Shared Waters, Shared Future

Northeastern Illinois Regional Water Supply Sustainability Workshops

Workshop logistics

- Today's workshop will be recorded.
- Closed captioning is enabled.
- We will be using the chat to hear from you throughout the workshop.
- We will be using a live polling tool called Mentimeter.
- Following today, we will share the slides with you and post the recording and materials to the **Shared Waters, Shared Future** website: cmap.is/water-workshops

Shared Waters,
Shared Future
Northeastern Illinois Regional Water Supply Sustainability Workshops

Creating a water sustainability plan

April 23, 2026

Shared Waters, Shared Future
Northeastern Illinois Regional Water Supply Sustainability Workshops

Using the chat, please share your:

- Name
- Title
- Organization



Shared Waters, Shared Future

Northeastern Illinois Regional Water Supply Sustainability Workshops

Partners

Chicago Metropolitan Agency for Planning

The Chicago Metropolitan Agency for Planning (CMAP) is our region's comprehensive planning organization. For decades, CMAP has conducted water supply planning to advance efforts that promote sustainable use of our water supplies.

Sea Grant
ILLINOIS – INDIANA

Illinois-Indiana Sea Grant (IISG) is a federal-university partnership (NOAA, U of I, Purdue) focusing on research, education, and outreach for 104 miles of southern Lake Michigan shorelines.

Shared Waters, Shared Future
Northeastern Illinois Regional Water Supply Sustainability Workshops

Funding acknowledgment: *Shared Waters, Shared Future* is funded by the Illinois Department of Natural Resources Office of Water Resources. We appreciate Wei Han, P.E., Ph.D., Water Supply Program Manager, and the department's commitment to water supply planning.

Workshop series

- Collaborating with water utilities and local governments (February 18)
- Creating a water sustainability plan (April 23)
- Addressing utility climate and drought preparedness (June 3)
- Modernizing Illinois' well impact review process (September 10)
- Understanding water governance and management in Illinois (November 12)

Shared Waters, Shared Future
Northeastern Illinois Regional Water Supply Sustainability Workshops

Workshop 1 summary

- Explored water supply collaboration models, regional examples, identified possible pathways to address shared challenges.

- Scan the QR code to:
  - Read the recap blog
  - Watch the recording
  - Access materials

Shared Waters, Shared Future
Northeastern Illinois Regional Water Supply Sustainability Workshops

Register: cmap.is/great-lakes-high-stakes

Great Lakes, High Stakes:

How we can steward the Great Lakes advantage



Wed., May 6
10 a.m. – 1 p.m.

Brookfield Zoo
Swan Pavilion

Free! Lunch and zoo pass provided.

Join leaders for a timely, future-focused conversation about how we can work together to protect and strengthen our region's water systems.

THE CENTURY PLAN

CHICAGO WATER WEEK

Chicago Metropolitan Agency for Planning

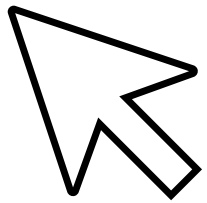
Today’s agenda

- Water sustainability planning and the Illinois State Water Plan
- Water sustainability planning in practice
- Five-minute break
- Integrating groundwater resources into planning
- Wrap-up and what’s next

Which best describes your primary role?

Respond via Mentimeter:

Click the link in the chat

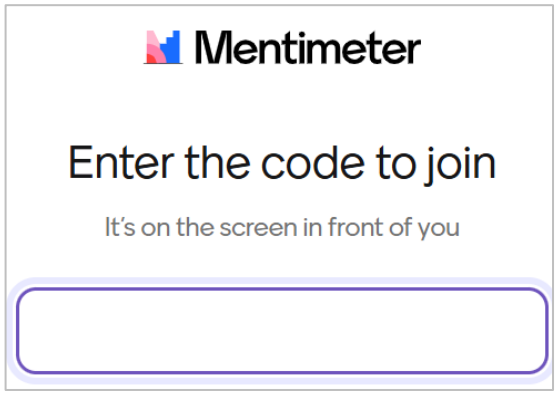


or

Scan the QR code

or

Join at menti.com code 4368 1595



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Northeastern Illinois Regional Water Supply Sustainability Workshops

Water sustainability planning

What is water sustainability planning?

Planning for water use and the systems that support it in ways that meet today's needs without compromising the ability of future generations to meet their own needs.

Avoid unacceptable social, economic, or environmental harm

Public health impacts	Reduced levels of service / reliability	Ecosystem degradation	Long-term water supply constraints	Affordability and equity impacts

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Northeastern Illinois Regional Water Supply Sustainability Workshops

How familiar are you with water sustainability planning?

Respond via Mentimeter:

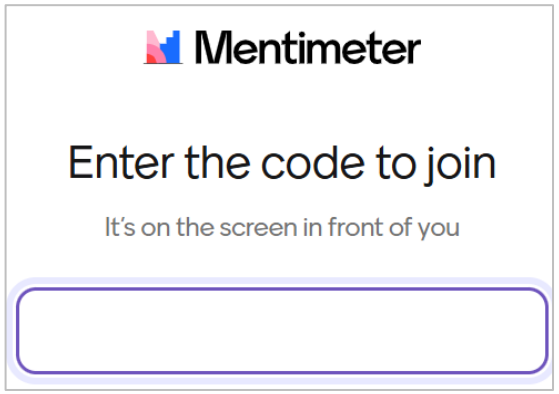
Click the link in the chat

or

Scan the QR code

or

Join at menti.com code 4368 1595



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Common building blocks

Understand the system	Water supply sources Infrastructure capacity and condition
Analyze	Socioeconomic projections Water supply availability & quality Current and future water demand Supply constraints and risks
Identify actions	Collaboration & partnerships Water conservation New supplies

Speaker



Wei Han, PhD, PE

Water supply program manager
Illinois Department of Natural Resources
Office of Water Resources

Shared Waters,
Shared Future
Northeastern Illinois Regional Water
Supply Sustainability Workshops





Illinois State Water Plan and Water Supply Planning

Shared Waters, Shared Future

Northeastern Illinois Regional Water Supply Sustainability Workshop

April 23, 2026

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

- State Water Plan and Sustainability
  - Plan Overview
  - Water Sustainability
- State Water Supply Planning
  - Program Establishment
  - Planning Regions
  - Strategic Goals
  - Implementation

What is the State Water Plan?



[IL State Water Plan 2022.pdf]

Mission

"For state agencies to develop a concise plan for addressing the water issues facing the state in an efficient and unified front."

Goals

To develop a Plan that provides policy and program guidance in water resources management and ensures that the water resources of the state are available to all in Illinois regardless of race, income, housing status, or geography, and that remediation efforts enhance and protect water quality and supply for all Illinoisans and wildlife.

History

The First Illinois Water Plan Issued 1967.

13 Critical Issues

1. Water Quality
2. Climate Change
3. Integrated Water Management
4. Long Term Funding
5. Water Sustainability
6. Lake Michigan
7. Flood Damage Mitigation
8. Aquatic and Riparian Habitat
9. Water Use Laws and Regulations
10. Navigation
11. Erosion and Sedimentation
12. Data Management
13. Recreation











Example Section



9

WATER SUSTAINABILITY

Overview

Having access to an adequate and reliable quantity and quality of water is critical to all Illinois residents, businesses, industries, agriculture producers, and to the state's boundless aquatic ecosystems. Water sustainability means that all water users have the water they depend on each day for generations to come. Achieving sustainable water management requires a planning approach that addresses the technical, environmental, societal, and economic challenges faced across the state.

In 2006, Governor Blagojevich issued Executive Order 2006-01 requiring the state to develop regional water supply plans. The order organized regionally based committees to develop and approve regional water supply plans from scientifically based data. The state was divided into ten water supply regions, generally based on surface water, groundwater, and county boundaries (See **Figure 9.1**). Of the ten regions, four have developed plans with one additional region currently developing a plan. The regional water supply plans provide recommendations to address the most critical water supply concerns in the region and lays out a plan of action to be implemented in the following years. Included in the planning process is an analysis of water demand versus water supply, highlighting any existing or future forecasted shortfalls. **Figure 9.2** illustrates a draft example of projected water availability for Northeastern IL through 2070.

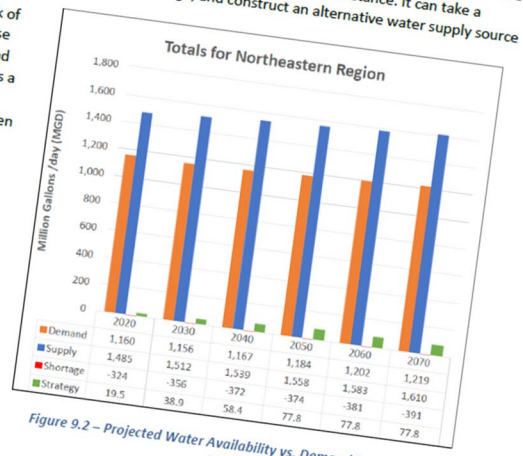
Illinois continues to focus on water supply sustainability. The Illinois Department of Natural Resources' Office of Water Resources plans to implement a statewide general assessment of water demand and supply at the county level for privately-owned users and public water supply systems. The intent is to expedite the previously initiated statewide evaluation of sustainability and facilitate a detailed study, like the regional water supply planning approach, once potential areas of concern are identified by the OWR water supply program manager.



Overview

Issues

For decades, communities have relied upon water sources without evaluating long-term sustainability or drought vulnerability. When a community experiences a shortage, often there is not a plan in place to mitigate the temporary or permanent circumstance. It can take a decade or longer to properly plan for, design, and construct an alternative water supply source or backup connection. Lack of planning for these risk exposures and uncertainties puts a community in desperate and often expensive circumstances. These unplanned for events are not only detrimental to the community but also to the water source itself and puts strain on others who rely on that resource. Where communities do plan for emergency and hazard mitigation and response, they can lack adequate data to support thorough and thoughtful planning, and often that planning does not utilize a multi-disciplined approach where economic impacts are considered and incorporated. The potential for climate change with higher evaporative losses and changes to precipitation patterns compounds these exposures and increases water supply sustainability risk. With lack of institutional and financial resources, these modern water supply challenges place even further stress on marginalized communities.



	2020	2030	2040	2050	2060	2070
Demand	1,160	1,156	1,167	1,184	1,202	1,219
Supply	1,485	1,512	1,539	1,558	1,583	1,610
Shortage	-324	-356	-372	-374	-381	-391
Strategy	19.5	38.9	58.4	77.8	77.8	77.8

Figure 9.2 – Projected Water Availability vs. Demand for the NE Region (IDNR, 2022)



Issues

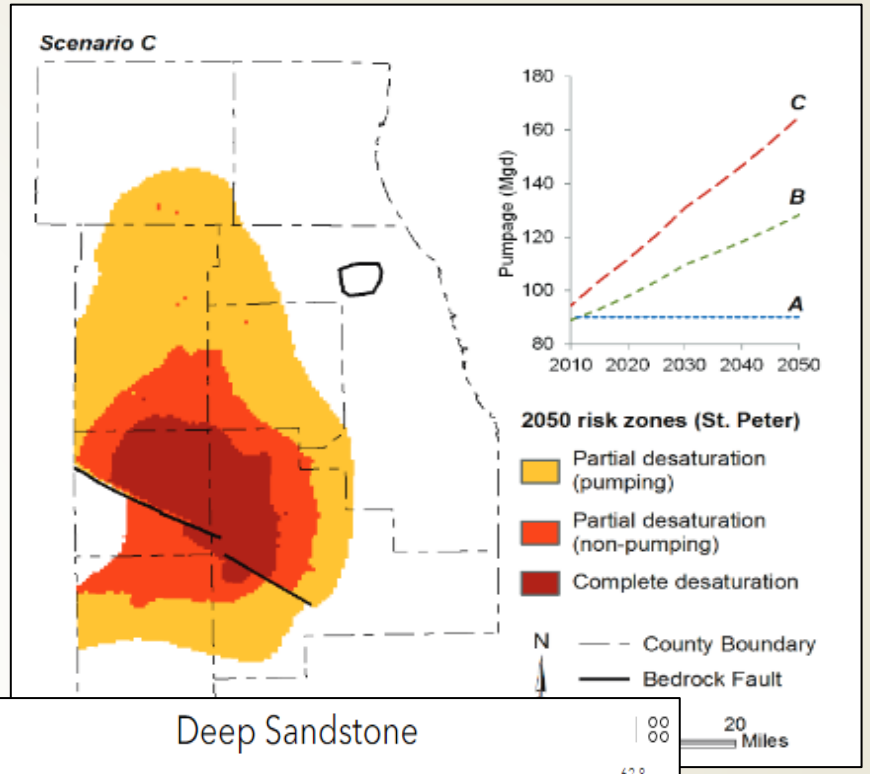


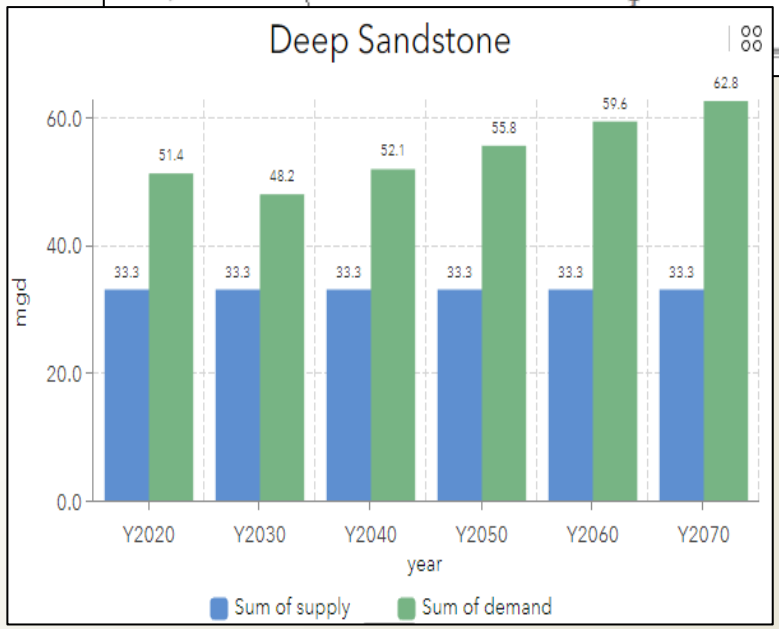
Example Report Recommendations

Issue	Recommendation	Lead Agency	Funding	Action
Ensure Illinois has a Sustainable Water Supply for all communities and users.	2. Update the statewide water demand forecasts with annual water use data and population forecasts. Determine sustainable water yield for all water supply sources and update every five years. Annually evaluate shortages. These data will be provided on a GIS application, available to the public, and easily accessible.	IDNR-OWR	Maintain Annual	Program
Solutions to water supply issues need to be derived from local collaboration and not directed from the state level.	3. Establish regional water supply committees throughout the state where there is sufficient local interest. Ensure consistent funding and data are readily available to support regional water supply committees. Add structure to regional plans to have local stakeholders identify and report on capital improvement project needs related to water sustainability.	IDNR-OWR	Increased Annual	Program

Water Sustainability

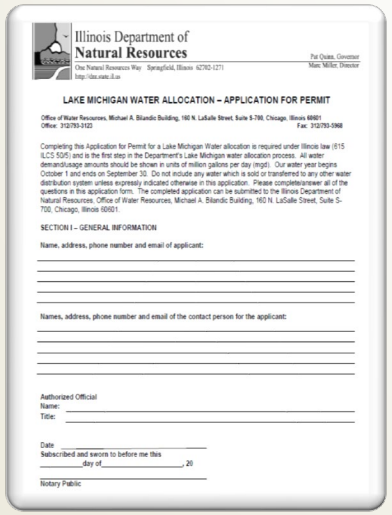
- **State Water Plan**: All water users have the water they depend on each day for generations to come.
- **Illinois State Water Survey**: Preserving water for future generations as a common goal while the impact of current water use may not be felt for decades or over a century.
- **Water Resources Engineering** by Larry Mays: Water resources sustainability is the ability to use water in sufficient quantities and quality from the local to the global scale to meet the needs of humans and ecosystems for the present and the future.





- Supreme Court Decree – an average 3,200 CFS for domestic water supply, navigation and water quality in Chicago Ship and Sanitary Canal, and storm water runoff from the canal's drainage area
- Illinois Administrative Code Title 17 Part 3730 – Allocation of Water from Lake Michigan





Illinois Department of
Natural Resources

LAKE MICHIGAN WATER ALLOCATION – APPLICATION FOR PERMIT

SECTION I – GENERAL INFORMATION

Name, address, phone number and email of applicant:

Names, address, phone number and email of the contact person for the applicant:

Authorized Official
Name:
Title:

Date
Subscribed and sworn to before me this
day of , 20

Notary Public

Lake Michigan Allocation Program

- Administered by IDNR/OWR Lake Michigan Management Section
- Allocation Permit Priority
  - Category I - water needs for residential, commercial or industrial
  - Category II - water demands to maintain a minimum flow for Navigation and sanitary dilution
  - Category III- Other Water Needs

State Water Plan Task Force

- IDNR
- IEPA
- IPCB
- IDOT
- IEMA
- IDOA
- IDPH
- IDCEO
- ISWS
- IWRC

Sub-group
- Drought
- Coast Management

Ongoing SWPTF Activities

- Quarterly Meeting with progress reporting
- Dissemination of information to the public
- Recommendations progress
- Identifying new issues for future consideration

Measuring Results & Quarterly Reporting

State Water Plan Implementation Progress Summary

Progress	Statistics (Updated 1/12/26)
146	Total recommendations
85	Recommendations started
38.3%	Average progression, if started
22.3%	Average progression, overall
4	Sections reporting this quarter
11	Recommendations completed

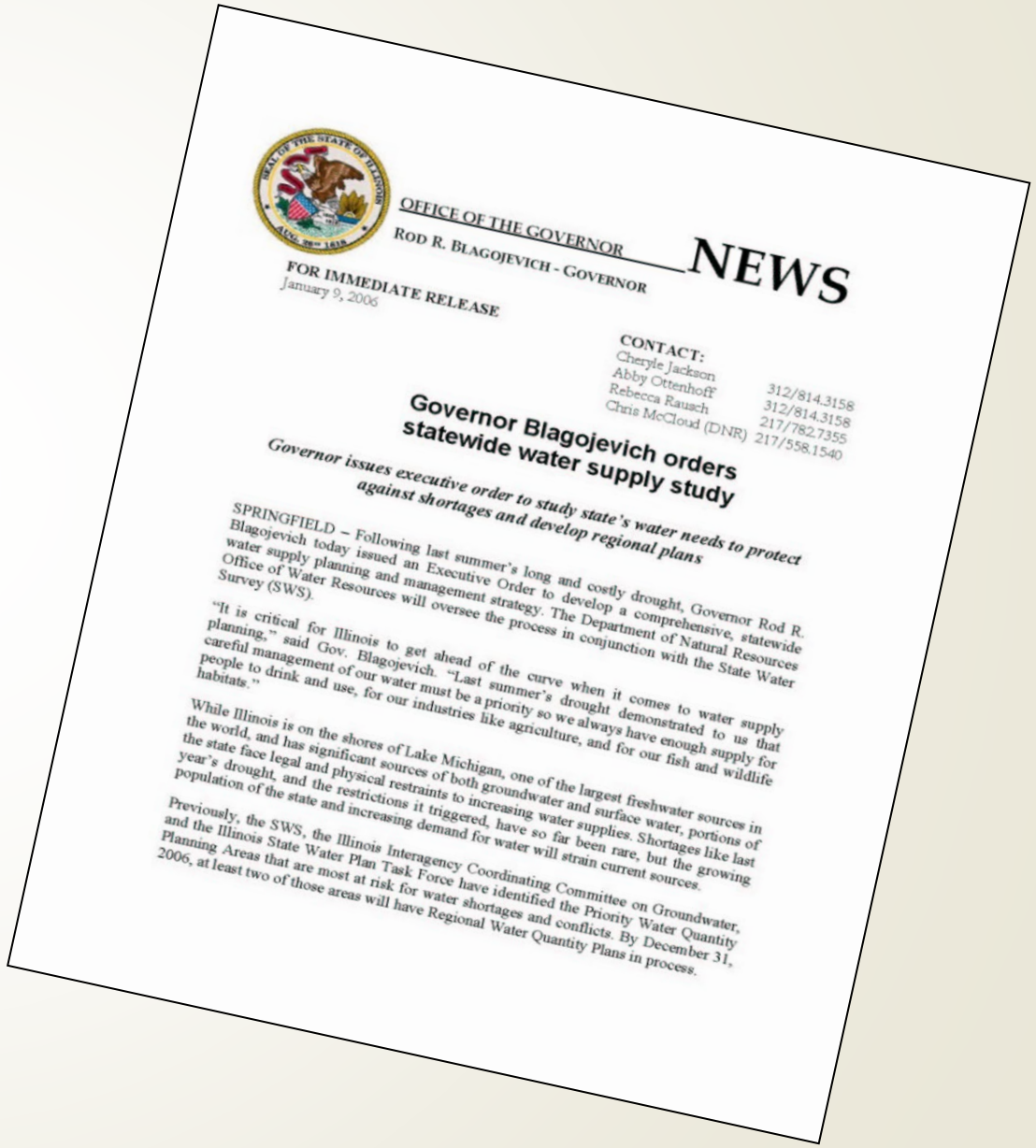
- *Next Task Force Meeting* ***July 20, 2026***

Illinois Water Supply Planning Program

GOVERNOR'S EXECUTIVE ORDER

January 2006

- The increasing demands on water resources and the potential impacts of drought are driving forces
- The quantity of surface water and groundwater must be properly assessed
- IDNR/OWR, in coordination with the State Water Survey, is mandated to
  - Define a comprehensive program for planning
  - Provide for public review of the draft plan
  - Establish a scientific basis and an administrative framework for plan implementation
  - Develop a package of financial and technical support



OFFICE OF THE GOVERNOR
ROD R. BLAGOJEVICH - GOVERNOR

NEWS

FOR IMMEDIATE RELEASE
January 9, 2006

CONTACT:
Cheryle Jackson 312/814.3158
Abby Ottenhoff 312/814.3158
Rebecca Rausch 217/782.7355
Chris McCloud (DNR) 217/558.1540

Governor Blagojevich orders statewide water supply study

Governor issues executive order to study state's water needs to protect against shortages and develop regional plans

SPRINGFIELD – Following last summer's long and costly drought, Governor Rod R. Blagojevich today issued an Executive Order to develop a comprehensive, statewide water supply planning and management strategy. The Department of Natural Resources Office of Water Resources will oversee the process in conjunction with the State Water Survey (SWS).

"It is critical for Illinois to get ahead of the curve when it comes to water supply planning," said Gov. Blagojevich. "Last summer's drought demonstrated to us that careful management of our water must be a priority so we always have enough supply for people to drink and use, for our industries like agriculture, and for our fish and wildlife habitats."

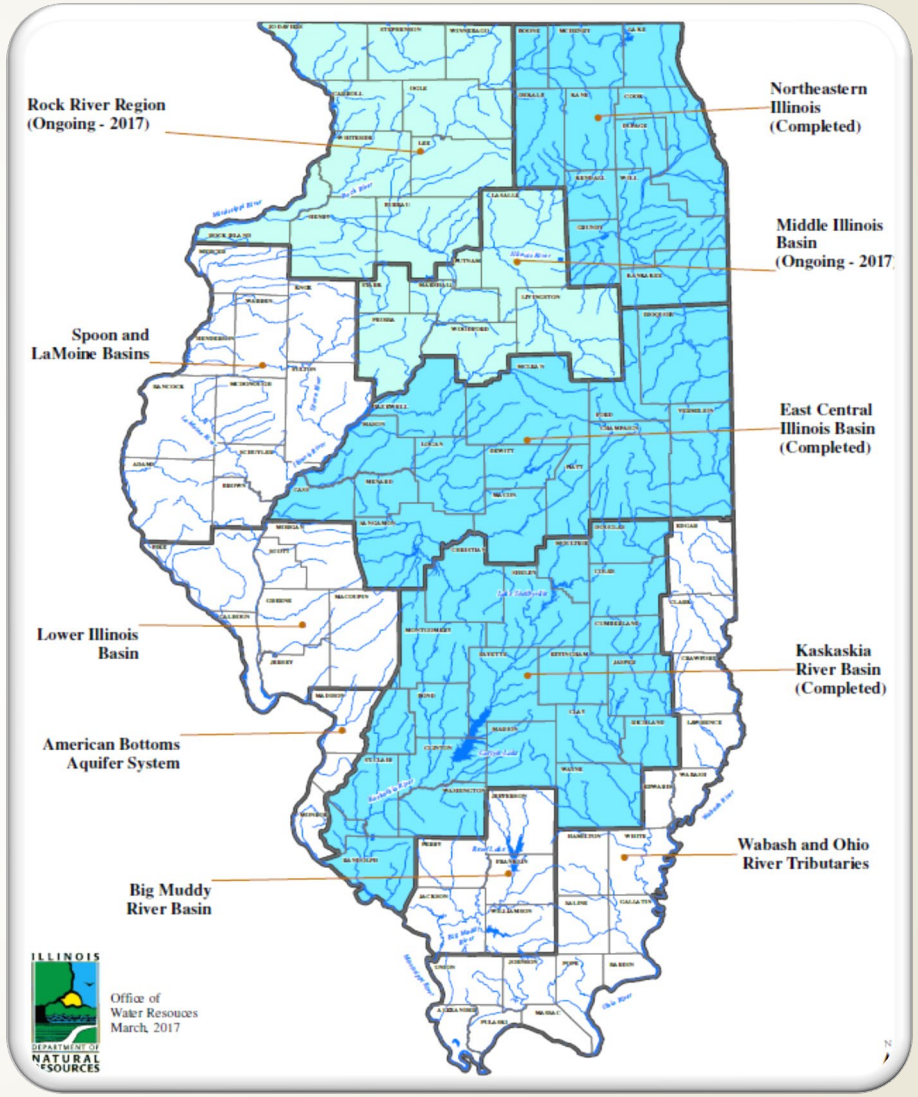
While Illinois is on the shores of Lake Michigan, one of the largest freshwater sources in the world, and has significant sources of both groundwater and surface water, portions of the state face legal and physical restraints to increasing water supplies. Shortages like last year's drought, and the restrictions it triggered, have so far been rare, but the growing population of the state and increasing demand for water will strain current sources.

Previously, the SWS, the Illinois Interagency Coordinating Committee on Groundwater, and the Illinois State Water Plan Task Force have identified the Priority Water Quantity Planning Areas that are most at risk for water shortages and conflicts. By December 31, 2006, at least two of those areas will have Regional Water Quantity Plans in process.

10 Water Supply Planning Regions

- NORTHEASTERN ILLINOIS
- ROCK RIVER REGION
- MIDDLE ILLINOIS REGION
- EAST CENTRAL REGION
- KASKASKIA RIVER BASIN
- SPOON AND LAMOINE
- LOWER ILLINOIS
- AMERICAN BOTTOMS
- BIG MUDDY RIVER
- WABASH AND OHIO RIVER

Regions are divided by source water – watershed or aquifer which region's water supply relies on.



Strategic Goals and Scope

- Strengthen Water Supply Assessment & Data Management
- Improve Regional Water Supply Planning
- Promote Water Conservation & Efficiency
- Protect Water Resources & Ecosystems
- Build Climate Resilience & Emergency Preparedness
- Enhance Public Engagement & Education

Guiding Principles

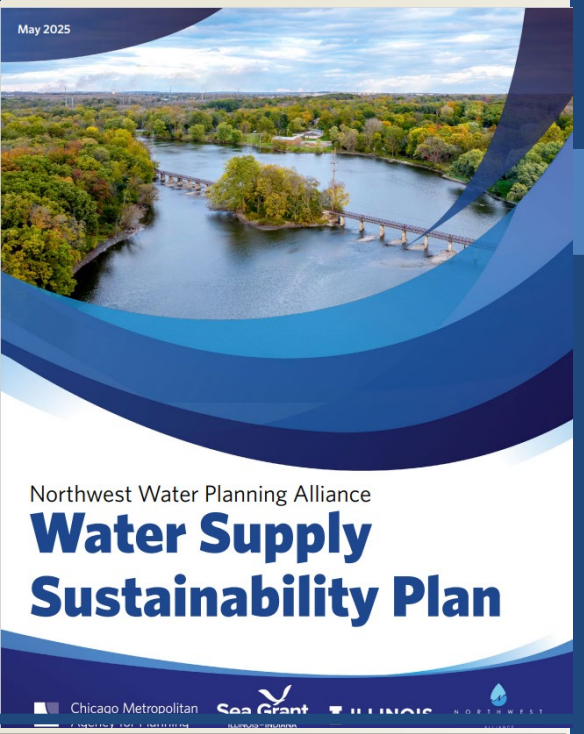
Equity: Ensure fair access to safe water for all communities

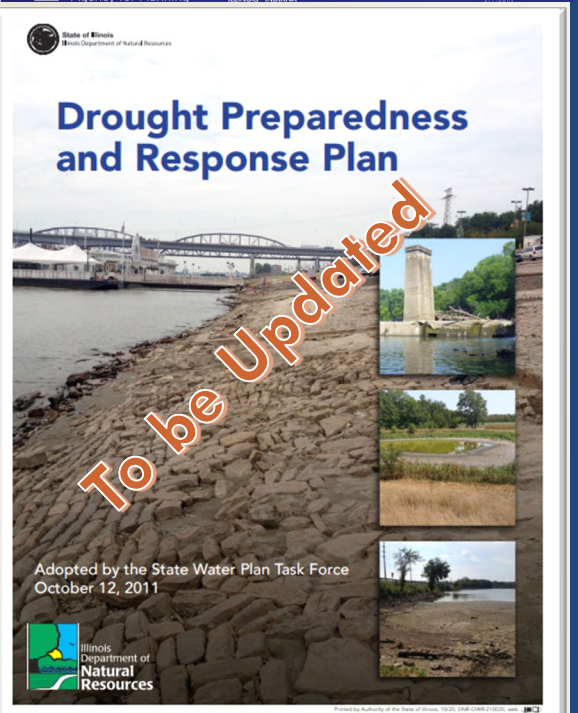
Science-Based Decision Making: Use data, modeling, and monitoring

Regional Collaboration: Work with regional planners and stakeholders

Resilience: Prepare for climate variability, droughts, and floods

Transparency: Engage the public and share information openly





ONGOING IMPLEMENTATION

- Water conservation and reuse
- Regional planning and implementation
- Illinois State Drought Preparedness and Response Plan
- Improvement of water use reporting
- Change of or secondary source water
- Bathymetric survey
- Managed aquifer recharge

Wei Han, P.E., Ph.D.
Water Supply Program Manager
IDNR – Office of Water Resources
Wei.Han2@illinois.gov
217-782-4819

ILLINOIS
DEPARTMENT OF
NATURAL
RESOURCES

Thank you!



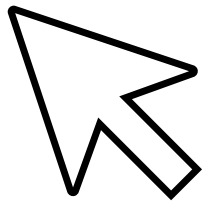
Wei Han, PhD, PE

Water supply program manager
Illinois Department of Natural Resources
Office of Water Resources

Which feels like the most actionable next water sustainability planning step?

Respond via Mentimeter:

Click the link in the chat

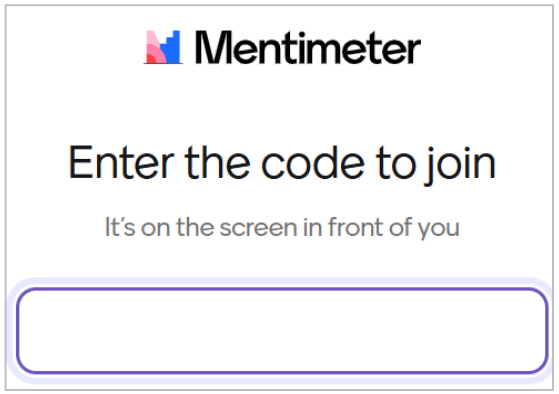


or

Scan the QR code

or

Join at menti.com code 4368 1595



Shared Waters, Shared Future
Northeastern Illinois Regional Water Supply Sustainability Workshops

Water sustainability planning in practice

Speakers



Claudia Hochstein

Water conservation consultant
Minnesota Department of Natural Resources



Tom Dumm, PE

Senior technical manager
Ramboll



Kathleen Smith, PE, PMP, ENV SP

Senior associate
Hazen and Sawyer

Shared Waters, Shared Future
Northeastern Illinois Regional Water Supply Sustainability Workshops

Speaker



Claudia Hochstein

Water conservation consultant
Minnesota Department of Natural Resources

DEPARTMENT OF NATURAL RESOURCES

Developing Minnesota's Water Supply Plan Template

Claudia Hochstein | Water Conservation Consultant

CMAP Shared Future Workshop Series | April 23, 2026

Water planning coordination

METROPOLITAN COUNCIL

Plans for regional services

Approves local comprehensive plan updates

DEPARTMENT OF NATURAL RESOURCES

Manages water quantity programs

Responsible for local water supply planning

DEPARTMENT OF HEALTH

Manages drinking water quality programs

Responsible for wellhead protection plans

Statutory requirements: 103G.291

- Projected demand
- Water system adequacy
- Planned system improvements
- Existing and future sources
- Natural resource impacts or limitations
- Emergency preparedness
- Water conservation
- Supply and demand reduction measures
- Allocation priorities consistent with 103G.261

1996-2016

E. HISTORICAL WATER USAGE

Historical water data is an important tool for determining trends and helping to assist the City in determining if there are problems within the system. The historical water usage for 2000 through 2007 is presented in Table 2.2.

TABLE 2.2
HISTORICAL WATER USAGE

	2001	2002	2003	2004	2005	2006	2007
Annual Avg. Demand (gal/d)	150,959	123,036	112,988	122,370	125,338	99,722	99,068
Max. Month Demand (gal/d)	208,065	158,742	136,935	134,290	143,710	128,129	132,833*
Est. Peak Day Demand (gal/d)[1]	377,400	305,090	282,470	305,925	313,345	249,305	332,083

[1] Peak day demand estimated using a peaking factor of 2.5 for peak day/avg. day ratio.

* Corrected for 1 MG provided for construction related activities.

Per capita use has decreased from 126 gallons per person per day (gpcd) in 2001 to 86.5 gpcd in 2006. There is very little commercial or industrial usage in Bird Island. Future water demand will be projected using a per capita demand of 90 gpcd.

F. WATER USE PROJECTIONS

The projected future water demand is presented in Table 2.3.

1996-2016

A.2. Per Capita Water Use

The per capita water use for the past ten years is shown in Table I-2. The residential per capita water consumption rate is calculated by dividing the residential average water use by the total number of residents, and is typically expressed as gallons per capita per day (GPCD). Data for residential use was available for 1989, 1990, and 1996 only. Using this limited data, the average residential per capita water use is approximately 50 GPCD. Total per capita water use was determined using total water consumption values from 1986 through 1990, and from 1996. Total per capita water use has averaged approximately 108 GPCD.

A.3. Water Demand by Customer Category

Water sales data from 1989, 1990, and 1996 provided by City staff were broken down into residential and non-residential customer categories. Residential use includes mobile home, apartment, and residential connections. Non-residential users include commercial, industrial, institutional, and government uses. According to this limited data, water use has averaged 47% residential and 53% non-residential for the City of Arden Hills.

Unaccounted-for water use is the difference between total water purchased and total water sold, as shown in Table I-4. Unaccounted-for water can result from several factors including unidentified pipe leaks, unmetered connections, watermain breaks, periodic hydrant flushing, hockey rink flooding, tank drainage for maintenance, and meter inaccuracies. Unaccounted-for use below 10% can be

1996-2016

Triggers for Allocation and Demand Reduction Actions. Triggering levels must be defined for implementing emergency responses, including supply augmentation, demand reduction, and water allocation. Examples of triggers include: water demand >100% of storage, water level in well(s) below a certain elevation, treatment capacity reduced 10% etc. Each trigger should have a quantifiable indicator and actions can have multiple stages such as mild, moderate and severe responses. Check each trigger below that is used for implementing emergency responses and for each trigger indicate the actions to be taken at various levels or stages of severity in Table 9.

X	Water Demand	☐	Water Main Break
☐	Treatment Capacity	X	Loss of Production
X	Storage Capacity	☐	Security Breach
☐	Groundwater Levels	X	Contamination
☐	Surface Water Flows or Levels	☐	Other (list in Table 9)
X	Pump, Booster Station or Well Out of Service		
☐	Governor's Executive Order – Critical Water Deficiency (required by statute)		

Table 9 Demand Reduction Procedures

Condition	Trigger(s)	Actions
Stage 1 (Mild)	Water Demand.	Adjust well and booster pump flowrates.
	Storage Cap.	Adjust well and booster pump flowrates.
	Booster Station out of svc.	Bypass Water Treatment Plant.
	Loss of Production.	Water allocation with residential priority.
	Contamination.	Isolate, contain and eliminate contamination source.
Stage 2	Water Demand.	Adjust well and booster pump flowrates.

Historical difficulties

- Version control
- Central tracking and review
- No way to harvest data
- Non-standardized calculations
- Data lacked 1:1 relationships

Resource Type	Resource Name	Risk	Risk Assessed Through *	Describe Resource Protection Threshold or Goal *	Mitigation Measures or Management Plan	Describe How Thresholds or Goals are Monitored
☐ Trout stream		☐ None anticipated ☐ Flow/water level decline ☐ Degrading water quality trends ☐ Impacts on endangered, threatened, or special concern species habitat ☐ Other: _____	☐ Geologic atlas or other mapping ☐ Modeling ☐ Monitoring ☐ Aquifer testing ☐ WRAPS or other watershed report ☐ Proximity (< 5 miles) ☐ Other: _____	☐ Not applicable ☐ Additional data is needed to establish ☐ See report: _____ ☐ Other: _____	☐ Not applicable ☐ Change groundwater pumping ☐ Increase conservation ☐ Other: _____	☐ Not applicable ☐ Newly collected data will be analyzed ☐ Regular check-in with these partners: _____ ☐ Other: _____
☐ Aquifer		☐ None anticipated ☐ Flow/water level decline ☐ Degrading water quality trends ☐ Impacts on endangered, threatened, or special concern species habitat ☐ Other: _____	☐ Geologic atlas or other mapping ☐ Modeling ☐ Monitoring ☐ Aquifer testing ☐ Proximity (obwell < 5 miles) ☐ Other: _____	☐ Not applicable ☐ Additional data is needed to establish ☐ See report: _____ ☐ Other: _____	☐ Not applicable ☐ Change groundwater pumping ☐ Increase conservation ☐ Other: _____	☐ Not applicable ☐ Newly collected data will be analyzed ☐ Regular check-in with these partners: _____ ☐ Other: _____

Wellhead Protection (WHP) and Source Water Protection (SWP) Plans
Complete Table 11 to provide status information about WHP and SWP plans.

