Rationale for the Workshop

Climate Change Adaptation Workshop for Natural Resource Managers in the Gunnison Basin

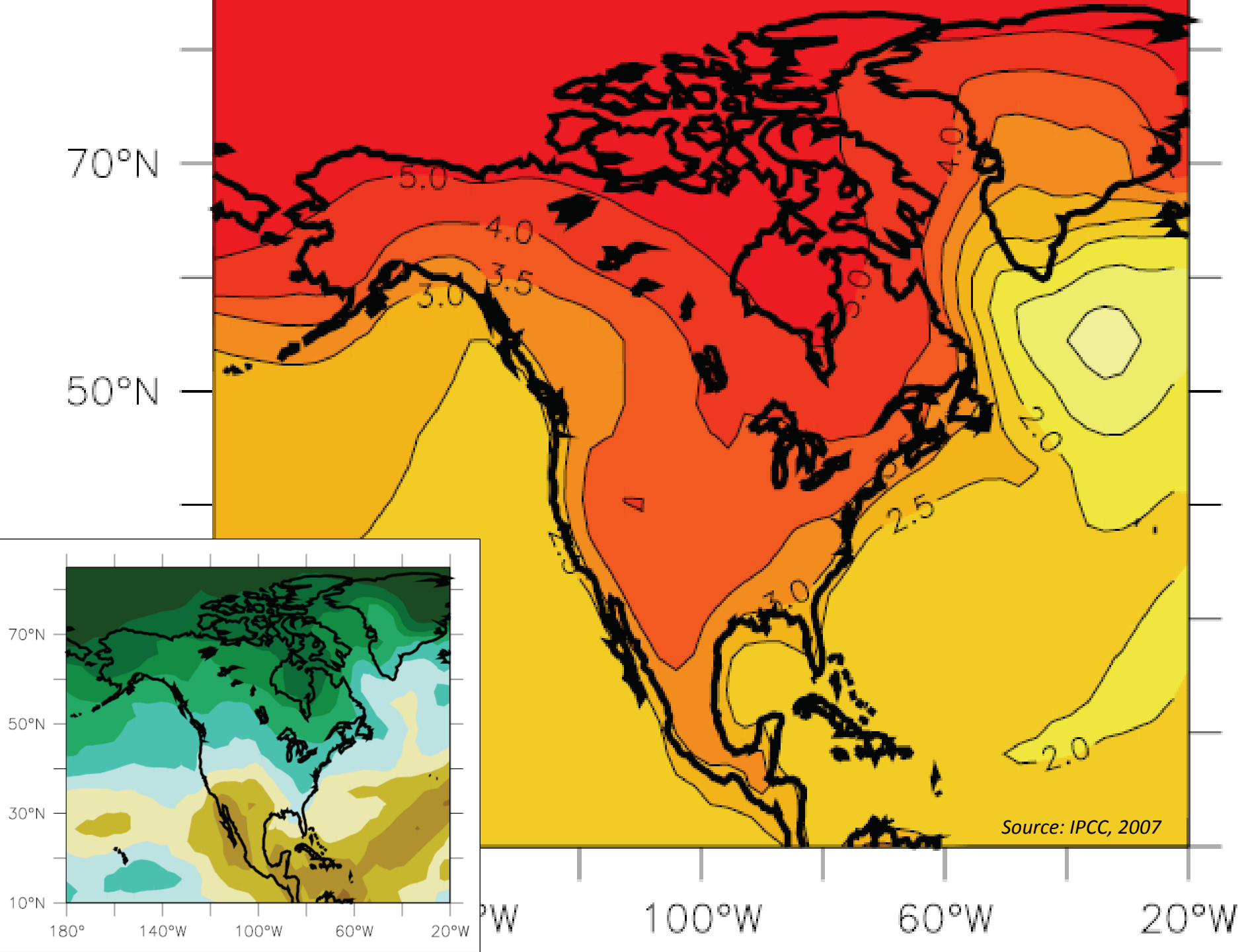
2-3 December 2009 – Western State College – Gunnison, Colorado

Gregg Garfin

Institute of the Environment

CLIMAS Climate Assessment for the Southwest

RISA Regional Integrated Sciences and Assessments
Building Bridges Between Climate Sciences and Society



Source: IPCC, 2007

Mt Crested Butte
Irwin
Crested Butte
Floresta
Taylor Park Reservoir
Gunnison National Forest
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Ohio
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Parlin
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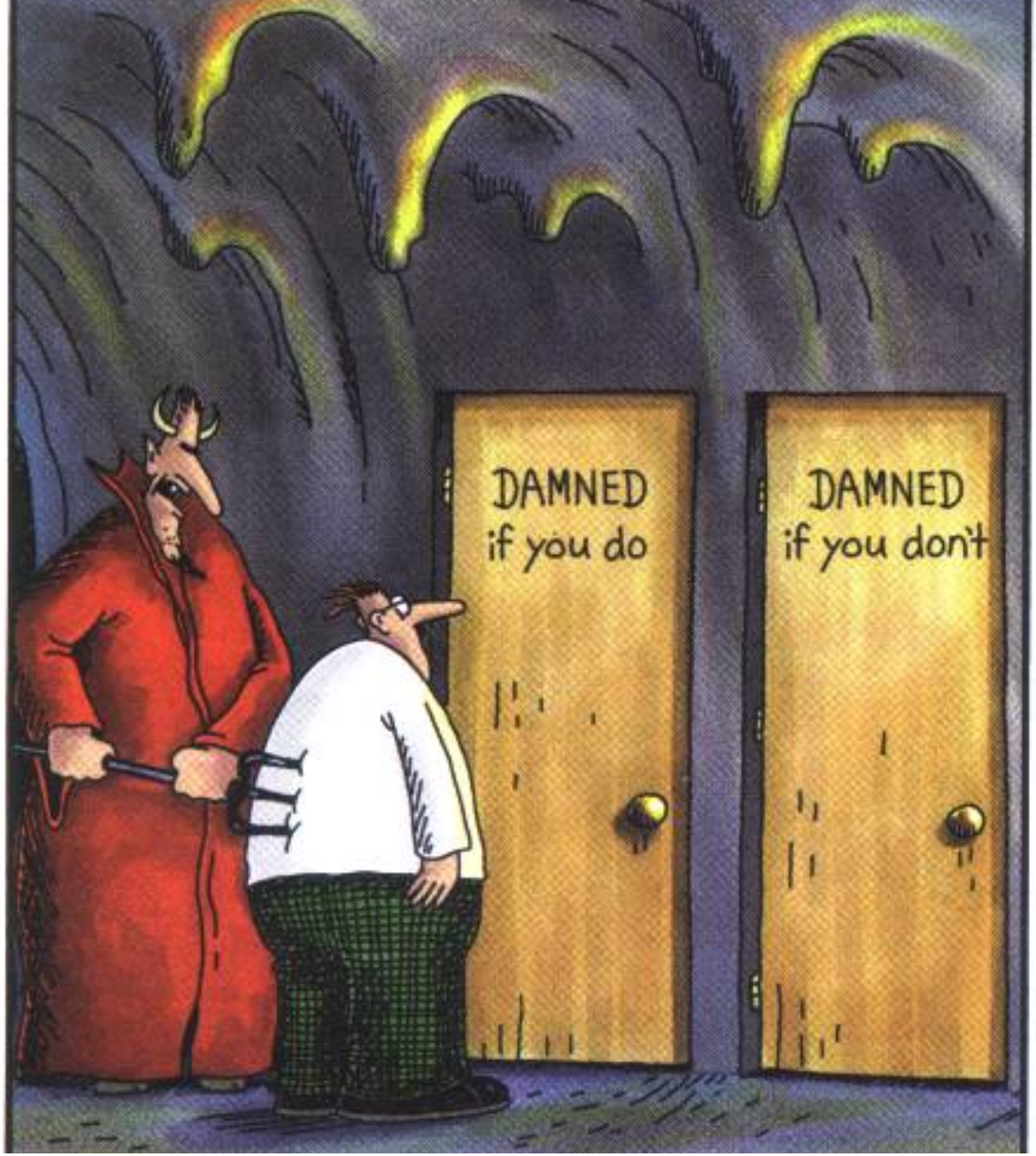
Doyleville
Curecanti National Recreation Area
©2009 Google - Imagery ©2009 TerraMetrics, Map data ©2009 Goog

