



# Groundwater recharge

Madeline Gotkowitz, Wisconsin Geological and Natural History Survey

Educational Series 50-2 | 2010

## What is groundwater recharge?

**G**roundwater recharge is water that has soaked into (infiltrated) the ground, and moved through pores and fractures in soil and rock to the water table. The water table is the depth at which soil and rocks are fully saturated with water. Recharge maintains the supply of fresh water that flows through the groundwater system to wells, streams, springs, and wetlands.

Not all precipitation becomes groundwater recharge—some of it runs off the land surface to streams or storm sewers, some evaporates, and some is taken up by plants. Important factors that affect recharge include land cover (forest, row crop, pasture, commercial or residential area, etc.), soil type, vegetation, and rainfall timing and intensity. For example, infiltration rates are higher in sandy soil than in clayey soil or pavement. Recharge is greatest in the spring and fall because the ground is not frozen and because plants are not using large amounts of water.

## Why is groundwater recharge important?

In Iowa County, almost all water-supply needs are met by groundwater, and recharge is critical to maintaining the abundance and quality of groundwater. Groundwater contributes to wells as well as flow to the county's streams, springs, and wetlands year-round, sustaining them during droughts and dry summer months.

## How the map was made

The groundwater recharge map was generated using a soil-water budget model that estimates groundwater recharge across Iowa County. The computer model calculates deep infiltration based on land cover, the water-holding capacity of the soil, and the daily precipitation and temperature. The final result is an estimate of groundwater recharge in inches per year, as shown on the map.

Although this recharge map was generated with a model and was not verified with field measurements, the estimates are reasonable based on physical characteristics of the landscape, and they are in good agreement with other estimates of recharge in this area of Wisconsin.

## What the map shows

The map identifies four recharge categories: very high, high, medium, and undefined (open water). Very high recharge rates occur primarily within the Wisconsin River valley, where the soil is very permeable, and on forested hill slopes. High recharge occurs where the soil is permeable and much of the land is in row crops or pasture. Areas mapped with medium recharge rates have fine-grained soil with lower permeability.

In an average year, the county receives about 35 inches of rain and snow. Of that, about 11 inches reaches the water table. In a very wet year, when as much as 49 inches of precipitation may fall in the county, the estimated average recharge rate is about 15 inches per year. During very dry years, when precipitation can be as low as 25 inches, the model estimates an average recharge rate of about 6 inches per year.

The relatively high rates of recharge over most of the county reflect several characteristics of the landscape. There is little development and the expansive forested and agricultural lands enhance recharge. Permeable soils present across most of the region also support recharge.

## Using the map

Information about recharge can inform land-use decisions. Development planned for areas with high recharge should incorporate design features to reduce runoff and preserve the quantity and quality of infiltration.

Groundwater is more susceptible to contamination where recharge rates are high because contaminants may be transported to the groundwater system along with the recharge. In high-recharge areas, additional planning and monitoring can accompany activities with the potential to release contaminants to the land surface.

*More information about recharge and groundwater resources in Iowa County is available from the Wisconsin Geological and Natural History Survey.*



# Groundwater recharge in Iowa County, Wisconsin



## Recharge in an average year

