

# Building Resilience to Climate Change in the Gunnison Basin

Betsy Neely, The Nature Conservancy  
Gunnison Climate Working Group

Southern Rockies LCC Webinar  
August 15, 2013

# Overview

- 1. Gunnison Climate Working Group**
- 2. What we are doing to prepare for change**
- 3. Lessons learned**
- 4. Next steps**



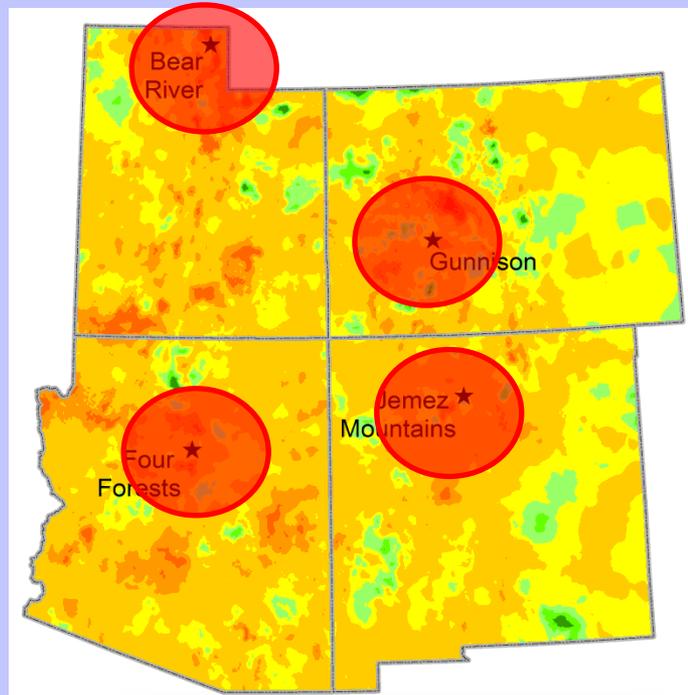


# Warming

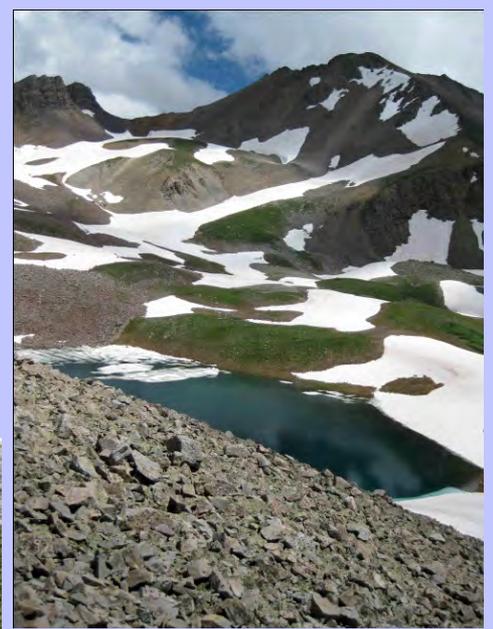
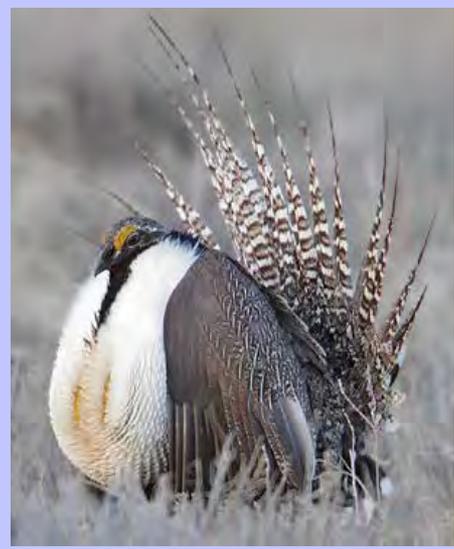
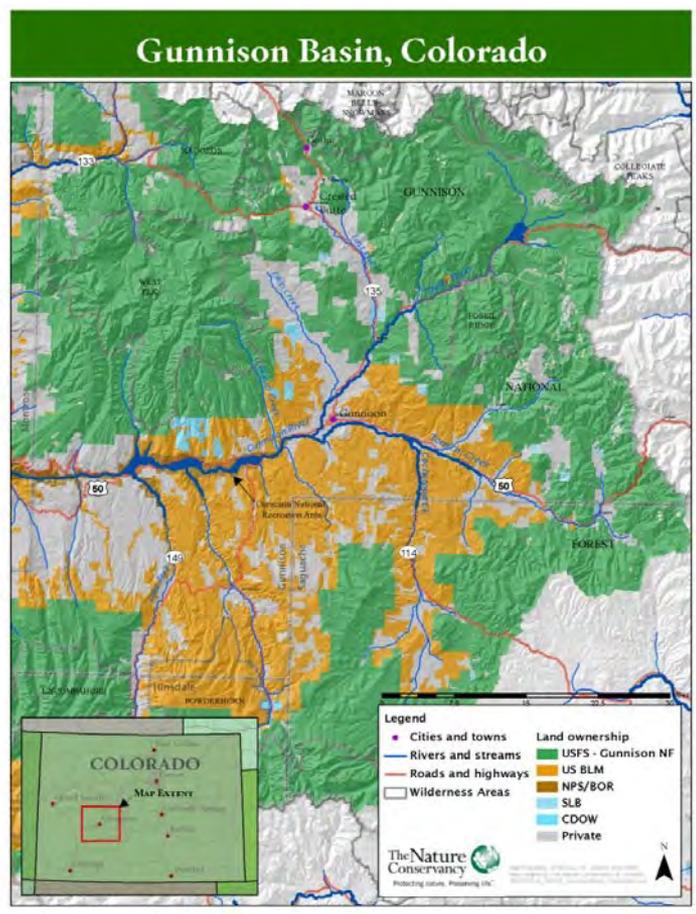
- Drives major ecological changes
- Threatens livelihoods



