

Envisioning Conservation in a Climate-Altered Future

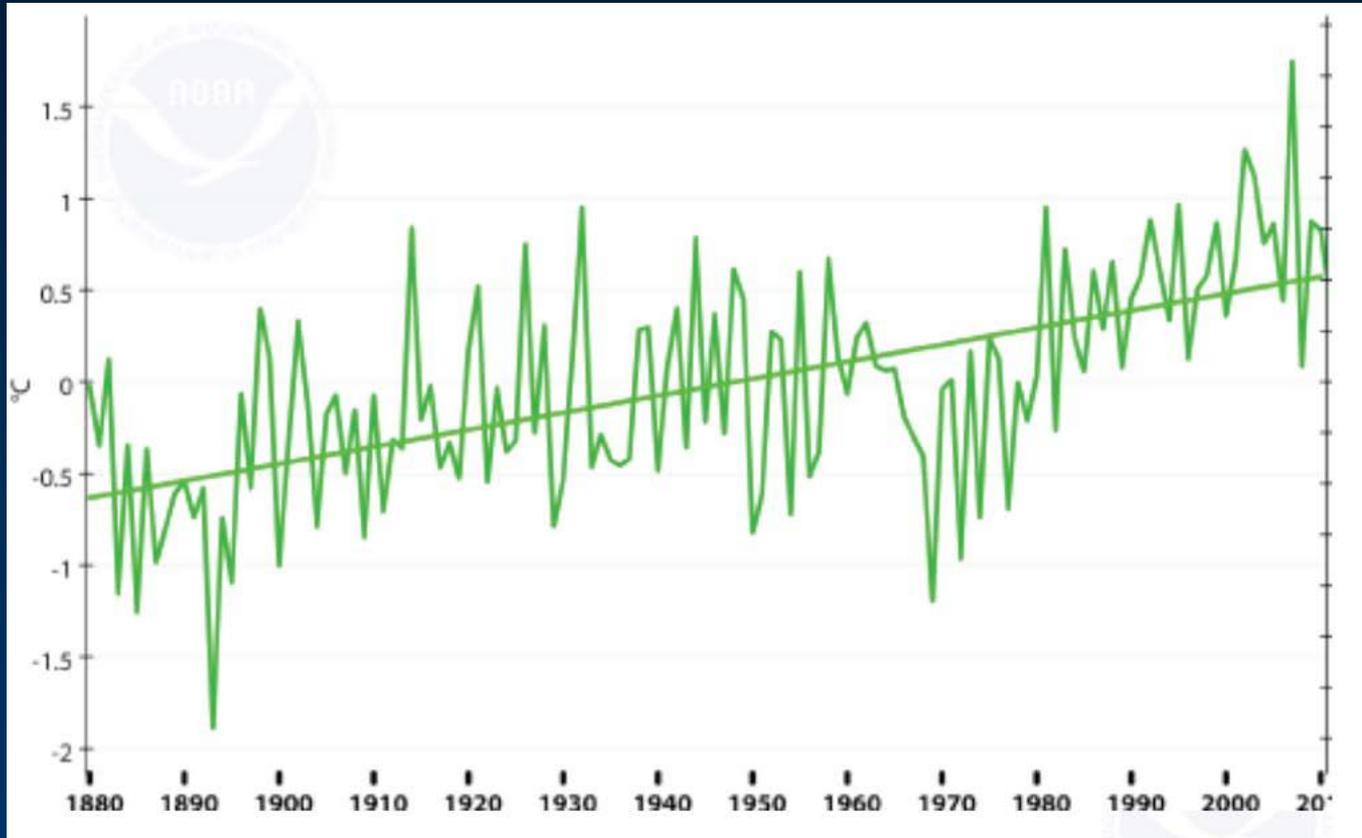
Dr. Bruce A. Stein
Director, Climate Change Adaptation
National Wildlife Federation

