



Healthy Waters #4: Healthy Connections Between Surface Waters and Ground Water

Clean and abundant water resources are essential for healthy fish and wildlife populations, our lakes, streams, wetlands and the people that live in North-Central Minnesota. Lakes, streams and wetlands provide for fish and wildlife habitat, swimming, boating, recreation and sometimes water for agriculture, industry, as well as drinking. But did you know that groundwater feeds and sustains our numerous lakes, streams, and wetlands? Groundwater also provides the majority of drinking water for almost all of North Central Minnesota and the vast majority of water for agricultural irrigation and industry.

Have you ever walked along the edge of a lake or river and come across an area of “really” cold water or observed water boiling from the hillside? Well, you may have just walked through or observed a groundwater spring. The groundwater spring is an observable connection between groundwater and surface water. But in most cases, this connection isn’t so visible. Much of North-Central Minnesota is characterized by sand and gravelly soils that allow water to easily drain from the surface into the ground to form extensive aquifers. These aquifers lie under and are connected to our surface water bodies, acting as water storage areas for surface waters during periods of little rainfall. Without aquifers, our lakes, rivers and wetlands could shrink or dry up. This “storage capacity” provides water supply during periods of low or no rainfall, such as winter or drought, and can also absorb and store water during times of ample rainfall or snowmelt. The connections between ground and surface water sustain reliable flows in lakes, rivers and wetlands for the creatures that inhabit them and the people that use them for recreation, agriculture or industry.

In Minnesota, increased pressures from development, agriculture and industry are leading many to ask, “What impact are we having on our surface and groundwater connections and what is healthy and sustainable?” Because surface water and groundwater are connected, excessive withdrawals from groundwater can cause lower water levels in these nearby wetlands, lakes and streams. Some streams, such as designated trout streams, are highly dependent on the cold groundwater supply. Without the groundwater, the water temperatures get too warm and oxygen levels decrease in the water, both of which can adversely affect trout.

The well drained soils within North-Central Watersheds give us great aquifers because they allow water to quickly infiltrate into the soil. However, sandy soil also allows chemicals applied to the surface to infiltrate quickly into the soil and drain into the water table; especially water soluble chemicals such as nitrates. This can lead to groundwater contamination. Because groundwater and surface water are connected, this groundwater contamination can then infiltrate into our surface water bodies.

Frequently, the most significant impact to our surface water is "out of sight" below ground. Despite its lack of visibility, we must consider groundwater when evaluating healthy lakes, streams and wetlands. Reduced groundwater flow results in reduced stream flow and lower lake levels. Contamination in our groundwater can result in impaired surface water quality. When compared to other parts of Minnesota, many portions of North Central Minnesota lakes, streams, wetlands and groundwater are still healthy. As we face continued pressure from changes in land management practices, increased use of groundwater sources for agriculture, industry or public water supply, as well as contamination from nutrient and chemical infiltration and surface runoff, we need to evaluate impacts to our interwoven surface and groundwater resources.

The waters of North Central Minnesota and the plants, animals and people that rely on them comprise a diverse and complex system. The health of the system can only be maintained if we protect, enhance and conserve the quantity and quality of these precious water resources into the future.

This article was written by Darrin Hoverson, Michele Walker, and Jaime Thibodeaux Hydrologists for the MN Department of Natural Resources on behalf of the Civic Engagement Team of the Leech Lake Watershed Restoration and Protection Project. [The next article in the Healthy Waters series: Climate Change Effects on Healthy Waters.](#)