Groundwater Contamination Susceptibility in Wisconsin

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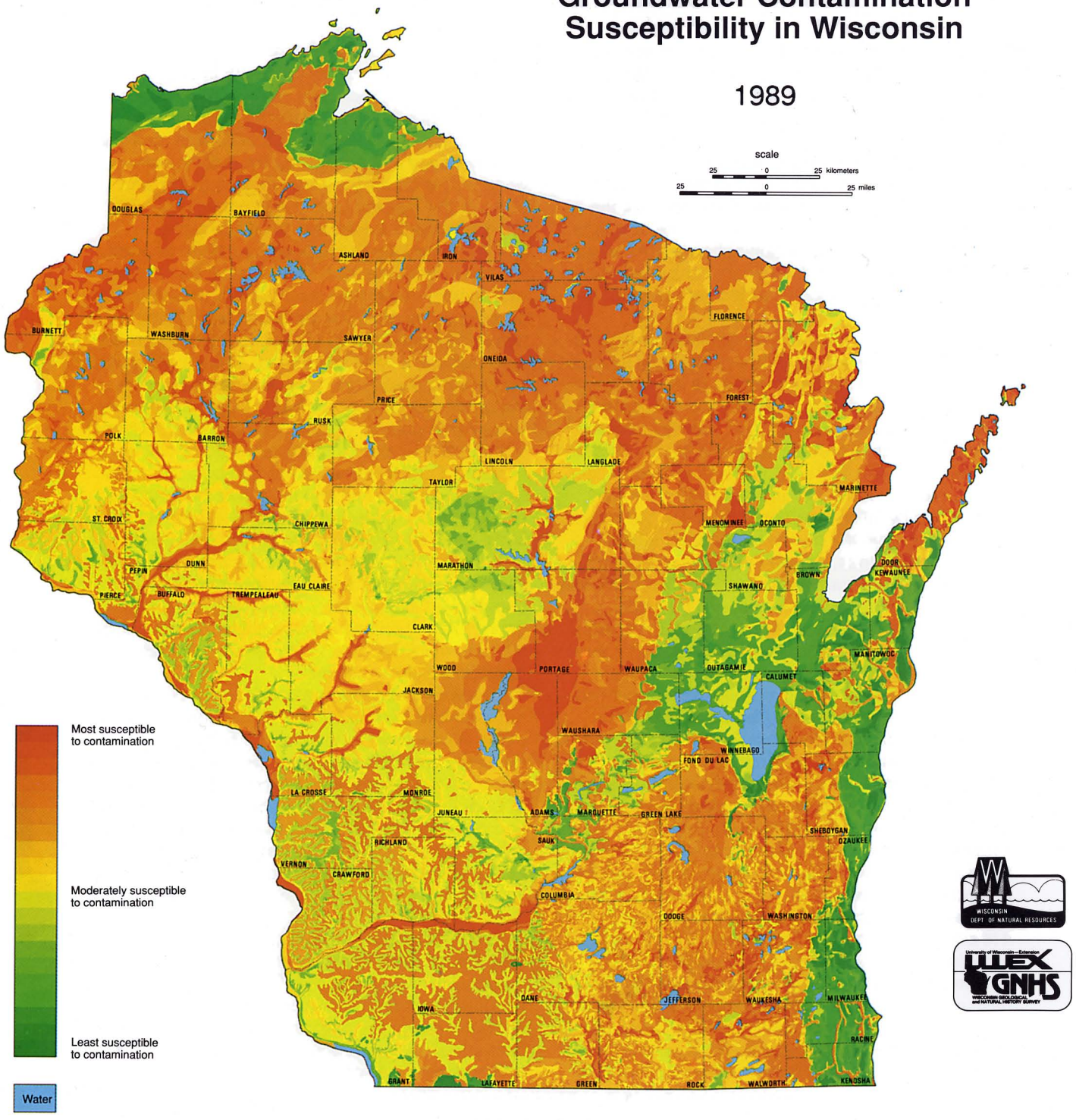

This map of groundwater contamination susceptibility in Wisconsin was reduced from an original 1:1,000,000-scale map. This page-size map has been published for general information and educational purposes only and should not be used for making planning or management decisions.

This map does not show areas that **will be contaminated**, or areas that **cannot be contaminated**. Whether an area will have groundwater contamination depends on the likelihood of contaminant release, the type of contaminants released, and the sensitivity of the area to contamination. In turn, the likelihood of contaminant release depends on the type and intensity of land use and contaminant sources in an area. This map highlights areas sensitive to contamination and shows them in a generalized way. It does not consider the individual characteristics of specific contaminants or the subsurface release of contaminants; that is, it only considers the ability of water to move from the land surface to the water table.

