

# Envisioning Conservation in a Climate-Altered Future

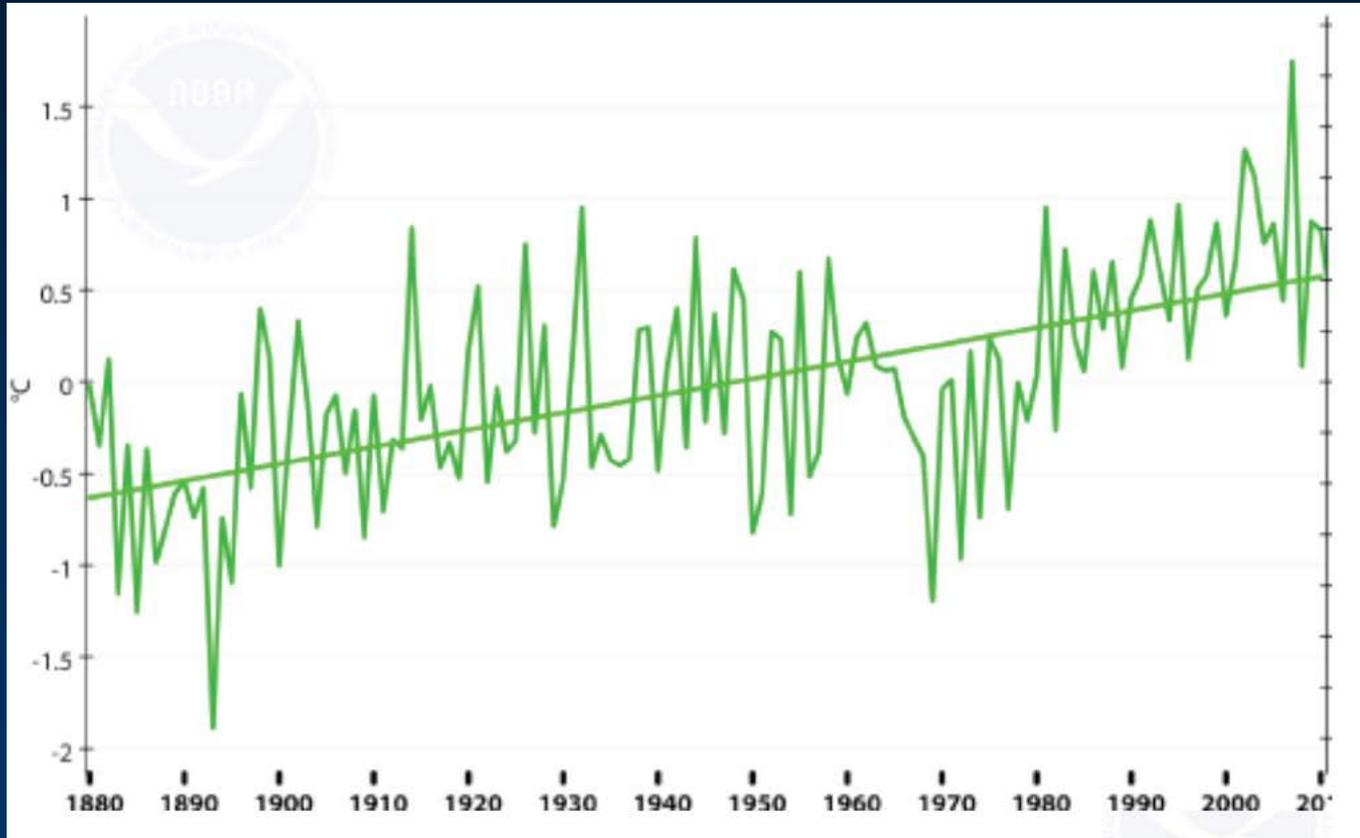
Dr. Bruce A. Stein  
Director, Climate Change Adaptation  
National Wildlife Federation