A new way forward

- Survey and interviews with DNR staff
- Attempts to engage public water suppliers
- Defined needs
- Researched available tools



Roadblocks

- Excel spreadsheet
  - Poor user experience
- Microsoft Forms
  - Can’t enter tabular data
- Forms and a spreadsheet
  - External users can’t upload files
- Built business case for a new custom tool
  - No money

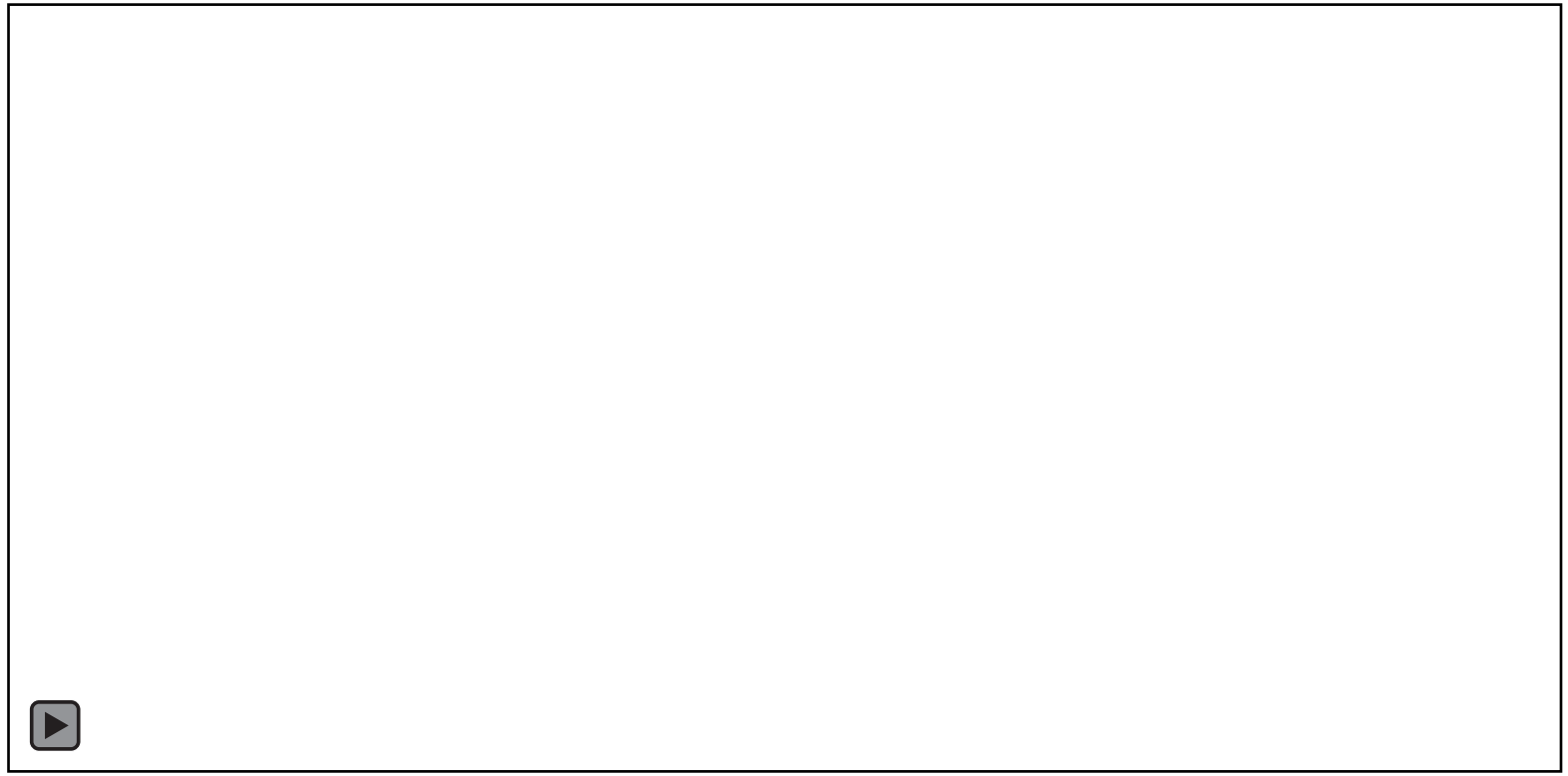


Chance encounter saves the day

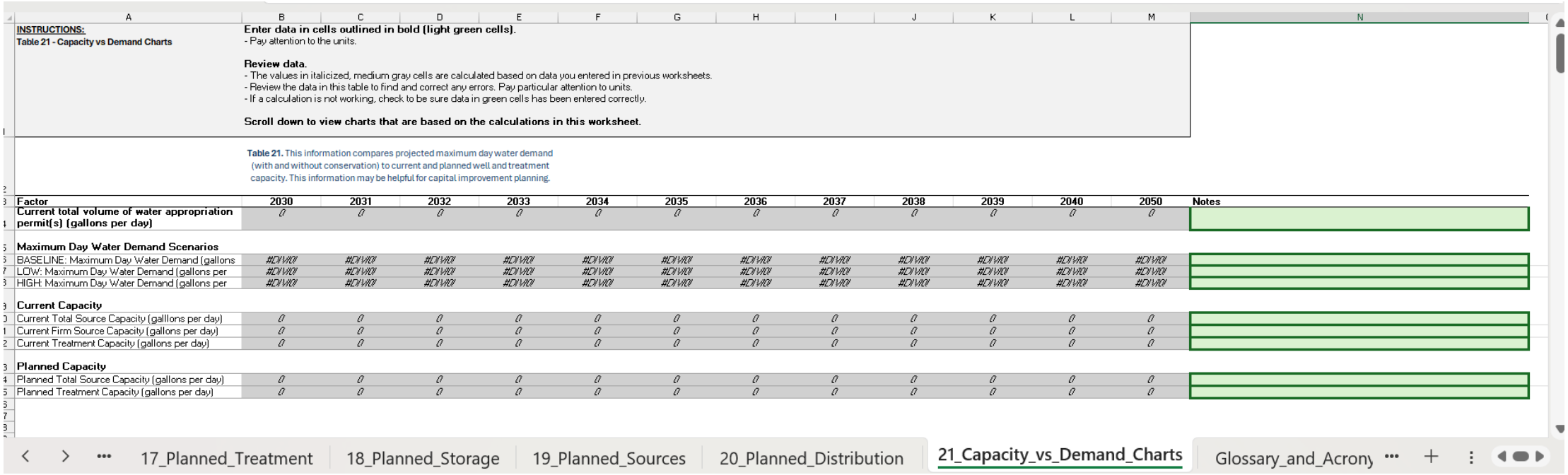


Qualtrics survey platform

- Clear navigation
- Use of survey logic allows us to reduce duplicative data collection
- Data in a queryable, consistent format
- Allows uploads



Excel spreadsheet for calculations



INSTRUCTIONS:
Table 21 - Capacity vs Demand Charts

Enter data in cells outlined in bold (light green cells).
- Pay attention to the units.

Review data.
- The values in italicized, medium gray cells are calculated based on data you entered in previous worksheets.
- Review the data in this table to find and correct any errors. Pay particular attention to units.
- If a calculation is not working, check to be sure data in green cells has been entered correctly.

Scroll down to view charts that are based on the calculations in this worksheet.

Table 21. This information compares projected maximum day water demand (with and without conservation) to current and planned well and treatment capacity. This information may be helpful for capital improvement planning.

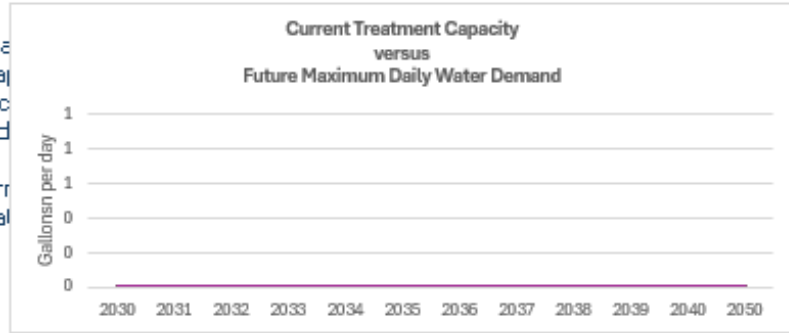
Factor	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2050	Notes
Current total volume of water appropriation permit(s) (gallons per day)	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	
Maximum Day Water Demand Scenarios													
BASELINE: Maximum Day Water Demand (gallons	*#DIV/0!*	*#DIV/0!*	*#DIV/0!*	*#DIV/0!*	*#DIV/0!*	*#DIV/0!*	*#DIV/0!*	*#DIV/0!*	*#DIV/0!*	*#DIV/0!*	*#DIV/0!*	*#DIV/0!*	
LOW: Maximum Day Water Demand (gallons per	*#DIV/0!*	*#DIV/0!*	*#DIV/0!*	*#DIV/0!*	*#DIV/0!*	*#DIV/0!*	*#DIV/0!*	*#DIV/0!*	*#DIV/0!*	*#DIV/0!*	*#DIV/0!*	*#DIV/0!*	
HIGH: Maximum Day Water Demand (gallons per	*#DIV/0!*	*#DIV/0!*	*#DIV/0!*	*#DIV/0!*	*#DIV/0!*	*#DIV/0!*	*#DIV/0!*	*#DIV/0!*	*#DIV/0!*	*#DIV/0!*	*#DIV/0!*	*#DIV/0!*	
Current Capacity													
Current Total Source Capacity (galllons per day)	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	
Current Firm Source Capacity (gallons per day)	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	
Current Treatment Capacity (gallons per day)	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	
Planned Capacity													
Planned Total Source Capacity (gallons per day)	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	
Planned Treatment Capacity (gallons per day)	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	

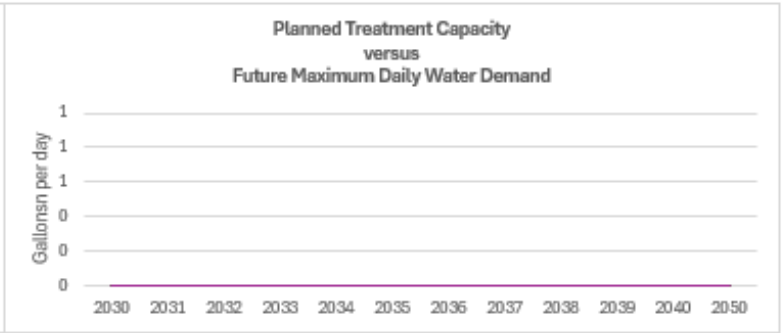
17_Planned_Treatment | 18_Planned_Storage | 19_Planned_Sources | 20_Planned_Distribution | **21_Capacity_vs_Demand_Charts** | Glossary_and_Acrony

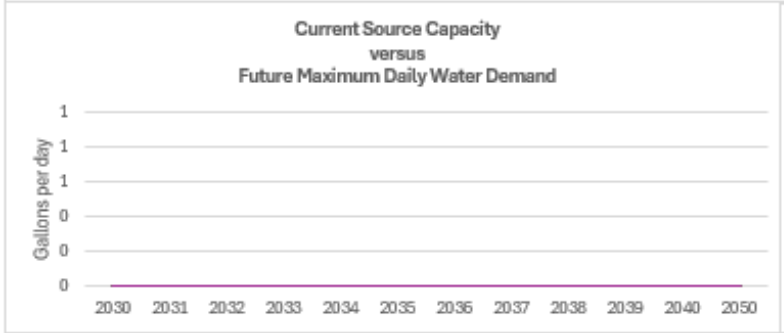
Pre-loaded charts

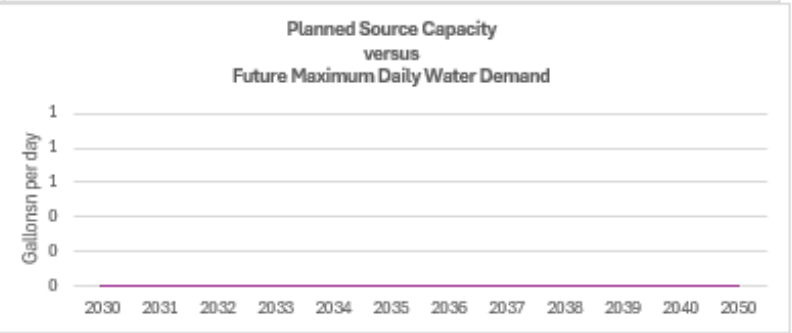
Charts of current treatment capacity vesus future ma
day water demand (upper left), planned treatment ca
versus future max day water demand (upper right), c
source capacity versus future maxiimum day water d
middle left), planned source capacity versus future
maximum day water demand (middle right), and curr
firm source capacity versus future maximum day wa
demand (bottom left).

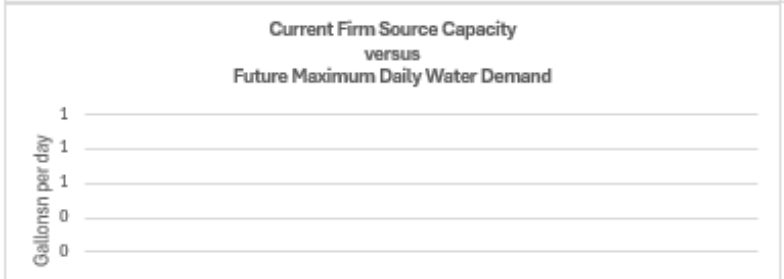
- Current Treatment Capacity (Gallons per day)
- Planned Treatment Capacity (gallons per day)
- BASELINE: Maximum Day Water Demand (Gallons per day)
- LOW: Maximum Day Water Demand (Gallons per day)
- HIGH: Maximum Day Water Demand (Gallons per day)
- Current total volume of water appropriation permit(s)











A work in progress

- Building out Sharepoint for review, revisions, and tracking
- Designing support and guidance, collecting feedback for FAQs
- Communicating with water suppliers
- Training staff on review protocol
- Developing review template documents



Thank you!

Claudia Hochstein | claudia.hochstein@state.mn.us | 651-259-5034

Questions

What is the biggest barrier to making water supply plans more useful?

Respond via Mentimeter:

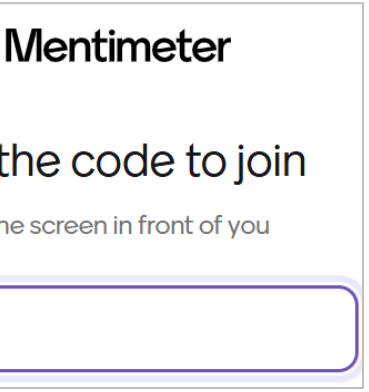
Click the link in the chat

or

Scan the QR code

or

Join at menti.com code 4368 1595



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Northeastern Illinois Regional Water Supply Sustainability Workshops

Speaker



Tom Dumm, PE

Senior technical manager
Ramboll

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Shared Future
Northeastern Illinois Regional Water
Supply Sustainability Workshops

Water Sustainability Planning in Practice: Nassau County–New York City Interconnection Feasibility

Presented by
Thomas E. Dumm, PE

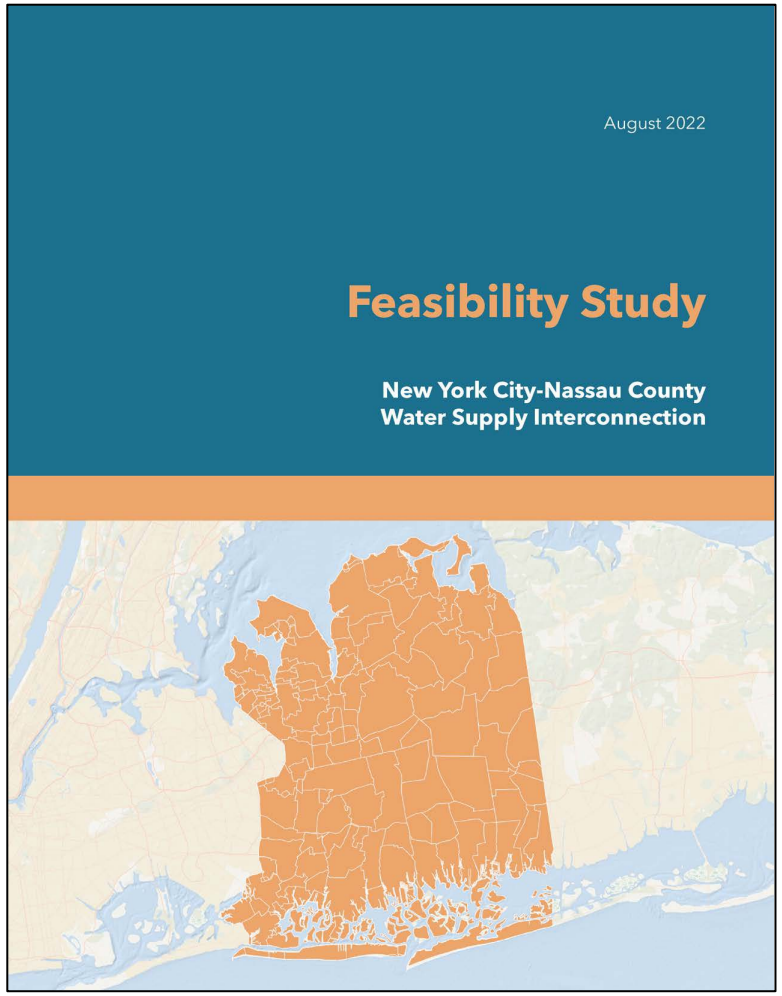
Co-Authors
George B. Rest, PE

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RAMBOLL

Study Purpose and Planning Context

- Nassau County relies on vulnerable groundwater supplies and faces long-term planning questions.
- Evaluate the technical, financial, and organizational feasibility of connecting New York City (NYC) public water supply to Nassau County.
- Meant to inform planning options and constraints, not to mandate action or commit communities to a specific interconnection projects.
- Illustrates how feasibility studies can help communities explore shared infrastructure, financial and management needs, and potential collaborations before major decisions are made.



Project Scope

Task 1: Document/Review Research

- Review of reports, GIS mapping, water quantity and quality data

Task 2: Stakeholder Outreach and Meetings

- Communications plan and progress meetings
- Stakeholder engagement

Task 3: Engineering

- Water quality evaluation
- Interconnection infrastructure concepts and cost estimates

Task 4: Financial

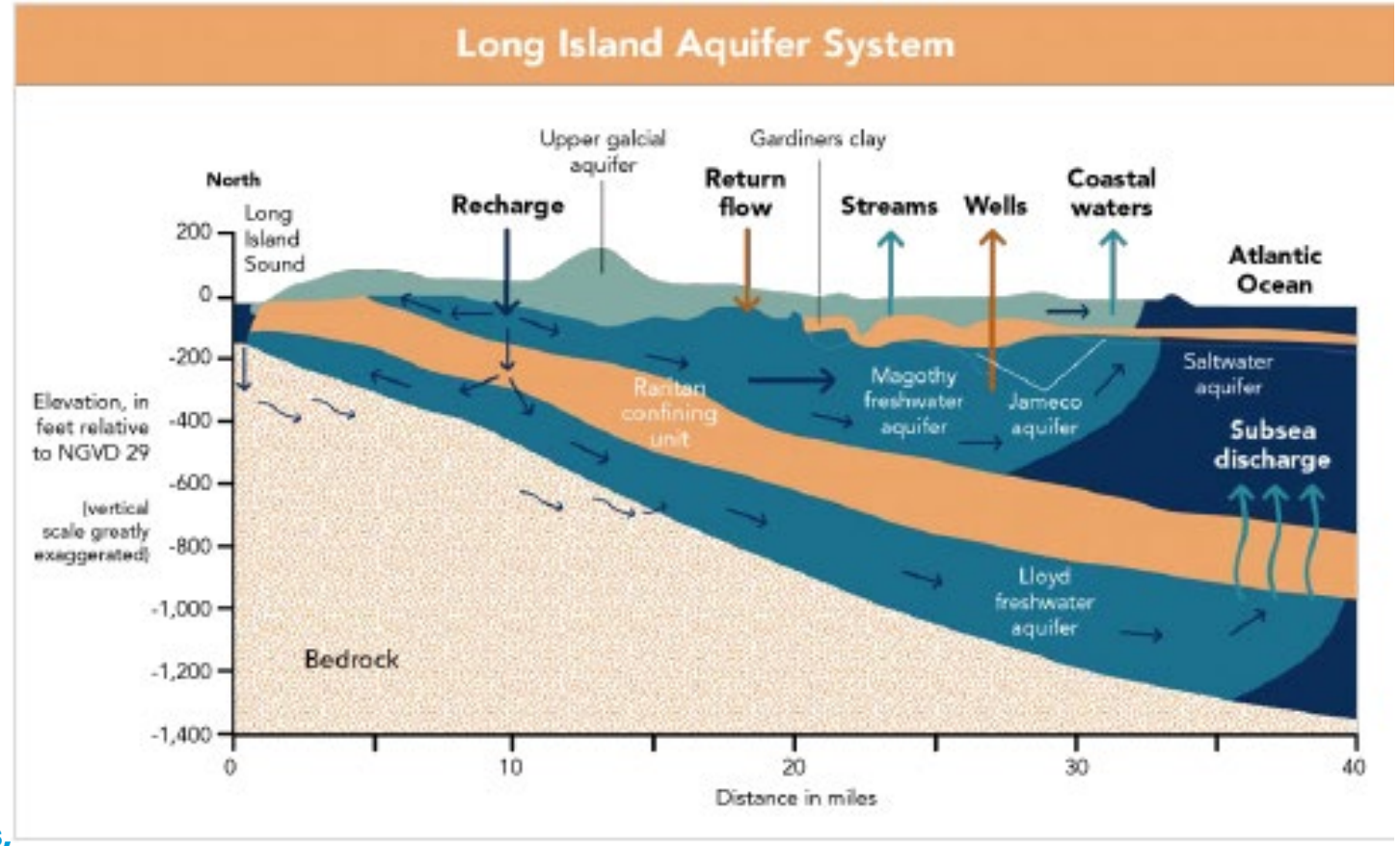
- Funding alternatives

Task 5: Organizational

- Alternative organizational approaches

Task 6: Reporting

Why is groundwater dependence a planning challenge for Nassau County?



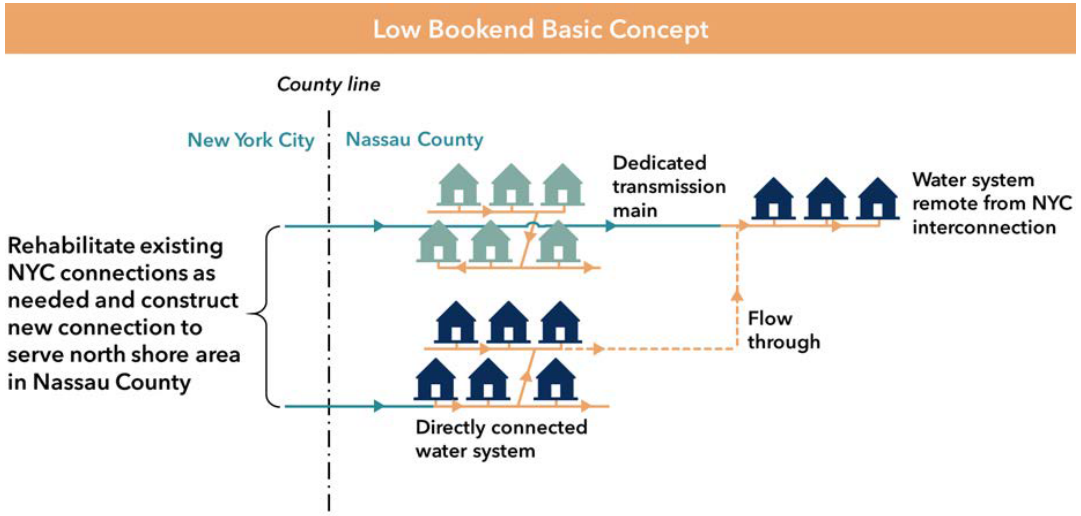
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What would it take for NYC water to help serve Nassau County?

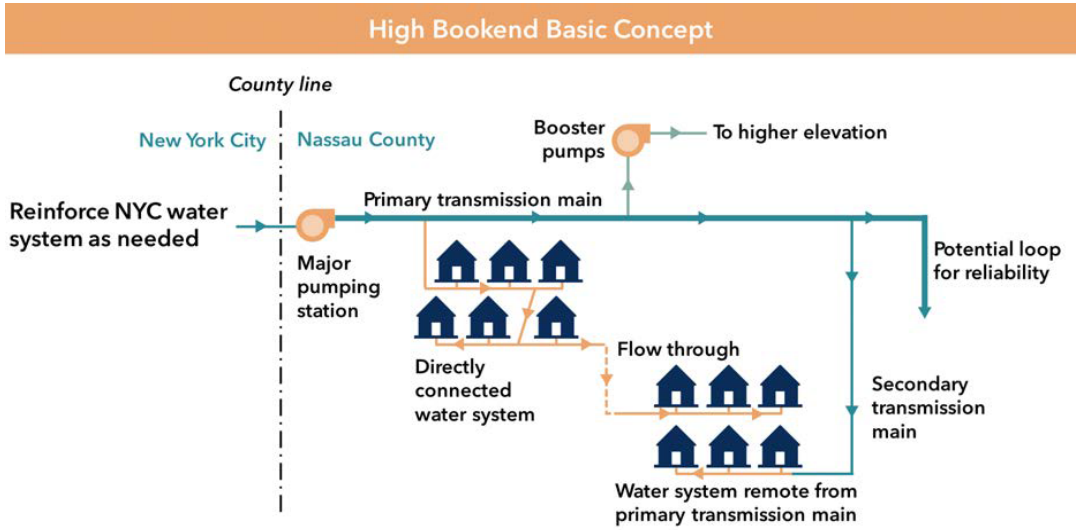


What interconnection concepts were considered, and how did they compare?

Low bookend: smaller-scale option using existing infrastructure
Up to 20 MGD | $35–53 million



High bookend: larger-scale option requiring new infrastructure
Up to 180 MGD | $1.4–2.2 billion



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Together, these concepts illustrate the range of possible regional options, from limited interconnection to large-scale new investment.

What financial and organizational alternatives were considered?

Summary Matrix for Organizational and Financial Review			
Organizational Alternative	Ability to Issue Debt	Viable for Near Term "Low Bookend"	Viable for Longer Term "High Bookend"
Public Utility Authority	Yes, Via revenue bonds	Yes, but probably not needed	Yes
County Special District	Yes, via general obligation bonds	Yes, but probably not needed	Yes
Intermunicipal Agreements	No, each utility issues own debt	Yes	Not practical
Combination of Above Alternatives (Phased Approach)	Yes, via revenue bonds or general obligation bonds	Yes, with Intermunicipal Agreements	Yes, with new organization and debt financing

What issues would need to be addressed to use NYC water in Nassau County?

- **Level of Interest** – Identify quantity, location and frequency of purchase.
- **Conservation Efforts** – Define potential for reductions in Nassau County water use.
- **Existing and New Connections** – Reactivate existing connections coupled with new connections.
- **Willingness and Ability to Sell** – Identify NYC's long-term position on water sales.
- **Price** – Negotiate terms and conditions of buy-sell agreement.
- **Corrosion Control** – Study on blending of surface and groundwater supplies.
- **Acceptance** – Assess willingness of Nassau County residents to receive fluoridated water from NYC.
- **DBP Concentrations** – Predict DBP concentrations in Nassau County.
- **Water Flow** – Define water delivery pressures and flow through Nassau County.

Thank you

Thomas E. Dumm, PE
Thomas.Dumm@Ramboll.com

George B. Rest, PE
George.Rest@Ramboll.com

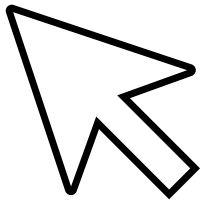
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Questions

What is the greatest benefit of developing a feasibility study for an interconnection or source switch?

Respond via Mentimeter:

Click the link in the chat

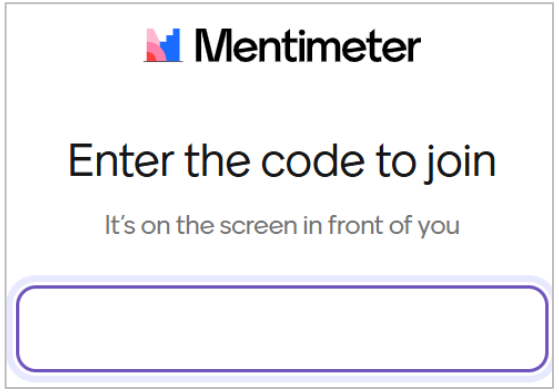


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Speaker



Kathleen Smith, PE, MPM, ENV SP

Senior associate
Hazen and Sawyer

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Northeastern Illinois Regional Water Supply Sustainability Workshops

Central Ohio Regional Water Study

April 23, 2026

Shared Waters, Shared Future
Northeastern Illinois Regional Water Supply Sustainability Workshops

Agenda

- Project Drivers
- Modeling and Scenarios
- Dashboard and Results

Speaker



Kathleen Smith

ksmith@hazenandsawyer.com

Hazen

Project Drivers

Central Ohio Growth

- Regional Growth in population from 2.5 million to over 3 million
- Major Developments
- Data Centers

Central Ohio Region Continues to Grow at Accelerated Pace as New Economic Development Projects Come Online

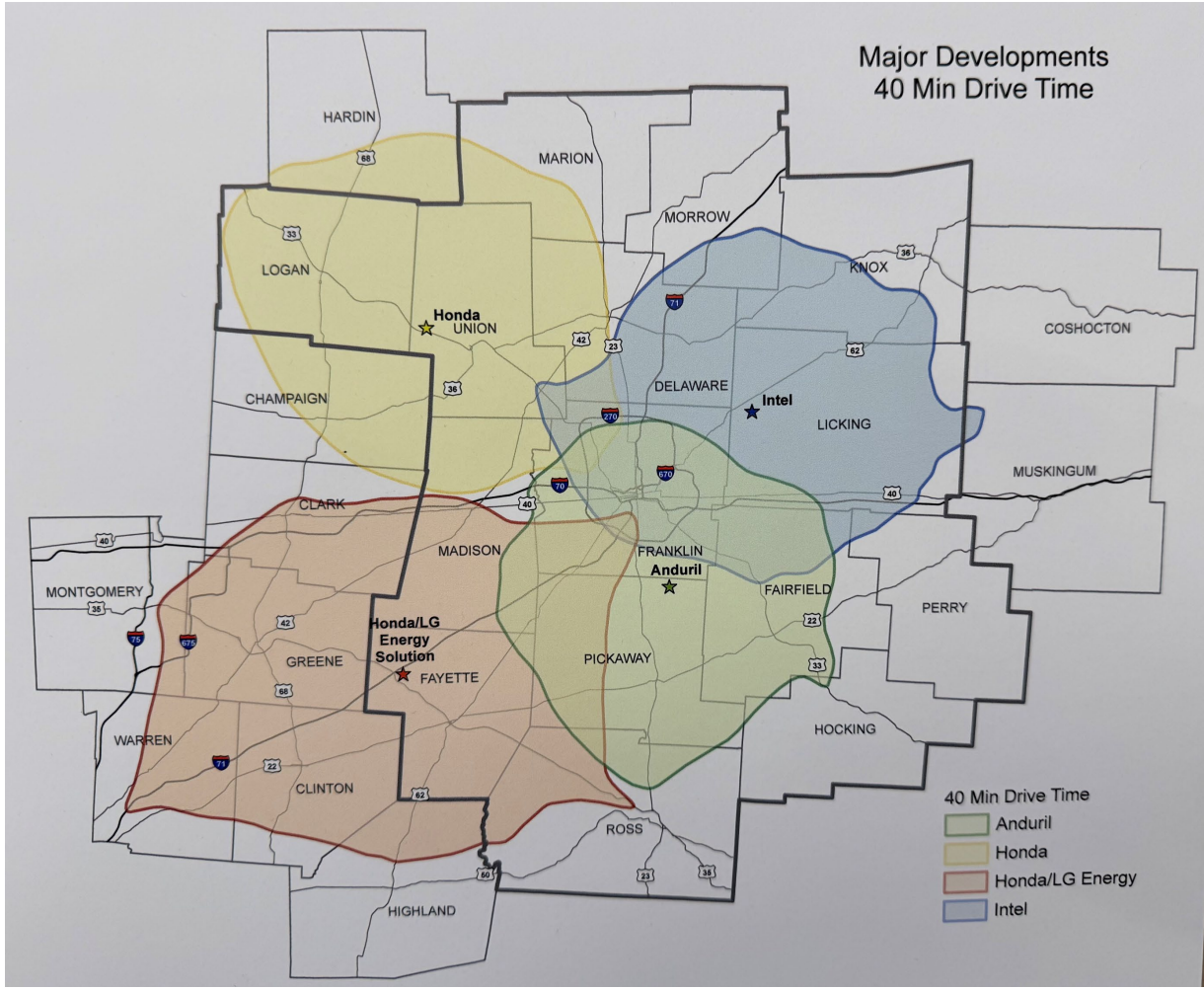


Region now expected to exceed three million residents by 2050

https://www.morpc.org/news/central-ohio-region-continues-to-grow-at-accelerated-pace-as-new-economic-development-projects-come-online/

Central Ohio Growth

- Regional Growth in population from 2.5 million to over 3 million
- Major Developments
- Data Centers

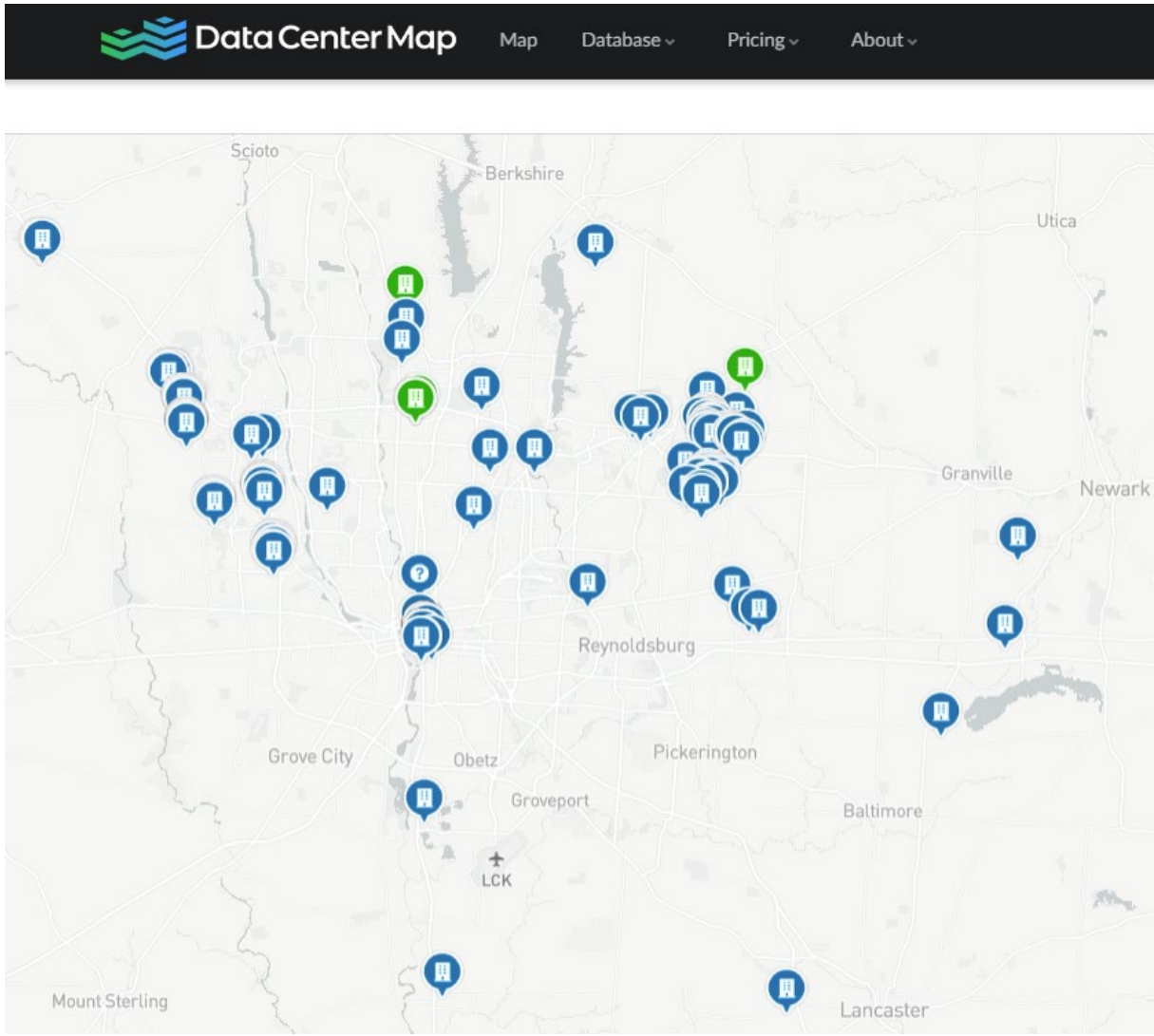


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Mid-Ohio Regional Planning Commission

Central Ohio Growth

- Regional Growth in population from 2.5 million to over 3 million
- Major Developments
- Data Centers



https://www.datacentermap.com/usa/ohio/columbus/

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Central Ohio Regional Water Study

- Current availability and demand
- Future demands
- Gap analysis
- Regionalization
- Water reuse
- Areas of opportunity



