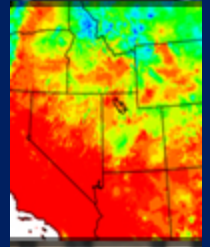
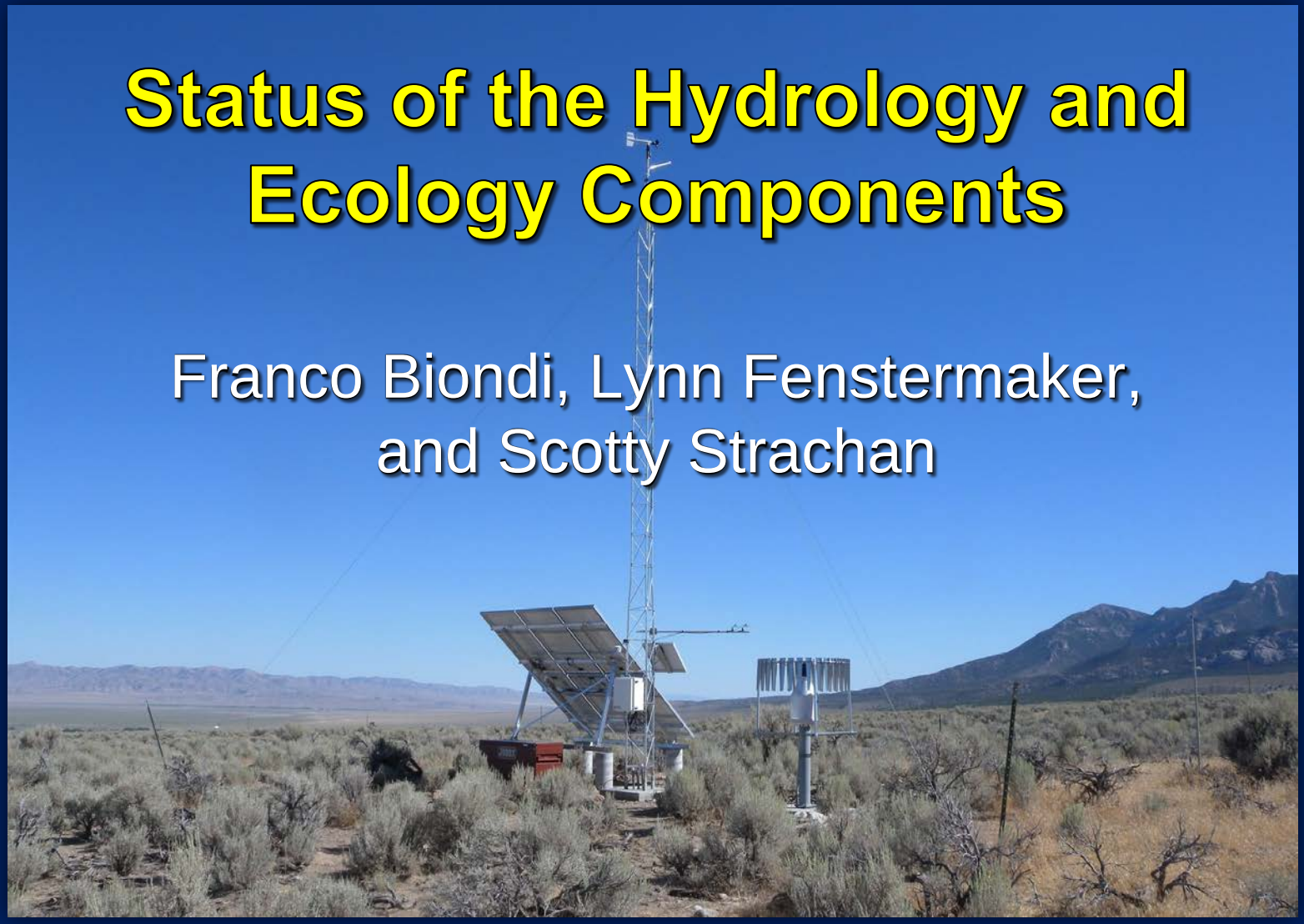





