Groundwater recharge map of Columbia County, Wisconsin

Columbia County

Wisconsin Geological and Natural History Survey Open-File Report 2012-02

Groundwater recharge is the portion of precipitation and snowmelt that has infiltrated the ground and reached the water table. Recharge maintains the supply of fresh water that flows through the groundwater system to wells, streams, springs, and wetlands. In Columbia 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, the county's streams, springs, and wetlands year-round, sustaining them during droughts and dry summer months.

Factors that affect the amount of 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.

This groundwater recharge map was generated using a soil-water budget model that estimates groundwater recharge across Columbia County, Wisconsin. The computer model (Westenbroek et al., 2010) calculates deep infiltration based on land cover, the water-holding capacity of the soil, runoff flow direction, and the daily precipitation and temperature. The final result is an estimate of groundwater recharge in inches per year, as shown on the map. The map is based on model results using the precipitation record from 1981, a year in which total precipitation in Columbia County was close to the average value of about 33 inches. The model indicates that of that amount, about 8 inches reaches the water table. In a very wet year, when as much as 50 inches of precipitation may fall in the county, the estimated average recharge rate is about 14 inches per year. During very dry years, when precipitation can be as low as 23 inches, the model estimates an average recharge rate of about 1.5 inches

This map shows five recharge classes and areas of open water. Recharge rates are high over much of the county because there is little development, and the predominance of permeable soil enhances recharge.

Groundwater recharge is lower in wetlands and other lower areas in the county where fine-grained soils retain water rather than quickly draining it. This results in more water uptake by plants, and less recharge to groundwater.

References

Natural Resources Conservation Service (NRCS), United States Department of Agriculture. Soil Survey Geographic (SSURGO) Database for Columbia County, Wisconsin. Accessed July 2010.

U. S. Geological Survey (USGS), United States Department of Interior. National Elevation Dataset, 2003.

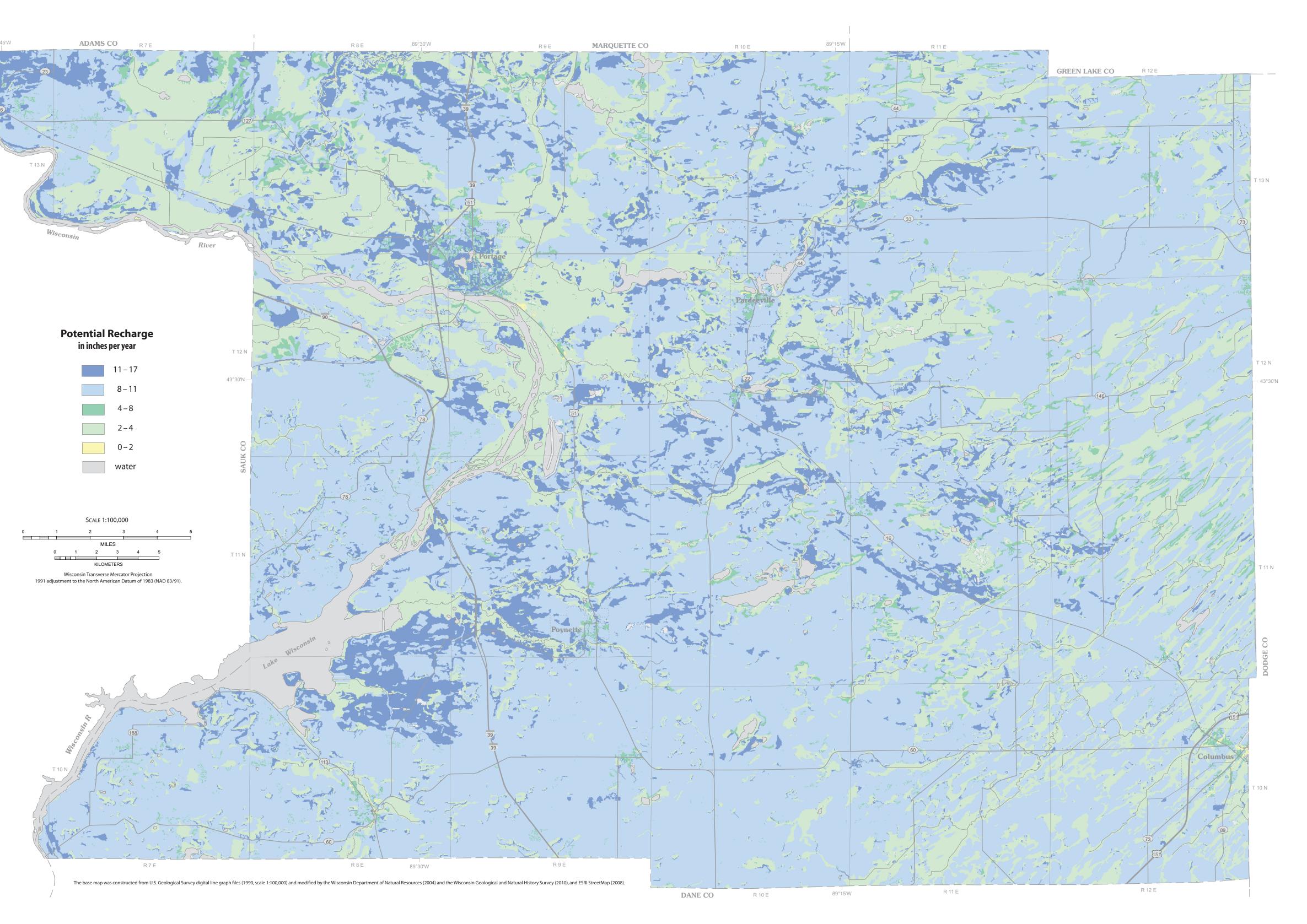
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Wisconsin Department of Natural Resources (WDNR). WISCLAND Land Cover Grid Data, 1998.

This map represents work performed by the Wisconsin Geological and Natural History Survey and is released to the open files in the interest of making the information readily available. This map has not been edited or reviewed for conformity with Wisconsin Geological and Natural History Survey standards and nomenclature.

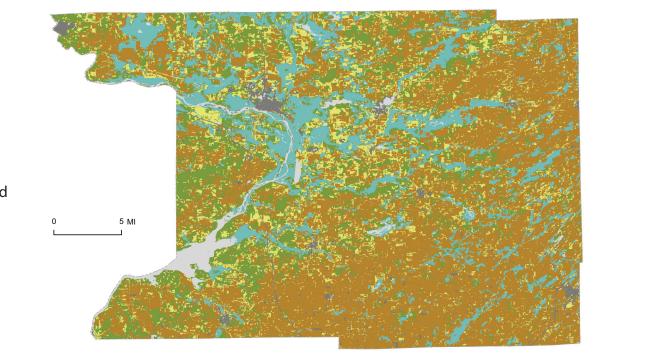
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<u>Extension</u>



Land Cover

- (WDNR WISCLAND)
- Forest Agriculture
- Shrub/Grassland Wetland Water
- Developed



Available Soil-Water Storage (NRCS SSURGO database)



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Select Inputs to Soil-Water Balance Model

