

Source Water Collaborative 2013 Pilots: Wisconsin Final Report

Description: The Wisconsin Nitrate Demonstration Project will measure groundwater response to agricultural crop production systems and other land use measures designed to make optimal use of nitrogen, maintaining profitability and productivity for agricultural producers and other land managers, while avoiding health risks to all that depend on wells for drinking water. The data and procedures for monitoring, optimizing and measuring will be transparently documented so that the results can be understood and the methods used and refined for others.

The objectives are to accurately determine the wellhead protection areas for public water systems in the selected geographic area; to design and install a groundwater monitoring system producing data sufficient to calibrate a predictive groundwater model; to precisely measure the nitrogen use and fate in the contributing areas; to accurately determine nitrogen use practices needed for public water system wells to avoid violation of the SDWA nitrate standard; to determine the relative cost of providing drinking water that meets nitrate standards by water supply infrastructure (new well or treatment system) as compared to maximizing nitrogen use efficiency.

Documenting each step of the process in a way that the tools and techniques can be transferred is critical to meeting our overarching goal to reduce the number of subwatersheds with multiple public water systems approaching unsafe levels of nitrate.

The target audiences include: public water system managers, consultants and professional associations; agricultural producers, consultants and professional associations; wastewater system managers, consultants and professional associations; managers of other lands with nitrogen uses.

While developed using Safe Drinking Water set-aside funding, the project is designed to facilitate implementation through companion Clean Water Act authorities. Project planning data assessing groundwater nitrate conditions in all Wisconsin HUC12 subwatersheds is a key element of Wisconsin's nutrient reduction framework. A nitrate demonstration project site is sought where nitrogen efficiency would benefit both public water systems and wastewater dischargers if at all possible. Nitrate demonstration project concepts are actively promoted for incorporation in trading and adaptive management projects of dischargers working to meet Wisconsin's new numeric phosphorus water quality standard.

Success of the nitrate demonstration project will be measured by: successful site selection, including recruitment of all essential collaborators; determination of nitrogen management system needed to maintain safe drinking water at public water system wells; compare costs of meeting drinking water nitrate standard by water supply infrastructure (new well or treatment system) and optimizing nitrogen use efficiency.

Accomplishments:

- Statewide assessment of all subwatersheds (groundwater nitrate condition, sensitive drinking water receptors, wastewater discharge collaboration opportunities, hydrogeologic model availability)
- Identification of geographic priority areas (conductive hydrogeology and local project management capacity)
- Refinement of wellhead protection area delineations for priority areas
- Development of monitoring and modeling scope of work and identification of partner capacity
- Initial landowner recruitment effort (through land conservation department using traditional methods)

Planned Next Steps:

- Continue landowner recruitment effort (tailored methods based on in-depth producer advice)
- Final design and implementation of baseline groundwater quality and nitrogen use and fate monitoring for selected site
- Predictive groundwater modeling to guide design of nitrogen use system needed for public water system wells to avoid violation of the SDWA nitrate standard
- Implementation and monitoring of demonstration nitrogen use system and groundwater condition
- Compare cost of providing drinking water that meets nitrate standards by water supply infrastructure (new well or treatment system) and implementation of optimal nitrogen efficiency practices.

Opportunities to Replicate: Plentiful opportunities to replicate the nitrate demonstration project are available in Wisconsin and surrounding states. Project methods are being developed as a demonstration specifically to promote replication.

Collaborative Approach: Advisors to the nitrate demonstration project include WDNR colleagues leading development of Wisconsin's nutrient reduction strategy, implementation of Wisconsin's new numeric phosphorus standard and pilot nutrient reduction projects under the state's CWA revolving loan fund. Nitrate demonstration project leaders are work group members for the state's nutrient reduction strategy, watershed assessment and TMDL implementation.

SWC Contribution:

- USEPA Region V has worked to structure and oversee the project so that it complies with all set-aside funding requirements. Region V hosts the project information sharing site (QUICKR).
- U.S. Geological Survey (USGS) is contributing not only monitoring advice, but also predictive modeling and collection of real-time water quality data on the water supply well.
- Wisconsin Rural Water Association is a day-to-day partner, from reaching out to public water systems to delineating wellhead protection areas.

- AWWA and NGWA source water committees have been briefed on the project; have offered advice and encouragement and offered further assistance as needed.

Lessons Learned:

- Wellhead protection in Wisconsin is perceived as regulatory only; availability of voluntary or collaborative measures and efforts are not well recognized. More new models are needed.
- Even where cost and business returns are not factors, fear of future regulation and potential liability outweigh willingness to participate in wellhead protection. Work is needed on these issues through relationships with ag industry sector groups, including understanding of root causes, potential new perspectives and tools (e.g., legal agreements).
- Even though nitrogen management methods were developed by agriculture technology sector decades ago as cost-saving measures, they do not appear to be currently widely practiced or accepted. Work is needed on these issues through relationships with ag industry sector groups, including understanding of root causes, demonstration and evaluation, and outreach.

Partners

In addition to USEPA, USGS, Rural Water, Sauk and Rock Counties, the following partners have been active in advising on the project in response to our invitation to join the advisory group.

Natural Resources Conservation Service, U.S. Department of Agriculture

Wisconsin Department of Health Services

Wisconsin Geologic and Natural History Survey

Center for Watershed Science and Education, UW-Stevens Point

Wisconsin Department of Agriculture, Trade and Consumer Protection

Wisconsin Water Association

Wisconsin Land and Water Conservation Association

Contact:

Brian Austin, Project Manager

Brian.austin@wisconsin.gov

608-266-3415

Mary Ellen Vollbrecht, Section Chief

Mary.vollbrecht@wisconsin.gov

608-266-2104

Wisconsin Department of Natural Resources Bureau of Drinking Water and Groundwater

101 South Webster Street, Madison, WI 53707-7921