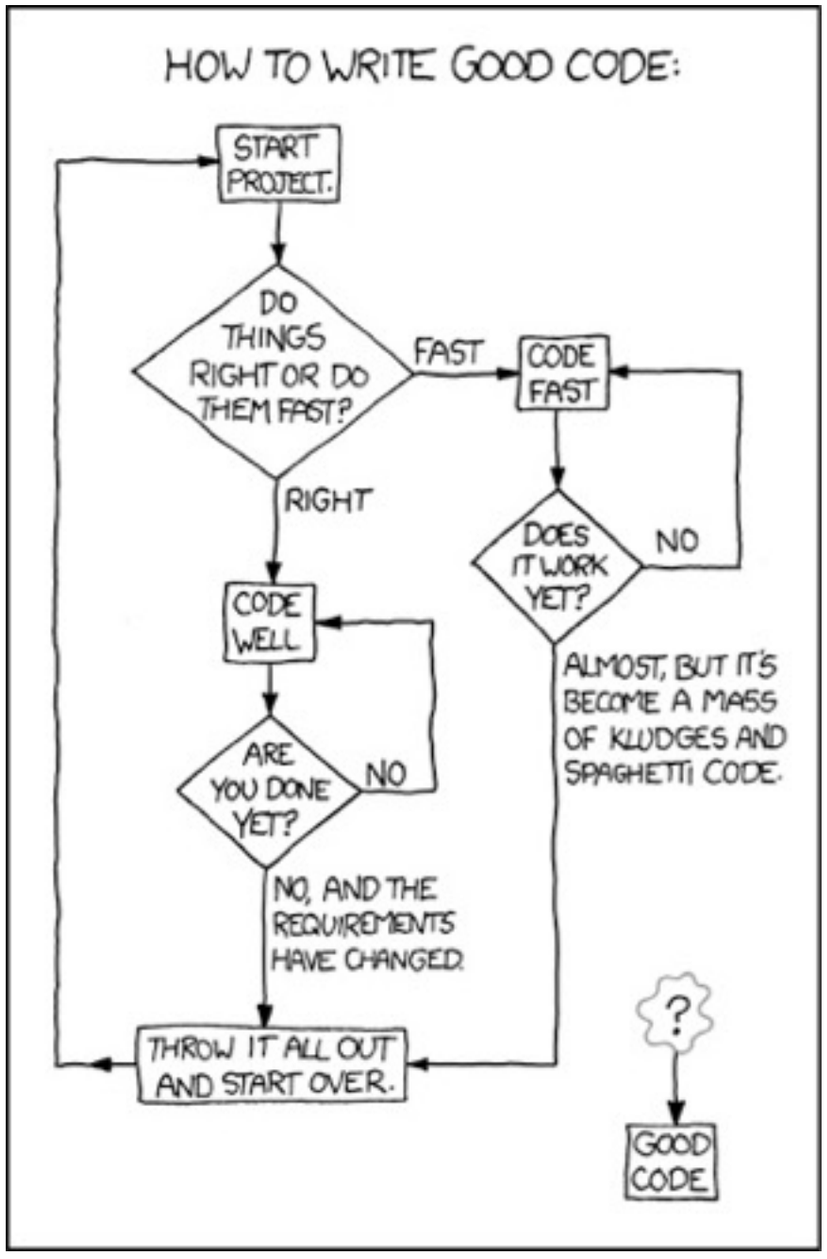


Equilibrium model: purpose

- Instantaneous feedback on what the long-term results might look like for a given management procedure.

- Can quickly rule out procedures that don't achieve long-term objectives without having to conduct extensive simulation testing.

- DISADVANTAGE: does not help with short-term planning of how to proceed from the status quo to a new MP.



Priorities & Objectives

- OVERARCHING OBJECTIVES:
  - biological sustainability,
  - fisheries sustainability & stability,
  - assurance of access (e.g., 4CDE & bycatch),
  - minimize bycatch mortality,
  - serve consumer needs.

Priorities & Objectives

- Board discussed the following priorities:
  - accounting for total mortality from all sources (by area),
  - size limits,
  - harvest control rules (30:20 control rule),
  - apportionment based on survey biomass or national shares,
  - and bycatch mitigation.

MSAB Governance

- Who should lead the MSAB meetings and how should deliberations be conveyed to the Commission?

- Board agreed to go one more round with Staff reporting at Interim and Annual meetings.

- Objective here is to ensure “stakeholder involvement and ownership” of the MSE process.

