Nevada climate, environmental data network to inform research, community

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University of Nevada, Reno researchers, visiting scholars and the Long Now Foundation tour the Snake Range Subalpine climate/environmental monitoring site in the Bristlecone Pine forest at 11,000-foot elevation in eastern Nevada. The site is one of 13 across the Great Basin of Nevada used to obtain long-term data for research, education and infrastructure planning. Credit: University of Nevada, Reno

Climate data from 13 geospatial monitoring stations across the Great Basin are being made available to researchers, educators and the public by a group of researchers from the Nevada System of Higher Education.

They have developed the long-term climate monitoring network specifically designed to measure variations in climate change and are now working to broaden the network's reach to include the all types of hazard monitoring in the region.

"This would be a Nevada-based environmental hazards data and information network," said Scott Mensing, a professor of geography at the University of Nevada, Reno and one of the project's principal investigators. "Anyone in the state could have access to it. It would be for all the people in Nevada."

What Mensing and his colleagues from the University of Nevada, Reno, the Desert Research Institute (DRI) and the University of Nevada, Las Vegas (UNLV) envision is an information and data network that would incorporate the already robust climate monitoring network they created as part of a $15 million National Science Foundation Experimental Program to Stimulate Competitive Research (EPSCoR) awarded to NSHE in 2008.

"We're moving into the sustainability phase, looking to keep this going for the next 10 years and on into the future," Mensing said. "It's decades of data that are important for research, education and infrastructure planning."

The researchers established the permanent monitoring stations to quantify the daily, seasonal and annual variability of climate that occurs from basin valleys to mountain tops of the Great Basin. Data gathered from the stations have the capability of being used to help scientists better understand the Great Basin's responses to climate change, as well as measure changes that affect water availability, carbon sequestration and biological diversity. The effort is called the "Nevada Climate-Ecohydrology Assessment Network" (NevCAN).

University of Nevada, Reno's Scotty Strachan installs sensors and networking gear on the tower at Snake Range Montane West climate and enviornmental monitoring site. The site is one of 13 across the Great Basin of Nevada used to obtain long-term data for research, education and infrastructure planning. Credit: University of Nevada, Reno

The stations are equipped with rain gauges, runoff collectors, soil sensors, ultrasonic snow depth sensors, wind direction and speed sensors, tree growth sensors, internet cameras and other measuring equipment. All the data are streamed to a central server where it is then immediately available for a wide variety of research and education. Information is publicly available for download to any person or group that seeks to use it for any purpose, be it research, education, agriculture, community

planning, personal interest, or otherwise.

"This project provides the opportunity to have long-term monitoring abilities in a region that is not well-monitored and over elevation gradients. I don't know of another place where this is done," said Thomas Piechota, interim vice president for research and dean of the graduate college at UNLV who served as one of the project's principal investigators.

"One of the things that was very obvious to us at the beginning of this project was that there were individuals and small groups of people throughout the three NSHE institutions that were interested in climate research, but there was no concerted effort to develop a statewide capability to do climate change research," added Nick Lancaster, a research professor in earth and ecosystem sciences at DRI and one of the project's leads. "One of our original intentions was to create a statewide or a virtual center for climate change research.

In an upcoming article published in the science journal *Eos*, a publication of the American Geophysical Union, the NSHE team describes the design and structure of the network, summarizes some first-year data that demonstrate the potential to address compelling science and management questions, and encourages creative research collaborations among scientists and stakeholders.

The NSHE team, led by Project Director Gayle Dana with more than 25 researchers from across the three campuses, is working on creating partnerships with a number of other environmental data networks, programs and agencies in Nevada for wildland fire, flood, droughts and earthquake monitoring.

"We need to make this effort much more proactive," Mensing said. "These are the types of environmental hazards that, once they hit you,

can inflict terrible damage to a region. If we can pull all the information and that is out there ahead of time, it will give stakeholders time to plan, before the next big event hits. Good, science-based planning data can help individuals and local governments make the proper disaster preparations ahead of time that can save these stakeholders millions of dollars."

He said the effort has positioned the state of Nevada as a prime climate change data destination, which will strengthen the state's reputation for research and innovation.

"The information network we've built allows us or anyone in the state or out of the state to design environmental research studies that can be truly innovative," he said. "It will help support ground-breaking research and help attract more research funding to our state. It's a rich data source that is available to anyone, and we are encouraging those within the scientific community to take advantage of this valuable new resource for studying climate variability and climate change impacts."

More information: To access data and images from the Nevada Climate Change Portal, go to: sensor.nevada.edu/NCCP/Default.aspx

Provided by University of Nevada, Reno

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