

Boyd, R.A., 1998, Characterizing ground water flow in the municipal well fields of Cedar Rapids, Iowa, with selected environmental tracers: *Journal of American Water Resources Association*, v. 34, no. 3, p. 507-518.

**Abstract:** Cedar Rapids obtains its municipal water supply from a shallow alluvial aquifer along the Cedar River in east-central Iowa. Water samples were collected and analyzed for selected isotopes and chlorofluorocarbons to characterize the ground-water flow system near the municipal well fields. Analyses of deuterium and oxygen-18 indicate that water in the alluvial aquifer and in the underlying carbonate bedrock aquifer was recharged from precipitation during modern climatic conditions. Analyses of tritium indicate modern, post-1952, water in the alluvial aquifer and older, pre-1952, water in the bedrock aquifer. Mixing of the modern and older waters occurs in areas where (1) the confining layer between the two aquifers is discontinuous, (2) the bedrock aquifer is fractured, or (3) pumping of supply wells induces the flow of water between aquifers. Analyses of chlorofluorocarbons were used to determine the date of recharge of water samples. Water in the bedrock aquifer likely was recharged prior to the 1950's. Water in the alluvial aquifer likely was recharged from the 1960's to 1990's. Biodegradation or sorption probably affected some of the ground water analyzed for chlorofluorocarbons. These processes reduce the concentration of CFC's, which results older than actual calculated dates of recharge.