

Title: Barron County Nitrate Study (Study No. 34)

Investigators: Principal Investigator

Dave Hanson
Water Supply Specialist
Wisconsin Department of Natural Resources
Cumberland Area

Project Assistant

William McKinley
Wisconsin Department of Natural Resources
Water Supply

Background/Need: Nitrate exceedances of the safe drinking water standard of 10 milligrams/liter in Prairie Lake, Barron and Dallas Townships were observed in wells sampled between 1980 and 1986. This study was conducted as a follow-up to evaluate the relationship of nitrate concentrations to well construction and location.

Methods: Field inspections were conducted to determine and assess nitrate contamination related to well construction. Items noted include changes in well construction, route of drainage for possible pollution sources, soil absorption units, underground fuel tanks, proximity of surface water sources to wells and livestock waste.

Results: Barron County exhibited vulnerability to nitrate groundwater contamination in the outwash area north of the town of Barron, resulting from land use, soil type, drainage, shallow depth to groundwater and shallow wells. Dallas Township showed limited nitrate pollution as a consequence of the scattered shallow wells which were sampled and the spatial distribution of point sources in the area, such as septic systems and livestock yards. Nitrate in Prairie Lake Township were found to be most acute in the outwash area east of the Red Cedar River and west of Prairie Lake, north of Chetek. This area is intensely farmed and irrigated, is developed with recreational and residential facilities, and has wells which tap a shallow sand and gravel aquifer.

Conclusions: Investigators conclude that the most consistently contaminated wells were driven point wells. Relatively shallow drilled sand and gravel wells, particularly in Prairie Lake Township, were also found to produce water with elevated nitrate concentrations. The wells least susceptible to nitrate contamination were those drilled into sandstone and cased below the unconsolidated material.

**Recommendations/
Implications:** Investigators recommend that homeowners should be made aware of the vulnerability of shallow wells to contamination by land use practices, and discourage the installation of drive point wells. Critical areas include sections 21, 22, 23 & 24 of Barron Township and Prairie Lake Township east of the Red Cedar River. Elevated nitrate concentrations do pose a human health risk in themselves, and also indicate the susceptibility of groundwater contamination by more toxic pollutants such as pesticides, petroleum products and volatile organic compounds.

Barron County should consider using a well siting permit system as a means to control placement of wells in vulnerable areas. A groundwater management plan is also recommended to minimize the impact of agricultural activities, define specific threats to groundwater and actions to minimize the impact of pollution, delineate vulnerable areas including recharge and catchment areas, establish a monitoring network to assess trends in groundwater quality and alert well drillers of appropriate well construction methods.

Availability of Report: This report is available for viewing and loan at:

The Water Resources Center
1975 Willow Drive
Madison, WI 53706
(608) 262-3069
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