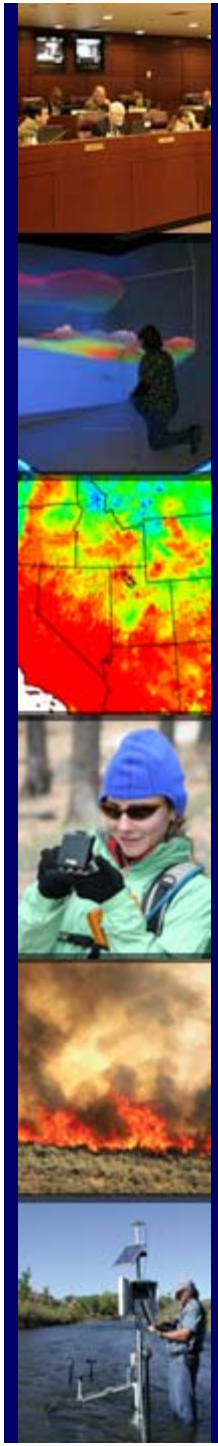


Nevada Infrastructure for Climate Change Science, Education, and Outreach

Nevada Infrastructure for Climate Change Science, Education, and Outreach

Project Director
Gayle Dana (DRI)

Principal Investigators
Nick Lancaster (DRI)
Scott Mensing (UNR)
Tom Piechota (UNLV)

July 13, 2009

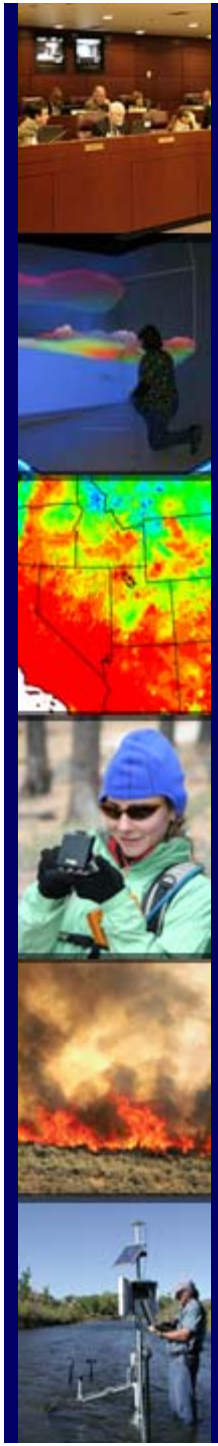
Presentation to

Lake Mead Water Quality Forum

NSF

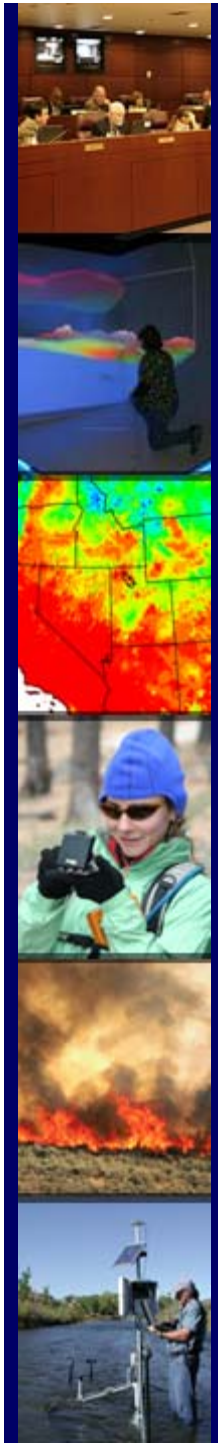
EPSCoR
Experimental Program to Stimulate Competitive Research

Nevada System of Higher Education
1865



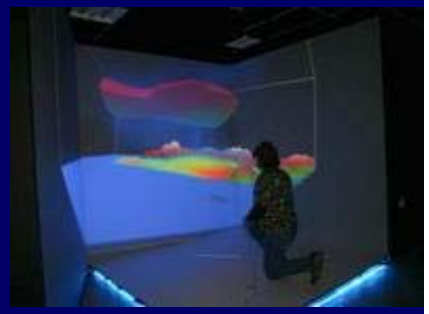
Vision

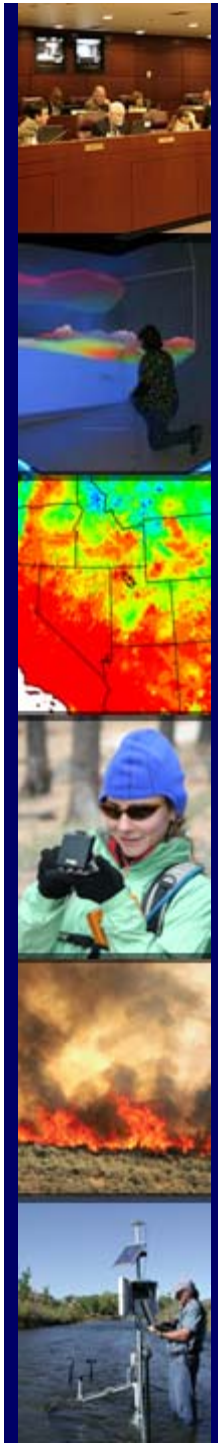
- *Create a statewide interdisciplinary program and virtual climate change center to....*
- *Stimulate transformative research, education, and outreach on the effects of regional climate change on ecosystem services (especially water resources) and....*
- *Support use of this knowledge by policy makers and stakeholders*



Project Basics

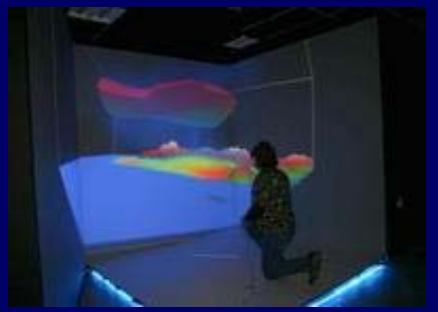
- 5 years (Sept 2008 to Aug 2013)
- NSF: $15,000,000 ($3,000,000/year)
- NSHE EPSCOR: $6,500,000
- NSHE Institutions
  - University of Nevada, Reno
  - University of Nevada, Las Vegas
  - Desert Research Institute
  - Nevada State College

