

Nevada Infrastructure for Climate Change Science, Education, and Outreach



ERTAB Meeting: Nevada Infrastructure for Climate Change Science, Education, and Outreach

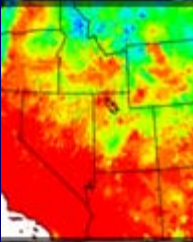
February 5, 2009

Desert Research Institute, Reno



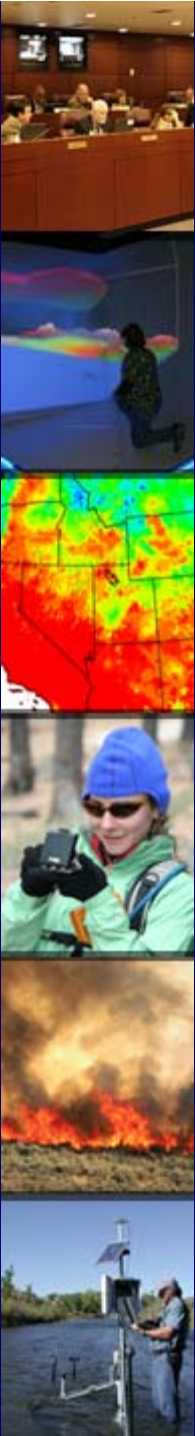
Meeting Objectives

1. Inform ERTAB of Nevada's EPSCoR and Climate Change Programs (PI's)
2. Inform ERTAB of Year 1 project milestones, progress, and changes to original plan (PI's)
3. Review progress toward achieving outcomes of the project (ERTAB)
4. Make constructive suggestions for improving and/or changing direction of work (ERTAB)



Nevada Background

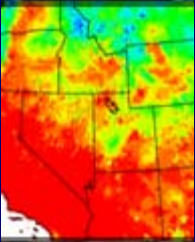
- Brief summary of Nevada characteristics
- Why?
 - Project should build on the strengths of the state
 - Project needs to meet both NSF goals and state goals
 - Project focus is at state and regional level



Demographics

Source: 2000 US Census

- Population:
 - Total: ~2M
 - Las Vegas (most populous city): ~0.6 M
 - Reno: ~0.2M
 - Clark County: ~1.4M
 - Washoe County: ~0.3M
- Population make up:
 - 61% Non-hispanic White
 - 24% Hispanic
 - 8% Black
 - 6% Asian
 - 1% Native American



