

groundwater nitrogen source identification and remediation

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The Seymour Aquifer in the Rolling Plains and the Ogallala Aquifer in Texas High Plains have some of the highest concentrations of groundwater nitrate in the state. Many streams receiving baseflow from these aquifers have elevated nitrate levels and may be contributing to excessive aquatic vegetation growth. These streams ultimately drain to the Gulf of Mexico where nitrogen has been identified as a possible cause of the hypoxic conditions surrounding the mouth of the Mississippi River.

The Seymour Aquifer is a shallow aquifer underlying over 300,000 acres in 26 counties of northwest central Texas. Approximately 90 percent of its water withdrawals are used for irrigation while the cities of Vernon, Burkburnett and Electra and many rural residents rely on this aquifer as a source of drinking water. The Ogallala Aquifer underlies all or part of 47 Texas counties and portions of seven midwestern states and is a vital source of water for agricultural, municipal and industrial purposes.

According to the Texas Nonpoint Source Management Program, the Seymour Aquifer has the highest groundwater pollution potential of all the major aquifers in Texas because of high nitrate concentrations throughout the formation. Monitoring data collected indicates that all wells sampled contain detectable levels of nitrate, with the majority of them exceeding federal drinking water standards. Potential sources of nitrate in groundwater include atmospheric deposition, natural sources, inorganic fertilizer, organic fertilizer (manure), concentrated animal feeding operations, barnyards, septic tanks and leaking sewer systems.

The goal of the *Groundwater Nitrogen Source Identification and Remediation in the Texas High Plains and Rolling Plains* project is to identify the source of nitrate nitrogen present in area groundwater and evaluate and demonstrate strategies and practices for reducing these levels. Using information from the source identification and evaluations of mitigation strategies, project members are developing educational materials for agricultural and water resource managers that illustrate current over application of nitrate below the root zone, particularly in irrigated areas. These materials are being paired with demonstrations on mining plant-available nitrogen from groundwater and using it as a “free” source of nitrogen to meet the nutrient requirements of various crops.

As the cost of fertilizer increases, the benefits of this educational initiative is extremely valuable to producers and may reduce fertilizer application throughout the area while increasing producer profits. This will, in turn, benefit water bodies in the area that receive stream baseflow from the natural discharge of the aquifer.



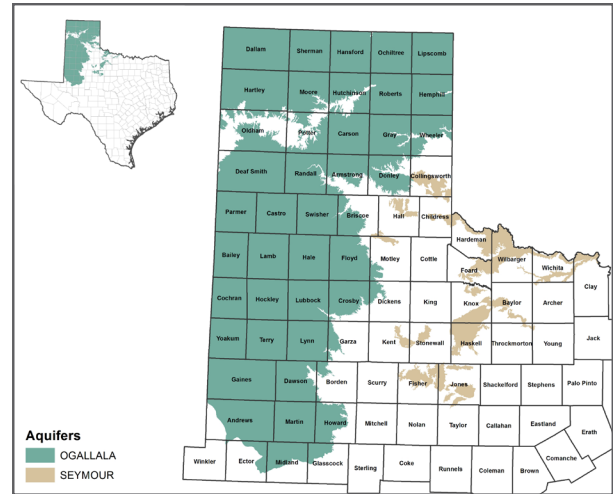
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Objectives

- Identify the source of nitrate in groundwater in the Texas High Plains and Rolling Plains
- Evaluate and demonstrate strategies and practices for reducing nitrate levels in groundwater in the Texas High Plains and Rolling Plains
- Transfer results and recommendations to farmers directly and through project partners

Collaborators

- Texas Water Resources Institute
- Texas AgriLife Extension Service
- Texas AgriLife Research
- Texas Water Development Board
- University of Texas Bureau of Economic Geology
- USDA Agricultural Research Service, Bushland
- USDA Natural Resources Conservation Service



Funding Agencies

- Texas State Soil and Water Conservation Board
- U.S. Environmental Protection Agency

