UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

Prairie Research Institute
Illinois State Water Survey
2204 Griffith Drive, MC-674
Champaign, IL 61820

Romeoville Water Supply Summary

Daniel B. Abrams, Cecilia Cullen, Devin Mannix

Romeoville, like many Illinois communities, is examining whether its water supply is equipped to meet 21st century demands. In that effort, Romeoville joined a group of local communities and industries that contracted the Illinois State Water Survey to evaluate the sustainability and viability of their future water supplies. This is a condensed nontechnical summary of the risk to Romeoville's groundwater supply.

Romeoville utilizes two distinct aquifer systems to meet water supply demands, the deep sandstone and the shallow. Both systems are unlikely to meet future water demands, especially if urbanization and water use increase more than modeled projections.

Deep Sandstone Aquifer. 'Sandstone aquifer' refers to a series of rock layers hundreds of feet below the surface that contain water. Overlain by hundreds of feet of rock and soil, rainwater does not replace water removed from the sandstone on timescales relevant for community planning, making pumping from the aquifer **unsustainable**. Declining water levels in this aquifer forced communities in Cook and DuPage Counties to cease usage by the 1990s, and Joliet will no longer use this aquifer by 2030.

The table below depicts the risk of Romeoville public supply wells being unable to meet community needs in 2021, 2050, and 2070. 'Low' risk wells are unlikely to encounter trouble meeting community demands. Wells with 'Moderate' risk could experience declining well performance. While not an immediate risk to water supply, such wells could see faster rates of declining water levels and require more frequent maintenance. 'High' risk wells are at greater risk of being unable to meet demands, particularly under peak pumping conditions (such as during summer when water use is higher). Wells with 'Excessive' risk will almost certainly struggle to provide water. This assessment is based on observations at existing wells in Will County that have already reached this level. **All risk increases if local demands increase beyond what is currently simulated.** The Table below presents model results for a *single scenario* of community growth. This scenario was vetted by Romeoville water operators, environmental consultants, and planning agencies.

Sandstone Well	Risk in 2021	Risk in 2050	Risk in 2070	Vulnerability to New User
Well 2	Moderate	Moderate	High	Excessive
Well 4	Moderate	Moderate	High	High
Well 10	Moderate	High	Excessive	Excessive
Well 11	Moderate	High	Excessive	Excessive
Well 13	Excessive	Excessive	Excessive	Excessive

In 2021, all Romeoville wells are experiencing some risk. Well 13 is unlikely to exceed current demands. By 2050, all but two of the wells are at high or excessive risk, and by 2070 all are at elevated risk. When new demands (such as new industries) are added to the model, water levels in all wells decrease dangerously. The modeled scenario indicates that the sandstone aquifer will no longer be a reliable water supply source for Romeoville.

Sandstone Summary: **Sandstone aquifer withdrawals in Romeoville are unsustainable. Models indicate risk will increase over time, even if Joliet leaves the sandstone by 2030 as planned. Risk is amplified by any new major sandstone water user, such as a data center or major industry.**

December 7, 2021

UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

Prairie Research Institute
Illinois State Water Survey
2204 Griffith Drive, MC-674
Champaign, IL 61820

Shallow Aquifer. Unlike the very deep sandstone aquifer, the **shallow aquifer** is at or near land surface and can interact with rivers and be replenished by rainwater. This allows for sustainable withdrawals from many shallow aquifers, but at the cost of **susceptibility to contamination**. Consequently, both water quality and quantity must be included in a risk assessment of the shallow aquifer.

Water Quality Risk Table

Shallow Well	Chloride Severity 2021	Chloride Severity 2050
Well 1	Excessive	Excessive
Well 3	High	Excessive
Well 5	Excessive	Excessive
Well 7	Excessive	Excessive
Well 8	Excessive	Excessive
Well 9	High	Excessive
Well 12	High	Excessive

Chloride, which originates from deicers applied to paved surfaces, accumulates in the groundwater and has become a growing problem in the shallow aquifer. The table to the left shows current and projected risk of chloride contamination (based on land use not changing) at each shallow public supply well. 'Low' means chloride is at natural concentrations in groundwater, 'Moderate' is slightly elevated, 'High' encompasses a range harmful to aquatic species, and 'Excessive' is above the EPA secondary standard, where water will begin to taste salty. Now and in 2050, chloride levels at all shallow Romeoville wells are close to or exceeding the EPA secondary standard. However, Romeoville mixes deep and shallow water before providing for customers to maintain acceptable chloride levels for drinking water. Future chloride severity could be worsened or improved by land use and deicing practices.

The geology of the shallow aquifer is highly variable and complicated. To render a more complete picture of water level risk, three different factors are assessed: 1) well productivity compared to the region, 2) whether well productivity has decreased at a well, 3) aquifer dewatering at the site of the well. A well's risk, shown in the table below, is defined by the number of risk factors present, with one being 'Moderate', two being 'High' risk, and all three risk factors as 'Excessive' risk.

Shallow Pumping Risk Table

Shallow Well	Does the well have **poor** capacity to increase demands?	Has well productivity **decreased**?	Is the shallow aquifer dewatering?	Risk
Well 1	✓	-	✓	High
Well 3	-	✓	✓	High
Well 5	-	-	✓	Moderate
Well 7	✓	✓	✓	Excessive
Well 8	✓	-	✓	High
Well 9	-	-	✓	Moderate
Well 12	✓	✓	✓	Excessive

Three shallow wells, 1, 3, and 8, are at high risk of being unable to meet community supply demands. Wells 7 and 12 are already at excessive risk, meeting all the risk thresholds. Wells 5 and 9 are the only moderate risk wells. Romeoville could have trouble in the future extracting water from the shallow aquifer if well performance deteriorates.

Shallow Summary: **Chloride concentrations in the shallow aquifer of Romeoville are increasing, with some wells exceeding the EPA secondary standard. Mixing shallow and deep water enables acceptable drinking water quality. Dewatering of the aquifer limits how demand may increase in the shallow aquifer. The shallow aquifer is becoming a less viable water supply.**