Landscape Conservation Cooperative National Conference  
March 27, 2012





# Stationarity is Dead



Global Average January Temperatures. Source NOAA 2009

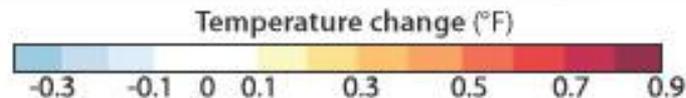
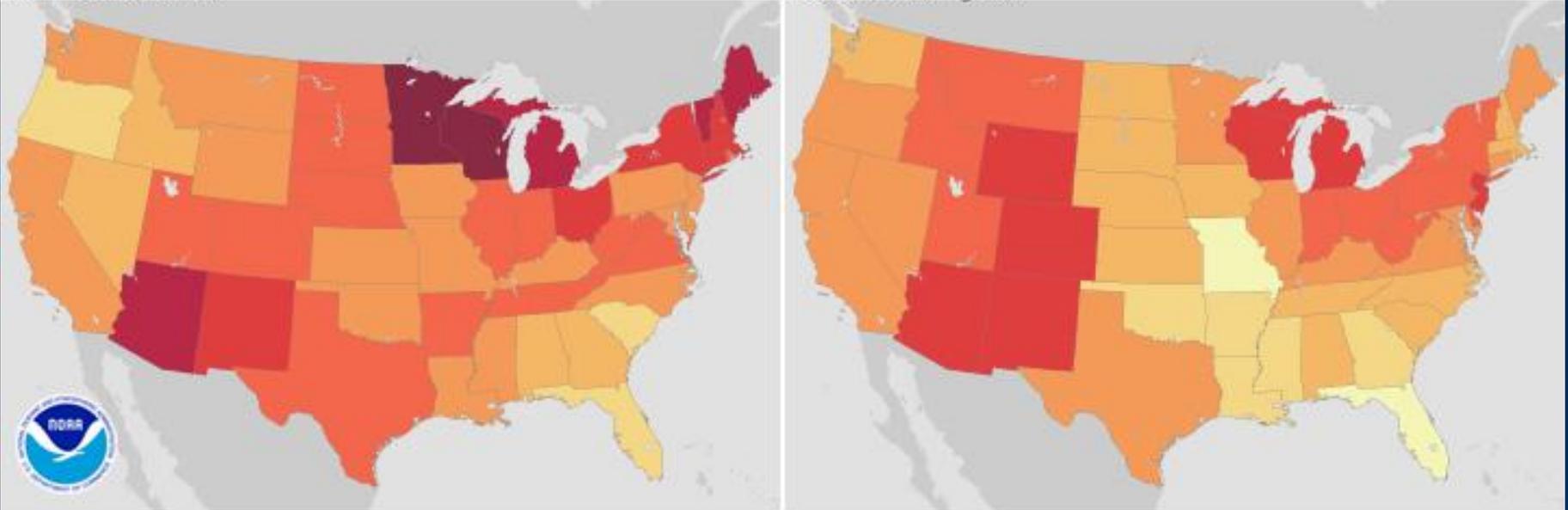
# The New “Normal”