Population Growth

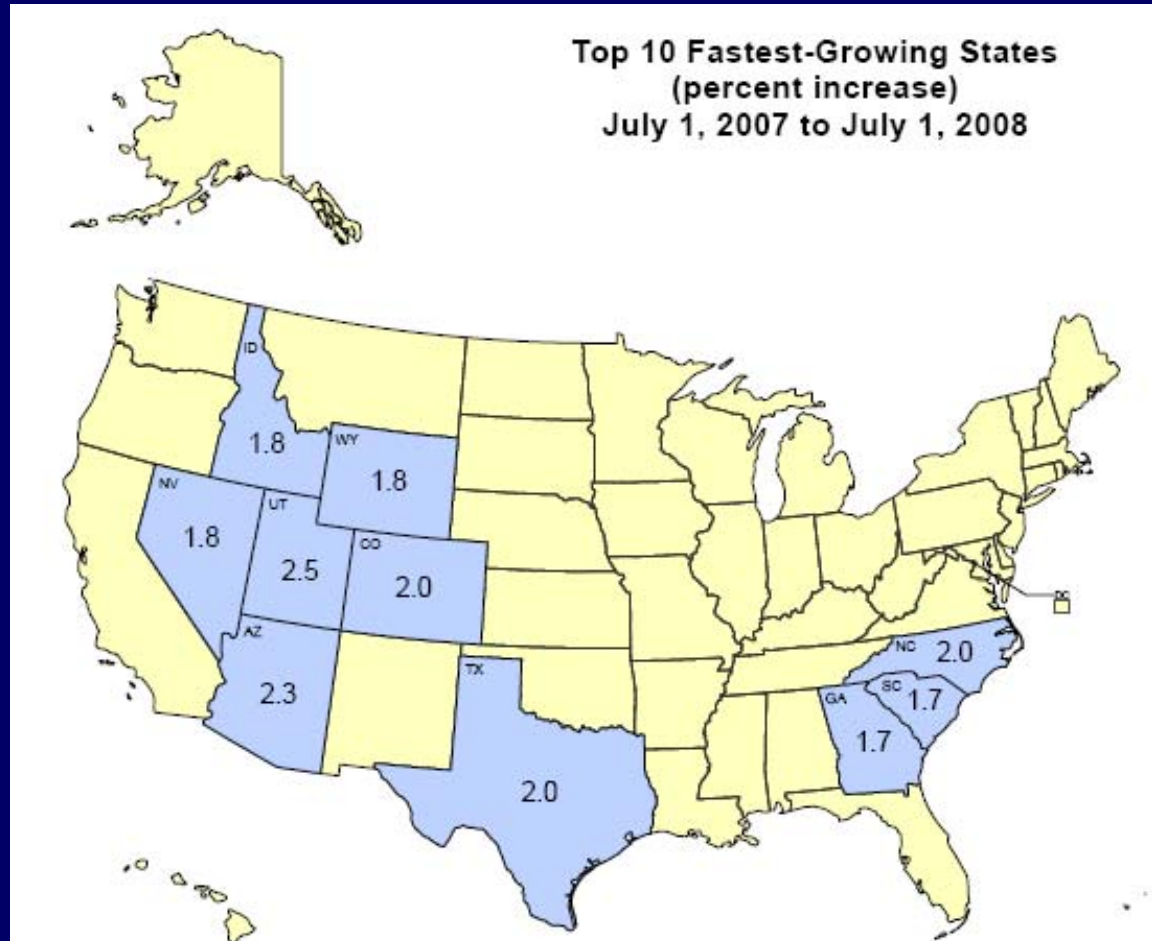
US Census Bureau

- NV was the fastest growing state in the nation for 19 straight years 1986 – 2005, and has been in the top four for 24 years.

- NV is projected to grow by ~50% over the next 20 years.

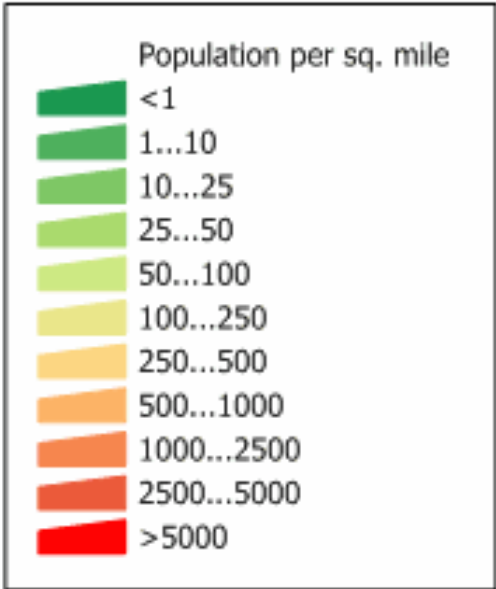
Nevada:

Most urbanized state in the nation; 88% of population is in urban centers¹

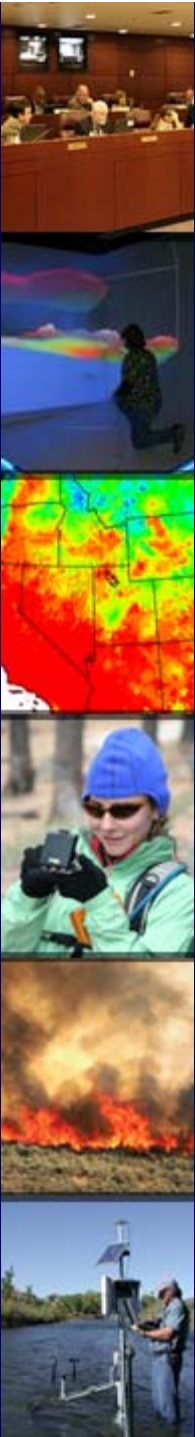
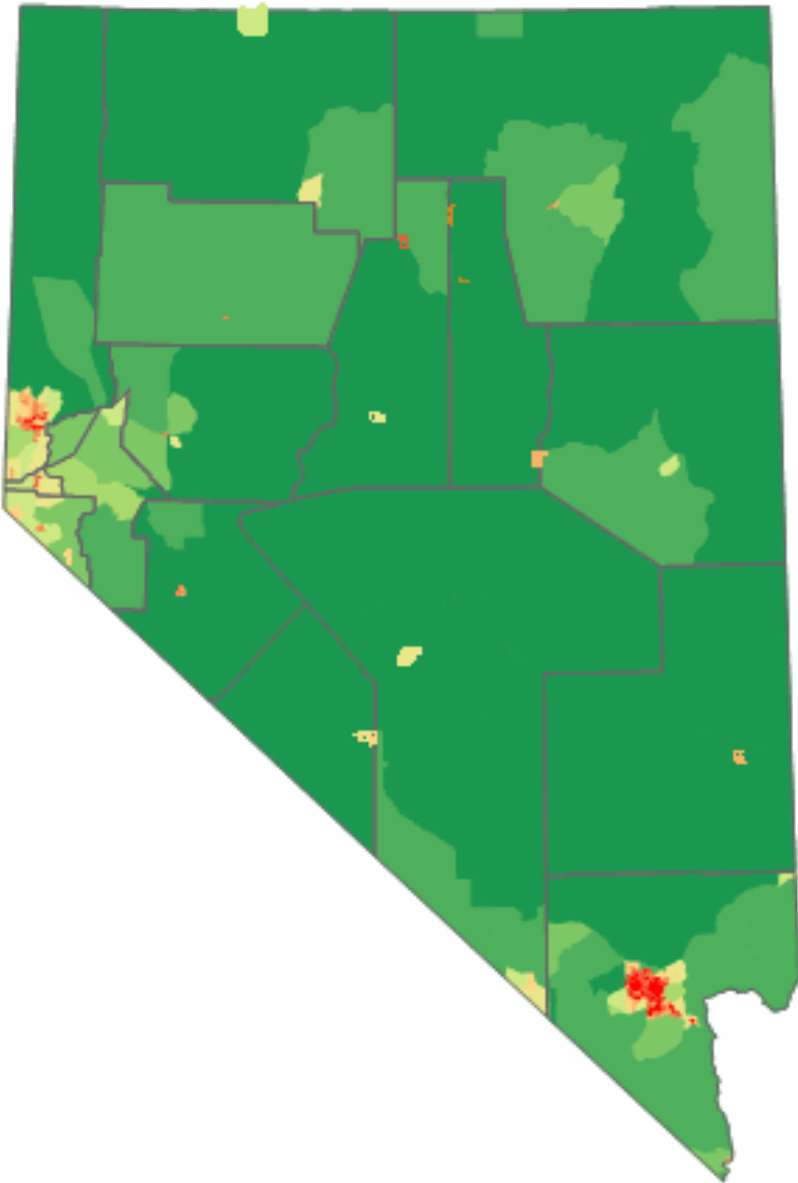


¹Kaiser Family Foundation, 2006. Urban Institute and Kaiser Commission on Medicaid and the Uninsured estimates based on the Census Bureau March 2005 and 2006 Current Population Survey (CPS: Annual Social and Economic Supplements)

Population Distribution

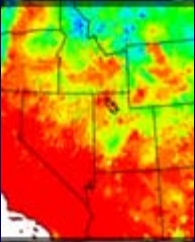


Source: U. S. Census Bureau
Census 2000 Summary File 1
population by census tract.



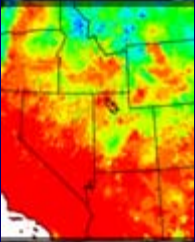
Geography, Vegetation, Climate

- Situated in the Great Basin
- Basin and range topography
- Elevation range: 470 ft on the Colorado River to 13,140 ft on Boundary Peak
- Vegetation: semiarid desert scrub in valleys to montane forests to high mountains
- Driest state in nation: mean annual precipitation of 279mm



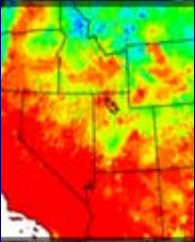
Economy

- Large population centers
 - Tourism is a major source of income
 - High tech companies increasing (moving from CA)
- Outside metropolitan areas
 - Mining : 8.7% of world gold production from NV
 - Cattle ranching
- 87% of land is Federally owned



Politics

- Capital is Carson City (~25 miles south of Reno)
- State legislature meets biennially
- Currently the legislature is controlled by the Democratic Party
- Interesting tidbits:
 - NV has a citizen's legislature
 - NV is a bellweather state; has voted for the winner of every presidential election since 1908 except in 1976 (voted for Gerald Ford over Jimmy Carter)