Dust
GCMs
GHG Emissions
Data
Laws, Policies, Institutions
Non-Stationarity
Population Estimates
Vegetation Models
Socio-Economics
Hydrologic Models
Technology Assumptions
Unknown Unknowns

- *What options do managers have?*

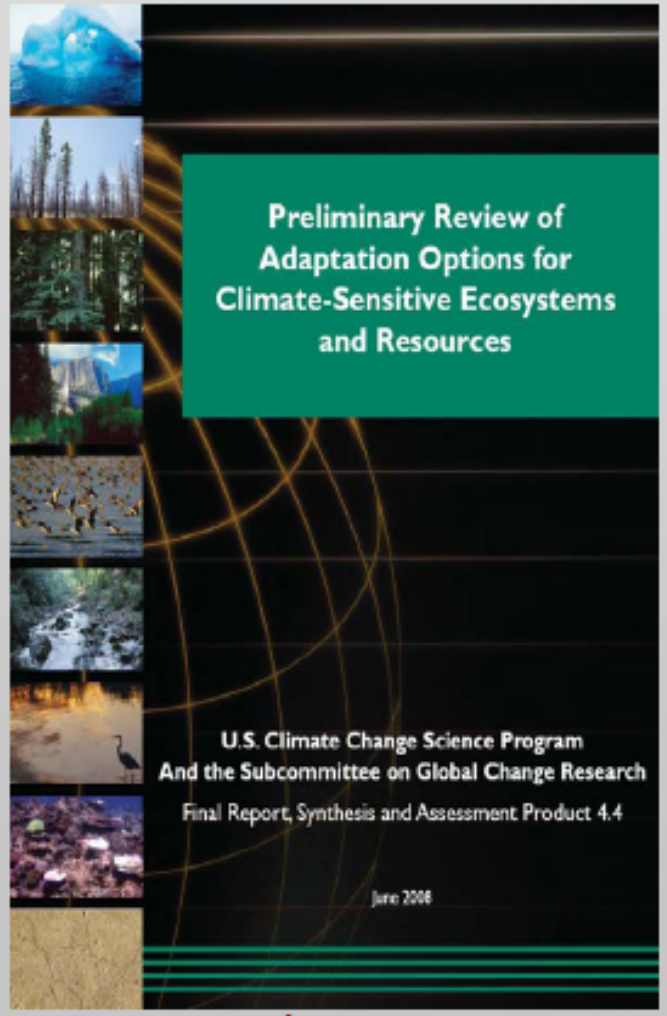


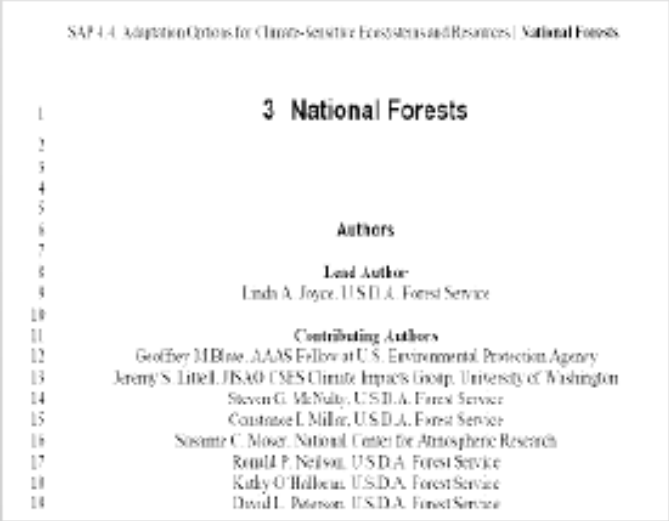
C'mon, c'mon – it's either one or the other

Taking these ideas to the ground...

U.S. Climate Change Science Program:

2008 SAP 4.4 Reports





SAP 4.4. Adaptation Options for Climate-Sensitive Ecosystems and Resources | **National Forests**

3 National Forests

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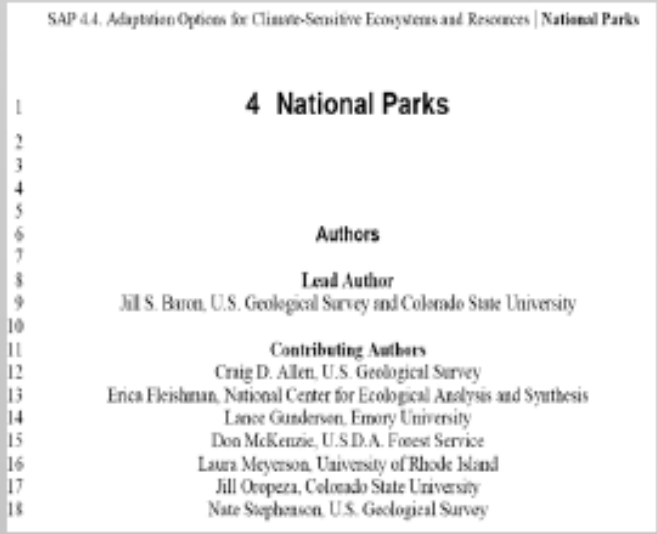

SAP 4.4. Adaptation Options for Climate-Sensitive Ecosystems and Resources | **National Parks**

