

# Citizen scientists helping test Iowa water quality

## More volunteers being sought for Middle Cedar nitrate testing



Bill Waldie of Shueyville lowers a bucket Tuesday from a bridge on Ireland Avenue as he tests Clear Creek in Tiffin for nitrates. Waldie is among volunteers who help researchers test water quality. (Stephen Mally/The Gazette)



TIFFIN — Seldom is water quality so visible as when Bill Waldie sticks a test strip into a bucket of water from Clear Creek and watches the paper turn shades of pink as it detects nitrate.

He takes a photo of the test strip and submits the image to a smartphone app. The app analyzes it and displays the results immediately online, where the University of Iowa can access them.

"What I like about this app is you get instant readings," said Waldie, 66, of Shueyville. "It is kind of cool."

Waldie is one of 12 volunteers testing nitrate along Clear Creek, which feeds into the Iowa River at Coralville, as part of a UI project supported by a nearly **\$90,000 grant from the National Science Foundation**.

Starting in April, UI researcher Chris Jones, along with Keith Schilling and Ibrahim Demir, from the UI's IHR Hydroscience & Engineering, plan to deploy 50 more volunteers along the Middle Cedar River, from Cedar Falls to Cedar Rapids, to test nitrate through the spring and summer.

"Crowdsourcing of science is going on around the country," Jones said. "You empower ordinary people to generate data."

The Iowa Department of Natural Resources had a **similar program, called lowater**, that asked volunteers to do water testing across the state. But the program was discontinued in 2016 amid budget cuts. The DNR now offers to help train locally-led efforts.

Why monitor nitrate?

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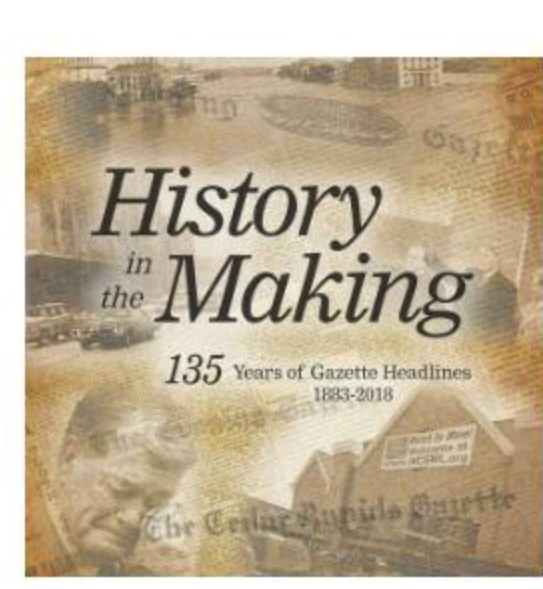
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Nitrogen is an essential nutrient in plant growth. But when it becomes too concentrated in water — which has happened in agricultural states like Iowa where it's applied as fertilizer — nitrate can harm humans and animals.

Nitrate in drinking water has been linked to cancer, rashes, hair loss, birth defects and other health problems, including infant methemoglobinemia, or blue baby syndrome. High levels of nitrate also can cause algae blooms that create toxins. Nitrate and phosphorus washing down the Mississippi River are responsible for an oxygen-deprived dead zone in the Gulf of Mexico.

Iowa has more than 70 sensors installed on streams and rivers across the state that measure nitrate loads and concentration so observers can tell whether water treatment plant upgrades, wetland improvements and agricultural conservation practices are working to reduce pollution.

Sensor data collected March through November feed directly into the [Iowa Water Quality Information System website](#), which has an interactive map that lets viewers see the nearly real-time nitrate measurements, as well as weather reports to coincide with the readings.

New SMARTPHONE App

UI researchers learned two years ago about the [Nitrate App, created by Dutch company Deltares](#), that uses smartphones to scan and analyze nitrate strips in the field, allowing citizen scientists to add to the pool of nitrate data. The Nitrate App data also will be displayed on the Water Quality Information System website.

"The magnitude of data you collect can buffer uncertainties about quality," Jones said.

He and Schilling have volunteers submit a few water samples that are laboratory tested to see if they match the Deltares readings. So far, the app readings have measured only slightly higher than those tested in a lab, Jones said.

In addition to testing the app's accuracy, the project will evaluate volunteers' monitoring plans and how the effort influences their understanding about water quality issues, Jones said.

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UI researchers will give each Middle Cedar volunteer 25 nitrate test strips and ask them to test streams in the watershed. This could be the Cedar River itself, small tributaries or even discharge from farm drainage tiles, Jones said.

"They have a lot of license," he said. "They could go to the same site 25 times in a month or 25 sites in one day."

Waldie, who retired from the annuities division of Transamerica in 2011, tests two sites in Tiffin once a week.

He lowers a galvanized steel bucket with his last name on the side over the bridge on Half Moon Road, scoops up some water and pulls up the blue-and-white rope. Tests done Tuesday showed nitrate was about 4 milligrams per liter of water, which is well within the federal drinking water standard of 10 milligrams per liter.

The UI team still needs about 20 volunteers to do water tests with the Nitrate App sometime between April and August in the Middle Cedar watershed. If you're interested, email Jones at christopher-s-jones@uiowa.edu.

I Comments: (319) 339-3157; erin.jordan@thegazette.com

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