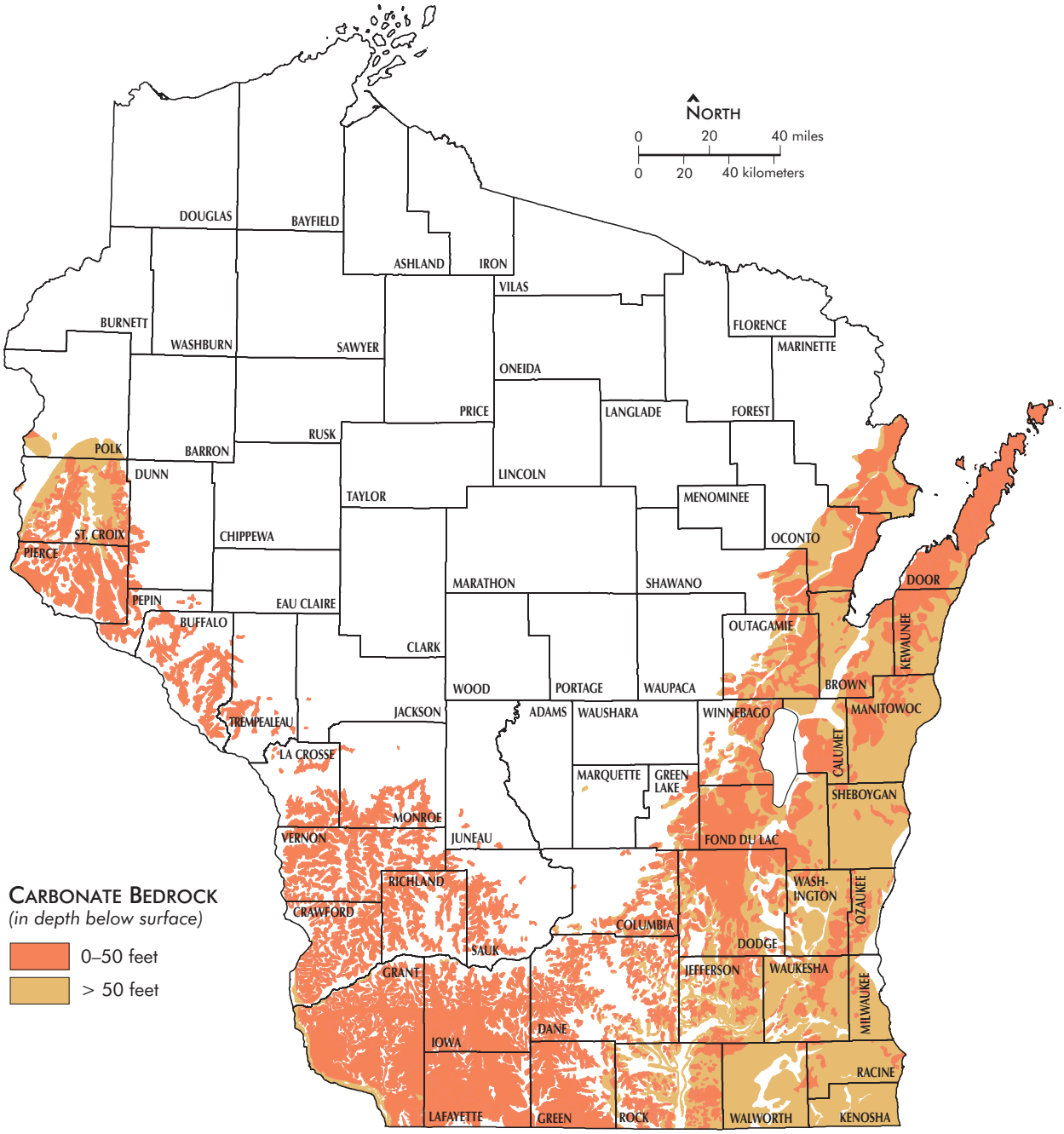
Karst and shallow carbonate bedrock in Wisconsin

Wisconsin Geological and Natural History Survey

Factsheet 02 | 2009

Areas with carbonate bedrock within 50 feet of the land surface are particularly vulnerable to groundwater contamination.