# Pilot Adaptation Landscapes

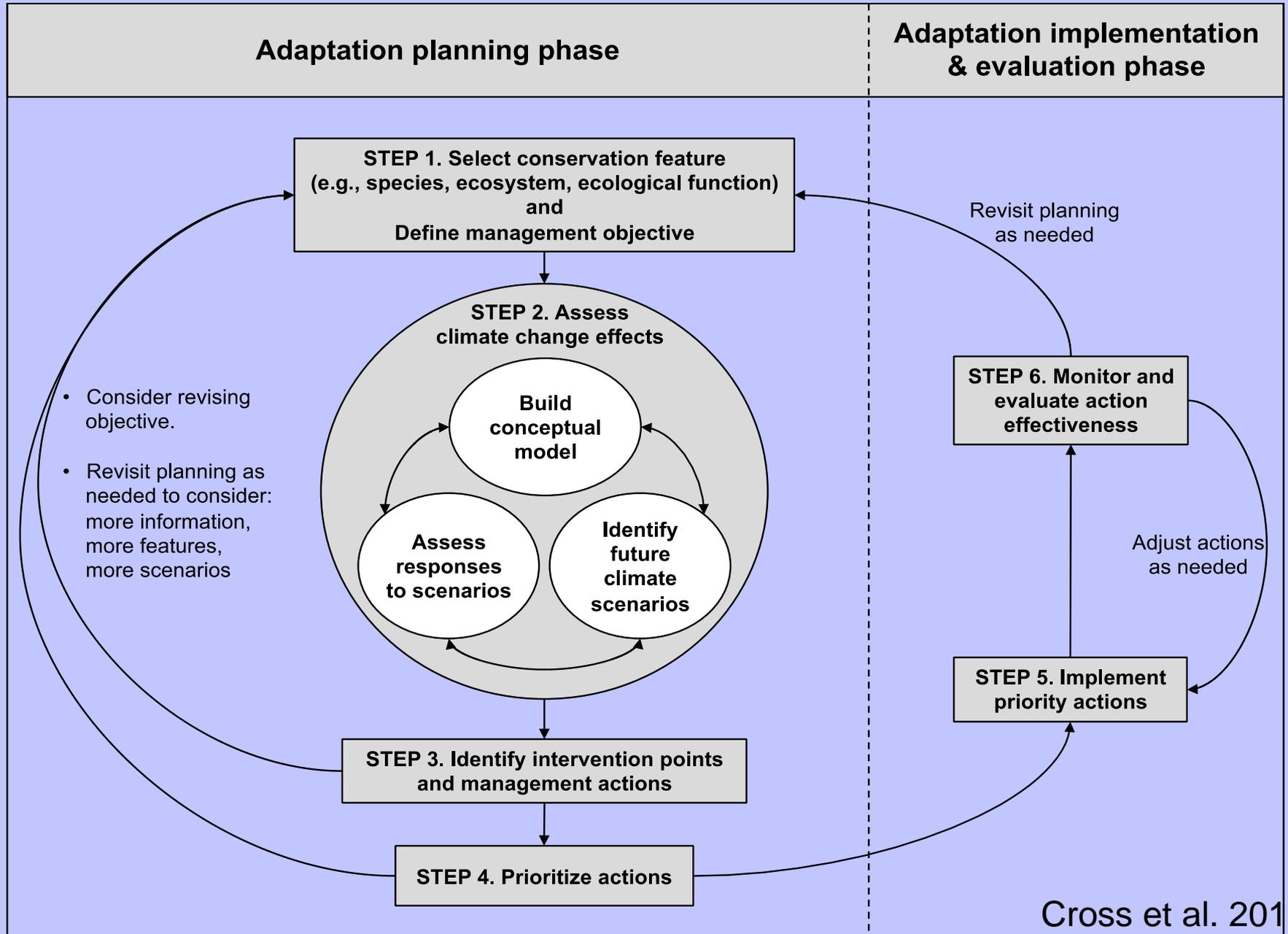


# 2009 Gunnison Basin Climate Adaptation Workshop for Natural Resource Managers



57 participants from 20 federal, state, & local agencies, NGOs & universities

# Adaptation for Conservation Targets (ACT) Framework



# Gunnison Sage-grouse Priority Adaptation Strategy

<b>Climate Change Impact</b>	<b>Strategy</b>
<p><b>Brood rearing habitats</b></p> <ul style="list-style-type: none"><li>• Fewer mesic &amp; lower quality sites</li><li>• More erosion</li><li>• Shift to higher elevation</li><li>• Chick survival diminished</li></ul>	<p><b>Retain H<sub>2</sub>O in most vulnerable brood-rearing habitats</b></p> <ul style="list-style-type: none"><li>• Restore seeps, springs</li><li>• Reduce head-cuts, incised gullies</li><li>• Raise water table</li></ul>



# Gunnison Climate Working Group- Chartered in 2010

1. Bureau of Land Management
2. Colorado Natural Heritage Program
3. Colorado Parks & Wildlife
4. Gunnison County
5. Gunnison County Stockgrowers Associatio
6. Lake Fork Valley Conservancy
7. National Center for Atmospheric Research
8. National Park Service
9. Natural Resources Conservation Service
10. Rocky Mtn. Biological Lab
11. The Nature Conservancy
12. Trout Unlimited
13. University of Colorado/Western Water Assessment
14. Upper Gunnison River Water Conservancy District
15. US Fish & Wildlife Service
16. US Forest Service & RMRS
17. Western State Colorado University



