EPA
United States
Environmental Protection
Agency

Evaluating the Implications of Climate Change for Decisions

Susan Julius
US EPA, ORD National Center for Environmental Assessment

STAC-Region 3 Climate Change Workshop
March 15, 2010

Office of Research and Development
National Center for Environmental Assessment

Uncertainty and Climate Change

- Need an approach to deal with climate change and associated uncertainties
- Debate in climate change vulnerability, impacts, and assessment community:

  Paradigm 1: Predictions at the regional scales of relevance for decision makers to support *"optimal"* decisions for *"most likely"* futures

  Paradigm 2: Identify greatest vulnerabilities and policy trade-offs across the broadest possible range of plausible futures to select decisions *"robust"* across the *"highest risk"* futures

Risk/Vulnerability Approach

Elements of Framework:

1. Understand decision context
2. Develop conceptual model of system – from endpoints back up to climate
3. Develop range of future scenarios
4. Assess vulnerability across this range (esp. surprises and thresholds)
5. Assess tradeoffs between/unintended consequences of policy options
6. Identify robust (not brittle) solutions to build readiness

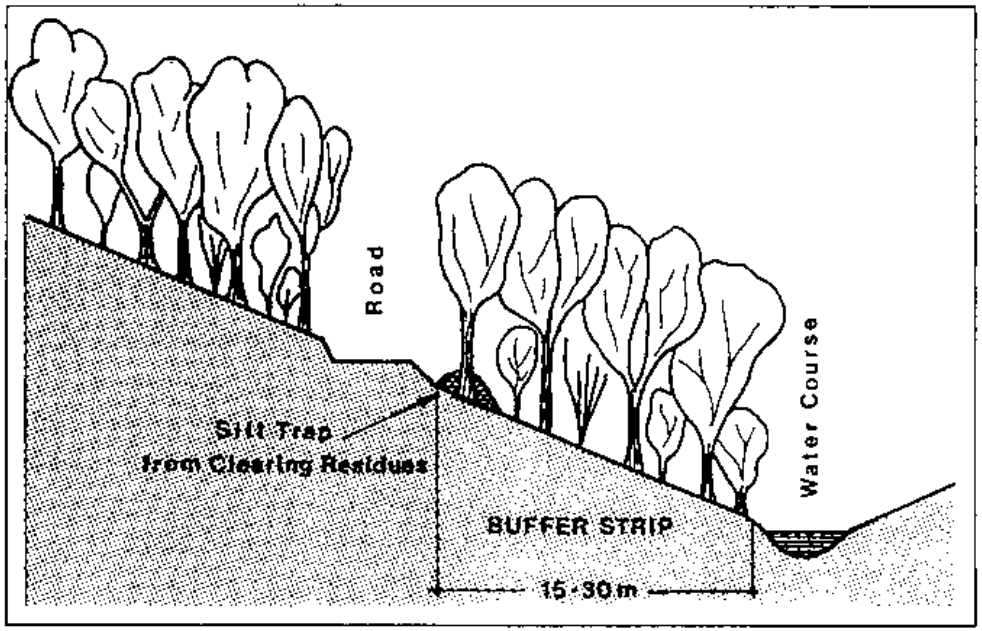
Determine Which Decisions Need Climate Information

- Compile a list of key decisions
- Develop criteria to evaluate relevance of climate change to decisions
- Select and prioritize decisions
- Evaluate prioritization results with stakeholder community
- Test sensitivity of results to alternative prioritization schemes
- Develop plan to provide needed research to support highest priority decisions

Criteria for Evaluating Decisions

- Identified characteristics of decisions that may be good candidates for decision support:
  - Characteristics of the decision itself
  - Characteristics of the decision process
  - Characteristics of the constraints influencing the decision making processes

- For one study we conducted, the most effective selection criteria were:
  - Climate adaptation potential
  - Dimensions of timeliness
  - Reversibility of decisions



