

Groundwater

By Mitch Brinks

Reprinted from January 18, 2011 edition of the *Crow Wing County Water Plan News*

We are blessed with an abundance of groundwater in this part of the state. In fact, it is estimated that 70% of Minnesotans use groundwater as their source of drinking water. Wise stewardship of this resource is of the utmost importance.

Groundwater protection efforts in Minnesota are relatively recent. During the drought years of the 1980s, groundwater conditions became a significant environmental issue. The Groundwater Act of 1989 was a major piece of legislation in Minnesota. Some of the highlights included:

- ◊ Stronger water conservation efforts were put in place and promoted
- ◊ Greater monitoring and testing of pollutants was required as they move through groundwater.
- ◊ Waste pesticide container cleanup and collection addressed in ag. areas
- ◊ Stronger emphasis to provide wellhead protection
- ◊ Emphasis for more cooperation and coordination among state agencies with groundwater responsibilities

The MN Department of Natural Resources (DNR), MN Department of Health (MDH), US Geological Survey, MN Pollution Control Agency (MPCA), and the MN Department of Agriculture (MDA) as well as local water planners and water systems engineers are all involved in protecting our ground-water resources. MPCA, MDH, and MDA are the primary agencies in charge of monitoring and regulating groundwater quality, whereas the DNR has more of a role in groundwater appropriation.

Just like surface water, groundwater is affected by point source and non-point source pollution. Point source contamination is traceable to one specific site or spill. For example, trichloroethylene (TCE) and lead in the groundwater in the northern Twin Cities metro area can be directly sourced back to the old Twin Cities Army Ammunitions Plant in Arden Hills. Leaking underground petroleum fuel tanks is a very common source of soils and groundwater contamination. Chlorinated cleaning solvents are another significant source of contaminants. Many of these manmade or refined organic compounds, referred to as Volatile Organic Compounds (VOCs), are common in commercial and household products.

Non-point source pollutants can collectively have a broad impact on our groundwater resources. Pesticides and herbicides associated with agricultural uses can cause excess nitrogen/nitrate levels in groundwater. Poorly functioning septic systems can also contribute excess nitrogen and phosphorus to the soil and groundwater. Increasing chloride levels from human uses are also a concern.

In addition to the uses of an area, the potential for contamination is influenced by the surficial or "surface" geology (or bedrock geology in the southeastern portion of the state). Since water moves more rapidly through sandy soil, shallow sand-point wells are more susceptible to contamination than deep, drilled wells. Many of the deeper aquifers have clay barriers that limit water movement from upper aquifers.

Much of the region around the Crow Wing County's lakes has a surficial sand aquifer (and thus, many shallow wells). Water table depths in this area are often less than 25 feet. In certain areas within this surficial sandy layer, there is a deeper aquifer below. Please refer to the map on page 3 for the location and depth of the surficial sand layer in Crow Wing County as well as the location of some of the deeper aquifers.

The MDH has established setbacks for both deep and shallow wells. A MDH Protecting Your Well" factsheet is available on Crow Wing County's website that shows these minimum requirements. For example, a well cannot be located any closer than 50 feet from a septic tank and drain field (100 feet if a shallow well). Wells need to be at least 35 feet from a lake or stream. Old wells also can be a conduit for groundwater contamination and should be sealed.

In addition to private wells, groundwater is extremely important as a source of public drinking water. There are over 400 registered public water systems in Crow Wing County. The state of Minnesota requires that all public water systems have some sort of wellhead protection. The type of wellhead protection varies depending on the size of the system. At a minimum, a 200-foot buffer around public wells must be analyzed and managed for contamination. For larger systems, a full wellhead protection plan is developed which identifies the boundaries of the wellhead protection area and drinking water supply management areas (which is the political boundary of the wellhead protection area). Generally, the wellhead protection area includes the surrounding recharge areas where water has an estimated time of travel of 10 years to reach the well. The wellhead protection plan also assesses the vulnerability of the well(s) in this area, and creates a plan of action for wellhead protection, including contingencies. Specific reports, called "Source Water Assessments," are also produced by MDH and summarize all the information available regarding the water sources used by a public water system.

Groundwater protection can take many forms, but it is a much preferred alternate to remediation, which can be very costly and time consuming. Many contaminated sites take decades of monitoring and clean-up before they can be useable. In addition, the regulatory framework has tightened over the years. Now, lending institutions will often not approve a commercial loan request until a Phase I Environmental Site Assessment (or similar study) is conducted to make sure that there were no past releases (or the potential for future releases) of hazard substances or petroleum products.

Crow Wing County has a number of helpful resources with respect to groundwater. The recently completed Geologic Atlas of Crow Wing County has a number of detailed maps and charts showing not only the surficial and bedrock geology of the area, but also the location of aquifers and the sensitivity of these aquifers to contamination. This information is available online on the water plan page of the Crow Wing County website at www.co.crow-wing.mn.us (it is also available in hard copy format upon request).

Another resource is MPCA's "What's in my neighborhood?" online searchable resource for potential contamination sites or sites with MPCA environmental permits. There is a map and text-based search. The map-based tool is located: <http://pca-gis02.pca.state.mn.us/wimn2/index.html>

MDH maintains an online database of County Well Index information which includes well and boring record of private wells throughout the state. This information includes well depth / type and the soil substrate material. Go to: <http://mdh-agua.health.state.mn.us/cwi/cwiViewer.htm>

Additional information on groundwater abundance and use in Minnesota is available on the University of Minnesota's Water Resources Center website @ <http://wrc.umn.edu>

We have put links to both of these resources on the groundwater page of the County website.