Ohio Environmental Protection Agency

Ohio Department of Natural Resources

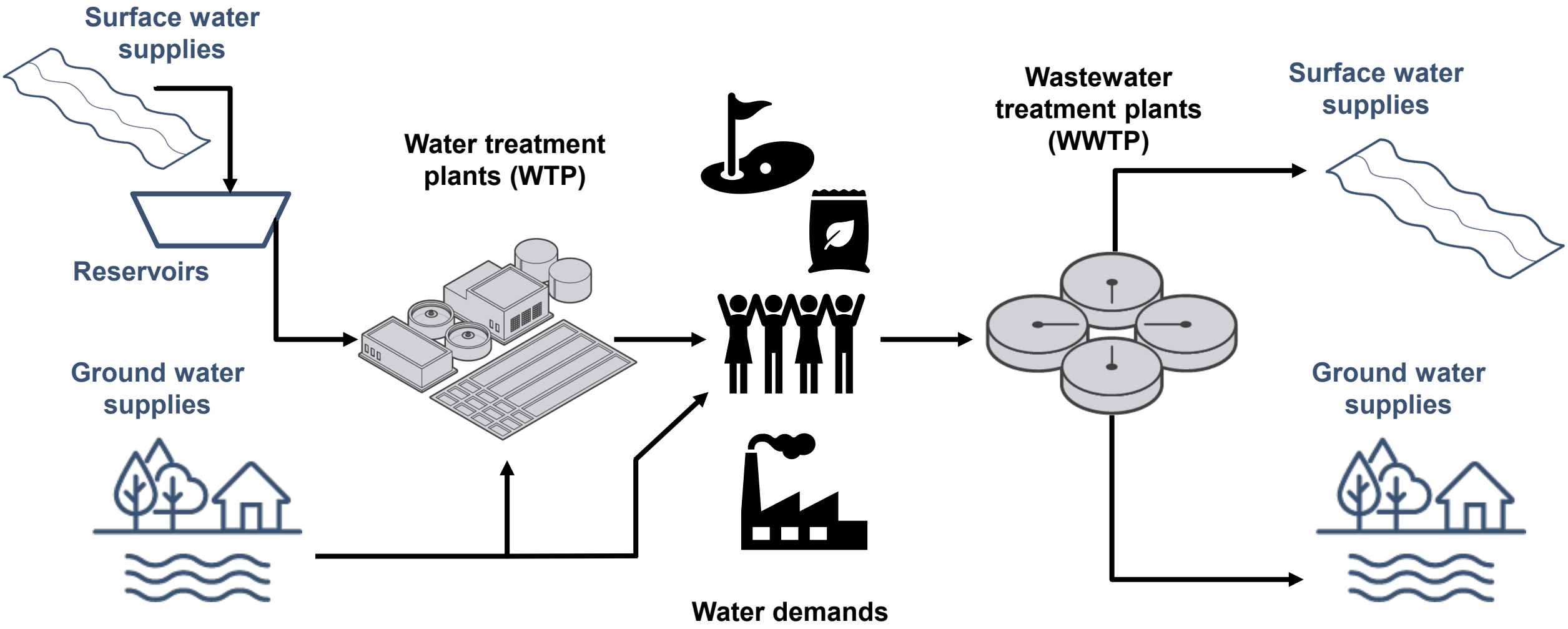
Ohio Water Development Authority

Shared Waters, Shared Future
Northeastern Illinois Regional Water Supply Sustainability Workshops

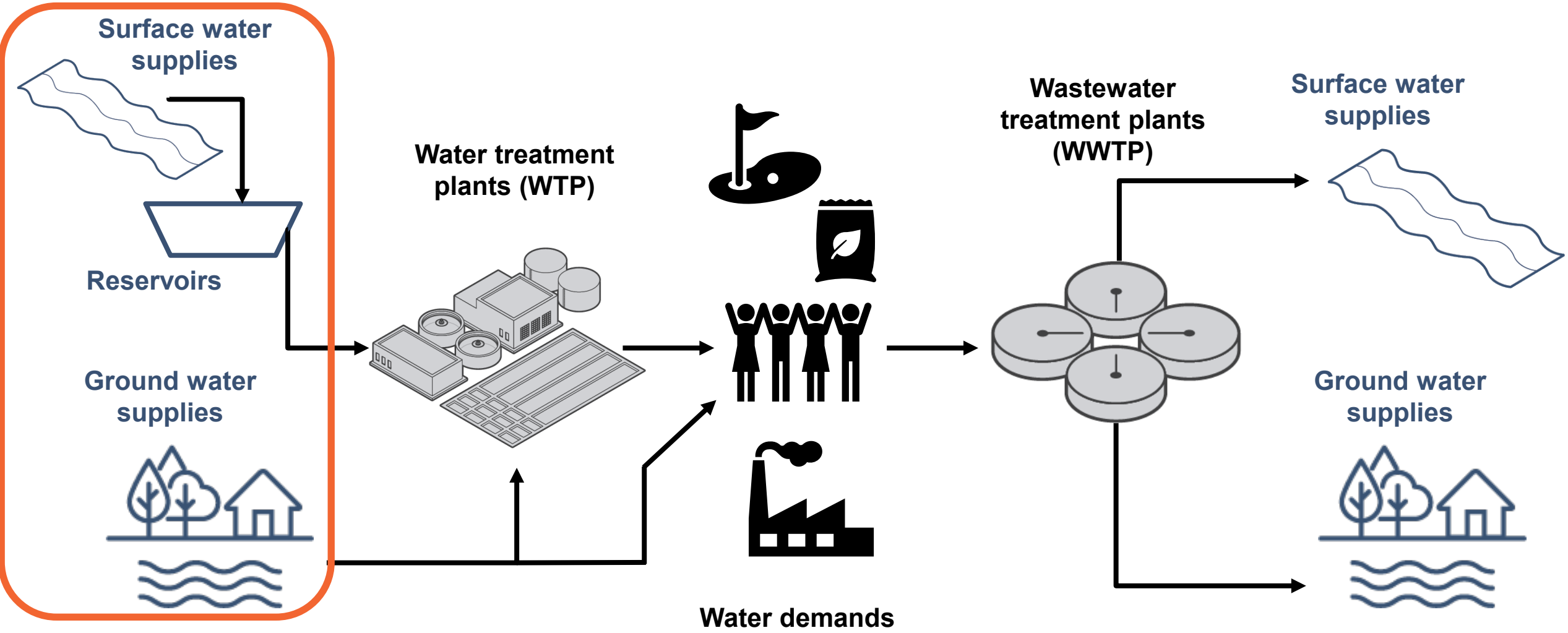
MORPC

Modeling and Scenarios

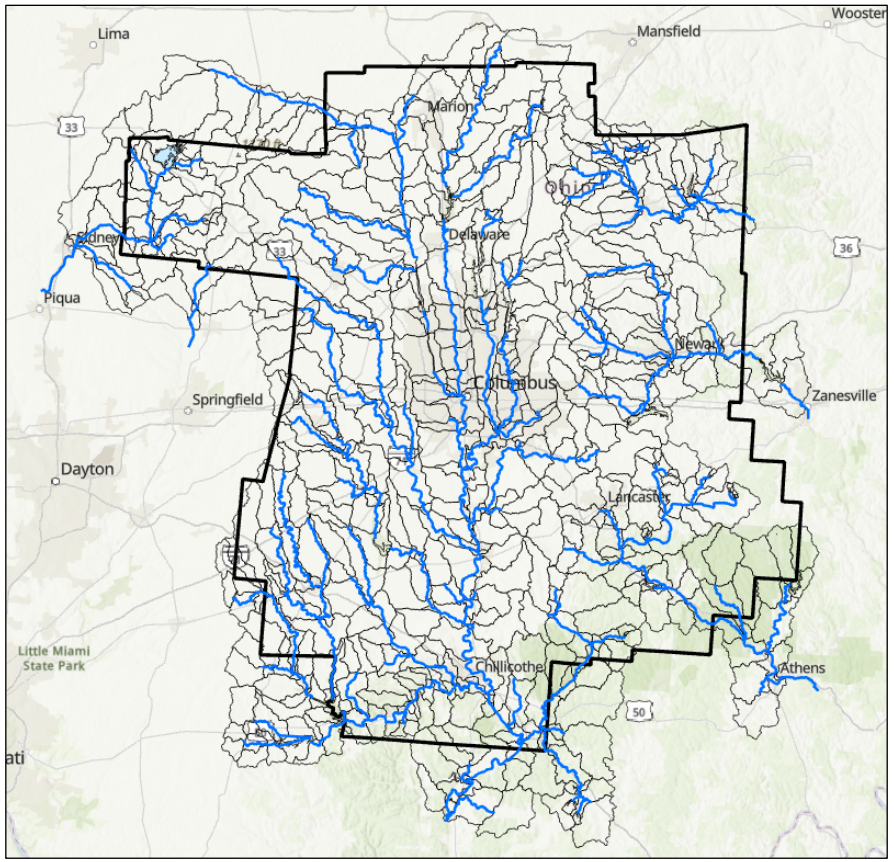
Model Components



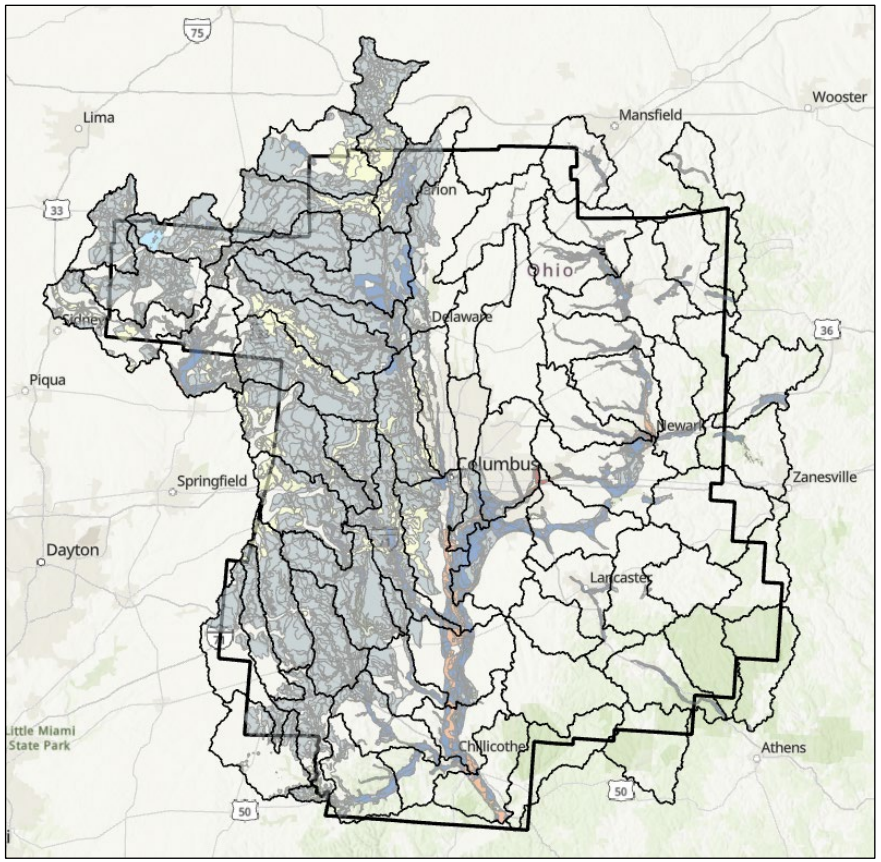
Model Components



Raw Water Availability



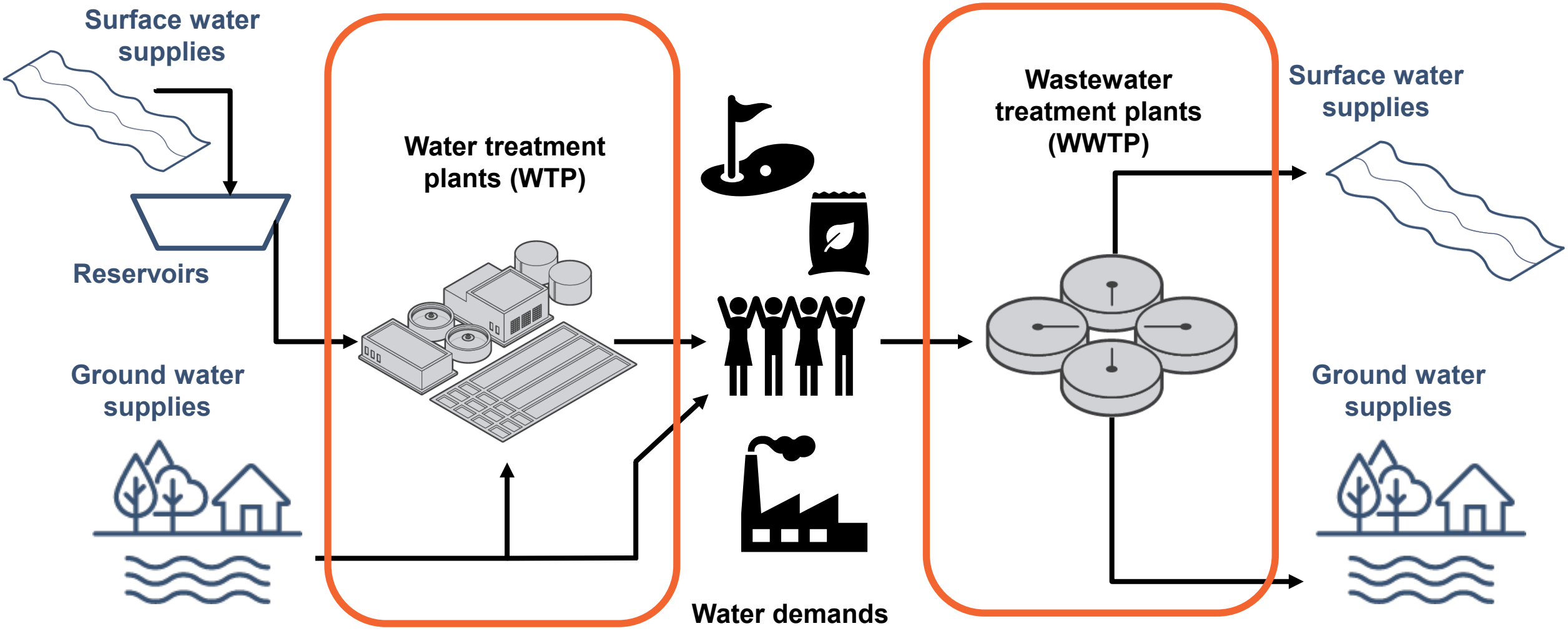
Surface Water



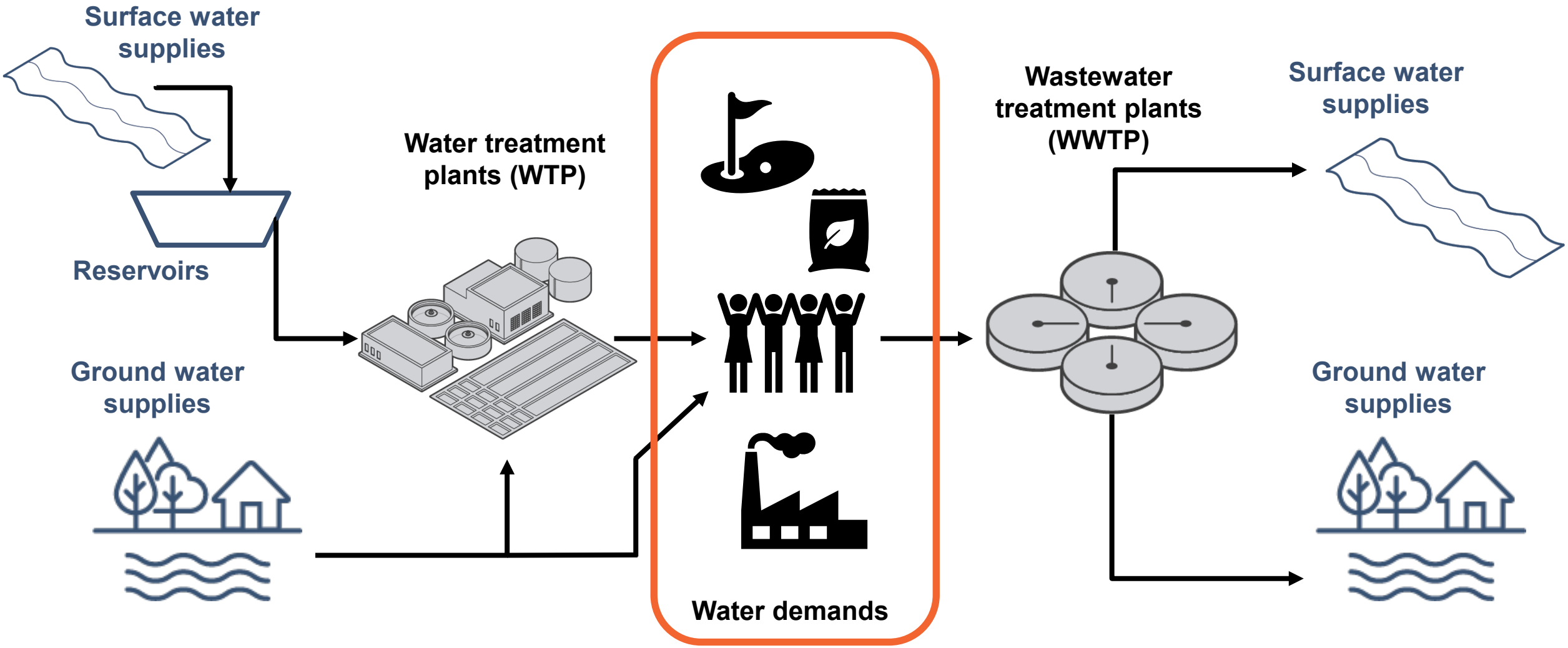
Groundwater

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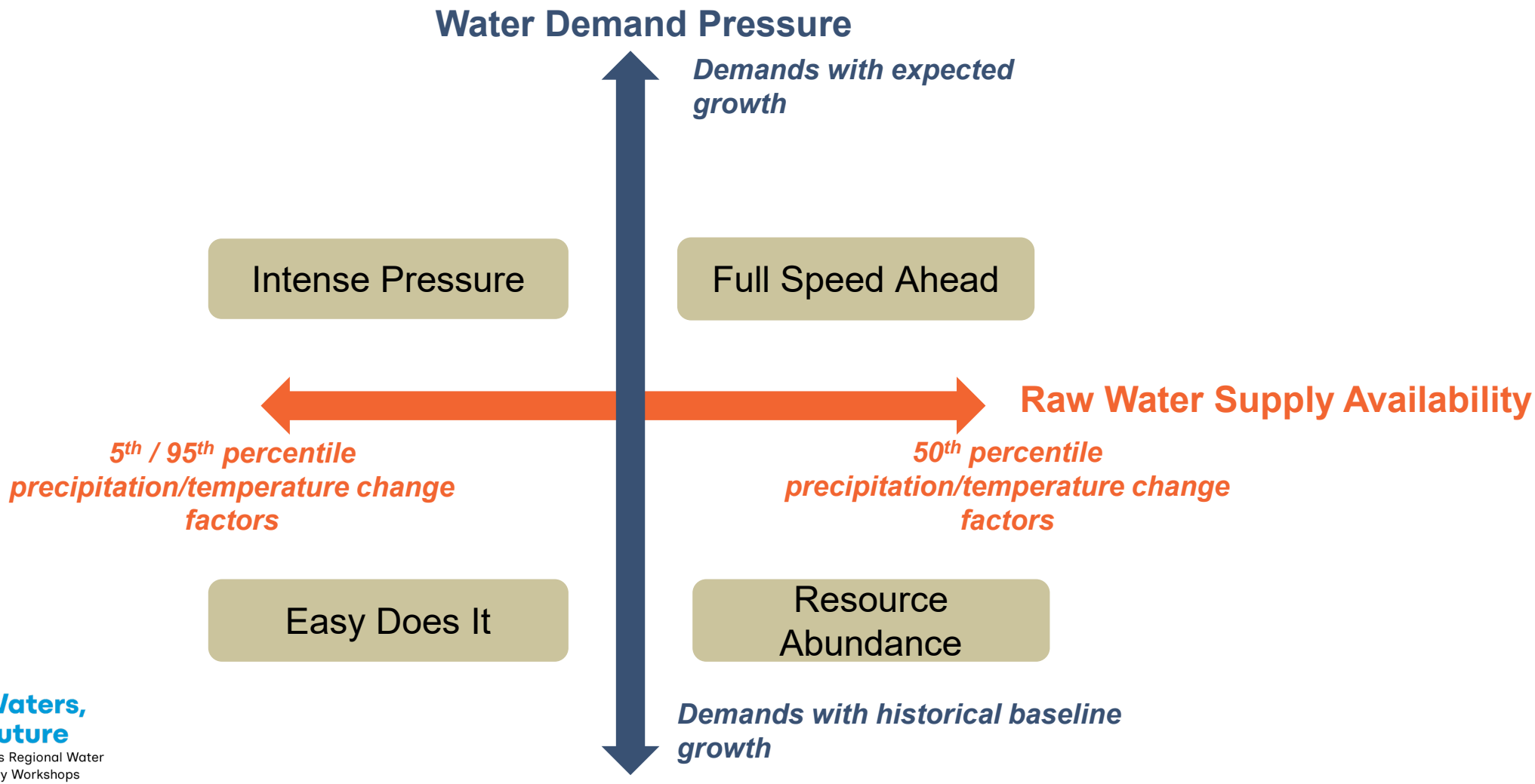
Model Components



Model Components



Model Scenarios



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Northeastern Illinois Regional Water Supply Sustainability Workshops

Dashboard and Results

Central Ohio Regional Water Study

Ohio Environmental Protection Agency

Hazen

Home | **Population Data** | Demand Data | Gap Identification | Water Quality

Search

The drop-down menus on the left-hand side of the screen control the presentation of population information on the map. Use the "Clear Selections" button in each drop-down box or the "Reset" button at the bottom of the page to clear selections. More Info...

Layer Visibility ⓘ
Multiple selections

County ⓘ
All

Grid - Data Category ⓘ
Population

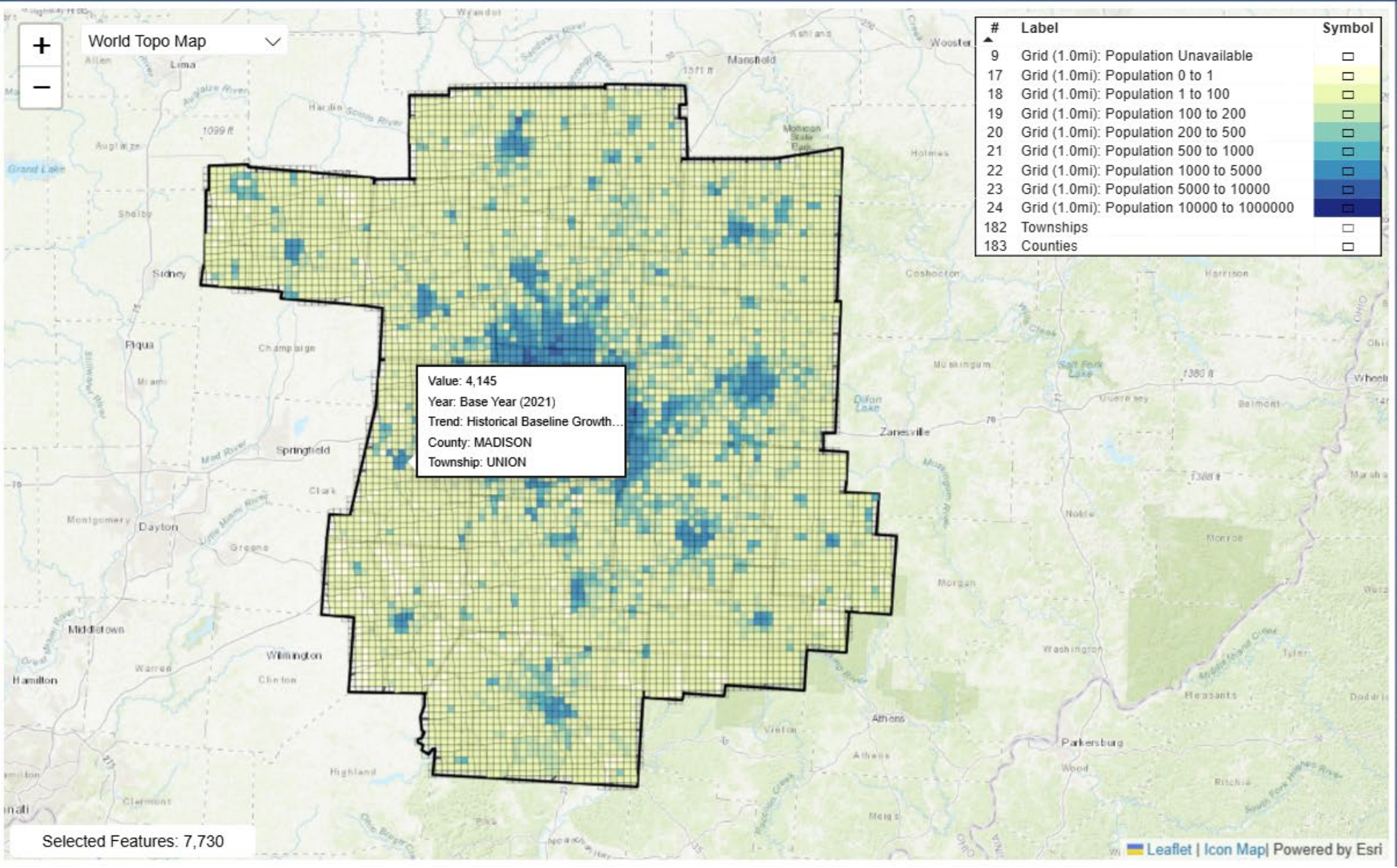
Grid - Growth Trend ⓘ
Historical Baseline Growth Tr...

Grid - Data Type ⓘ
Value

Grid - Data Year ⓘ
Base Year (2021)

Land Use - Data Category ⓘ
Future Land Use (2050)

Reset



#	Label	Symbol
9	Grid (1.0mi): Population Unavailable	
17	Grid (1.0mi): Population 0 to 1	
18	Grid (1.0mi): Population 1 to 100	
19	Grid (1.0mi): Population 100 to 200	
20	Grid (1.0mi): Population 200 to 500	
21	Grid (1.0mi): Population 500 to 1000	
22	Grid (1.0mi): Population 1000 to 5000	
23	Grid (1.0mi): Population 5000 to 10000	
24	Grid (1.0mi): Population 10000 to 1000000	
182	Townships	
183	Counties	

Environmental Protection Agency

Central Ohio Regional Water Study

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Home | Population Data | Demand Data | Gap Identification | Water Quality

Search

The drop-down menus on the left-hand side of the screen control the presentation of water demand data on the map. Use the "Clear Selections" button in each drop-down box or the "Reset" button at the bottom of the page to clear selections. More Info...

Layer Visibility ⓘ
Multiple selections

Demand Node Visibility ⓘ
All

County ⓘ
All

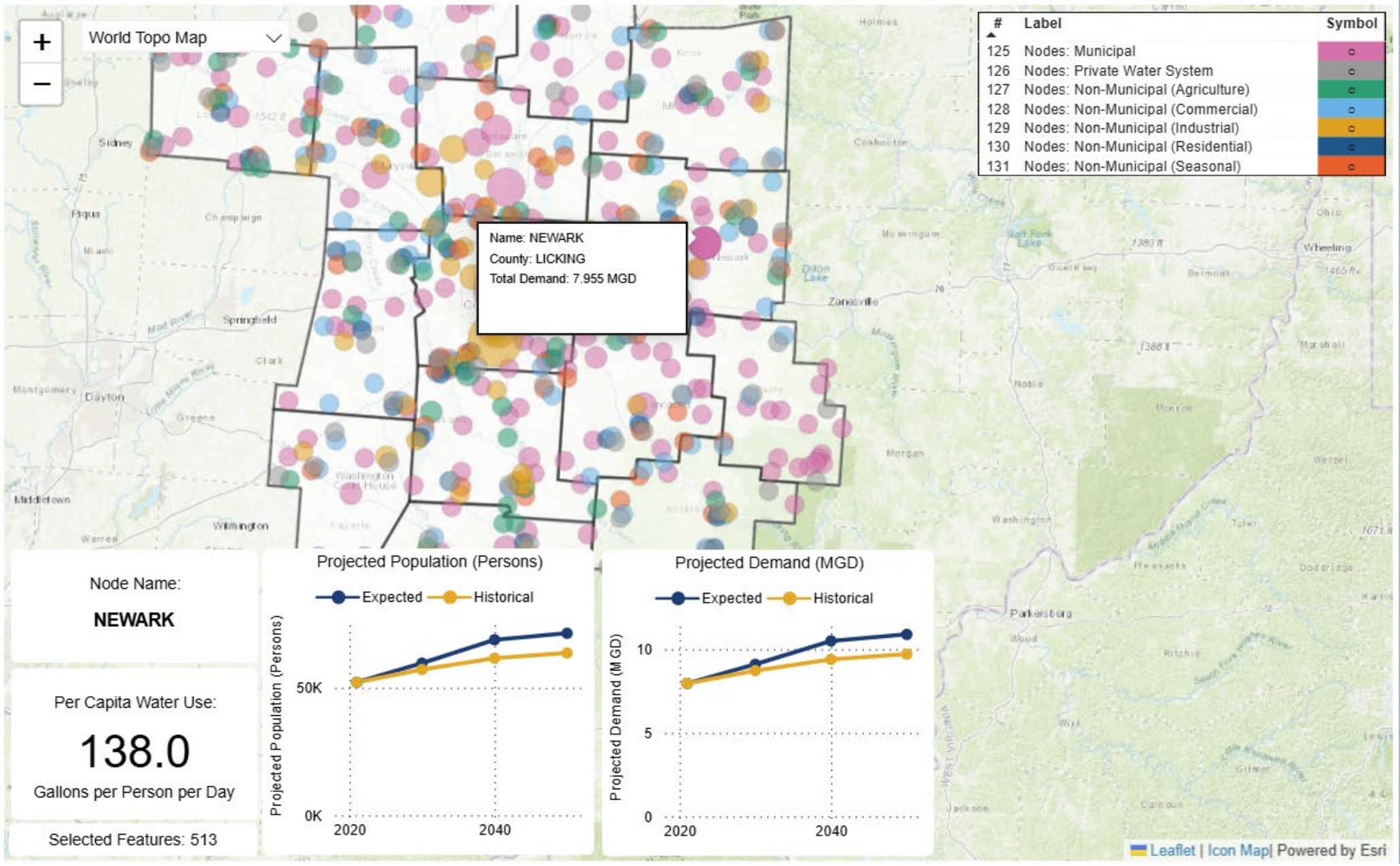
Nodes - Population Trend ⓘ
Historical Baseline Growth Tr...

Nodes - Value Type ⓘ
Total Demand

Nodes - Value Year ⓘ
Base Year (2021)

Nodes - Scale Per Capita Use ⓘ
0.00%

Reset



#	Label	Symbol
125	Nodes: Municipal	
126	Nodes: Private Water System	
127	Nodes: Non-Municipal (Agriculture)	
128	Nodes: Non-Municipal (Commercial)	
129	Nodes: Non-Municipal (Industrial)	
130	Nodes: Non-Municipal (Residential)	
131	Nodes: Non-Municipal (Seasonal)	

Node Name:
NEWARK

Per Capita Water Use:
138.0
Gallons per Person per Day

Selected Features: 513

Leaflet | Icon Map| Powered by Esri

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Ohio Environmental Protection Agency

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Home | Population Data | Demand Data | Gap Identification | Water Quality

Data Updated 5/20/25

Search Node Name

The drop-down menus on the left-hand side of the screen control the presentation of water demand data on the map. Use the "Clear Selections" button in each drop-down box or the "Reset" button at the bottom of the page to clear selections. More Info...

Layer Visibility
Multiple selections

Demand Node Visibility
All

County
All

Nodes - Population Trend
Expected Growth Trend

Nodes - Value Type
Total Demand

Nodes - Value Year
Base Year (2021)

Nodes - Scale Per Capita Use
0.00%

Reset

World Topo Map

#	Label	Symbol
125	Nodes: Municipal	
126	Nodes: Private Water System	
127	Nodes: Non-Municipal (Agriculture)	
128	Nodes: Non-Municipal (Commercial)	
129	Nodes: Non-Municipal (Industrial)	
130	Nodes: Non-Municipal (Residential)	
131	Nodes: Non-Municipal (Seasonal)	

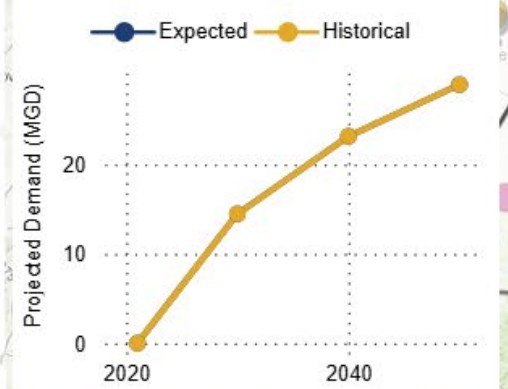
Name: 506000115 - Industrial
County: LICKING
Total Demand: 0.000 MGD
Number of Users: 18

Node Name:
506000115 - Industrial

Per Capita Water Use:
N/A
Gallons per Person per Day

Selected Features: 513

Projected Demand (MGD)



Leaflet | Icon Map| Powered by Esri

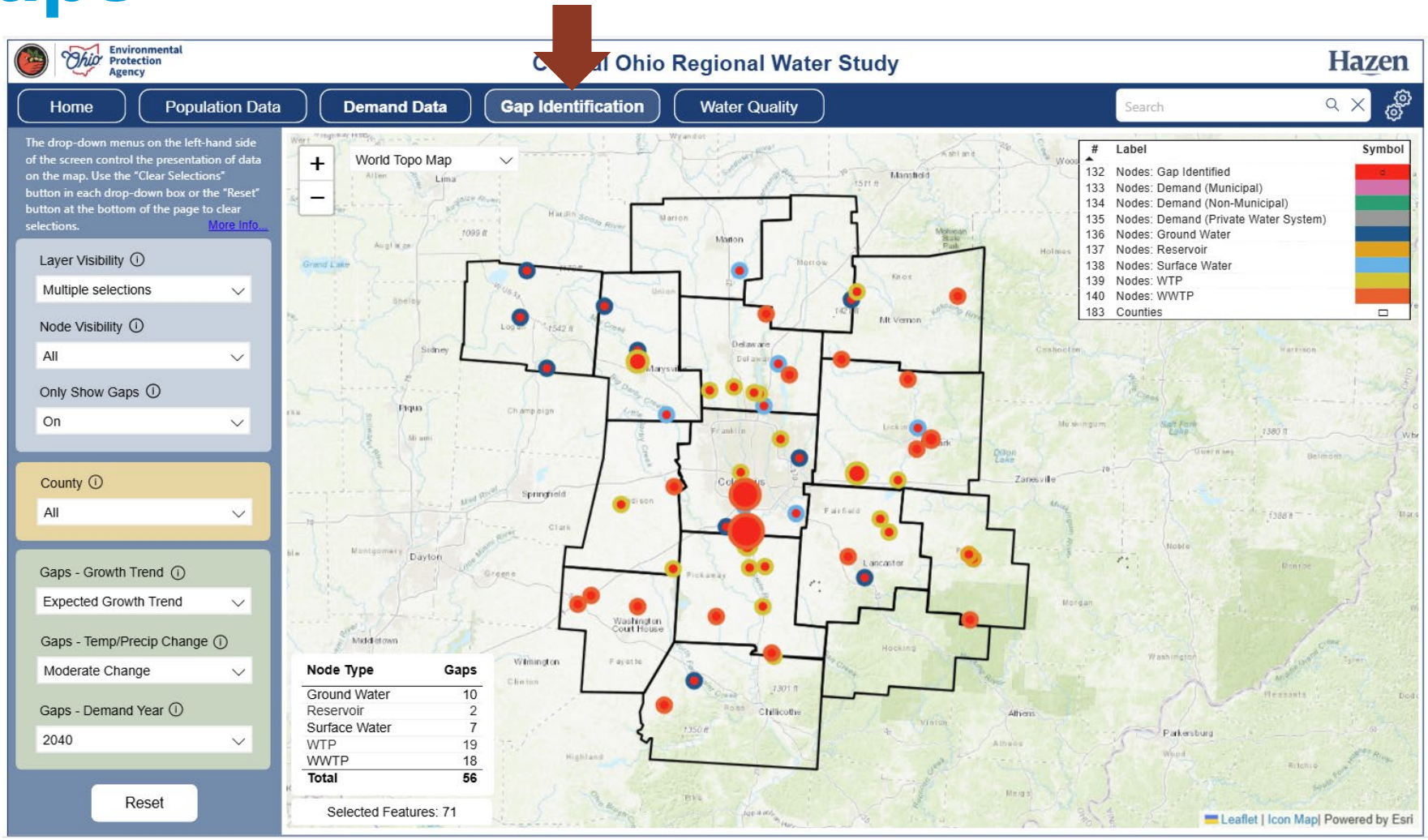
Resource Gaps

Gaps are defined based on the node type:

- **Surface water** – if any shortage is observed throughout the simulation period
- **Reservoir** – if usable storage ever reaches 20% or lower
- **Groundwater** – if remaining ground water ever reaches zero
- **Water treatment plant** – if the max month average flow reaches 80% or more of the permitted capacity
- **Wastewater treatment plant** – if the max annual average flow reaches 100% or more of the permitted capacity

In the dashboard, red-filled nodes represent gaps for the selected conditions on the left

Node sizing reflects the magnitude of the identified gap



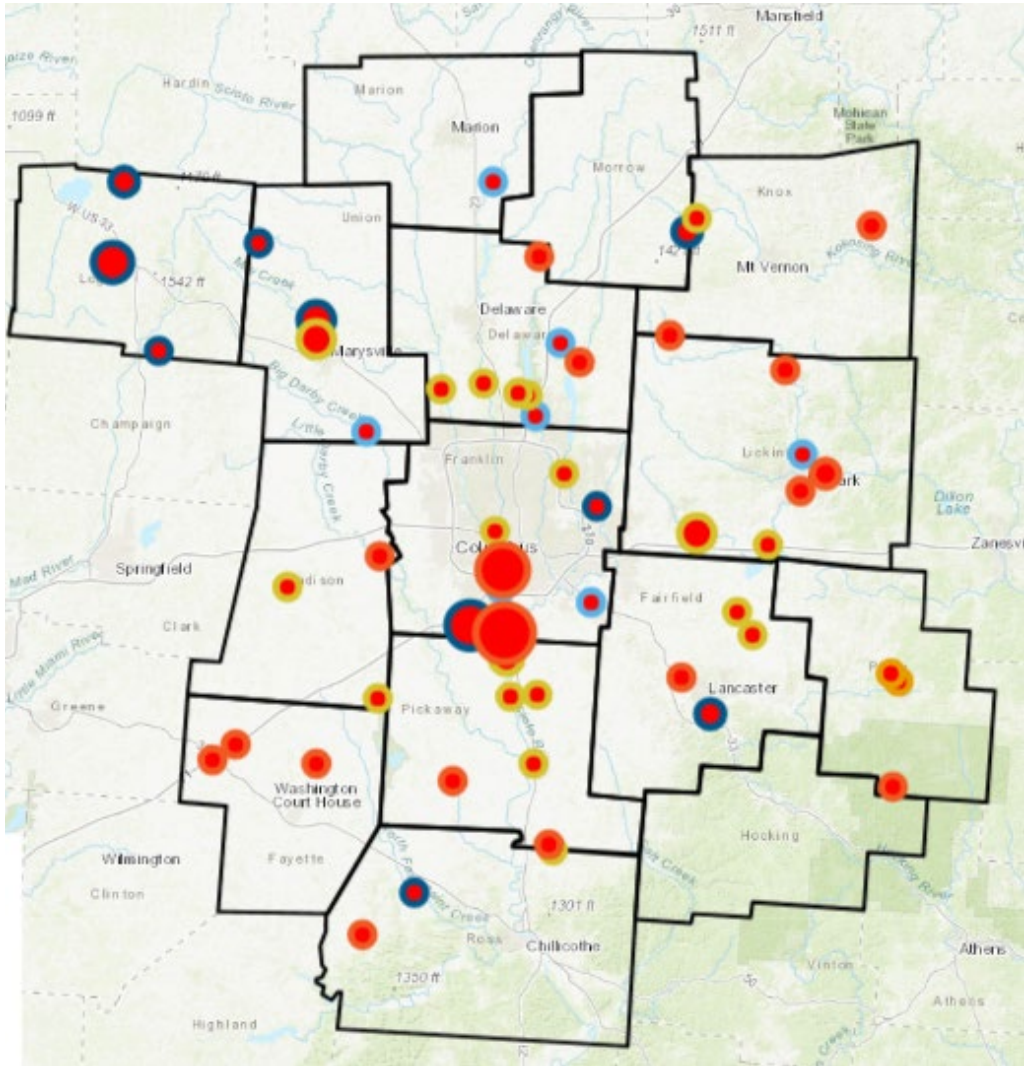
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Resource Gaps Summary

Scenario		GW	Reservoir	SW	WTP	WWTP	Total
Base Year		2	2	7	7	13	31
Intense Pressure *(expected growth + high temperature/precipitation stress)*	2030	4	2	7	10	16	39
	2040	10	3	7	19	17	56
	2050	10	5	7	22	20	64
Full Speed Ahead *(expected growth + moderate temperature/precipitation stress)*	2030	4	2	7	10	16	39
	2040	10	2	7	19	18	56
	2050	10	2	7	22	21	62
Easy Does It *(historical growth + high temperature/precipitation stress)*	2030	4	2	7	10	14	37
	2040	9	2	7	14	15	47
	2050	9	4	6	16	14	49
Resource Abundance *(historical growth + moderate temperature/precipitation stress)*	2030	4	2	7	10	14	37
	2040	9	1	7	14	15	46
	2050	9	1	7	16	16	49

County-Level Report Out

- County data analysis including model demands
- Discussion of gaps identified
- Identification of areas of opportunity
- Detailed project options – LOCAL, REGIONAL, REUSE
  - Local – Utility largely uses its own assets to fill gap or industrial provides its own onsite solutions
  - Regional – Utility collaborates with other utilities
  - Reuse – Utility leverages reuse water to provide non-potable water to an industrial user to reduce potable water demand
  - Cost models for comparative purposes and are in 2024 costs
- Water quality analysis



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Central Ohio Regional Water Study

Ohio Environmental Protection Agency

Hazen

Home | Population Data | Demand Data | **Gap Identification** | Water Quality

Data Updated 5/20/25

Search Node Name or ID

The drop-down menus on the left-hand side of the screen control the presentation of data on the map. Use the "Clear Selections" button in each drop-down box or the "Reset" button at the bottom of the page to clear selections. More Info...