4 National Parks

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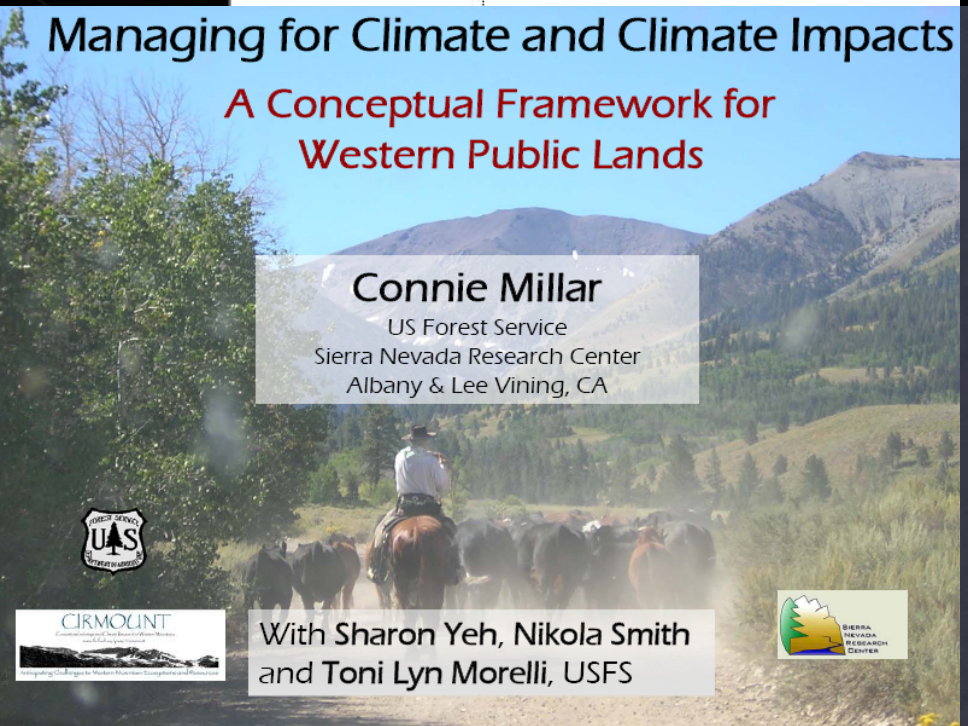
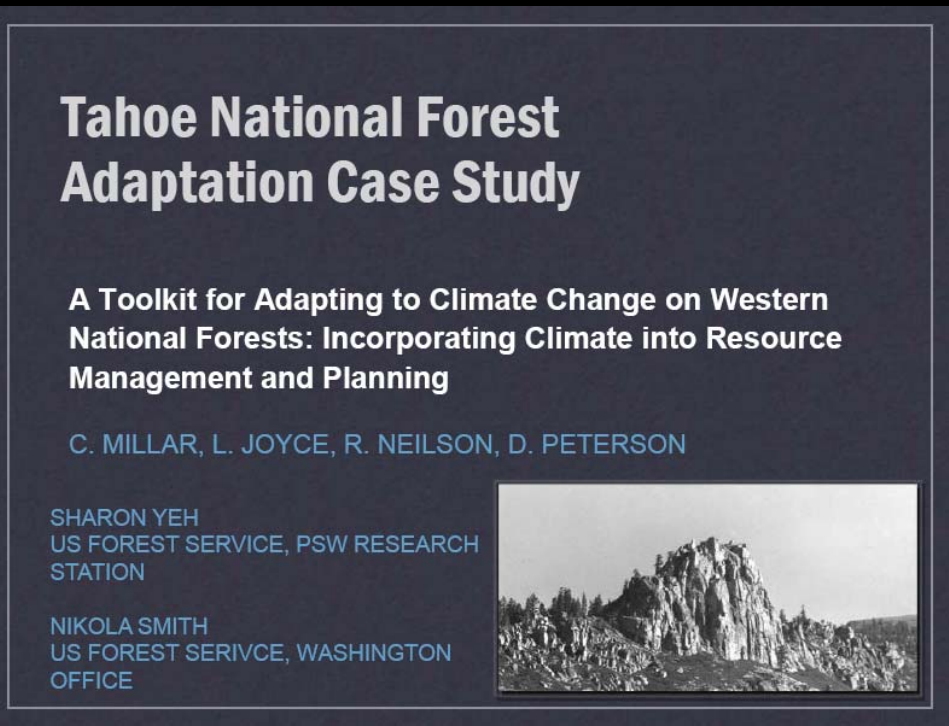
You are not alone