- My role is to facilitate the MSE process by providing necessary tools, data, and predictions how of alternative policies perform with respect to the objectives. Provide technical support and simple explanations of alternative procedures are simulation tested.

- **Your role** is to specify fishery objectives for industry, recreational, native/FSC, and other users of the halibut resource. Aid in the design of management procedures that are tractable to industry and markets and help foster long-term stewardship of the resource. Lastly outreach with other stakeholder groups.

MSAB Governance

MSAB Governance

- MSAB interests and purpose.

- MSAB governance, chairs, deliverables, deadlines, and meeting format.

Purpose & Needs

- To develop a process in which stakeholders are directly involved in the development of harvest policies.

- Stakeholder training & tools for understanding tradeoffs among objectives.

“Light on the hill”

- Clearly defined set of management objectives;
- a set of performance criteria related to the objectives;
- a set of management strategies to consider; and
- a means of calculating the performance criteria for each strategy.

Governance

- How does the board wish to proceed?
    - Chair(s)
    - deliverables
    - meeting format (meeting facilitation).

THE MSE DUMPING GROUND

General questions that I keep hearing that are related to management.

- Wont we protect the spawning biomass if we throw back the big old “fecund” females?
- Should we reduce the minimum size-limit to reduce wastage?
- What are the down stream effects of bycatch?
- Is the current harvest rate conservative?
- Should we have different harvest rates in different areas?
- Should we have different size-limits in different areas due to geographic differences in size-at-age?
- How would changes in fisheries selectivity affect the spawning stock biomass?
- How sensitive is the harvest policy to misreporting of catch?
- How sensitive is the harvest policy to discard mortality rates or misreporting of bycatch?
- What are the benefits of national shares in comparison to survey-based apportionment?
- What would we learn if we expanded the survey data into deeper waters?
- Would it be possible to conduct surveys every other year, or some sort or rotational policy?
- What are the benefits to the directed fisheries if bycatch or discard mortality rates are reduced?
- Is the current harvest policy working and does it meet the specified objectives?
- Does apportionment meet the current objectives?
- … and many others!

Which questions can we address with a coast-wide model?

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Which questions require a spatial operating model?

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Which questions can we address with no model?

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Fisheries management is about making choices among alternative management actions.

Decision makers inherently must make a prediction about the potential consequences of each management action, and making predictions involves some sort of method for predicting the future.

Two basic choices for predicting the future:

1. “to predict using the sometimes wonderful intuitive (and largely subconscious) capabilities of the human mind.
2. or to resort instead to some explicit model or “deductive engine” for piecing together known elements of the prediction in some conscious way.”

Walters and Martell, Fisheries Ecology and Management (2004)

Coastwide model is insufficient to address many of the management questions.

Should we continue with its development?

Fishery Goals and Objectives

See Pages Document

Coastwide Operating Model

Outline

- MSE and closed-loop policy evaluation
- Operating Model Description
  - Scenarios & Procedures
  - What is in the Operating Model?

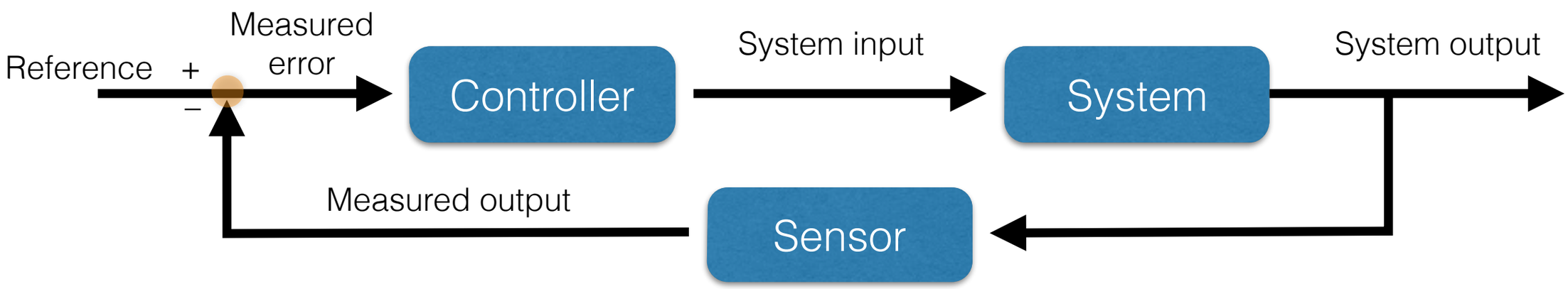
Closed-loop policy evaluation

- Why is it necessary to conduct “closed-loop simulations” when testing Management Procedures?

