

COORDINATION AND CONSERVATION ARE KEY TO A SUSTAINABLE WILL COUNTY WATER SUPPLY

Key takeaways

A recent study by the Illinois State Water Survey (ISWS) reveals that sandstone aquifers in western Will, Kendall, and southern Kane counties will no longer support the long-term water needs of communities and private industries.

In Will County, groundwater levels in sandstone aquifers have dropped, with wells in this area at risk of running dry by 2029.

The City of Joliet's effort to secure Lake Michigan water offers an opportunity for nearby communities to work together on solving future water supply needs.

Continued coordination through the Southwest Water Planning Group (SWPG) is critical as communities explore options for an alternative water supply.

Implementing water conservation strategies now will reduce future costs associated with new infrastructure.

Executive Summary

Communities in western Will County are working together to identify alternative water sources that can lower their dependency on a sandstone aquifer in danger of running dry. Aquifers are underground layers of permeable material that produce water for residents and businesses alike. After decades of high use, aquifers throughout the county are being used to withdraw 30.5 million gallons of water a day when studies have shown the sustainable amount really should be 2.5 million gallons a day.

The issue raises major sustainability concerns over communities' drinking water supplies. Risk maps that depict future water demand projections also pinpoint widespread areas in the region where water wells may no longer operate decades from now. In response to this problem, Joliet is building out infrastructure to switch from groundwater to Lake Michigan water by 2030.

Communities in western Kendall County and southern Kane County also are grappling with having their groundwater supplies run dry over the long term.

As part of ongoing work to understand future water supply conditions in Will County, the Illinois State Water Survey provided communities with risk maps and projections of their individual groundwater supply challenges, using CMAP's socioeconomic and water demand forecasts to understand future water use. CMAP'S ON TO 2050 plan recommends [coordinating and conserving our shared water resources](#), and identifies a number of additional activities stakeholders can use to help in this effort. This policy brief delves into the questions facing Will County communities and their groundwater supplies, and sheds light on the solutions that can put our region on a more sustainable path going forward.

Why are Will County communities seeking new water sources?

In 2018, Joliet began an extensive effort to evaluate and plan for an alternative drinking water source after city officials learned they had a dozen years until their current source, a deep sandstone aquifer, would no longer provide enough water for the community. In January 2020, the Joliet City Council voted to pursue using Lake Michigan water with the goal of a complete transition by 2030, either by purchasing water through the City of Chicago or withdrawing water directly from the lake in Hammond, Indiana.

Meanwhile, the underlying limitations of the sandstone aquifers in the area could leave other communities and private industries that depend on them without a reliable water source. New sandstone wells are being planned and constructed due to water quality concerns in the shallower aquifers. Excessive use of road salt and other pollutants is lowering water quality and driving communities to the deeper aquifers. In response, a group of 12 communities including Joliet, private industries, and Will County jointly funded the Illinois State Water Survey (ISWS) to improve the scientific understanding of the area's groundwater sources. Calling itself the Southwest Water Planning Group (SWPG), the communities sought answers to critical questions about how much water could be sustainably withdrawn from the aquifers, and under what conditions a community's wells would no longer provide enough drinking water.