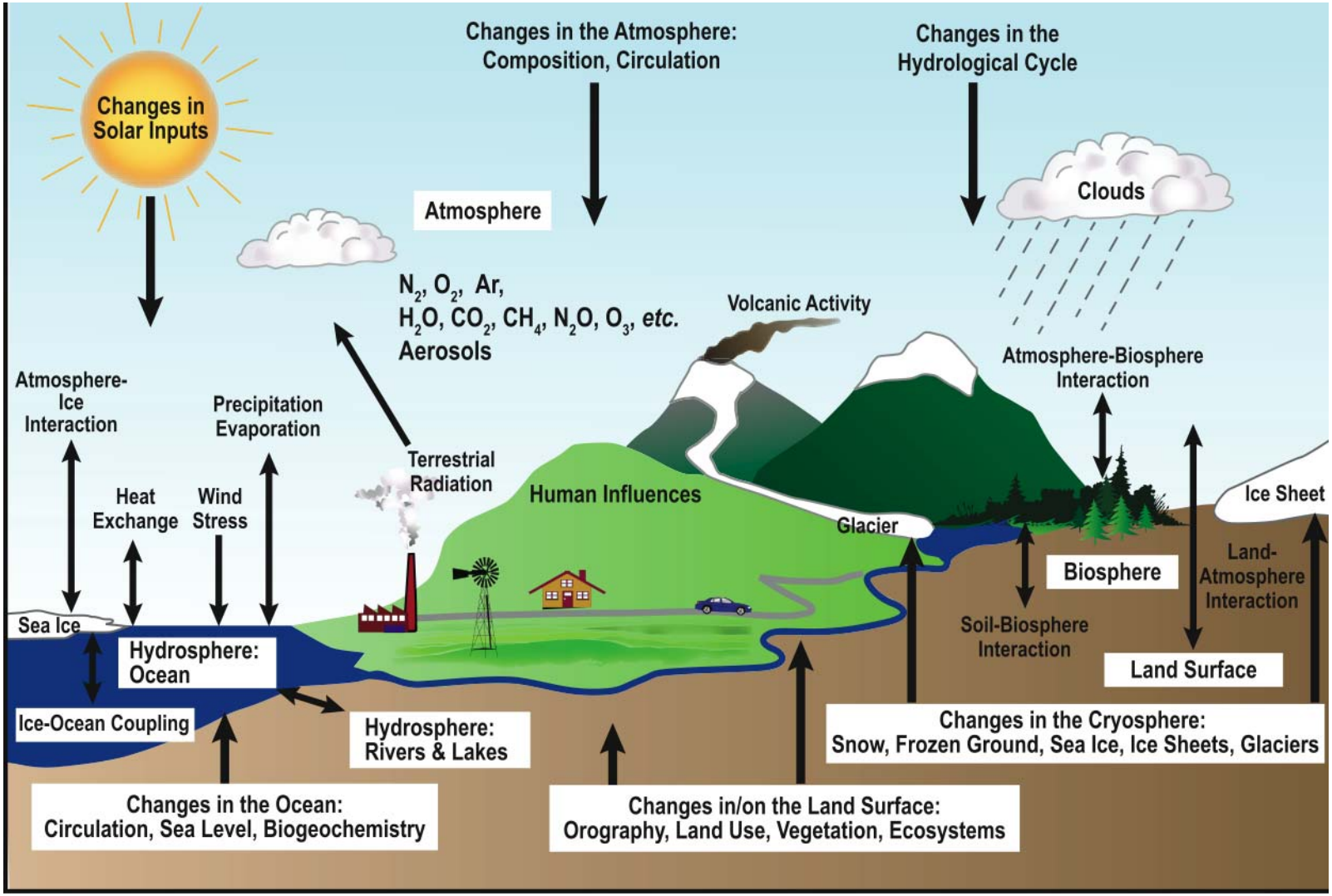


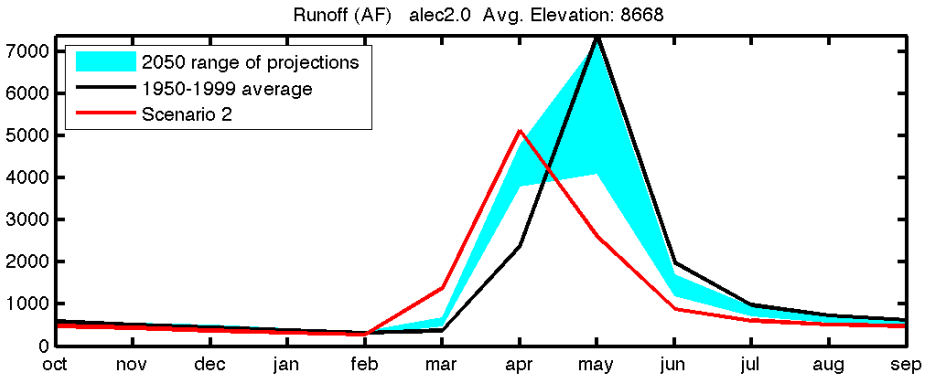
Lessons Learned

- Adaptive Management
- Managers choose
- Partnerships
- Public involvement
- Science-management collaboration
- Incorporate uncertainty

9:10-11:30 **Overviews**	Regional Climate Change Ecological Consequences Trends in Streamflows Adaptation Planning	Mearns Billick/Inouye Barsugli Cross
11:30-11:45	Framework Logistics	Cross/Garfin
11:45-12:45	LUNCH	
12:45-4:30 **Breakout Groups** Refine objectives Develop model Assess impacts	**Gunnison sage-grouse** ("grouse") **Alpine ecosystems** ("Alpine") **Gunnison headwaters** ("hydro")	Schulz & Enquist Cross & Hayward Garfin & Gori
5:00	Happy Hour ☺	

Climate System




Runoff (AF) alec2.0 Avg. Elevation: 8668
2050 range of projections
1950-1999 average
Scenario 2
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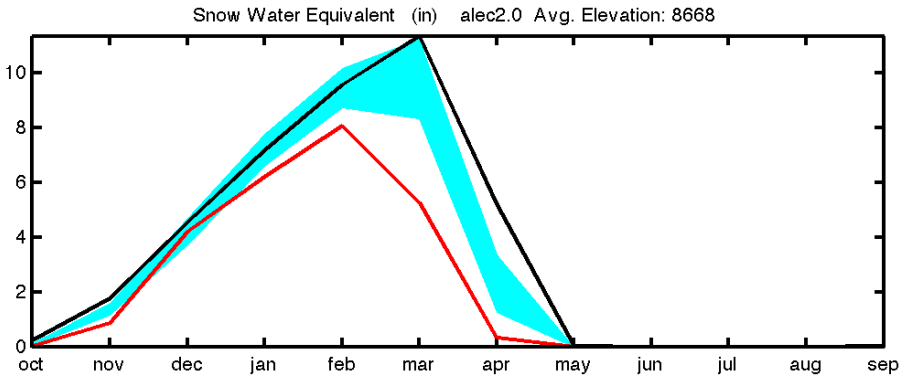
Snow Water Equivalent (in) alec2.0 Avg. Elevation: 8668
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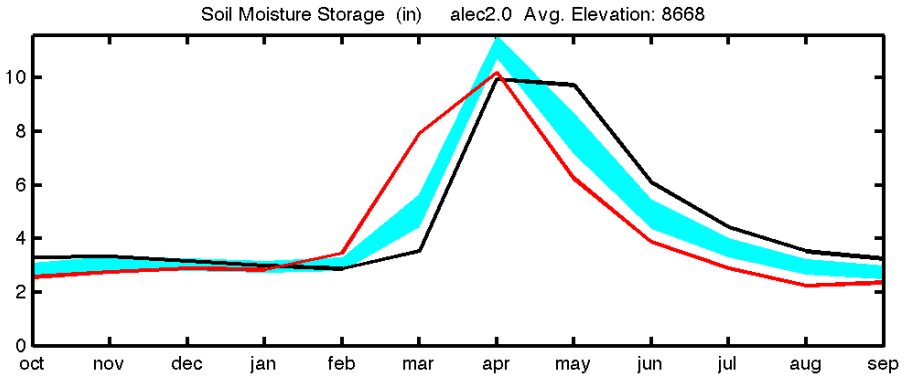
Soil Moisture Storage (in) alec2.0 Avg. Elevation: 8668
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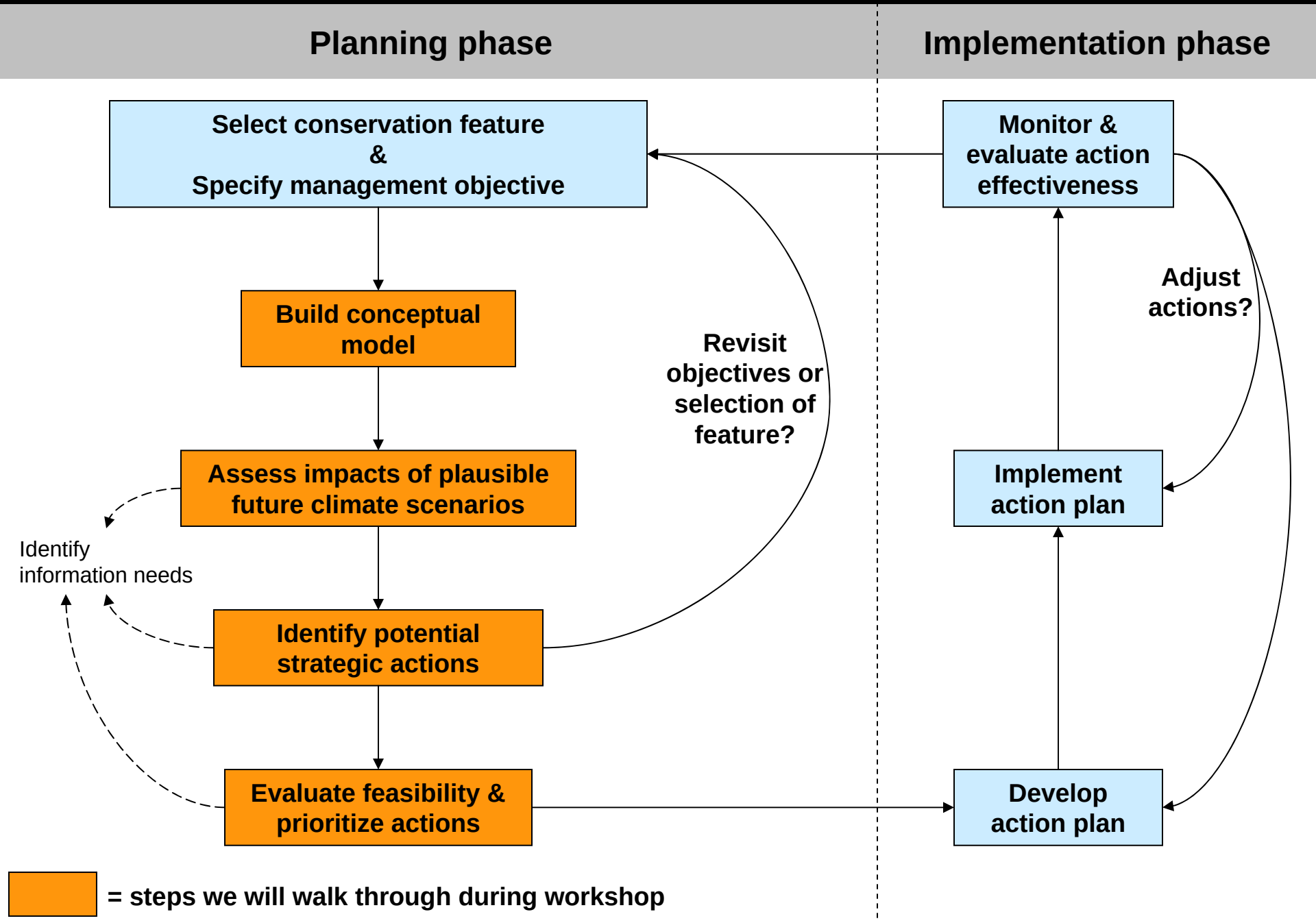
Climate Change Adaptation Framework



