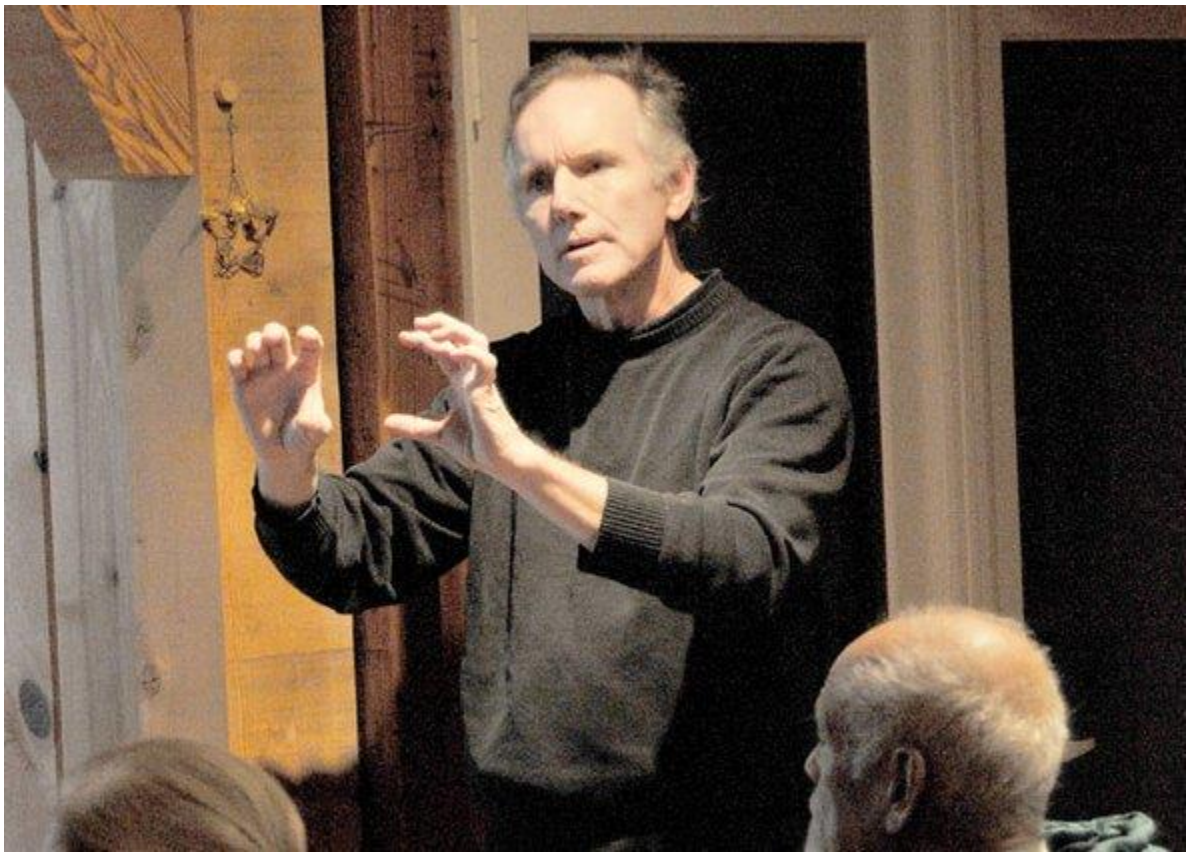
West Fork and Tainter Creek watersheds well test results discussed



DR. PAUL MCGINLEY is the director of the Center for Watershed Science and Education in Stevens Point. That is the location of the lab where many citizens have their well water tested. Here, Dr. McGinley discusses the results of a recent testing with residents of the West Fork Kickapoo.

GILLIAN POMPLUN
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VERNON AND CRAWFORD COUNTIES - Citizens of the West Fork Kickapoo River and Tainter Creek watersheds gathered to hear the results from November 2019 well testing. About 20 citizens were at each of the meetings held in the two watersheds on Thursday, Feb. 13. There they were able to hear Dr. Paul McGinley and Jessica Haucke of the UW-Stevens Point Center for Watershed Science and Education discuss groundwater, and the results of the testing.

As will be the case with the upcoming Driftless Area Water Study (DAWS) well testing in Crawford, Vernon and Richland counties, the individual well testing results are revealed only privately to the well owners. The broad range results reported publicly discuss only overall trends from the sampled wells in the watersheds for coliform bacteria, E.coli and nitrate, and metals if that test is included.

In the West Fork Kickapoo watershed (Bloomingdale to Liberty) 50 wells were sampled.

In the Tainter Creek Watershed in 2018, 44 wells were sampled – 26 in Vernon County and 18 in Crawford County. In 2019 39 samples were taken – 21 in Vernon and 18 in Crawford. Of the total 39 wells sampled in 2019, 10 were repeats from 2018, and 29 were wells not tested in 2018. The watershed council allowed people who had received concerning results in 2018 to re-test in 2019.