Landscape Conservation Cooperative National Conference
March 27, 2012





Stationarity is Dead



Global Average January Temperatures. Source NOAA 2009

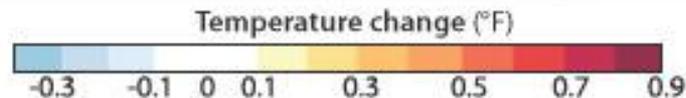
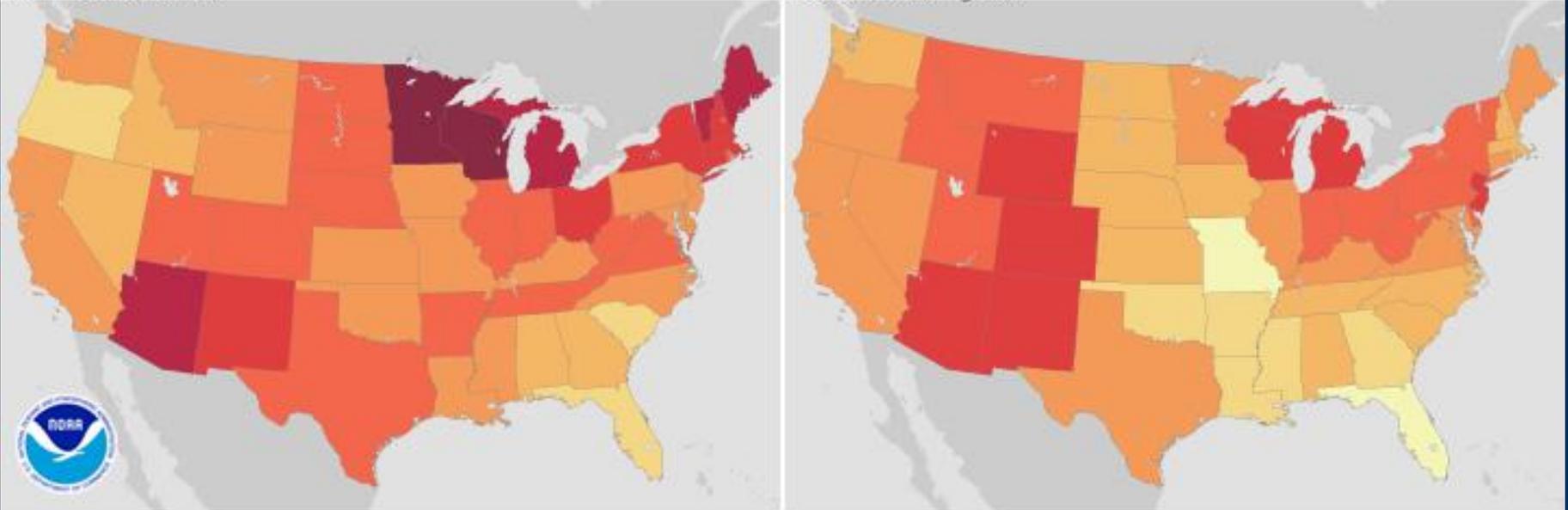
The New “Normal”

Change in Rolling 30 Year Average

Statewide Changes in Annual “Normal” Temperatures (1981–2010 compared to 1971–2000)

Minimums (“Lows”)

Maximums (“Highs”)



