**Irrigation and groundwater level monitoring: More than just data**



By Brent Beste, District Appropriation Hydrologist, DNR Southwest Region

Many DNR water appropriation permits have groundwater level monitoring conditions added to the permit to require the collection of groundwater aquifer water levels. Occasionally, these permit conditions may not get the attention they deserve. Often, the goal of groundwater monitoring is to protect the aquifer and reduce impacts to other water users and natural resources that also depend on the same groundwater. The information that is being collected, however, can be incredibly useful for irrigation management by water users. The DNR wants local landowners and water users to help the DNR manage local groundwater systems, as they are most connected to the groundwater resource.

The DNR utilizes groundwater level monitoring as required in state law, to manage water demands and inform decisions. Specifically, the reason may be to protect an aquifer, mitigate a well interference, or gather data to protect both irrigators and other water users if a well interference complaint is filed with the DNR. Water appropriation permits include these additional conditions to monitor groundwater levels for a specific and important purpose. These conditions are not added to permits lightly.

Producers throughout Minnesota learned to use required groundwater level monitoring for their benefit. This includes efforts to improve irrigation efficiency, protect resources, and make decisions on when and how much to irrigate. This is regularly practiced in areas of southwestern Minnesota where groundwater resources are limited by geology – the study of science that helps to explain how the rocks and soil below the ground determine water availability and aquifer extent.

Reed Van Hulzen, an irrigator in southwest Lincoln County, irrigates in an area with a thin layer of sandy soils and a thick layer of clay overlying a buried sand and gravel aquifer. Often, by late summer, water levels in the pumped aquifer reach a point that if pumping were to continue, permanent damage to the aquifer could occur. Van Hulzen said, “Groundwater monitoring helps make decisions on when to start and stop pumping to meet DNR regulatory requirements to protect the aquifer.” By understanding how water levels respond, Van Hulzen is able manage irrigation timing to irrigate longer into the summer and ensure long-term water availability. Without understanding how water levels respond to pumping, water levels could fall below the safe yield threshold established by the DNR for the local aquifer. Water levels that fall below this water level for an extended period could limit long-term water availability of the aquifer, including for permitted uses and domestic needs.In this situation, the monitoring well is important to extend the irrigation season and sustain the water source.

In another area of southern Minnesota, the DNR works with producers to protect shallow groundwater resources through monitoring groundwater levels. Groundwater level monitoring highlighted the need to coordinate irrigation scheduling to manage groundwater use, with the goal of avoiding well interferences due to a better understanding of the geology of the area. When a consortium of irrigators installed a required monitoring well nest (a group of wells near one another to monitor different aquifers to compare to each other), all involved learned how two aquifers were interconnected and how deeper groundwater pumping was lowering the water level in shallower groundwater (i.e., near the surface of the ground). By monitoring and managing water use timing, the irrigators have put less stress on the aquifers and prevented domestic well interferences in the area for the past five years, including during the 2021 drought.

By reaching out to your local hydrologist to ask questions and understand the data irrigators are collecting, an irrigator can learn a lot to help manage the water availability and maintain that resource for the future. Groundwater level monitoring is a tool used to manage water use, protect domestic supplies and natural resources that depend on that same water such as trout streams and calcareous fens. By understanding the benefits of groundwater level monitoring and using it as one of the many tools to help manage water availability and protection, irrigators can learn to manage impacts to resources to mitigate problems before they become a potential concern.

Groundwater level information collected by the DNR, irrigators and others can be found by searching [MNDNR Cooperative Groundwater Monitoring](https://www.dnr.state.mn.us/waters/cgm/index.html), or directly at [dnr.state.mn.us/waters/cgm/index.html](https://www.dnr.state.mn.us/waters/cgm/index.html).