Nevada Infrastructure for Climate Change Science, Education, and Outreach

Status of the Hydrology and Ecology Components

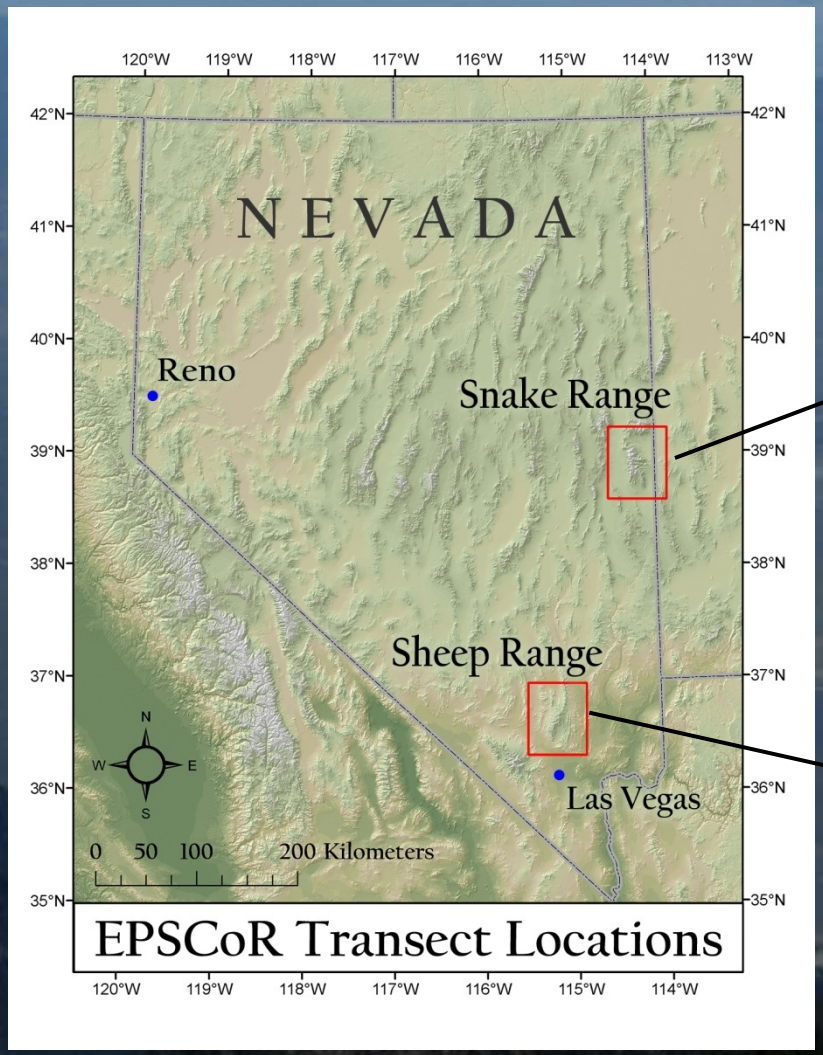
Franco Biondi, Lynn Fenstermaker, and Scotty Strachan

