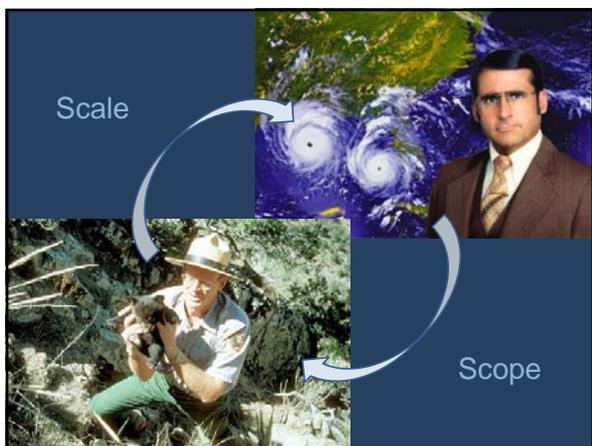


Ecological response models: part 1 - overview

Approaches to vulnerability
assessment





What approach do we take, and at what scale?

- Action plans should use the best information
 - Qualitative assessment
 - Experimentation
 - Models



Considerations for Ecological Response Models

- WHY are you modeling?
- WHAT are you modeling?
- HOW are you modeling?

WHY are you modeling?

WHAT are you modeling?

- Target
 - Genes, species, ecosystems
 - Primary productivity
 - Mass balance
 - Nutrient flow
- Context
 - Spatial and temporal aspects of input and output
 - Factors and interactions included

HOW are you modeling it?

- Data sources
 - Experiments, experts, observations, paleo
- Model type
 - Conceptual
 - Correlative/phenomenological
 - Mechanistic
 - Deterministic vs. stochastic
 - Physiological, biogeochemical, etc.
 - Rule-based, agent-based, trait-based
 - Bayesian

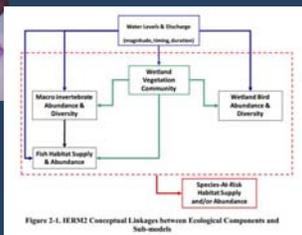
Types of ecological response models

- Conceptual models
- Expert opinion models
- General characterization models
- Habitat or occupancy models
- Vegetation/habitat response models
- Physiologically based models
- Ecological models

