

## **Nutrients in Ground Water from Private, Public-Supply, and Monitoring Wells Open to the Glacial Aquifer System, United States**

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### **Abstract**

Nutrient concentrations in ground water in the glacial aquifer system of the United States were investigated by comparing concentrations in private, public-supply, and monitoring wells. The water-quality data were collected as part of the U.S. Geological Survey's National Water-Quality Assessment program from 469 private wells, 99 public-supply wells, and 1,116 shallow monitoring wells (generally less than 100 feet deep) across the glacial aquifer system.

The median nitrate concentrations (measured as dissolved nitrate and nitrite) in ground water from the private and public-supply wells considered here are 0.1 mg/L, and 0.2 mg/L, respectively. These concentrations differ appreciably from the median concentration for the monitoring wells (1.2 mg/L); sample concentrations from monitoring wells reflect recently recharged ground water, whereas sample concentrations from the other well types reflect older water, possibly explaining this difference. Comparison of ground-water concentrations from private, public-supply, and monitoring wells at nitrate screening levels of 1, 4, and 10 mg/L, respectively, indicates increasing differences by well type with higher screening levels. Preliminary analysis of phosphate and ammonia concentrations indicates no significant variation among well types. In addition to water-quality differences among well types, there is a range of physical (well depth, casing diameter, surficial material, and others) and water-quality differences in water from private, public-supply, and municipal wells. Comparison of median nutrient concentrations among areas of similar hydrochemistry shows a statistical difference by hydrochemical area. Hydrochemical areas have similar water quality based on major ions and alkalinity and determined by cluster analysis. Five hydrochemical areas were defined across the aquifer system in this analysis.