- What is wrong with open-loop simulations?

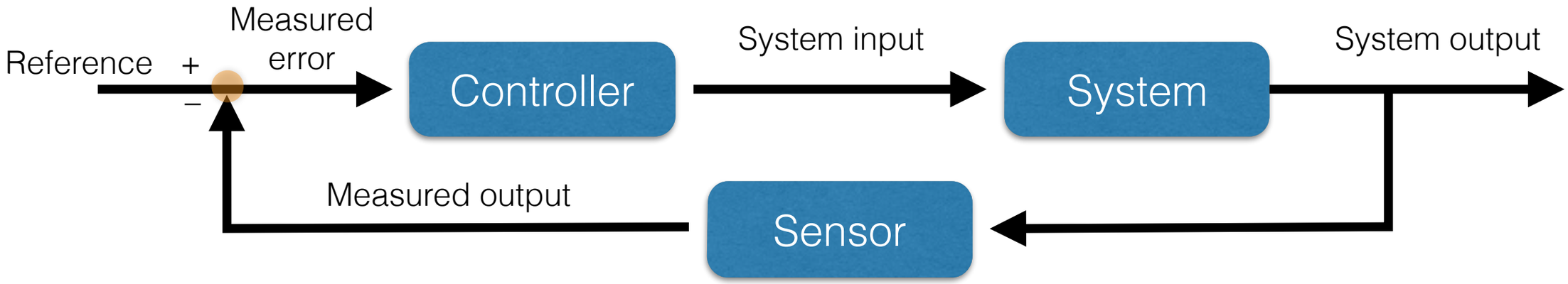
What is “closed-loop”?

- Comes from control theory in engineering.
- Model behaviour of dynamical systems with inputs, and how their behaviour is modified by feedback.

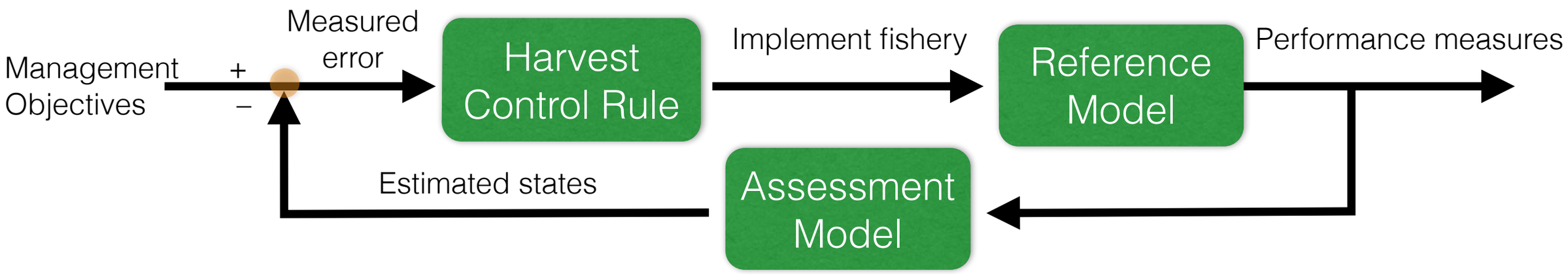


How is it applied in MSE?

- Engineers view:



- Fish squeezers view:



Why is it necessary to conduct “closed-loop simulations” when testing Management Procedures?

- Let’s use an analogy here:
  Cruise-control which on of these forms has feedback control?

Why is it necessary to conduct “closed-loop simulations” when testing Management Procedures?

- What is the objective when setting the cruise control?

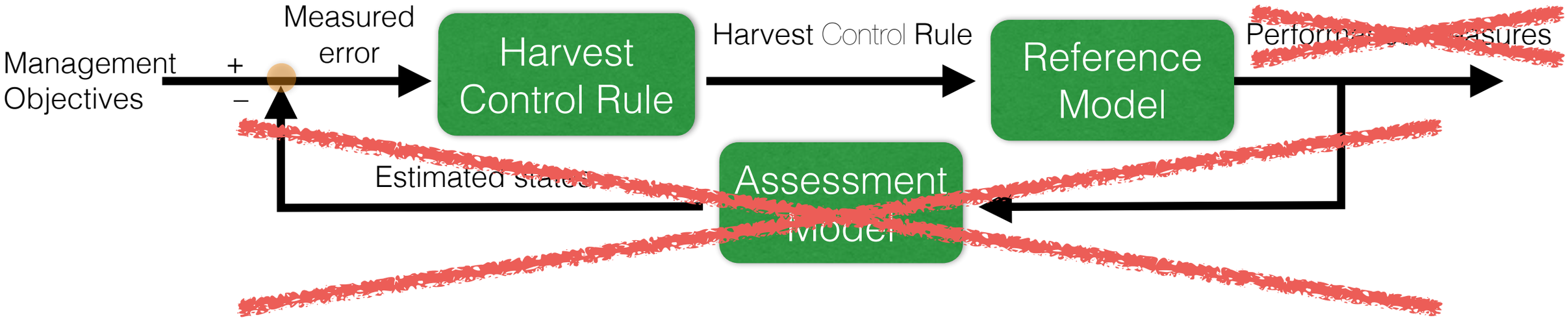
Why is it necessary to conduct “closed-loop simulations” when testing Management Procedures?

