OHIO CHAMBER OF COMMERCE
RESEARCH FOUNDATION

WATER READINESS AND DATA CENTERS

A NEAR TERM STUDY FOR OHIO

TABLE OF CONTENTS

EXECUTIVE SUMMARY

This study presents a focused analysis of the impact of data centers on water resources in Ohio. It is intended to provide greater clarity on local impacts. It draws on publicly available information related to Ohio's water resources, current data center technologies, energy and water use, and emerging technology trends. By bringing this information together in a single document, the report aims to provide a constructive, fact-based analysis around water resources using locally relevant data.

This report focuses on water as a critical resource needed to support data center growth in two specific development corridors centered around Columbus and Cincinnati–Dayton and does not cover other regions of Ohio. A closer look at these two corridors provides a more detailed understanding of existing data centers and their interaction with water resources based on data center type, technologies used, and the power needed to operate them. It also provides an opportunity to assess scenarios for future data center growth in these corridors over the next five years, as well as key considerations associated with those growth scenarios.

The report's central conclusion is that Ohio has sufficient water-resource capacity to support projected near-term data center growth in both corridors, in addition to ongoing supply of water for other businesses and residents. The extent to which this growth can be supported will depend more on infrastructure readiness, power-water coordination, stormwater management, and public transparency than on water scarcity. Overall, the analysis finds that the analyzed corridors appear broadly well positioned to support additional data center growth from a water-resource perspective through 2030. In both priority corridors, the analysis shows that water availability is not likely to be the primary limiting factor; instead, the constraints are infrastructure timing, coordination across water and power systems, wastewater and discharge management in specific locations, and the cumulative local effects of stormwater runoff, siting, and public trust. This distinction is important because a region can be water-rich in aggregate while still facing local service, permitting, or infrastructure bottlenecks.

The study finds that multiple policy actions and other strategies are underway aiming to provide greater clarity to communities and stakeholders that align data center growth with critical resource management. Additionally, there are opportunities to

further align community needs and expectations around data centers and economic growth. The study accounts for historical and projected water demands, existing water-resource capacity, and future scenarios for data center development. A scenario-centered approach is used to quantify drought frequency and intensity, water system stress, water-quality impacts, and possible opportunities to minimize impacts associated with data center development. The timeframe adopted for scenario development is 2026–2030 as this period coincides with review of new data centers seeking to connect to power utilities and the rapid pace of technological innovation and advancement. Analysis beyond this timeframe is difficult due to the fast pace of technological advances and unpredictable market expansion. While this study includes a high-end 'worst-case' planning scenario, that case is considered unlikely, and current trends in cooling technology suggest actual direct data center water demand may track below the high-water case.[1] Study findings are summarized below.

Table 0.1. Executive takeaways

Topic	Columbus corridor	Cincinnati-Dayton corridor	Executive takeaway
Current capacity	~1.9 GW	~65 W	Columbus is the main scale case
2030 growth outlook	~10–15 GW	~450–550 MW	Both grow, but from different bases
Water resource position	Surface-water rich; Upper Scioto system	Groundwater-rich; major aquifer support	Water availability is favorable in both
2030 water demand scenarios	5.1 / 28.8 / 43.7 MGD	0.1 / 2.2 / 3.5 MGD	Technology and power mix matter materially
Main water risk	Infrastructure timing, source-water sensitivity, watershed quality	Siting, groundwater-sensitive planning, local stormwater impacts	Local execution matters more than statewide supply
Main water-quality issue	Stormwater, upstream water-quality conditions	Stormwater, aquifer-sensitive siting	Water quality impacts must be mitigated at the local level
Cross-cutting implication	Power generation may drive more water demand than on-site cooling	Power generation may drive more water demand than on-site cooling	Water and energy planning should be integrated

---

[1] Direct water demand refers to the water a data center uses onsite to operate the facility. This is mainly water used for cooling systems, for example, cooling towers, evaporative cooling, humidification, and sometimes maintenance or domestic building use.