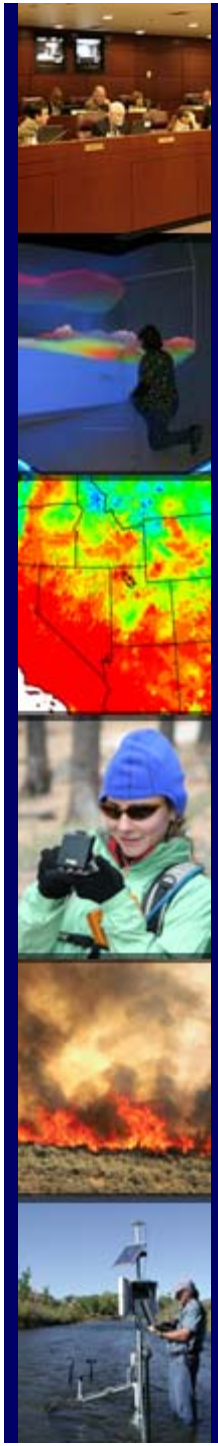




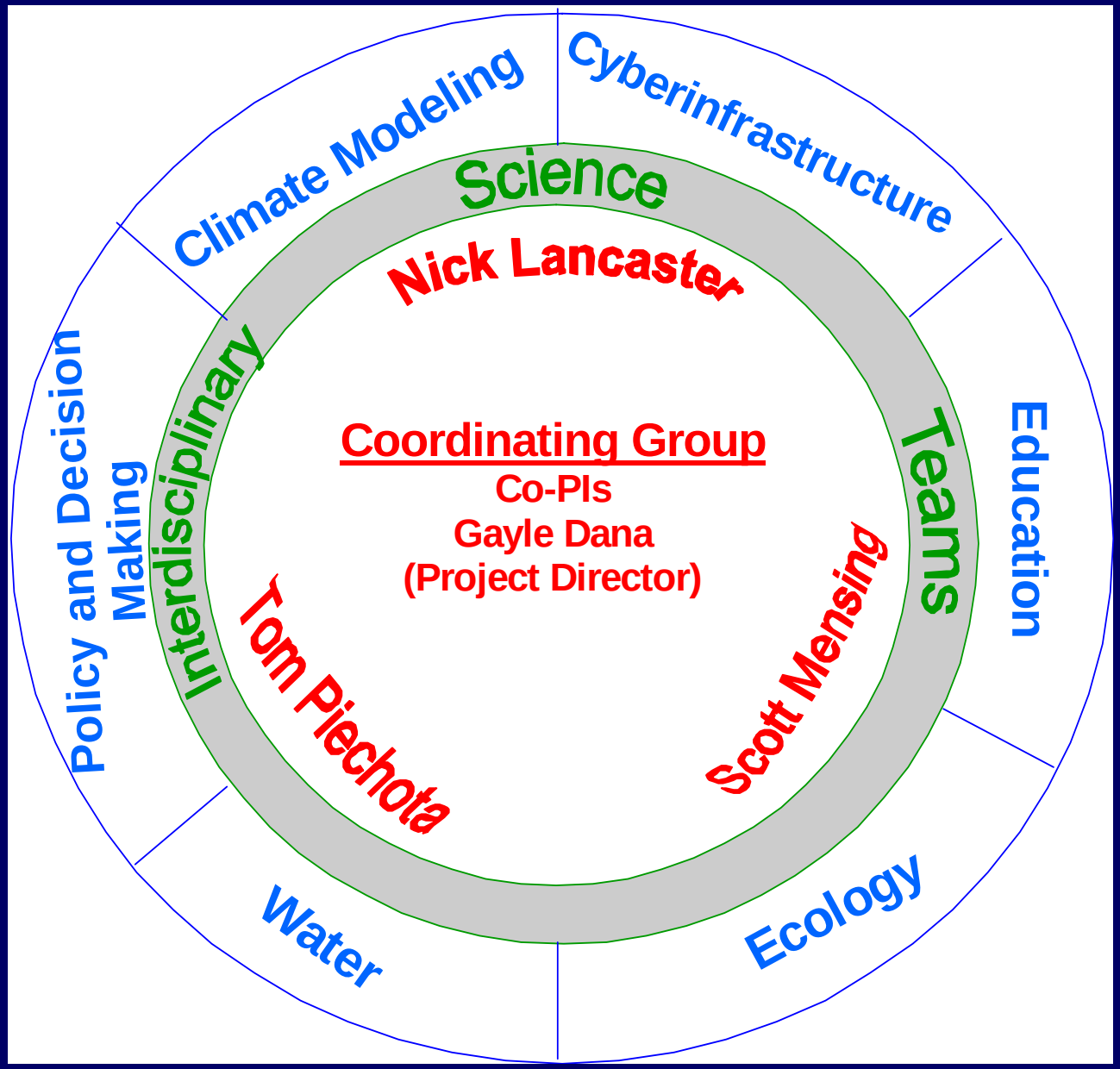
Legacies (Infrastructure Building)

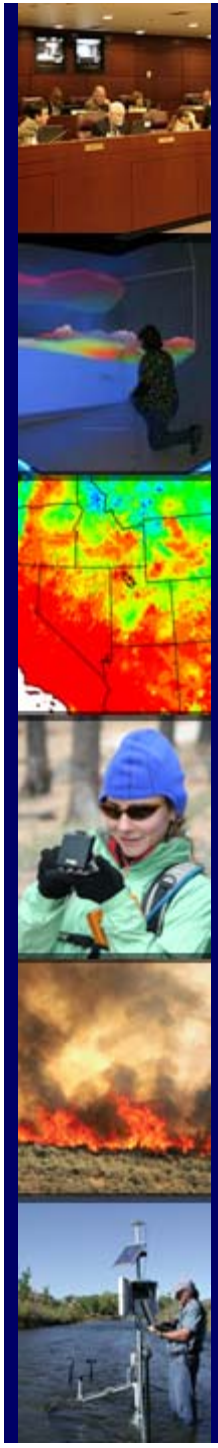
- Regional Climate Modeling
- Observational Network
  - Central and Southern Nevada
  - Water resources and ecology
- Climate Change Data Portal
- Enhanced Computational Abilities (e.g., clusters, visualization)
- Climate change education (NSHE and K-12)
- Seven (7) new faculty in NSHE