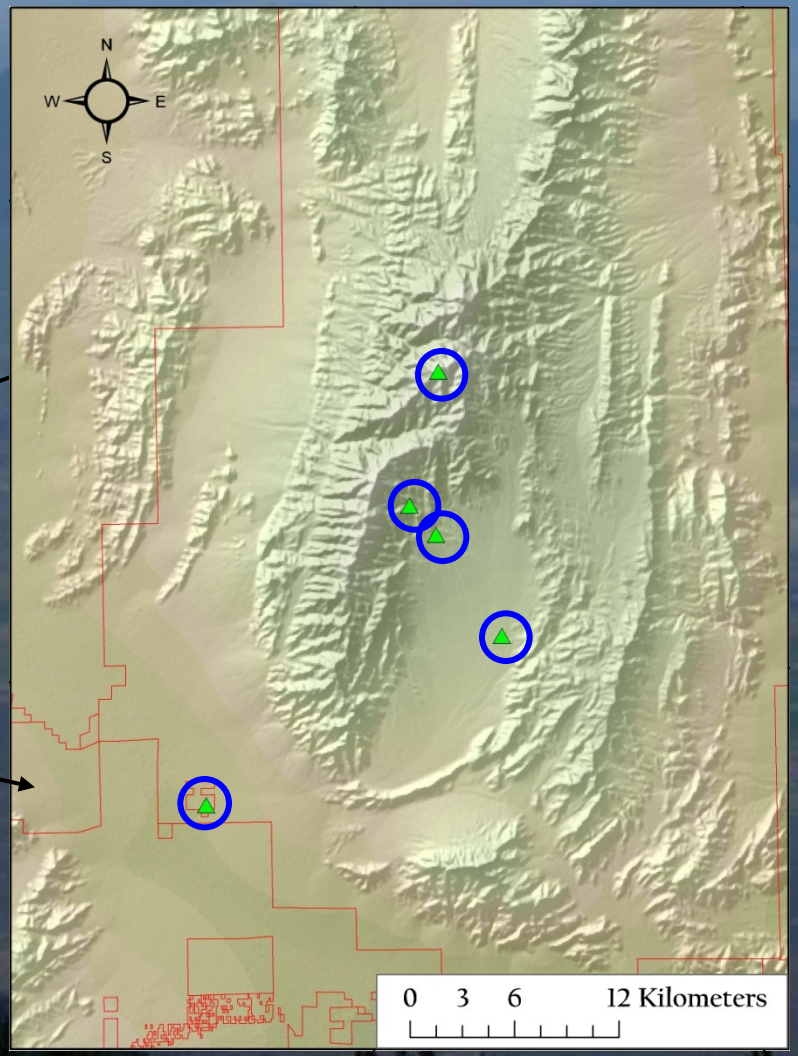


Major Year 2 Accomplishments

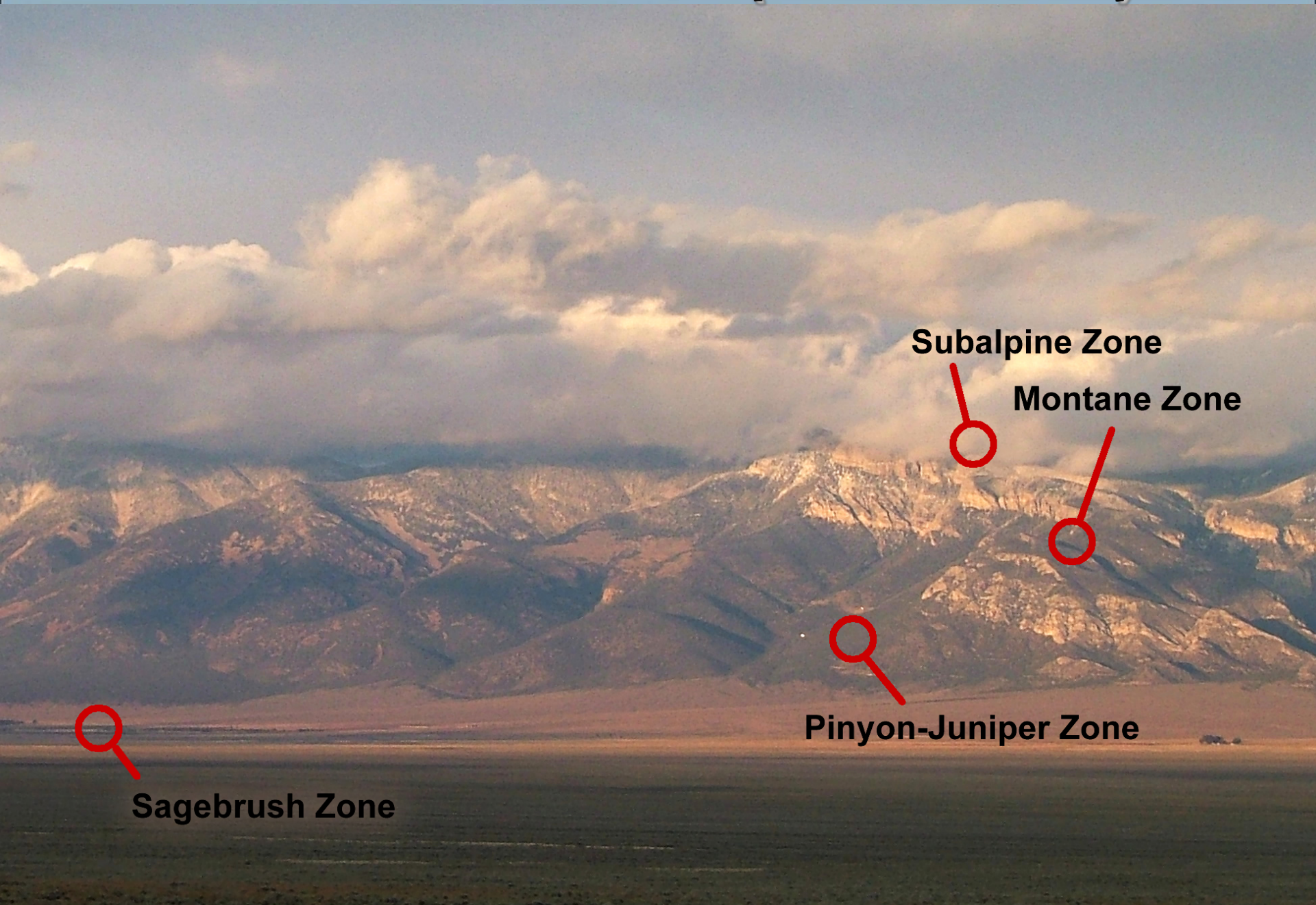
- Component activities
  - Transect Installation
    - Current Status
  - Scientific Accomplishments
    - Graduate Student Research (GRA and Seed Grants)
    - Course Development
    - Outreach
- Challenges and Changes to Original Plan
- Timeline for Future Activities