Conceptual models



Figure taken from Heemscker et al. 2003 – Ecology and Society



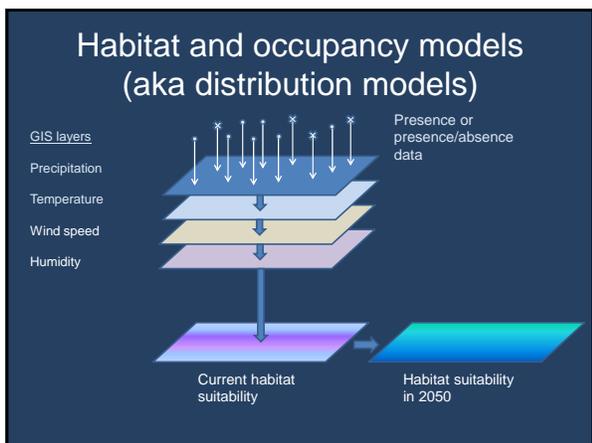
Expert opinion models

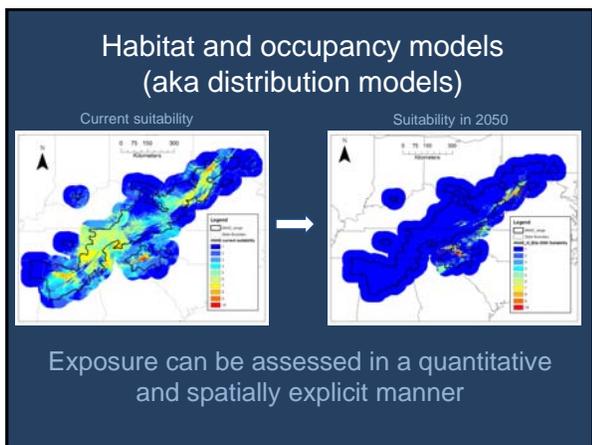


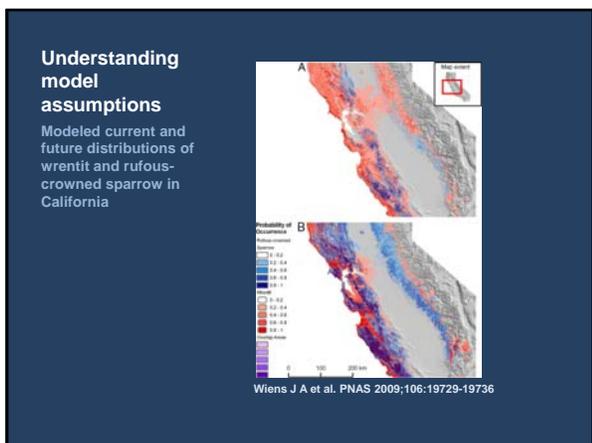
General characterization models



Lavorel et al. 1997 – Trends in Ecology & Evolution





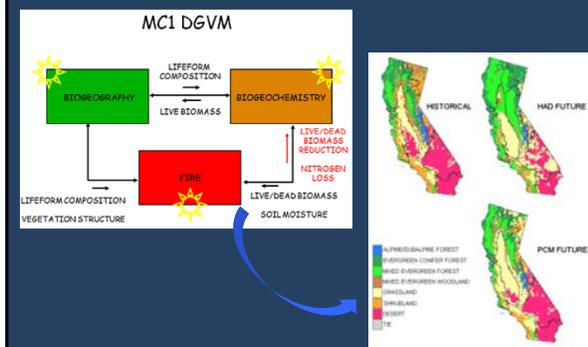


Vegetation/habitat response models

- Species distribution models
- GAP models
- Landscape models
- Biogeochemical models
- Dynamic global vegetation models

Robinson et al. 2008. Vegetation models and climate change: Workshop Results.

Dynamic vegetation models



Physiologically based models

Can be a variant of distribution models

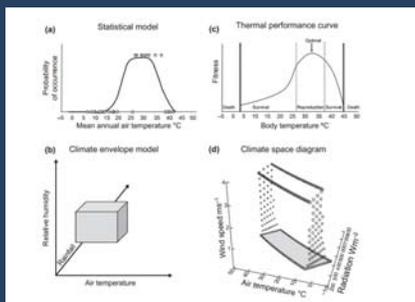
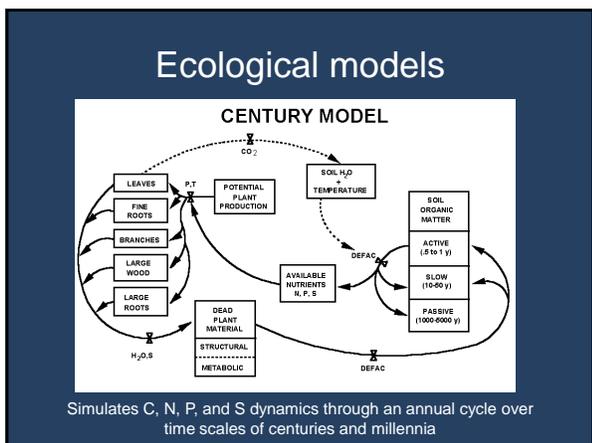
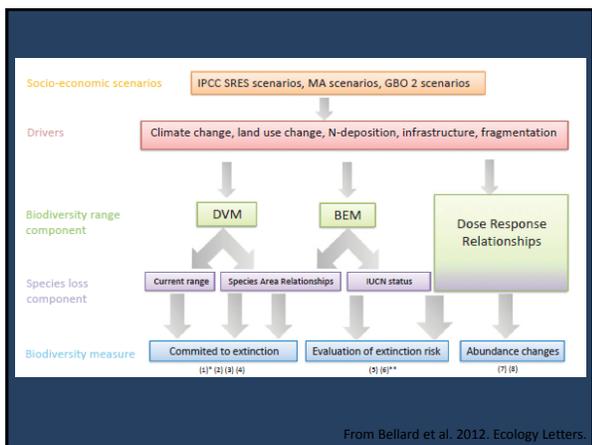


Figure taken from Kearney and Porter 2009 – Ecology Letters







Which model is best for my needs?

- What data are available?
- What's your timeline, expertise, and budget?
- What output do you need to meet your objectives (e.g. making a decision, understanding system function, etc.)

What would *you* do?

