Unit 1: Presentation 2

Foundational Concepts and Overview of Key Steps

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Session Goals

• Unpack the concept of vulnerability
• Emphasize the importance of defining goals based on user needs
• Review assessment design considerations
• Summarize key assessment steps

Key Steps for Undertaking a Vulnerability Assessment

1. Determine objectives and scope
2. Gather relevant data and expertise
3. Assess the components of vulnerability
4. Apply assessment results in adaptation planning
Steps 1 and 2

1. Determine objectives and scope
   - Audience/user needs
   - Goals and objectives
   - Assessment targets (species, habitats, ecosystems)
   - Scale (temporal and spatial)
   - Appropriate approach (not one size fits all)

2. Gather relevant data and expertise
   - Review existing literature
   - Reach out to experts
   - Obtain/develop climate and ecological response projections

Considerations

- Level of specificity and complexity also relate to objectives and type of decision processes
  - Most complex not always the “best”
  - Potential for “false accuracy” when projecting at scales finer than data can bear

- Project management triad (can only maximize two of the three)
  - Time
  - Cost
  - Quality

Step 3

3. Assess components of vulnerability
   - Assess sensitivity, exposure, adaptive capacity
   - Estimate overall vulnerability
   - Document confidence levels/uncertainties
Sensitivity
Measure of whether and how a species or system is likely to be affected by a given change in climate

- Sunburn example:
  - Amount of melanin in skin is key physiological factor
  - Melanin absorbs UV rays, which cause sunburn
  - Skin with lower melanin levels is more sensitive to sunburn

Exposure
Measure of how much of a change in climate or other environmental factor a species or system is likely to experience

- Sunburn example:
  - The amount of UV rays determines exposure
  - Strength of rays depends on latitude, season & weather
  - With enough exposure, most anybody can burn

Adaptive Capacity
Ability to accommodate or cope with climate change impacts with minimal disruption

- Sunburn example:
  - Can be intrinsic (reduce sensitivity) or extrinsic (reduce exposure)
  - For sunburn, extrinsic adaptations includes sunblock, protective clothes, shelter
  - Intrinsic adaptations include UV-induced increase in melanin production (i.e., tanning)
Putting the Pieces Together

- Detailed modeling efforts
  - In-house or commissioned
- Vulnerability indices
  - e.g., NatureServe Index
- Expert elicitation
  - Supplement and/or supplant modeling

Addressing Uncertainty in Vulnerability Assessments

- Natural resource management has always faced uncertainty
  - Anxiety about uncertainty often leads to “analysis paralysis”
  - Don’t deny it, embrace it
- Three types of uncertainty
  - Climate predictions
  - Ecological responses
  - Management effectiveness

Step 4

4. Apply assessment results in adaptation planning

- Reduce sensitivity (e.g., actively plant drought-tolerant species in area projected to get drier)
- Reduce exposure (e.g., identify and protect cold-water refugia)
- Enhance adaptive capacity (e.g., remove coastal armoring to facilitate habitat migration inland in response to sea-level rise)
Using Assessment Results: An Example