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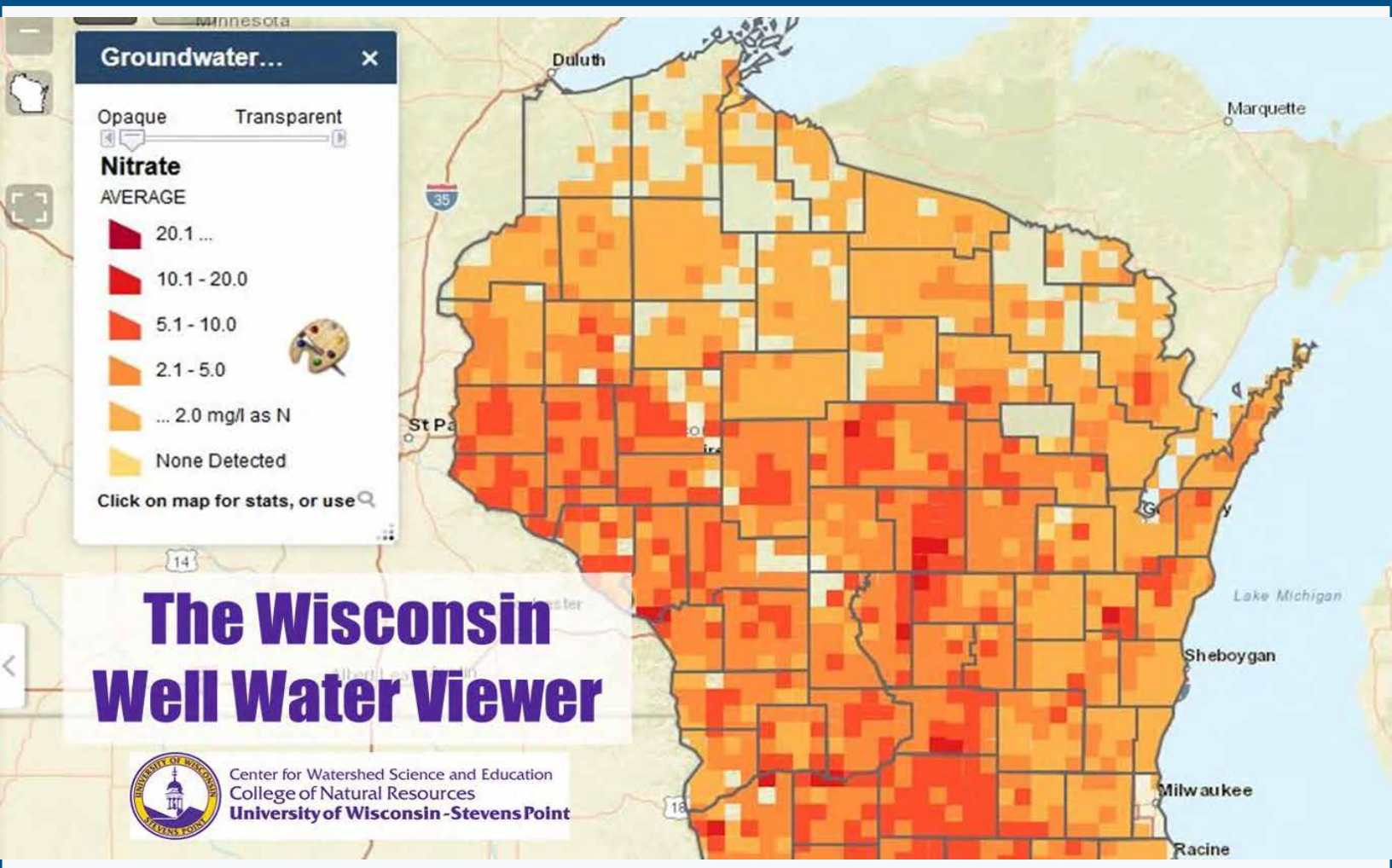
Participatory Science Data Management Case Studies

Wisconsin Well Water Quality Viewer



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Wisconsin Well Water Quality Viewer

Improving Data Management for Participatory Science

The Interactive Viewer's map displays a large public dataset on 14 ground water quality parameters across Wisconsin, which includes anonymized data submitted by homeowners integrated with data collected by state agencies. Aggregating the data in maps helps highlight patters. The program relies on extensive community engagement to encourage testing of private wells.

Issue:
Ground Water

Location:
Wisconsin

Tools:
Specimen/ Sample Collection & Site Selection

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Project Overview & Goals

About a quarter of Wisconsin's population relies on private wells for drinking water. The Wisconsin Well Water Quality Interactive Viewer was created as an educational tool to help people better understand Wisconsin's ground water resources. The viewer integrates water quality data from well water samples voluntarily submitted from homeowners and other well water data collected by state agencies over the past 25 years. The Center for Watershed Science and Education (CWSE) at the University of Wisconsin – Stevens Point manages the program and conducts community focused outreach to arrange testing events for homeowners.

Role of Project Participants

With the guidance of CWSE, community leaders plan the logistics for the ground water testing events including advertising, sample kit distribution and collection, and organizing local educational events to share the community's results. Individual homeowners use the provided kits to collect a sample of their raw well water and drop the samples off for lab analysis.

Data Management

Samples are analyzed by a state-certified lab. The lab results are loaded and stored in an Access database hosted by CWSE. Queries are run within the Access database to perform quality control. The Viewer aggregates the data from the Access database and integrates data from several other Wisconsin ground water quality sources. The Viewer categorizes each water quality parameter based on minimum thresholds and displays color-coded water quality values (based on concentration levels and health benchmarks) aggregated at the county, township or section map levels.

Data Use

Homeowners who participate in the program receive their individual test results along with interpretive information to help inform best practices for maintaining a well or water treatment decisions. The main data use of the Viewer is by organizations interested in understanding the baseline ground water quality levels of an area. These entities include local health and land conservation departments, realtors, water treatment companies, environmental nonprofits, and state agencies. Individual homeowners use the Viewer to learn if their

wells are impacted by local/regional/state well water quality concerns.

Issues & Lesson's Learned

The major issue has been eliminating redundancy when aggregating multiple source data together, especially as the time spans many years. In Wisconsin, unique well identification began in 1988. Data collected prior to this time, or more recent data in which unique well identification is not provided, can make identification and removal of redundant data difficult. The challenge of aggregating historical data has shown the importance of collecting data on the front end and demonstrated that it can assist with these challenges. Steps should be taken sooner rather than later to ensure that data collected now can be easily integrated with future data.

Outcomes & Success Factors

The program benefited from predecessors having the foresight to collect an abundance of data including water quality parameters outside of the basic health-related contaminants, and to create the database on which the Viewer relies. Individuals often have as many questions about aesthetic-related concerns as they do about health-related contaminants that they can not necessarily taste, see, or smell. The Viewer reflects over 220,000 private wells and continues to add more as it generates interest in ground water quality. Data from the program is being used in updating Wisconsin's NR 151 nitrate rule making process, which is considering using the data layers produced from the aggregate well data to classify sensitive areas. This would allow for the inclusion of areas that may not be geologically sensitive, but where the data has identified an issue.

Opportunities

- There is a pilot underway to track ground water quality in four counties over a 5-year period. The goal is a citizen-driven network that will track changes in water quality over time.
- While there is a push to create a centralized submission system for ground water quality data, this would require significant resources to maintain and coordinate with all the various data collection entities. There is a need for long-term state and federal investments beyond one-time grant awards to support similar efforts and make them sustainable.