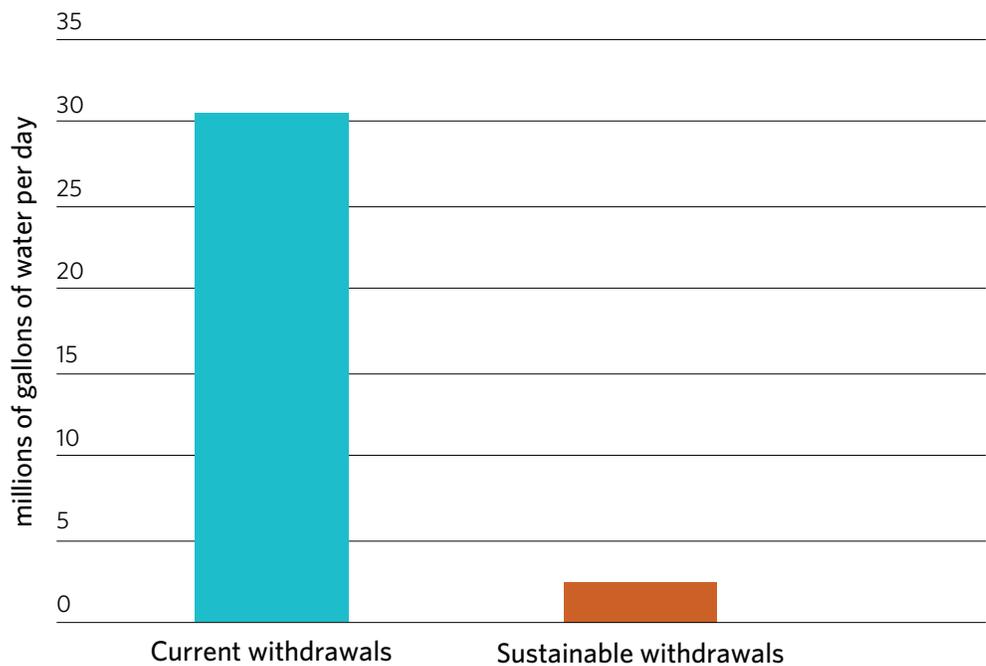
Even as work continues on an alternative, Joliet recognizes that updated information about the sandstone aquifer is critical to managing its current water supply source over the next 10 years. As surrounding communities weigh whether to join a new water system with Joliet, villages need to make sure they understand the sustainability concerns of their current source.

Study reveals use of sandstone aquifer is not sustainable

Armed with more detailed monthly water data from participating communities, the results of an [ISWS study released in May](#) revealed the extent of overuse of the aquifers, raising sustainability concerns among SWPG participants. Based on ISWS estimates, communities and private industries in the area have exceeded the sustainable yield — the amount of water that could be withdrawn from the aquifers without leading to further decline. While the sustainable yield is around 2.5 million gallons of water a day, communities and industries are pumping approximately 30.5 million gallons of water a day from the aquifers. This overuse has been happening for decades, resulting in a “cone of depression” where the water stored in the aquifer has been depleted and has caused water levels to drop. Sandstone wells in this area will begin to run dry, pump sand, or encounter other issues that reduce their ability to produce water.

Comparison between current withdrawals and sustainable withdrawals from aquifers in Will County

Source: Illinois State Water Survey, 2020.