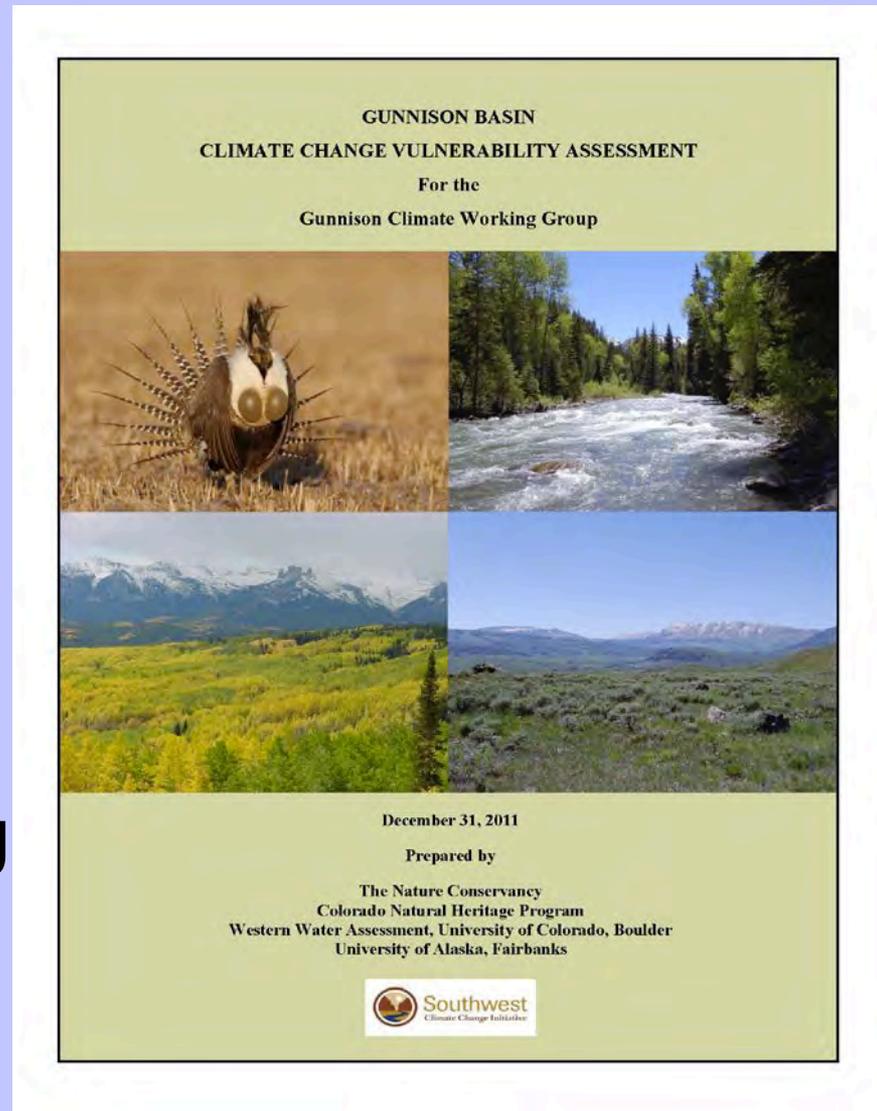
# Gunnison Climate Working Group Goals

1. Increase understanding & awareness of threats to nature & people
2. Identify & prioritize strategies & techniques
3. Promote coordinated & effective action



# Ecological Vulnerability Assessment

- What species & ecosystems are at risk?
- How vulnerable are they & what attributes make them vulnerable?
- Set priorities for developing strategies