Nevada Monitoring Transects

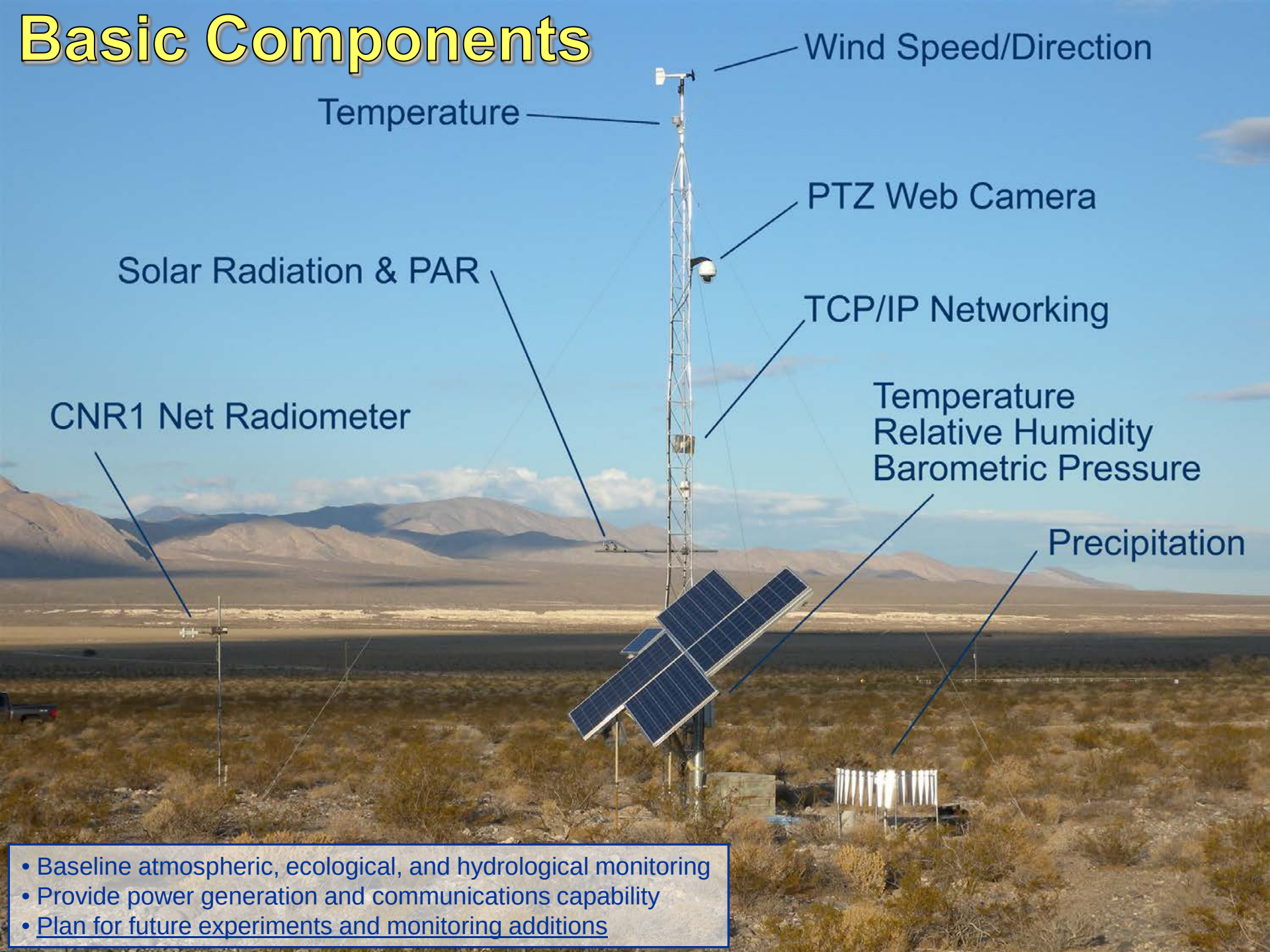




Snake Transect (West Side)



