

Impact

Sharing the difference CSU Extension makes in people's lives and their communities.

Keeping well water safe to drink

Well users in one of Colorado's most rural regions are learning to test their drinking water and protect their health.

Issue

In Colorado's San Luis Valley, nearly one third of all residents get their drinking water from wells that are connected to an extensive, shared aquifer. Since well water does not receive the same protections that regulate municipal water supplies, well users are responsible for safekeeping their own water. In 2009 the Environmental Protection Agency (EPA) helped fund a community collaborative led by the San Luis Valley Ecosystem Council (SLVEC) and its executive director, Christine Canaly, to hold a series of forums on well water safety and hand out free water quality test kits. To be effective, the initiative required specialized technical assistance. The collaborative discovered that resource in Colorado State University Extension.

Extension's Response

The SLVEC community collaborative asked CSU Extension water specialists to help develop the educational forums. Extension had previously created several educational and management resources on well water quality for the Northern Plains & Mountains Regional Water Program, a USDA-funded, multi-state water quality partnership. The resources were a perfect fit for the SLVEC forums and included:

- Handouts on well and septic system management and drinking water quality
- A DVD called "Know Your Ground Water" (produced by Montana State University)
- An online Water Quality Interpretation Tool (see sidebar)

In addition to designing forum presentations using these resources, Extension trained the county public health nurses and SLVEC staff. These professionals then led a total of 13 forums throughout Alamosa, Conejos, Costilla, Rio Grande and Saguache counties in the spring of 2009.

In all, 337 participants attended the forums and took home test kits and educational resources. Extension paid for nitrate analyses in 100 of the 300 households that tested their water. The United States Geological Survey has previously detected nitrates from fertilizers in specific areas of the Valley's ground water supplies.¹ Extension mapped the test results (each water sample was tagged with its geographic location) to create a baseline analysis of the Valley's well water quality.



The Bottom Line

- CSU Extension educational resources encouraged problem solving at the household level by giving people the knowledge and skills they needed to ensure safe drinking water.
- CSU Extension contributed to long-term environmental health solutions that county public health nurses are now carrying forward in accordance with mandates from the Colorado Public Health Act of 2008.

By the Numbers

- Total well water test kits handed out: 337
- Total wells tested: 300
- Percentage residents reporting improved well monitoring and maintenance: 97
- Amount Extension contributed in in-kind and direct expense to improve well water quality: \$8,000

Impact

Six months following the forums, the SLVEC community collaborative conducted a follow-up participant survey.

- 97 percent of respondents reported that they were better able to monitor and maintain their well.
- 95 percent started a well record file.
- 96 percent planned to have their well tested again in the future.

Results from test kits showed the presence of bacteria in 42 percent of wells. Of these, 7 percent, or 22 out of 296 completed analyses, registered positive for coliform bacteria. Arsenic levels, which originate from natural mineral deposits, were found to exceed drinking water standards in 7.2 percent of the samples, or 12 out of 167 completed analyses. Nitrate levels exceeded drinking water standards in five out of 240 completed analyses.² Other contaminants and heavy metals were also present at varying levels. Complete test results are available through CSU Extension.

Of the respondents who used the free test kits, 17 percent had already consulted the online water quality interpretation tool to learn what their test results meant. By plugging bacterial, nitrate and heavy metal values into the online tool, users learned whether water quality problems existed and if so, the recommended treatment options. Of the 24 percent of respondents who reported finding water quality problems, 78 percent had plans to fix the problem.

As a result of CSU Extension's overall assistance:

- Valley residents learned to take control of their well water quality.
- The SLVEC collaborative was awarded additional EPA funding for continued environmental risk assessment throughout the Valley.
- The partnership created long-term environmental health solutions that county public health nurses are now carrying forward in accordance with mandates from the Colorado Public Health Act of 2008 to develop local public health plans and train and educate local public health workers.

¹ Stogner, R.W., Sr., 2005, Distribution and mass of nitrate in the unconfined aquifer beneath the intensively cultivated area north of the Rio Grande, San Luis Valley, Colorado, 1997 through 2001: U.S. Geological Survey Scientific Investigations Report 2004-5290, 62 p.

² Drinking water standards, set by the EPA, are expressed in maximum contaminant level (MCL) figures. The MCL for arsenic is 0.01 mg/L; nitrate is 10 mg/L.; and, total coliform is 0 organisms/100mL.

Bacteria Comes in Many Forms

Bacteria are mostly harmless, microscopic organisms found just about everywhere. For instance, iron-reducing bacteria found in well water can stain laundry and even clog well screens. However, some varieties of bacteria found in drinking water can cause sickness and disease. Testing water for every kind of bacteria is difficult, although most labs report coliform levels. This broad class of bacteria, which includes fecal coliform and Escherichia Coli (E. coli), lives in the digestive tracts of humans and many animals. Their presence typically indicates microbial contamination in the well. The presence of coliform should, at a minimum, demand further investigation. Possible contamination sources may be damaged septic systems or proximity to an animal waste source. It may necessary to disinfect the well through shock chlorination. Replacing the well cap, casing and seal may also be required.

Learn More

- The San Luis Valley Ecosystem Council spearheaded the community collaborative that received an EPA Environmental Justice grant to address well water quality issues throughout the area. View updates and reports at www.slvec.org.
- The Northern Plains & Mountains Regional Water Program Water Quality Interpretation Tool explains if drinking water is out of compliance with EPA contaminant levels and how to resolve the problem: <http://region8water.colostate.edu/wqtool/index.cfm>.

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