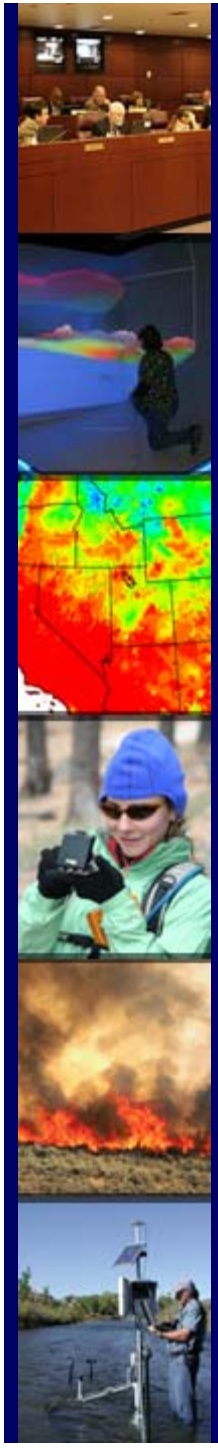
Project Science Structure





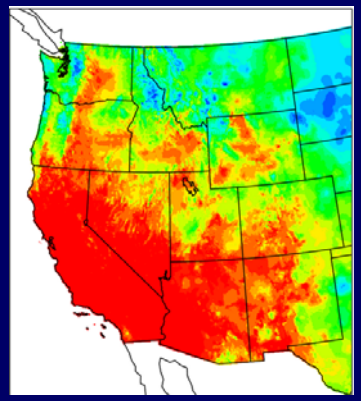
Steering Committees

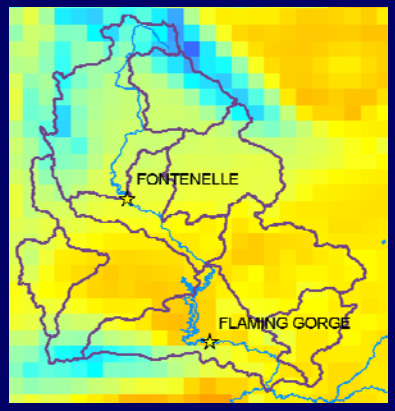
- Climate Modeling
  - Darko Koracin, DRI
  - Scott Bassett, UNR
  - Zhongbo Yu, UNLV
- Education
  - David Hassenzahl, UNLV
  - Michael Collopy, UNR
  - Saiid Saiidi, UNR
  - John Farley, UNLV
  - Paul Buck, CSN
  - Jacque Ewing-Taylor, UNR
- Cyberinfrastructure
  - Sergiu Dascalu – UNR
  - Shahram Latifi – UNLV
  - Fred Harris – DRI
- Water
  - Michael Young, DRI
  - Dale Devitt, UNLV
  - Laurel Saito, UNR
- Ecology
  - Franco Biondi, UNR
  - John (“Jay”) Arnone, DRI
  - Brett Riddle, UNLV
- Policy and Decision Making
  - William Smith, Jr., UNLV
  - Asako Stone, DRI
  - Derek Kauneckis, UNR

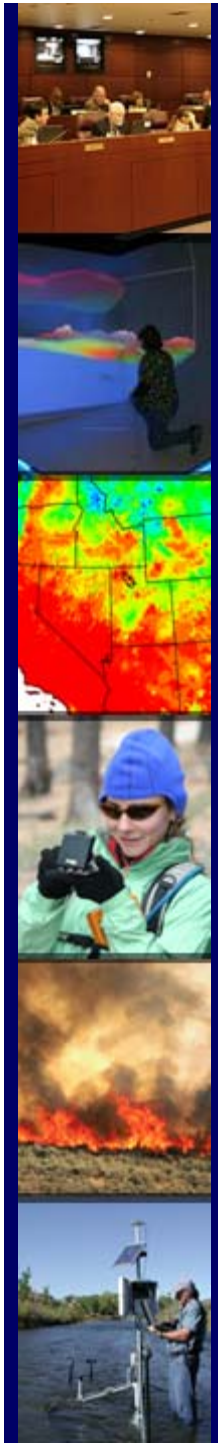


Climate Modeling

- Climate predictions on state, regional, urban, and local scales primarily focused on:
  - Hydrological resources
  - Alternative futures – Urbanization
  - Renewable energies (wind, solar)
  - Air quality
- Integrative studies with other components
- Paleoclimate predictions on various scales

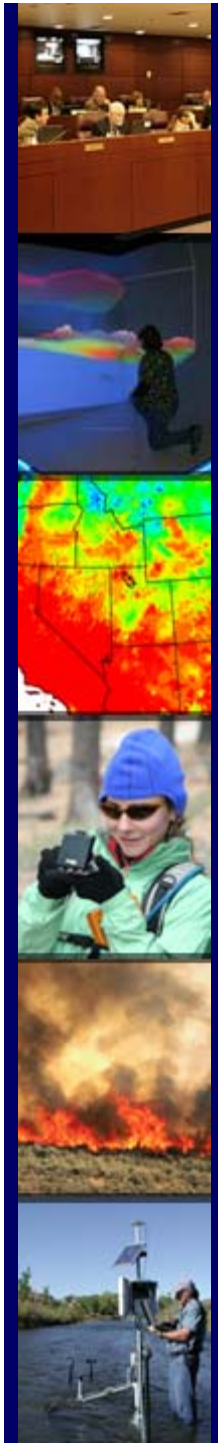






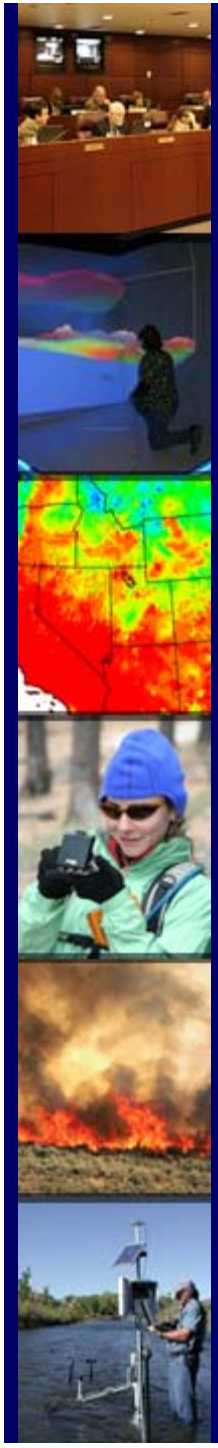
Water

- Environmental transects at two locations in Nevada (Sheep Range/Spring Mtns and Great Basin NP)
- Data to improve our understanding of processes controlling local and basin-wide recharge rates
- Information to be used with numerical models to evaluate interactions between surface and groundwater systems
- Predictions, including uncertainties, that can be used to assess how these interactions will differ under climate change and/or climate variability scenarios.