The Columbus corridor is the higher-pressure planning case due to the existing concentration of data centers and scale of expected growth. Current data center capacity in the area is estimated at roughly 1.9 gigawatts (GW) and could grow five- to eightfold to approximately 10–15 GW by 2030. Yet even under high-growth assumptions, direct data center water demand remains small relative to broader regional water availability in the Upper Scioto system. By contrast, the Cincinnati–Dayton corridor starts from a much smaller base—about 65 megawatts (MW) today, with scenarios reaching roughly 450–550 MW by 2030—and appears even less likely to face water availability as a binding constraint because of substantial groundwater resources in southwest Ohio.

Across the scenario analyses, modeled 2030 water demand varies meaningfully depending on cooling technology and power-generation assumptions. In central Ohio, projected data center water consumption ranges from approximately 5.1 million gallons per day (MGD) in a low-water case to 43.7 MGD in a high-water case, with a base case of 28.8 MGD. In Cincinnati–Dayton, the range is approximately 0.1 to 3.5 MGD, with a base case of 2.2 MGD. These results reinforce that future water impacts are shaped not only by data center growth rates but also by the cooling technologies deployed and the type of electricity generation required to serve incremental load increases.

Direct water consumption at data centers varies by cooling technology, but total water impacts also depend heavily on the electricity generation needed to serve growing load. In many scenarios, water demand associated with power generation may be as or more important as, or more important than, on-site cooling demand. Given the current mix of data centers and likely growth scenarios, both the Columbus and Cincinnati–Dayton corridors appear to have sufficient water-resource capacity to support near-term demand, provided infrastructure planning and investment keep pace. Drought risk appears more pronounced in the Columbus corridor than in Cincinnati–Dayton, particularly during summer months when population and industrial demand are higher; however, severe drought conditions remain relatively infrequent in both corridors. As population and industrial activity grow, continued planning and investment in water infrastructure will be needed to keep pace with development.

Water quality risks associated with data center growth appear manageable within Ohio's existing regulatory structure, particularly because most facilities connect to existing water and wastewater systems rather than discharging directly to surface waters. The clearest recurring local water-related impact is stormwater runoff from large, impervious data center footprints. In the modeled scenario, runoff increased by approximately 76% from pre-development to post-development conditions without mitigation. This indicates that site design, retention, controlled release, and hydrogeology-aware stormwater strategies will be critical to reducing localized flooding, erosion, and downstream water-quality impacts.

Indirect water demand is defined as the water used elsewhere to support the data center's operations, especially electricity generation.

Table 0.2 Current and Forecasted Water Demands

Corridor	Current Water Availability	Forecasted Data Center Demands	Water Quality
Columbus	Total consumption[2] is projected to account for 300–400 MGD which is approximately 5% of the total water availability	Forecasted water demand with future data center: • Low scenario – 5.1 MGD • Base scenario – 28.8 MGD • High scenario – 43.7 MGD	Construction activity, wetland impacts, and added impervious surface may affect water quality, but impacts are expected to be manageable through BMPs, permitting pathways, and sufficient wetland credits.
Cincinnati/ Dayton	Total consumption is projected to account for 250–300 MGD which is approximately <1% of the total water availability[3]	Forecasted water demand with future data center: • Low scenario – 0.1 MGD • Base scenario – 2.2 MGD • High scenario – 3.5 MGD	

All but one of the existing Ohio data center footprints are connected to local water and wastewater infrastructure systems, meaning that water is treated before being discharged to surface waters. This means there is limited direct discharge impact to Ohio waters, both groundwater and surface water, from data centers.[4] While this could change in the future if data centers begin to locate in areas that do not have available water infrastructure, it is likely that data centers will continue to seek co-location with such infrastructure, so they are not required to obtain a permit for discharge. Should additional permits be needed in the future, the Ohio Environmental Protection Agency (EPA) can issue permits that protect water quality and ensure compliance through its National Pollutant Discharge Elimination System (NPDES) program authorized under the Clean Water Act (CWA).

