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SWIGG Study Update – Identifying Sources of Fecal Contamination in Private Wells in Lafayette, Grant, and Iowa Counties

MADISON — The Southwest Wisconsin Groundwater and Geology Study of Grant, Iowa, and Lafayette Counties has entered its second phase: identifying fecal sources of contamination in homeowners' private wells. Samples were collected in mid-April 2019 from 35 private wells. Wells were randomly selected from those previously found during the study to be contaminated with coliform bacteria or high nitrate (above the drinking water standard of 10 ppm).

Samples were analyzed for pathogens and non-pathogenic microorganisms. The types of microorganisms present can indicate sources of fecal contamination such as human wastewater and livestock manure.

Homeowners received results letters this week, and each county's conservation department is being provided an update.

Contamination of fecal origin was observed in 32 of 35 wells (91%). There was evidence of both human and livestock fecal contamination of wells, including both cattle and swine manure. The researchers emphasize that the percentage of positive wells from this sampling event is not indicative of a region-wide contamination rate because the sampling focused on wells that had previously shown contamination.

Microorganisms capable of causing illness were also detected, including *Salmonella*, rotavirus group A, adenovirus, and enterovirus. However, the researchers caution the data only report microorganism detection rates and cannot be easily translated to estimates of health risk.

The percentage of wells that test positive is expected to differ as weather and land use change over time, and it's too soon to assess which contamination source is more prevalent.

Contamination sources are expected to vary seasonally. For example, in Kewaunee County contamination by human wastewater was more common in early spring when groundwater levels were high, while bovine contamination was more common in fall, after manure had been applied.

Tests only identify fecal sources of contamination, like wastewater and manure, and do not capture other potential contaminants or sources of contamination, like fertilizers.

Different wells will be randomly selected for future sampling rounds. The next round is scheduled for early August.

The research team will also carry out geologic studies and analyze well construction practices in the three-county region, with the goal of determining correlations between water quality, geology, and well construction.

According to Ken Bradbury, Director and State Geologist at the Wisconsin Geological and Natural History Survey-University of Wisconsin-Madison Division of Extension, groundwater conditions in southwest Wisconsin differ from those in eastern Wisconsin, and in particular from Kewaunee County, where similar studies were previously conducted. In both areas, wells draw groundwater from aquifers, or water-bearing rocks, composed of fractured dolomite, a type of limestone. In Kewaunee County there is a single dolomite aquifer, but in southwestern Wisconsin there can be as many as three separate aquifers at different depths below the ground surface, each with different water quality. "Before we can completely interpret the results of water sampling, we need to determine the depth and construction of each well sampled so that we can understand the source of water for that well," said Bradbury.

The study was initiated by Grant, Iowa, and Lafayette Counties in collaboration with researchers from the U.S. Department of Agriculture, the Wisconsin Geological and Natural History Survey-UW-Madison Division of Extension, and the U.S. Geological Survey. Support for the study comes from the counties and agencies involved as well as other organizations, including the Lafayette Ag Stewardship Alliance and the Iowa County Uplands Watershed Group.