# Ecological Vulnerability Assessment Targets & Methods

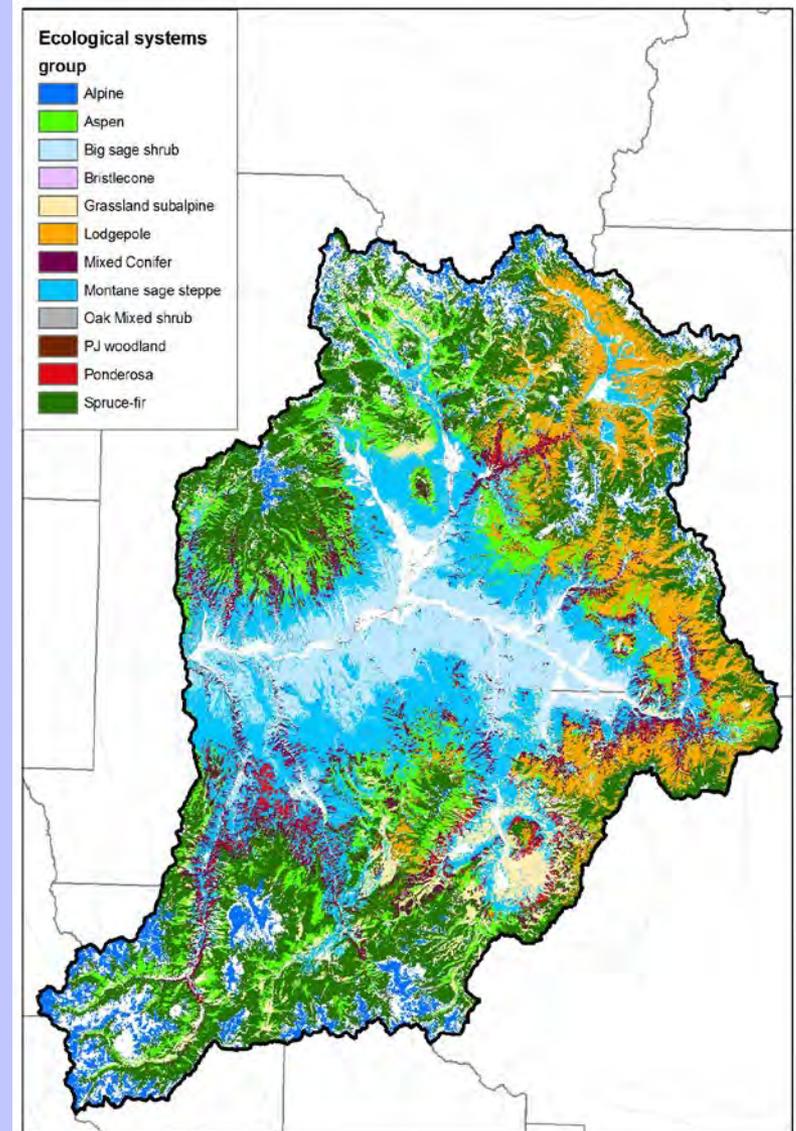
## 24 Ecosystems

- Manomet Center for Conservation Science

## 73 Species

- NatureServe Climate Change Vulnerability Index

Literature review &  
workshops, expert  
input



# Vulnerability of Ecosystems: Ranking (14/24 terrestrial & freshwater ranked H or M)

## Upland Terrestrial Ecosystems

Vulnerability											
Ecosystem	Vulnerability Score	Restricted to high elevation/ or at southern edge of range	Narrow bioclimatic envelope	Increased pest attacks	Increased invasive species and encroachment from natives	Barriers to intrinsic dispersal ability	Fire	Drought	Timing of snowmelt	Phenologic change	Increased grazing or browsing
Xeric alpine	Highly Vulnerable	High	Medium	-	Medium	High	-	-	-	Medium	Low
Mesic alpine	Highly Vulnerable	High	Medium	-	Medium	High	-	Low	Medium	Medium	Low
Spruce-fir	Moderately Vulnerable	-	-	High	Low?	-	Medium	Medium	Medium	-	-
Douglas-fir	Highly Vulnerable	-	Medium	High	-	-	High	High	High	-	Medium
Aspen	Moderately Vulnerable	-	Low	Medium	Low	Medium	Low	Medium	Low	Low	High
Bristlecone pine	Highly Vulnerable	-	Low	High	High	High	Low	-	Low	-	-