Other water quality impacts associated with data centers are similar to those of industrial facilities with large physical footprints, where construction, loss of natural wetlands, and impervious surfaces can lead to increased localized erosion, channelized flows, and potential stormwater pollution. Ohio EPA and the U.S. Army Corps of Engineers (USACE) regulate and enforce compliance for impacts to water quality through the Clean Water Act (CWA) Section 404 Wetlands Permitting process. Effects of development are typically mitigated through best management practices (BMPs), low-impact

---

[2] In this report, total consumption is defined as water that is withdrawn from natural resources, such as surface water supplies or groundwater aquifers, and is intended for human uses, such as public drinking water supply, industrial uses, or agricultural uses, among others.

[3] For the Cincinnati analysis, water availability assumes groundwater recharge rates are sustainable – detailed withdrawal and recharge rates are currently being evaluated by an independent third-party regional study.

[4] Office of the Ohio Consumers' Counsel. Quick facts: Data centers in Ohio. Office of the Ohio Consumers' Counsel. https://www.occ.ohio.gov/factsheet/quick-facts-data-centers-ohio#:~:text=Ohio has about 200 data,to consumers make development attractive.&text=Companies plan to invest up,Ohio data centers by 2030.

development (LID)[5], and the purchase of wetland or streambank credits to offset environmental impacts.[6] A review of existing mitigation banks and service areas within Ohio suggests that adequate wetland and streambank credits available to both corridors. Mitigation banks appear to be keeping pace with demand, but there are opportunities for data centers to both contribute more to the conservation of natural areas and to communicate environmentally beneficial actions to communities. The table below summarizes findings associated with water quantity and quality:

Table 0.3. Top-Line Findings Matrix

Corridor	Category	Findings
Columbus	Data centers	Columbus has 95% of Ohio's total data center capacity, with Central Ohio positioned for continued growth as demand remains strong
	Water quantity & availability	Columbus' medium drought risk, ample water resources, and planned water infrastructure expansions demonstrate its ability to meet increased future demand. Total water consumption is projected to account for 300–400 MGD, which is approximately 5% of total water availability
Cincinnati	Data centers	Cincinnati has less data center capacity than Columbus, but the segment is projected to grow at a steeper rate in coming years
	Water quantity & availability	Cincinnati has low drought risk, is water-rich, and has the infrastructure necessary to support future demand. Total water consumption is projected to account for 250–300 MGD, which is approximately <0.1% of the total water availability
Statewide	Growth scenarios	Modeling different water demand cases shows variance in future demand but even the extreme high scenario is manageable due to significant water resources

Statewide, water quality impacts are expected to remain limited and manageable under current conditions. Future impacts would increase with development intensity under each scenario, but current measures such as BMPs, permitting pathways, and wetland credits appear adequate to address them, with additional monitoring as needed. While the physical implications of data center growth through 2030 are within the capabilities of existing governance and regulation for water supply, discharge,

---

[5] Low-impact development (LID) is an approach to stormwater management that uses site design features such as green roofs, pervious pavement, rain gardens, and bioswales to reduce runoff and related water-quality impacts; https://www.epa.gov/nps/nonpoint-source-urban-areas

[6] Wetland or streambank credits are a form of compensatory mitigation used when development impacts wetlands or streams; developers may satisfy mitigation requirements by purchasing credits from approved mitigation banks or similar programs instead of performing all restoration directly on-site; https://www3.epa.gov/owow/RealEstate/reading/CompensatoryMitigation.pdf; https://www.epa.gov/cwa-404/mitigation-banks-under-cwa-section-404

and site-level impacts, there is high public interest in current and future data center development. This level of interest is not unique to Ohio, but across the country as communities seek greater transparency on local water and energy impacts, costs, and opportunities to engage.