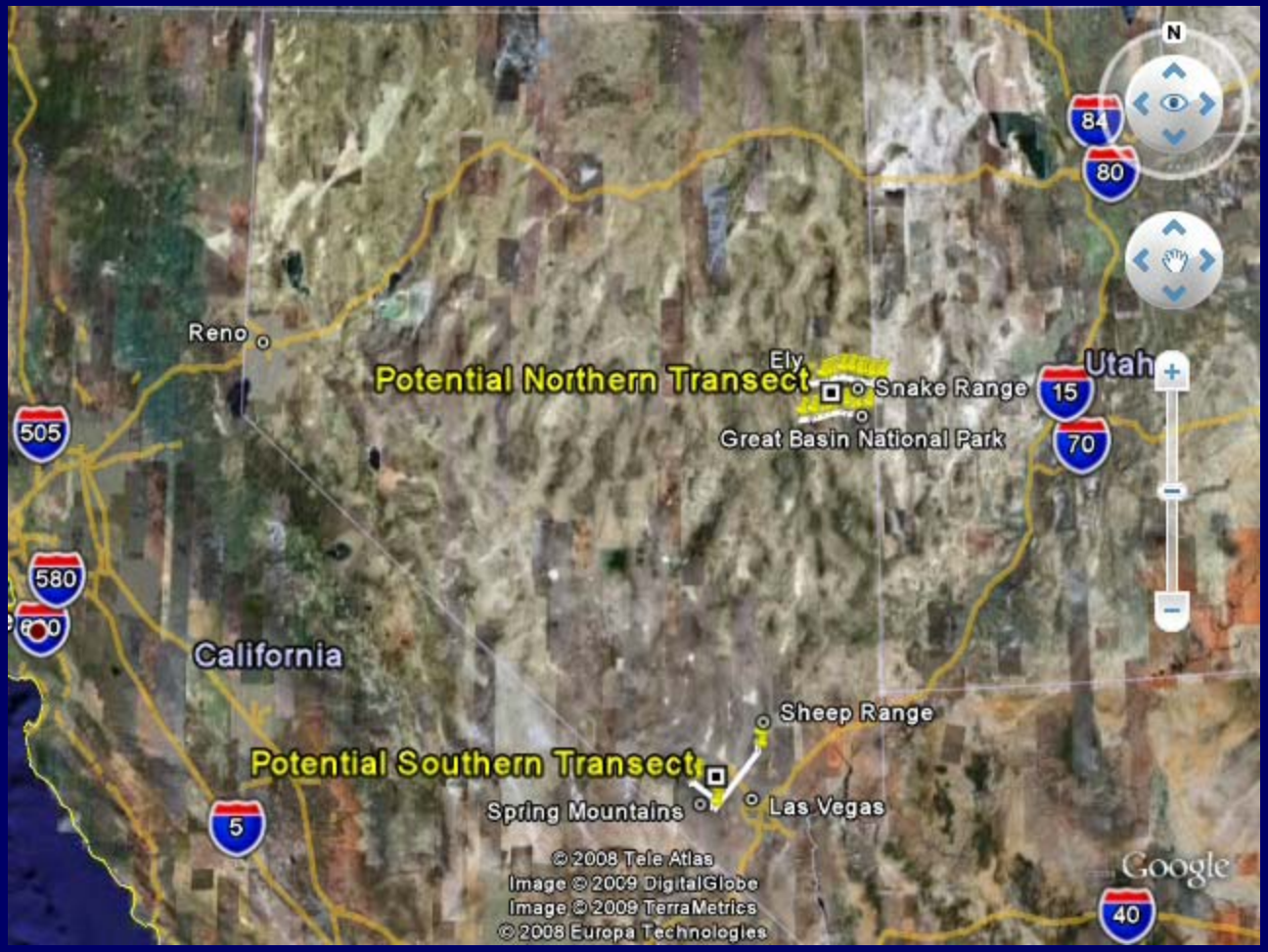


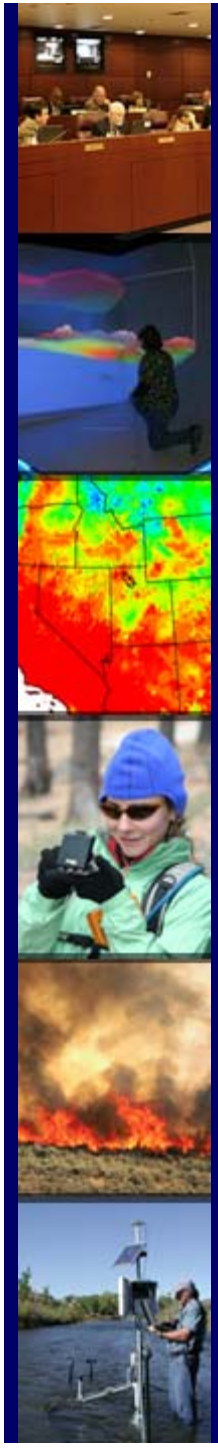
Ecology

- Also uses the Environmental Transects
- Improved understanding of processes controlling local and basin-wide impacts of climate on species dynamics and disturbance regimes
- Information to be used with numerical models to evaluate interactions between landscape-level processes and biophysical indicators
- Predictions, including uncertainties, of changes in wildfire regime, primary productivity, biodiversity (including invasive species), etc.