Layer Visibility ⓘ
Multiple selections

Node Visibility ⓘ
All

Only Show Gaps ⓘ
Off

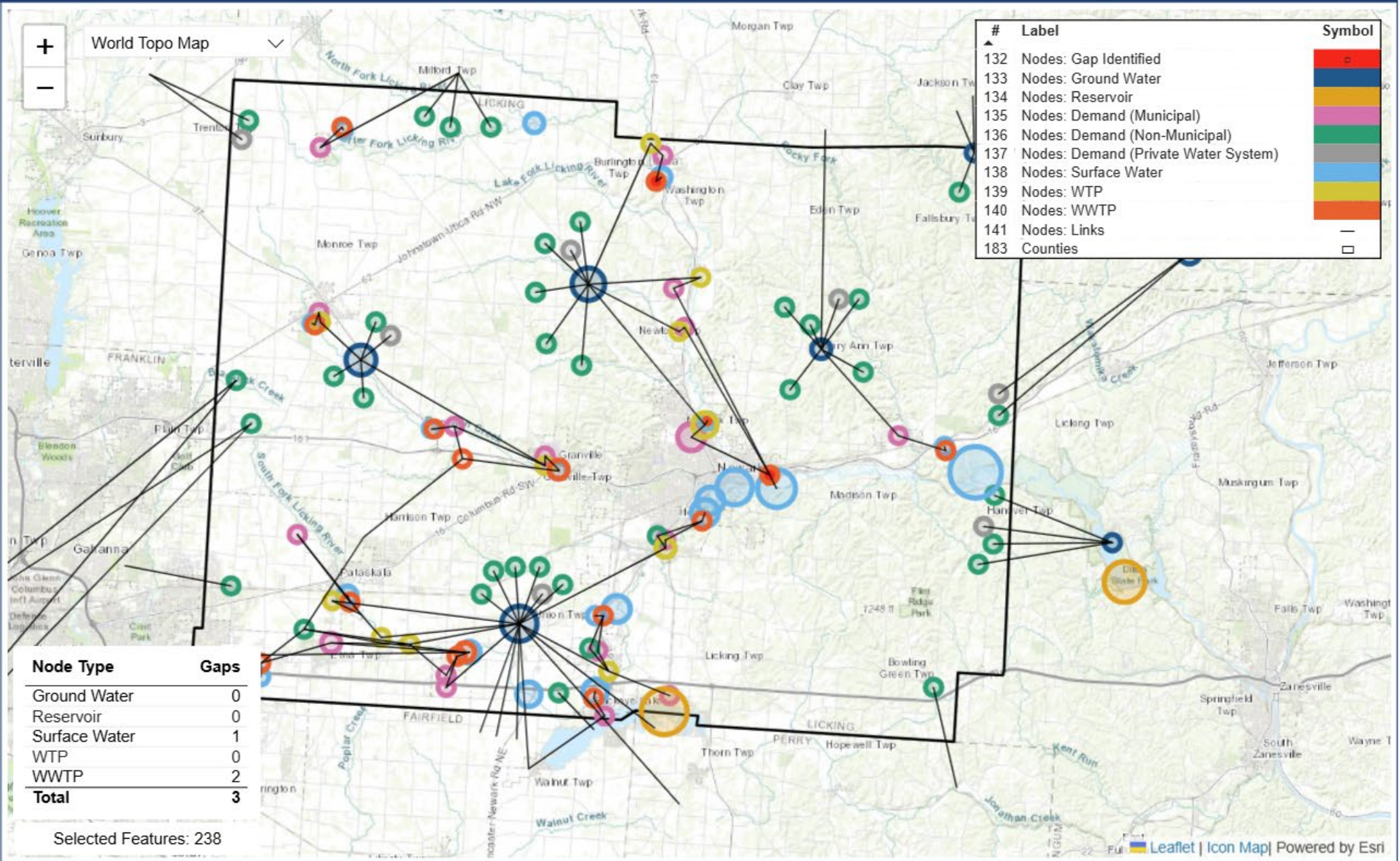
County ⓘ
LICKING

Gaps - Growth Trend ⓘ
Expected Growth Trend

Gaps - Temp/Precip Change ⓘ
Moderate Change

Gaps - Demand Year ⓘ
Base Year (2021)

Reset



Central Ohio Regional Water Study

Ohio Environmental Protection Agency

Hazen

Home | Population Data | Demand Data | **Gap Identification** | Water Quality

Data Updated 5/20/25

Search Node Name or ID

The drop-down menus on the left-hand side of the screen control the presentation of data on the map. Use the "Clear Selections" button in each drop-down box or the "Reset" button at the bottom of the page to clear selections. More Info...

Layer Visibility ⓘ
Multiple selections

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All

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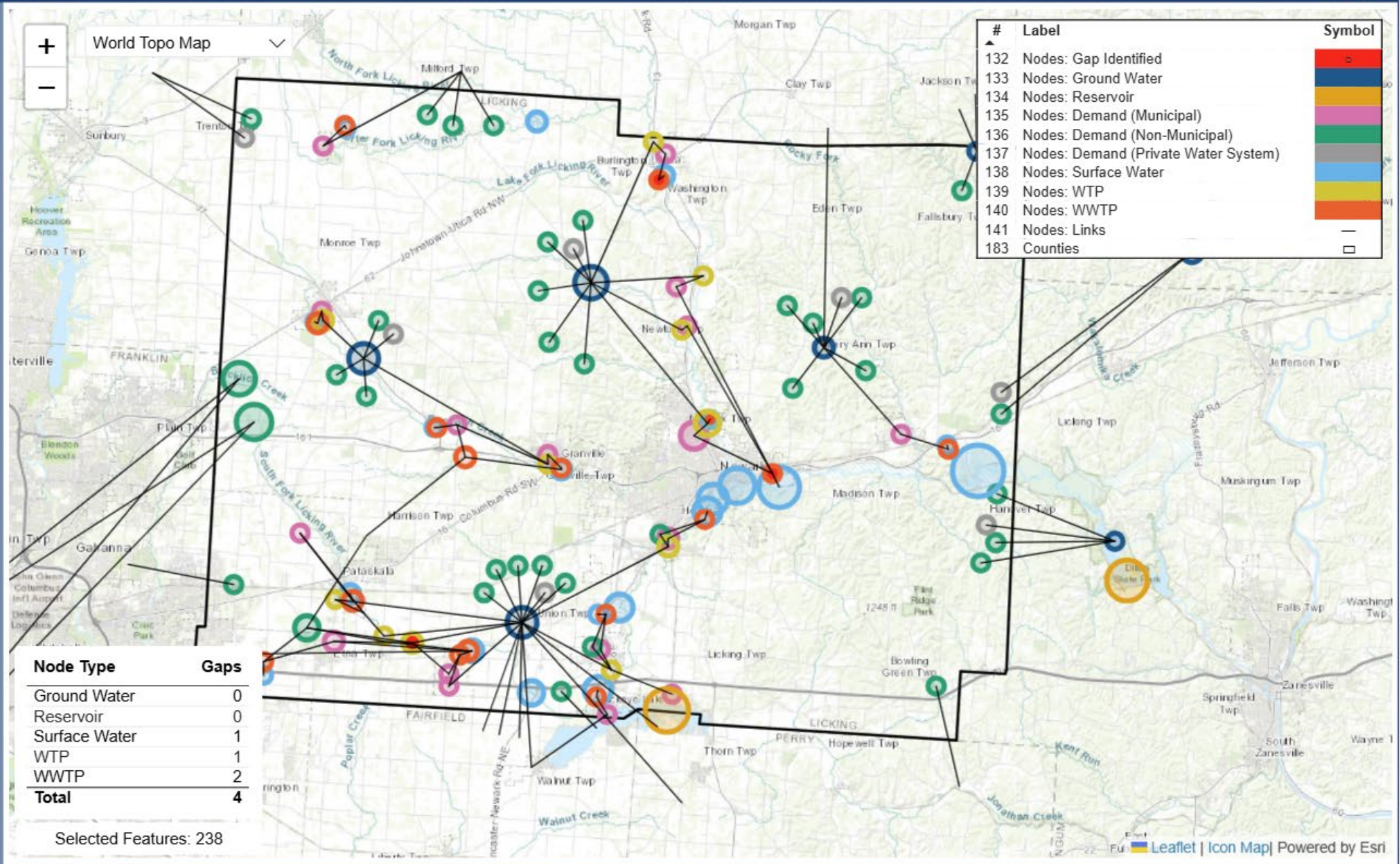
County ⓘ
LICKING

Gaps - Growth Trend ⓘ
Expected Growth Trend

Gaps - Temp/Precip Change ⓘ
Moderate Change

Gaps - Demand Year ⓘ
2030

Reset



Central Ohio Regional Water Study

Ohio Environmental Protection Agency

Hazen

Home | Population Data | Demand Data | **Gap Identification** | Water Quality

Search

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Only Show Gaps ⓘ
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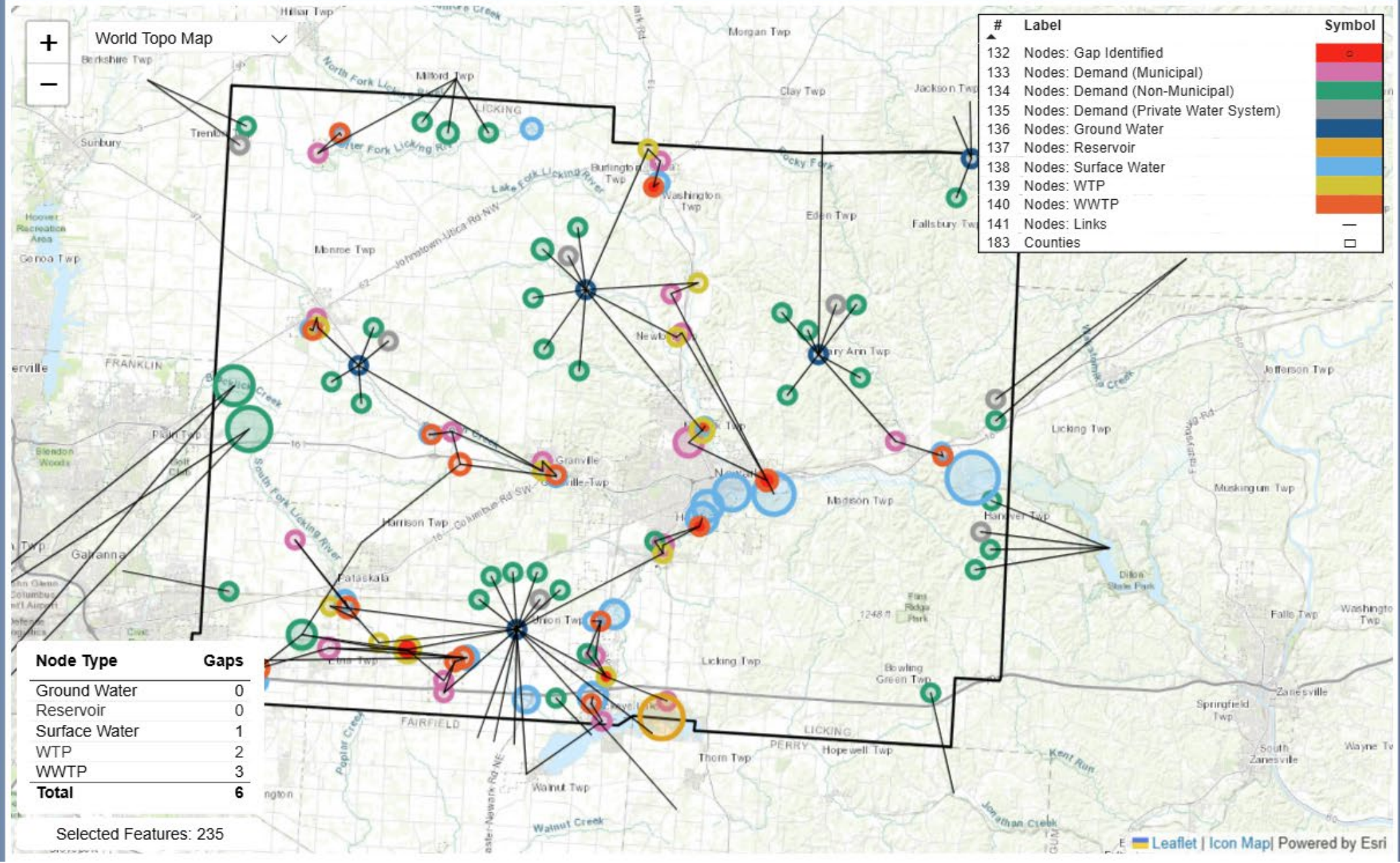
County ⓘ
LICKING

Gaps - Growth Trend ⓘ
Expected Growth Trend

Gaps - Temp/Precip Change ⓘ
Moderate Change

Gaps - Demand Year ⓘ
2040

Reset



Project Resources

- Dashboard
- Regional and County-Level Presentations and Recordings
- Technical Presentations
- WaterStudies@epa.ohio.gov

Shared Waters, Shared Future
Northeastern Illinois Regional Water Supply Sustainability Workshops

Thank you!

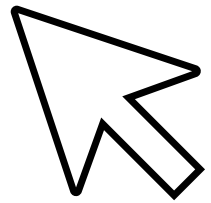
Shared Waters,
Shared Future
Northeastern Illinois Regional Water
Supply Sustainability Workshops

Questions

Based on Kathleen's framework, where are you today?

Respond via Mentimeter:

Click the link in the chat

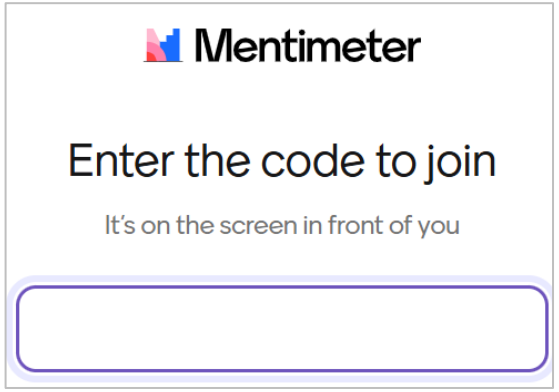


or

Scan the QR code

or

Join at menti.com code 4368 1595



Shared Waters, Shared Future
Northeastern Illinois Regional Water Supply Sustainability Workshops

5-minute break

Integrating groundwater resources into planning

Speakers



Dan Whalen, PE

Geological engineer
Williams & Works



Dan Hadley

Associate research scientist
University of Illinois' State Water Survey



Dave Hart, PhD

Hydrologist/geologist
Wisconsin Geological and Natural History Survey

Shared Waters, Shared Future
Northeastern Illinois Regional Water Supply Sustainability Workshops

Speaker



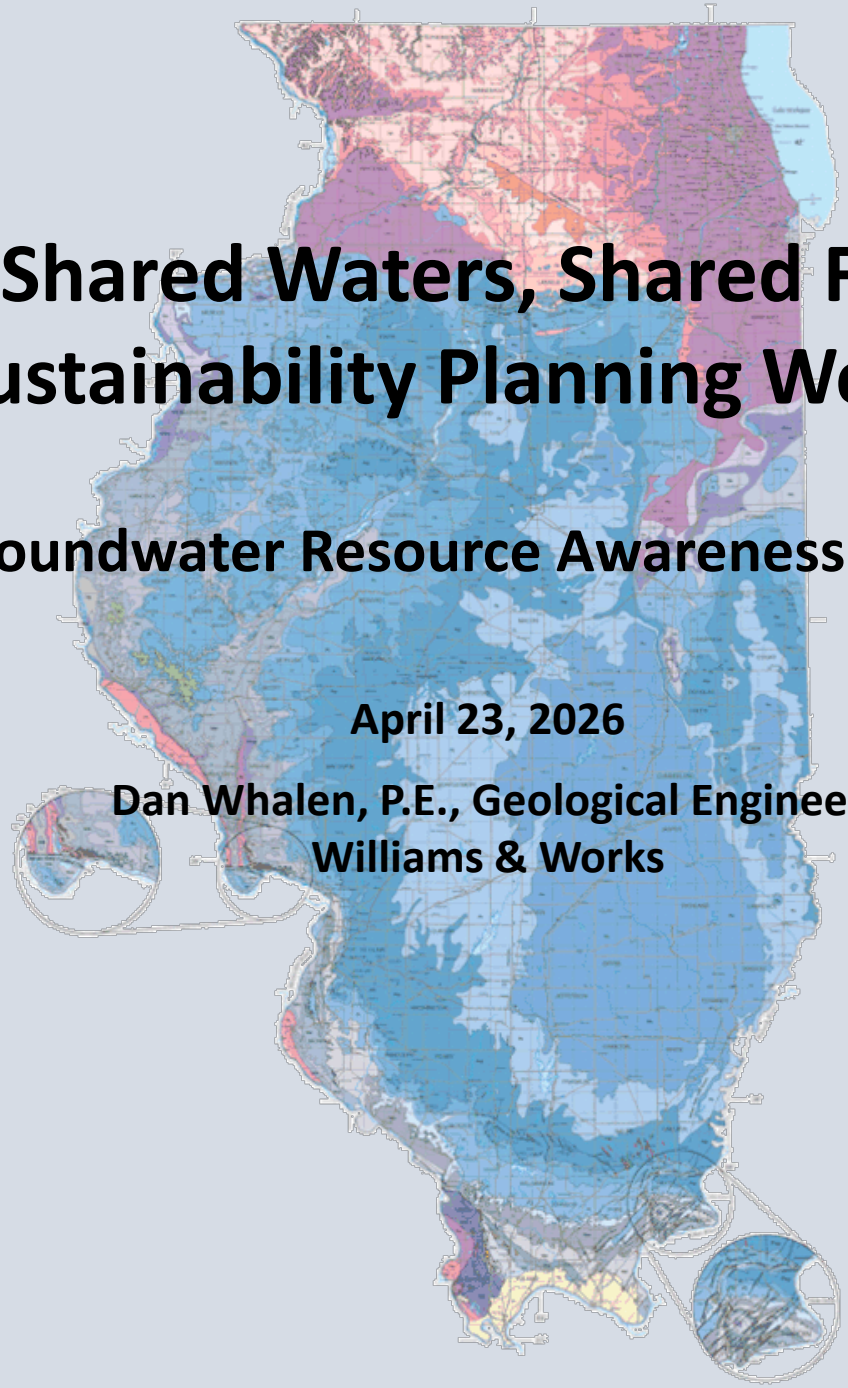
Dan Whalen, PE

Geological engineer
Williams & Works

Shared Waters,
Shared Future
Northeastern Illinois Regional Water
Supply Sustainability Workshops

Shared Waters, Shared Future
Water Sustainability Planning Workshop Series

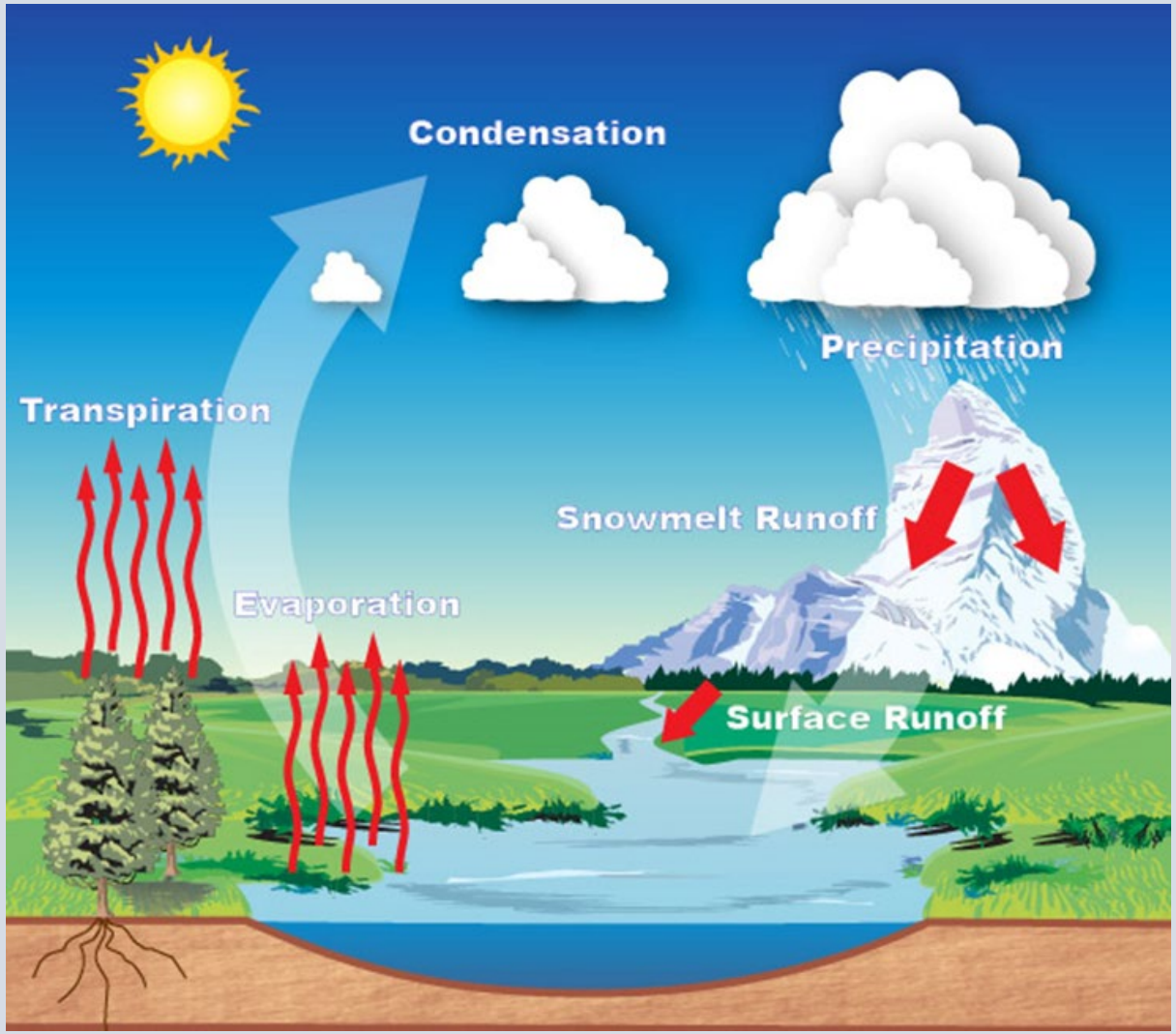
Integrating Groundwater Resource Awareness into Master Planning

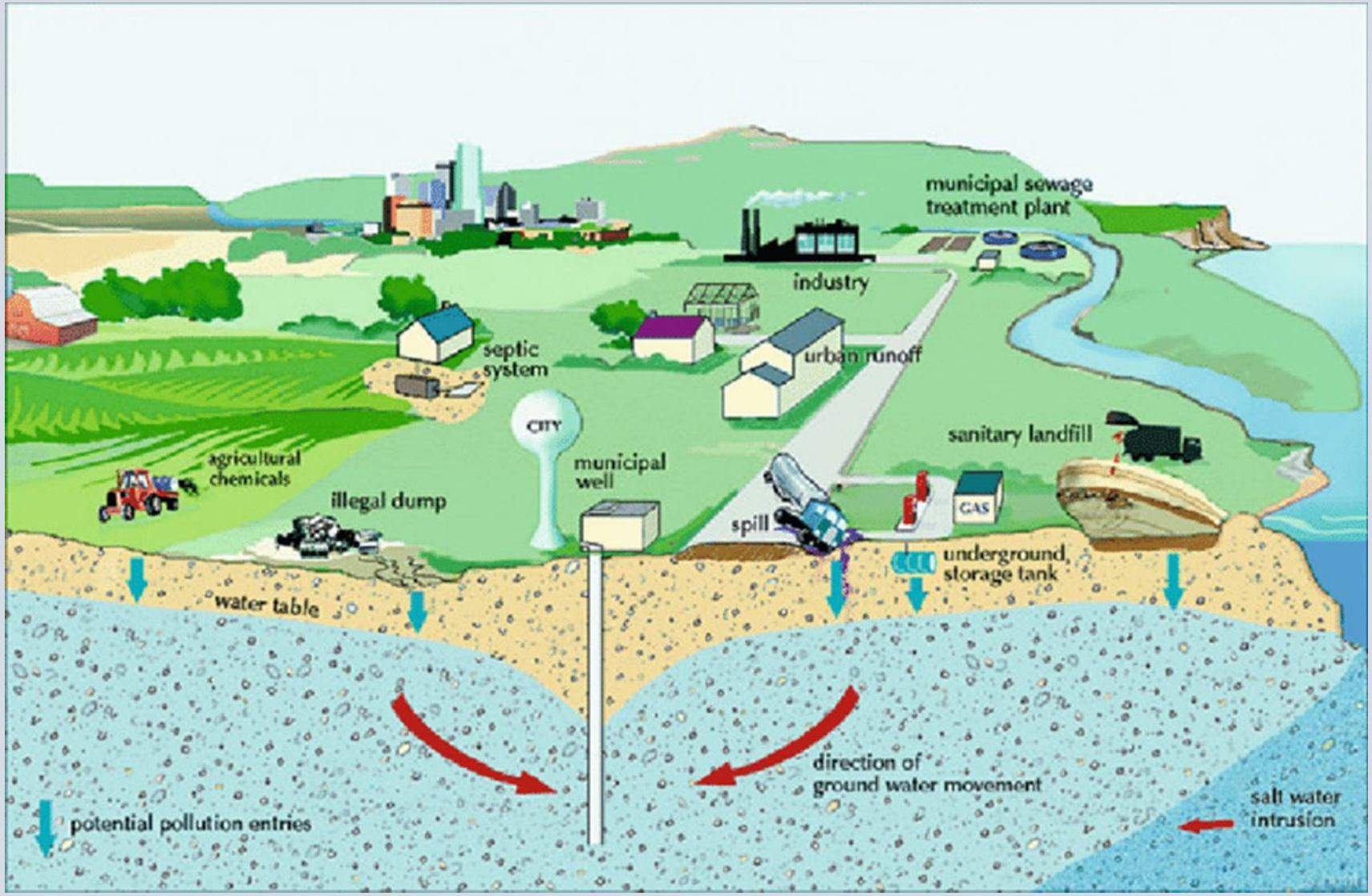


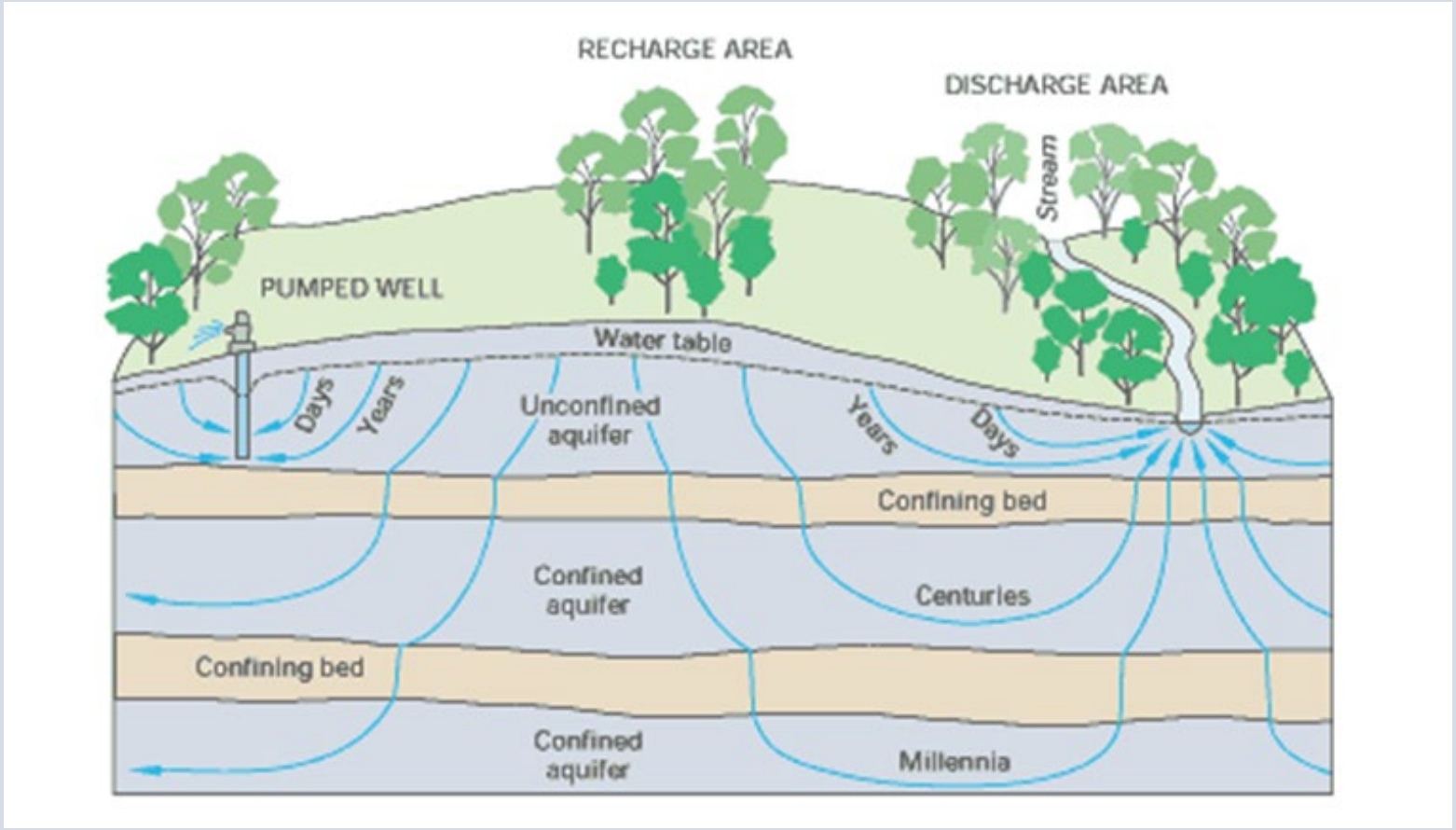
April 23, 2026

Dan Whalen, P.E., Geological Engineer
Williams & Works

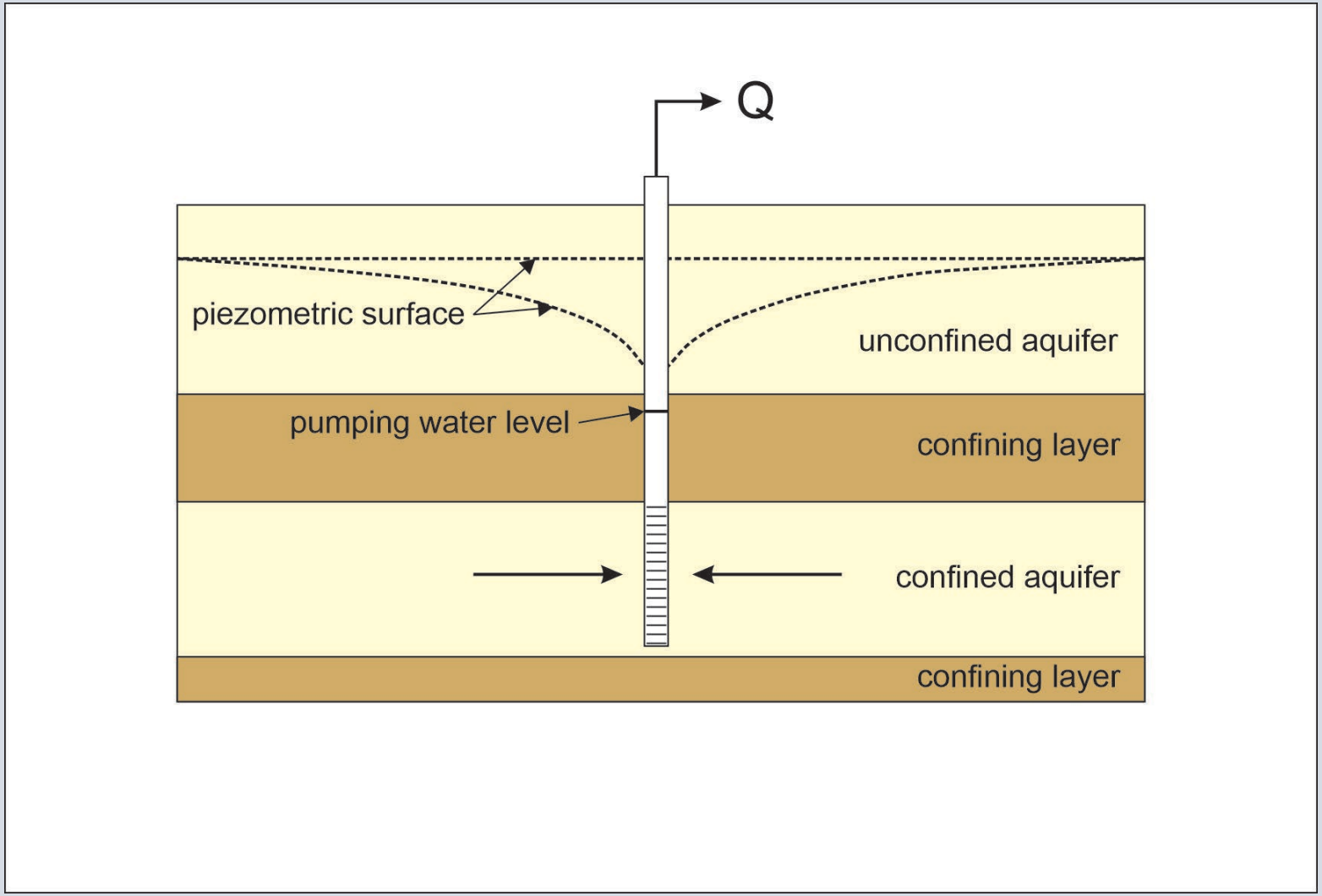
Chicago Metropolitan
Agency for Planning


Condensation
Precipitation
Transpiration
Snowmelt Runoff
Evaporation
Surface Runoff