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5:00	Happy Hour ☺	

8:30-11:30 **Breakout Groups** Identify Actions Opportunities Needs	Grouse Alpine Hydro	
11:30-12:30	LUNCH	
12:30-1:30 **Report Back**	Discussion	Garfin
1:30-2:30 **Opportunities for Strategic Actions**	Discussion	McCarthy Garfin
2:30-2:45	BREAK	

2:45-3:10 **Monitoring & Future Research**	Discussion	Gori
3:10-4:10 **Panel Discussion**	How Natural Resource Managers are Addressing Climate Change and Potential Next Steps	Gann
4:10-4:20 **Summary, Outcomes, Next Steps**		McCarthy
4:20-4:30 **Closing Remarks**		Sullivan

Workshop Agenda – Tab 1

SOUTHWEST CLIMATE CHANGE INITIATIVE (SWCCI)

WORKSHOP AGENDA
CLIMATE CHANGE ADAPTATION WORKSHOP
FOR NATURAL RESOURCE MANAGERS IN THE GUNNISON BASIN

December 2-3, 2009
Aspinall-Wilson Center, Western State College, Gunnison, Colorado

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WORKSHOP GOAL:
Identify management strategies that will help native plants, animals and ecosystems adapt to a changing climate and lay the groundwork for their implementation.

WORKSHOP OBJECTIVES:
1. Provide background information on climate change as it applies to the Gunnison Basin.
2. Assess the impacts of climate change on a set of high-priority species, ecosystems and natural processes selected by workshop organizers and participants.
3. Identify concrete management strategic actions that will reduce climate change impacts.
4. Identify opportunities for ongoing learning, collaboration, and implementation of on-the-ground climate change adaptation projects in the Gunnison Basin.
5. Present and test a new framework for landscape-scale climate change adaptation for use at this and other sites across the Southwest.

OUTCOMES:
1. Shared understanding of the known current and potential future effects of climate change, through development of conceptual models, for Gunnison sage-grouse, alpine ecosystem and Gunnison headwaters.
2. Set of updated management objectives for Gunnison sage-grouse, alpine ecosystem, and Gunnison headwaters and strategic actions to promote conservation features' resilience and realignment in the face of climate change.
4. Statement of research and monitoring needs for climate adaptation in the Gunnison Basin.
5. Commitment among participants to take action and recommended next steps to be taken by natural resource managers of the Gunnison Basin.

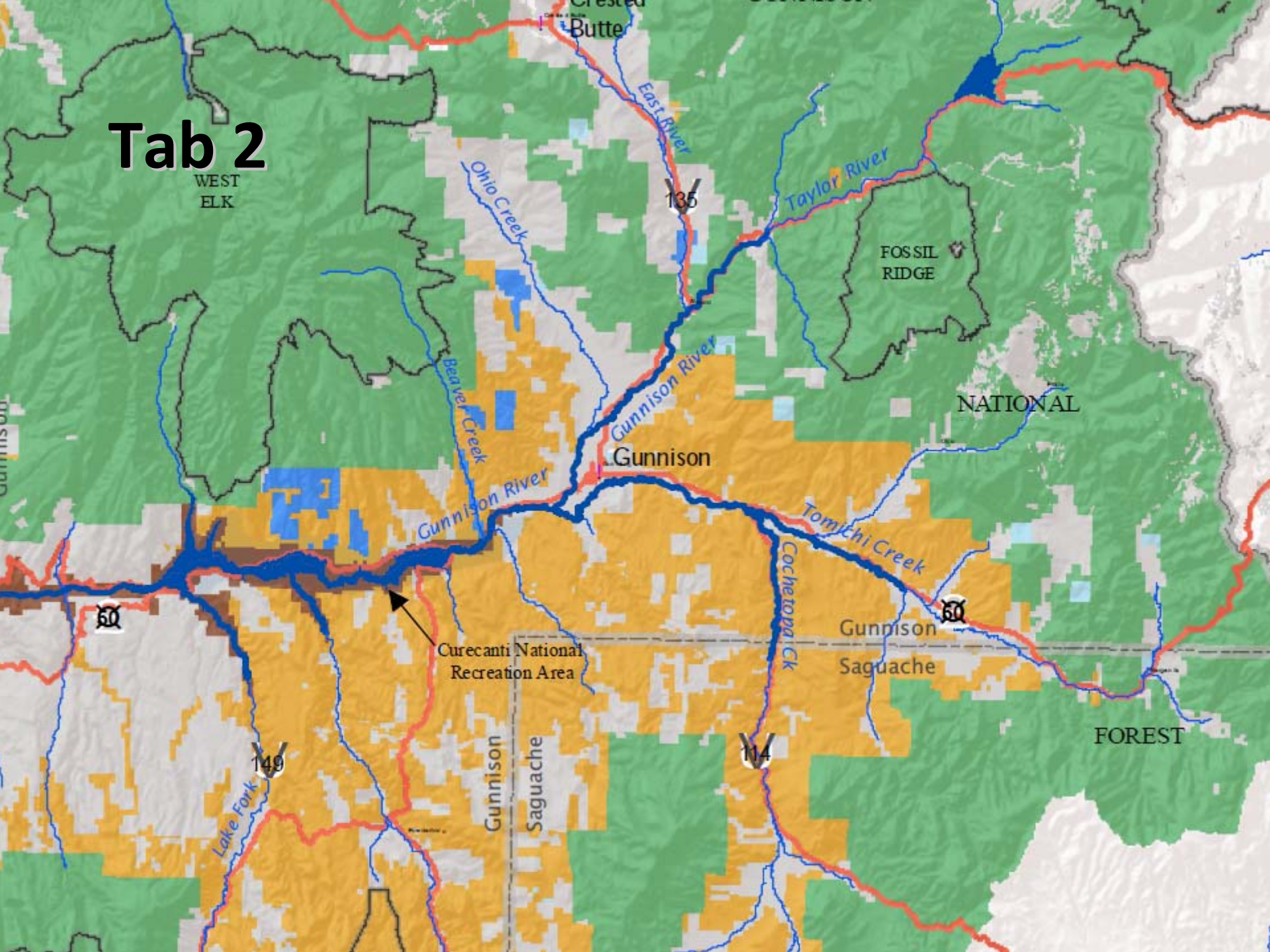
DECEMBER 2, 2009: 8:30 AM -12:00 PM

8:30- 8:40 Welcome
- Tim Sullivan, *State Director, The Nature Conservancy, CO*

8:40-8:50 Southwest Climate Change Initiative (SWCCI) Overview
- Patrick McCarthy, *Director, SWCCI, The Nature Conservancy, NM*

8:50-9:10 Statement of the Problem and Rationale for Workshop

Tab 2


Crested
Butte
East River
Ohio Creek
135
Taylor River
WEST
ELK
FOSSIL
RIDGE
Beaver Creek
Gunnison River
NATIONAL
Gunnison
Gunnison River
Tomichi Creek
Cochetopa Ck
50
50
Gunnison
Saguache
Curecanti National
Recreation Area
FOREST
149
114
Lake Fork
Gunnison
Saguache

Conservation Features – Tab 3

Gunnison Climate Change Adaptation Workshop
Summary of Conservation Features

At the Gunnison Basin Climate Change Adaptation Workshop, we will apply an adaptation planning framework to develop strategic actions for three different types of conservation features (species, ecosystem, and ecological process). Based on participant input, we selected the Gunnison sage-grouse, alpine ecosystem and Gunnison headwaters to be the focus of adaptation planning exercises conducted during breakout sessions.