## 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



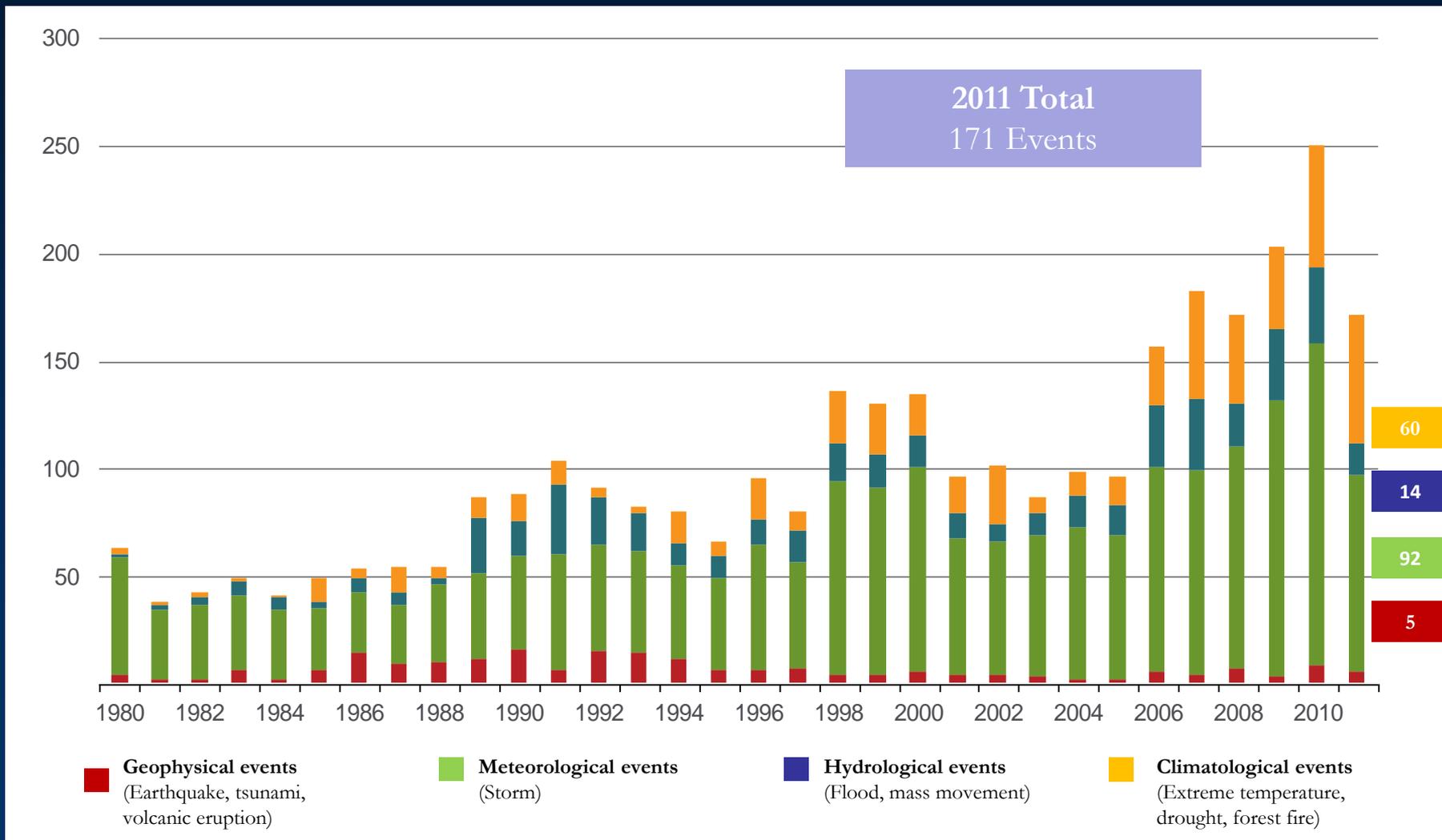
Massive Southwestern Wildfires



Historic Mississippi Flooding

# US Natural Disasters 1980 – 2011

## Number of Events, Annual Totals





# Climate Adaptation

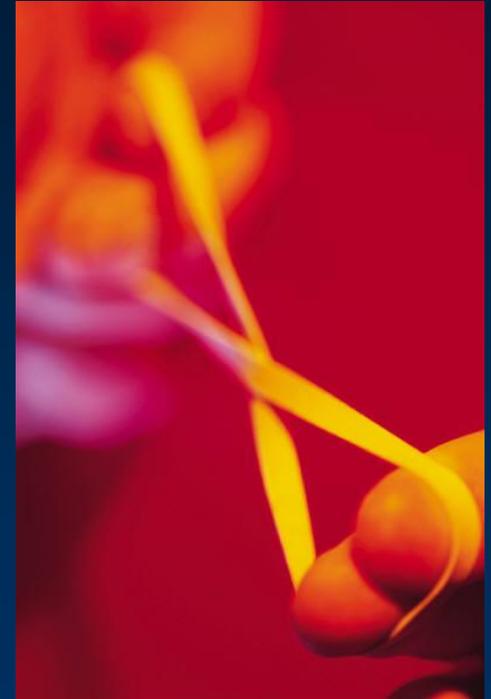
Initiatives and measures designed to reduce the vulnerability of natural and human systems against actual or expected climate changes.

*--IPCC AR4 Synthesis*

Prepare for ...

Cope with ...

Accommodate to ...





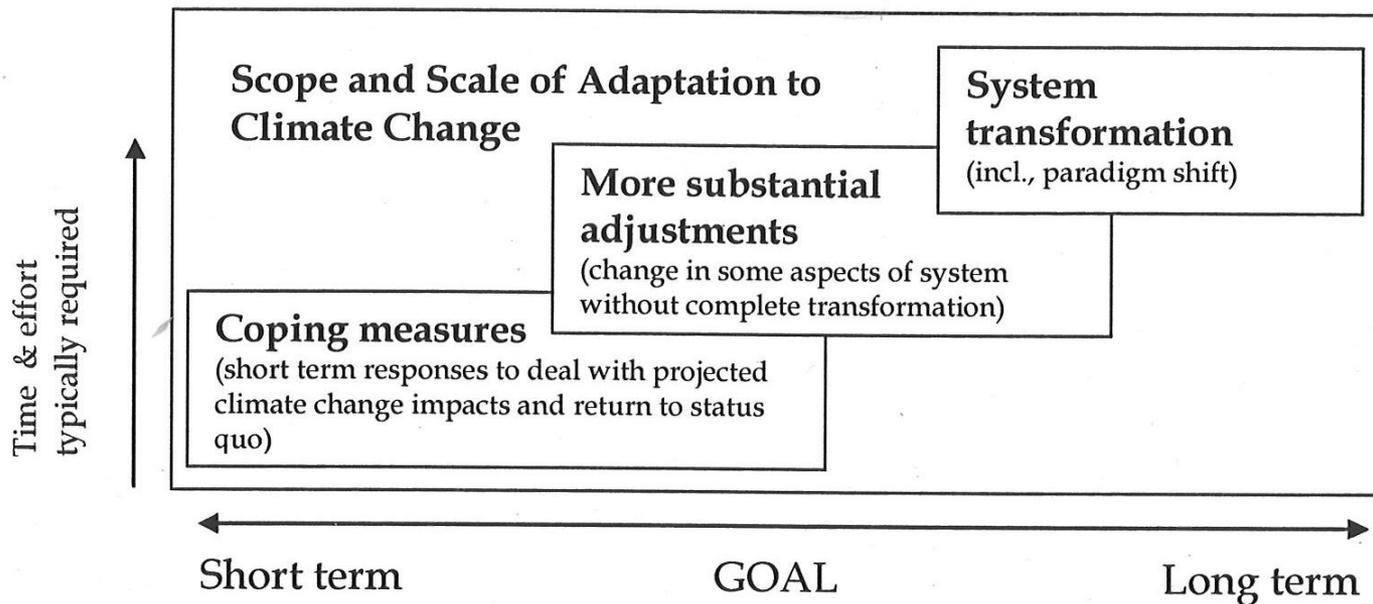
“I skate to where the puck is going to be,  
not where it has been.”