Source: NOAA 2011

Increasing Climate Extremes



Widespread Mid-America Tornadoes



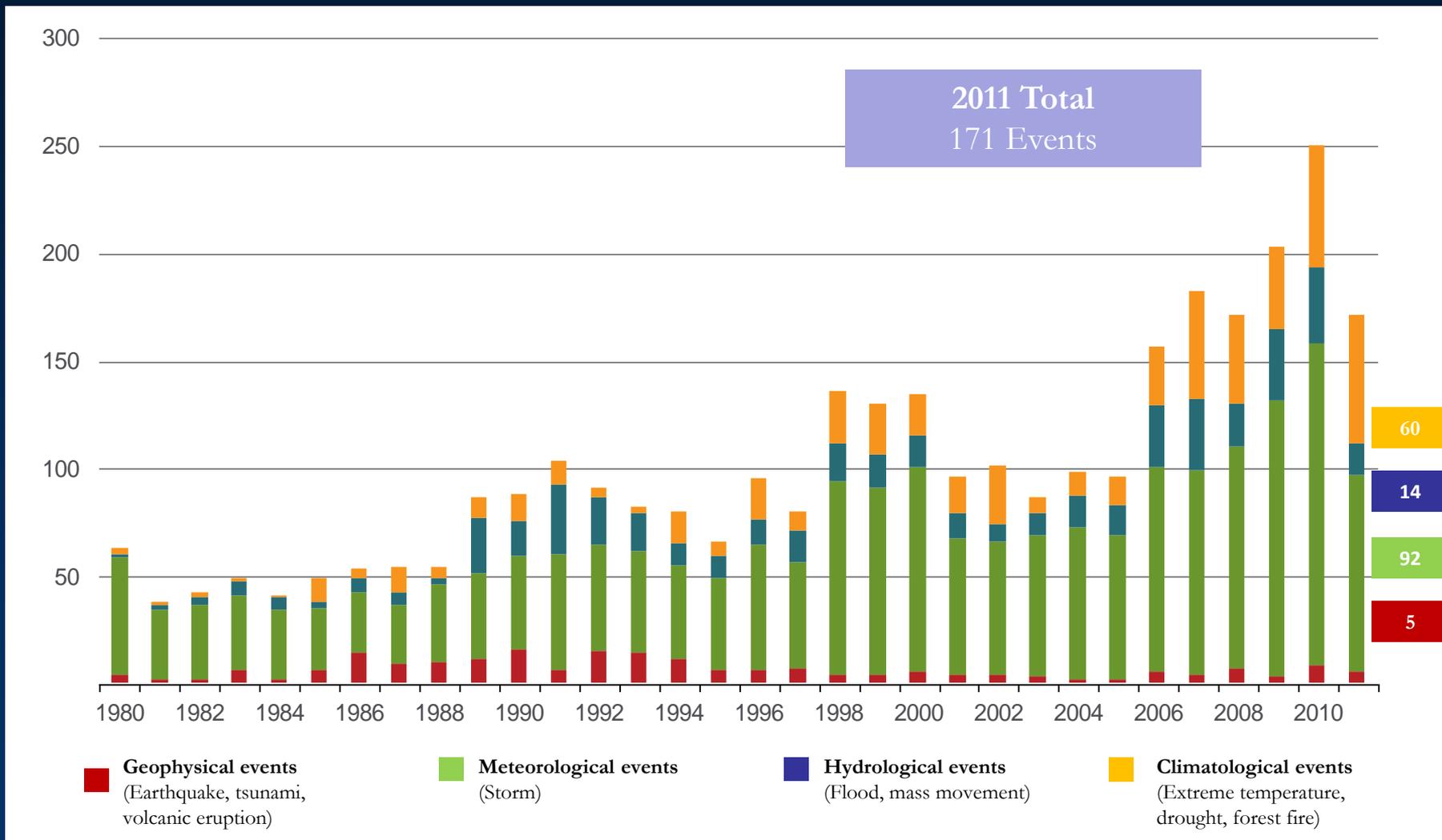
Massive Southwestern Wildfires



Historic Mississippi Flooding

US Natural Disasters 1980 – 2011

Number of Events, Annual Totals





Climate Adaptation

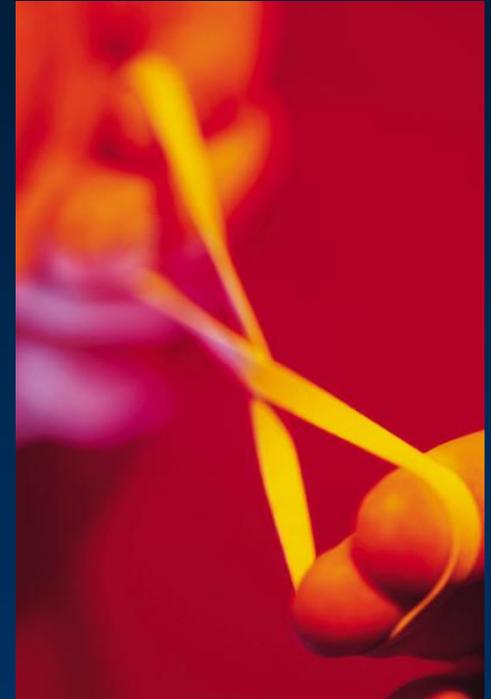
Initiatives and measures designed to reduce the vulnerability of natural and human systems against actual or expected climate changes.

--IPCC AR4 Synthesis

Prepare for ...

Cope with ...

Accommodate to ...





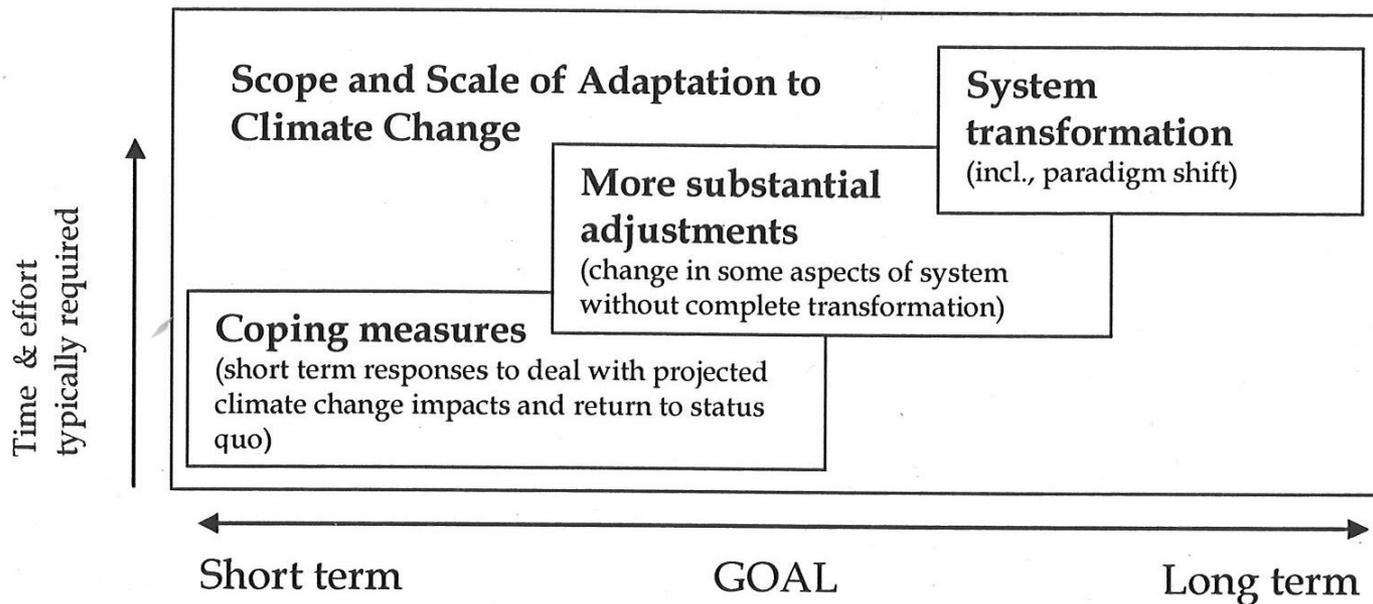
“I skate to where the puck is going to be,
not where it has been.”

