



Wetland impacts from groundwater withdrawals

March 2016 Snapshots

Often we think of surface water and ground water as different resources, or at least disconnected. Then, events remind us that they are really part of the same resource. Declining water levels in White Bear Lake have garnered a flood of media attention, but this is not an isolated case.

Even in our water-rich state, there have been many instances over the years of impacts to wetlands and other surface water features from ground water withdrawals. Irrigation, municipal drinking water needs, and construction dewatering are some examples. We tend to notice these impacts more, but as increasing demands on water occur, we have to deal with these interactions and impacts much more frequently.

Finding the cause of impacts to groundwater can be trickier than impacts from drainage. "When these impacts occur, they are more challenging to recognize, quantify, and address than those from ditching, tiling, or filling" said Kane Radel, BWSR wetland specialist. "Impacts from groundwater pumping are even harder to estimate than impacts from tile drainage. The impacts vary with time, climate, and the agricultural economy, and may not present themselves for several years depending on climate changes."

Pumping ground water at a rate of more than 10,000 gallons per day or 1 million gallons per year requires an [appropriation permit](#) from the Department of Natural Resources, who by statute is required to "manage water resources to ensure an adequate supply to meet long-range seasonal requirements for domestic, agricultural, fish and wildlife, recreational, power, navigation, and quality control purposes."

As part of evaluating these permits, DNR hydrologists are on the lookout for possible "[well interference](#)", where high-capacity ground water withdrawal may interfere with nearby wells. They also evaluate potential impacts to Public Waters Wetlands and [Calcareous Fens](#) (a type of ground water-dependent wetland given special protection). There are not pre-existing maps showing the extent and location of all Wetland Conservation Act (WCA) jurisdictional wetlands. So in evaluating appropriation permit applications, DNR hydrologists may not be aware of nearby wetlands that may be impacted.

A Different Approach Needed?

*The **Coon Creek Watershed District** in the North Metro area is considering a different approach to the unintended effects of nearby groundwater withdrawals on vulnerable surface water resources. Staff has observed many instances where water has disappeared from wetlands without any obvious surface drainage at the same time as a nearby dewatering operation and when rainfall has been adequate.*

In response, the District is drafting a policy document outlining practices to reduce the impact of dewatering projects on nearby groundwater-dependent ecosystems. At present, the District applies the policy goals and objectives to their comments on the 35 appropriation permit applications they review each year. However, in the future they could adopt the policy in full, which sets up a regulatory role for the District. In that case, some de-watering project proposers would need to apply for a District permit. The permit would require project details and if needed, make stipulations for dewatering and discharge to minimize impact to nearby wetlands.

District Administrator Tim Kelly says, "We've just seen too many instances where you can almost watch the wetland disappear from a dewatering project across the highway. Right now we think review and comment is the best course of action. We don't want to go the full regulatory route, but we will if we have to."

BWSR and local government wetland specialists have been working with DNR hydrologists to alleviate this gap. DNR hydrologists have been consulting with WCA staff to help identify wetlands and evaluate potential impacts near proposed ground water withdrawals. 2013 legislation now requires those seeking to construct new high capacity wells to work with DNR staff on a preliminary assessment – evaluating water availability and possible impacts before well construction. If WCA wetlands are identified at this point, landowners can be alerted to their location and potential for adverse impacts prior to well construction.

The reminders of the interconnection of surface waters, such as wetlands, and ground water are becoming more and more common, without the need of dramatic media attention. There is always more work to be done, but working in partnership we will continue to assess the effects of groundwater use on rivers, streams, lakes, and wetlands, and minimize negative impacts to surface waters from groundwater withdrawal.

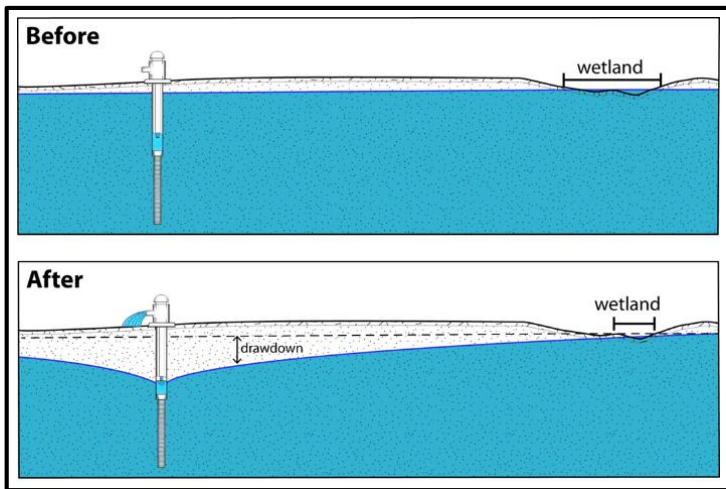


Figure 1

How it works

Figure 1 depicts a potential impact from pumping from a high-capacity well. Pumping produces a **cone of depression** in the water table. If this cone reaches a nearby wetland, it may have a drainage impact. Whether or not it does depends on details of well construction, geologic setting, climate and water use. Situations need to be dealt with case by case. For example, wells tapping deeper “confined” aquifers have less potential to impact wetlands than wells tapping shallow surficial aquifers (Figure 2).

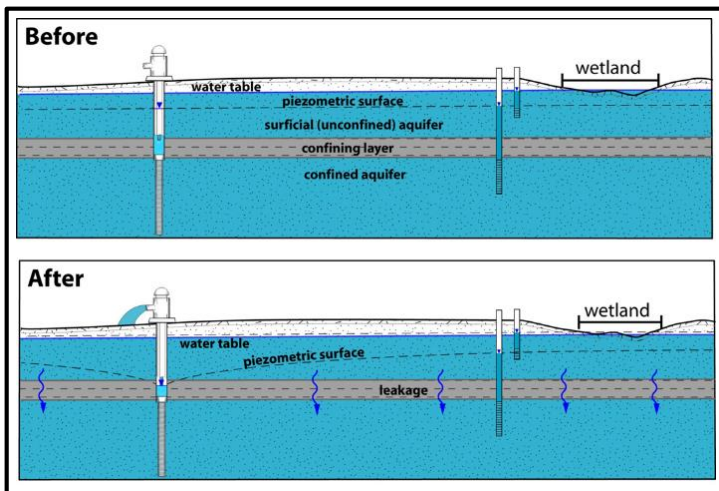


Figure 2