This study includes data and metrics from a range of stakeholders across Ohio including Ohio EPA, the Mid-Ohio Regional Planning Commission, economic accelerators, utility providers, and industry experts to provide greater clarity around how and where water is used and impacted by the operation of data centers. An overriding observation made by these stakeholders during the study reflects a lack of understanding and perceived lack of transparency regarding data centers and their impacts on water and other local resources. This includes a broad desire of these stakeholders for greater opportunities to engage in integrated planning and public participation when it comes to the siting of data centers. Interviewees noted that frustration is focused on lack of information which fuels assumptions, and by limited ability to partner with data center owners in a way that allows for proactive planning, collaboration, and a clear understanding of responsibility and essential conversations that lead to “good neighbor” policies and actions to support positive long-term outcomes and trust. The focus of this report is an institutional and technical baseline evaluation and is not intended to seek broad public opinion, but rather to assess critical resource use, infrastructure readiness, and regulatory capacity associated with data center development through 2030.

The key near-term question for Ohio is not whether the state has enough water to support data center growth, but whether planning, infrastructure delivery, watershed protection, and public communication can keep pace with that growth. As lower-water cooling technologies become more common, the largest water demand is likely to come from electricity generation rather than on-site cooling. This makes proactive, integrated planning across water, wastewater, energy, and land use essential to sustaining economic growth while maintaining community confidence.

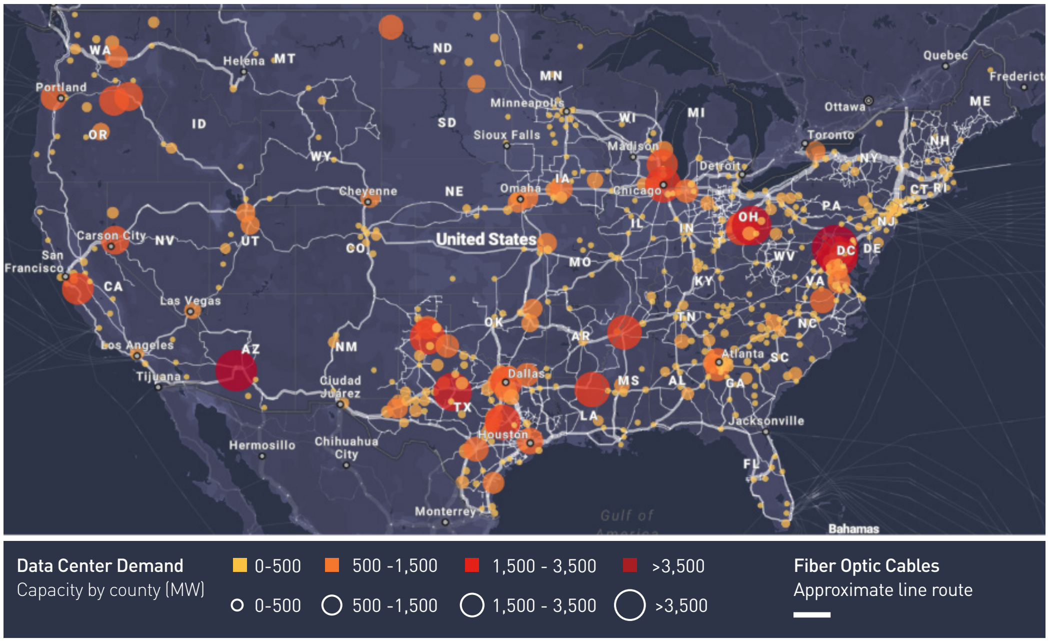
INTRODUCTION

01

Overview of Data Centers

The U.S. currently has over 4,000 data centers, with more added annually as demand for artificial intelligence (AI) and cloud computing increases. This puts the U.S. at the forefront of data centers globally, with most data centers located in Arizona, California, Illinois, Texas, and Virginia. However, emerging growth hubs include Atlanta, Columbus, Dallas, and Salt Lake City (Figure 1).[7]

Figure 1. Total data center capacity (operating and under construction). Map courtesy of National Laboratory of the Rockies (Source: Accelerating Speed to Power)