Basic Components



- Baseline atmospheric, ecological, and hydrological monitoring
- Provide power generation and communications capability
- Plan for future experiments and monitoring additions

Sheep Range Installation Status

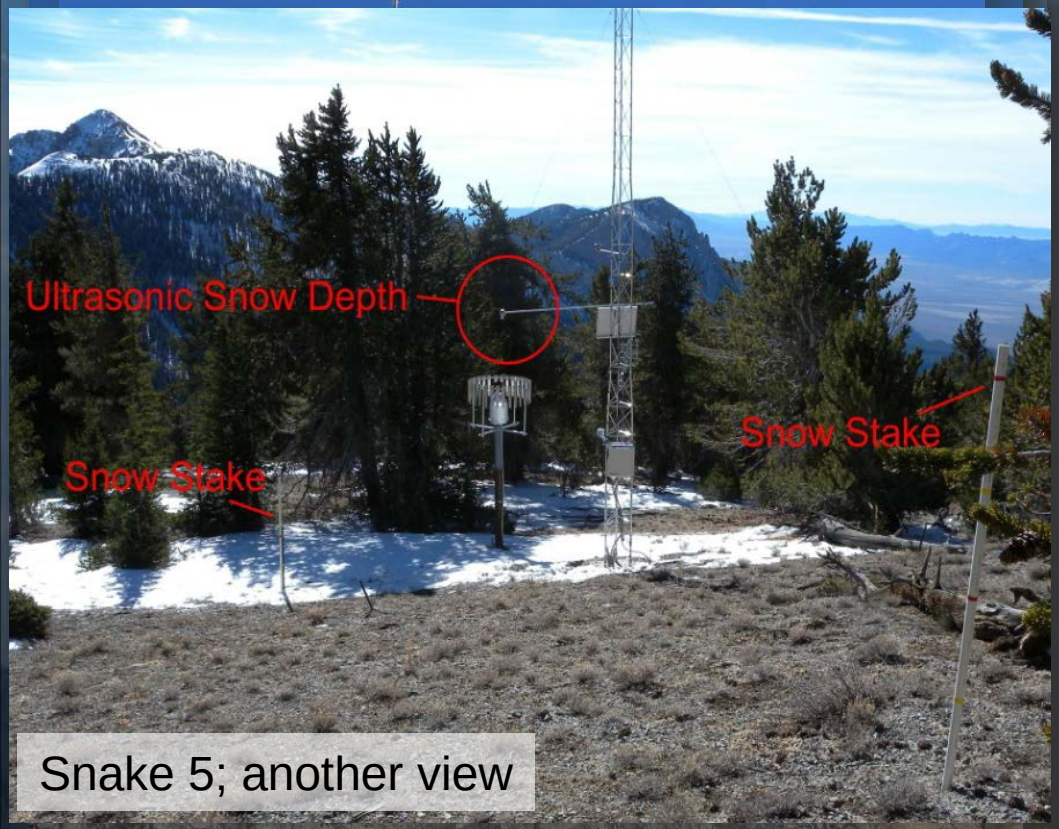
Runoff Collector, Sheep 4

Digging foundations for solar panels
Sheep 4

Transporting equipment to Sheep 4

	Permit	Concrete	Climate	Comm	Soil/Veg
1	√	√	√	√	
2	√	√	√		
3	√	√	√		
4	√	√			1
5	√				