Criteria for selecting features to focus on at the workshop include: species, ecosystems or processes of ecological significance within the watershed; rare, imperiled or Colorado Division of Wildlife Tier I species; species of concern; availability of information; particular vulnerability to climate change; and potential for development of adaptation strategies. A short description of each of these features is below.

Gunnison sage-grouse:
The largest known population of the Gunnison sage-grouse, only known from southwestern Colorado and southeastern Utah, occurs in the Gunnison Basin. The grouse's priority habitats include montane sagebrush shrublands and riparian meadows. The Gunnison sage-grouse is ranked as critically imperiled by NatureServe/Colorado Natural Heritage Program, and is a Colorado Division of Wildlife Tier I species. Other imperiled species and/or species of concern inhabiting the sagebrush shrublands include Gunnison's prairie dog, Brewer's sparrow, Green-tailed towhee, Vesper's sparrow, Sage thrasher, Rollin's twinpod, skiff milkvetch and Gunnison milkvetch.

Gunnison headwaters:
The Gunnison headwaters include the upper watershed of the Gunnison River above the junction with Beaver Creek. Primary tributaries include East River, Ohio Creek, Taylor River, Tomichi Creek, Los Pinos Creek, and South Beaver Creek. These rivers and streams support riparian woody riparian vegetation. Associated imperiled species and/or species of concern inhabiting the headwaters include Colorado River cutthroat trout, boreal toad, Black Swift, and the Gunnison sage-grouse. The group will consider these "nested" species and ecosystems of conservation concern and the characteristics of the headwaters hydrologic regime that are important for maintaining them.

Alpine ecosystem:
The alpine ecosystem occurs above approximately 11,500 feet (timberline) and includes the highest peaks of the West Elk, Elk, Sawatch, and San Juan Mountains. Alpine habitats include dry alpine tundra, moist to wet alpine meadows, dwarf shrublands, fell-fields, talus slopes, snow and ice fields, and krummholz. These are cold wind-swept environments much of the year and receive intense ultraviolet radiation. For the purposes of this workshop, we will also include the transition zone between the alpine and subalpine zone (e.g., subalpine meadow/tree-line interface) because of potential shifts in plant and animal species. Associated imperiled species and/or species of concern include American pika, yellow-bellied marmot, Uncompahgre fritillary, Colorado tansy-aster, White-tailed Ptarmigan, Brown-capped Rosy Finch, and Rocky Mountain bighorn sheep. Wolverines were historically present.

SWCCI Fact Sheet – Tab 3

The Southwest Climate Change Initiative:
Information and Tools for Natural Resources Management
in a Changing World

The Southwest Climate Change Initiative (SWCCI), a collaboration between The Nature Conservancy and state, federal, private and academic partners, provides information and tools for climate change adaptation planning and implementation to conservation practitioners in the Four Corners states.

The project's objectives:

(1) Assess and map the exposure of natural areas in the Four Corners states – Arizona, Colorado, New Mexico and Utah – to past and projected future climate change.

(2) Identify vulnerable landscapes, watersheds, habitats, and species.

(3) At one case study landscape in each of the four states, build understanding of how climate change may affect ecosystems, and identify strategies that natural resource managers can use to prepare for and adapt to climate change.

The scientific information and tools that the SWCCI develops will be useful in developing regional and landscape-scale management plans, fostering cross-site learning, and informing policy. The SWCCI provides scientific information as a foundation for effective land and water management in a changing world.

Opportunities and benefits of engagement with the SWCCI:

- Learn how climate change affects conservation areas of the Southwestern U.S.
- Help develop practical strategies for climate change preparation and adaptation at case study landscapes in each of the Four Corners states.
- Develop partnerships with the climate change research community to inform and develop effective land and water management policy and practice.
- Help develop and test science-based climate adaptation tools for planners and managers.

Time frame:

- The SWCCI regional exposure assessment will be completed in April 2010. Some products are already available at http://www.climatewizard.org/swcci.
- Landscape adaptation workshops:
  - New Mexico – Jemez Mountains workshop completed in April 2009, follow-up work is now underway.
  - Colorado – Gunnison Basin workshop will be held in December 2009.
  - Arizona – Workshop will be held in northern Arizona in April 2010.
  - Utah – Workshop will be held in May or June 2010.

Climate Scenarios – Notebook Tab 4

Scenarios for Climate Change Adaptation Workshop for Natural Resource Managers in the Gunnison Basin (L. O. Mearns with contribution from J. Barsugli)

Time frame: 2040-2060 compared to 1980-1999
Region: Western Colorado
IPCC SRES Emissions Scenario: A2 ("medium-high emissions")

Scenario #1: Moderate change
Increased annual temperatures (2+°C), no substantial change in annual precipitation, but increased cool season precipitation and decreased warm season precipitation

Season	Precip-%	Temp-°C	Temp-°F
Annual	~0.0	+2.0-3.0	+3.6-5.4
Winter	+15.0	+2.0	+3.6
Spring	-12.0	+2.5	+4.5
Summer	-15.0	+3.0	+5.4
Fall	+4.0	+2.5	+4.5

Scenario #2: Extreme change
Increased annual temperatures (3+°C), ~10% decrease in annual precipitation, with greater decreases in warm season precipitation

Season	Precip-%	Temp-°C	Temp-°F
Annual	-10.0	+3.0	+5.4
Winter	~0.0	+3.0	+5.4
Spring	-15.0	+3.0	+5.4
Summer	-20.0	+4.0	+7.0
Fall	-10.0	+3.0	+5.4

Qualitative statement regarding expected temperature change signal and elevation
Most research for mid-latitude locations indicates increasing temperature change signal with increasing elevation, such that the signal should be largest at higher elevations. However, this statement must be moderated by consideration of the overall degree of warming. With very low levels of warming, this signal may not be seen. For example, in Colorado so far, in trends in observed temperature, more warming is seen at middle and lower elevations. At higher elevations, temperatures are still low enough such that snow persists and a strong feedback between snowmelt and resulting lower reflectivity and increased absorption of energy at the surface (known as the snow albedo feedback) does not develop.

Other general features of climate change
Due to increased temperatures, more precipitation will fall as rain as opposed to snow. Snow melt will start earlier in the spring, and snow will begin to accumulate later in the winter. This will have distinct implications for the timing of runoff, for example.