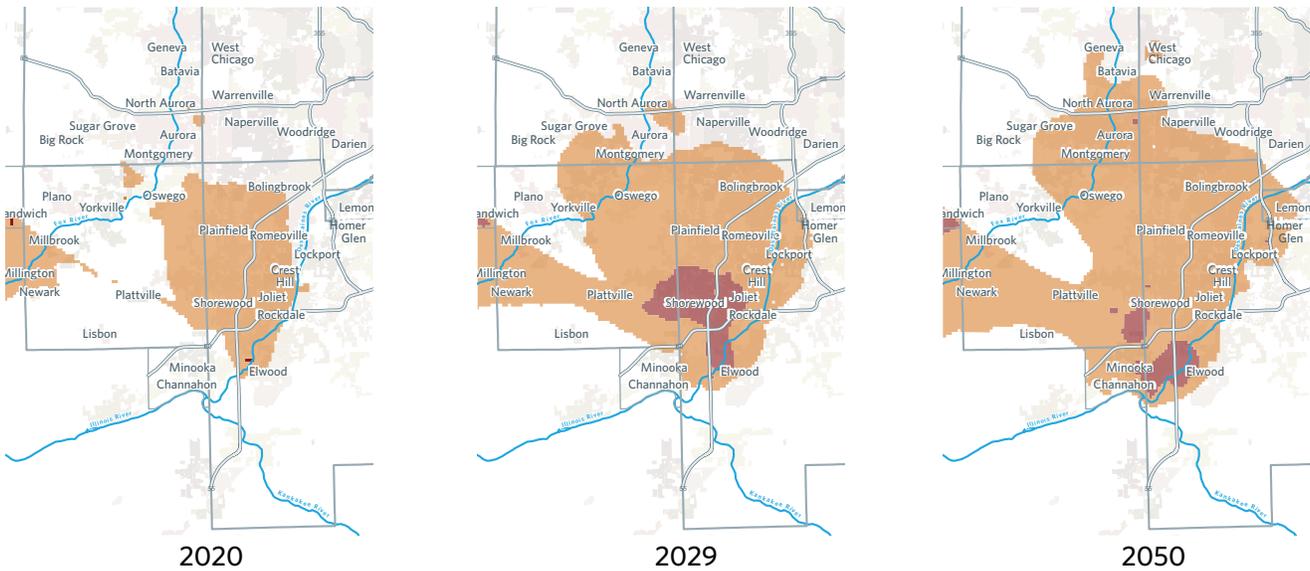
“Switching water sources will be necessary for all communities relying on the sandstone aquifer in this area, but the timing will vary by community,” explained Daniel Abrams, a lead groundwater expert for ISWS. To understand future conditions, the ISWS uses projections of the location and amount of water needed to meet future population and employment growth. The SWPG communities helped provide and refine those estimates, and identified the location of new planned wells. ISWS also used demand forecasts derived for several communities from the Joliet alternative water study and [CMAP’s water demand forecast](#), which shows larger regional context. Local well drillers also gave advice about how wells and corresponding equipment perform in different conditions.

The study results are displayed as risk maps for future years that highlight areas where underground water levels have dropped to a point where wells may not produce water. To answer the central question of when each community could run out of water, the study assumed most of the communities will continue to use the sandstone aquifer with the exception of Joliet, Oswego, Montgomery, and Yorkville. Officials in those communities already have decided to secure an alternative water source. The resulting maps show that problems will escalate in the Joliet area until 2030, when Joliet is slated to switch to Lake Michigan water. In 2035, Oswego, Montgomery, and Yorkville in Kendall County are assumed to switch off groundwater to a source that still needs to be determined. Even with these milestones, the risk of other communities in the area running out of water remains significant.

Each community has received a report that estimates when the wells could be inoperable or when water levels in their specific wells will drop to a point where performance is likely to decline. “We are entering uncharted territory,” Abrams said, noting how estimating the performance of wells under these unprecedented conditions is difficult. In the meantime, participating communities and industries need to send ISWS monthly water level data to keep the groundwater model up to date and help inform decision-making as they work to find an alternative water source.

Risk associated with declining water levels in the sandstone aquifer in the CMAP region

- Risk of declining well performance
- Severe risk of well operability



Source: Illinois State Water Survey, 2020.

How did we get here?

In situations like the one in western Will, Kendall, and southern Kane counties, the collective withdrawal of groundwater over decades has depleted the overall resource. The issue, however, extends well beyond the area and can't be attributed to a particular well or community. In Illinois, groundwater is governed by the rule of reasonable use, meaning one can withdraw water to meet everyday needs. The review of new wells primarily is focused on water quality and does not consider the long-term effect on supply. For much of Illinois' history, this approach has worked because groundwater supplies have been clean and plentiful. Historically, our scientific understanding of the aquifers hasn't provided enough information to make decisions about sustainable withdrawals.

ISWS' work to develop and advance the regional groundwater flow model has dramatically increased the technical understanding of the sandstone aquifers. While the work has the potential to inform sustainable management of groundwater sources, a structure for making those types of decisions does not yet exist. For example, under current law, another public or private well could be permitted in this area today, and leave a nearby community with less time to secure another source.