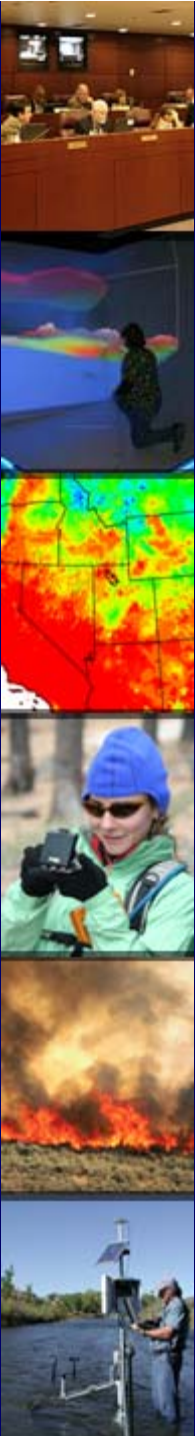


Education

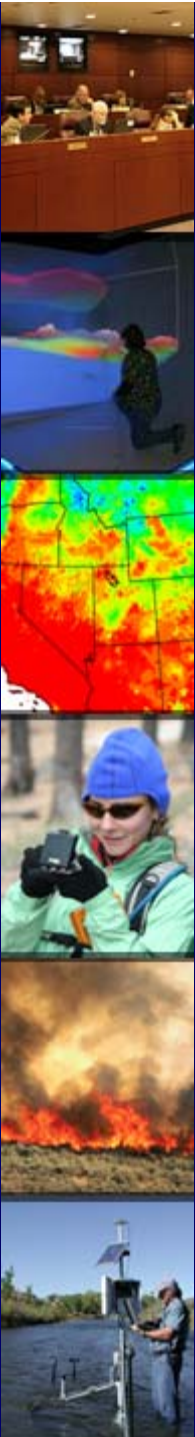
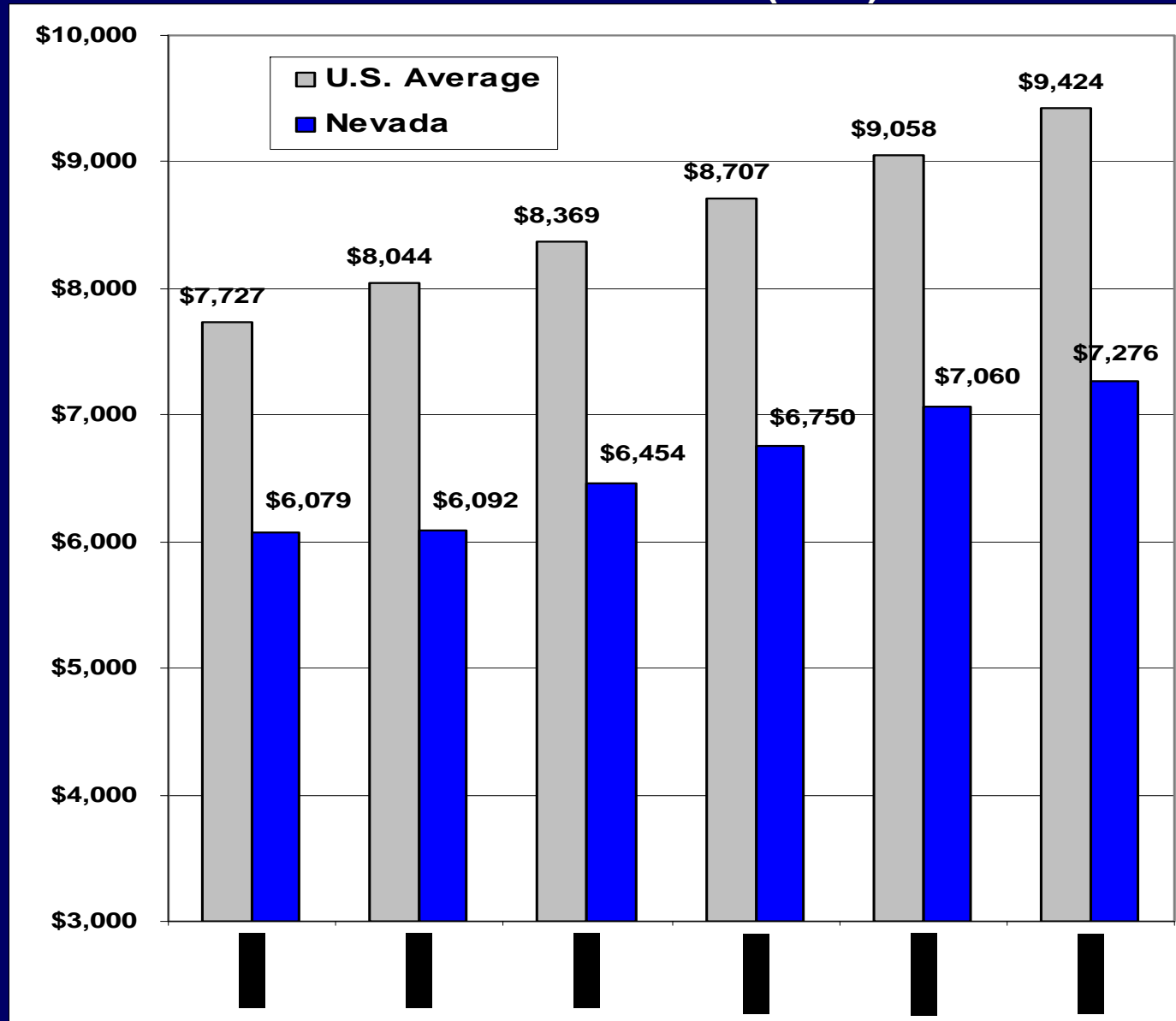
- High school graduation rate (2005) was ~65%¹
- Nevada continues to trail all states in the proportion of 9th graders enrolling in college by age 19 (<23%)
- Very small proportion of students entering college earn a certificate or degree (<10%)
- Since early 1990's colleges/universities have become less affordable
- These trends could undermine NV's ability to develop an educated workforce