Page Break

Scenarios for Climate Change Adaptation Workshop for Natural Resource Managers in the Gunnison Basin (L. O. Mearns with contribution from J. Barsugli)

Scenario Framework
The framework for the two scenarios chosen are quantiles of the probability distributions for temperature change and precipitation change (%) for annual and seasonal values for an area covering most of western Colorado, but with input from the other reports cited above.

Quantiles: 25th to 75th*

Season	Precip-%	Temp-°C	Temp-°F
Annual	-9.0 to +7.0	+2.0 to +2.7	+3.6 to +4.8
Winter	-5.0 to +18.0	+1.5 to +2.5	+2.7 to +4.5
Spring	-12.0 to -0.1	+1.7 to +2.5	+3.0 to +4.5
Summer	-20.0 to +6.0	+2.0 to +3.0	+3.6 to +5.4
Fall	-7.0 to +16.0	+2.0 to +2.5	+3.6 to +4.5

*This refers to the values associated with the lowest and highest 25% of the statistical data distribution of model runs.

Scenario Information Sources
- Ray, A. et al., 2008. *Climate Change in Colorado: A Synthesis to Support Water Resources Management and Adaptation*. Boulder, CO: Western Water Assessment. http://cwb.state.co.us/Home/ClimateChange/ClimateChangeInColoradoReport)
- *Climate Change and Aspen: an Assessment of Impacts and Potential Responses* (http://www.aspci.org/dB/PDFs/Publications/2006_CCA.pdf)
- Probabilistic information generated using the CMIP3 suite of model results, based on methods used by Tebaldi, C. et al. 2004, 2005.
  - Tebaldi, C., L. O. Mearns, R. Smith, D. Nychka, 2004. Regional probabilities of precipitation change: A Bayesian approach. *Geophys. Res. Lett.* 31 L24213, doi:10.1029/2004GL021276
  - Tebaldi, C., R. Smith, D. Nychka, and L. O. Mearns, 2005. Quantifying uncertainty in projections of regional climate change: A Bayesian approach to the analysis of multi-model ensembles. *J. Climate* 18:1524-1540.
- Results from *Regional Climate Projections* (Christensen, J.H., et al., 2007, in: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Solomon, S., et al. (eds.)] http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-chapter11.pdf)
- Preliminary results from the North American Regional Climate Change Assessment Project (NARCCAP http://www.narccap.ucar.edu/) Regional Climate Model Simulations. The main emissions scenario considered is the A2, a medium high scenario. Mearns, L. O., et al., 2009. A regional climate change assessment program for North America. *EOS*, September 2009.

Page Break

Scenarios for Climate Change Adaptation Workshop for Natural Resource Managers in the Gunnison Basin (L. O. Mearns with contribution from J. Barsugli)

Climate Change Adaptation Framework – Tab 5

Climate Change Adaptation Framework

Gunnison Climate Change Workshop
Southwest Climate Change Initiative
December 2-3, 2009

At the workshop, we will present an iterative framework for developing strategic actions for climate change adaptation[1]. The climate change adaptation framework is designed for collaborative application in a given landscape by a multidisciplinary group of managers, conservation practitioners and scientists, and includes the following steps (Figure 1):

1) **Select feature targeted for conservation** (e.g., species, ecological processes, or ecosystems) and **specify an explicit, measurable management objective** for that feature;

2) **Build a conceptual model** that illustrates the climatic, physical, ecological, and socio-economic drivers that affect the selected feature;

3) **Assess impacts of plausible future climate scenarios:**

   a. Use the conceptual model to assess climate change impacts (i.e., develop hypotheses of change) by examining how specific changes in climate variables might directly or indirectly influence the selected feature, for each scenario of future climate conditions being considered;

   b. Consider how human responses to climate change (e.g., solar and wind power development, construction of dams for increased water storage, etc.) may influence the selected feature;

   c. Assess the likely impact of climate change relative to other known impacts or threats, and identify which climate-induced impacts are most critical to address to achieve the stated management objective.

4) **Identify potential strategic actions in light of climate change:**

   a. Identify intervention points—those places in the system that we can influence through management and conservation actions;

   b. Brainstorm potential strategic actions that can be taken at those intervention points to achieve the stated objective under each climate scenario;

   c. Determine whether the management objective or the selection of the feature needs to be revisited: Does climate change fundamentally change the landscape? Do the management objectives for that feature need to change? Will the feature even be found in the same location in the future? Does our view of the landscape and boundaries need to change?

[1] The Climate Change Adaptation Framework presented here is adapted from Cross et al. (in prep.) (contact mcross@wcs.org for a copy of the manuscript) and The Nature Conservancy's "Conservation Action Planning Guidelines for Developing Strategies in the Face of Climate Change" (October 2009) (included in workshop folders).

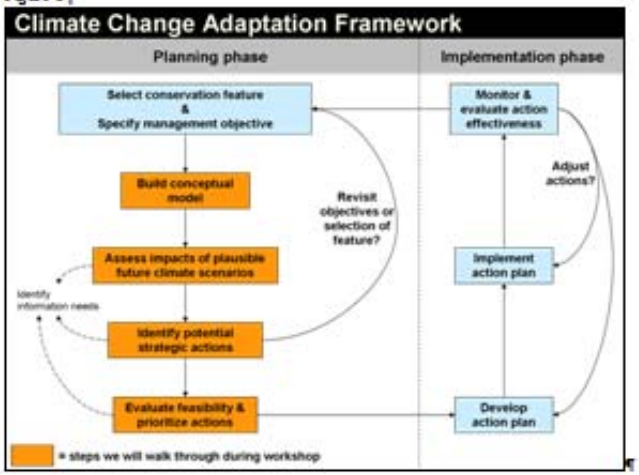
5) **Evaluate feasibility of potential strategic actions and prioritize** according to factors such as: cost; social and political feasibility; potential for positive effects or risk of unintended negative consequences for other features or objectives; and robustness to uncertainty in future climate;

6) **Develop action plan** outlining priority strategic actions to be implemented;

7) **Implement action plan;**

8) **Monitor and evaluate action effectiveness** and progress toward objectives—adjust or reevaluate actions if needed to address system changes or ineffective actions.

Figure 1



Tables for Planning Exercises – Tab 5

Table 2. Identification of Strategic Actions to Address Climate Change Impacts for Scenarios #1 and #2: Gunnison Climate Workshop

Conservation Feature (circle): sage-grouse, alpine ecosystem, Gunnison headwaters

Management Objective:_____

Climate Change Impact (Hypotheses of Change)	Intervention Point	Scenario #1 Strategic Action	Scenario #2 Strategic Action	Level of Urgency / Priority	Opportunities to Implement

Definitions – Tab 5

Gunnison Climate Workshop Definitions

1. **Adaptation to climate change:** An adjustment in natural systems in response to a changing climate in order to moderate adverse impacts or capitalize on novel opportunities (IPCC 2007). Adaptation involves anticipating the influence of climate change and using this information to make proactive choices to achieve objectives.

2. **Adaptive capacity:** The ability of a system to adjust, to moderate, to take advantage of, or cope with novel conditions (IPCC 2000). Enhancing an ecosystems adaptive capacity is an effort to reduce the systems vulnerability and/or strengthen its ecological resilience through management or mitigation.

