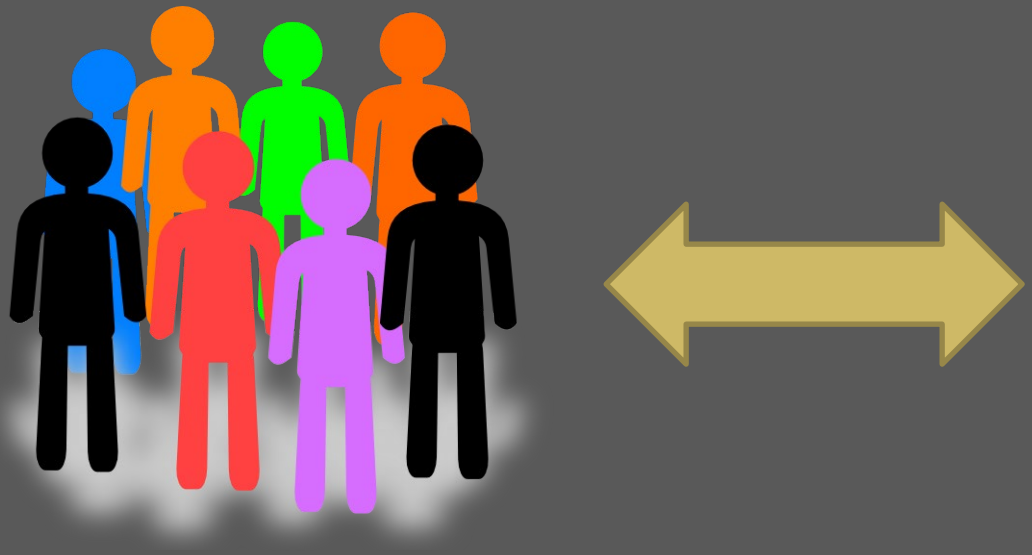
Introduction to Management Strategy Evaluation



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Gavin Fay, Amanda Hart, Allan Hicks, Brian Irwin, Sarah Gaichas, Jon Deroba, Ralph Keeney

What is Management Strategy Evaluation (MSE)? *Defining Terminology*

- MSE is a structured collaborative process to provide decision support via an evaluation of management actions in terms of management objectives (Cummings)
- "A formal application of common sense for situations too complex for the informal use of common sense" - Ralph Keeney
- Lots of other definitions available with similar themes (Punt et al., 2014; Irwin and Conroy 2013; Allan Hicks IPHC)

What is MSE?

The Road Map

Stakeholders and Managers ID what they want, and how

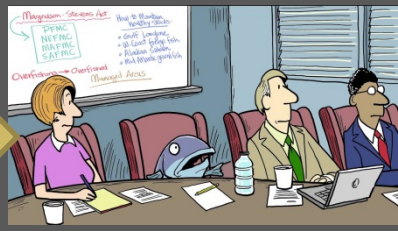
- Objectives
- Related metrics
- Uncertainties
- Management actions or procedures

Scientists create a virtual reality (simulation) of the system

- Data collection
- Regulations
- Ecosystem
- namics
- Ec mic model
- Uncer
- Record metrics

Stakeholders and Managers review results

- Evaluate management action performanc
- Access tr offs in m



Managers implement an action

Decision Frame

Alternatives ➡ Objectives ⬇	Alternative A	Alternative B	Alternative C	Alternative D
Objective 1				
Objective 2				
Objective 3				
Objective 4				
Objective 5				

Choose the alternative that best achieves your objectives

Decision Frame

Decision Frame

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Decision Frame

Decision Statement – Decide … **who, what, when, where, why**

- Geographic, legal, budget, time, etc. constraints
- Trigger – why this problem now?

e.g., *decide what regulatory changes to make to the summer flounder recreational fishery, such as minimizing discarding or converting discards to landings to maximize the biological and economic benefits of the fishery while accounting for tradeoffs between these benefits.*

Addressed via an elicitation and discussion of your concerns,

- for example, scoping questions 1 and 2.

“Never enough time to do it right… always enough time to do it over” ~ Anon.