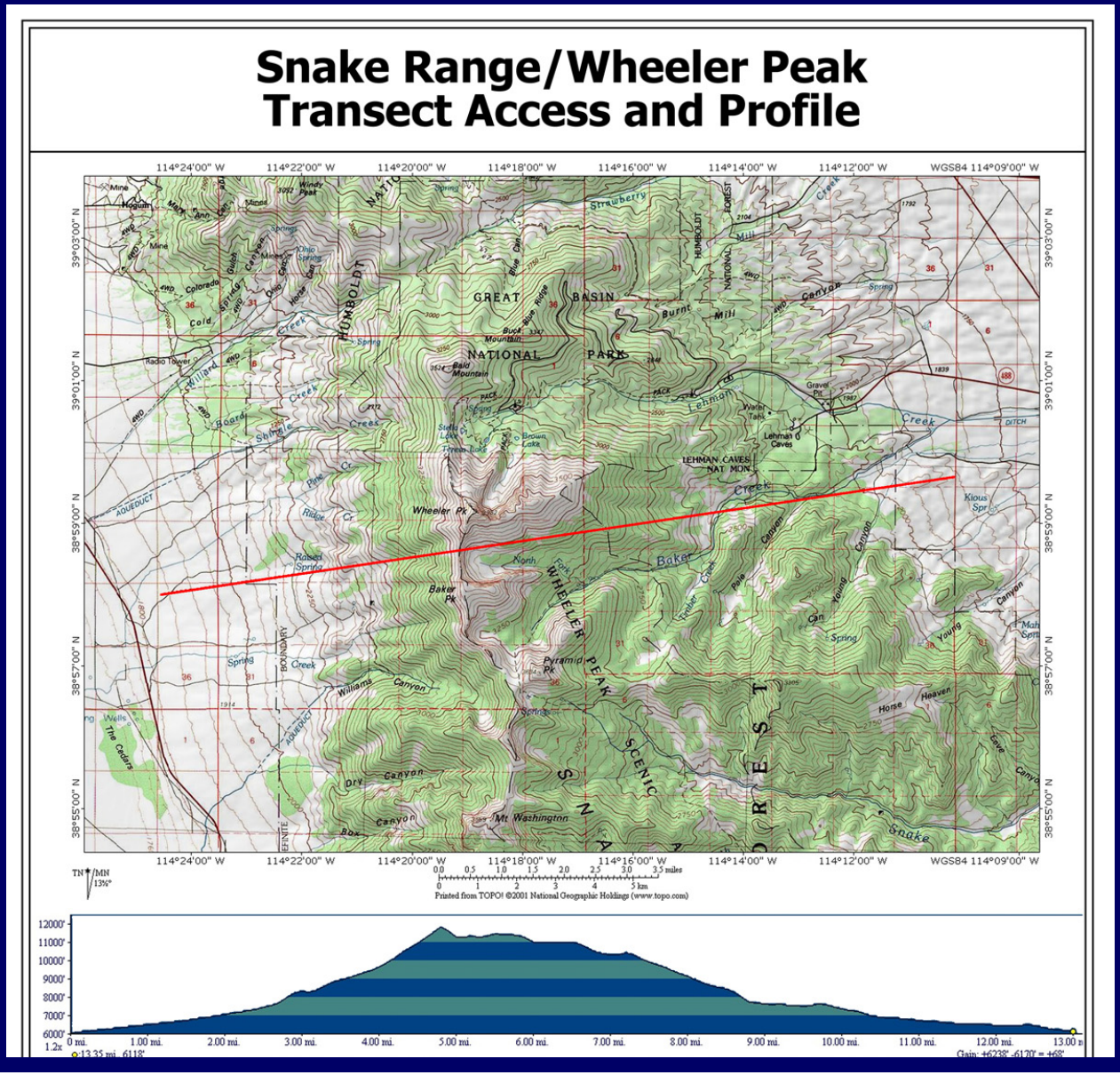


Environmental Transects



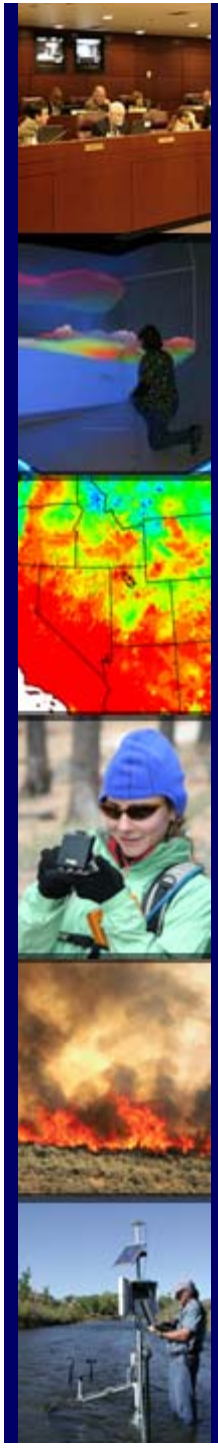


Profile of Transect

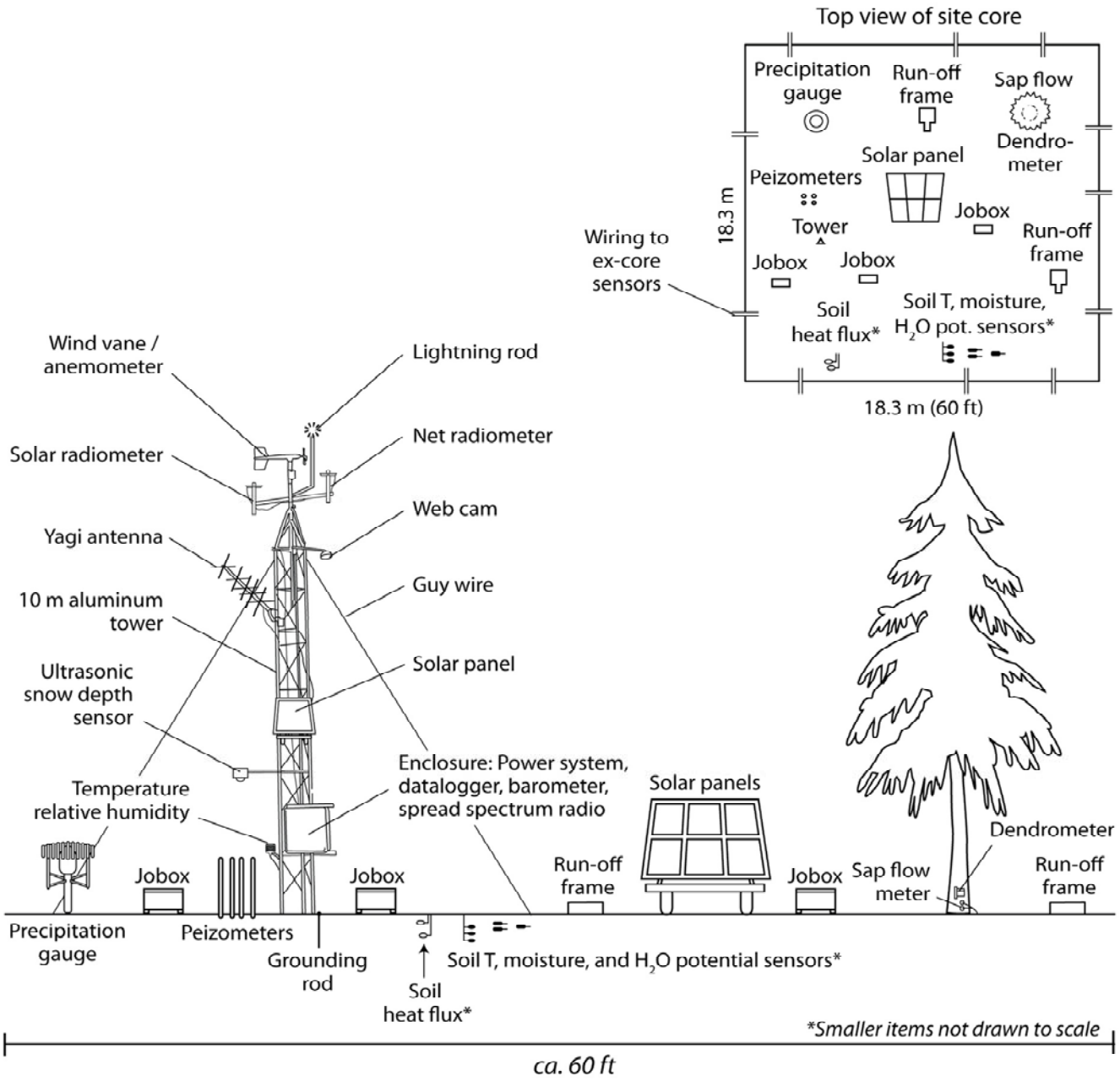


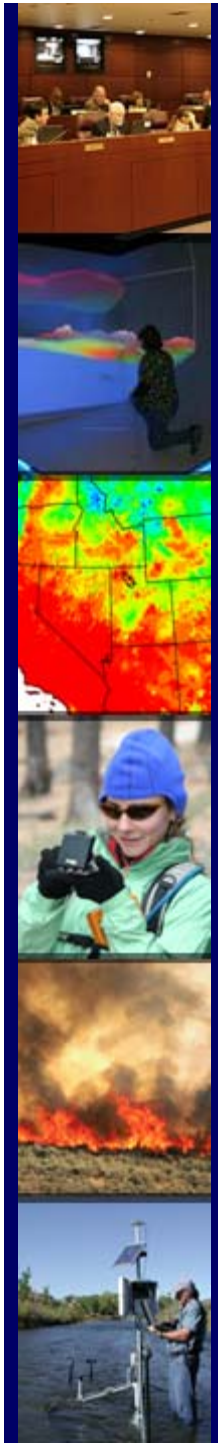

Elev. 7000


Elev. 8500

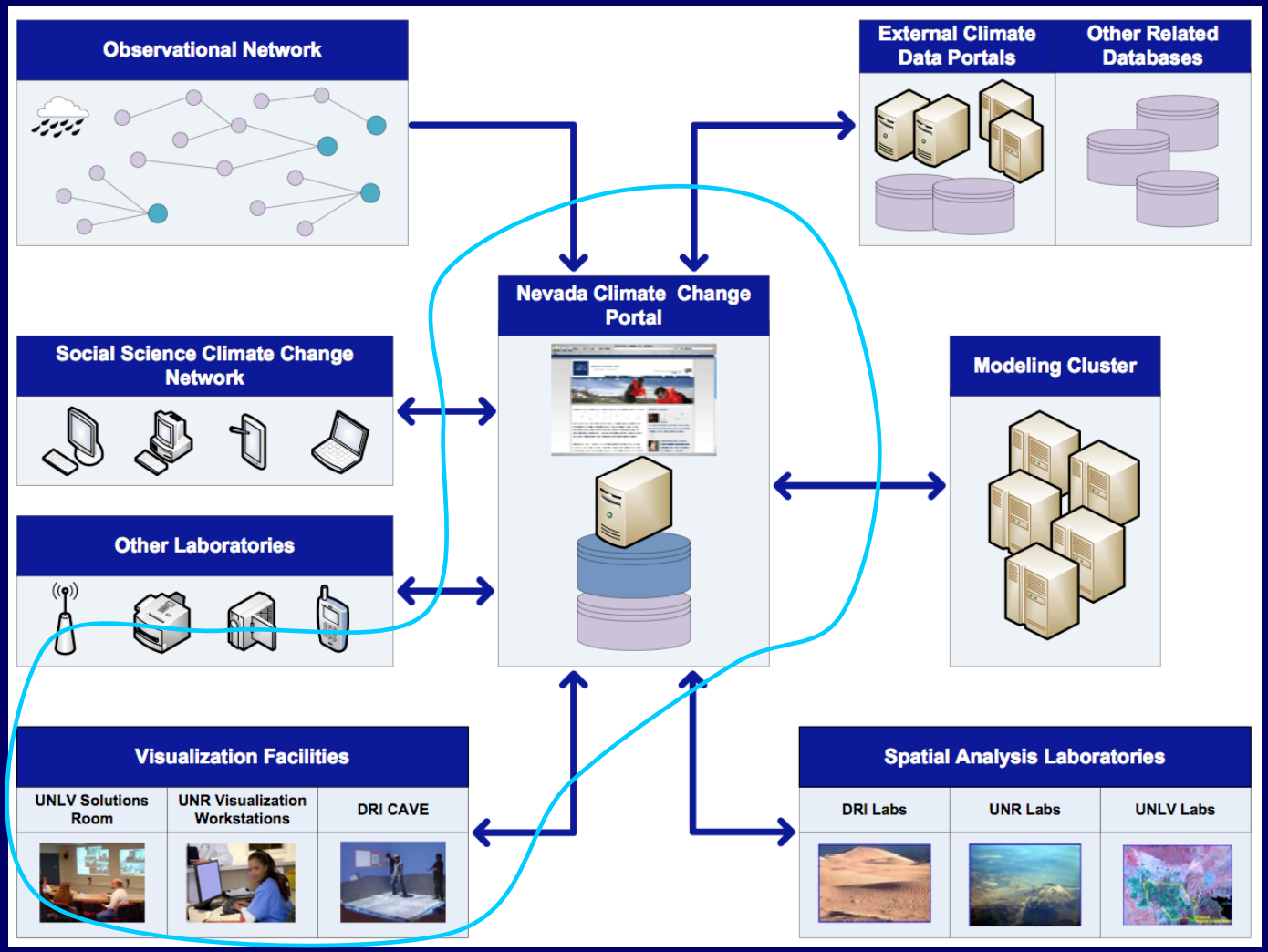


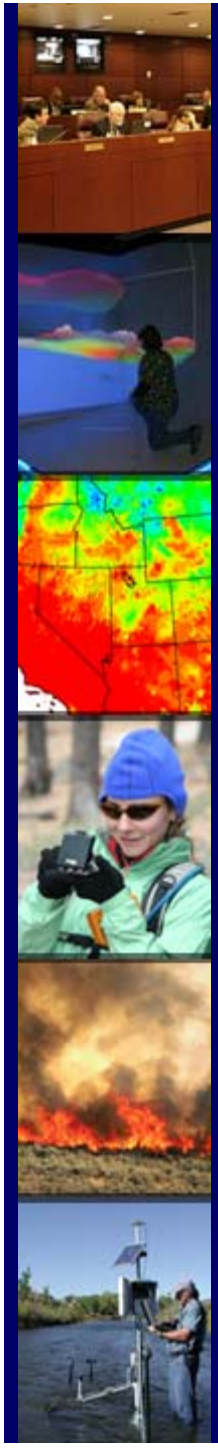
Typical Site





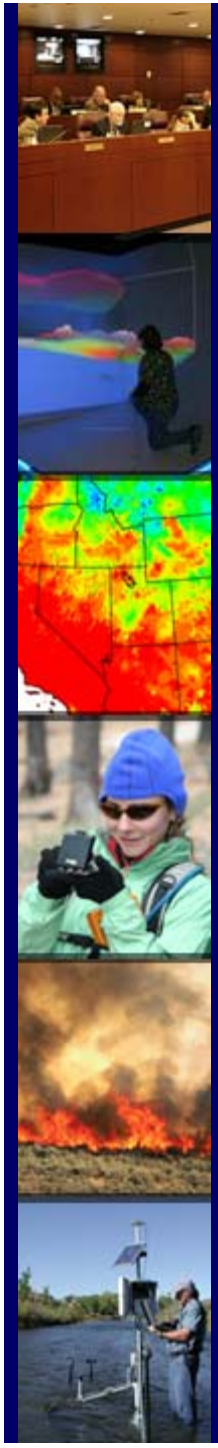
Cyberinfrastructure and Data Portal





Policy and Decision Making

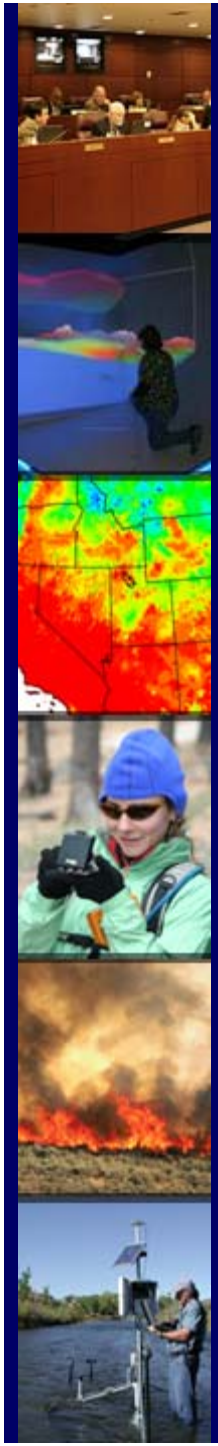
- Data collection that is synergistic with biophysical monitoring
- Visualization of functional multidisciplinary spatial data to inform behavior and policy
- Improved science communication regarding alternative scenarios modeled, and scientist's understanding of audience perceptions and needs
- Integration of local & 'scientific' knowledge to enhance community resilience to climate change



Interdisciplinary Science Teams

- How will climate change affect water resources and linked ecosystem services and human systems?