3. **Adaptive strategies:** Three approaches to adaptive strategies are resistance, resilience, and enabling natural resources to respond to changes, e.g., improving habitat connectivity to enable species movement (the latter is the most proactive approach).

4. **Climate change impacts (hypotheses of change):** How climate change will specifically impact conservation features and their ecological attributes. Vulnerability of the systems-the combination or exposure and sensitivity of the ecology of the species or ecosystem (e.g., *significantly reduced snow pack will alter the spring and summer hydrologic flow regime for a riparian ecosystem*).

5. **Conceptual ecological model:** Illustration of the climatic, ecological, social and economic drivers that affect a selected species or ecosystem. A box and arrow diagram representing ecological relationships to help understand and communicate potential ecological impacts of climate change on conservation features.

6. **Driver:** An ecological element that causes a change in an organism, community, ecosystem, or other ecological component of the landscape.

7. **Exposure:** The degree, duration, and/or extent to which a system is in contact with a perturbation, often depicted by analysis of historic climate and future climate projection data (such as changes in temperature and precipitation).

Literature – Tab 6

Environmental Management
DOI 10.1007/s00267-009-9345-1

U.S. Natural Resources and Climate Change: Concepts and Approaches for Management Adaptation

Jordan M. West · Susan H. Julius · Peter Kareiva · Carolyn Enquist · Joshua J. Lawler · Brian Petersen · Ayana E. Johnson · M. Rebecca Shaw

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Abstract Public lands and waters in the United States traditionally have been managed using frameworks and objectives that were established under an implicit assumption of stable climatic conditions. However, projected climatic changes render this assumption invalid. Here, we summarize general principles for management adaptations that have emerged from a major literature review. These general principles cover many topics including: (1) how to assess climate impacts to ecosystem processes that are key to management goals; (2) using management practices to support ecosystem resilience; (3) converting barriers that may inhibit management responses into opportunities for successful implementation; and (4) promoting flexible decision making that takes into account challenges of scale and thresholds. To date, the literature on management adaptations to climate change has mostly focused on strategies for bolstering the resilience of ecosystems to persist in their current states. Yet in the longer term, it is anticipated that climate change will push certain ecosystems and species beyond their capacity to recover. When managing to support resilience becomes infeasible, adaptation may require more than simply changing management practices—it may require changing management goals and managing transitions to new ecosystem states. After transitions have occurred, management will again support resilience—this time for a new ecosystem state. Thus, successful management of natural resources in the context of climate change will require recognition on the part of managers and decisions makers of the need to cycle between "managing for resilience" and "managing for change."

Keywords Climate change · Adaptation · Resource management · Ecosystems · Resilience · Uncertainty · Triage · Thresholds

The views expressed herein are those of the authors and do not represent official policies of the U.S. Environmental Protection Agency.

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TNC Planning Guidelines & Gunnison Measures of Conservation Success - Tab 6

CONSERVATION LEARNING UNIT

Process for Adjusting a Conservation Action Plan to the Potential Impacts of Climate Change for the Climate Adaptation Clinic

VERSION 1.3, August 2009

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Gunnison Basin Project

Measures of Conservation Success

The Gunnison Basin is a vast sagebrush landscape containing the largest population of Gunnison sage grouse and all the world's skiff milkvetch, a rare plant. An area in need of restoration and habitat protection, the Gunnison Basin has been identified by The Nature Conservancy as a priority landscape for its conservation efforts. This document describes the work the Conservancy in partnership with private landowners, local land trusts, and public agencies is doing to conserve this important area.

What We Want to Conserve

The primary focus of our conservation efforts in the Gunnison Basin will be directed towards protection and restoration of extensive areas of sagebrush shrubland which contain the largest population of the Gunnison sage grouse, all known populations of the skiff milkvetch, as well as other rare plants and animals, and riparian systems.

Our Conservation Vision

The long-term vision for the Gunnison Basin is to protect and manage, as a natural landscape, an approximately 300,000-acre montane sagebrush shrubland system with viable populations of Gunnison sage grouse and skiff milkvetch. This vision includes increasing awareness, appreciation and support for conservation among landowners, political officials, donors, and the public.

Participant List – Tab 7

Gunnison Climate Change Adaptation Workshop Participant List
November 11, 2009

Organization	Last Name	First Name	Target Group	E-mail Address
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Evaluation Form – Tab 8

Gunnison Climate Change Adaptation Workshop
December 2-3, 2009

I am a: ☐ Public Agency Natural Resource Planner or Manager ☐ Public Agency or Academic Scientist
☐ Breakout Session Facilitator ☐ Breakout Session Notetaker ☐ TNC or other NGO Employee
☐ Other: _____

1=Not at All 2=Marginal 3=Neutral 4=Mostly 5=Absolutely

	This presentation or activity provided valuable information that enhanced my understanding of climate adaptation issues (Not at all → Absolutely)	This presentation or activity increased my ability to incorporate climate change impacts into my management/conservation work (Not at all → Absolutely)
Day 1 – Wednesday, December 2		
• Welcome and opening presentations by Sullivan, McCarthy and Garfin	1 2 3 4 5	1 2 3 4 5
• Climate change science presentations by Mearns, Billick, Inouye and Barnugli	1 2 3 4 5	1 2 3 4 5
• Overview of conservation adaptation planning and explanation of adaptation framework by Cross and Garfin	1 2 3 4 5	1 2 3 4 5
• Break-outs: *management objectives, models & climate change impacts*	1 2 3 4 5	1 2 3 4 5
Day 2 – Thursday, December 3		
• Break-outs: *strategic actions, research and monitoring needs*	1 2 3 4 5	1 2 3 4 5
• Full group presentation and discussion: *priority strategic actions*	1 2 3 4 5	1 2 3 4 5
• Full group discussion: *monitoring & research priorities*	1 2 3 4 5	1 2 3 4 5
• Panel discussion: *implementing workshop recommendations*	1 2 3 4 5	1 2 3 4 5
• Workshop summary and closing remarks by McCarthy and Sullivan	1 2 3 4 5	1 2 3 4 5
• Peer review of each project adaptation strategies	1 2 3 4 5	1 2 3 4 5
• Team break-outs: improving adaptation strategies & next steps	1 2 3 4 5	1 2 3 4 5
• Closing plenary presentations	1 2 3 4 5	1 2 3 4 5
Overall Workshop		
• I have a better understanding of the impacts of climate change on the Gunnison Basin.	1 2 3 4 5	1 2 3 4 5
• The framework presented is useful for developing climate adaptation strategies.	1 2 3 4 5	1 2 3 4 5
• The presenters were knowledgeable & well prepared.	1 2 3 4 5	1 2 3 4 5
• The facilitators were knowledgeable & well prepared.	1 2 3 4 5	1 2 3 4 5
• The workshop was the right size.	1 2 3 4 5	1 2 3 4 5
• Overall, I have a better understanding of the resources that are available and how to incorporate climate adaptation strategies into my conservation work.	1 2 3 4 5	1 2 3 4 5

Participation & Interaction

Ground Rules

- Participate
- Don’t Dominate
- “Boss-Free Zone”
- Everyone advocates
  - but the team decides
- Cell phones off
- No email or side conversations
- Have Fun

Questions?

Gregg Garfin
Institute of the Environment
The University of Arizona
www.environment.arizona.edu

- What is the **greatest barrier** or uncertainty that **you** face in **moving forward** on planning for climate change?

- Do you think **you** can do anything about it?

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