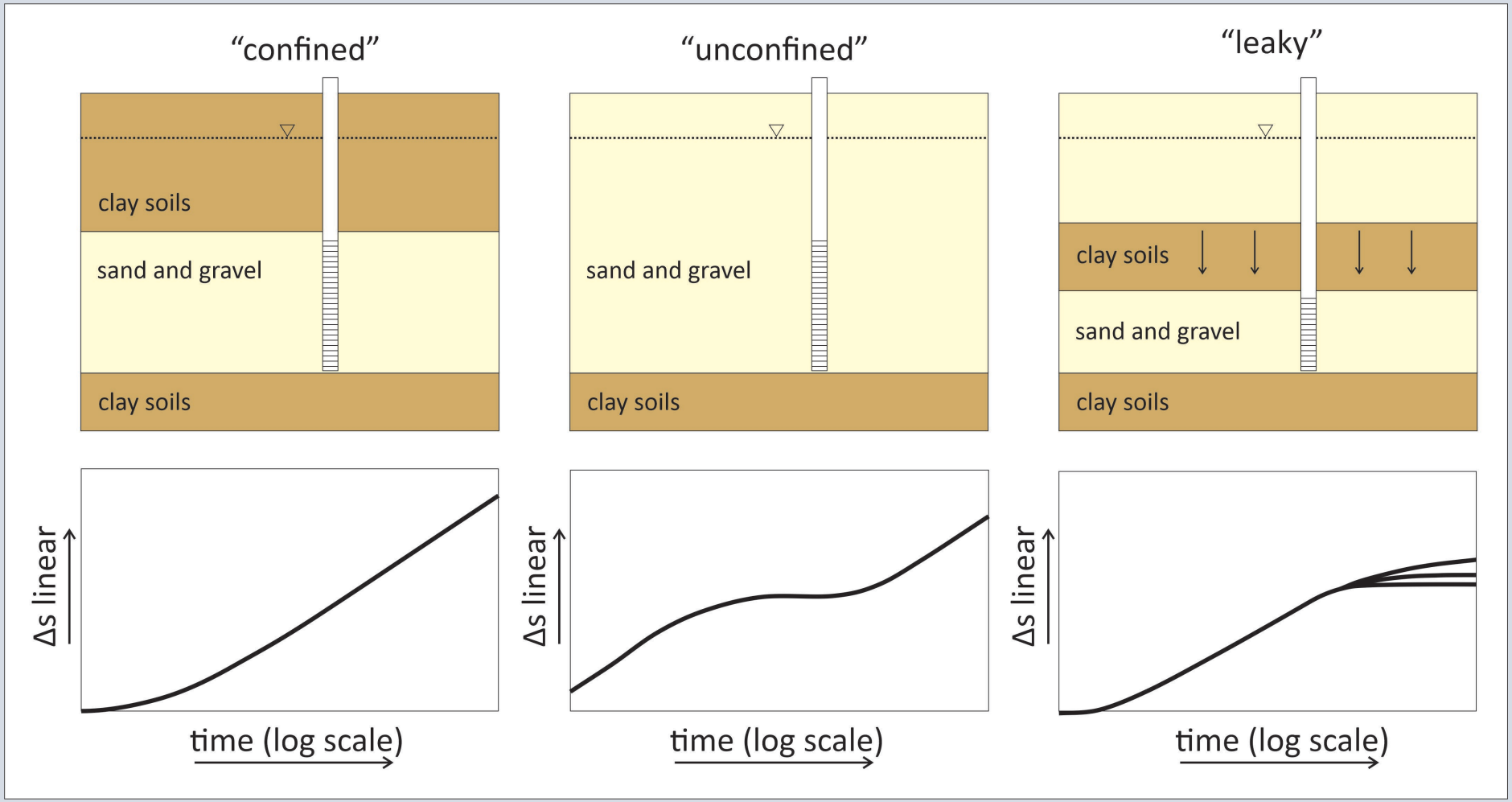

municipal sewage treatment plant
industry
septic system
urban runoff
CITY
sanitary landfill
agricultural chemicals
municipal well
illegal dump
spill
GAS
underground storage tank
water table
direction of ground water movement
salt water intrusion
potential pollution entries


RECHARGE AREA
DISCHARGE AREA
Stream
PUMPED WELL
Water table
Days
Years
Unconfined aquifer
Years
Days
Confining bed
Confined aquifer
Centuries
Confining bed
Confined aquifer
Millennia

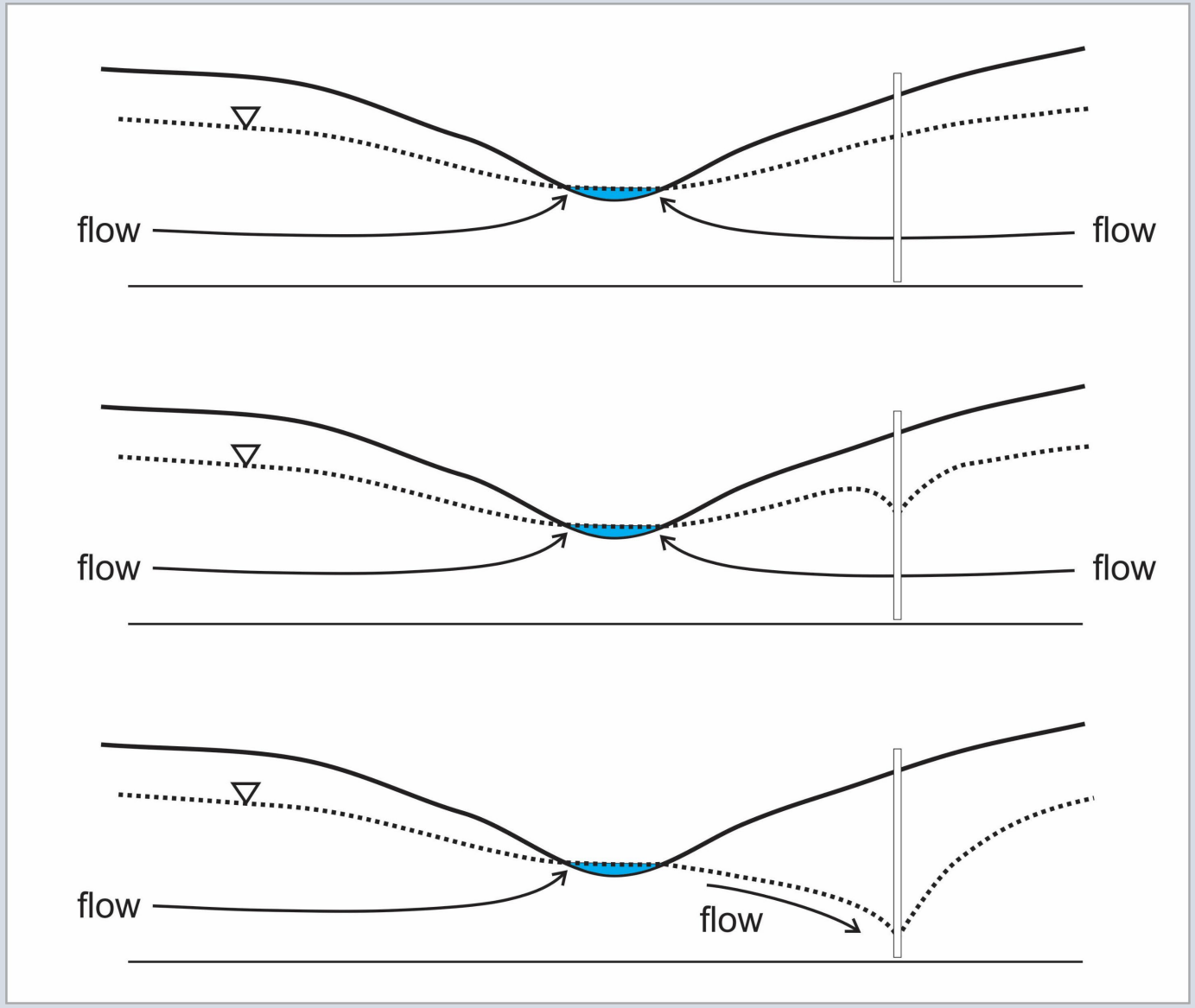
Water Well Pumping Behavior



Aquifer “Types” and How They Behave



Groundwater Development



Groundwater Development

Under natural conditions previous to development by wells, aquifers are in a state of approximate dynamic equilibrium.

Groundwater Development

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Discharge by wells is a new discharge superimposed upon a previously stable system, and it must be balanced by an increase in the recharge of the aquifer, or by a decrease in the natural discharge, or by loss of storage in the aquifer, or by a combination of these.

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The maximum quantity of ground water is limited by the deleterious side effects caused by pumping and operation of the basin or aquifer.

Groundwater Development

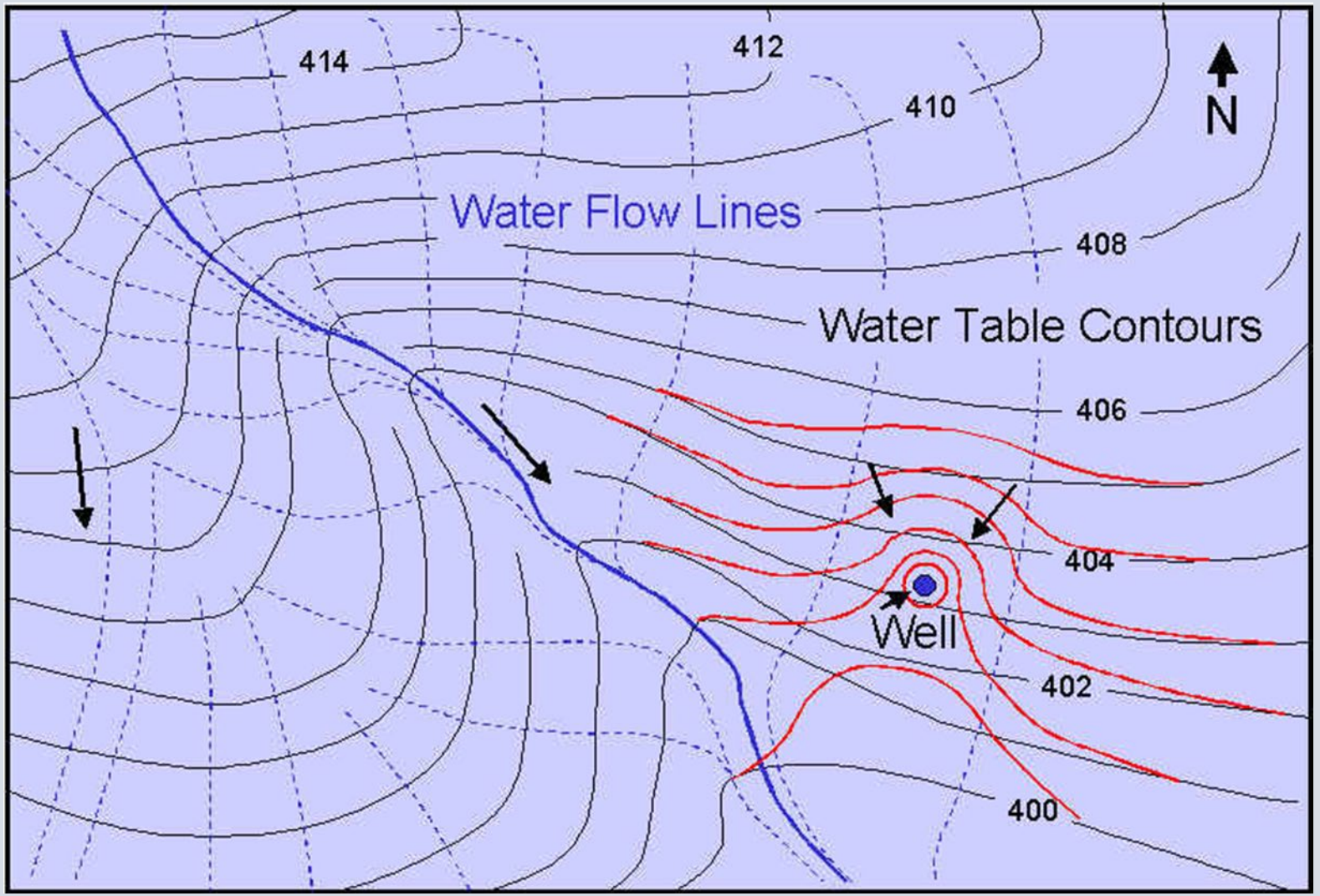
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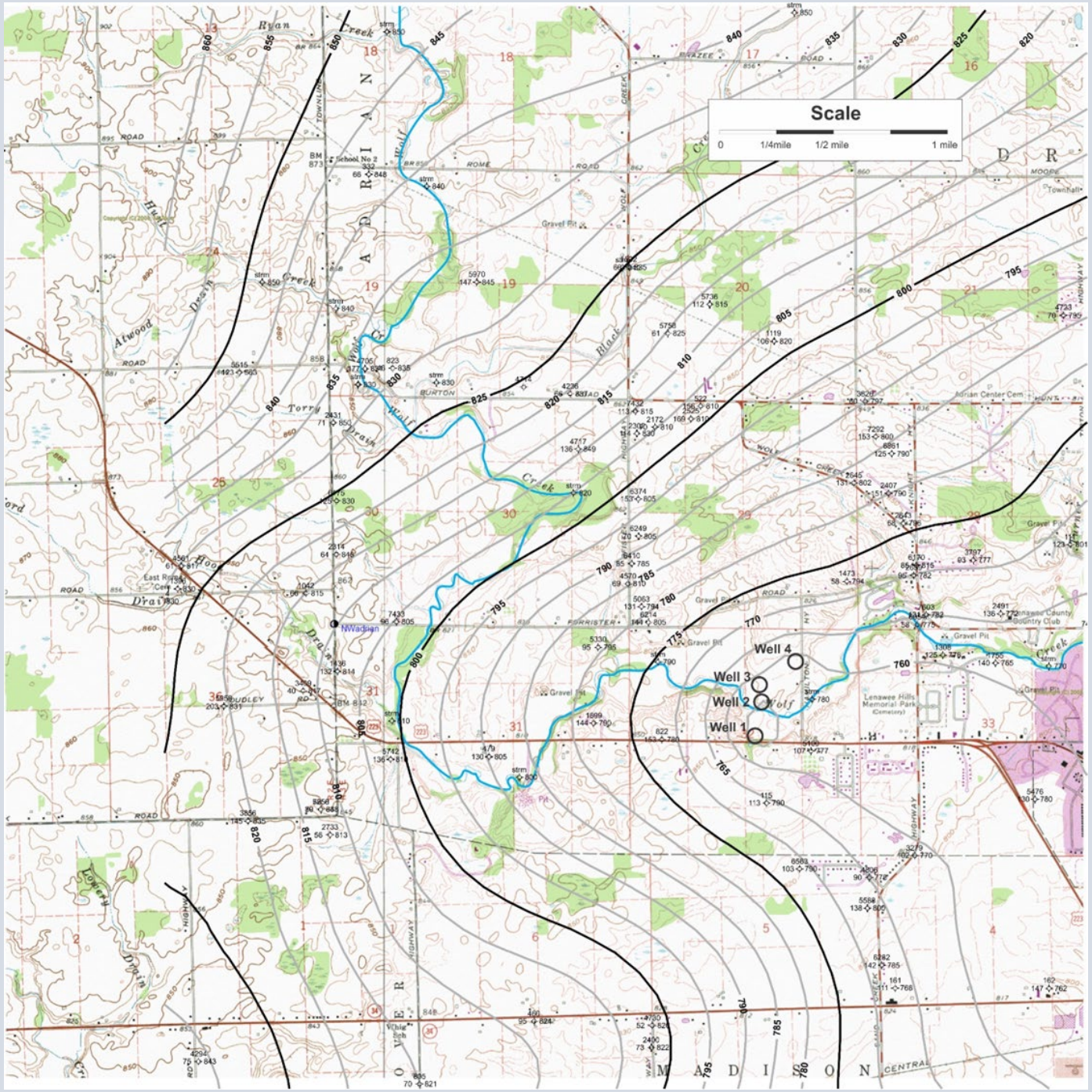
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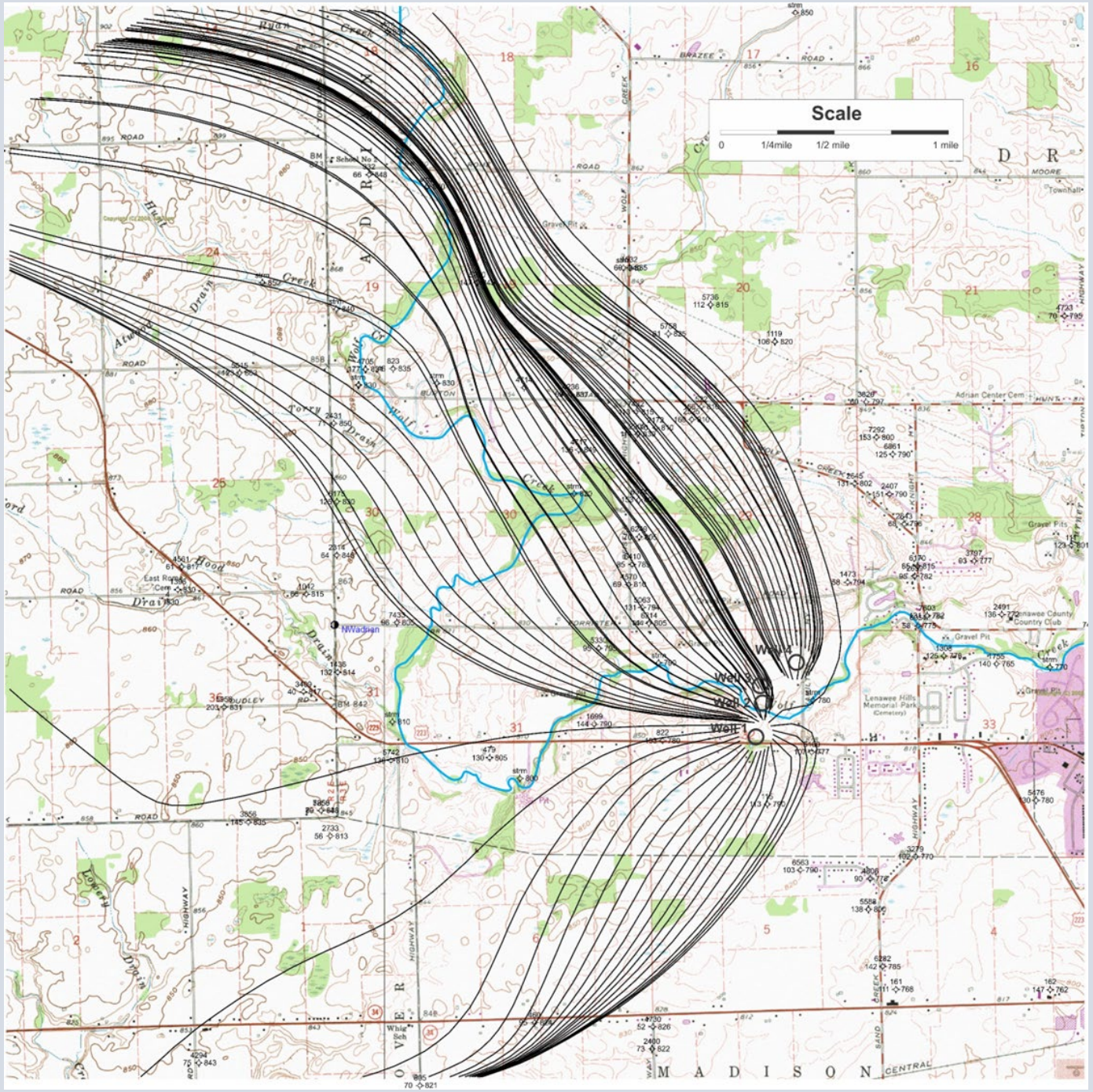
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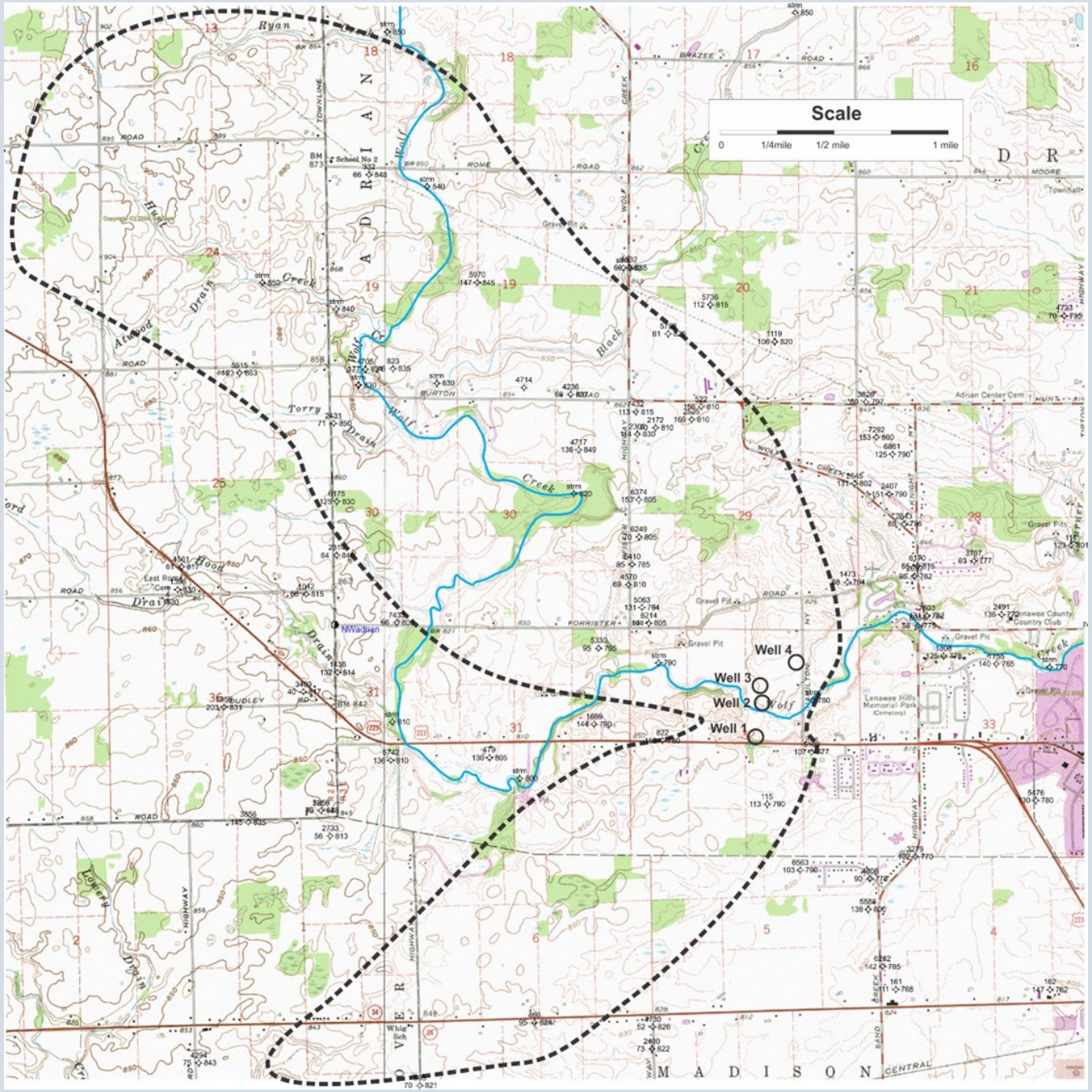
The maximum quantity of ground water is limited by the deleterious side effects caused by pumping and operation of the basin or aquifer.

Practical sustained yield is the rate at which groundwater can be withdrawn without lowering groundwater levels to critical stages, exceeding recharge or discharge, or causing undesirable changes to the water quality.

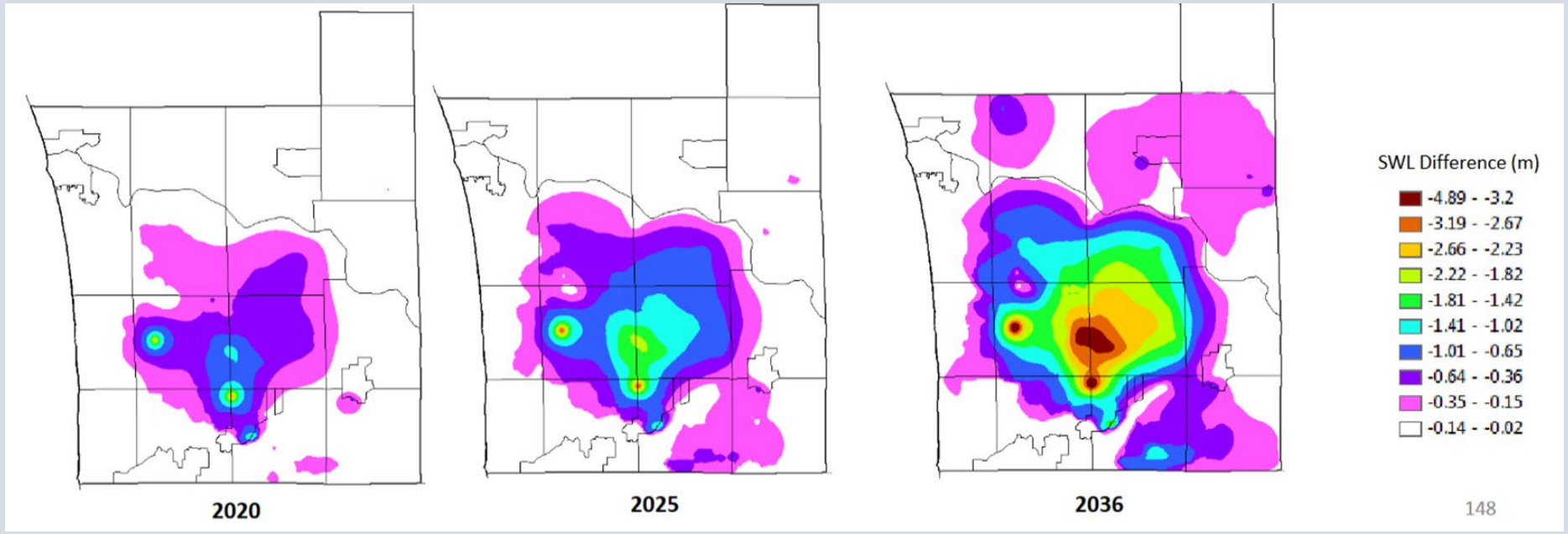

414
412
410
408
406
404
402
400
N
Water Flow Lines
Water Table Contours
Well


Scale
0
1/4mile
1/2 mile
1 mile
Well 1
Well 2
Well 3
Well 4
Wolf Creek
Black Creek
Torry Drain
Atwood Drain
Hull Drain
Lowery Drain
Ryan Creek
Flood Drain
Adrian Center Cem.
Lenawee Hills Memorial Park (Cemetery)
Lenawee County Country Club
East Riverside Cem.
Gravel Pit
MADISON
RIDGE
ROAD
HIGHWAY

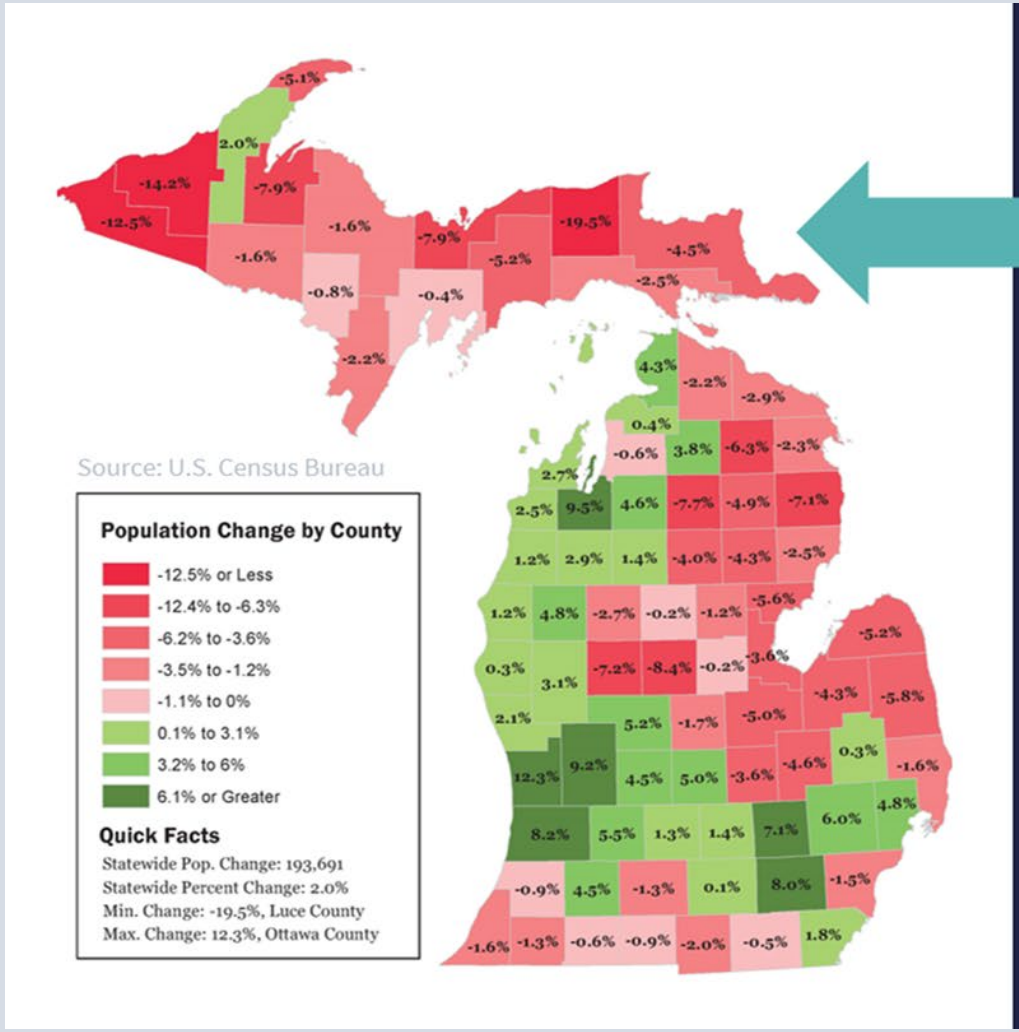

Scale
0
1/4mile
1/2 mile
1 mile
Well 4
Well 3
Well 2
Well 1
NWadsen
MADISON CENTRAL


Scale
0
1/4mile
1/2 mile
1 mile
Well 1
Well 2
Well 3
Well 4
Wolf Creek
Black Creek
Torry Drain
Hood Drain
Atwood Drain
Lowery Drain
Ryan
Hull
MADISON CENTRAL

Case Study – Ottawa County



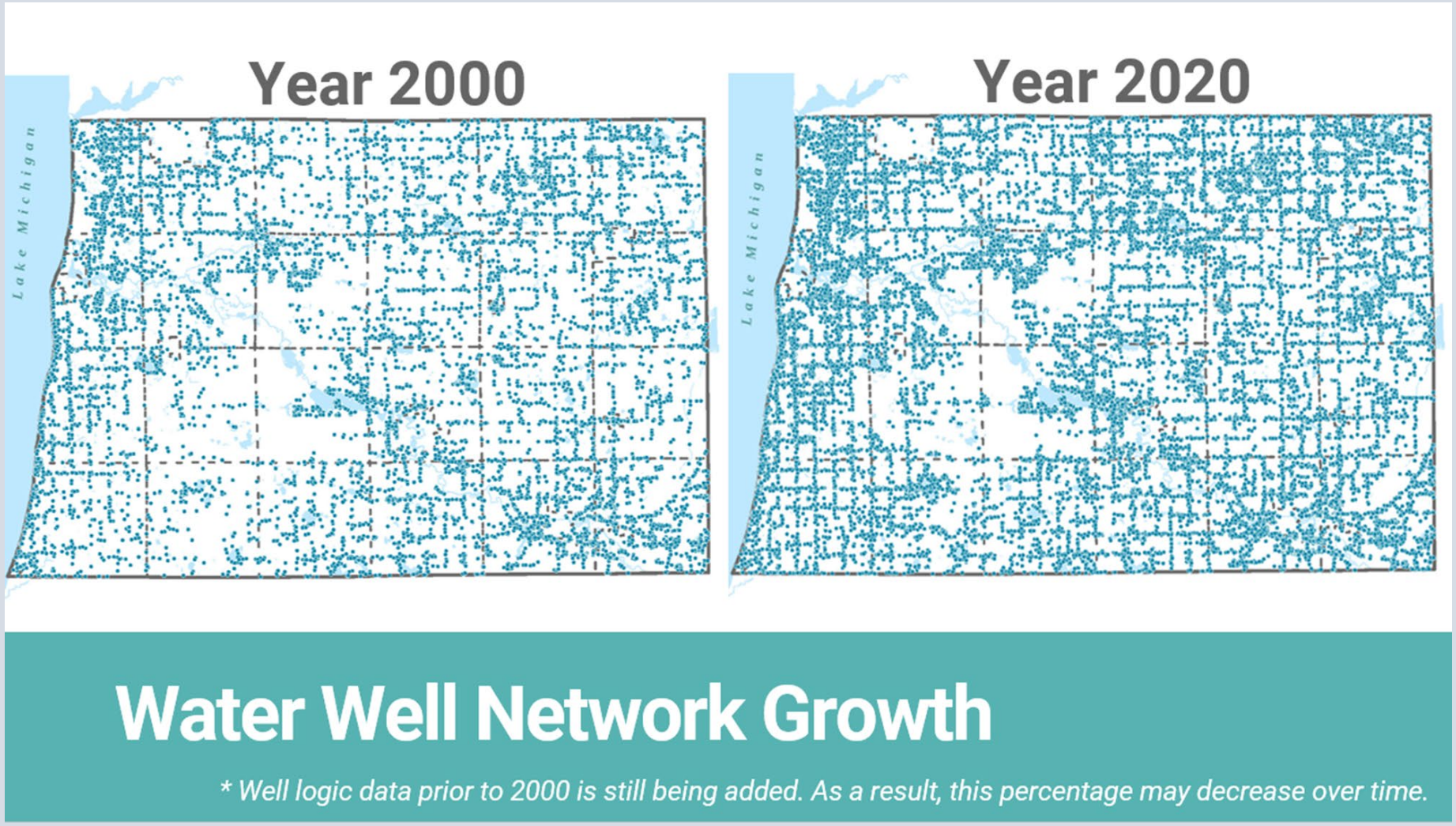
Case Study – Allegan County



Populations are moving within the state.

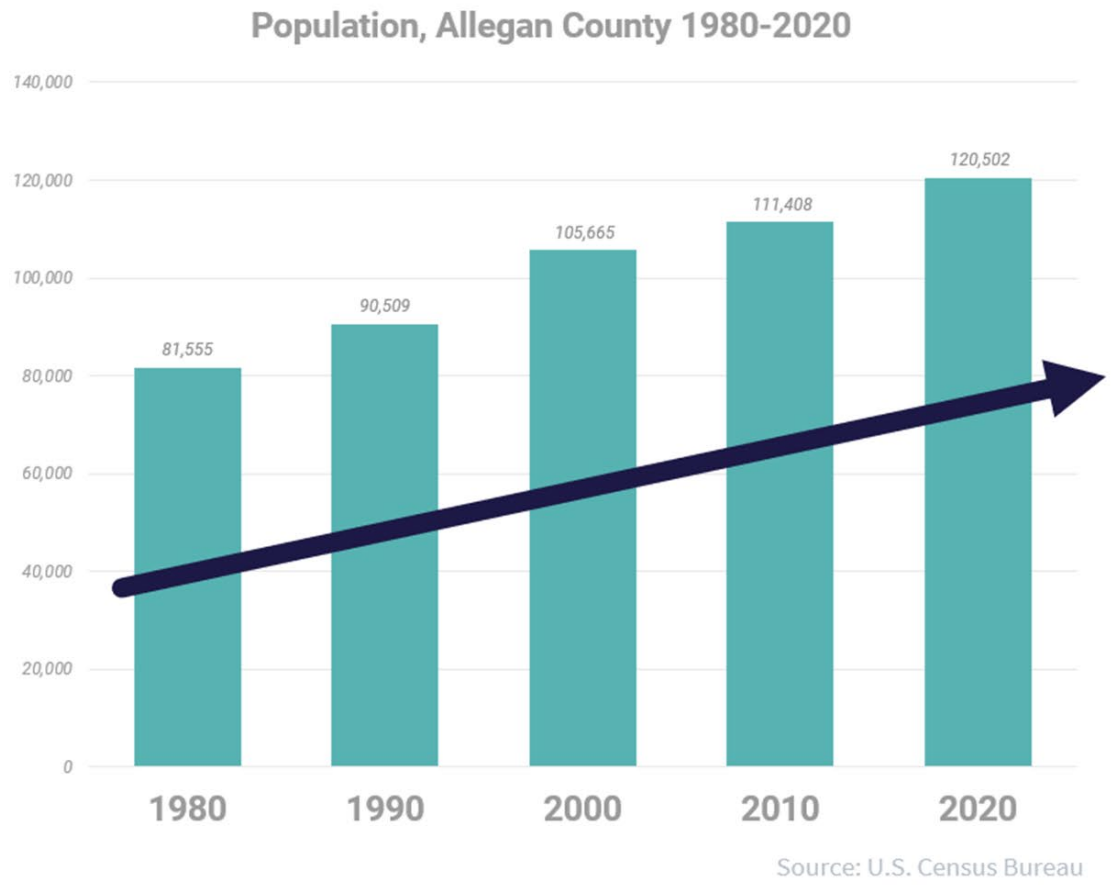
From 2010 to 2020, Allegan County experienced some of the highest population growth in Michigan at 8.2%.

Case Study – Allegan County



Case Study – Allegan County

As the population grows, anticipated groundwater demand grows too.



Case Study – Allegan County

- A **complex geology** where some areas of the aquifer system are limited in capacity while other areas are highly transmissive.
- Highlighted the presence of numerous **potential or known sites of contamination** throughout the County.
- **Hints of declining groundwater levels** due to unsustainable water use trends. (More data is needed.)

Case Study – Allegan County

- **Data drives decision making**
- Development of **strategies, policies, programs**
- Determine the (level of) **call to action** with Local Units of Government
- Relationship building



Closing Remarks

- **Groundwater is a resource that communities can manage.**
- **Data should drive decision-making.**
  - Understand the conditions of groundwater in your community.
  - Groundwater may or may not be (abundantly) available everywhere in Michigan.
  - The master plan can be a place to document available data that can be used by local officials, and does not have to be pushed into becoming a local policy decision or goal.
- **Educate the public during the engagement to:**
  - Build relationships
  - Increase local knowledge
  - Create opportunities for resident buy-in

Questions

What aspect of groundwater feels most important to better understand?