Snake Range Installation Status



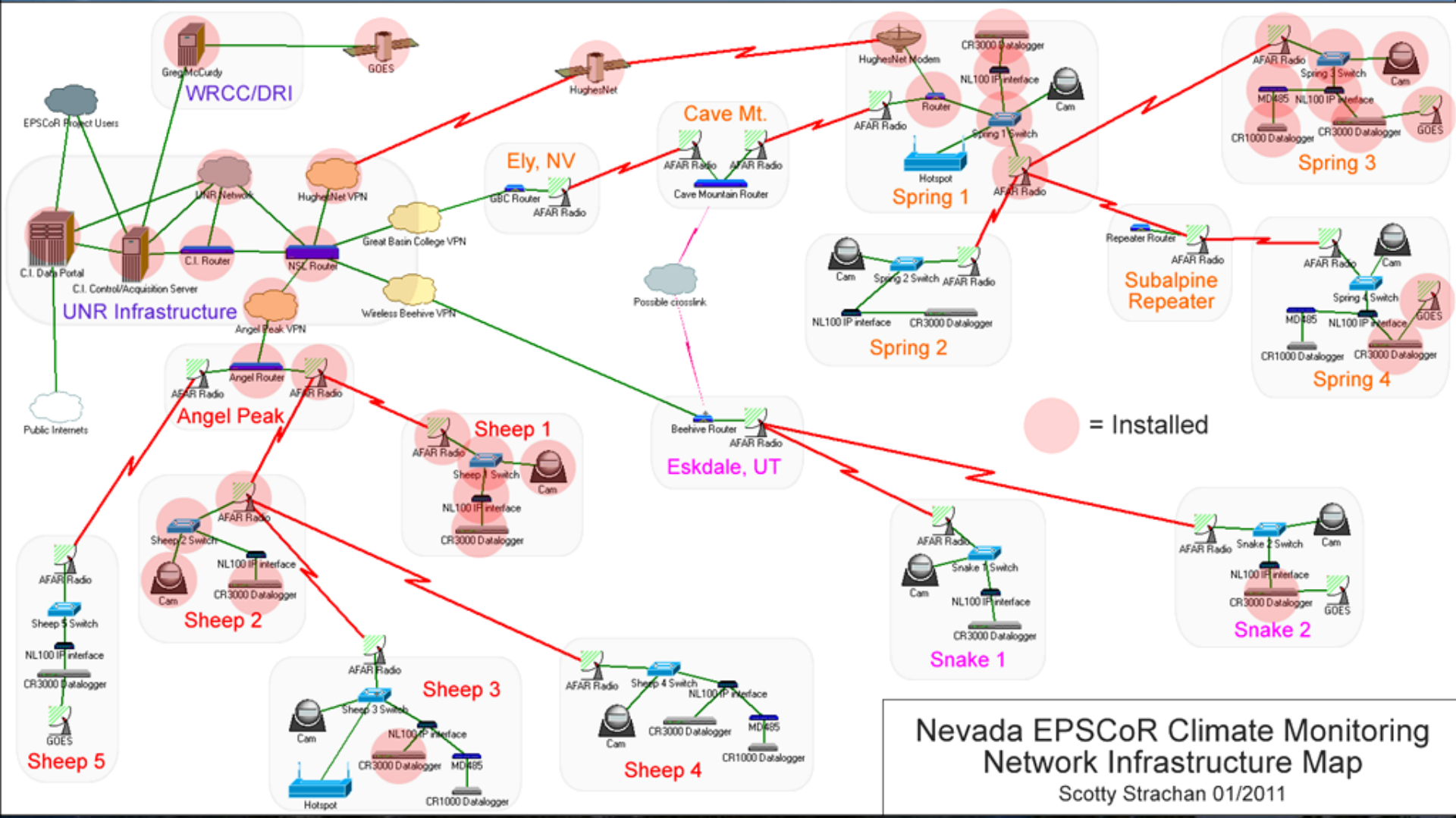
Snake 5; another view

Snake 7

	Permit	Concrete	Climate	Comm	Soil/Veg
1*	√	√	√		
2	√	√	√	√	
3	√				
4	√	√	√	√	¾ √
5	√	√	√	√	
6					
7	√	√	√		
8	√				

* Snake 1 is an EC tower site from previous studies; we intend to instrument as a transect station in the future

Networking Infrastructure Plan and Installation Status



Graduate Students

- Mike Hay, MS in Geography, landscape simulation of ecosystem processes (SIMPPLLE) and proxy climate data (TRIM) (Ecology GRA)
- Britt Johnson, PhD in Hydrology, snowfall and snow cover effects on plant phenology and transpiration (Ecology GRA)
- Jeremy Koonce, PhD in Hydrogeology, analysis of distributed temperature sensing to understand ET processes in shallow groundwater basins (Hydrology GRA)
- Amanda Wagner, MS in Hydrogeology, sapflow and isotope analyses to gain an understanding of groundwater contribution to ET (Devitt/Young Seed Grant)

Graduate Students Cont.

