



Managing Our Groundwater

Proactive planning to ensure continued access to abundant, fresh groundwater

Background

Ottawa County is the fastest growing county in Michigan. It is also one of the most agriculturally diverse and productive counties in the State, and nationally. As the County's population continues to grow and its agricultural industry flourishes into the future, access to abundant, fresh water is essential.

Residents, agricultural producers, and businesses in Ottawa County obtain their water from two primary sources: municipal water systems and natural aquifer systems. The County's urbanized areas are served principally by municipal systems that distribute water processed from Lake Michigan, while its rural areas rely on water that is pumped from underground geologic aquifer systems. Since 2005, there have been instances in the County where the aquifer system has not had the capacity to support new withdrawals, due mainly to low water levels. There have also been instances where extracted groundwater contains elevated levels of sodium chloride. In order to understand the long-term sustainability of the County's aquifer system, the Ottawa County Board of Commissioners requested that a comprehensive, forward-looking study be conducted. One of the primary goals of the study was to identify those areas of the County where continued and/or increased groundwater withdrawals may negatively impact the sustainability and quality of the aquifer system.

Study Results

Michigan State University (MSU) was hired in 2012 to conduct the comprehensive, two-part groundwater study for Ottawa County. An initial, Phase I groundwater assessment was completed by MSU in 2013. The assessment helped to validate the anecdotal reports: water levels in the deep bedrock aquifer system have been gradually declining over the last 20 years. And in certain areas of the County, sodium chloride levels in the bedrock aquifer are rising above recommended standards for drinking water (>250 mg/L) and agricultural irrigation (>70 mg/L).

The primary reasons for the declining water levels and increasing sodium chloride concentrations is two-fold. First, water in the deep bedrock aquifer is not being replenished as quickly as it is being withdrawn for water consumption. This is occurring mainly because of the unique geology underneath Ottawa County. A substantial layer of impermeable clay material sits atop the deep bedrock aquifer nearly 100 foot below the land surface. This naturally occurring clay layer prevents water that percolates down from the surface from recharging back into the bedrock aquifer. Secondly, the bedrock aquifer, known as the Marshall Formation, is naturally-rich in sodium chloride. Consequently, as water levels decrease, the concentration of sodium chloride increases in the water that is being pumped from the aquifer system.

A Phase II study commenced in 2014 by MSU to assess how the County's groundwater supply will be impacted as demand for water increases into the future. This study utilized water-demand projections for the years 2020, 2025, and 2035 based on anticipated growth trends countywide. The study results, finalized by MSU in March 2018, provide community officials with the information needed to develop a sustainable action plan for effectively and collaboratively managing our groundwater resources.

Next Steps

County officials have been working diligently to define the framework for a Comprehensive Groundwater Management Plan. The Plan will be a multi-faceted endeavor that incorporates, at minimum, recommended actions for educational outreach regarding the County's groundwater resources, water conservation strategies, land use planning techniques, well-water permitting procedures, and water and wastewater infrastructure expansions. A collection of experts and local decision-makers has been assembled to assist in the development of the Plan and its recommended actions. Because water is of utmost importance to the viability of our communities, it is essential that this Plan have the support of all necessary stakeholders to ensure the recommended actions are implemented. The County's Planning and Performance Improvement Department is spearheading this important, collaborative community planning effort.

