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As water shortage worsens, experts suggest tech to manage Colorado groundwater use

Colorado lawmakers are asking: Is technology the answer to better water-use practices?

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In a report to the Colorado General Assembly on Monday, experts urged lawmakers to adopt technology that could better control the use of groundwater in the state as water supplies shrink.

Experts with the University of Colorado and Colorado State University proposed using technology to monitor groundwater levels, increase transparency about water use and create an online platform for managing water rights. They highlighted potential solutions, such as attaching monitors to farmers' water pumps, using high-altitude



NIKKI WENTLING | DENVER BUSINESS JOURNAL

Taylor Sharpe, a mechanical engineer with Virridy, holds one of the company's water monitoring systems inside Virridy offices at the University of Colorado in Boulder on July 22, 2022. Virridy's system was one of the technologies highlighted Monday, Aug. 1, 2022, in a report about emerging

balloons to survey watersheds, tracking the amount of water provided by snowpacks and harnessing blockchain technology for water rights transactions.

technologies that could be used to improve water resource management in Colorado.

The report, titled "Emerging technologies to Improve Water Resource Management in Colorado," was mandated by the General Assembly in a bill approved last year. It will be formally presented to lawmakers on the Water Resources Review Committee at the Colorado Water Congress summer conference Aug. 24 in Steamboat Springs. Evan Thomas, one of the authors of the report and the director of the Mortenson Center in Global Engineering at CU, will testify.

"What we're going to be presenting is where we go next with this, which is, let's actually start matching policy for water regulation with technology," Thomas said. "The next step is to actually say, 'OK, in this area, we're going to start deploying technology and matching that against community or collective action or state efforts to conserve this resource.'"

A megadrought in the western United States has caused the Colorado River to shrink and its two most important reservoirs, Lake Powell and Lake Mead, to drop to unprecedented levels. Water planners and climate scientists agree that broad changes need to be made regarding water use and conservation.

In their report, experts at CU and CSU called for the adoption of creative and innovative technologies to collect and provide data about groundwater use. That data could be provided to lawmakers who could then use it to take more educated actions on water use in the state, they wrote.

"We have to conserve water for its highest and best use, which means understanding who's using water, reducing the use of water, incentivizing conservation and disincentivizing nonproductive uses," Thomas said. "At the end of the day, there are going to have to be some hard choices."

In addition to leading the Mortenson Center, Thomas serves as CEO of Virridy, a company highlighted in the report for its work to

monitor groundwater use by farmers in California.

Agriculture is responsible for about 70% of groundwater and surface water use globally, according to the United Nations. In an effort to control freshwater use, California passed its Sustainable Groundwater Management Act in 2014, which in part capped farmers' groundwater pumping. Also in California, the energy company PG&E runs a program through which it pays farmers to shut down their pumps and conserve electricity during times of high stress on their electrical grid.

Virridy works with California farmers to attach monitors to their water pumps and provide them with data on how much water they're using. The monitors also have the ability to stop the pumps automatically at a farmer's request, which they might do in order to receive a payout from PG&E, said Taylor Sharpe, a mechanical engineer with Virridy.

Virridy is looking to expand across California, and it has some monitors in use in Colorado, including on the property of Colorado Sen. Cleave Simpson, R-Alamosa. Simpson, who has advocated for Virridy's technology, is an alfalfa farmer and the general manager of the Rio Grande Water Conservation District.

The report also focused on Urban Sky, a Denver company that developed a zero-emission remote sensing vehicle, called a stratospheric microballoon, that its inventors say can provide high-resolution aerial images at lower costs than using fixed-wing aircraft or drones.

Urban Sky partnered with Denver Water in May to collect imagery of the South Platte River. The water utility plans to use the images to determine techniques for retaining sediment and reducing sheetwash along the riverbank.

Lawmakers who mandated the report were also interested in how blockchain technology could be harnessed for water management. They wondered whether the blockchain, which acts as an unalterable ledger that tracks assets and records transactions, could provide a method to increase transparency into water rights.

In their report, experts wrote that they "could see blockchain being important" for individuals adhering to water agreements, but they

noted a lack of trust about the technology.

As part of the report, experts interviewed 28 water managers in the state, and they conducted a survey of water rights stakeholders. The idea of a blockchain-based platform for water rights transactions received the most scrutiny from stakeholders of all the ideas presented.

Experts and lawmakers will discuss the ideas at the conference Aug. 24. In a foreword to the report, Simpson and Rep. Brianna Titone, D-Arvada, who together led the bill mandating the study, said that the work "cannot come at a more important time."

"As we see the Colorado River becoming endangered and other areas such as the Rio Grande in similar peril, and with drought and fire seasons not letting up, we must be ever more vigilant in our quest to be more efficient and conserve our most precious resource," Simpson and Titone wrote. "We can achieve this through technology and policy."

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