Coordination and conservation provides a path forward

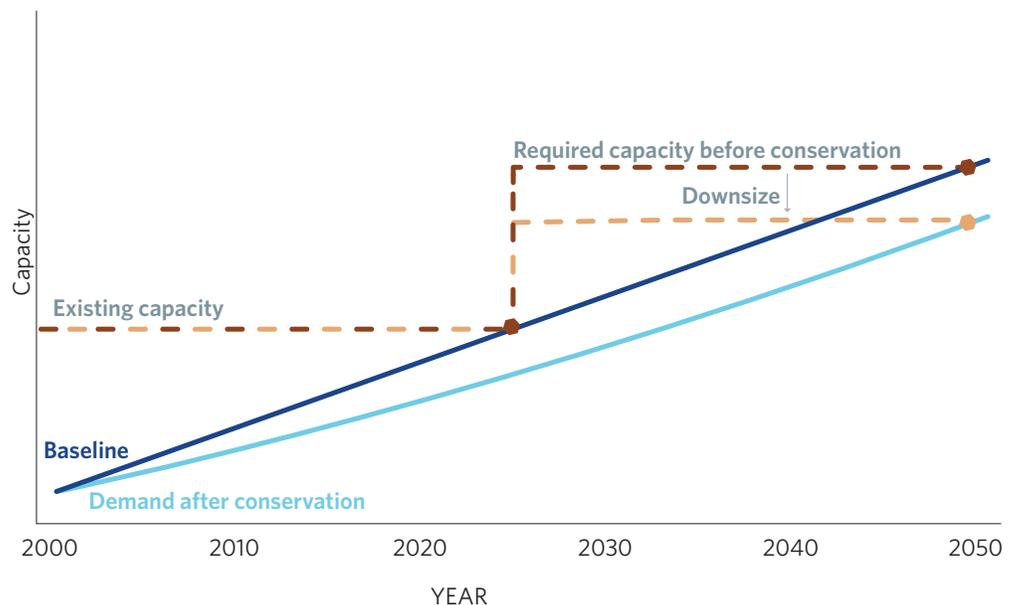
As Joliet proceeds with procuring Lake Michigan water, nearby communities will need to evaluate their own systems over the next 12 months and decide whether to work with Joliet and others on a regional solution, or forge their own path to secure an alternative supply. Each municipality's decision will affect the size and corresponding costs of a shared water system, making continued conversations with nearby communities a necessity.

As partners with ISWS, each community in the Southwest Water Planning Group has additional information to power their decisions in the year ahead. However, questions remain, and the SWPG will explore those as well. Together, communities will be learning about potential governance structures for shared water systems, management requirements associated with access to Lake Michigan water, and water conservation practices to reduce costs — all of which will help them make a decision on their future water supply.

Communities also can expand water conservation efforts and encourage residents to adopt more environmentally sustainable practices at home while switching to a new water source. A transition to a new source has cost implications, making an emphasis on water conservation all the more important. Using less water can reduce the infrastructure size needed to support a new water source. Many communities in the area are anticipated to grow in the future and will need to design their new water systems to meet projected demand. The diagram below illustrates how an effective water conservation program can reduce the size of capital facility construction and subsequently lower cost increases for the water utility and its customers.

Costs associated with a new water source could be reduced through water conservation

Source: American Water Works Association, 2006. Water Conservation Programs - A Planning Manual. AWWA Manual M52, First Edition, page 75.



Communities also can encourage water conservation by promoting the use of water-efficient plumbing fixtures and appliances, update water rate structures to incentivize conservation, and reduce outdoor water use. Through its [Rethink Joliet Water](#) campaign, the City of Joliet is conducting outreach on water conservation and offering rebate programs for water-efficient fixtures. Reducing water lost through leaky pipes, which results in lost revenue to communities, is a required conservation measure for communities that use Lake Michigan water. In addition, careful land use planning can play a role in promoting conservation, as the design and location of new development can reduce water use.

Understanding both the available supply of water and current and future demand is critical to making informed land use, transportation, and infrastructure investment decisions. To help implement water resource goals, land use planners and water utility managers will need to work together and align local efforts with current and future water supply constraints.

The work of the SWPG exemplifies the regional coordination that is needed to tackle this complex issue. Together, communities must explore and implement strategies to ensure a long-term water supply for residents and businesses.

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