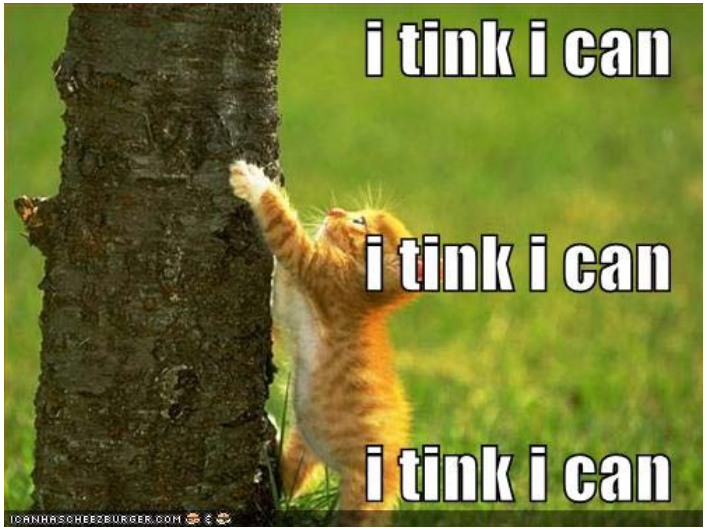
Prioritize Decisions

- Categories to use in prioritization might include:
  - **Climate sensitivity**: highly time sensitive and vulnerable to climate change
  - **Capital investment**: high capital investment, high design flexibility, high adaptive capacity of managing institution
  - **Resource value**: highly valued resource or high expected benefit from providing decision support
  - **Information availability**: extensive information available on environmental / ecological functions of resource and on climate change impacts on resource / management practice
- Once attributes are prioritized, test sensitivity and review results with stakeholders

Benefits of This Approach

- This kind of approach can inform decision makers on
  - Degree to which management decisions are sensitive to climate change
  - Whether goals are in danger of not being met
  - Magnitude of effort needed to address climate change effects

- Decisions not selected are generally ones that
  - are not influenced by climate-related variables
  - are made more frequently
  - involve projects with a limited lifespan

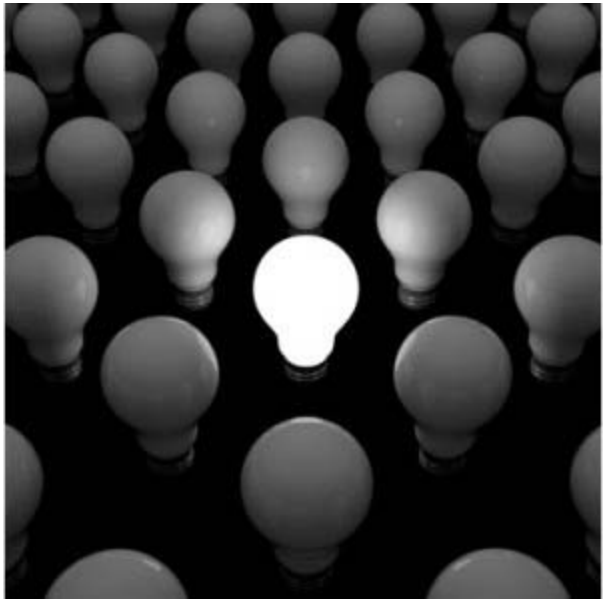


Benefits of This Approach

- High priority decisions can then be used to address climate change

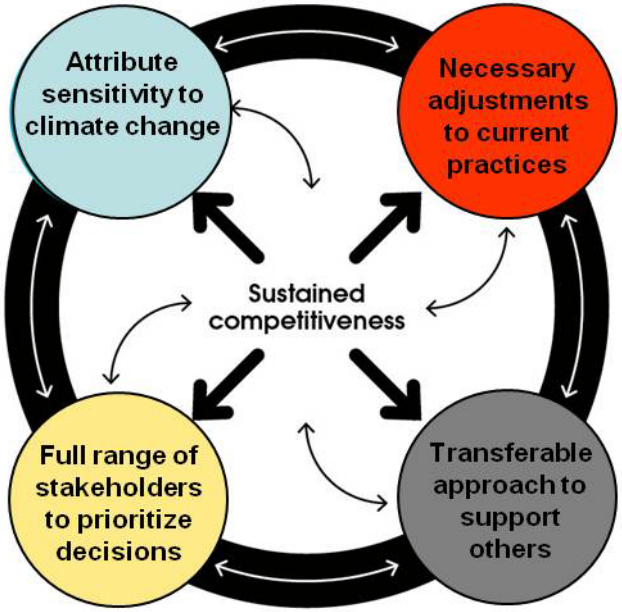
  Example: adjust decisions about placement of forested riparian buffer strips spatially or temporally, or in terms of size and number to address climatic change impacts

- Decisions filtered out during the screening process exhibit no properties that make their effectiveness dependent on climatic changes



Future Directions

- Refine our understanding about which attributes of decisions are particularly sensitive to climate
- Identify the types of adjustments needed to decision-sensitive practices to maintain effectiveness
- "Checklists" or best practice approaches for
  - Evaluating vulnerability to climate change at different spatial and temporal scales
  - Selecting indicators of resilience for different ecosystem types
  - Evaluating the effectiveness of adaptation options
  - Examining the potential challenges posed by climate change to the resource management goals of our partner institutions on the ground
  - Blending the results from the different scales of assessment
  - Developing methods to address long term changes and responses for:
    Anticipation of change, Triage, Managing change



Key conceptual challenge: Generalizing place-based adaptation best practices to national-scale set of guiding principles and practices for building resilience to climate change