Groundwater Contamination Susceptibility in Wisconsin

Groundwater is the water that is stored in soil and rock formations beneath the land surface. Wisconsin has vast quantities of high quality groundwater; 70 percent of the residents and 97 percent of the communities rely on groundwater as their source of drinking water. But once groundwater is contaminated, it is expensive and often not technically possible to clean. Groundwater does not have the self-cleansing ability of surface water. The susceptibility of groundwater to contamination is defined as the ease with which a contaminant can be transported from the land surface to the surface of the groundwater, called the water table.

Activities on the land can contaminate groundwater; most contaminants originate on the land surface and seep down to the groundwater. In some cases, however, groundwater can become contaminated from natural causes such as radioactivity in the form of radium, which is present in certain types of rocks.

Many materials that overlie the groundwater offer good protection from contaminants that might be transported by infiltrating water; however, the amount of protection from the overlying materials varies. Thus, in some areas, the overlying soil and bedrock materials allow contaminants to reach the groundwater more easily than in other areas of the state.

Five physical resource characteristics for which information was available were identified as important in determining how easily a contaminant can be carried through overlying materials to the groundwater. These factors are **type of bedrock, depth to bedrock, depth to water table, soil characteristics,** and **characteristics of surficial deposits.**

The **type of bedrock** that allows water to pass through it quickly provides less protection for the groundwater than bedrock that is more restrictive in allowing the passage of water or contaminants. Fractured limestone and dolomite usually do not protect groundwater because they have open cracks that are interconnected; shale offers good protection because it is almost impermeable; sandstone and other rocks provide an intermediate level of protection.

The **depth to bedrock** factor indicates the thickness of soil and surficial deposits in an area. This information is used to determine the relative importance of other resource factors. For example, where the bedrock surface is deep and the water table occurs above the bedrock, the type of rock is considered less important than when the depth to bedrock is shallow; then the rock is more likely to influence a contaminant's ability to reach the groundwater.

The **depth to water table** is difficult to map statewide because it changes with the local terrain. In general, the closer the water table is to the land surface, the less contact contaminants have with filtering materials overlying the water table.

Characteristics of soil and surficial deposits are considered the most important factors in determining how susceptible an area is to groundwater contamination. Soil, the unconsolidated material occurring from the land surface to 5 feet below the land surface, is the first material through which water and accompanying contaminants seep en route to the groundwater. Important soil characteristics are texture (the amount of sand, silt, and clay), organic matter content, permeability, and water-holding capacity. Surficial deposits are geologic materials lying between the soil and the top of the bedrock. Except for the unglaciated southwest part of the state, most surficial deposits in Wisconsin were left by glaciers. These materials range from well sorted, coarse-grained sand and gravel to poorly sorted, fine-grained silt and clay. Areas with sand and gravel are considered more susceptible to groundwater contamination; areas with silt and clay are considered less susceptible.

Some groundwater contamination in Wisconsin has occurred in Door County and in the central part of the state known as the Central Sands. Both areas are very sensitive to contamination because of the materials that overlie the groundwater. In many parts of Door County, there is thin soil on top of the bedrock that has large fractures leading directly to the groundwater. In the Central Sands, sandy soil on top of sandy glacial deposits allows water and accompanying contaminants to infiltrate quickly to the groundwater.

These two cases are easily identified because they are extreme. But what about the areas that are less obvious? To help identify other areas sensitive to contamination, this map was prepared. Areas shown in *red* on the map are more susceptible to contamination; areas shown in *green* on the map are less susceptible to contamination.

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Resource Characteristic Map Compilation—R. Dale Cotter and Lee Trotta, United States Geological Survey, Water Resources Division

Cartography and Layout—Michael Czechanski, Wisconsin Geological and Natural History Survey; Mark Riggle, Wisconsin Department of Natural Resources

Technical Advice—R. Dale Cotter and Lee Trotta, United States Geological Survey; Ronald Hennings, Ken Bradbury, Michael Bohn, Wisconsin Geological and Natural History Survey; James Peterson, University of Wisconsin–Extension; David Mickelson, University of Wisconsin, Department of Geology and Geophysics; John Cain, Wisconsin Department of Natural Resources, Office of Technical Services; Mark Riggle, Wisconsin Department of Natural Resources

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