--- 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

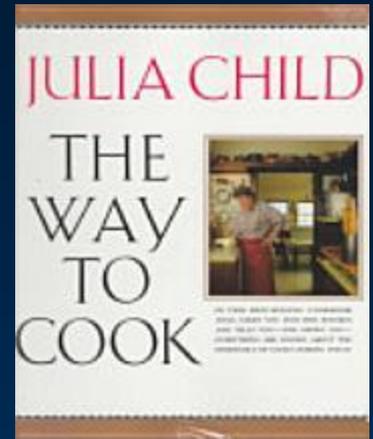
# Scope and Scale of Adaptation



*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”



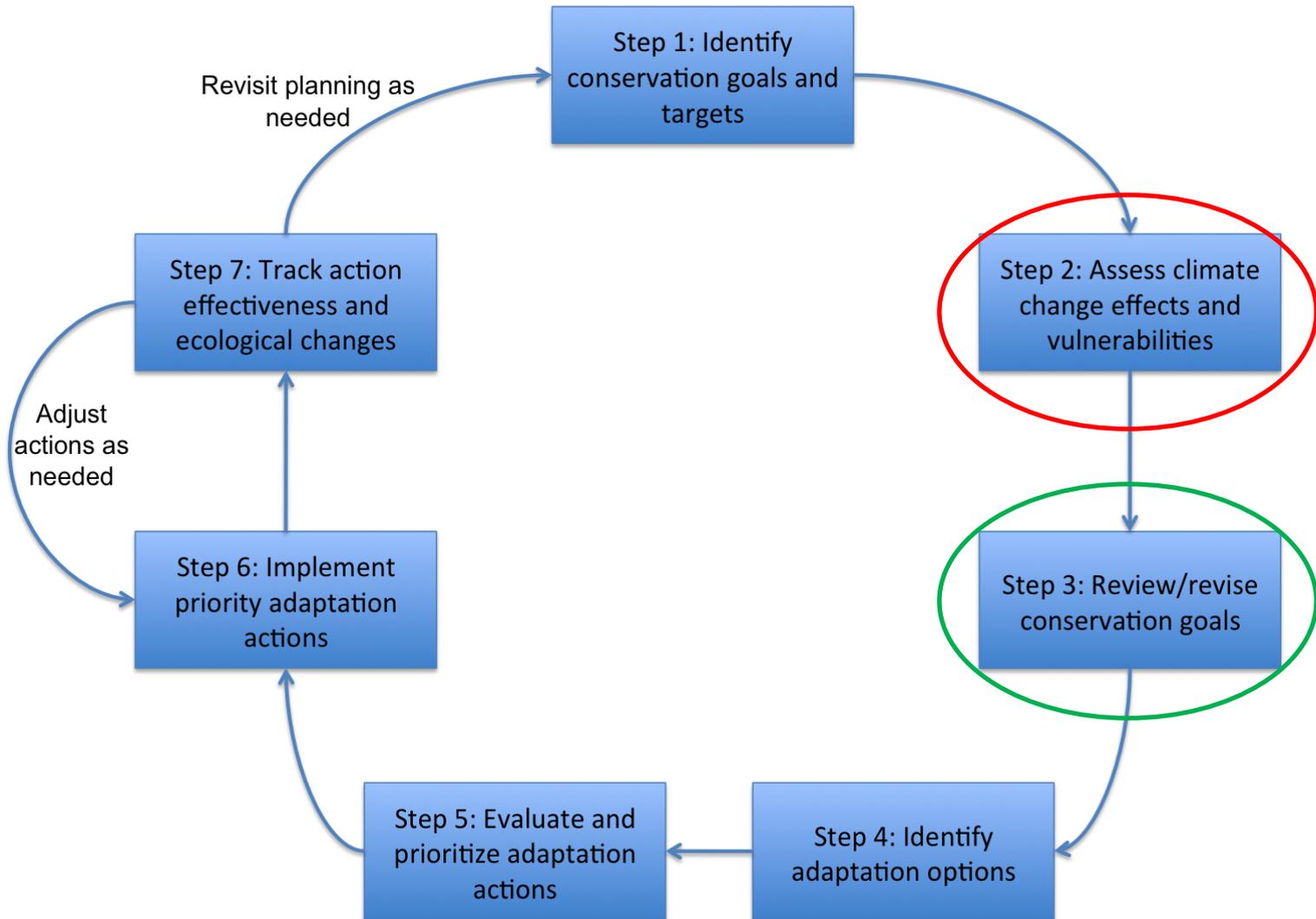
# The Secret Sauce for Successful Adaptation