--- Wayne Gretzky

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

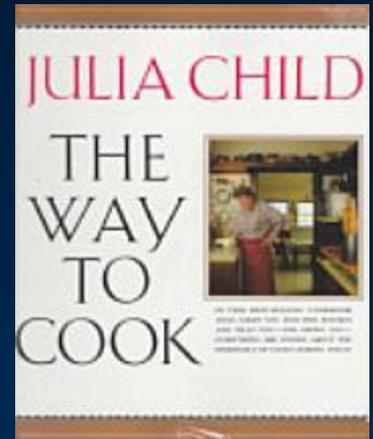
Scope and Scale of Adaptation



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”



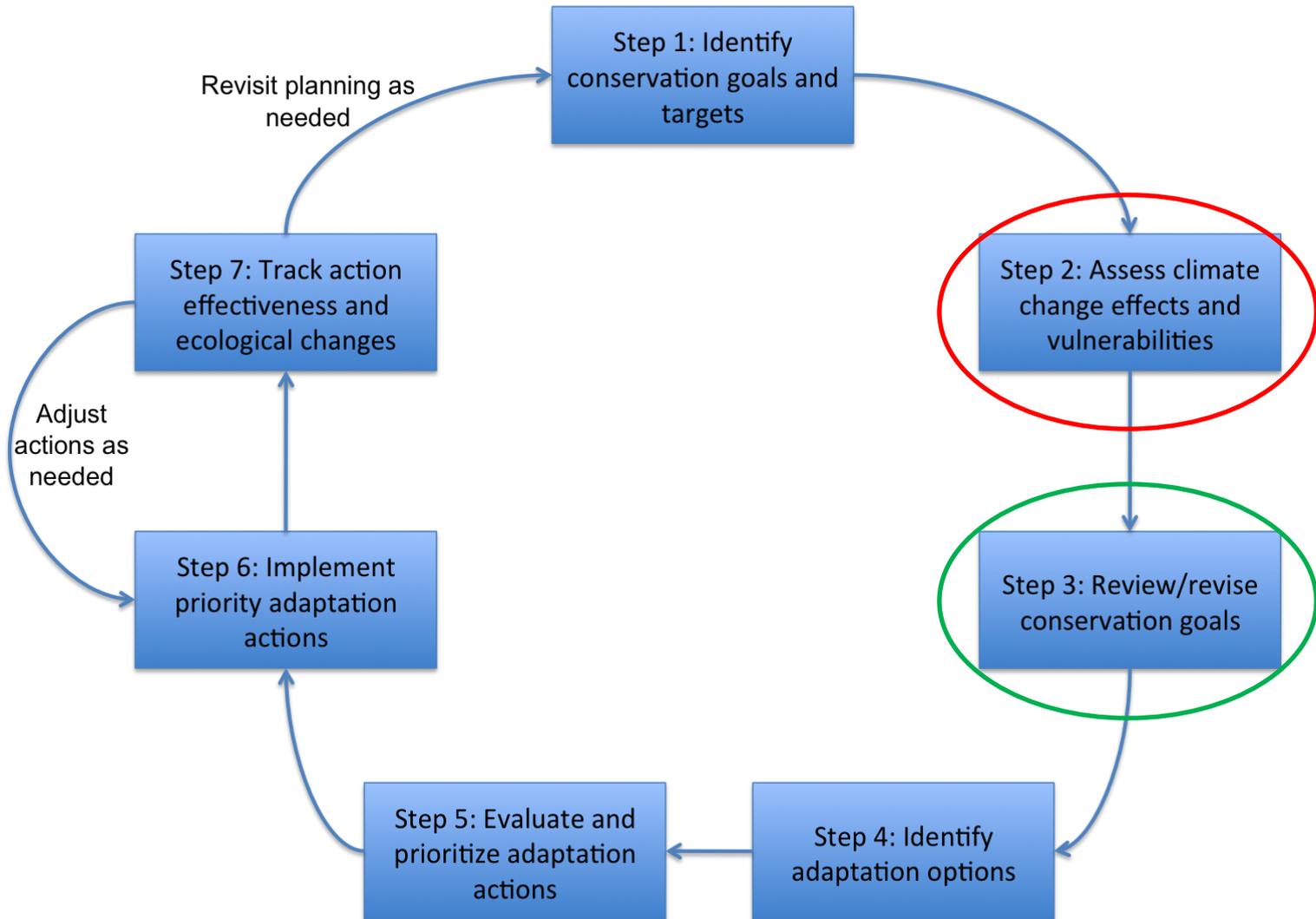
The Secret Sauce for Successful Adaptation

Intentionality

In the face of climate change,
Good Conservation Isn't Good Enough!

