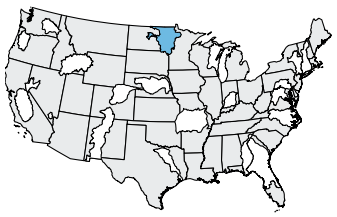
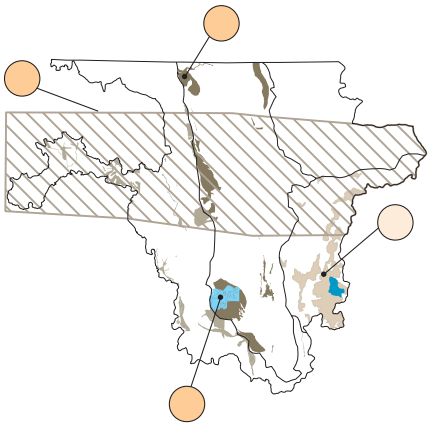


Five major water-quality characteristics were evaluated for ground-water studies in each NAWQA Study Unit. Ground-water resources were divided into two categories: (1) drinking-water aquifers, and (2) shallow ground water underlying agricultural or urban areas. Summary scores were computed for each characteristic for all aquifers and shallow ground-water areas that had adequate data. Scores for each aquifer and shallow ground-water area in the Red River of the North Basin were compared with scores for all aquifers and shallow ground-water areas sampled in the 20 NAWQA Study Units during 1992–95. Results are summarized by percentiles; higher percentile values generally indicate poorer quality compared with other NAWQA ground-water studies. Water-quality conditions for each drinking-water aquifer also are compared to established drinking-water standards and criteria for protection of human health. (Methods used to compute rankings and evaluate standards and criteria are described by Gilliom and others, in press.)

RADON



All radon concentrations ranked in the lower 50 percent of the samples collected from other NAWQA Study Units. Currently (1998), there are no Federal drinking-water standards for radon. The historical standard was exceeded in two-thirds and one-half of the samples collected from the surficial and buried aquifers, respectively.

EXPLANATION

Drinking-water aquifers

Surficial aquifers (Northeastern subregion was not studied)

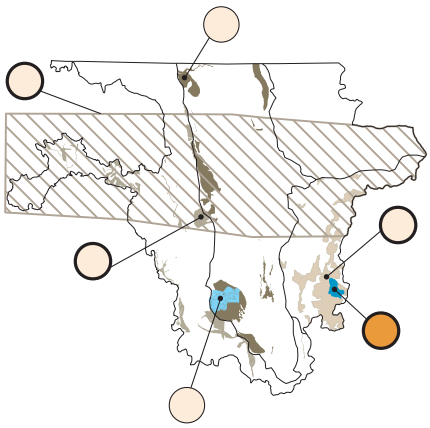
- **West**
- **Central**
- **Southeast**

Buried glacial aquifer sampled area

Shallow ground-water study areas

- **Sheyenne Delta**
- **Otter Tail outwash**

NITRATE

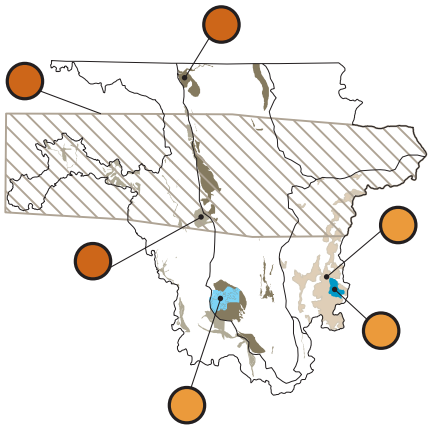


Although nitrate concentrations generally were low in comparison to other Study Units, the variability of nitrate concentrations was high. This explains why 27, 8, and 6 percent of the samples from the western and southeastern surficial aquifers and the buried aquifers, respectively, exceeded the USEPA drinking-water standard, whereas a much larger percentage of samples from these aquifers had concentrations close to or below detection limits. Nitrate concentrations in shallow ground water of the Otter Tail Outwash agricultural area ranked in the upper 50 percent among other Study Units.

Ranking of ground-water quality relative to all NAWQA ground-water studies— Darker colored circles generally indicate poorer quality. Bold outline indicates one or more drinking-water standards or criteria were exceeded

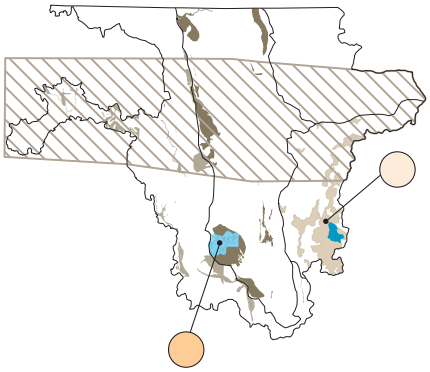
- **Greater than the 75th percentile** (Among the highest 25 percent of NAWQA ground-water studies)
- **Between the median and the 75th percentile**
- **Between the 25th percentile and the median**
- **Less than the 25th percentile** (Among the lowest 25 percent of NAWQA ground-water studies)

DISSOLVED SOLIDS



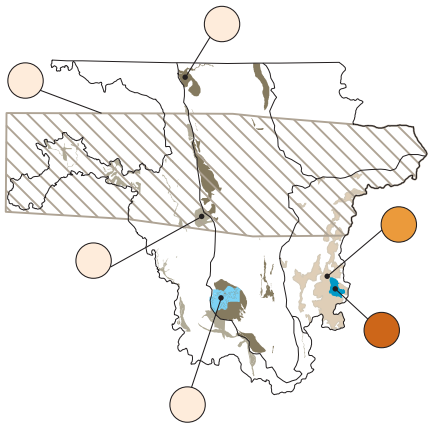
Dissolved-solids concentrations ranked in the upper 50 percent of the samples collected from other NAWQA Study Units. These concentrations were highest in the surficial aquifers located in the western and central subregions and in the buried aquifers sampled. These dissolved-solids concentrations, which largely reflect the effect of geology and semiarid climate, exceeded the drinking-water standard in more than one-third of the ground water sampled basin wide and from 14 to 17 percent of the shallow ground water sampled in the two agricultural areas studied.

VOLATILE ORGANIC COMPOUNDS (VOCs)



Of the two areas studied, VOCs were detected in only one well (Sheyenne Delta agricultural area), placing the Study Unit among the lowest compared to other NAWQA Study Units for VOC detections.

PESTICIDES



The number and concentrations of pesticides (mostly atrazine and related herbicides and bentazon) were relatively low with the exception of shallow ground water in the Otter Tail outwash area. Although no drinking-water standard was exceeded in the Otter Tail study, pesticide detections ranked among the highest in detections compared to other NAWQA Study Units (highest quartile).

CONCLUSIONS

Given the large area of agricultural cropland in the Red River Basin Study Unit, pesticide detections and nitrate concentrations in ground water were relatively low compared to the other NAWQA Study Units.

For the Otter Tail outwash area, where sandy soils over relatively permeable surficial aquifers have been irrigated to enhance crop production, shallow ground water has been contaminated with pesticides and nitrate. These results show the importance of considering the geology along with agricultural and water-management practices in protecting ground-water quality.

The geology and semiarid climate of the western part of the basin result in dissolved-solids concentrations that are among the highest in the NAWQA Study Units. However, these concentrations are not a serious health risk for drinking water. They can result in esthetic nuisances, such as scale buildup, staining, and unpleasant taste.