## Intentionality

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

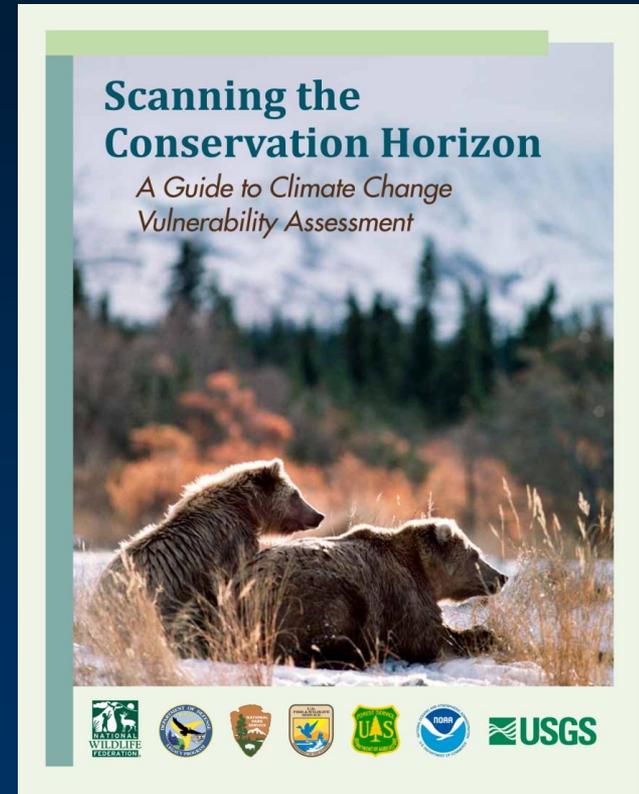


# Adaptation Planning and Implementation Cycle



# 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



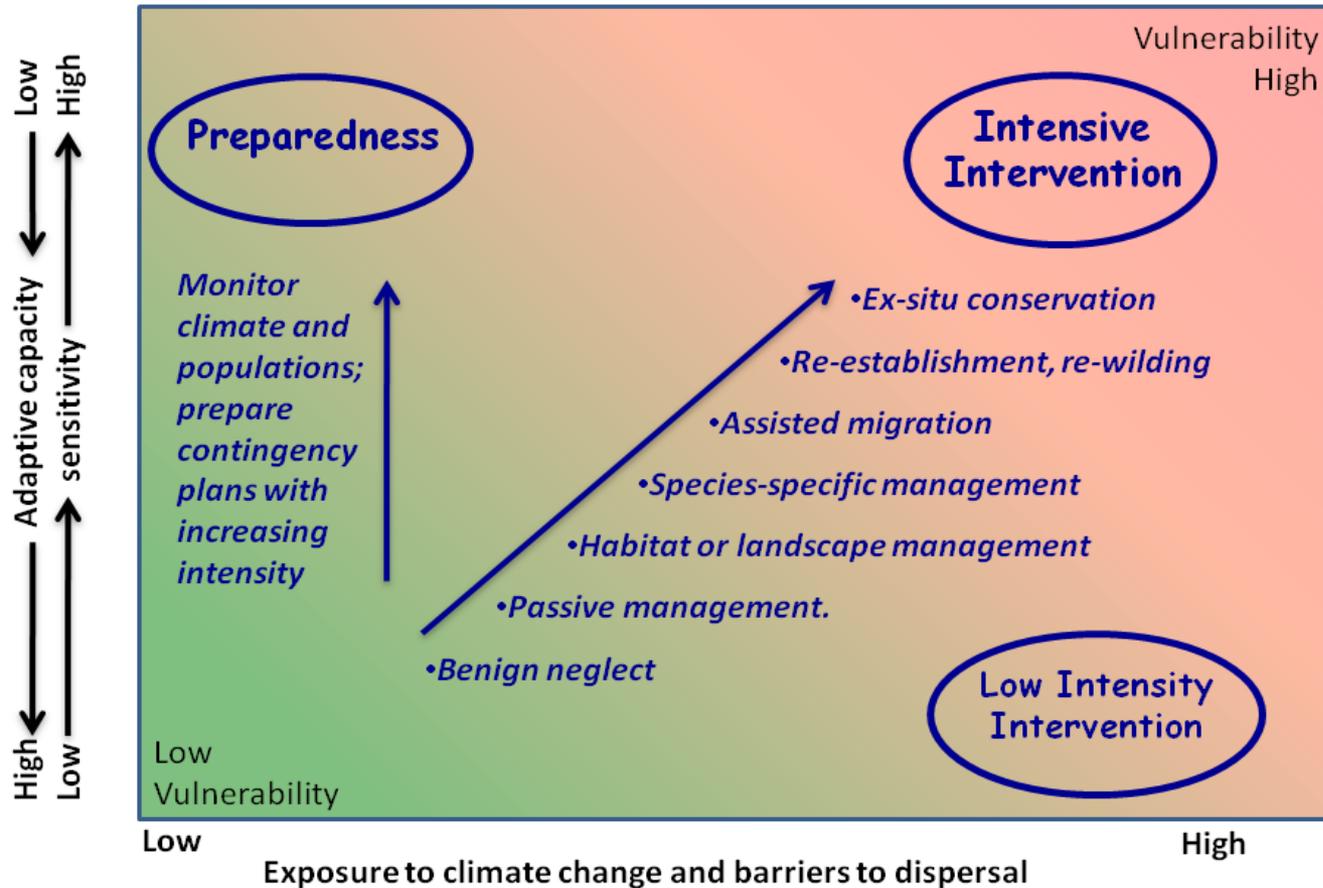