Lodgepole	Moderately Vulnerable	Low	Low	High	Low	-	High	Medium	-	-	-
Ponderosa pine	Moderate Increase	-	-	Low	Medium	-	Low	Low	-	-	Low-Med
Juniper woodlands	Presumed Stable to Moderate Increase	-	-	Low	Low	Low	Low	Low	-	-	-
Montane sagebrush	Moderate Increase	-	-	-	Medium	-	Low	Low	-	-	Low

# Key Factors affecting Ecosystems

- Increased pest attacks
- Increased invasive species
- Barriers to dispersal
- Fire
- Drought
- Decreasing base flows
- Dependence on timing & magnitude of snowpack



# Vulnerable Species of Concern (74% or 54/73 species)



43/50 Plants

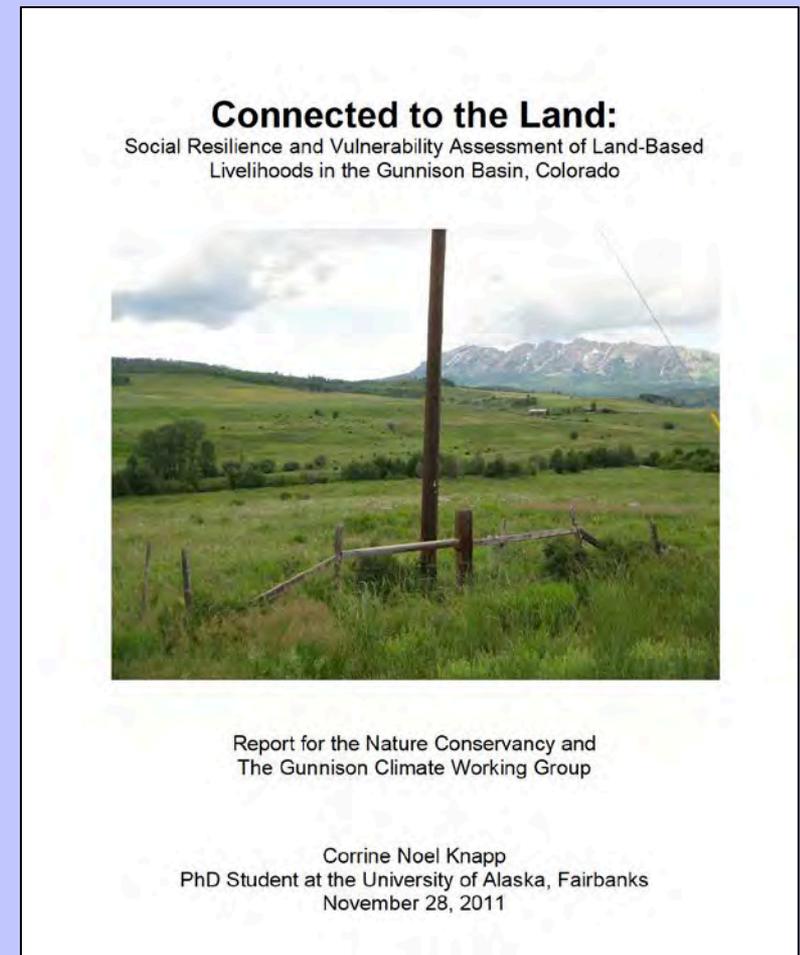
11/23  
Animals



- Most vulnerable species are in freshwater, alpine, spruce-fir & sagebrush
- Plants, amphibians, fish, &

# Social Resilience & Vulnerability Assessment

1. How will land-based livelihoods be impacted?
2. How will they respond?



# Social Resilience & Vulnerability Assessment

“Probably the biggest is the drought: severe drought. I have seen it a couple times in my life. Where there was almost no snowpack and then the ensuing summer there was no stock water, no grass, all those things and then no hay to go through the next winter.”