West Fork results

Overall, Jessica Haucke described the results of the well testing in the West Fork as “quite good, although I will discuss some concering results with bacteria and nitrate.” Most of the samples came from the middle of the watershed, with a few coming from the western part closest to agricultural fields on the ridge between Viroqua and Westby.

“Overall, based on the test results, you guys are doing really well with water quality in your watershed,” Haucke said. “Now you just need to form partnerships to work together to keep it that way.”

West Fork coliform

Of the 50 wells tested, 16 showed a positive result for coliform bacteria (32 percent), and only two tested positive for E.coli. As Valley Stewardship Network’s Tom Lukens observed, “basically the two that tested positive for E.coli are an abandoned well and a spring, and were tested just to confirm contamination that was already suspected.”

Haucke explained that the presence of coliform bacteria may not cause health issues themselves, but that they are an indication, though, that a pathway exists for bacteria to be entering your well water that shouldn’t be there.” Haucke described the West Fork’s coliform bacteria results as “probably representative of an area with thinner soils and fractured bedrock.”

“Detecting total coliform, is an indicator that there is cause for concern,” Haucke elaborated. “We encourage well owners who get a positive result for coliform to become sleuths to try and identify how the bacteria are getting into their water and what the source might be. An ongoing program of testing may be necessary to evaluate the success of any remediation efforts."

ABOUT 20 citizens gathered at Nature Nook in the West Fork Kickapoo to hear results of a recent well water testing in the watershed.

Dr. Paul McGinley pointed out that with groundwater, the water in your well likely starts as rain near your well, perhaps coming from within a one-mile radius. Coliform bacteria won't survive in your groundwater indefinitely – the bacteria need warmer temperatures in order to survive. Nitrate, on the other hand, is very persistent.

"Once nitrate gets through the plant root layer in the soil, nitrate basically gets into the groundwater and much of it can stay in the groundwater until that groundwater drains to a stream or is pumped out through a well, McGinley explained.

West Fork nitrate

Of the 50 samples tested in the West Fork, 19 (38 percent) showed no nitrate, 13 wells showed a level of two milligrams-per-liter (mg/L) or less (26 percent). Two mg/L is basically the naturally occurring level of nitrate in groundwater that comes about from the natural decomposition of plant material. There were 12 wells that showed a level of between two and five mg/L 24 percent), and four wells that showed a level between 5-10 mg/L (eight percent). Nitrate levels greater than 10 mg/L exceed the federal clean drinking water standard, and are considered unsafe to drink. Only two wells – an abandoned well and a spring – showed nitrate levels of 10 mg/L or greater, and none were higher than 20 mg/L.

"We automatically sample a well that tests positive for coliform bacteria for E.coli, a very dangerous form of coliform bacteria," Haucke explained. "If your well tests positive for

E.coli, then you should discontinue use of the water immediately as it is an indication that pathogens may be present that can cause severe health impacts."

Haucke explained that options for well owners with high levels of nitrate range from buying bottled water, installing a reverse osmosis system, or drilling a new well. She cautioned that moving to drill a new well without understanding the source of the problem might not solve the problem.

Dr. Paul McGinley explained that nitrate moves through soil very easily if it is not taken up by growing plants. He said that the presence of nitrate in groundwater above the naturally occurring level is related to land use. Sources of nitrate can include agricultural fertilizers, lawn fertilizers, septic systems and animal wastes.

Tainter Creek coliform

In the November 2019 testing of wells in the Tainter Creek Watershed, 14 of the 39 samples tested positive for the presence of coliform bacteria (36 percent). Of the 14 samples that tested positive for coliform bacteria, there were no samples that tested positive for E.coli.

In the November 2018 and 2019 testings combined, 25 of the 83 wells sampled tested positive for coliform bacteria (30 percent). Of the 25 wells that tested positive for coliform bacteria, no wells tested positive for E.coli.

JESSICA HAUCKE and Dr. Paul McGinley spoke to about 20 people at the Franklin Town Hall regarding results of a recent well water testing in the Tainter Creek Watershed.

Tainter Creek nitrate

Jessica Haucke provided results for the November 2019 testing, and for the combined November 2018 and 2019 testing. In the Tainter Creek testing, homeowners were able to do both the 'Homeowners Test' for coliform bacteria and nitrate, as well as the 'Metals Test.' The West Fork well owners did only the 'Homeowners Test.'

In November 2019, of 39 wells sampled, three showed no nitrate (eight percent), and nine showed nitrate of less than two mg/L (23 percent). Nine wells showed nitrate levels of between two and five mg/L (23 percent), and 11 showed nitrate levels of between 5-10 mg/L (28 percent). Seven wells showed nitrate levels above 10 mg/L (18 percent), and no wells showed nitrate levels above 20 mg/L.