# Reducing Vulnerability

## 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

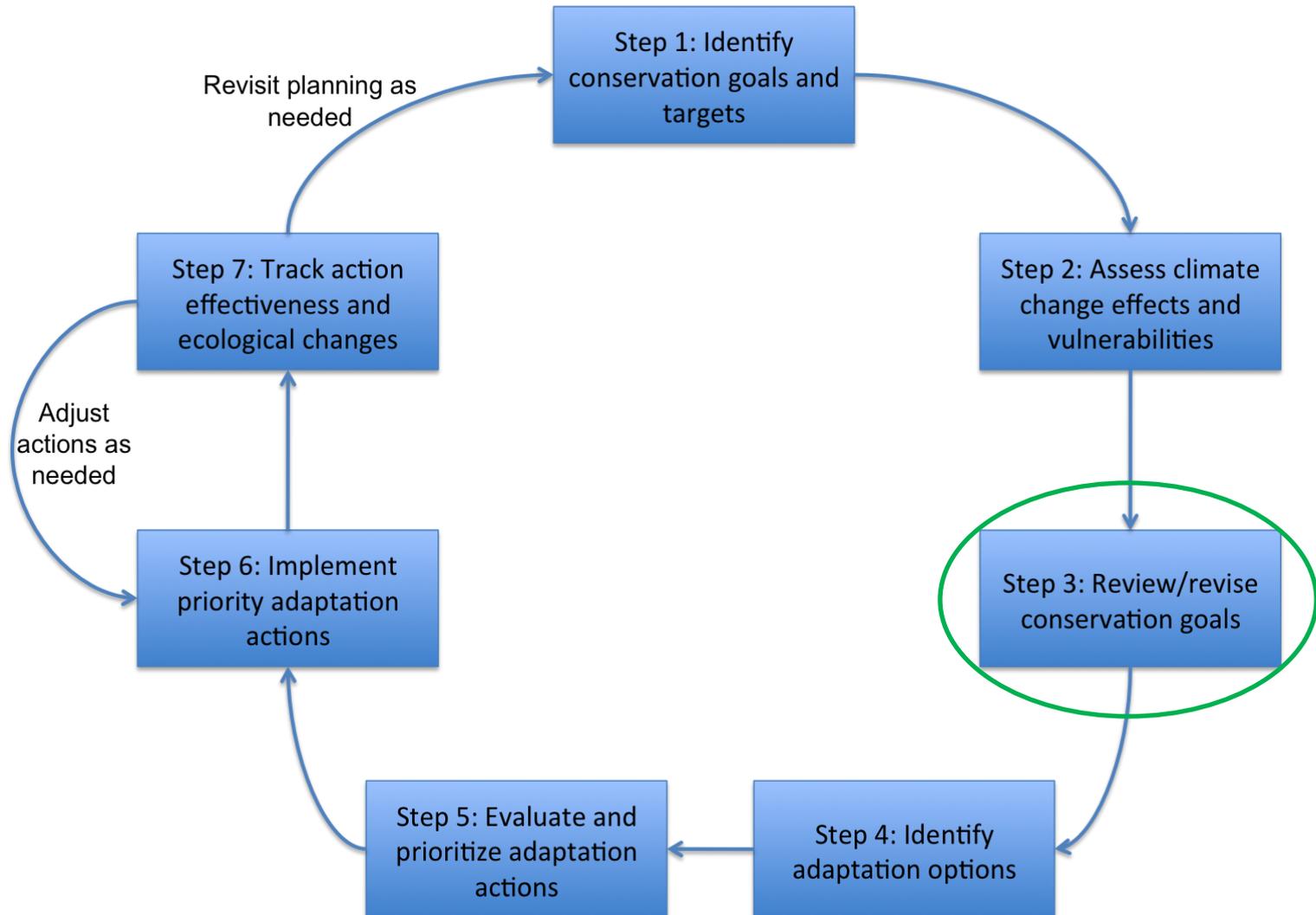


# Using Vulnerability to Inform Management Options



Source: Dawson et al. 2011

