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Reading the snow

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New sensors help estimate water available yearly from snowpack

Anne Lombardo / Snamp Correspondent

The University of California is installing a network of wireless sensors in the Sierra to improve the state's ability to make accurate water supply forecasts.

Information collected from these wireless systems includes snow depth, soil moisture, temperature, relative humidity and solar radiation.

It is important to measure the stare's snowpack so officials can estimate the amount of water to expect from the spring runoff from year to year.

That is why the University of California's Sierra Nevada Research Institute, with National Science Foundation funding, is continuing its installation of a new wireless data collection system throughout the Sierra. This distributed network of wireless sensors will provide a more accurate real-time estimate of the amount of water stored in the mountain's snowpacks.

Researchers Dr. Steven Glaser, a University of California, Berkeley professor of civil and environmental engineering, and Dr. Roger Bales, a UC Merced professor of engineering and director of the Sierra Nevada Research Institute are working on the installation of the sensor network.

The first data collection site is located at the National Science Foundation's site near Shaver Lake. This station has been monitoring hydrologic variables since 2003 as part of the King's River Experimental Watershed project.

The second site has recently been installed in the Tahoe National Forest as part of the research being conducted by Roger Bales and the Sierra Nevada Adaptive Management Project (SNAMP) The study also has two wired stations at their southern site near Fish Camp.

Part of SNAMP's goals are to investigate the impacts of forest thinning projects in national forests on water quality and quantity in nearby creeks. Learning more about the effects of forest thinning on snow accumulation and its retention in forests is an important part of the equation. The new wireless network will provide an excellent opportunity to collect the biggest data footprint and so better understand changes in the forest's water balance.

Current estimates for snow depth are made by snow surveyors who ski or helicopter to set locations to measure snow depth and snow water content manually. Measurement sites have historically been in flat open meadows. The new wireless networks allow multiple measurements to be taken over a large area on a continuous basis.

All this new information will help those who manage California's reservoirs and flood systems be better prepared to predict snow melt and runoff every year, allowing for more precise water management and reservoir operations. Knowing how much water to release from reservoirs to provide for the water needs of farmers, power production, people and fish, while still avoiding any seasonal flooding events is a yearly challenge, one that can only benefit from increasing accurate information.