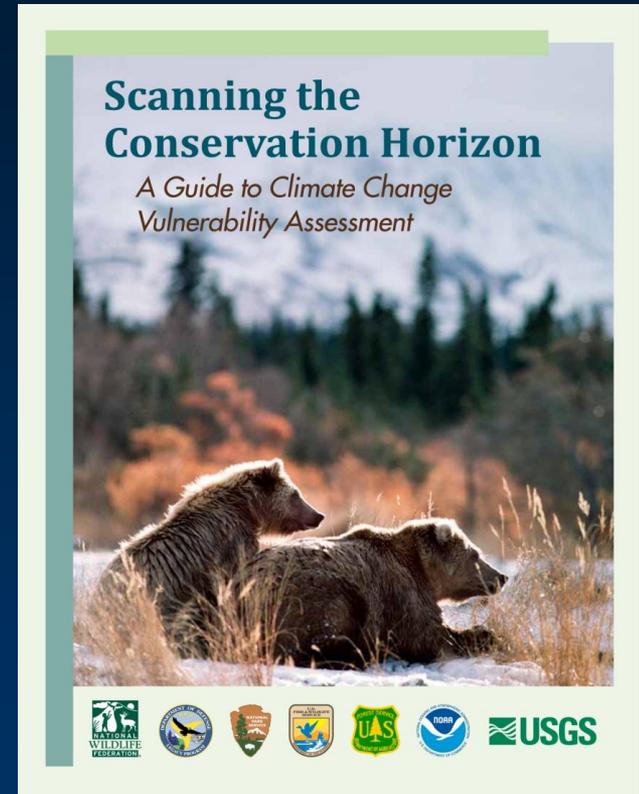


Adaptation Planning and Implementation Cycle



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



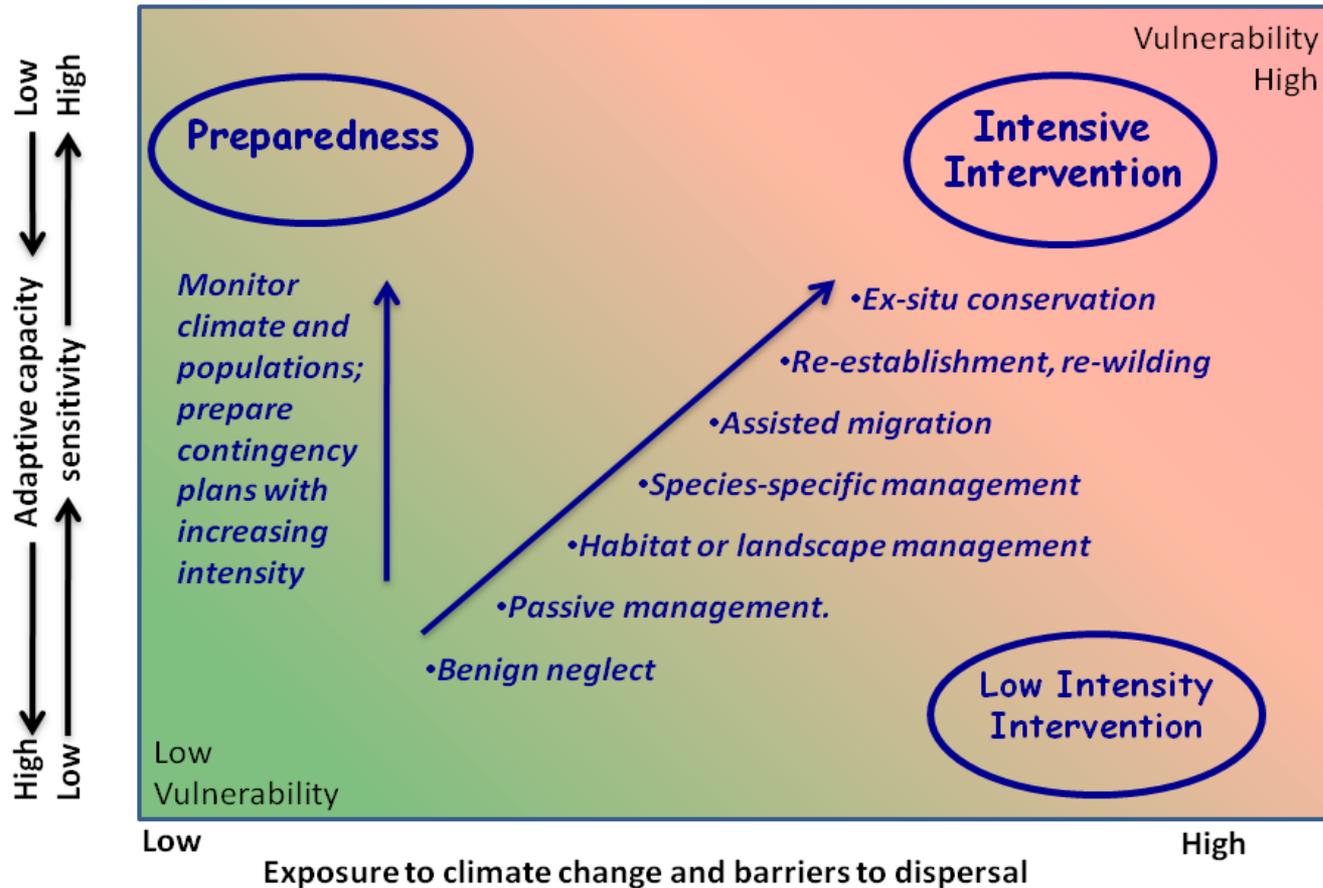
Reducing Vulnerability