# Reconsider Conservation Goals/ Management Objectives



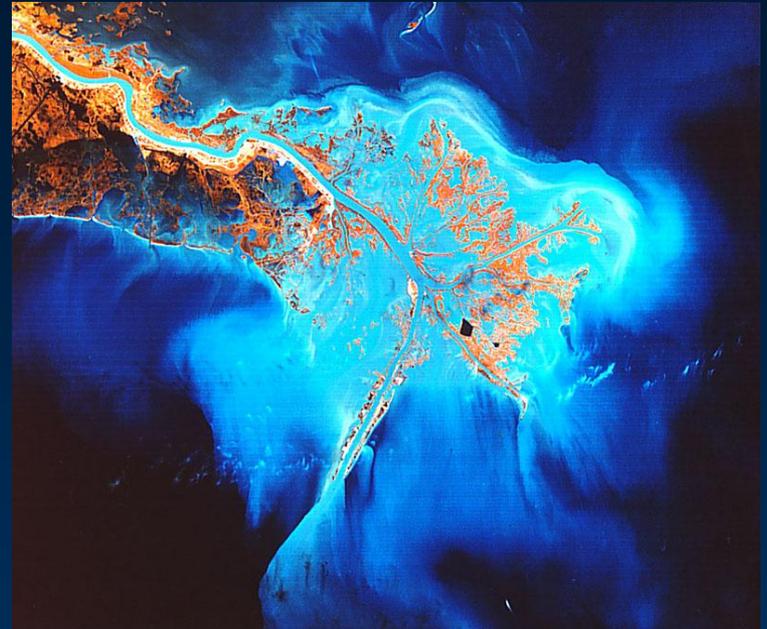
# Reconsidering Goals

- 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”



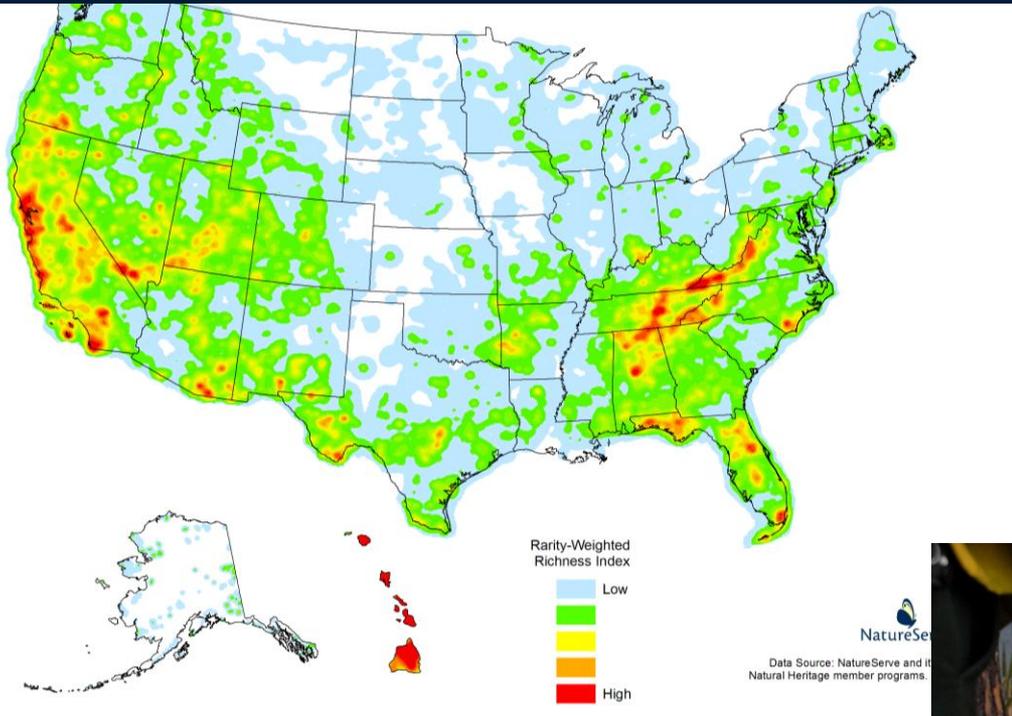
# Which Conservation Targets?

