

Unit 1: Presentation 2

Foundational Concepts and Overview of Key Steps

Patty Glick
National Wildlife Federation

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

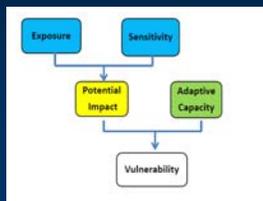
- Level of specificity and complexity also relate to objectives and type of decision processes
 - Most complex not always the "best"
 - Potential for "false accuracy" when projecting at scales finer than data can bear
- Project management triad (can only maximize two of the three)
 - Time
 - Cost
 - 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

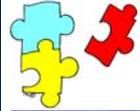
Adaptive Capacity

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



Likelihood Scale	
Qualitatively	Quantitatively
Virtually certain	>95 percent probability of occurrence
Very likely	>80 percent probability
Likely	>60 percent probability
About as likely as not	33 to 60 percent probability
Unlikely	<33 percent probability
Very unlikely	<10 percent probability
Exceptionally unlikely	<1 percent probability

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