¹Nevada Department of Education, *2005-2006 State Accountability Summary*

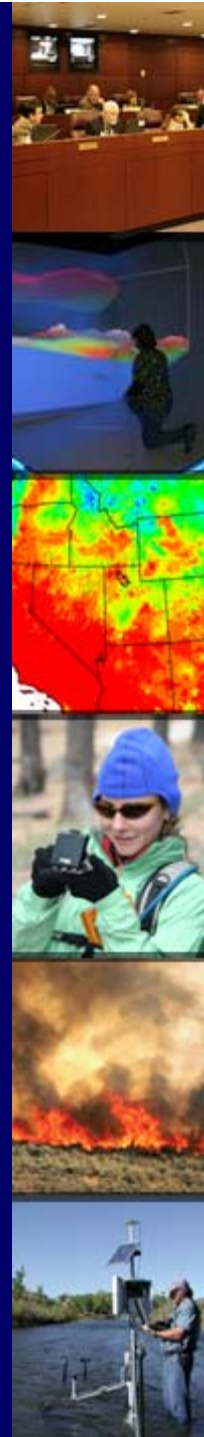
²Measuring Up 2006. *The State Report Card on Higher Education – Nevada*. The National Center for Public Policy and Higher Education.



U.S. - Nevada Current Expenditures per Student in Public Schools (K-16)



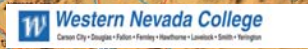
Nevada System of Higher Education (NSHE)



Reno



Carson City



Elko



Las Vegas



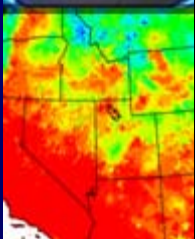
Henderson



Nevada Research Institutions

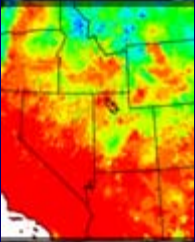
(numbers from 2007)

Institution	Number Students	Annual Research Dollars
UNLV	28,000	\$107M
UNR	16,000	\$188M
DRI	-----	\$36M



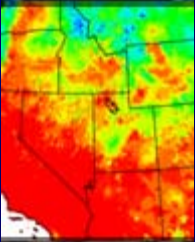
NSF EPSCoR

- Program goals
- History/Success of NSF EPSCoR in Nevada
- EPSCoR-initiated Global Change Programs in Nevada



Definitions

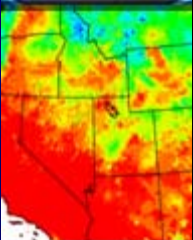
- EPSCoR: Experimental Program to Stimulate Competitive Research
- RII: Research Infrastructure Improvement Grant



Nevada EPSCoR Programs – Funding

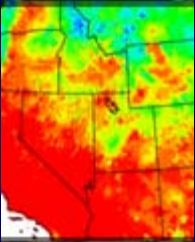
(cumulative numbers to date)

Agency	Federal	State Cost Share
NSF	\$41.1M	\$16.1M
NIH IDeA-BRIN	\$16.9M	0
DoD	\$11.6M	\$1.2M
NASA	\$5.2M	\$3.7M
DOE	\$2M	\$1.7M