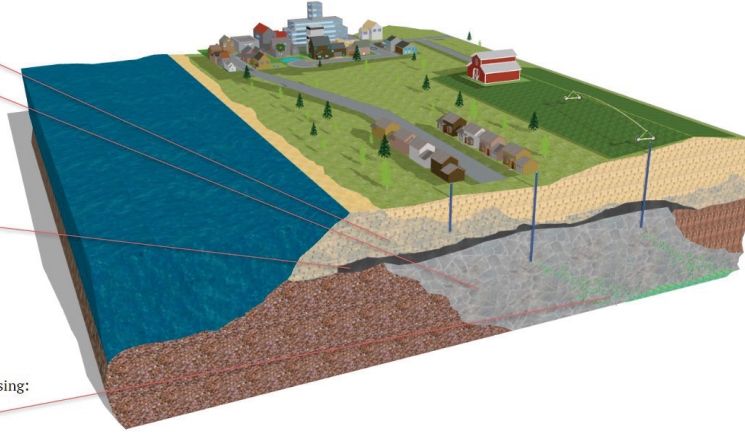
Learn More

miottawa.org/groundwater

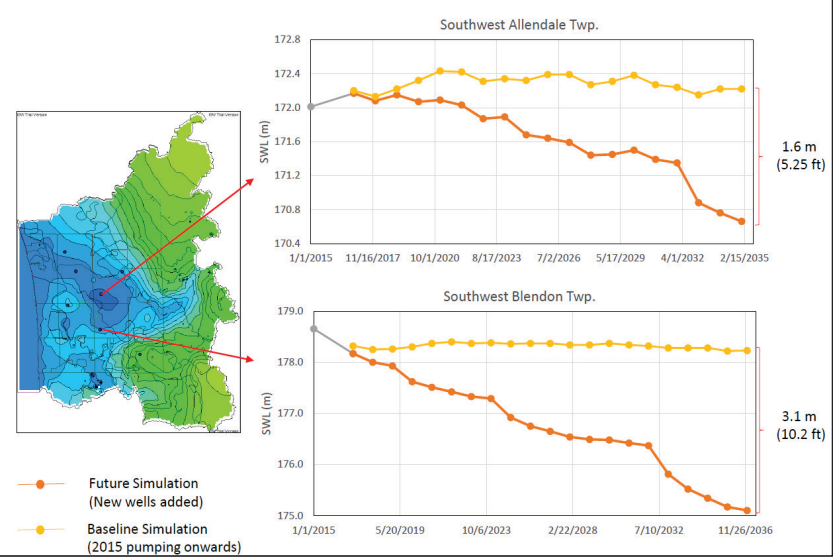
Ottawa County Groundwater Challenges

Aquifer Cross-Section

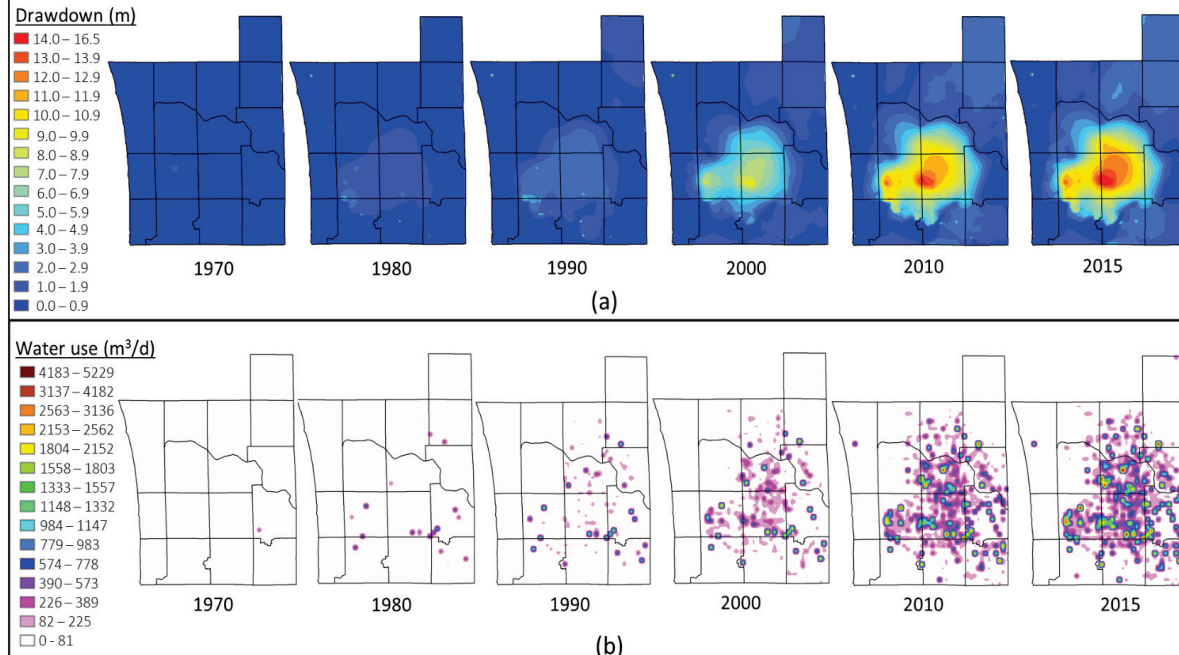
- Our groundwater comes from:
 - shallow aquifer pockets left from glaciers
 - deep aquifers within the bedrock
- Groundwater is typically replenished by rainfall seeping into the ground
- A thick clay layer above our bedrock aquifer prevents it from being replenished
- Our bedrock aquifer cannot pull water from Lake Michigan, because they are not connected
- Our geologic conditions, along with pumping rates, is causing:
 - water levels to decline in the deep aquifer
 - salt to be pulled up from the bottom of the aquifer



Water Level Trends



Water Use Progression



Correlation: Drawdown & Chloride