- 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

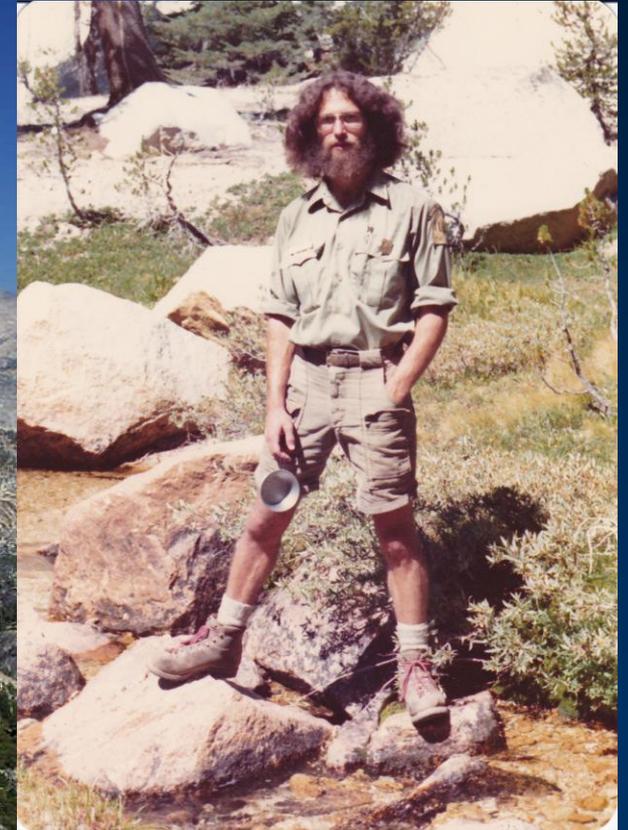
# From Pattern to Process



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



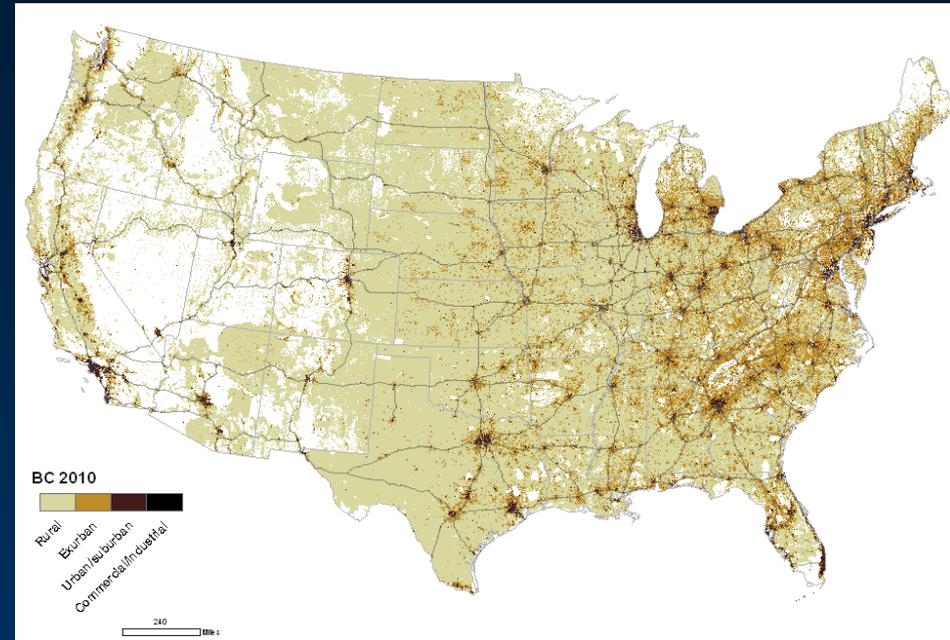
# Actions Linked to Climate Impacts

- 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

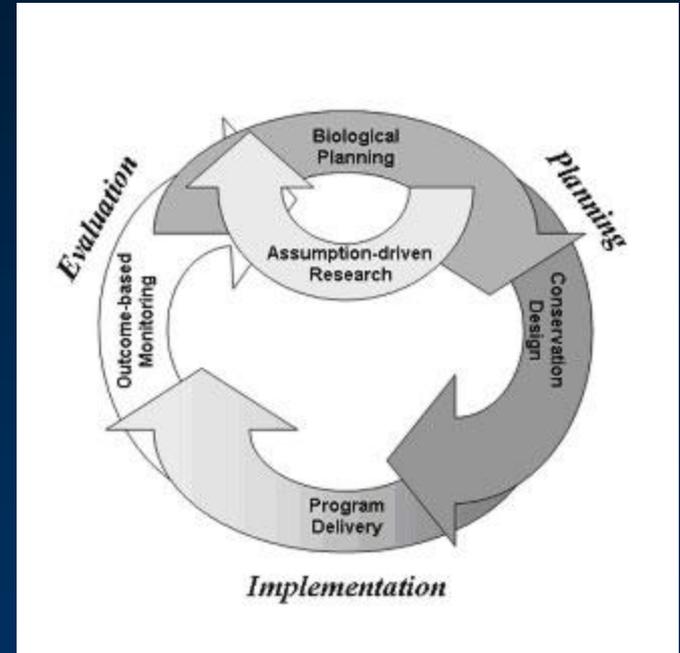
# Robust in an Uncertain Future

- 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