The combined November 2018 and 2018 results showed seven wells with no nitrate at all (eight percent), and 17 wells with nitrate levels at two mg/L or less (20 percent). There were 14 wells that showed nitrate levels between two and five mg/L (17 percent), and 28 wells with nitrate levels between 5-10 mg/L (34 percent). A total of 17 wells showed a nitrate level of greater than 10 mg/L (20 percent, and no wells showed a nitrate level of greater than 20 mg/L.

Tainter metals results

Generally, the results across both samplings in the Tainter Creek Watershed for metals showed good results. This lead Vernon County Conservationist Ben Wojahn to question the value of offering the metals test going forward, versus just offering the homeowner's test and increasing the number of wells that could be sampled. He said that he plans to raise this question up with the DAWS coordinating group.

Of the 39 wells sampled in November 2019, 87 percent showed no presence of arsenic; of the total 83 wells sampled in November 2018 and 2019, 89 percent showed no presence of arsenic. In November 2019, five wells (13 percent) showed a very low level, and across both samplings, nine wells (11 percent) showed a very low level.

Levels of calcium in the water, a function of the limestone dolomite bedrock, were in the upper range in 33 of 39 wells tested in November 2019 (a combined 85 percent). In the combined 2018 and 2019 samplings, 71 of 83 wells showed calcium levels in the upper range (a combined 85 percent). High calcium is not a threat to human health, and is likely a good dietary source of the nutrient.

When copper or lead show up in well test results, this is an indication that the metals are getting into the water from the piping in the home's water delivery system. This will often occur with water that is very acidic – most of the water coming out of limestone bedrock tends to be very alkaline.

In the November 2019 sampling, 36 of 39 samples showed low levels of copper (92 percent), and no wells showed elevated levels of lead. In the combined 2018 and 2019

samplings, 76 of the 83 samples showed low levels of copper (92 percent), and only one showed slightly elevated levels of lead (0.026-0.050 mg/L).

Levels of magnesium, for which there is no health standard and no known adverse health impacts at drinking water concentrations, showed up at the 21-60 mg/L range in 78 of the 83 combined 2018 and 2019 samples (94 percent). Magnesium is naturally occurring in Wisconsin water, and can be a source of hard water.

Across both testings, levels of iron, potassium, manganese, sodium, and sulfate were low. Levels of zinc were below the health advisory level of two mg/L in 69 of the 83 combined samplings (83 percent), with 12 wells testing at one to five mg/L (14 percent), and two testing at greater than five mg/L (two percent). At levels higher than five mg/L, zinc can be toxic to fish. High levels of zinc can interfere with the body's use of copper, but can function positively in human health as an antioxidant, and can aid in protein formation. Concentrations of zinc greater than one mg/L usually occur only when corrosive water is distributed through galvanized pipes, or in zinc mining areas in southwestern Wisconsin.

Groundwater basics

Dr. Paul McGinley teaches Water Resources at the UW-Stevens Point College of Natural Resources, and is the Director of the Center for Watershed Science and Education. Jessica Haucke is a Research Specialist with CWSE, and as she says, "touches every sample that moves through their lab." Both have connections to southwest Wisconsin – McGinley relatives lived near Rolling Ground and Haucke in rural Viola.

Haucke explained that the lab typically analyzes about 5,000 water samples for nitrate per year. She said that in 2019, due to elevated awareness of problems with drinking water in the state, that number had doubled to around 10,000 samples.

McGinley explained that on average, Wisconsin receives about 32 inches of precipitation per year, with much of that coming in the spring. Of the 32 inches, about 22 inches are used by plants, leaving about 10 inches to work its way into groundwater and streams.

"Of course, with the extremely wet years we've had in the last few years, it's likely that more than 10 inches per year is making its way into our groundwater," McGinley said.

Another way to consider that 10 inches per year is that every square mile makes enough water to fill up a five gallon bucket every second – there's 31 million seconds in a year.

"Around here, the ridges can be at about 1,300 feet above sea level, and the valleys about 700 feet above sea level. What this means is that there is about a 500 foot difference in elevation between the ridge and the valley," McGinley explained. "Water moves into the ground, percolates to the water table, and then moves to streams. Streams that are higher up in the tributaries of watersheds will recharge from water that is

shallower in the bedrock profile, whereas larger streams in the valley floor can also receive water that is deeper in the bedrock profile."

McGinley explained that when water falls as rain, it does not contain all of the "stuff" that is in groundwater. Water picks up the "stuff" while it is moving through the soil profile and bedrock. If there are not growing plants, providing a "plant root layer," as the water is moving downward, then nutrients such as nitrate can be carried downward into the groundwater.

When discussing nitrate levels in groundwater, McGinley said that if you are losing 20 lbs. of nitrogen or more per acre, then you are more likely to see elevated levels of nitrate in groundwater.

"Cover crops or perennial vegetation present on fields in the spring and the fall can help to capture some of this excess nitrogen and prevent it from getting into the groundwater," McGinley explained. "The nitrate available to infiltrate into the groundwater can come from plant debris decomposing, and from excess amounts of fertilizer applied beyond what the crop can use."