Ohio is emerging as a major tech hub in the Midwest, with Columbus leading the way as the #10 market in the North American Tech Hubs Index. With ample water supply, available land, multiple fiber-optic cable lines running across the state, and a reliable power system, Ohio has become an attractive location for data center growth.[8,9] Major AI and data centers investments are already underway in the state, including a $1.5B data center investment in New Albany and $10B investment to meet demand for cloud computing and AI.[10,11] Other notable projects include a hyperscale

---

[7] Site Selection. A new tech index emerges from the data. Site Selection. https://siteselection.com/a-new-tech-index-emerges-from-the-data/

[8] Site Selection. A new tech index emerges from the data. Site Selection. https://siteselection.com/a-new-tech-index-emerges-from-the-data/

[9] Kohrman Jackson Krantz. (2025, March 5). Ohio: A rising hub for data centers and technological growth. KJK. https://kjk.com/2025/03/05/ohio-a-rising-hub-for-data-centers-and-technological-growth/

[10] Amazon. AI and cloud infrastructure in Ohio gets $10 billion Amazon investment. About Amazon. https://www.aboutamazon.com/news/aws/aws-continues-to-invest-in-ohio

[11] Meta. Meta New Albany data center [PDF]. Meta Data Centers. https://datacenters.atmeta.com/wp-content/uploads/2025/09/Meta-New-Albany-Data-Center.pdf

manufacturing facility in Columbus, the Bowling Green Data Center outside Toledo, the Hamilton Data Center in Hamilton/Cincinnati, and a 10-gigawatt data center mega-campus in Pike County.[12,13,14]

Data Center Growth

This report explores how data center development and growth may affect the availability and quality of Ohio's water resources and provides observations on current conditions, future trends, and key considerations for balancing growth with water resource management. The report assesses how different growth and technology scenarios—including data center capacity expansion and the adoption of new cooling technologies—could affect high-impact geographies (referred to in this report as "corridors") as well as watersheds. The study presents observations and considerations specific to data center development in Columbus and Cincinnati–Dayton to provide the foundational local information to support more effective dialog around water impacts from data centers.

To better understand the impacts of data centers on water resources, it is important to examine recent growth in data centers, emerging technologies, and the ways facilities use water both directly and indirectly. The sections below provide a summary that helps build context for understanding current and future water-related impacts.

Developers are rapidly building more data centers to meet the growing demand for AI and digital services. Although experts are still evaluating the full extent of data centers' effects on communities, multiple sources consistently identify several recurring impacts associated with data centers. One major concern is the growing demand on power utilities and infrastructure to operate data centers. Historically, the capacity of data centers relative to the total U.S. electricity consumption was relatively flat—1.5% (or 61 terawatt-hours (TWh)) in 2007 and 1.8% (or 70 TWh) in 2014.[15,16] As AI adoption and cloud computing accelerated in the late 2010s, data centers began consuming a larger percentage of the U.S. total electricity consumption, reaching 183 TWh or 4.4% of the total U.S. electricity consumption in 2023.[17] This growing demand has increased concerns about whether utilities can secure sufficient electricity supply and expand transmission and distribution infrastructure quickly enough while minimizing rate increases on consumers.

---

[12] State Affairs. Landmark public-private partnership. State Affairs. https://pro.stateaffairs.com/oh/energy/landmark-public-private-partnership

[13] Bowling Green Data Center. Hello, Bowling Green! We are... Bowling Green Data Center. Facebook. https://www.facebook.com/BowlingGreenDataCenter/posts/122099868284833643

[14] Cincinnati Business Courier. (2025, September 8). Hyperscale AI data center Hamilton Logistix. Cincinnati Business Courier. https://www.bizjournals.com/cincinnati/news/2025/09/08/hyperscale-ai-data-center-hamilton-logistix.html

[15] Lawrence Berkeley National Laboratory. (2007). Report to Congress on server and data center energy efficiency: Public Law 109-431. OSTI.GOV. http://www.osti.gov/servlets/purl/929723-4d6s1A/.

[16] Lawrence Berkeley National Laboratory. (2016). United States data center energy usage report. Lawrence Berkeley National Laboratory.