- Lorenzo Apodaca, MS in Life Sciences, assessing envelope of interannual variation in vegetation response-correlating sage growth rings to precipitation & satellite data (Fenstermaker/Devitt Seed Grant)

- Kerensa Kruse, MS in Hydrology, impact of climate change on surface runoff (Hydrology GRA)

- Ashwitha Francis, undergrad in Life Sciences, impact of past climate change on genetic structure of Great Basin pocket mouse (summer scholarship)

- Mallory Eckstut, PhD in Life Sciences, impact of climate oscillations on past, present, and future of North American deserts biota (graduate fellowship)

Course Development

L Saito (UNR), S Fernald (NMSU) and T Link (UID) have developed a graduate course entitled "**Interdisciplinary Modeling: Water-Related Issues and Changing Climate**" (http://www.cabnr.unr.edu/saito/Classes/nres730/nres730.htm)

Course Objectives:

1.Discuss the philosophy of modeling

2. Become aware of models in different disciplines used to address water issues related to climate change

3. Work in interdisciplinary teams to explore issues and approaches associated with interdisciplinary modeling

4. Complete an interdisciplinary modeling project that addresses one or more water-related issues related to climate change

Course Development Cont.

- F. Biondi developed an introductory undergraduate class, entitled “Climate Change and its Environmental Impacts”
  - Accepted at UNR as part of the Natural Sciences (Group A) Core Curriculum
  - Cross-listed between Geography and Atmospheric Sciences
  - J. Arnone taught the course in Spring 2010, F. Biondi in Fall 2008 and 2010
  - 4 credits, including a 1-credit weekly laboratory
  - Part of the Climate Change curriculum being considered by the Education Component

Partnerships

- Nevada Seismological Laboratory (for network communication)
- Great Basin College in Ely (for network communication)
- CIRMOUNT and GLORIA (through Connie Millar)
- Mountain Research Initiative (Berkeley 2010 Workshop)
- Long Now Foundation (information exchange, site tour, etc.)

S. Strachan (UNR) explaining station instrumentation to Long Now Foundation members

Presentations and Publications

- Conferences: presentations at American Society of Agronomy, AGU Fall Meeting, “High-Five” Symposium, APCG and AAG Meetings
- Participation to undergraduate and graduate research meetings and competitions at NSHE campuses
- Publications (*Ecosphere* article, several abstracts)
- Year 2 report to NSF

Other Component Activities

- Working with Cyberinfrastructure on transect data flow into data portal and component web pages
- AAAS review; addressing reviewer comments
- Discussions with Niwot Ridge LTER on high altitude instrumentation and maintenance
- Development of a “gray” literature library on Great Basin and Mojave Desert hydrology and ecology for data portal

Challenges

- Budget challenges
  - Enough funds for “soft money” personnel; particularly the field crew
  - Monitoring station network communication enhancement and backup requires more funding than originally planned
  - Acquisition of complete “sensor packets” for a majority of the transect stations
- Integratation of new faculty hires into existing activities
- Communication and differing ideas on how to pursue science and infrastructure priorities

Changes

- Modification of Hydrology and Ecology strategic plan to ensure realistic goals and assignment of team members to specific tasks
- New Integrative Science Projects (ISP) in Years 4 and 5
- Some funds have been redirected to guarantee participation of project personnel
- Development of more economical approaches for real time communication with stations
- Development of partnerships for equipment loans (GRA research) and data (SNWA)

Timeline

- 2011:
  - Continue data collection & develop transect maintenance plan
  - Finish network connections
  - Complete instrumentation of sites
  - Search for Climate Scientist (UNLV) & Ecosystem Modeler (DRI)
  - Define new ISP projects
  - Complete seed grants
- 2012-2013:
  - Continue data collection with all data transmitted to Data Portal
  - Establish baseline conditions and conceptual linkages
  - Address questions identified in ISP projects
  - Present results at meetings and in journals
  - Develop transect sustainability plan and identify funding

With thanks to the Transect "Experts"

- Brad Lyles, DRI
- Brian Bird, UNLV
- Greg McCurdy, DRI
- Richard Jasoni, DRI
- Dr. David Charlet, CSN
- Plus several students and volunteers

Photo: B. Johnson; other photos in presentation by S Strachan, B Bird, B Lyles and L Fenstermaker