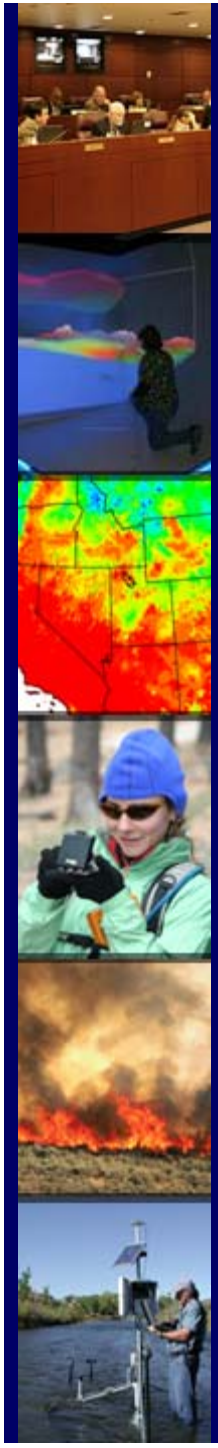
- How will climate change affect disturbance regimes (e.g., wildland fires, invasive species, insect outbreaks, droughts) and linked systems?



Current Interdisciplinary Science Teams

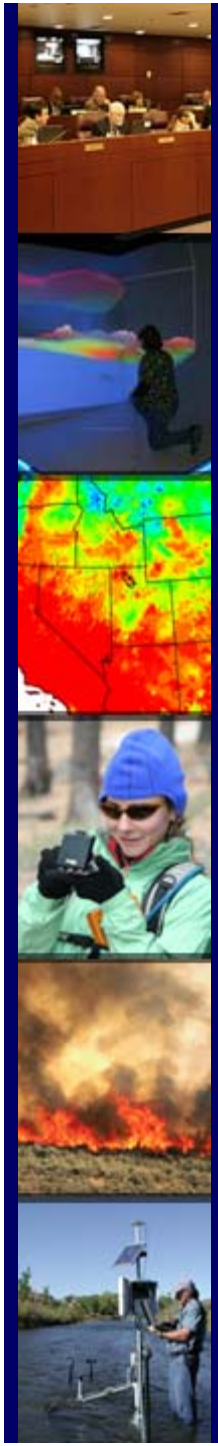
- ***"Losing the Lake"***
  UNLV, UNR, DRI

- ***"Effects of Climate Change on Spring Ecosystem Hydroecology as a guide to developing alternative water policies"***
  UNR, DRI



Current Seed Grants

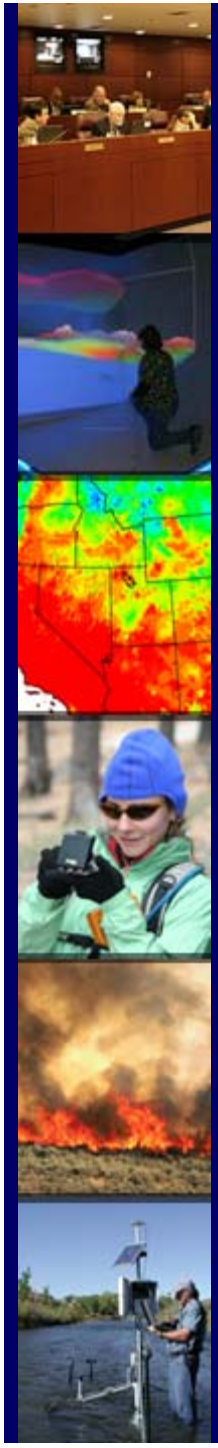
- ***"Creation and Pilot Testing of Wireless Sensor Networks to Capture Spatial Variability at EPSCoR Transect Sites"***
- ***"Water source partitioning for shrubland transpiration using innovative field methods"***
- ***"Aerosol Modification of Snow Albedo in Southern Nevada and its Influence on Snow Melt and Spring Runoff Team"***
- ***"Understanding the Impact of Climate Change Media Messages"***



Education

1. K-12 – focus on Middle Schools
   - Whole school approach – 6 schools per yr
   - 30 teachers per yr - Science/Math/English
   - Summer institute & work with science teams

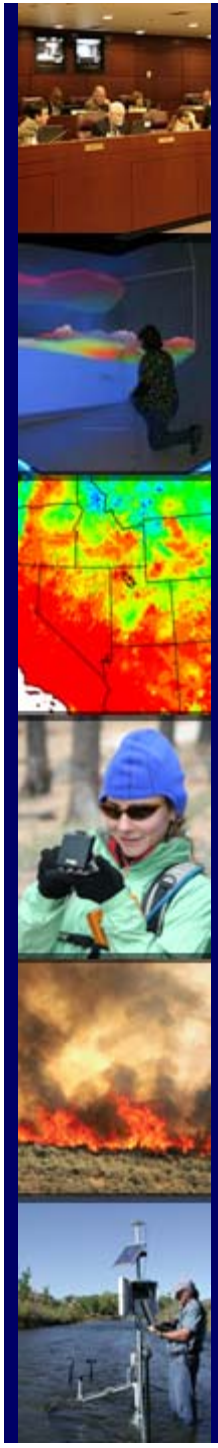
2. Undergraduates
   - 30 scholarships per year
   - Annual poster session and symposium
   - New minor in climate change



Education

3. Graduate students
   - 21 – 25 graduate assistantships per yr
   - Graduate certificate in climate change
   - Support for conf. & research travel

4. Curriculum development
   - Grants for new UG & G courses
   - Support for DRI faculty teaching
   - Teaching climate change symposium YR2



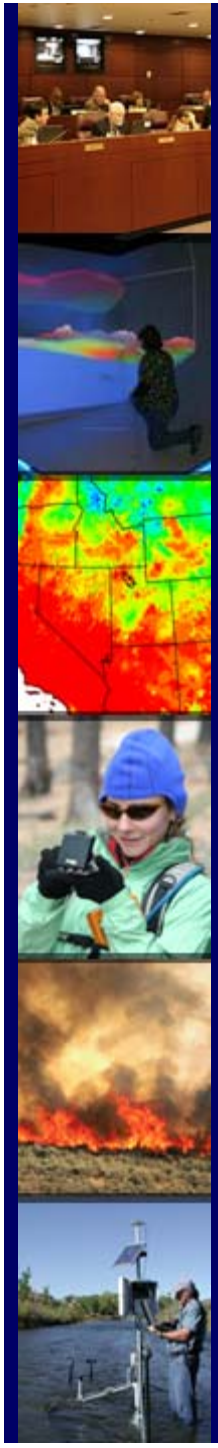
Outreach

1. Ongoing activities
   - Stakeholder Advisory Committee
   - Nevada Small Business Development Center
   - Video / web site