Choose the alternative that best achieves your objectives

Decision Frame

Objectives ⬇				
Objective 1				
Objective 2				
Objective 3				
Objective 4				
Objective 5				

Your Values = Objectives

- Objectives (what you want)
  - e.g., I want a successful trip (fundamental objective)
  - e.g., I want a catch per trip (means objective – quantifiable)
- Metrics
  - Quantitative measure of achievement
  - Used to compare the performance of alternative management actions

Choose the alternative that best achieves your objectives

Decision Frame

Alternatives ➡ Objectives ⬇	Alternative A	Alternative B	Alternative C	Alternative D
Objective 1	# caught per trip			
Objective 2	% chance of legal catch			
Objective 3	Overfishing or overfished			
Objective 4	Discard mortality rate			
Objective 5	# of regulation changes			

Choose the alternative that best achieves your objectives

Decision Frame

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Actions = Alternatives

- ID possible management actions to evaluate
  - What should management do to achieve your objectives?
  - Be creative and expansive
- Examples
  - Slot limit
  - Lower size limits
  - Share best practices to reduce mortality

Choose the alternative that best achieves your objectives

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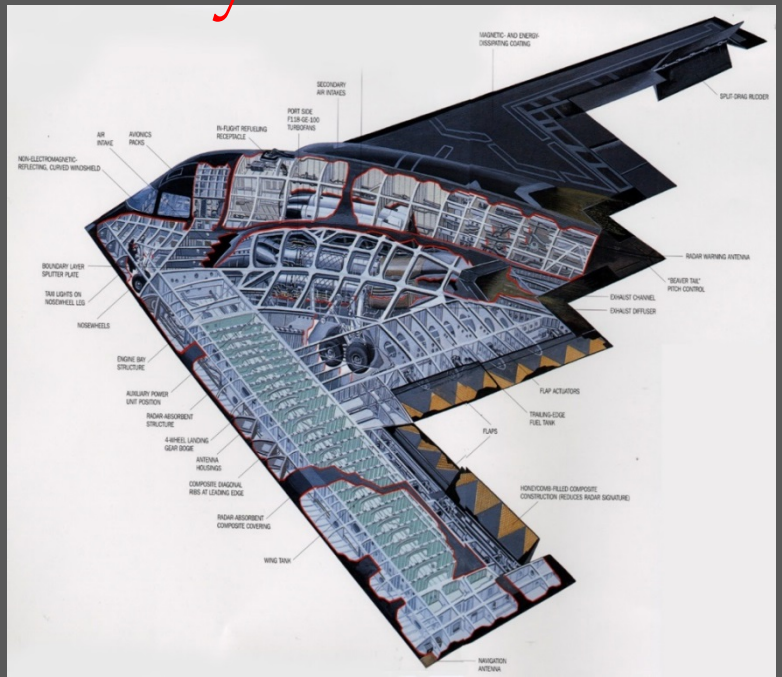
What is MSE?
Closed-loop Simulation

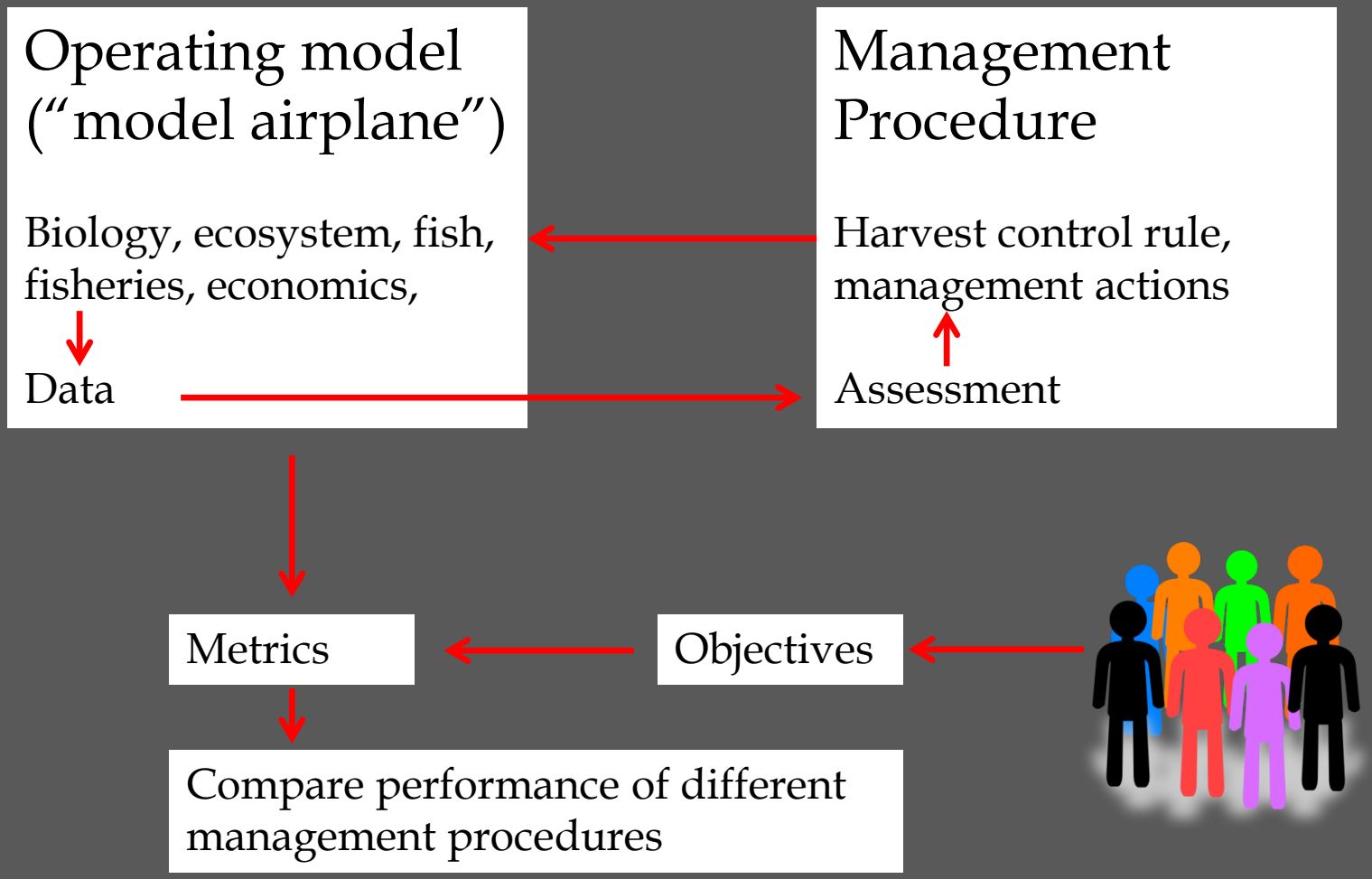
- Virtual reality (S. Cadrin)
- Flight simulator (J. Deroba, et al.)
- Play “what if” scenarios with no real world risk (G. Fay)