Gunnison Basin Rancher

Table 4. Percentage of Gunnison Basin participants who talked about these weather impacts to land-based livelihoods.

	Ranchers n=19	Recreation n=16
Drought		
Inadequate snowpack		
Extreme cold		
Timing of runoff		
Lack of spring moisture (stockwater, spring range, wildflowers)		
Extreme snowfall		
Dust on snow		
Cold during calving		
Thunderstorms		
Too wet/rainy		
Early fall snowstorms		
Weather in other places		

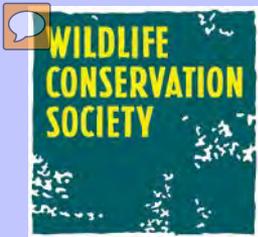


# Gunnison Sage-grouse: highly vulnerable

Impacts to brood-rearing habitats will likely increase with drought, erosion & shifting habitats

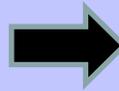


- Increased head cuts & incision
- Lowered water table



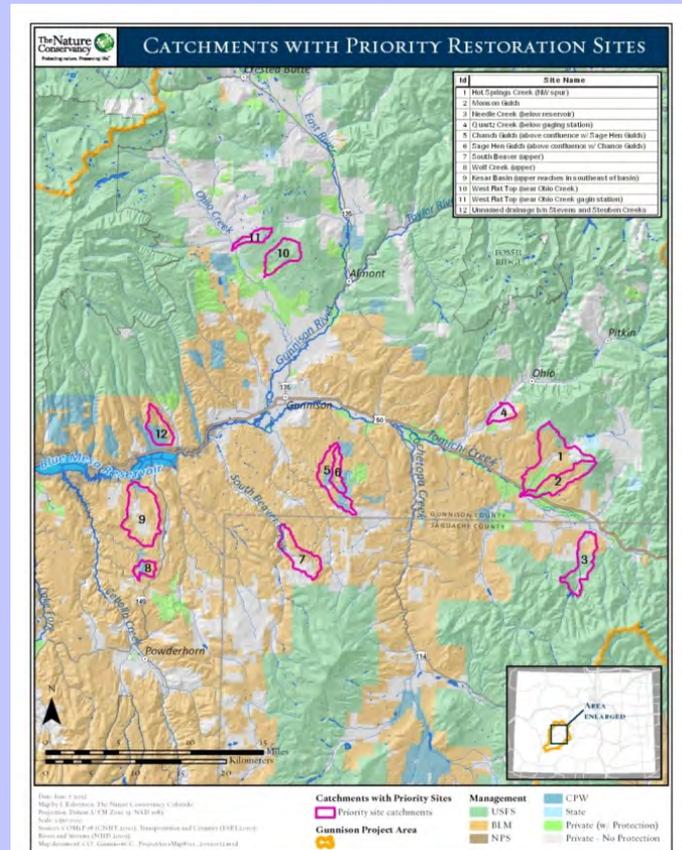
# On-the-Ground Climate Adaptation Project

Build resilience of brood-rearing habitat to help Gunnison Sage-grouse & other wildlife species adapt to climate change



# Goals

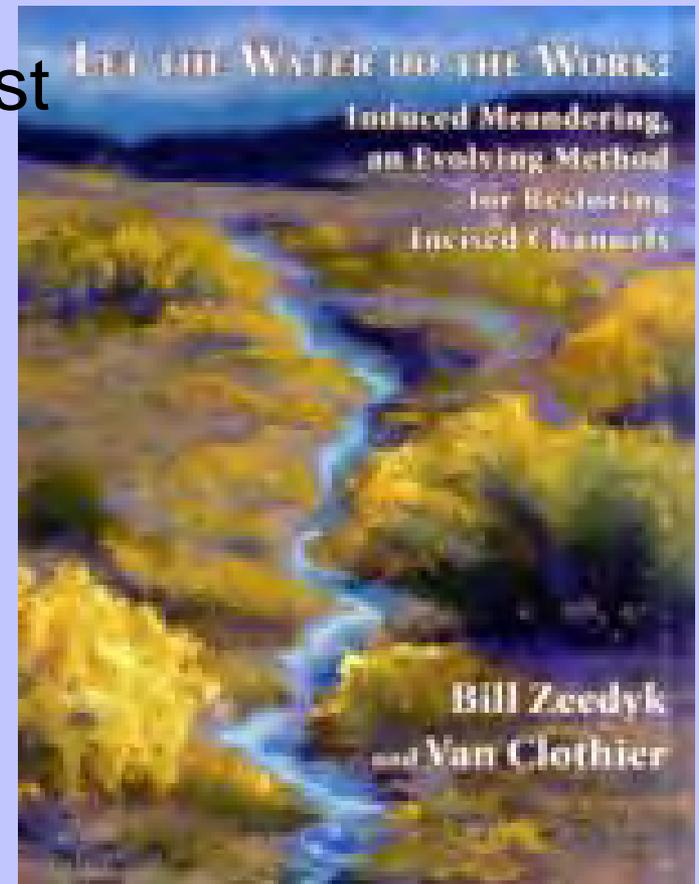
1. Prioritize sites & design projects
2. Restore wet meadow habitat
3. Establish monitoring program
4. Share tools, methods & findings



