

Key Points about Models

- Every scientific investigation has an underlying model
- Every management strategy has an underlying model

Key Points about Models

- Models can take many forms
- There is no “right” model

Key Points about Models

- You use models every day

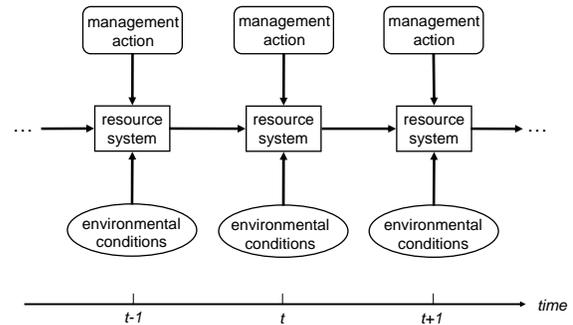
Modeling in Adaptive Management

- Purpose of modeling in AM: to link management actions to management impacts
- Benefits of modeling in AM:
 - Makes explicit one’s assumptions about the resource system
 - Generates predictions of management impacts based on those assumptions
 - Allows assumptions to be tested by comparing predicted outcomes against monitoring data

Features of Models in AM

- Models characterize resource changes through time
- Management actions are included as drivers that influence resource dynamics
- Environmental conditions are included as needed to describe resource dynamics

Management Situation



Models can Express Uncertainty

- We often are unsure about what the effect of an action will be
- Uncertainty (or disagreement) is expressed through different hypotheses about how an ecosystem works
- Alternative models can imbed these hypotheses to capture the uncertainty
- The central focus of AM is to reduce this uncertainty, through the comparison of model predictions against monitoring data

Alternative Models

- To be useful in an adaptive management context, alternative models should:
 - Differ in their predictions, so as to determine which action is most appropriate
 - Be testable with monitoring data, so as to determine which model is most appropriate

Models and Learning in AM

- Models in AM incorporate different hypotheses about how the resource system works
- Different models predict different outcomes from management
- The predicted outcomes are compared and contrasted against monitoring data
- Allowing one to learn which hypotheses are most appropriate for the resource system being managed

Comments

- Common complaint: “there’s not enough data to build a model”
 - But that’s exactly when AM is most useful
 - It is possible to build models based on ecological understanding, absent new data
- What’s the alternative to building and using explicit models?
 - Letting the models implicit in management actions remain unexpressed and untested

Starting the Modeling Process

- Identify the ecosystem processes that link management actions to desired outcomes (objectives)
- Identify sources of uncertainty that impede management, and express that uncertainty with simplified models
- Develop the quantitative details as the need requires and data allow
- It is helpful to work with an individual who is adept at guiding model development

Models and NEPA

Types of Models

- NEPA documents are a kind of descriptive model
 - Predictive – What happens to a given resource when an action is implemented
 - Quantitative when possible

Types of Models

- Models for Adaptive Management Purposes
 - Assist in developing objectives, actions, and monitoring needs
 - Can help provide a framework for anticipated results