reality



simulations

What is MSE?
Closed-loop Simulation



Punt et al., 2016; B. Irwin; G. Fay

Participation

- As a participant:
  - Your input on management actions and simulation features supplies the design elements of the model
    - i.e., you should recognize your input in the model airplane we produce
  - These meetings are an opportunity to express input , and help defi t ought to lysis and deci
  - You d what yo chieve this
    - I.E t does suc
    - Yo ding; they lentify management actions that may achieve your wish list
  - Expect the need for repetition and patience

Expectations

Selection of a management action might entail:

- Finding a best "optimal" action - difficult
  - Success as everyone defined it may not be achievable

Definitions of success may differ, we may value tradeoffs differently

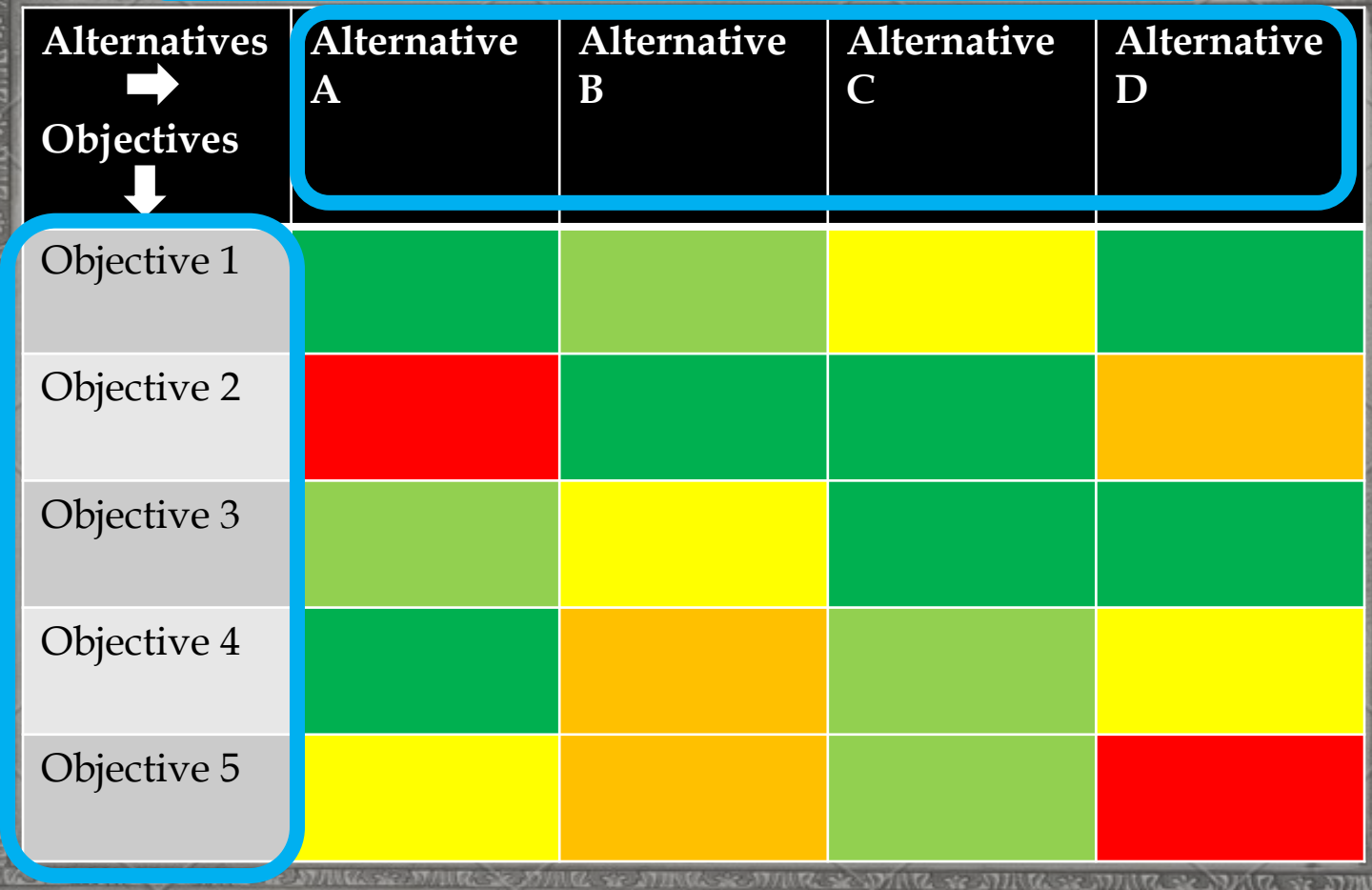
- What actions are unacceptable
  - Eliminate obviously bad options (sometimes easiest)
- Is there an acceptable management action?
  - A satisfactory option given compromise and tradeoffs

The decision may still be difficult or contentious, but this process helps

Decision Frame

Choose the alternative that best achieves your objectives

Decision Frame



Choose the alternative that best achieves your objectives

Mental Checklist:

- **Tractability**
  - Is the problem tractable, can progress be made, will actions have effects or should effort be focused elsewhere?
- **Trigger Sentence**
  - why is it a problem now? Why focus on this rather than …
  - Why this problem, how important is it?
- **Decision Maker**
  - Who decides? Defines the perspective of the decision.
  - If multiple decision makers, what process will be used to select an alternative
- **Stakeholders**