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

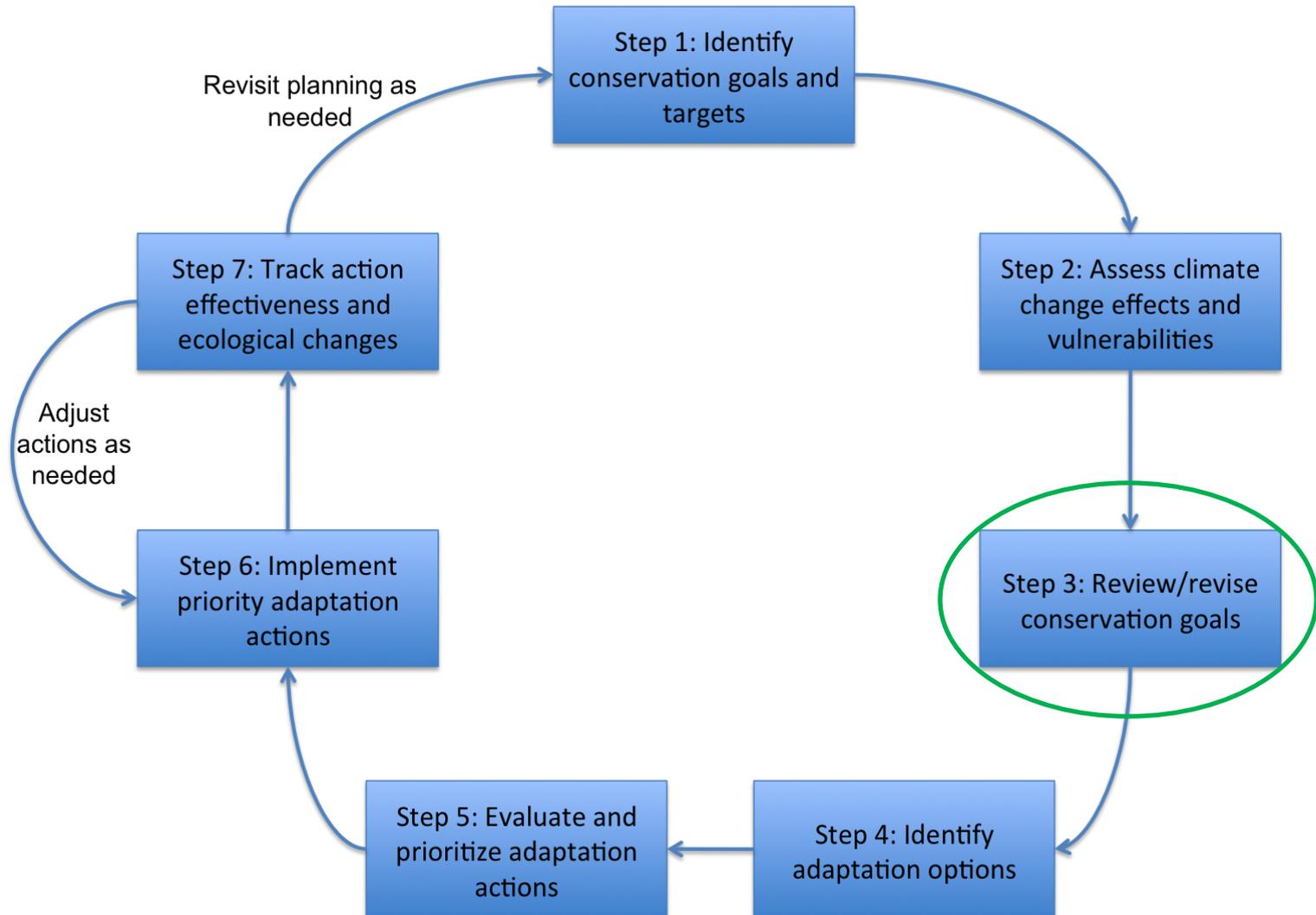


Using Vulnerability to Inform Management Options



Source: Dawson et al. 2011

Reconsider Conservation Goals/ Management Objectives