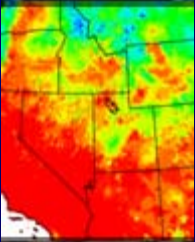
NSF EPSCoR Goals & Objectives

- Stimulate R&D and competitiveness
- Advance science & engineering
- Catalyze key research themes
- Activate collaborations
- Broaden participation
- Sustainability



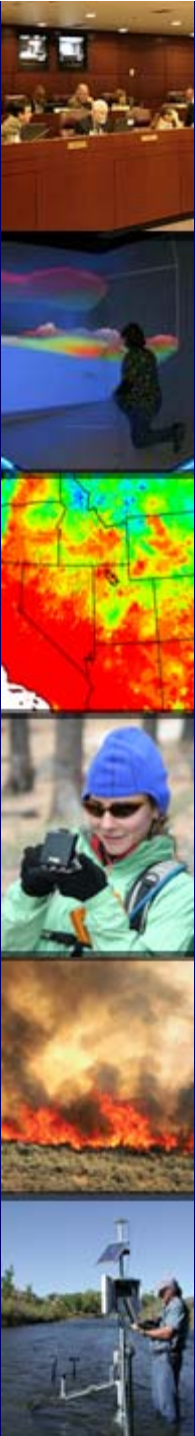
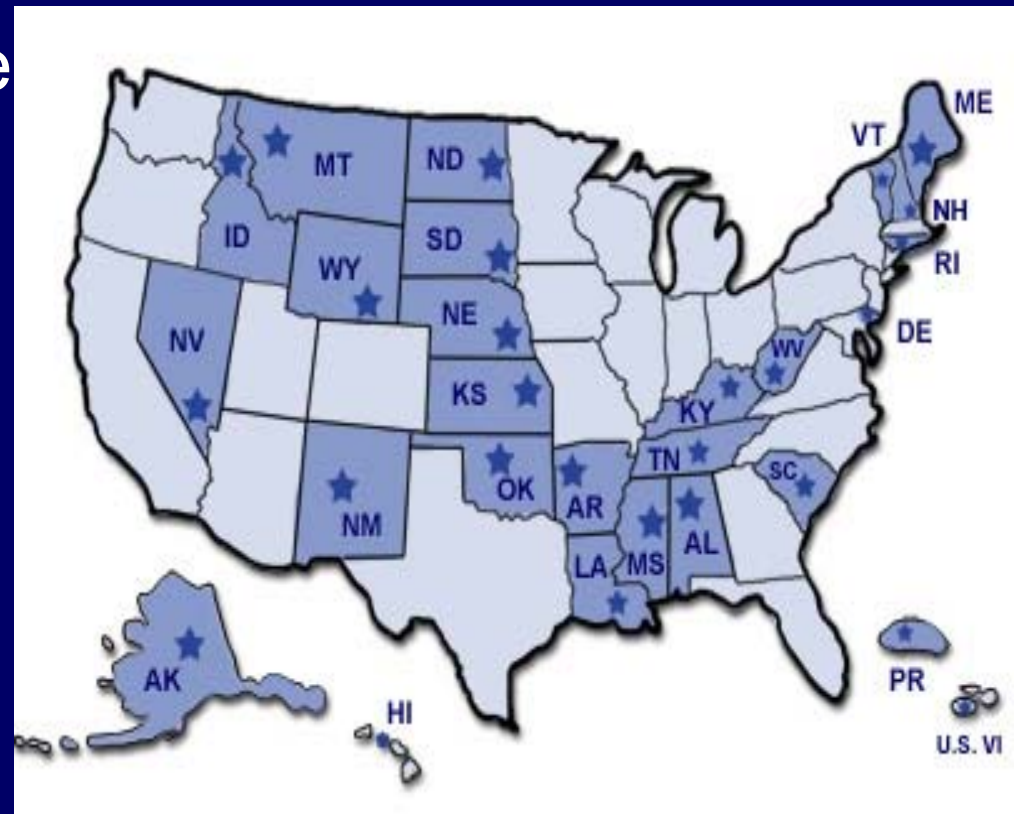
Enable EPSCoR States to:

- Enhance discovery and learning through utilization of cyberinfrastructure and other evolving technologies;
- Develop the diverse, well-prepared, internationally competent and globally engaged STEM workforce necessary to sustain the nation's competitive edge;
- Facilitate knowledge generation leading to economic development; and
- Expand the scientific literacy of all citizens, and disseminate to them the importance of STEM research and education.



