

Schulmeyer, P.M., 1995, Effect of the Cedar River on the quality of the groundwater Supply for Cedar Rapids, Iowa: U.S. Geological Survey Water-Resources Investigations Report 94-4211, 68 p.

Abstract: The Surface Water Treatment Rule under the 1986 Amendment to the Safe Drinking Water Act requires that public-water supplies be evaluated for susceptibility to surface-water effects. The alluvial aquifer adjacent to the Cedar River is evaluated for biogenic material and monitored for selected water-quality properties and constituents to determine the effect of surface water on the water supply for the City of Cedar Rapids, Iowa. Results from monitoring of selected water-quality properties and constituents showed an inverse relation to river stage of discharge. Water-quality properties and constituents of the alluvial aquifer changed as water flowed from the river to the municipal well as a result of drawdown. The values of specific conductance, pH, temperature, and dissolved oxygen at observation well CRM-4 and municipal well Seminole 10 generally follow the trends of values for the Cedar River. Values at observation well CRM-3 and the municipal water-treatment plant showed very little correlation with values from the river. The traveltime of water through the aquifer could be an indication of the susceptibility of the alluvial aquifer to surface-water effects. Estimated traveltimes from the Cedar River to municipal well Seminole 10 ranged from 7 to 17 days.

Above-normal streamflow and precipitation during the study could have increased the effect the river had on the alluvial aquifer and on the possibility of contamination by a pathogen. Microscopic particulate analysis of 29 samples found no *Giardia* cysts or *Cryptosporidium* oocysts in water collected from municipal wells. Data also indicate that the aquifer is filtering out large numbers of algae, diatoms, rotifers, and nematodes as well as filtering out *Cryptosporidium*, *Giardia*, and other protozoa. The number of algae, diatoms, rotifers, protozoa, and vegetative debris for selected municipal wells tested showed at least a reduction to 1 per 1,000 of the number found in the river. A relative risk factor and a log-reduction rate were determined for the aquifer in the vicinity of selected wells. One municipal well had a high-risk factor, three other wells had a moderate-risk factor, and four wells had a low-risk factor. The filtering efficiency of the aquifer is equivalent to a 3 log-reduction rate or 99.99-percent reduction in particulates.