- Controller
    - Simple mechanical system
    - Complicated electronic system

Why is it necessary to conduct “closed-loop simulations” when testing Management Procedures?

- Mechanical
    - What happens on a hill?
    - What feedback is in place to maintain speed?

What is wrong with open-loop simulations?



Operating Model

Scenarios (range of plausible models)

S1 | S2 | S3 | S…

Management Procedure

MP1

MP2

MP3

MP4

MP…

Operating Model

Performance Metric

P1(S1, S…)

P2(S1, S…)

P3(S1, S…)

P4(S1, S…)

P…(S1, S…)

Scenarios (range of plausible models)

S1 | S2 | S3 | S…

Management Procedure

MP1

MP2

MP3

MP4

MP…

Operating Model

Performance Metric

P1(S1, S…)

P2(S1, S…)

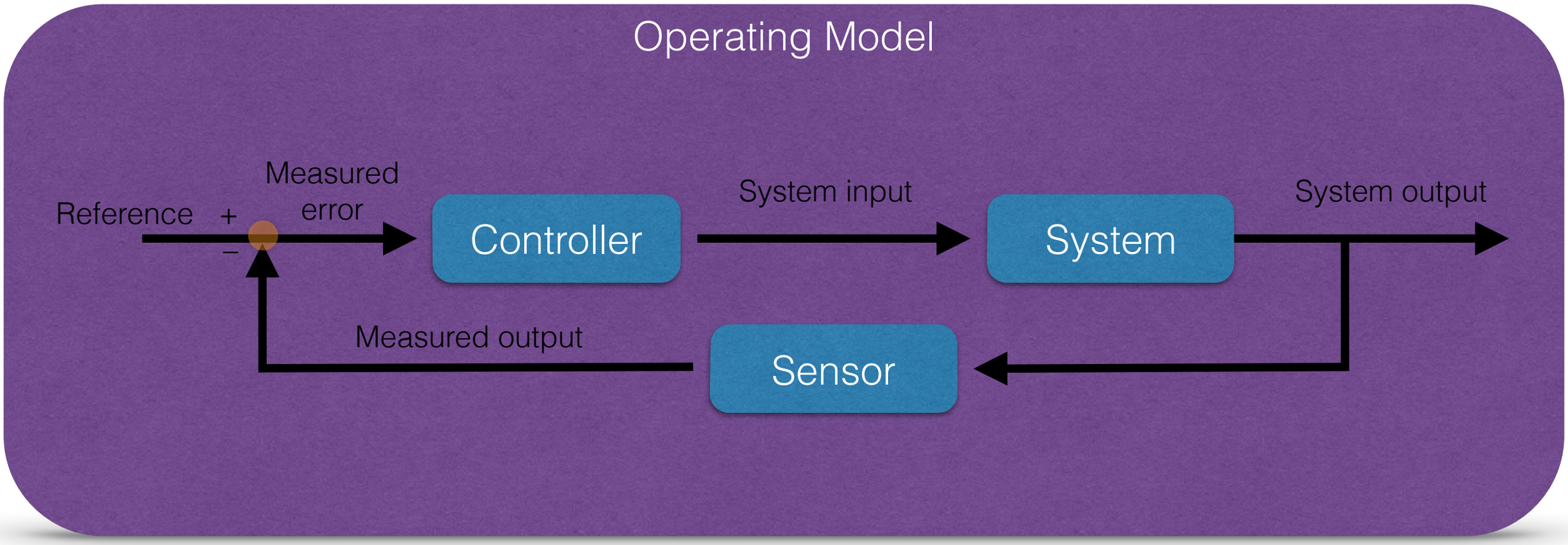
P3(S1, S…)

P4(S1, S…)

P…(S1, S…)

The focus of the MSAB

What's in the OM?