  - who is involved, who's objectives do we care about?
  - What are the roles of the stakeholders
- **Classify the problem**:
  - Uncertainty
  - # of objectives
  - How often (repetition)
- **Boundaries of the problem, Scope**
  - Geography
  - Social realm – who of the public might be affected
  - Legal
  - Time frame (of the consequences)
  - Time frame (how long you have to decide)
  - Economy, budget
- **Linked decisions**
- **Objectives**:
  - Fundamental
- **Alternatives**:
  - Main strategies available
- **Background/context**
  - Legal, ethical, political or other constraints
- **Clear and precise prose**
  - Use unbiased languages

Good Problem Definition Process:

Think broadly, question assumptions, and consider the objectives

Step 1. Articulate concerns & wishes

Think about:

- What is on your wish list?
- What's wrong with the current situation?
- Why is it hard to make this decision?

Brainstorming tips for groups

- Let individuals write objectives first
  - (avoid group think)
- If someone is anchored on a favorite alternative, ask why?
- If someone is terrified of a particular alternative, ask why?
- Keep asking questions until your list is complete.
- Push yourself and others to think deeply and broadly.
- Revisit, Repeat, Rephrase until complete .

USGS

Common Natural Resource Objectives

Benefits

- resource objectives
  - Population size
  - Distribution
  - diversity
- resource use objectives
  - Harvest
  - $
  - recreational
- Social/cultural objectives
  - Distribution of benefits

Costs

- $
- Time
- Human resources

Approaches to generating alternatives

1. Focus on fundamental objectives
2. Address conflicting objectives
3. Challenge apparent constraints
4. Visualize – use diagrams
5. Create portfolios & strategies
6. Revisit objectives