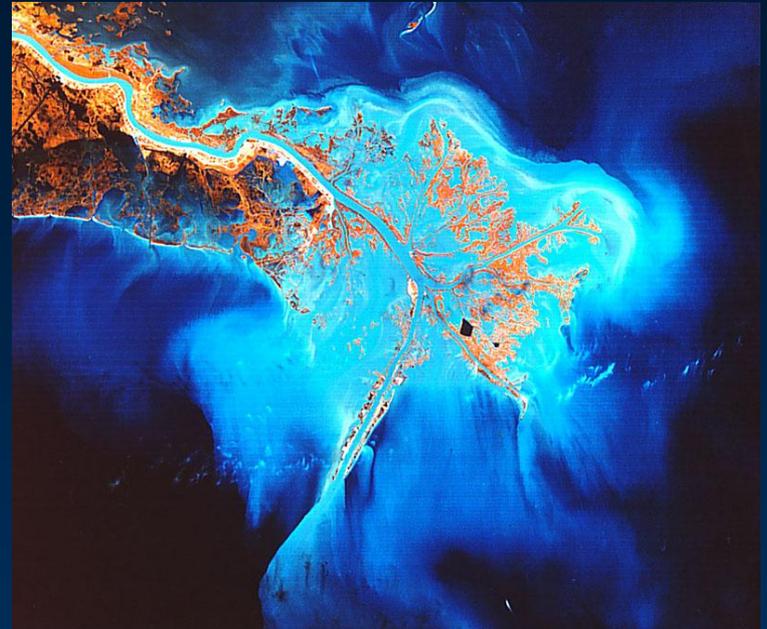
Reconsidering Goals

- 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”



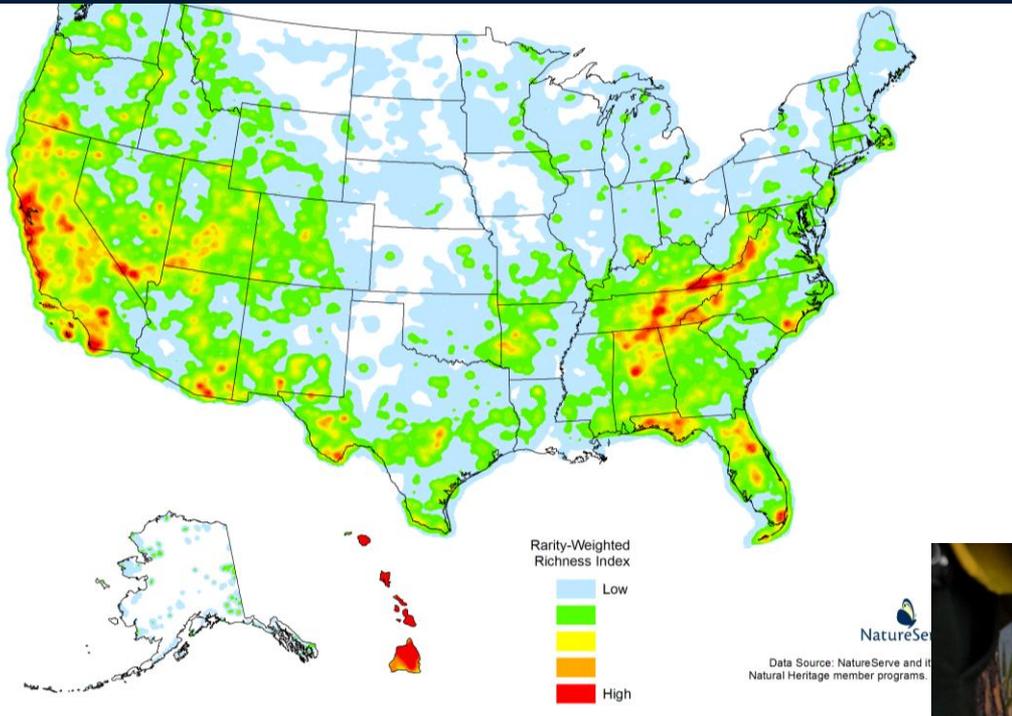
Which Conservation Targets?