Bill Zeedyk, Zeedyk Ecological Consulting

*Let the Water Do the Work: Induced Meandering,  
an Evolving Method for Restoring Incised  
Channels (2012)*

Riparian Restoration Specialist



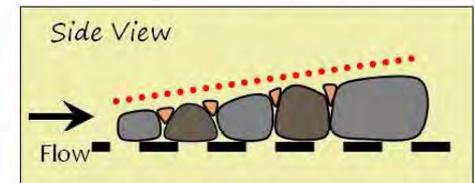
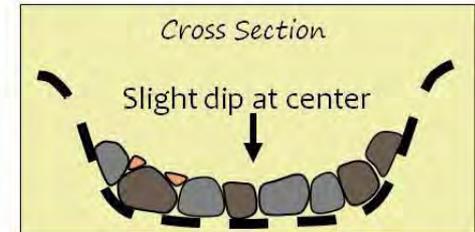
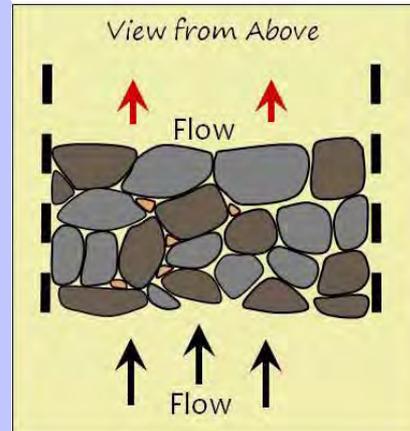
# Use Simple Structures to:

1. Reduce erosion & head cuts
2. Raise water table & improve base flows
3. Improve health & expand riparian vegetation



## One Rock Dam

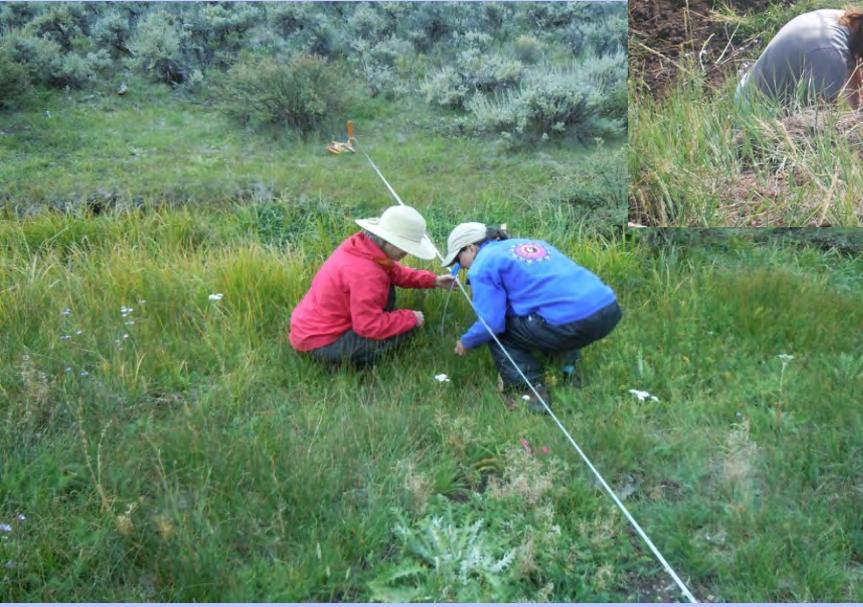
= 1 rock high + uniform surface







# Monitoring



# 1<sup>st</sup> Year Results: Media Luna

October 2012



August 2013



# Project Benefits

- Gunnison Sage-grouse & chicks
- Nesting for neo-tropical migratory birds
- Winter range for elk & deer
- Forage for livestock



