Moving from Vulnerability to Adaptation

EcoAdapt™
Meeting the challenges of climate change
Adaptation Planning Framework

Overarching Conservation Goal(s)

1. Identify Conservation Target(s)
   - Species
   - Habitats
   - Ecosystems

2. Assess Vulnerability to Climate Change
   - Sensitivity
   - Exposure
   - Adaptive Capacity

3. Identify Management Options
   - Reduce Sensitivity
   - Reduce Exposure
   - Increase Adaptive Capacity

4. Implement Management Options
   - Changes in Policy
   - Changes in Practice
   - Institutional Changes

Monitor, Review, Revise

From Glick et al. 2011 Scanning the Conservation Horizon
Defining Adaptation

**Adaptation** refers to efforts to reduce the negative effects of or respond to climate change.

**Adaptation actions** explicitly incorporate climate considerations, and aim to alleviate the impacts of climate change by increasing resilience and/or decreasing vulnerability.
Vulnerability

Adaptation Strategies

Resistance  Resilience  Transition

Increase Knowledge  Engage Coordination
**Prevent** the effects of climate change from reaching or affecting you.

**Examples:**
- Manage forest vegetation, and reduce fire severity and patch size
- Increase proactive management to prevent invasive weeds
- Reduce erosion potential to protect municipal water supplies
- Identify and protect aquifer recharge zones
Resilience Strategies

Weathering the impacts of climate change by avoiding the effects of or recovering from changes.

Examples:

- Repair, replace, and reroute trails and trail bridges to increase resilience to higher peak flows
- Promote native genotypes and adapted genotypes of native species
- Employ a risk-diversification approach to forest management and silvicultural practices
Transition Strategies

*Intentionally* accommodate change and enable resources to adaptively respond to changing and new conditions.

**Examples:**

- Facilitate change to desired species assemblages
- Promote connected landscapes that can facilitate species migration along climatic gradients
- Identify and protect refugia
- Accept loss of recreation sites and/or adjust the timing or route of access
Applying Vulnerability Assessment Results in Adaptation Planning

• **Reduce Sensitivity**
  – *Example:* Actively plant drought-tolerant native species in an area projected to get drier (*resilience*)

• **Reduce Exposure**
  – *Example:* Replant riparian vegetation to limit water temperature increases (*resistance*)

• **Enhance Adaptive Capacity**
  – *Example:* Support connectivity across the landscape between different populations (*transition*)
Case Study #1: Gunnison Basin sage-grouse

Built a conceptual model to diagram factors that affect Gunnison sage-grouse population size and habitat condition.
Goal: Build wet meadow resilience for sage-grouse

Priority adaptation strategies

1. Retain water in most vulnerable brood-rearing habitats
   - Permanently tie water to land via easements
   - Improve irrigation practices
   - Restore seeps, springs; remove headcuts, gullies; raise water table

2. Improve and restore nesting and wintering habitats
   - Improve/re-establish leeward mtn shrub habitats via fencing, planting
   - Maintain and expand perennial grass and forb cover
   - Abate/prevent cheatgrass encroachment

3. Improve zoning laws and other policy options to protect habitat and maintain land uses
   - Transfer development rights
   - Protect habitats via subdivision planning
Goal: Build wet meadow resilience for sage-grouse

Temperature, Drought, Erosion | Water table

Actions

• One rock dams
• Media Luna
• Monitoring
Case Study #2: Seeps & springs in the Sky Islands

Fire, Air Temperatures, Drought

Altered Precipitation Patterns
Goal: Restore seeps and springs in the Sky Islands

Fire, Air temperature, Drought
Altered precipitation patterns

Priority adaptation strategies

1. Create climate-smart spring restoration methodologies
   - Develop a springs restoration manual and conduct trainings on its use

2. Restore upland habitat to increase recharge and decrease erosion (include fire considerations)
   - Assess upland grazing management for spring benefit/detriment
   - Adapt prescribed fire planning to consider springs locations
   - Conduct springs assessments ahead of planned restoration treatments

3. Improve infrastructure at spring sites to conserve water and provide habitat
   - Identify and implement evaporation-reducing devices for cattle tanks
   - Repair/restore infrastructure to conserve water
   - Identify springs where renovation or improvement of agriculture water sources help take pressure off springs as water source
Goal: Restore seeps and springs in the Sky Islands

Actions

- Conducted spring inventories and assessments using trained volunteers and professional staff and instituted a citizen scientist “Adopt-A-Spring” monitoring
- Repaired a spring-fed pond and installed native plants
- Installed fencing around perennial spring on private property
- Installed wildlife entry/exit ramps at developed springs for endangered frogs
- Developed a spring restoration guidebook for the region
Questions?

More examples available at CAKEx.org