1. Conferences
   - State / Inter-jurisdictional / National

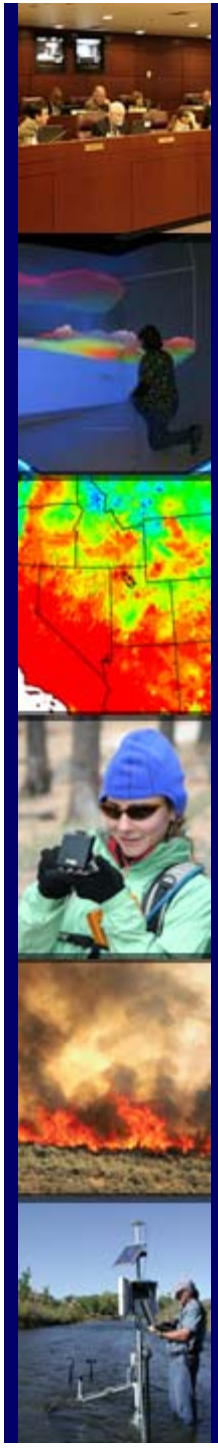
1. Diversity
   - Minority startup
   - Mentoring – High School / Community College / Univ.

2. Tri-State Partnership
   - Idaho, New Mexico, Nevada



Current Graduate Fellowships

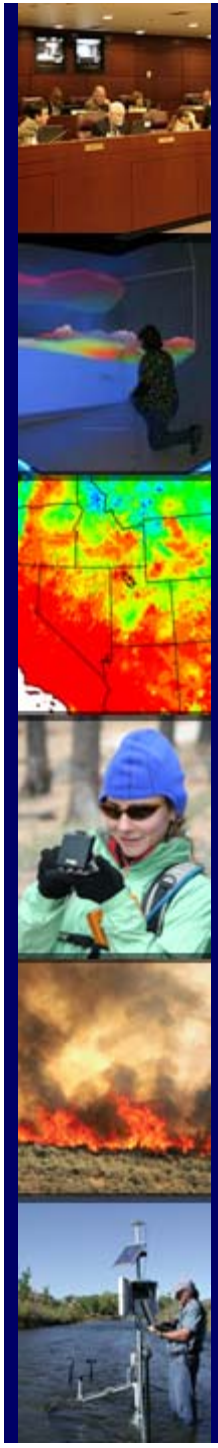
- ***Confronted with climate change: Response of a small mammal to past and future environmental trends***
- ***Climate Change Impacts to Groundwater, Spring Hydrology and Aquatic Communities, Amargosa Desert and Death Valley National Park, Nevada and California***
- ***Assessing the Vulnerability of Walker Lake to Climate Change***
- ***Climate Change Impacts on Fire Regimes and Tree Population Dynamics at a Desert Springs Complex***
- ***In Situ Aerosol Monitoring for Ecology and Climate Modeling Research***
- ***Climate Responses of two invasi annuals, Cheatgrass and Red Brome***
- ***Reducing Cloud Uncertainities in Climate Models***
- ***Cyberinfrastructure Component-NSF EPSCoR Climate Change Graduate Fellowships***



Current Graduate Fellowships

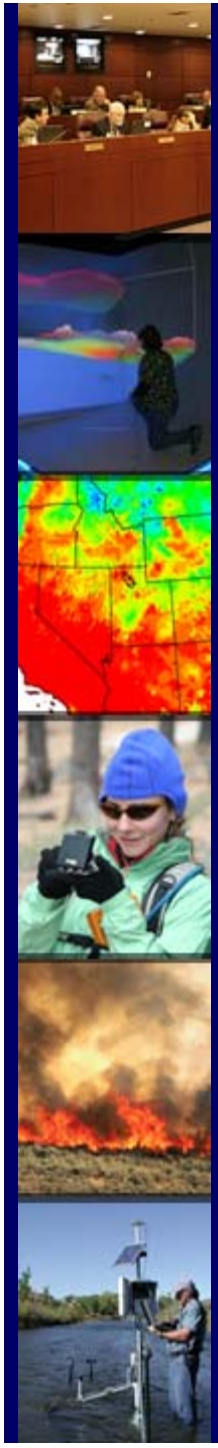
- *The Waterfall Fire after Five Years*
  Mike Sady - WNC

- *Vegetation Description and Monitoring Along Two Transects in Nevada*
  David Charlet and Patrick Leary - CSN



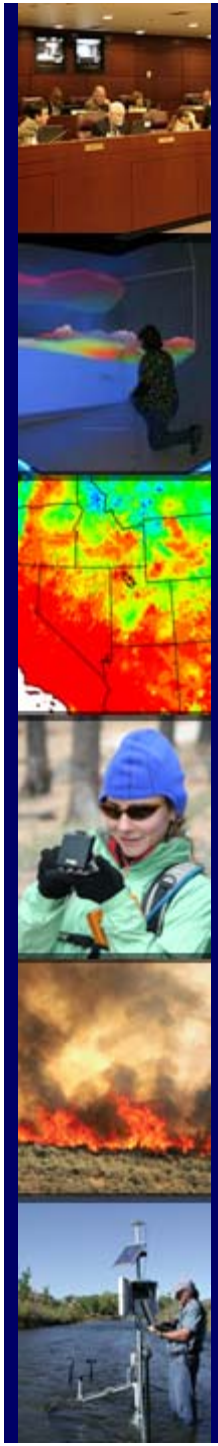
Nevada Climate Change Forum

- Purpose: to accelerate dialogue between scientists working on climate change related research and decisions makers who can potentially use this research
- Goals:
  1. to provide a forum to share project information and other information from key constituents;
  2. to develop research, education, and outreach collaborations that will help to ensure the sustainability of the research infrastructure developed in this project;
  3. to facilitate the development of a more focused Stakeholder Advisory Committee (SAC) that will work closely with the Policy and Outreach Component
  4. to formulate further study work that may address specific needs of the state.



Nevada Climate Change Forum

- Example Constituents
  - Federal, State, Local Management Agencies
    - Water
    - Land
    - Environment
  - Educational institutions (particularly K-12)
  - Tourism Sector
  - Agriculture Sector
  - Energy Producers
  - Native American communities
  - Non-governmental organizations



Nevada Infrastructure for Climate Change Science, Education, and Outreach

QUESTIONS?

www.nvclimatechange.org