NSF EPSCoR States

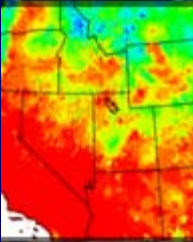
- State must receive <math><0.75\%</math> of NSF's total funding (NV = .25%)
- 25 states plus two U.S. jurisdictions



Nevada's

Research Infrastructure Improvement Grants

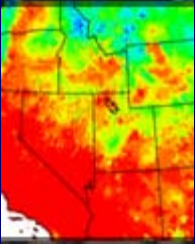
- 1985: Planning Grant
- 1986: Numerous focal areas
- 1993: Bridge Engineering, Chemical Physics, Plants/Environmental Stress
- 1999: Genomics, Interface Materials, Interdisciplinary Environmental science
- 2001: Abiotic Stress, Nanomaterials, Advanced Computing
- 2004: Arid Soils, Sensor Technology, Cognitive Information Processing
- 2008: Climate Change



Nevada NSF EPSCoR Highlights

Bridge Engineering

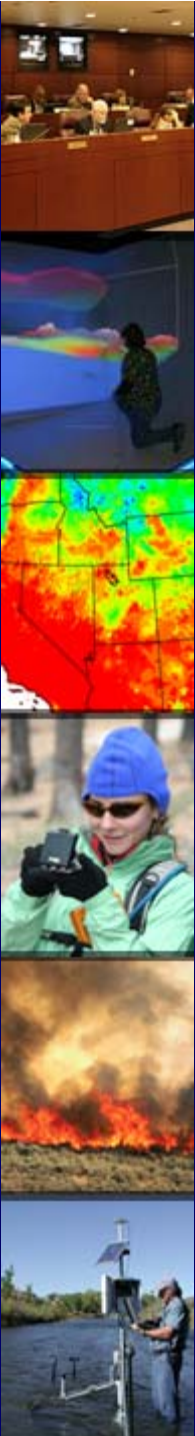
- RII developed a world-renowned shake-table facility (93-NSF EPSCoR)
- Has led to >\$20M in non-EPSCoR funds
- Current work: Earthquake-scale shaking of an experimental four-span bridge



Nevada NSF EPSCoR Highlights

Cyberinfrastructure

- ACES (02-NSF EPSCoR)
 - Access grid node
 - Visualization laboratory
- Center for Advanced Visualization, Computation and Modeling (CAVCaM)
 - 4-sided CAVE
 - \$20M DRI facility
 - 6-sided CAVE
 - To be completed July 2009
 - First in the West



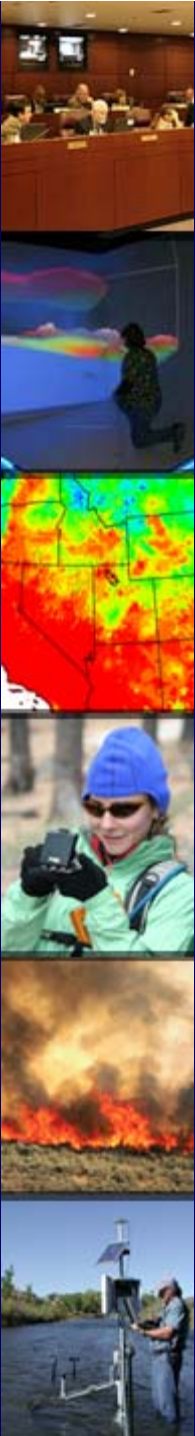
EPSCoR-leveraged Global Change Programs and Facilities in Nevada

Nevada Desert Research Center: Impacts of Climate Change on the Mojave Desert Ecosystem

- Mojave Global Change Facility
 - 99-NSF EPSCoR & DOE EPSCoR
- Nevada Desert FACE Facility
 - DOE EPSCoR