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Wisconsin Geological and Natural History Survey 3817 Mineral Point Road • Madison, Wisconsin 53705-5100
Tel 608.263.7389 • Fax 608.262.8086 • WisconsinGeologicalSurvey.org

Director and State Geologist: James M. Robertson

Fracturing and bedding in an exposure of carbonate bedrock near Sturgeon Bay in Door County.

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Carbonate bedrock, rock formations composed primarily of limestone or dolomite, underlie the southern third of Wisconsin in a V-shaped belt (see map on other side). These rocks are commonly fractured, with the fractures providing primary pathways for groundwater movement.

Carbonate rocks are soluble, and percolating surface water can enlarge fractures to form conduits, caves, and sinkholes that are the hallmarks of a **karst** system and its related karst landscape.

In Wisconsin, karst landscapes are direct evidence of underlying shallow, fractured carbonate bedrock. But the lack of classic karst features in a landscape does not mean that shallow fractured carbonate bedrock is absent, or that the groundwater is potentially any less vulnerable to contamination.

Carbonate bedrock and groundwater contamination

Carbonate formations are important aquifers in Wisconsin. These aquifers supply water for homes, farms, cities, industries, and other human uses as well as maintaining water levels in lakes and wetlands and flows in streams and springs.

Carbonate aquifers are exceptionally vulnerable to contamination for two reasons:

- Groundwater flow in fractured rocks and karst systems can be extremely rapid—tens to hundreds of feet per day.
- Carbonate rocks are poor at filtering or otherwise removing contaminants.

Some site-specific questions to ask about carbonate aquifers

Carbonate aquifers are particularly vulnerable where overlying soils are thin or absent. There are numerous examples of groundwater contamination of carbonate aquifers in such settings in Wisconsin. Consequently, land-use activities in areas of carbonate rock must be carefully managed to avoid the release of contaminants to groundwater.

Types of questions to ask:

- Is carbonate bedrock present in the subsurface?
- How deeply is it buried? In other words, what is the thickness of the overlying material?
- What is the nature of the overlying material? For example, what is its origin, composition, grain size, etc?

Water- and land-use management plans in areas with carbonate bedrock should always address these sorts of questions as they seek to protect groundwater quantity and quality.

For more information, contact

Kenneth R. Bradbury, Ph.D.
Wisconsin Geological and Natural History Survey
608.263.7921, krbradbu@wisc.edu

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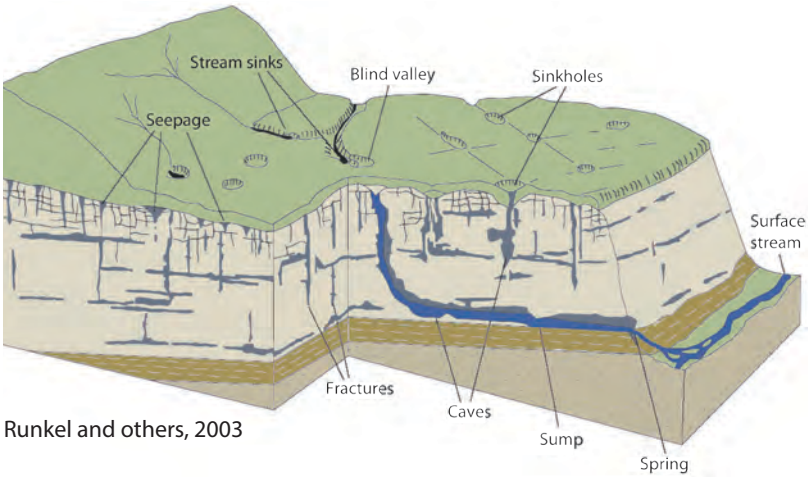
Typical features of a karst sytem and landscape: Seepages, sinkholes, caves, fractures, springs, and stream sinks.



Runkel and others, 2003