Manure Application and Karst

What you need to know before you spread your next load

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What is Karst?

Karst refers to an area where bedrock such as limestone is easily dissolved by water. **Karst** regions are generally characterized by connecting cracks and layers between rocks that easily transport water and pollutants to the groundwater. Sink-holes, shallow soils, sinking streams and springs are found in areas of **karst** bedrock.

Why is Karst a problem for local farmers?

Karst allow surface runoff to directly enter groundwater, which can carry manure, bacteria, fertilizers and pollutants directly to neighboring wells.

Manure (solid or liquid) applied to frozen and snow covered soil has a much higher risk of moving during winter and spring thaws.

What Can I do?

1. **Learn to recognize Karst features.**
2. **Change manure management in these sensitive areas**

Recognizing Karstic Features

One of the easiest Karstic features to see are areas of **exposed and shallow bedrock**. These indicate that soils are thin, and that care should be taken in nearby fields (up to 1 mile away). Exposed bedrock features can vary from small ledges (above) to the Niagara Escarpment (the ledge from Door County to Fond du Lac), or even scattered pieces of bedrock seen in farm fields.

Sinkholes are found in areas where the soil is slightly thicker over the bedrock. As the limestone dissolves, soil falls into the holes. These start small, and grow over time. **Larger Sinkholes** (above) may be an acre or more in size, and the runoff from several square miles may drain into them. The photo below shows more than a half dozen sinkholes that have developed in a field.

Depending on the location, these sinkholes may be

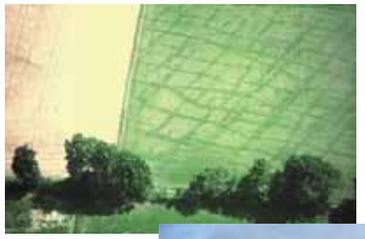
marked in some way or just a patch of weeds where the farmer is unable to plow over them each year. A single tree or bush away from a fenceline is often a clue that a sinkhole exists in that location.

Miniature or Moving Sinkholes are found in fields, and drain a smaller volume of water. They are often the size of gopher holes, and are covered by each spring and fall by tillage, only to reappear after the next major rain event.

An indicator of **invisible or buried sinkholes** are disappearing ponds. These often appear in late winter as the snow melts. What makes these field ponds unique is that they disappear overnight or in a few hours – as soon as the frost comes out of the soil. Water does not pond in these areas at other times of the year.

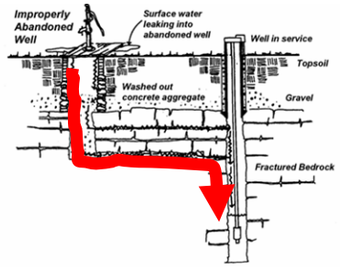
Downstream Sinkholes may be a few yards to a few miles downslope of the field you are spreading in. Generally these drain a smaller area (up to 600 acres or more). This means that you should not only examine the field you are spreading in, but also the fields downslope as well. The term **Swallet** refers to a downstream sinkhole into which a small stream disappears. The water may re-appear elsewhere (as a spring) or be absorbed into the aquifer.

Fracture Traces are found in areas of shallow soils, and most of the year are invisible. They are cracks in the bedrock that have filled with soil. These cracks serve as direct conduits to groundwater. In late summer when it is dry, alfalfa and red clover will grow much taller and greener over these fractures (due to the extra moisture and soil depth). After the first snowfall, the snow melts first above these cracks. In some cases, they may be plowed shut every year or allowed to grow up in grass/shrubs, and have the appearance of an old fencerow.



Fracture traces indicate that you have an area of **shallow soils.** The less soil you have above the bedrock, the less filtering of contaminations can take place.

Unused or improperly abandoned wells are another key contaminant source. These provide direct pathways for surface water to enter groundwater. In karst areas, they were often dug in the low areas in fields. They may also allow contaminations near the top of the aquifer to travel downward and contaminate newer, deeper wells.



Steps you can take to prevent problems

1. Learn as much as you can about each field and the fields downslope. Ask the farmer about these and other features.

2. Contact local agencies (Land Conservation, NRCS) for resources, such as spreading restriction maps, etc.

3. If you're not sure, find another field.

Local Contacts:

LCD offices: Brown Co phone, NRCS office Brown Co.

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