Envisioning Conservation in a Climate-Altered Future

Dr. Bruce A. Stein
Director, Climate Change Adaptation
National Wildlife Federation

Landscape Conservation Cooperative National Conference
March 27, 2012
Stationarity is Dead

Global Average January Temperatures. Source NOAA 2009
The New “Normal”
Change in Rolling 30 Year Average

Minimums ("Lows")
Maximums ("Highs")

Source: NOAA 2011
Increasing Climate Extremes

Widespread Mid-America Tornadoes

Massive Southwestern Wildfires

Historic Mississippi Flooding
Number of Events, Annual Totals

2011 Total
171 Events

Geophysical events
(Earthquake, tsunami, volcanic eruption)

Meteorological events
(Storm)

Hydrological events
(Flood, mass movement)

Climatological events
(Extreme temperature, drought, forest fire)

Source: MR NatCatSERVICE
© 2011 Munich Re
Climate Adaptation

Initiatives and measures designed to reduce the vulnerability of natural and human systems against actual or expected climate changes.

--IPCC AR4 Synthesis

Prepare for …

Cope with …

Accommodate to …
“I skate to where the puck is going to be, not where it has been.”

--- Wayne Gretsky
A Continuum of Change

• Resistance
  – Focus on persistence and maintaining status quo
  – Protection of high value and unique assets

• Resilience
  – Healthy species and systems can better accommodate shifts and perturbations
  – *NOT* just about maintaining status quo conditions

• Transformation
  – Facilitate/manage inevitable ecological shifts
  – Focus on continuing functionality and ecological value, even if different species composition
Scope and Scale of Adaptation to Climate Change

- **Coping measures**
  (short term responses to deal with projected climate change impacts and return to status quo)

- **More substantial adjustments**
  (change in some aspects of system without complete transformation)

- **System transformation**
  (incl., paradigm shift)

---

From Moser & Ekstrom 2010
Guidance for Climate-Smart Conservation

• NWF-led expert workgroup developing criteria and guidance for “climate-smart” conservation

• Broad federal, state, NGO collaboration

• Not a recipe book
  – Rather, “the way to cook”
The Secret Sauce for Successful Adaptation

Intentionality

In the face of climate change,
Good Conservation Isn’t Good Enough!
Adaptation Planning and Implementation Cycle

1. **Step 1:** Identify conservation goals and targets
   - Revisit planning as needed

2. **Step 2:** Assess climate change effects and vulnerabilities
   - Step 3: Review/revise conservation goals
   - Adjust actions as needed

3. **Step 4:** Identify adaptation options
   - Step 5: Evaluate and prioritize adaptation actions
   - Step 6: Implement priority adaptation actions
   - Step 7: Track action effectiveness and ecological changes
Understanding Climate Impacts and Vulnerability

• Understanding vulnerability is key to designing effective adaptation

• Many options for assessing, depending on needs, capacity, and resources available

• Components of vulnerability
  – Sensitivity
  – Exposure
  – Adaptive Capacity
Reducing Vulnerability
The Essence of Adaptation

• Decrease exposure
  – E.g., riparian restoration to cool stream temps

• Decrease sensitivity
  – Enhanced genetic variability (e.g., reforestation with more southern genotypes)

• Increase adaptive capacity
  – Restoring key ecological processes to landscape
Using Vulnerability to Inform Management Options

Source: Dawson et al. 2011
Reconsider Conservation Goals/Management Objectives

1. Identify conservation goals and targets
2. Assess climate change effects and vulnerabilities
3. Review/revise conservation goals
4. Identify adaptation options
5. Evaluate and prioritize adaptation actions
6. Implement priority adaptation actions
7. Track action effectiveness and ecological changes

Revisit planning as needed
Adjust actions as needed
Reconsidering Goals

- Goals are the *why*; strategies the *how*
- Goals are a reflection of human values
  - Multiple goals can apply to same resource/landscape
  - Conservation goals evolve
- Need is for “climate-informed conservation goals”
  - Not just “climate change goals”
Which Conservation Targets?

• Compositional Diversity
  – Species
  – Ecological units

• Processes
  – Ecological processes
  – Evolutionary processes

• Ecosystem Services
  – Goods and services of value to humans

Goals for different targets can be complementary or conflicting
From Pattern to Process

Sustaining Pattern at Larger Scales
The New “Natural” and Novel Ecosystems
Key Characteristics of Climate-Smart Conservation

Forward-Looking Goals

• Be explicit about goals
  – ensure they are climate-informed

• Look forward, but consider historical variability

• Buying time may still have a place
Actions Linked to Climate Impacts

• Show your work!
• Process is key
• Climate lens important even:
  – if you continue doing the same thing
  – adopt “recommended” adaptation strategies (e.g., connectivity)
• Existing stressors still important
Broader Landscape Context

• Shifting patterns will require broader geographic perspective

• Most actions are local
  – But should have landscape context

• Need to work across geographic and institutional boundaries

• LCCs ideally positioned for this

Housing Density 2010
Source: D. Theobald, CSU
Robust in an Uncertain Future

• We will be surprised!
  – Climate shifts
  – Ecological response
  – Human response

• Look for solutions that work across multiple possible futures
  – Low regrets or no regrets strategies
Agile and Informed Management

• Transparency is key

• Continuous and dynamic learning
  – to deal with surprises and uncertainty

• Adaptive management one, but not only approach

FWS Strategic Habitat Conservation framework
Safeguards People and Wildlife

• Sustaining ecosystems is important for people too!

• Ecosystem-based adaptation
  – Focuses on using ecological services to reduce human vulnerabilities to climate change
Avoids Maladaptation

- In addressing one impact, consider consequences for other resources
- Evaluating trade-offs will be increasingly important
- However, one person’s adaptation may be another’s maladaptative response!
“Mindfulness” in Adaptation

• Adaptation Intentional
  – Designed to address specific climate impacts
  – Focuses on reducing key vulnerabilities

• Adaptation Consistent
  – Consistent with general adaptation principles, but not linked to specific impacts or vulnerabilities

• Adaptation Neutral

• Maladaptive
  – Actions that increase vulnerabilities or undermine ecosystem resilience
Key Challenges

• Moving from adaptation planning to implementation
• Promoting innovation in adaptation strategies
• Validating common assumptions/received wisdom
• Addressing short-term threats but within context of longer-term climate-informed goals
• Dealing with policies and laws that assume stationarity
Envisioning Conservation in a Climate-Altered Future