

## Summary of Citizen Science Water Monitoring Campaign, May 2018

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**Good water quality is important to the health of the public.** In communities surrounded by agriculture, there is potential for contamination of water resources by manure and fertilizer application. Nitrates and phosphates are plant nutrients needed for improved growth, but excesses of these nutrients cause adverse impacts on water resources. In May of 2018, our monitoring program sought to measure levels of plant nutrients present in well water, rivers and streams within the Elkhorn and Lower Platte River basins using rapid test strips.

Thank you to every participant who took part in testing their water resources this spring and sent us their results. In total, **69 surface water** and **57 well water samples** were tested by 65 participants across 20 different counties. Washington county had the highest number of well water results with 13 tests completed, while Dodge had the highest number of surface water samples with 13 tests completed. Seward, Wayne, Saline, Otoe, Gage, Platte and Butler counties had a single participant in each county.

### How was water quality measured?

Test results were gathered using rapid test strips, described in the following link: <https://go.unl.edu/wqcs>. These tools detect nutrients at the level of parts-per-million (ppm), which is a unit of measure for dissolved chemicals. To put this in perspective, detecting *1 ppm of nitrate in 1 liter of water* is similar to detecting *1 grain of table salt within 1/3 cup of granulated sugar*. While this scale of measure is small, changes in nitrates and phosphates at this scale can have serious impacts on water quality.

### Nitrate (NO<sub>3</sub>) Results

The presence of nitrates in well water is indicative of surrounding groundwater contamination and is a potential public health hazard in the absence of proper filtration equipment for drinking water. In Wayne county, well water nitrate concentrations were reported as high as 20 ppm (highest of any county). Nitrate was below detectable levels in the well water of Saline and Platte counties. Of the well water results, 41% of participants reported nitrate concentrations above the U.S. EPA safe drinking water limit of 10 ppm.

In surface water, such as streams, lakes and rivers, the presence of excess nitrates leads to eutrophication which is the overproduction of algae that can be harmful to aquatic organisms. 50% of reported surface water samples were above 10 ppm which included Colfax, Wayne, Thurston and Dixon counties. Nitrate was below detectable levels in surface water samples collected in Gage county.

### Nitrite (NO<sub>2</sub>) Results

Nitrite is produced from nitrate and has similar health and environmental impacts as nitrates. However, nitrite is less persistent than nitrate and therefore occurs at lower concentrations. Saline county reported the highest well water nitrite concentration (1.5 ppm) while the highest average surface water concentration of nitrite was reported in Colfax county (0.23 ppm). 11.5% of participants reported a nitrite measurement above the safe drinking water limit of 1 ppm. Nitrite was below detectable levels in the well water samples from the following counties: Saunders, Colfax, Seward, Wayne, Stanton, Sarpy, Cass and Gage. Similarly, surface water nitrite was below detectable limits in Seward, Wayne, Cuming, Thurston, Dodge, Sarpy, Washington, Douglas, Dixon, Butler and Gage.

### Phosphate (PO<sub>4</sub>) Results

Excess phosphates in well or surface water do not directly impair drinking water quality; however, they do lead to eutrophication and the overproduction of harmful algae. 72% of participants reported phosphates between 5 to 50 ppm. Colfax and Stanton had an average phosphate concentration of 13.3 ppm in well water, whereas Saunders had an average of 22.7 ppm of phosphates in surface water. Phosphates were below detectable levels in well water from Seward and Platte, and surface water in Seward county.

Thank you all for participating in this program. We look forward to your continued participation for this summer and fall sampling to monitor your community's water resources. If you have additional questions, please contact us by email using the information on the following page or our website: <https://go.unl.edu/wqcs>.



## Spatial Occurrence of Nutrients as Reported by Citizen Scientists

Geographical results for water samples collected through May of 2018 across participating counties. Graphs A, C and E present average results for well water tests of nitrates (A), nitrites (C) and phosphate (E), and graphs B, D and F present average results for surface water test of nitrates (B), nitrites (D) and phosphates (F). For information about how your specific test results fit into these results, please contact us.

### For Additional Questions or Information, Contact Us:

Professor Shannon Bartelt-Hunt  
 (402) 554-3868 | [sbartelt2@unl.edu](mailto:sbartelt2@unl.edu)

University of Nebraska, Department of Civil Engineering  
 1110 S. 67th St | Omaha, NE 68182-0178