Respond via Mentimeter:

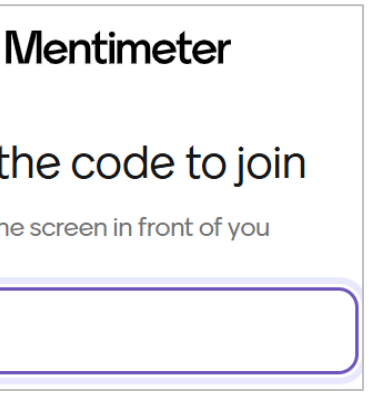
Click the link in the chat

or

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Join at menti.com code 4368 1595



Shared Waters, Shared Future
Northeastern Illinois Regional Water Supply Sustainability Workshops

Speaker



Dan Hadley

Associate research scientist
University of Illinois' State Water Survey

Shared Waters, Shared Future
Northeastern Illinois Regional Water Supply Sustainability Workshops

Shallow Groundwater Sustainability in Kane County: The Value of Community Data



CMAP: Shared Waters Shared Futures Workshop
April 23, 2026

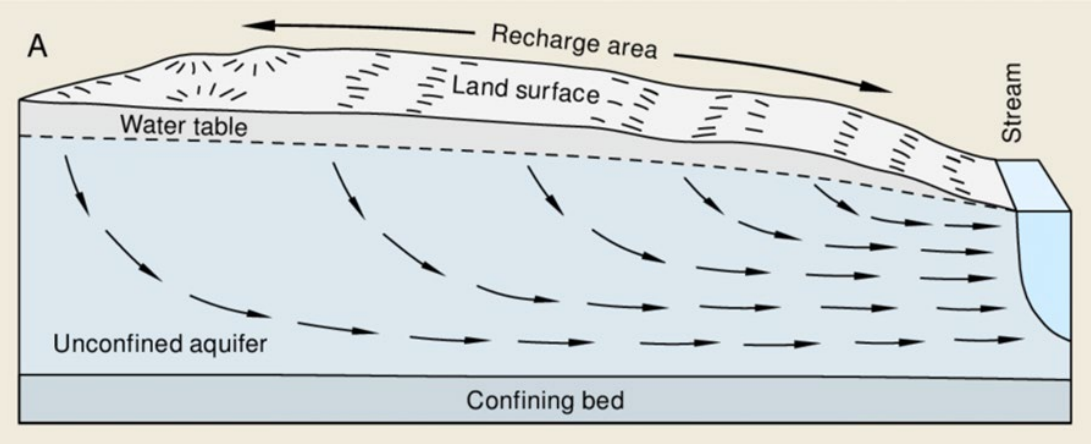
Daniel R. Hadley
Cecilia Cullen
Daniel Abrams

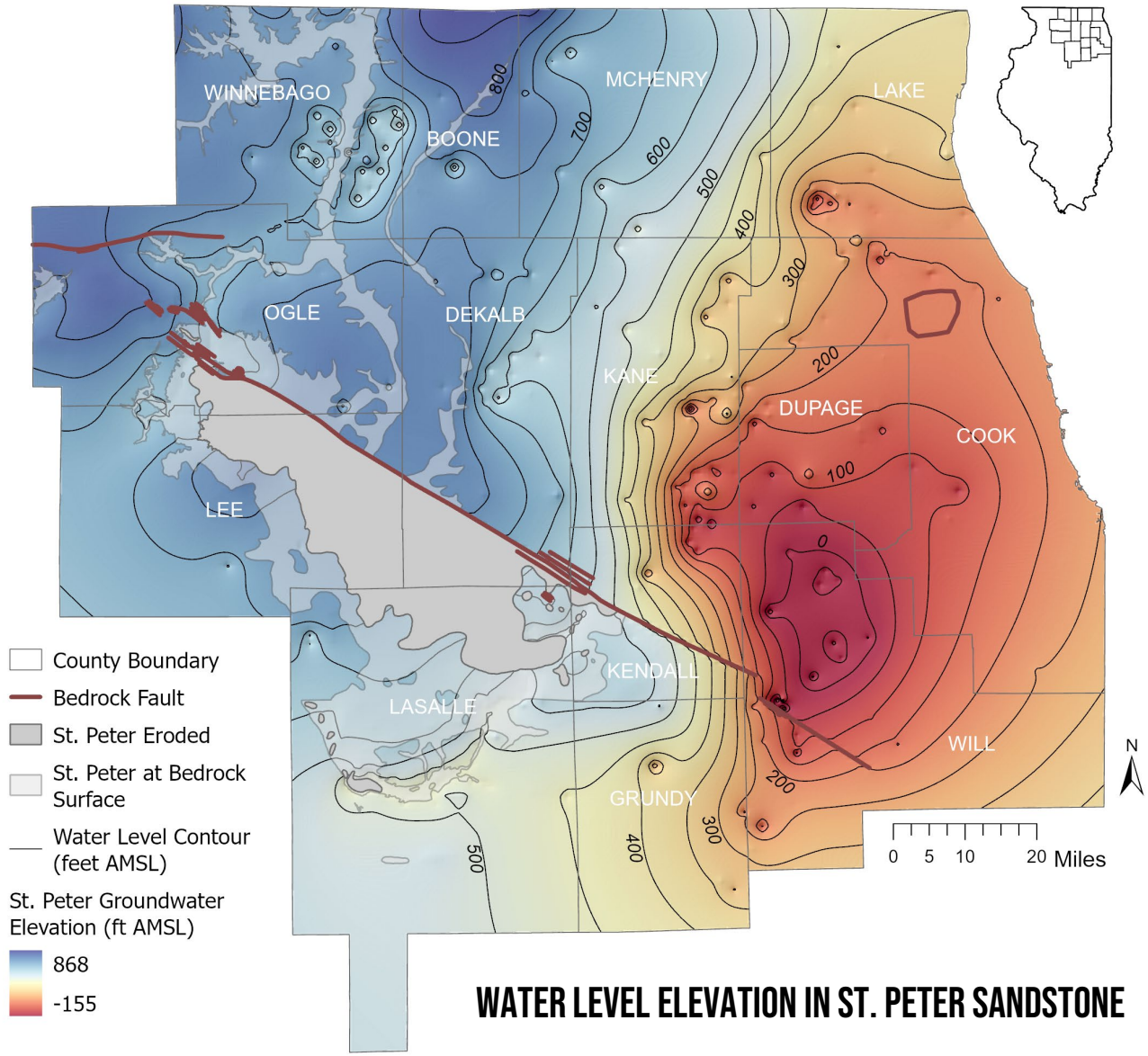
ILLINOIS
Illinois State Water Survey
PRAIRIE RESEARCH INSTITUTE

Why care about shallow aquifers in Kane?

- Relied upon by thousands of homeowners
- Relied upon by municipalities
- Shallow aquifers provide baseflow to streams in Kane
- May be relied upon if deep sandstone aquifers are depleted

- Water Quality issues
  - Chloride
  - Arsenic
  - PFAS

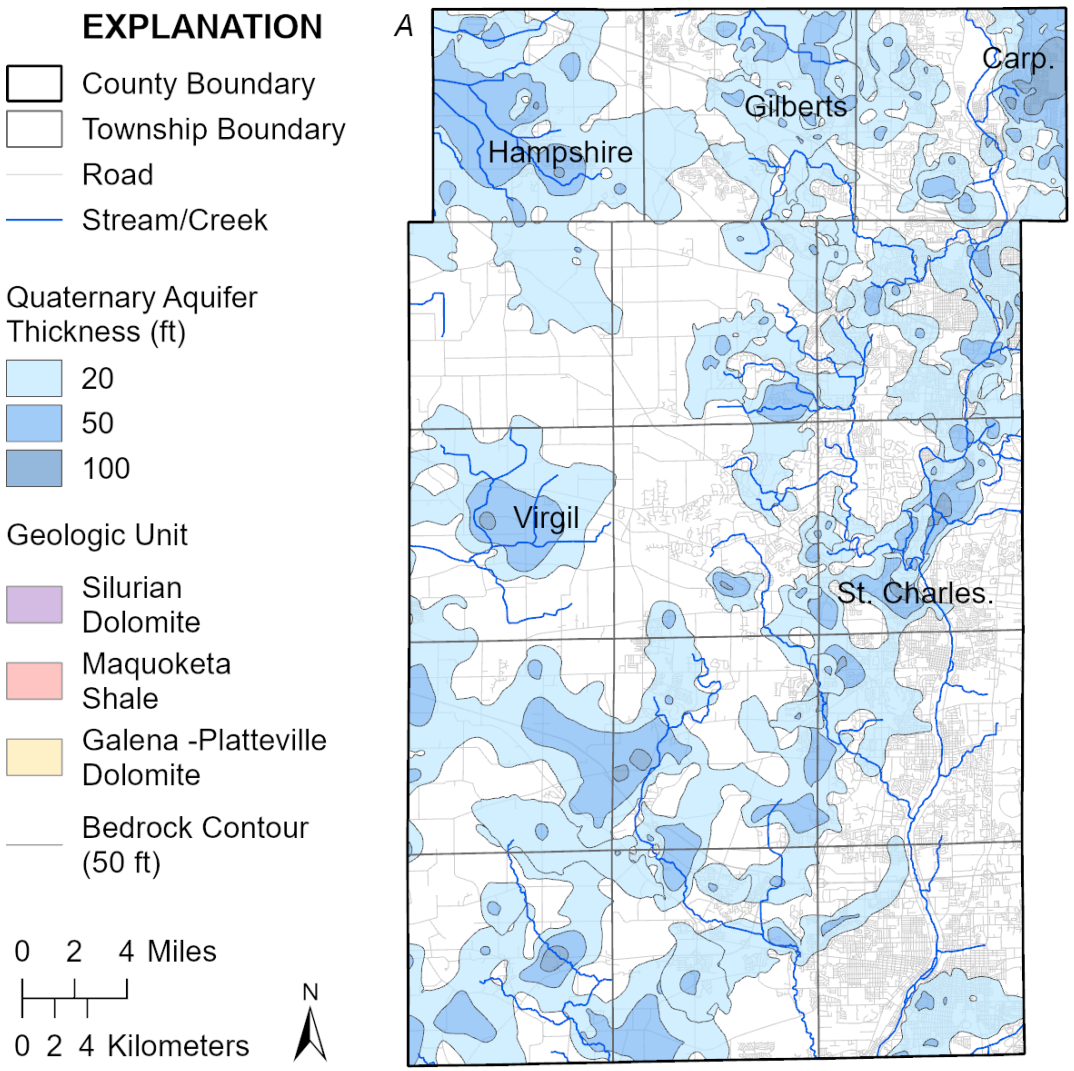




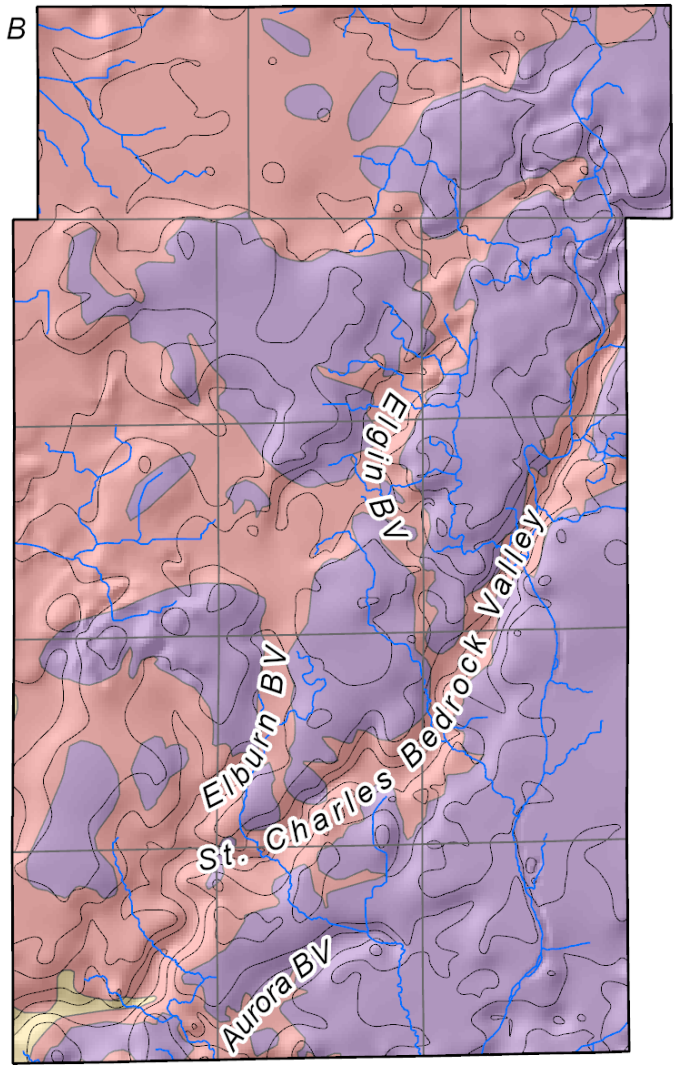
WATER LEVEL ELEVATION IN ST. PETER SANDSTONE

Kane shallow aquifers

- Glacial advances filled bedrock valleys
- Layered clays, silts, sands, gravels, with scattered interconnections
- Weathering of bedrock surface
- Upper 25-125 feet of bedrock surface considered the “Shallow Bedrock Aquifer”



Glacial aquifers



Shallow bedrock units

Groundwater Flow Modeling and Stakeholder Engagement

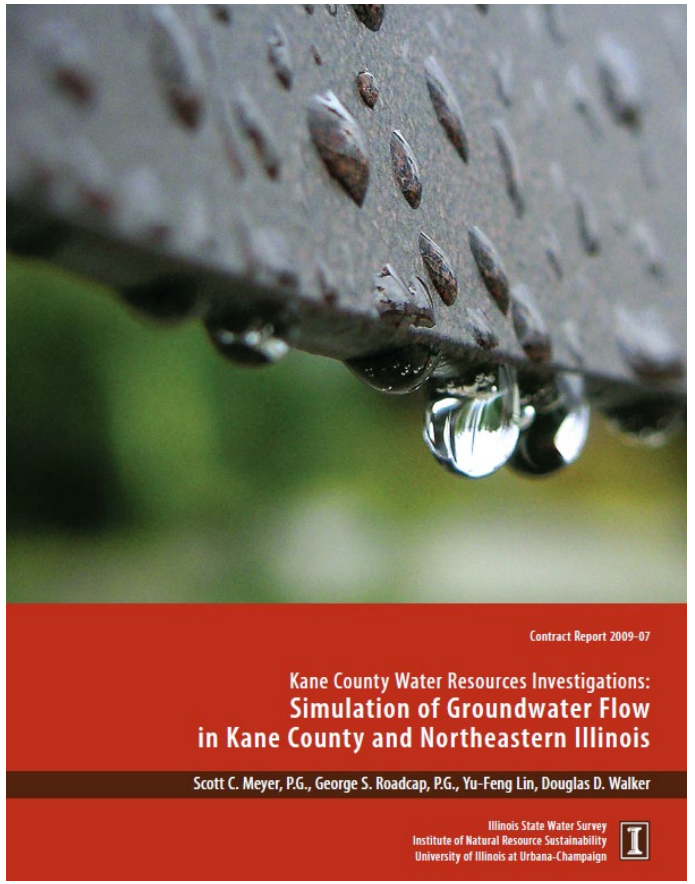
Updating existing Kane Shallow Groundwater Flow model (2004)

Formation of the Kane Groundwater Sustainability Group (KGSG)

- Met with every shallow groundwater municipality
- Illinois Water Inventory Program
  - Water use
  - Water levels
- Water use projections to 2050
  - CMAP on to 2050 as baseline
  - Modifications by each community
- Sharing of water quality data (chloride)

Major Goals

- Sustainable Supply vs Demand
- Have streams been depleted as much as predicted?
- Use model to simulate chloride accumulation from road salt application



Groundwater Flow Modeling and Stakeholder Engagement

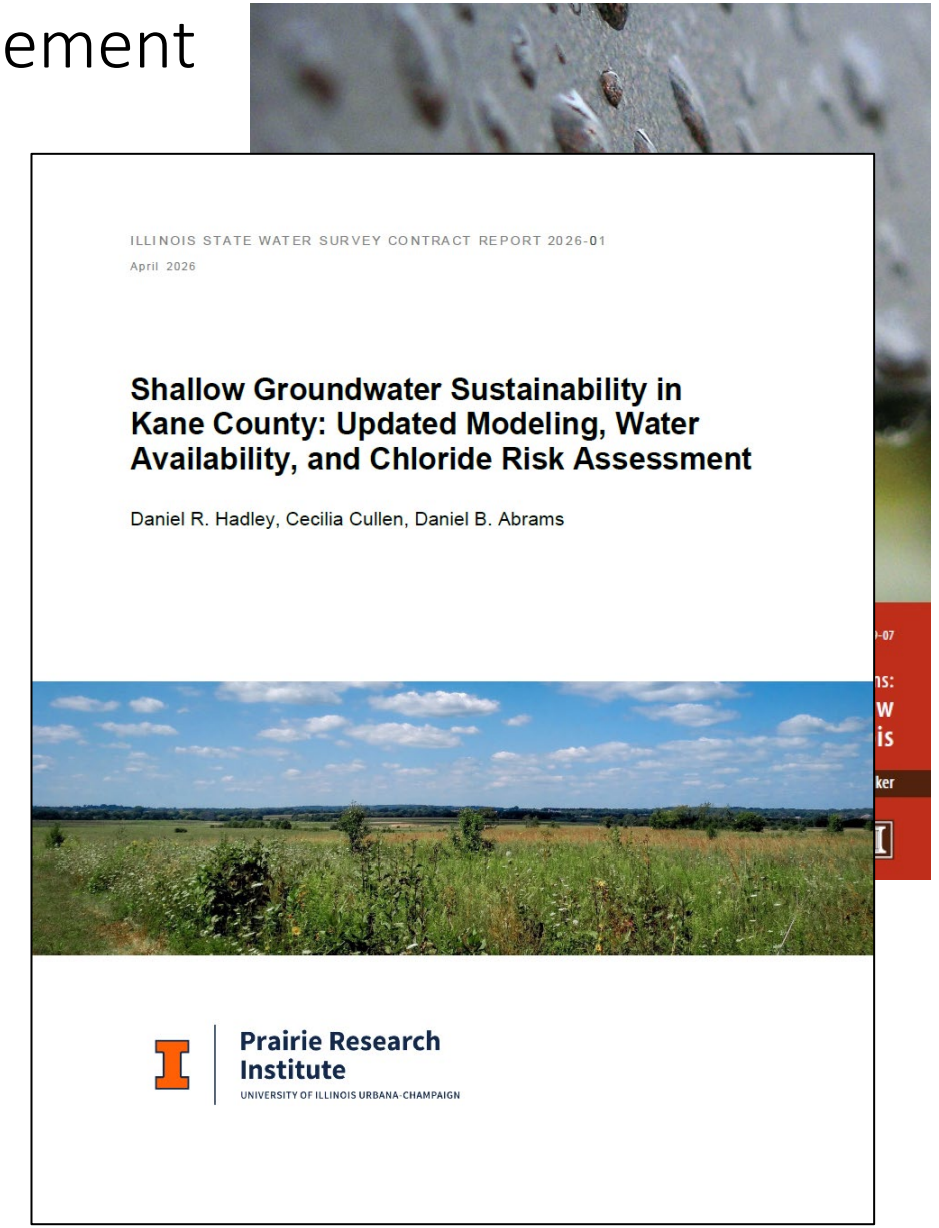
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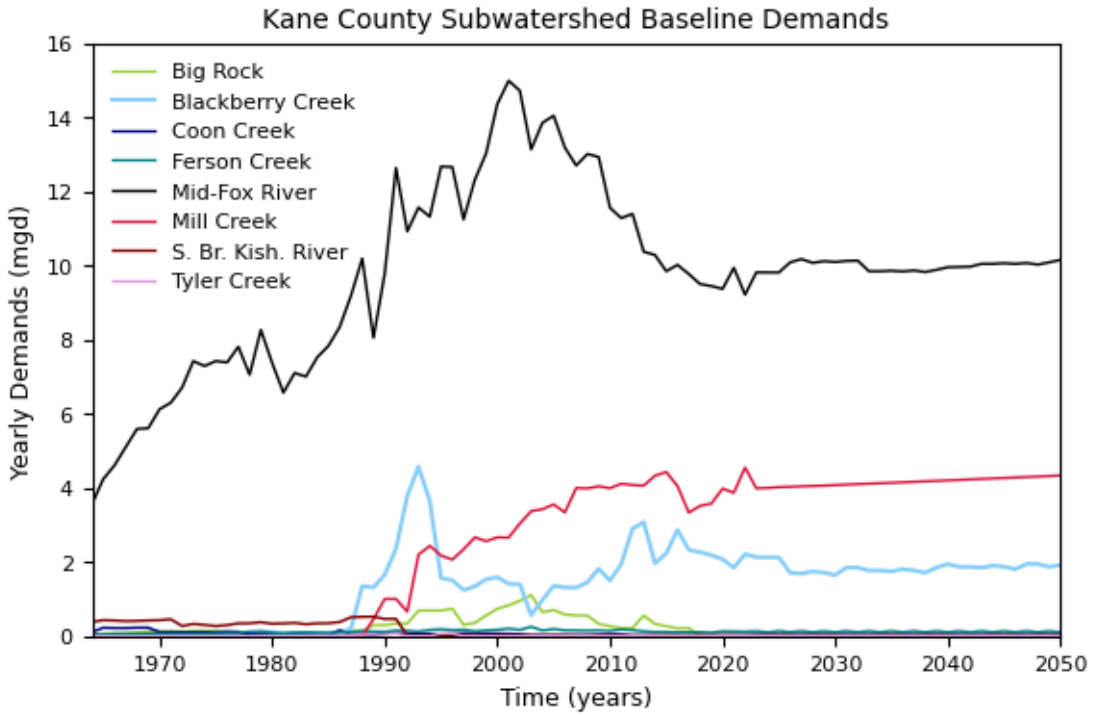
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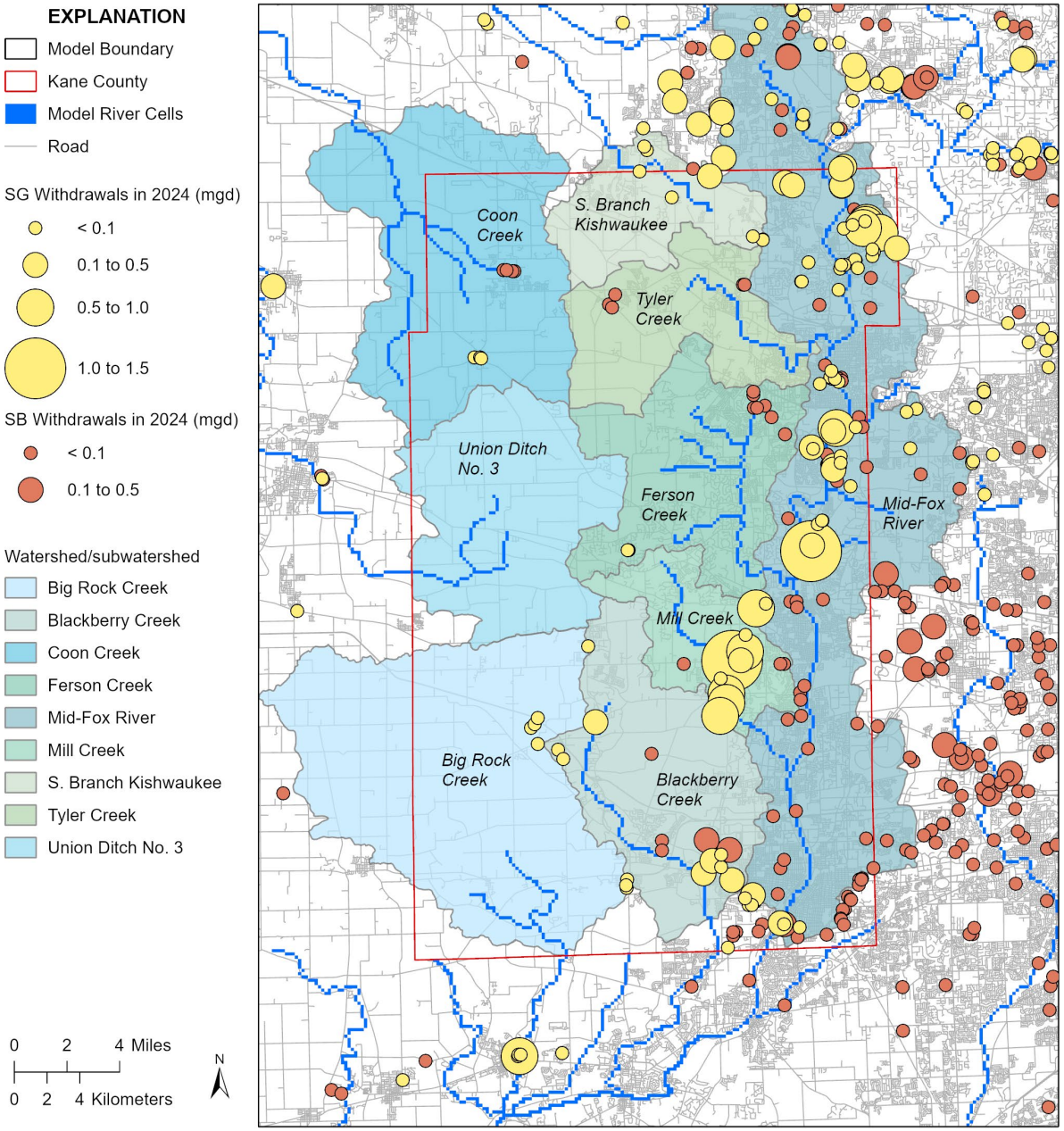


https://hdl.handle.net/2142/133029

Shallow Groundwater Demand

- Most water use in:
  - Mid-Fox Subwatershed
  - Mill Creek Subwatershed
- Large decrease since 2003
  - communities using more Fox River water or sandstone groundwater
- Demands expected to increase only by 4.5% to 2050

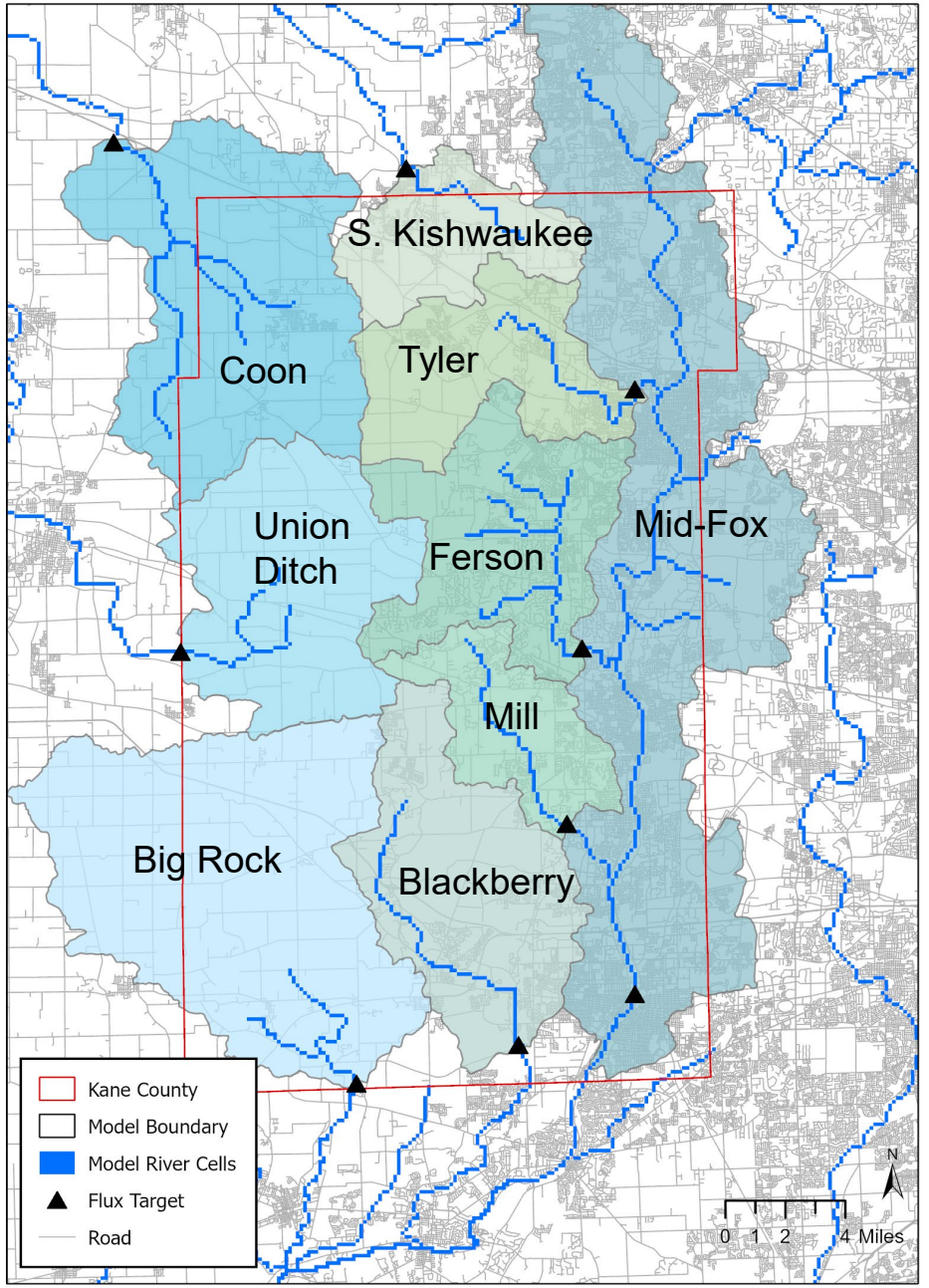




Sustainable Supply Vs Demands

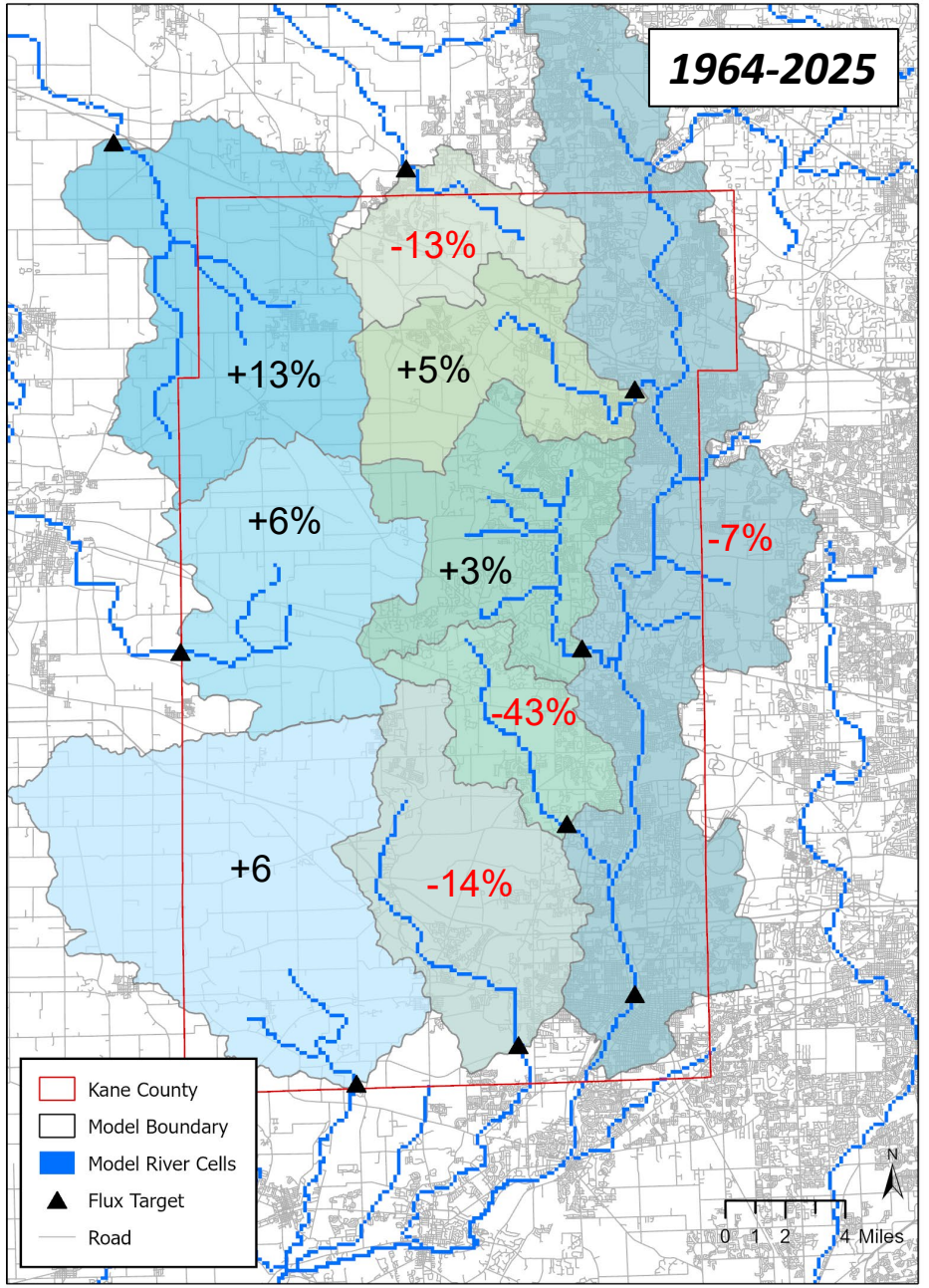
- Sustainable Supply – amount of groundwater that can be withdrawn that sustains 85% of baseflow (does not exceed 15% reduction)
- Demands= Municipal/Industrial/Commercial users (not domestic)

Sub-Watershed	Sustainable Supply (MGD)	Demand in 2025 (MGD)	Demand in 2050 (MGD)	Demand in 2050-ID(MGD)
Big Rock Creek	1.45	0.01	0.01	0.01
Blackberry Creek	1.67	2.12	1.91	2.49
Coon Creek	1.87	0.03	0.03	0.03
Ferson Creek	1.32	0.14	0.10	0.14
Mid Fox River	6.32	9.81	10.2	13.2
Mill Creek	0.37	4.02	4.33	5.63
S Br. Kishwaukee River	0.48	0.02	0.01	0.02
Tyler Creek	0.66	-	-	-
Union Ditch	1.16	-	-	-
TOTAL	**15.31**	**16.14**	**16.56**	**21.53**

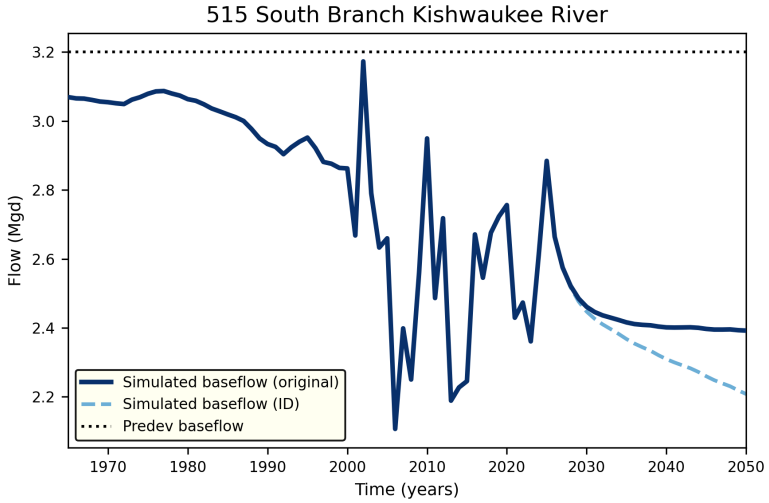


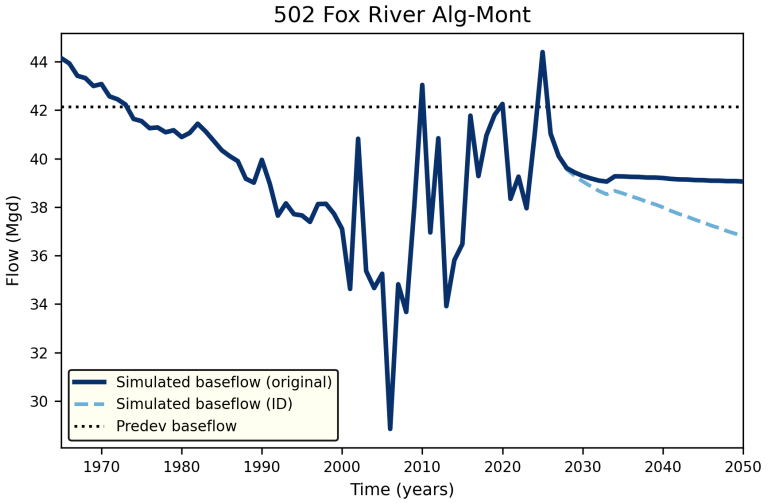
Modeling Results:
Baseflow Reductions from Predevelopment

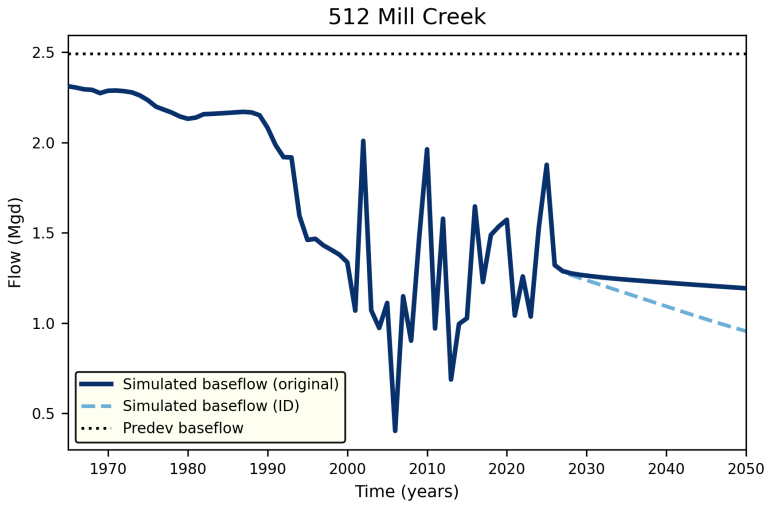
- What happens when demands exceed sustainable supply?
- “Streamflow capture”
- Mill Creek: 43% decline in baseflow
- Blackberry Creek: 14% decline in baseflow
- S. Branch Kishwaukee: 13% decline in baseflow
  - Even though minimal demands in watershed
  - Likely due to Algonquin wells just outside of watershed boundary
- Mid-Fox River: 7% decline in baseflow