Operating Model

Controller
(Procedures or Harvest Policy)

Harvest control rules

Allocation

System
(Reference Model)

Population Model

Observation sub models

Implementation Models

Movement Migration

Sensor
(Stock Assessment)

Reference Points Stock Status

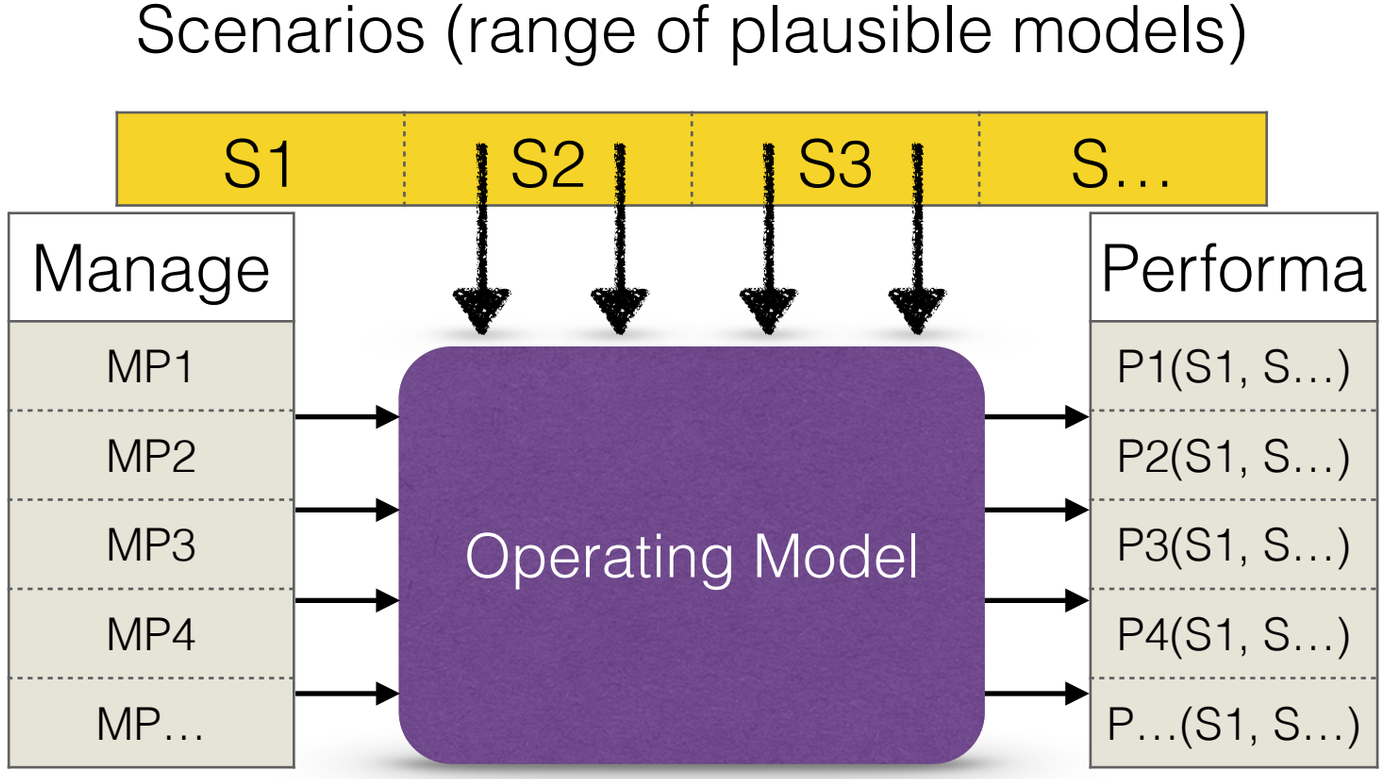
Statistical Criterion

Observation sub models

Population Model

Scenarios

Scenarios (range of plausible models)



Scenarios

- Recruitment
    - +ve and -ve PDO (~35% difference in recruitment)
- Growth
    - increasing, decreasing trends
    - density-dependent
- Natural mortality
    - Size-dependent
    - time-varying

Procedure controls

- Harvest Control Rule (HCR)
    - empirical versus model based reference points
    - catch floor, size-limits, apportionment/shares
        - regulatory discards and bycatch limits.
- Sensor (stock assessment method)
    - what input data should be used,
    - what type of model(s) should be used

Central Question

- Does the current harvest policy satisfy the MSAB objectives?
    - Scenarios: recruitment (high & low), size-at-age (increasing & decreasing).

- If not, what has to be tuned to satisfy the objectives.