- 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

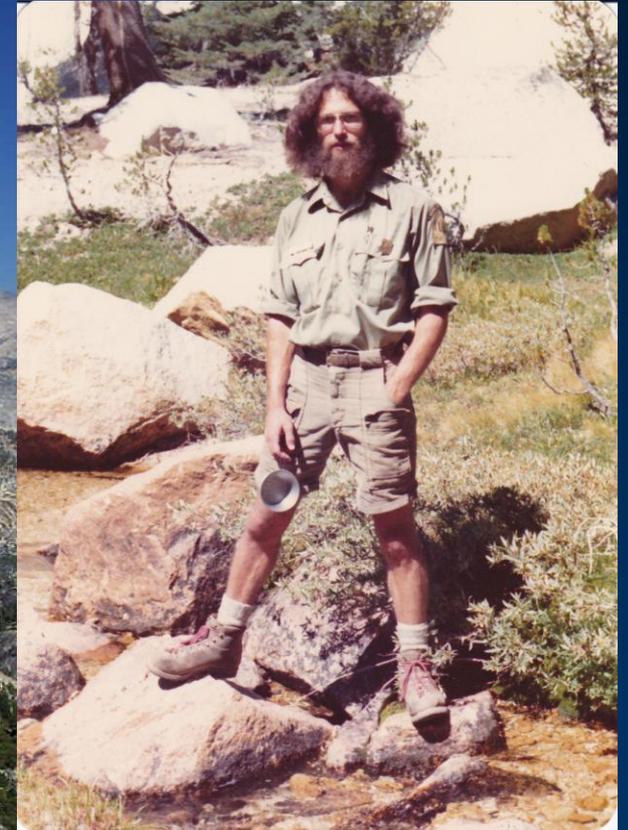
From Pattern to Process



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



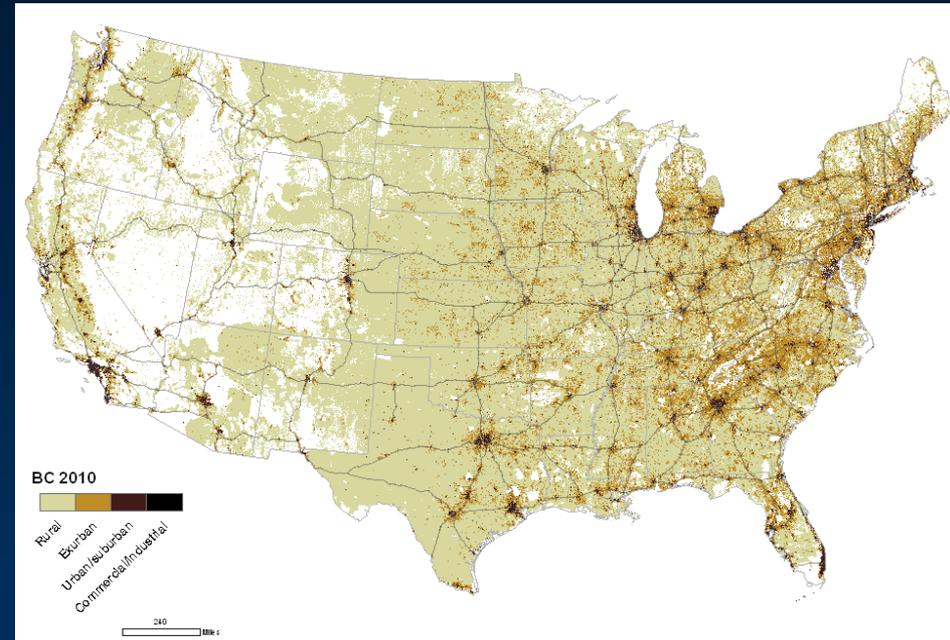
Actions Linked to Climate Impacts

- 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

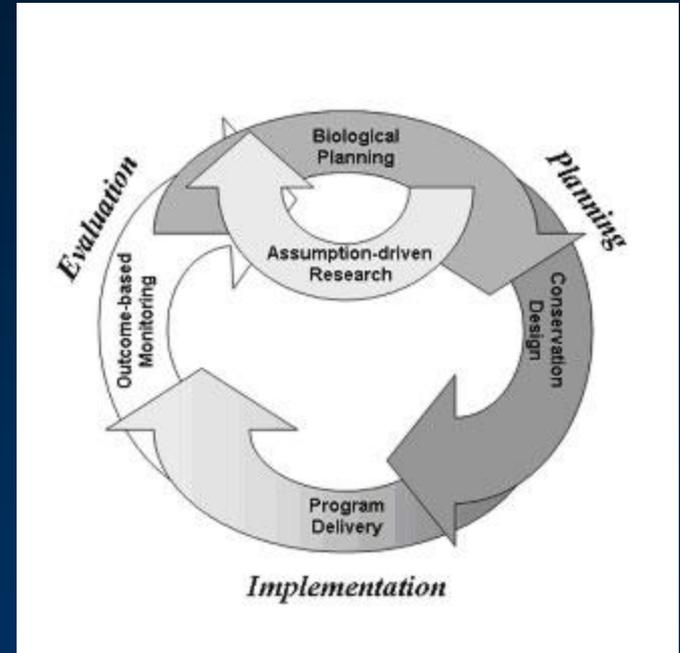
Robust in an Uncertain Future

- 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