Cornell Lab of Ornithology

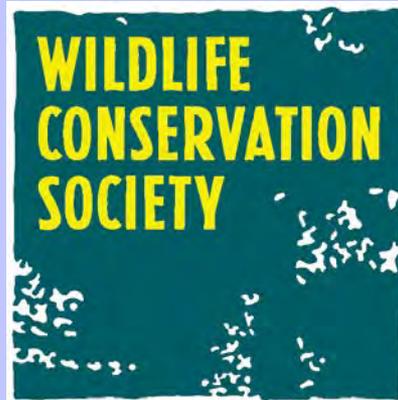


# Lessons Learned

1. Collaborate across boundaries
2. Taking action builds understanding & support for adaptation
3. Find & engage local champions
4. Nature-based solutions can benefit both nature & people



# Special Thanks to our Funders & Gunnison Climate Working Group for In- kind-Support

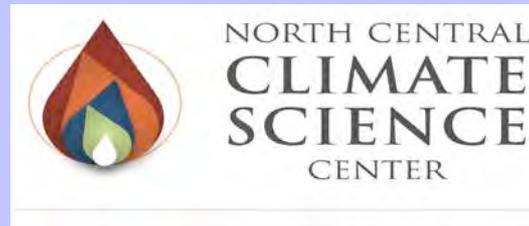




# Next Steps

1. Complete adaptation project & monitor response
2. Formalize Gunnison Climate Working Group
3. Develop basin-wide adaptation strategies for priority systems

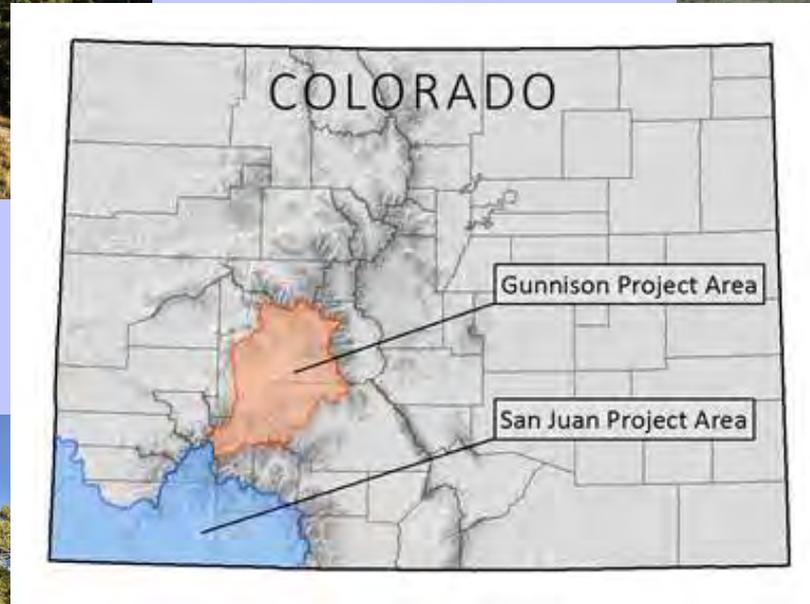




# Natural Resource Management Decision Making under Climate Uncertainty: Building Social-Ecological Resilience in SW Colorado



# Project Area





# Goals

- Facilitate adaptation to build SE resilience, ecosystem & species conservation, & sustainable communities.
- Work with decision-makers to develop strategies/actions to reduce climate change impacts on nature & people.



# Gunnison Climate Working Group

Jim Cochran, Gunnison County\*

Brian St. George, Andrew Breibart, Gay Austin, BLM\*

Renee Rondeau, CNHP\*

Nathan Seward, Amy Seglund, Paul Jones, CPW\*

Ken Stahlnecker, NPS\*

Christina Santana, Liz With, Chris Bove, John Scott, NRCS\*

Matt Vasquez, Mark Hatcher, John Murphy, Carol Howe,  
USFS\*

Pat Magee, Jonathan Coop, WSCU\*

Frank Kugel, UGRWCD\*

Joseph Barsugli, Imtiaz Rangwala, Western Water  
Assessment

Camille Richard, Lake Fork Valley Conservancy

Corrie Knapp, Univ. of Alaska Fairbanks

Advisors: Bill Travis-CU, Linda Joyce-USFS

# Thank You!

A woman with a backpack and a man walking on a stone path through tall grass in a hilly landscape. The woman is in the foreground, looking down at the path. The man is further ahead on the path. In the background, there are rolling hills and several cars parked on a road.

**Contact:**

**Betsy Neely, TNC: [bneely@tnc.org](mailto:bneely@tnc.org)**

**Nathan Seward, CPW: [Nathan.Seward@state.co.us](mailto:Nathan.Seward@state.co.us)**

**Jim Cochran, Gunnison Co:**

**[JCochran@gunnisoncounty.org](mailto:JCochran@gunnisoncounty.org)**