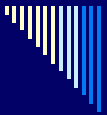


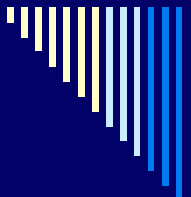
Limits of prediction

Scenarios seminar
14 February 2007




Outline for the day

- Short intro (Matt)
- Break into 4 debate groups
- Group debate
- Short presentation by Amy & Oonsie
- Break into 4 discussion groups
- Feedback from groups & discussion



Introduction: Limits of Prediction

Overview of Pielke et al.



Prediction Enterprise

- Public
- Politicians
- Predictive Scientists



Accuracy and Uncertainty

- Difficulties in assessment
- Assumptions + Incentives
- Naïve Baselines
- Aleatory vs. Epistemic uncertainty



Prediction as a Process

- Lack of context if it's a product only
- Better predictions not necessarily needed for better decisions
- Ultimate goal: Decision making
- Research, Communication, and Use



Comments?

**“Rejecting the cloak of objectivity
in favor of the hair shirt of realism”**



Two Sides of the Debate

- Teams 1 & 3: Scientific predictions are an essential management tool. Funding for improving ecological predictions should be increased.
- Team 2 & 4: Scientific predictions are misleading and harmful. Society should focus on other mechanisms for improving ecosystem management.

How do predictions relate to scenarios?

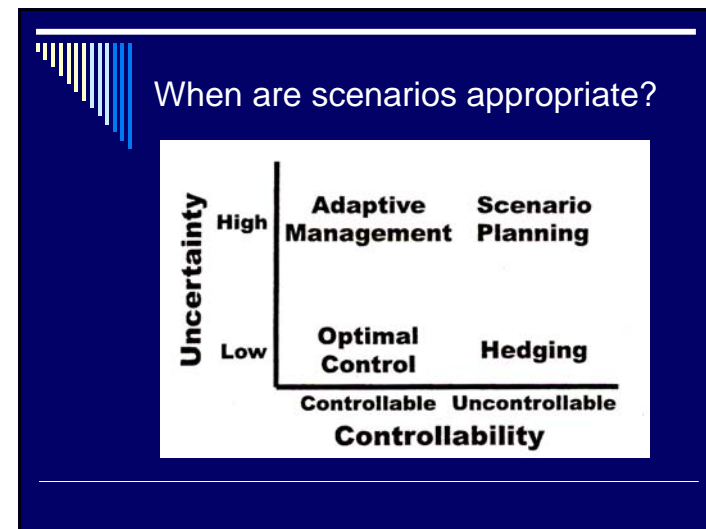
The Probable: Making Predictions

- An ecological prediction is:
 - "The probability distribution of specified ecological variables at a specified time in the future, conditional on current conditions, specified assumptions about drivers, measured probability distributions of model parameters, and the measured probability that the model is correct."
- In practice:
 - Theoretical
 - Phenomenological

(Clark et al. 2001, Carpenter 2002)

Assumptions made in predictions

- We have the right model
- Current relationships hold






Major Benefits to Scenario Planning

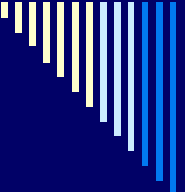
- Increased understanding of key uncertainties
- Incorporation of alternative perspectives
- Greater resilience of decisions to surprise

(Peterson et al. 2002)



Other distinctions between Scenarios and Predictions

- Representation of human values
- How they are communicated
- Acknowledgement of feedbacks between humans and environment



Scenarios and the changing role of science

Ludwig. 2001. The era of management is over. Ecosystems 4: 758 - 764



Complex “wicked” problems

- E.g. Climate change, threatened species conservation, water quality
- Involve many academic disciplines
- Involve values, equity and social justice
- Don't have ‘objective’ technical solutions that can be found using scientific methods



Changing perception of science

- Increasing recognition that science is influenced by societal values, institutions, academic disciplines, personal beliefs etc.
- Increasing questioning of expert advice
- Increasing recognition of the limitations of science in understanding and addressing wicked problems e.g. MA (Norgaard 2007)



Emerging modes of science

- Democratization of science-based decision-making (less technocratic)
 - More collaborative and participatory, involving policy-makers, scientists and citizens
 - Consider multiple values & perspectives
 - Consider multiple solutions
 - Consensus based rather than adversarial
- Tools: scenario planning, large integrated assessments (e.g. MA)



Break-out groups

What limitations do we face in making predictions for Lake Wingra in ~2030?
(within the context of each scenario)

G1 and G2: Technical limitations
G3 and G4: Contextual limitations



More discussion questions

- What do you think about the statement “uncertainties about the future can often be reduced more successfully through decision making than through prediction”?
- Comments on: “There are no bad predictions, only inappropriate uses of predictions.”
- How can scientists help in the decision-making process? Is it our job?