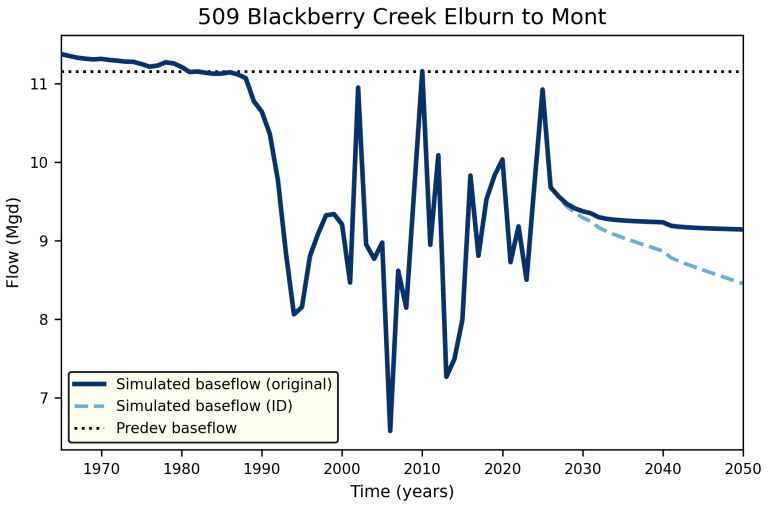


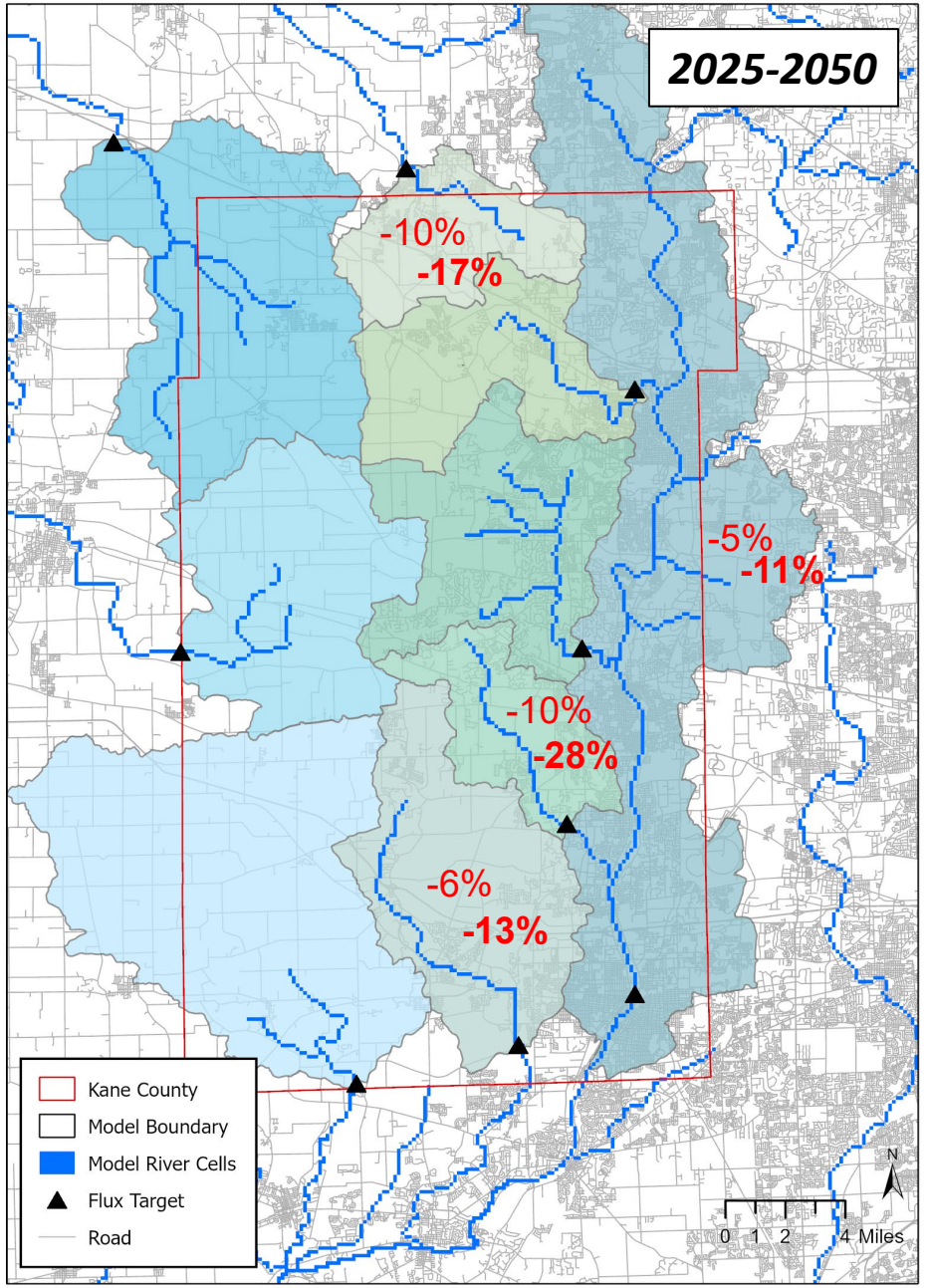
Modeling Results: Projected Baseflow Reductions











BOLD= Increased Demand Scenario (30% increase in demands)

Significance of Effluent

Sub-Watershed	Sustainable Supply (MGD)	Demand in 2025 (MGD)	Average Effluent Additions (MGD)
Big Rock Creek	1.45	0.01	0.81
Blackberry Creek	1.67	2.12	-
Coon Creek	1.87	0.03	-
Ferson Creek	1.32	0.14	0.13
Mid Fox River	6.32	9.81	72.77
Mill Creek	0.37	4.02	0.5
S Br. Kishwaukee River	0.48	0.02	1.44
Tyler Creek	0.66	-	0.42
Union Ditch	1.16	-	0.51
TOTAL	**15.31**	**16.14**	**77.6**

- Baseflow supplemented by effluent
- Effluent additions can be much greater than any declines in baseflow from groundwater extraction
- Effluent can “save the day”, but caution if it goes away
- Mill Creek dry/nearly dry in summer droughts even with effluent additions

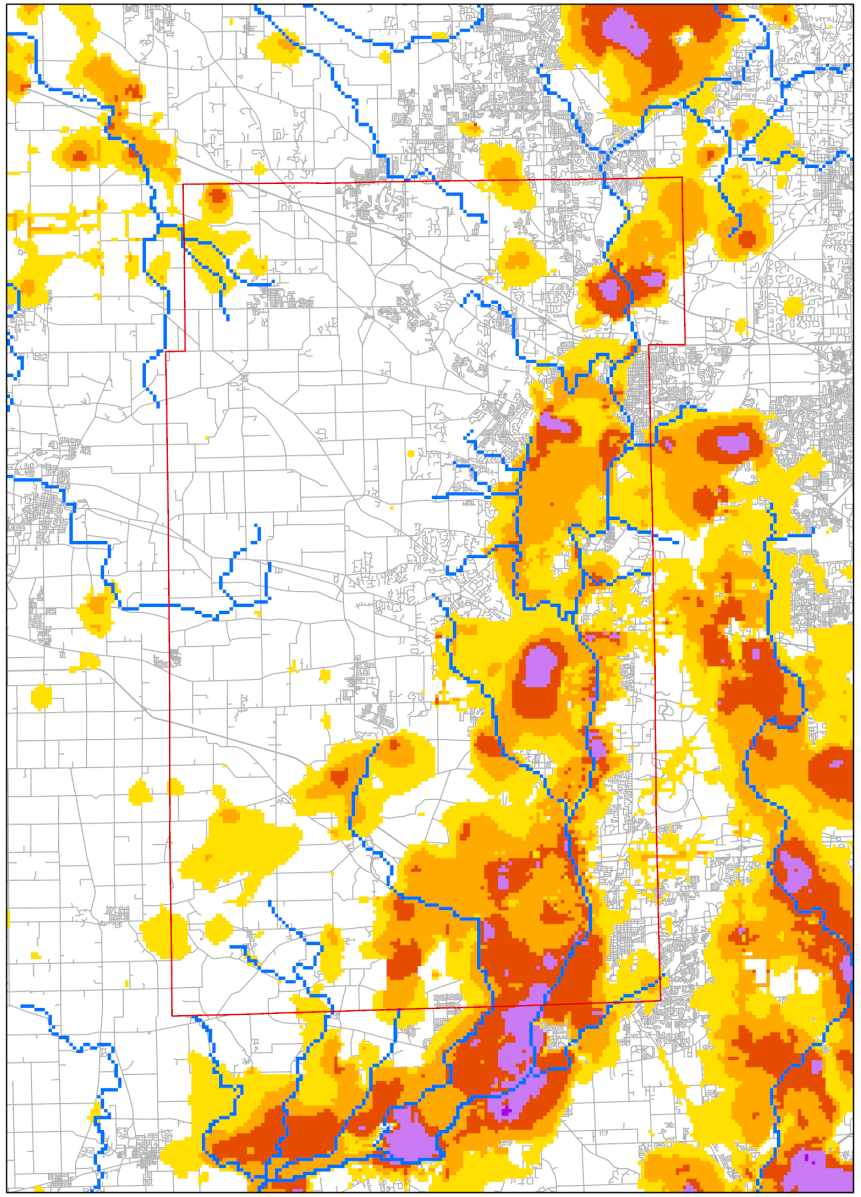
Main Takeaways

- Sustainable supplies and demands are not evenly distributed amongst the subwatersheds
- Mill Creek, Blackberry Creek, and S. Branch Kishwaukee are in deficit now and in the future

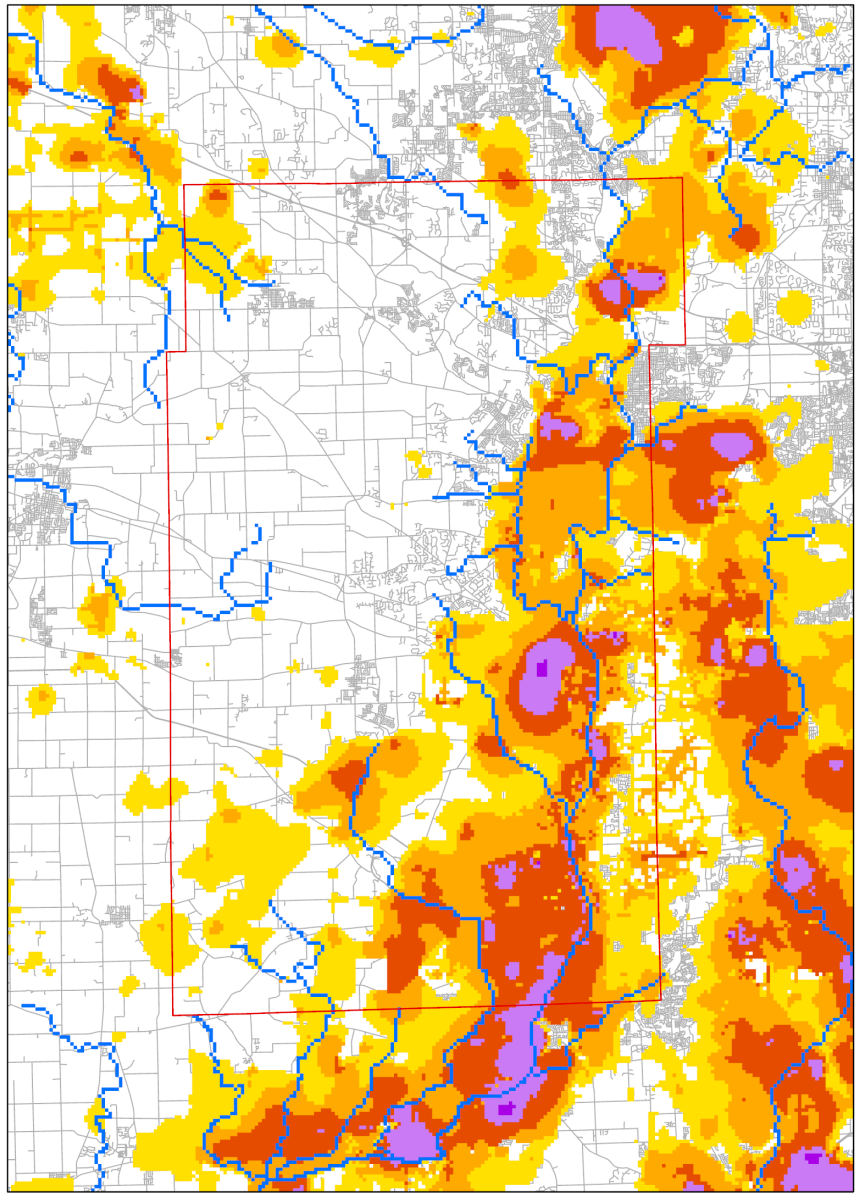
Simulated Chloride Maps

- Major sand unit of the SCBV
- Hotspots of chloride above 250 mg/L
- Very high in Montgomery/Yorkville

Layer 13- 2025



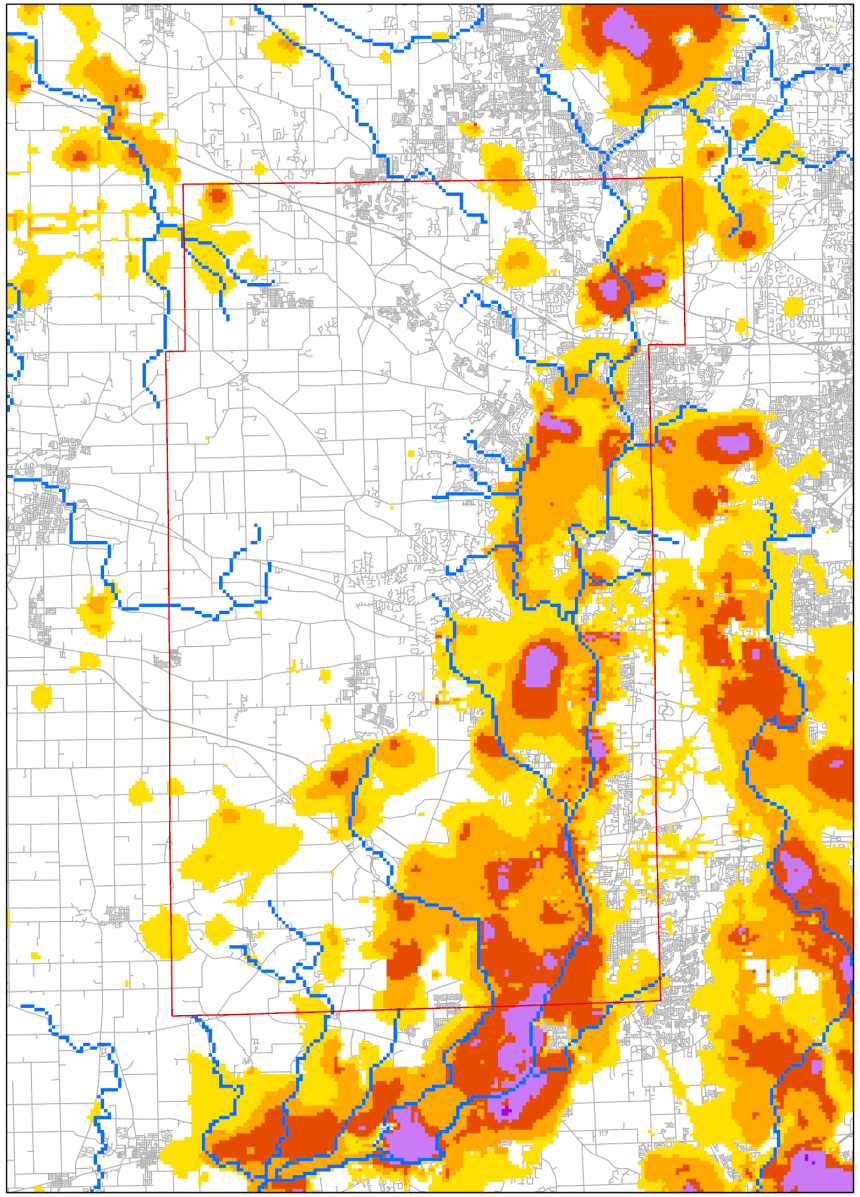
Layer 13- 2050 – business as usual



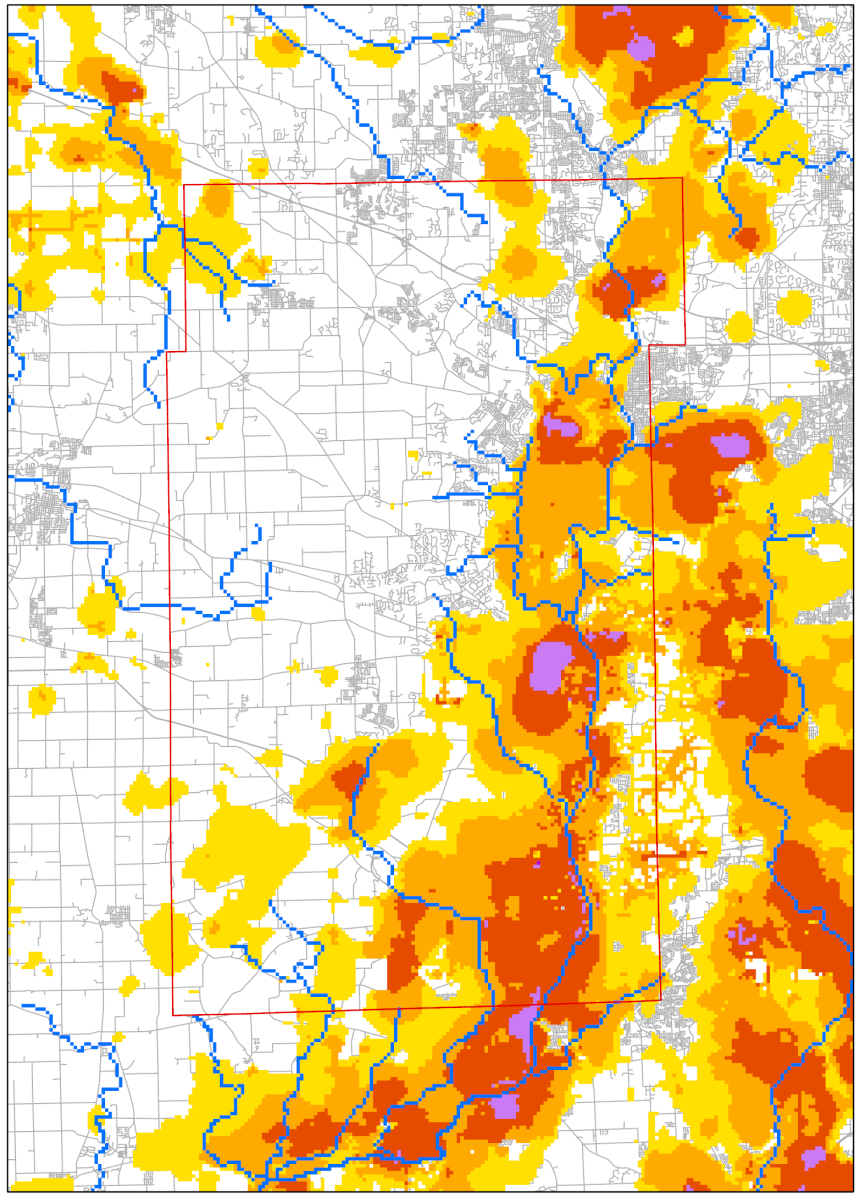
Simulated Chloride Maps

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Layer 13- 2025



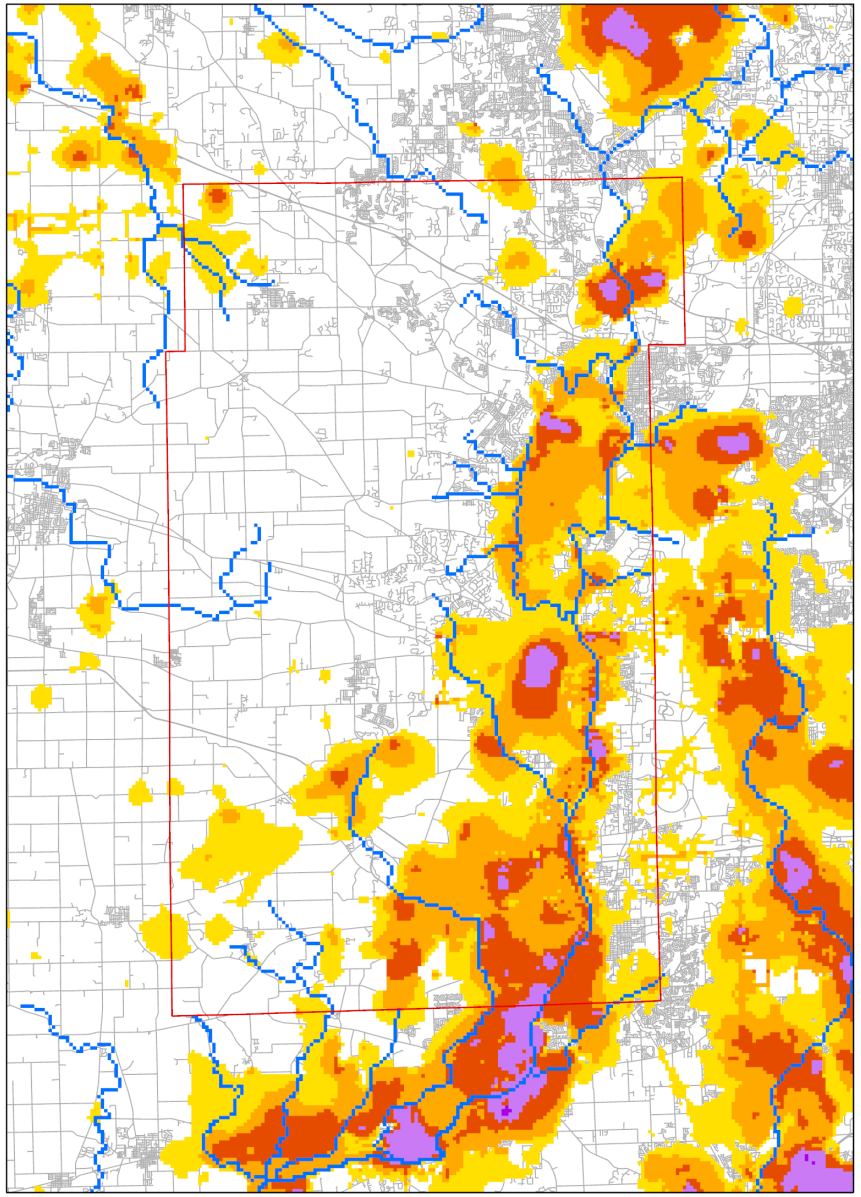
Layer 13- 2050 – 40% reduction all roads + comm.



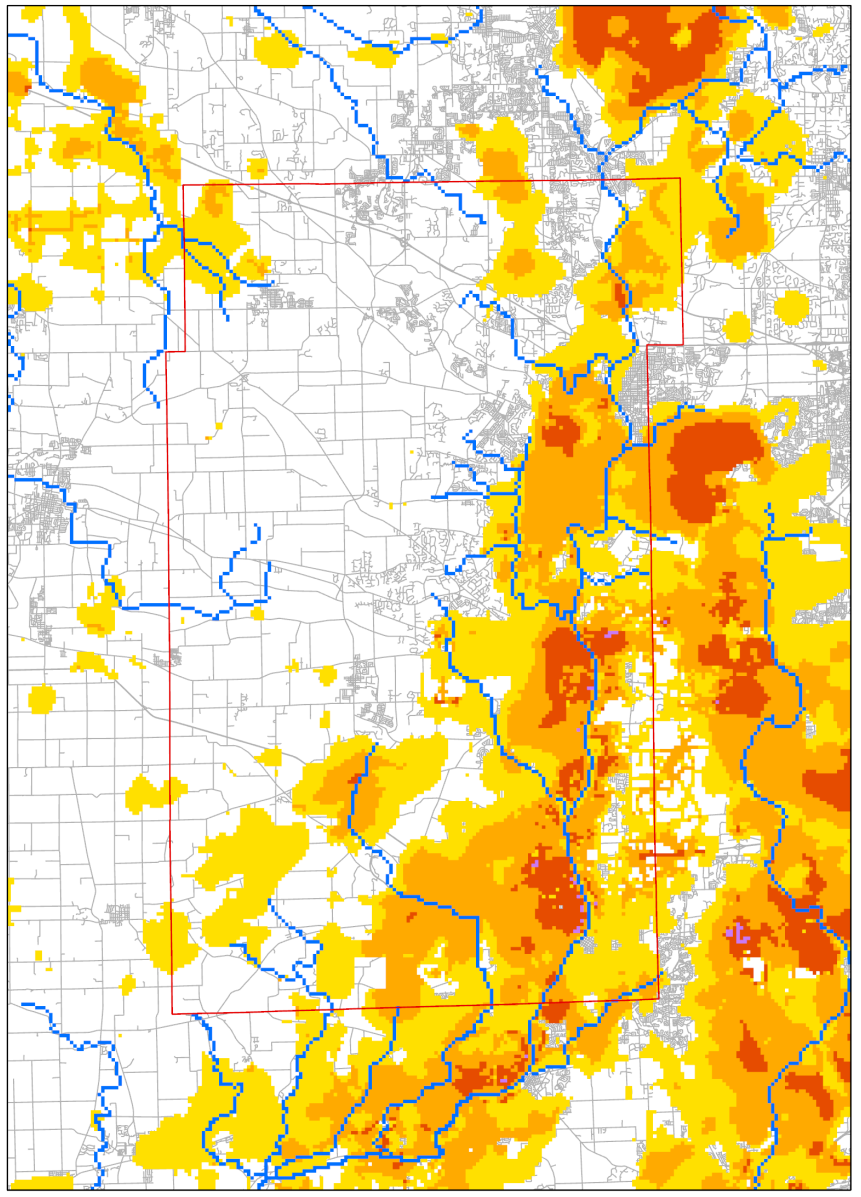
Simulated Chloride Maps

- Chlorides still present after 25 years
- More areas in 15-50 range
- Secondary MCL areas reduced

Layer 13- 2025

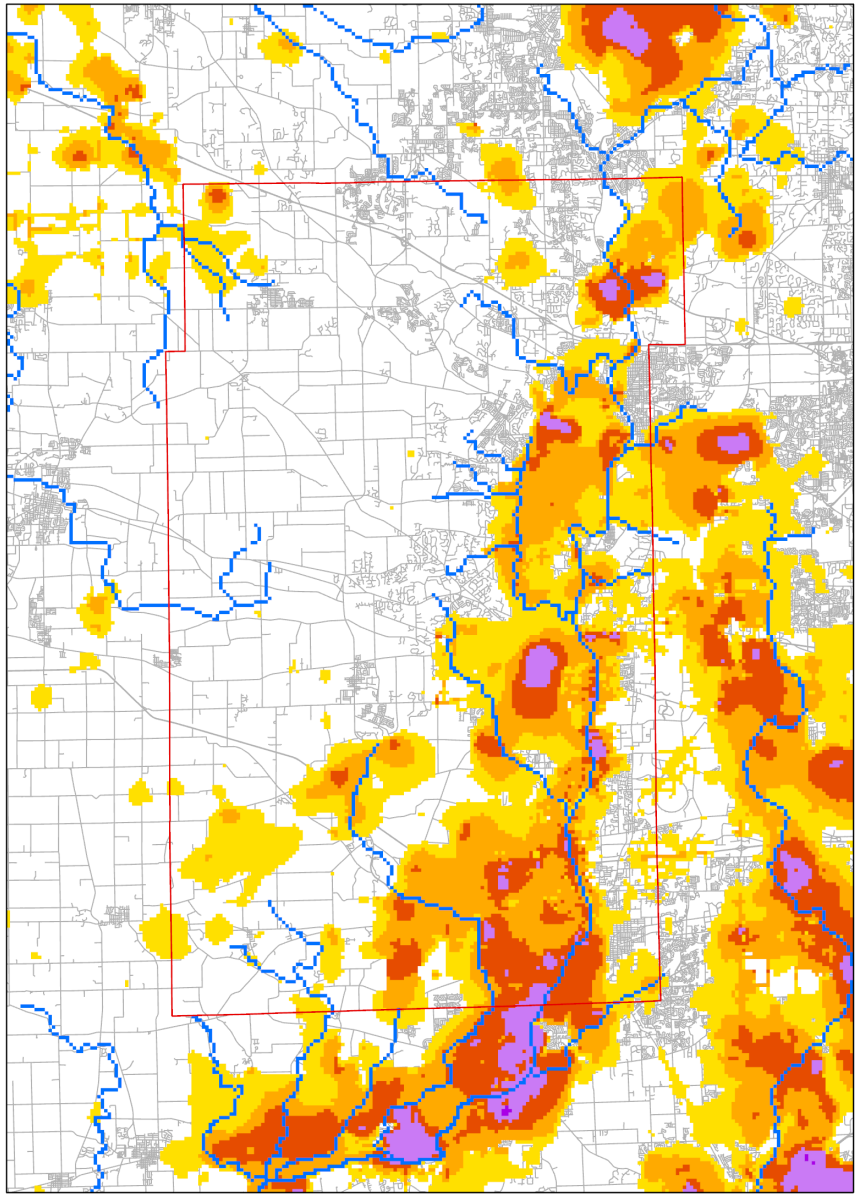


Layer 13- 2050 – No chloride applied after 2025

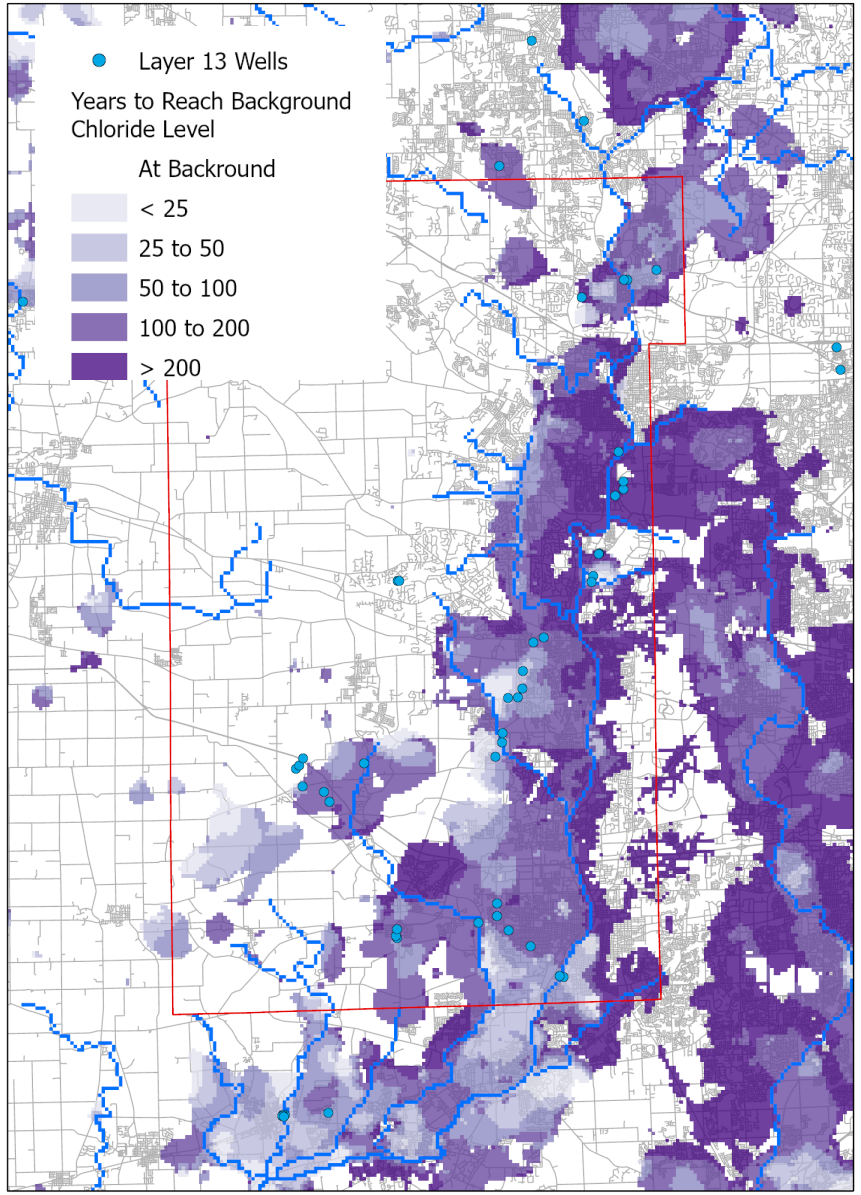


Simulated Chloride Maps

Layer 13- 2025



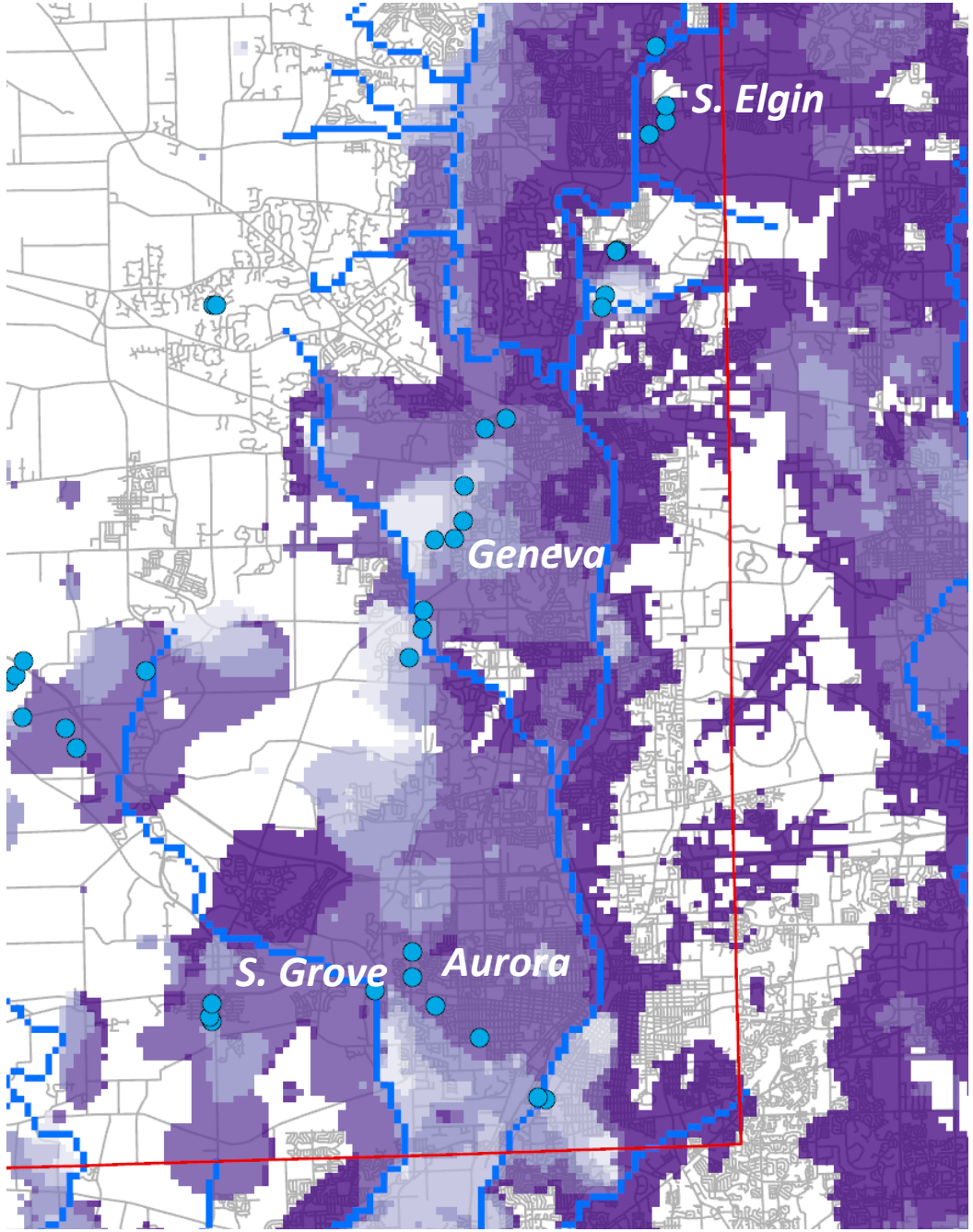
Layer 13- out to 2250



Chloride Residence Time- Layer 13

- Some areas take a LONG time to clear
  - Areas of lower aquifer transmissivity
  - Would not want these areas to get above 250mg/L

- Slower movement away from streams and edge of aquifer



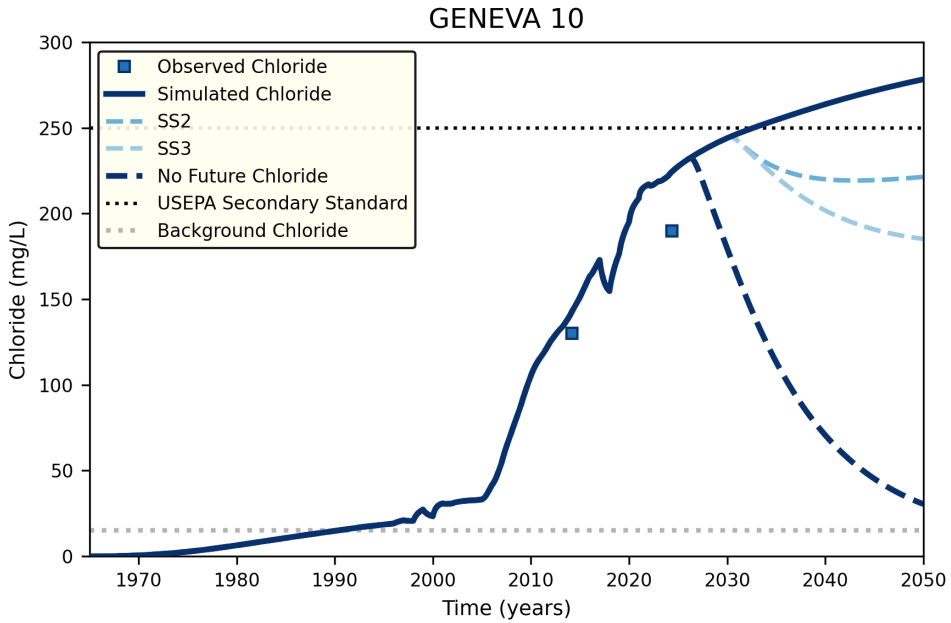
Main takeaways:

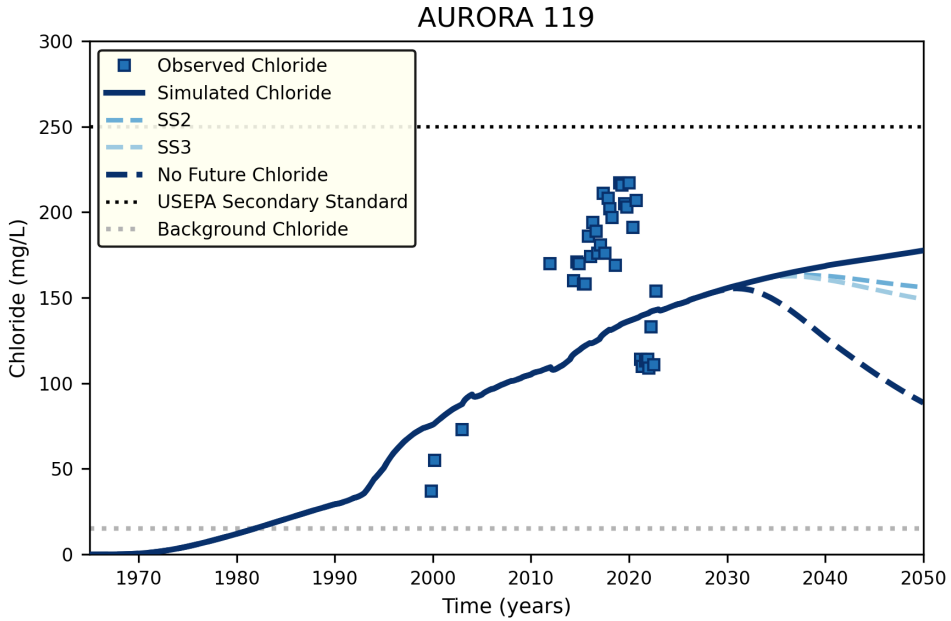
- Sensible salting practices that target BOTH roads and commercial areas ideal

- Chloride can have 10s to 100s of years residence time
  - Proximity to rivers
  - Aquifer transmissivity matters

- All the more reason to start sensible salting now

- Management Priorities
  1. Carpentersville (Cl not high yet)
  2. South Elgin
  3. St. Charles 7 and 9 (Rt 64 and Randall)
  4. Geneva wellfield near Mill Creek (Peck Road)
     - Focus on private/commercial areas (Geneva already sensibly salting)
  5. Aurora wells, particularly 101, 119, 127, and 129
  6. Sugar Grove (already sensibly salting)





Questions

Speaker



Dave Hart, PhD

Hydrologist/geologist
Wisconsin Geological and Natural History Survey

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Extension
UNIVERSITY OF WISCONSIN-MADISON

A Web Application to Facilitate Groundwater Management Decisions in the Central Sands of Wisconsin

Dave Hart[1], Trey Coury[2], Thea Showalter[2], and Emily Baker[3]

1.Wisconsin Geological and Natural History Survey

2. Nelson Institute, University of Wisconsin-Madison

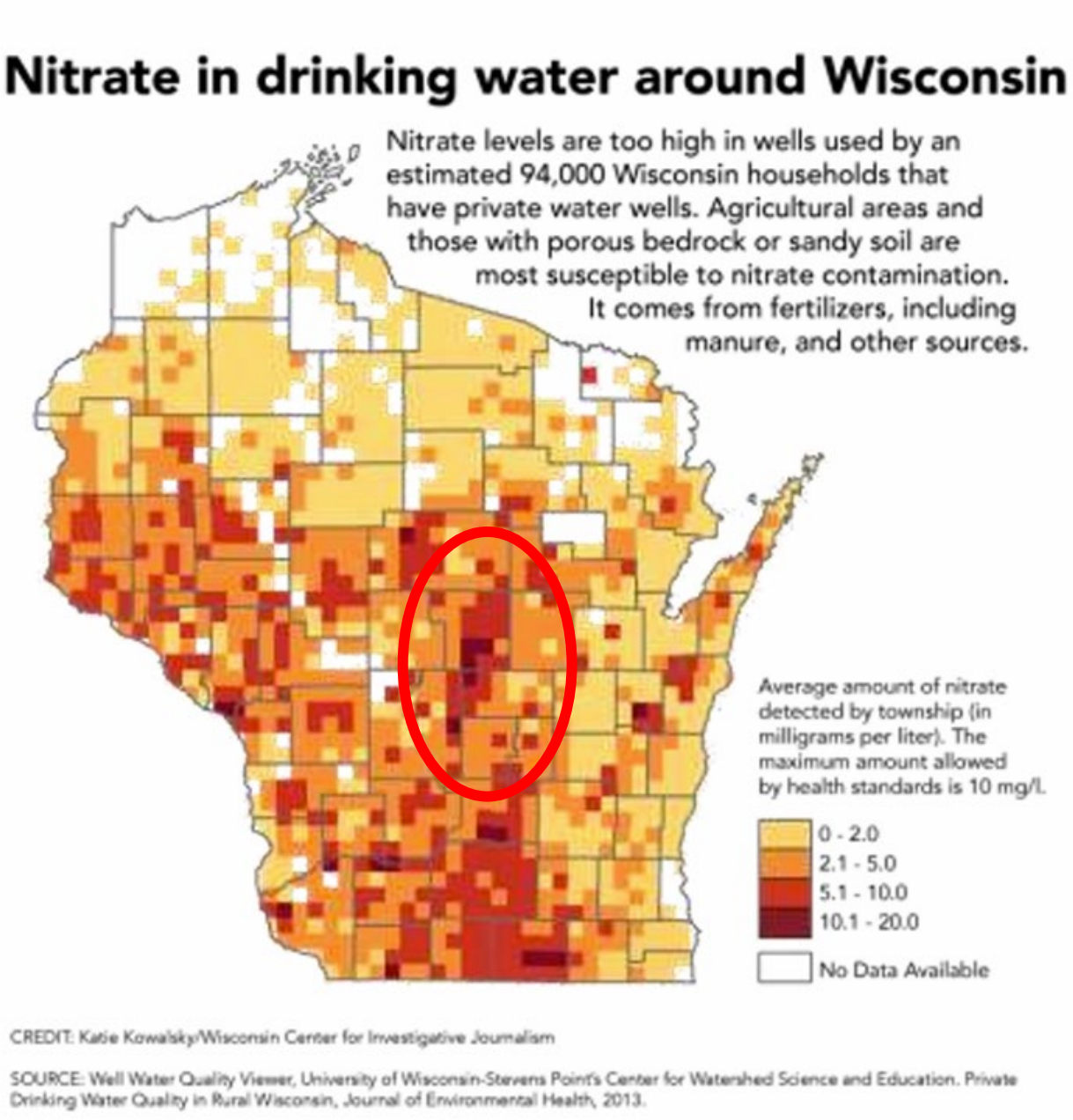
3. Hamilton College, NY



Photo: Thea Showalter

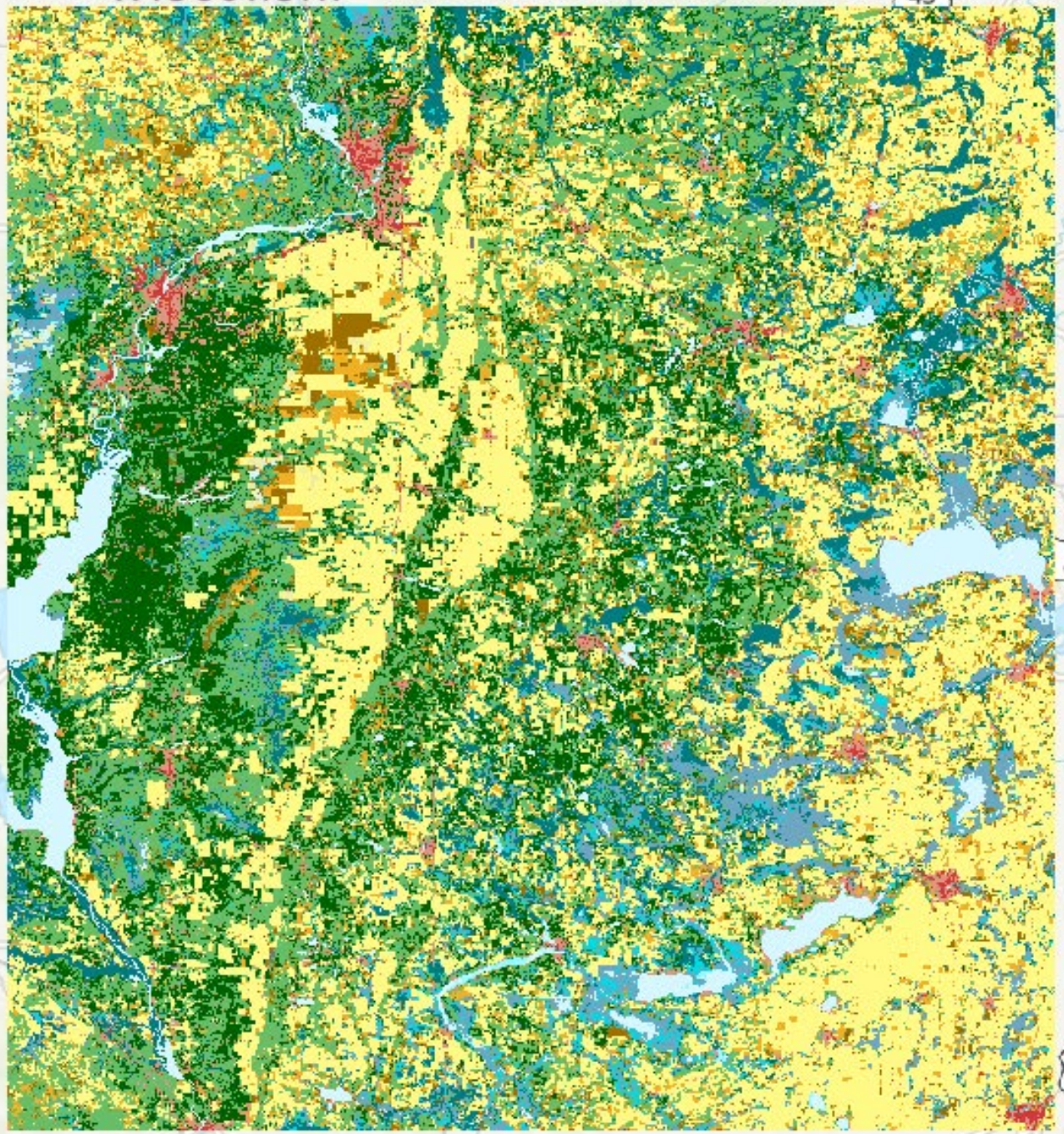
Background

- Nitrate contamination: 5-15% of private wells
- High nitrate susceptibility throughout region
- Ecological and human health impacts



Land Use

Wiscland 2 Data



- Urban/Developed
- Agriculture
- Grassland
- Forest
- Open Water
- Wetland
- Barren
- Shrubland

Using Stream/Road Intersections as monitoring points (Regional Synoptic Survey)

- Benefits
  - Ready and long-term access to monitoring locations
  - No expensive infrastructure
  - Scalable (Larger Area -> Go downstream)
  - Sites integrate contributing area

- Drawbacks
  - Needs to be baseflow dominated
  - Sites integrate contributing area (smearing)
  - Dependent on model results to interpret source (same as wells)
  - Long time to observe change with larger area
  - Stream bed denitrification (hyporheic zone)
  - Access not always at best location



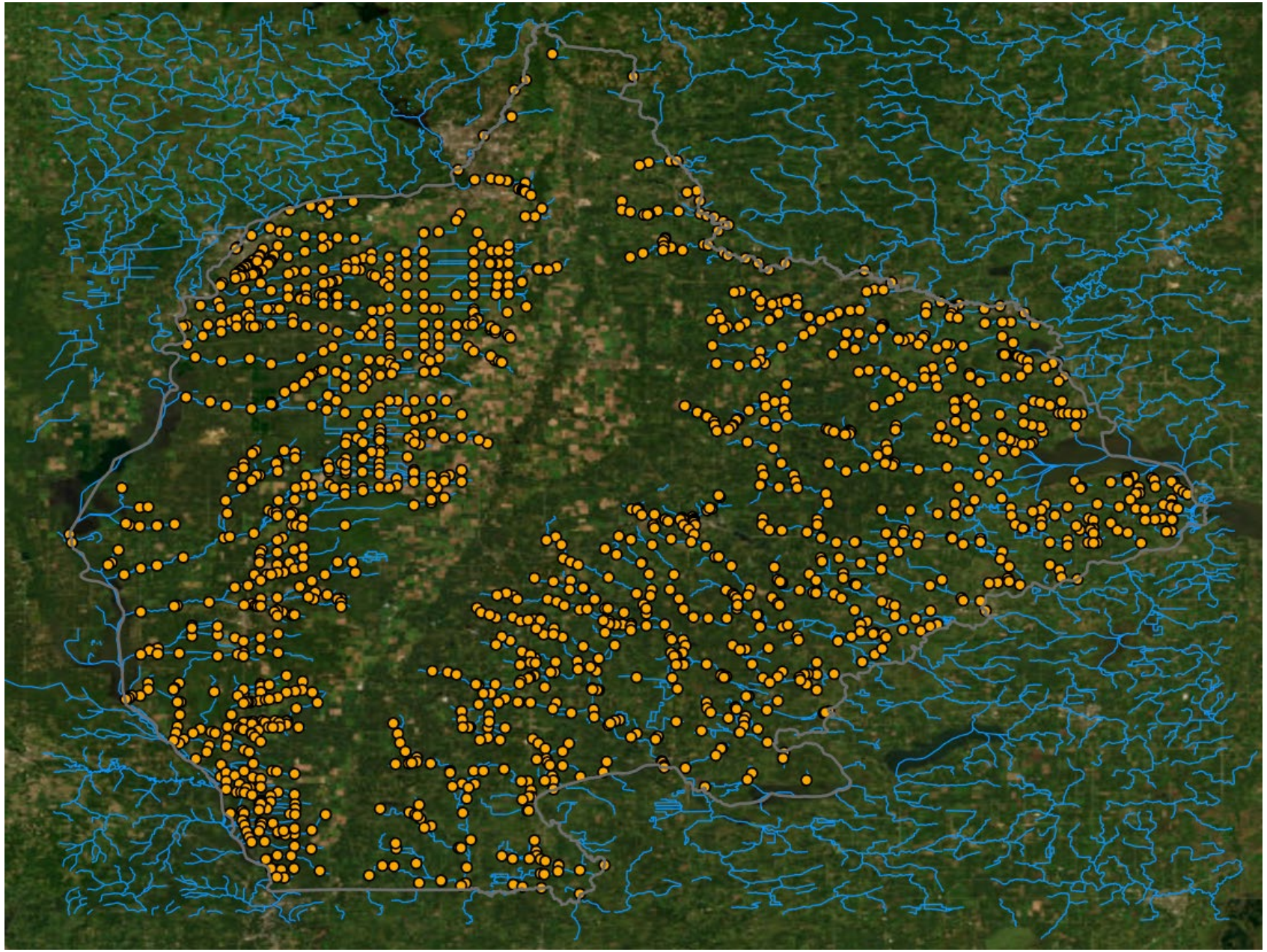
Photo: Mike Parsen



Photo: Ben Bradford

Intersections

1421
Possible
Monitoring Points



Wisconsin Geological
and Natural History Survey
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Results

513 stream-road crossings

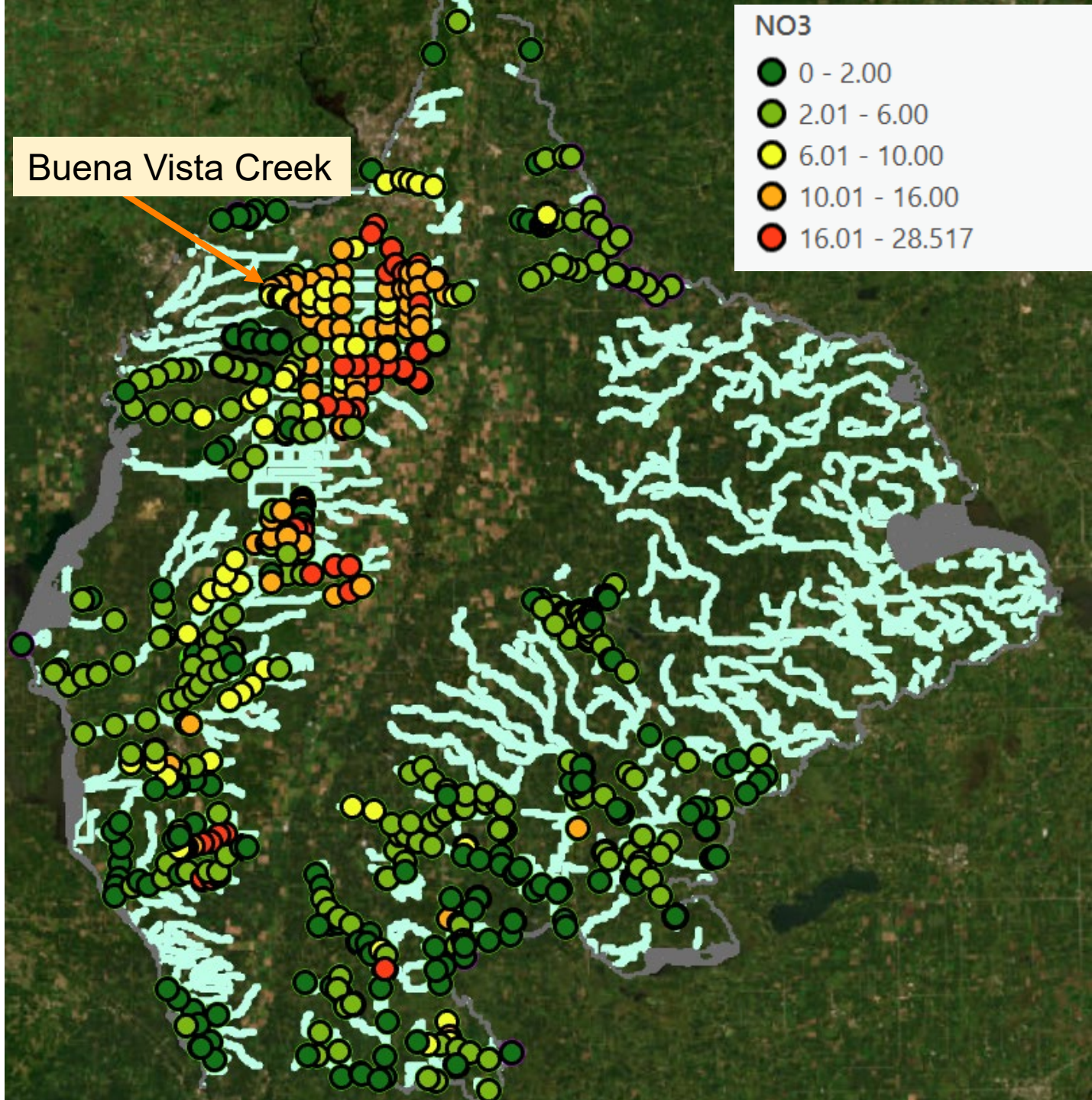
450 usable data points

~250 field work hours

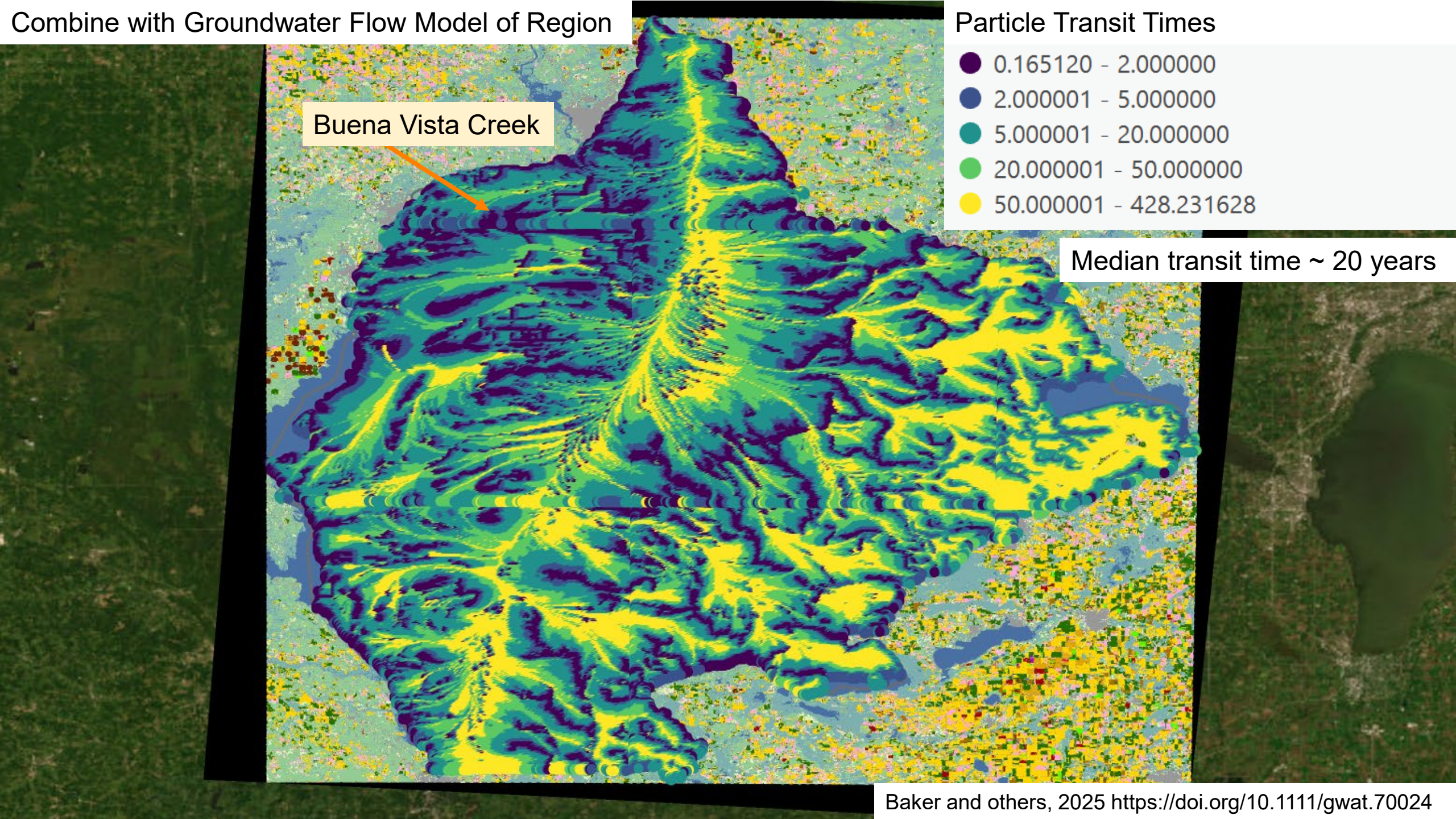
NO3-N was 11.9 ppm



Buena Vista Creek @ 95th St S

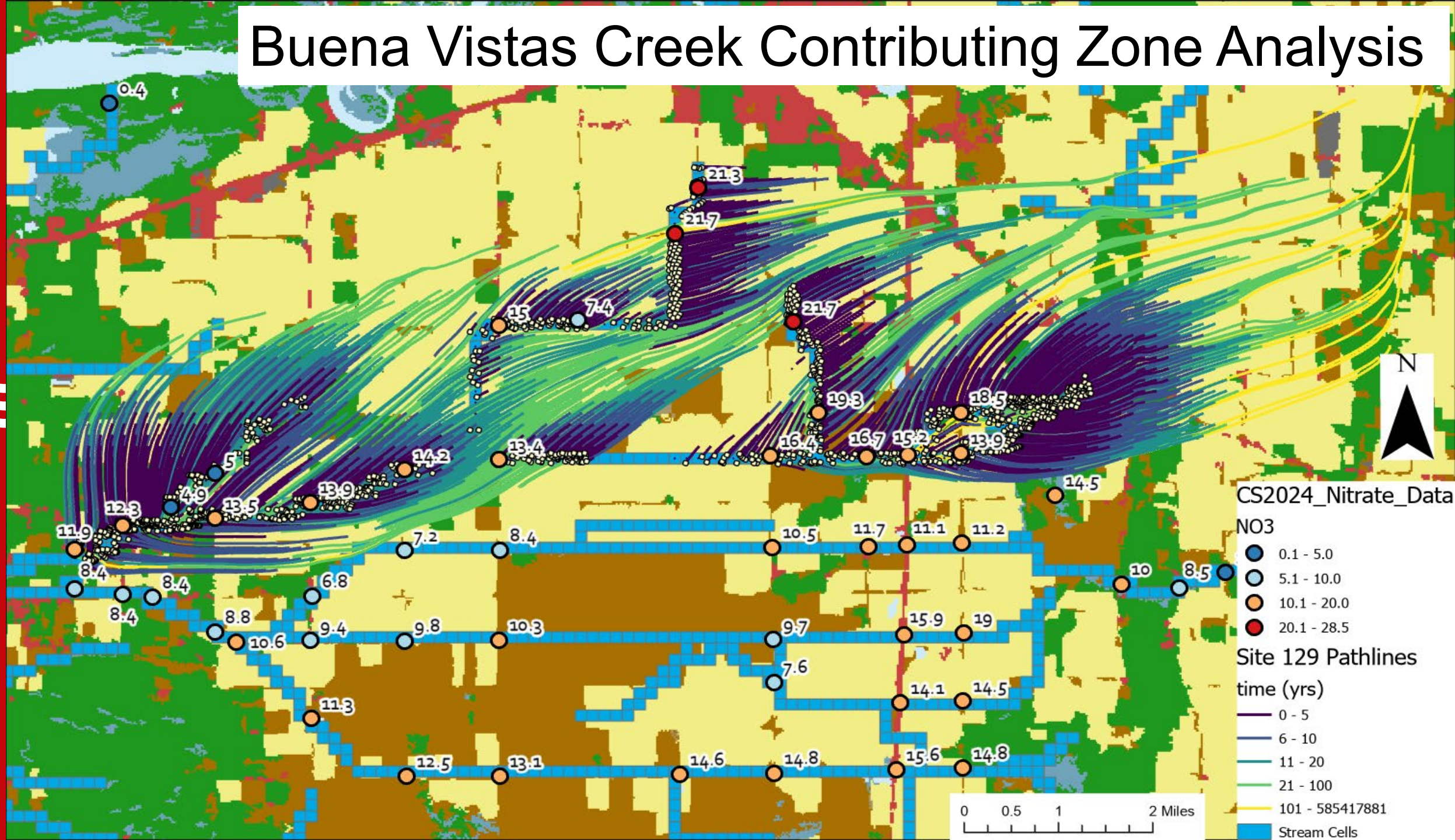


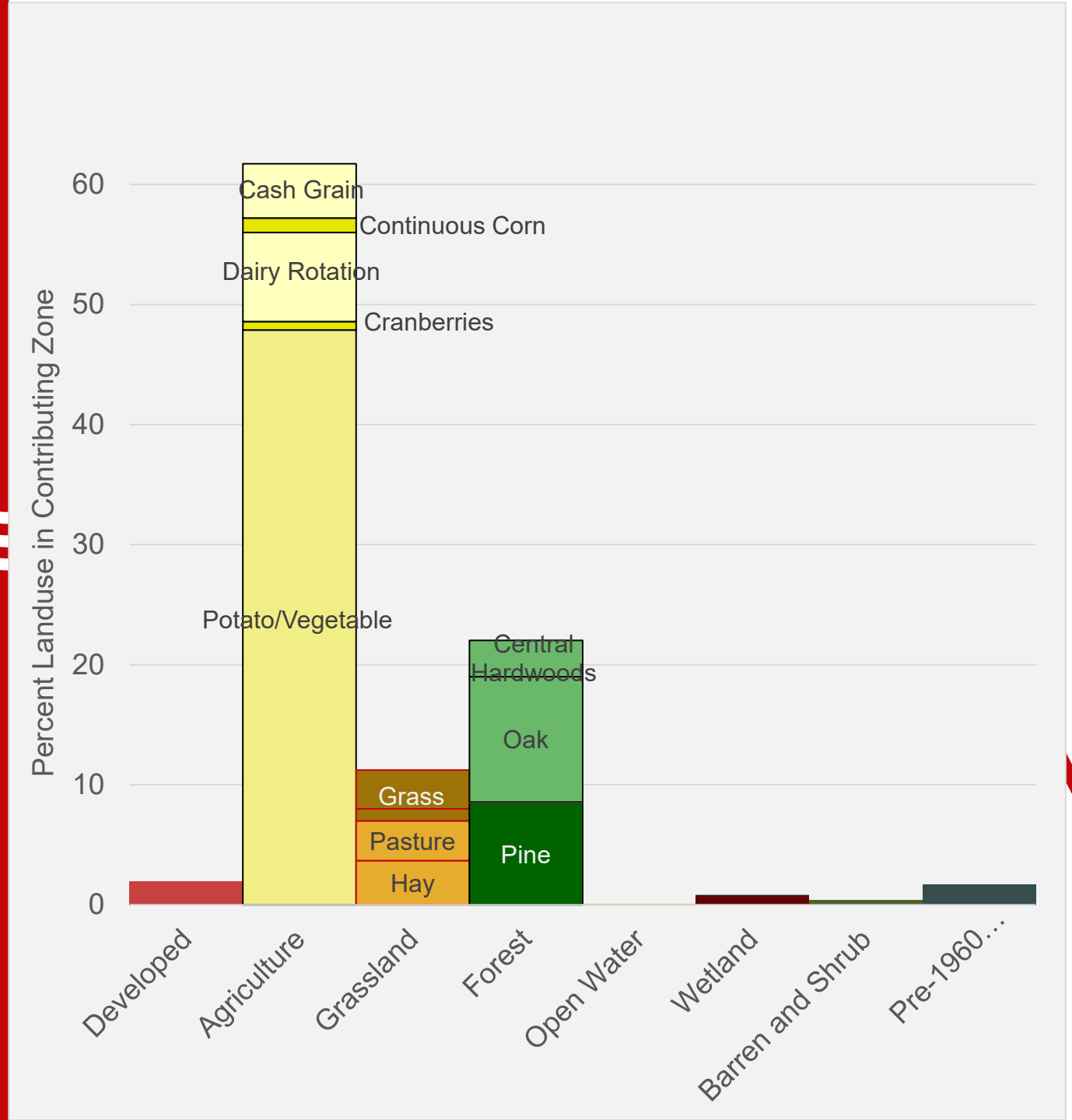
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Baker and others, 2025 https://doi.org/10.1111/gwat.70024

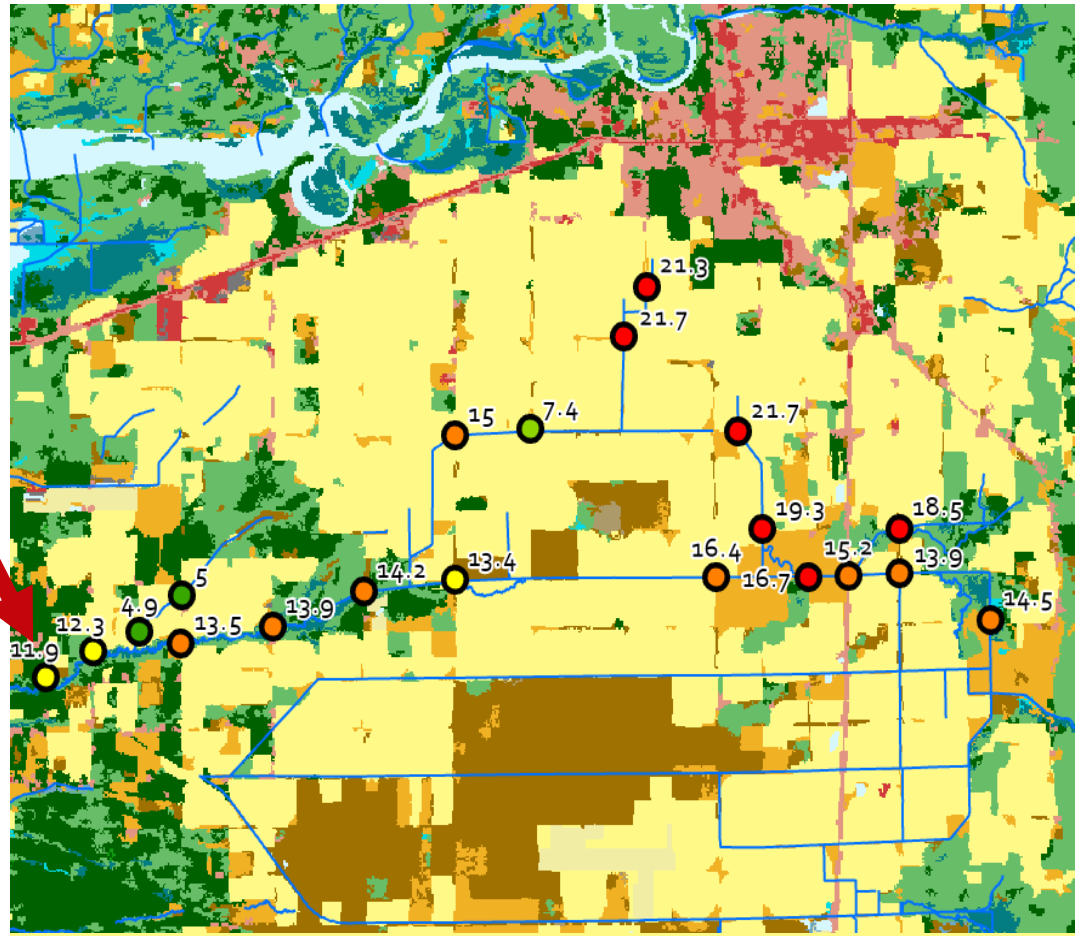
Buena Vistas Creek Contributing Zone Analysis





Buena Vista Creek Site 129 contributing zone (NO3 as N)
11.9 mg/L at site 129
Max 21.7 mg/L
Min 4.9 mg/L

1690 flow paths
16700 acres or 26 square miles



Purpose

The **Central Sands Groundwater Tracker** is a web application (app) designed by the Wisconsin Geological and Natural History Survey (WGNHS) to visualize the flow direction, contributing zones, and transit times of groundwater in Wisconsin's Central Sands.

The app was created as an educational tool and can be used to: (1) identify contributing areas for groundwater in a given area, (2) understand how long groundwater may take to travel to a given area, (3) identify the land cover at the start of an identified groundwater flow path, and (4) inform how long it may take for changes in land use or management to impact groundwater in a given area.

The app does not identify which groundwater flow paths are accessed by any specific well. The app also does not inform users of how land use along a groundwater flow path may affect the water quality.

The app is only a representation of groundwater flow in the Central Sands generated by a computer model of groundwater flow for the region (see the **Model Assumptions** tab for more information). It is not applicable outside of the model area (gray outline on the **Interactive Map** tab) or for overland flow characteristics. The WGNHS is not responsible for misuse or misrepresentation of the data.

The app was created using R statistical programming and Shiny programming that visualize MODPATH output and Wiscland data. It was created by the WGNHS with input and review by staff at UW–Madison Division of Extension and Portage County.

Questions

For questions about the app, contact **Dave Hart** (djhart@wisc.edu) at WGNHS or **Jennifer McNelly** (jennifer.mcnelly@wisc.edu) at Wood County Extension.

Acknowledgements

- Funding - USGS/UW Water Resources Institute 104G Competitive Grant (Project Number: WR22R004)
- Thank you to
  - UW-Stevens Point Center for Watershed Science and Education (Kevin Masarik)
  - Portage County (Tyler Kunze)
  - Anna Fehling (Wisconsin Geological and Natural History Survey)








Questions

Where would better data or tools make the biggest difference for your community or region?

Respond via Mentimeter:

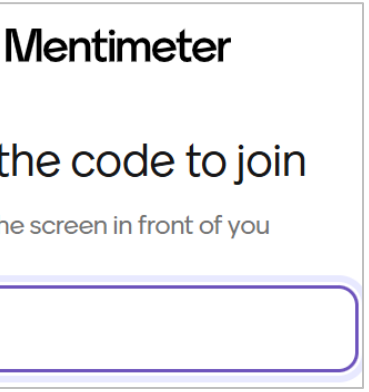
Click the link in the chat

or

Scan the QR code

or

Join at menti.com code 4368 1595



Shared Waters, Shared Future
Northeastern Illinois Regional Water Supply Sustainability Workshops

Wrap up & what's next

Thank you for joining us!

- Today's workshop was recorded.
- Once processing is complete, the recording and materials will be posted on the **Shared Waters, Shared Future** website: cmap.is/water-workshops

Shared Waters,
Shared Future
Northeastern Illinois Regional Water Supply Sustainability Workshops

Continue the conversation

- Catalyst Series: Great Lakes, High Stakes: Managing our water advantage (May 6)
- Addressing utility climate and drought preparedness (June 3)
- Modernizing Illinois' well impact review process (September 10)
- Understanding water governance and management in Illinois (November 12)

Shared Waters, Shared Future
Northeastern Illinois Regional Water Supply Sustainability Workshops

Thank you

Chicago Metropolitan Agency for Planning

The Chicago Metropolitan Agency for Planning (CMAP) is our region's comprehensive planning organization. For decades, CMAP has conducted water supply planning to advance efforts that promote sustainable use of our water supplies.

Sea Grant ILLINOIS–INDIANA

Illinois-Indiana Sea Grant (IISG) is a federal-university partnership (NOAA, U of I, Purdue) focusing on research, education, and outreach for 104 miles of southern Lake Michigan shorelines.

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Funding acknowledgment: *Shared Waters, Shared Future* is funded by the Illinois Department of Natural Resources Office of Water Resources. We appreciate Wei Han, P.E., Ph.D., Water Supply Program Manager, and the department's commitment to water supply planning.

Shared Waters, Shared Future

Northeastern Illinois Regional Water Supply Sustainability Workshops