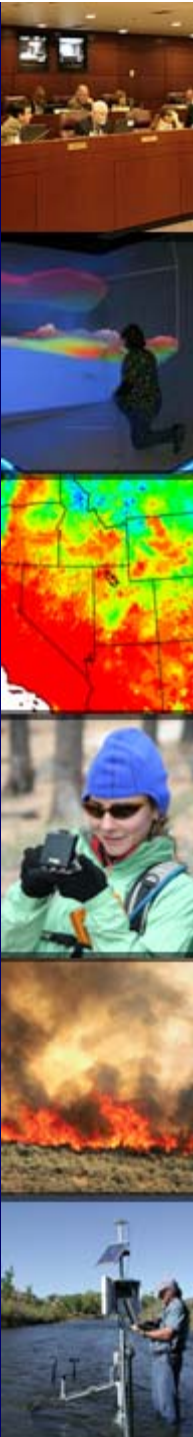
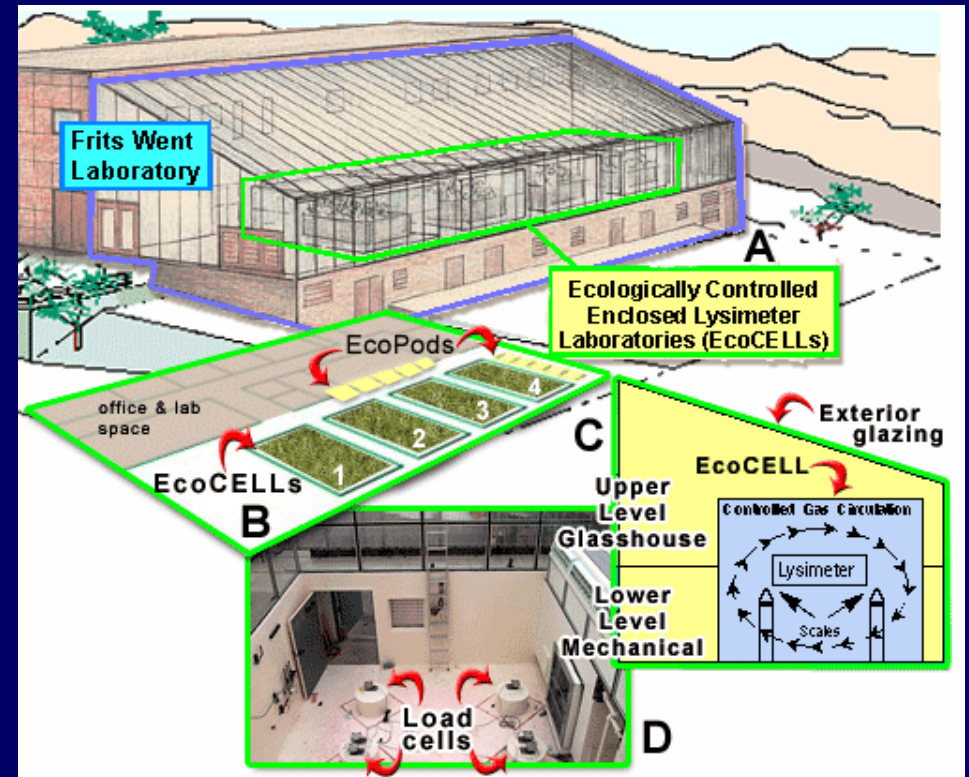
B-3. Getting around on the FACE rings involves a lot of pushing. Michael Loik and Travis Huxman make quite a team.



EPSCoR-leveraged Global Change Programs and Facilities in Nevada

Dorothy S. Gallagher Great Basin Environmental Research Laboratory & Frits Went Laboratory

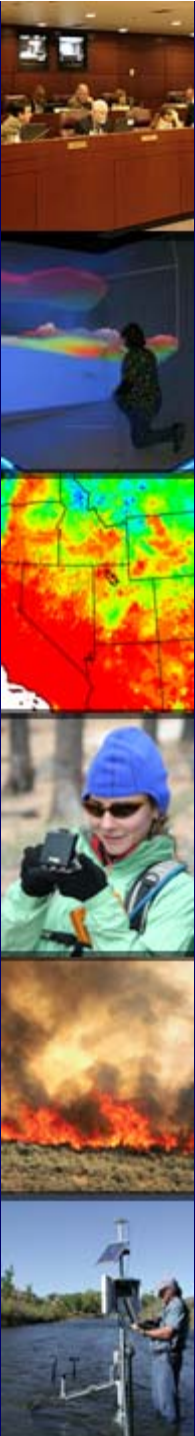
- Global environmental change effects on terrestrial ecosystems
- Private funding and 93-NSF EPSCoR



EPSCoR-leveraged Global Change Programs and Facilities in Nevada



- GBERL, FWL, NDFF, MGCF have led to:
 - Millions in non-EPSCoR federal funding for global change research in NV
 - Hundreds of peer-reviewed papers



2008 Nature Article, (Arnone et al.)

- Study conducted in DRI Ecocells
- Effects of yearlong heat wave on grassland CO₂ uptake
- Findings suggest frequent warm years could lead to sustained decrease in CO₂ uptake by terrestrial ecosystems