[17] Lawrence Berkeley National Laboratory. (2024). 2024 United States data center energy usage report. eScholarship. https://escholarship.org/uc/item/32d6m0d1

As utilities expand generation, transmission, distribution, and water infrastructure to keep pace with large-load growth, one related consideration is whether some of those costs will be recovered through higher customer rates. In Ohio, customers of Columbus Water and Power are likely to see rate increases that were recommended by the Columbus Utility Advisory Board and approved by City Council to support regional growth, system reliability, and major infrastructure investments.[18] Similarly, the City of Cincinnati approved rate increases that took effect in January 2026.[19] Both Columbus and Cincinnati maintain that their rates remain among the lowest in the region. In 2025, the Ohio Legislature passed House Bill 15 to reform electricity regulation, including measures intended to improve rate-setting transparency, accelerate infrastructure approvals, and expand behind-the-meter generation options for large electricity users.[20] The law also helps prevent investor-owned electric distribution utilities from owning generation, which may reduce incentives to favor utility-owned supply and increase reliance on competitive self-supply options that could lower costs for customers.

Data centers have historically relied on water intensive cooling technologies, and this remains the case for many older data facilities. As high-performance computing and AI workloads increase, they require more energy-intensive servers that generate more heat, thereby increasing colling demand. Although newer cooling technologies use less water, and, in some cases, reduce water consumption to near zero, continued data center growth is increasing electricity demand from energy generators/suppliers that have their own water requirements. While water consumed for on-site cooling at a data center has a local impact on water use and quality, water used in energy production may not have the same immediate local impact. The water impacts associated with energy production occur where the energy is generated, which may not coincide with the location of the data center. Because electricity can be generated remotely and transmitted to data centers, officials need to understand both the local and regional impacts of data center development when considering siting, infrastructure capacity, and ways to incentivize growth while protecting water resources.

Water and Data Centers

With the rapid growth of large-capacity facilities in Ohio, water and wastewater infrastructure are important factors in determining where and how data center growth occurs. These considerations are more pronounced in areas without existing utility capacity, where projects may face additional infrastructure and permitting needs.

---

[18] City of Columbus, Department of Public Utilities. (2026, Winter). *Utility Update*. winter26uufinal.pdf

[19] Greater Cincinnati Water Works. *Water & sewer service charges*. City of Cincinnati. https://www.cincinnati-oh.gov/water/water-sewer-service-charges/

[20] Ohio Consumers' Counsel. *Governor DeWine signs House Bill 15 marking win for Ohio consumers*. Ohio Consumers' Counsel. https://www.occ.ohio.gov/content/governor-dewine-signs-house-bill-15-marking-win-ohio-consumers

Ohio has more than 4,000 public water systems serving approximately 11 million people each day.[21] Ohio's drinking water comes from surface water and groundwater sources, sand and gravel aquifers and bedrock aquifers.[22] Potable water, or drinking water, is drawn from these sources and delivered through water lines after chemically disinfection at water treatment plants. Non-potable water is not safe for human consumption and flows through wastewater collection systems after being conveyed from users to wastewater treatment facilities. Together, these two water streams support a more circular water system that can help reduce unnecessary water consumption while providing safe drinking water, sanitation, and healthy ecosystems. Potable water is the most common water source used by data centers, although some facilities also withdraw non-potable water. After cooling, about 80% of this water evaporates, and the remainder is discharged to wastewater treatment.[23] Historically, enterprise data centers—operated on-site by the businesses that own them—represented the largest data center segment, accounting for approximately 65% of servers as recently as 2014.[24] With the rise of cloud computing in the 2010s, organizations began shifting their computing needs from on-site enterprise environments to colocation facilities, where a third party operates the facility and provides services. As of 2023, analysts estimate that enterprise data servers represented only about 15% of all servers, while colocation servers accounted for roughly 45%.[25]

Major cloud service providers—including Meta, Microsoft, Amazon, and Google—have led the development of a third type of data center: hyperscale facilities. These companies are deploying data centers at massive scale, both in server capacity and in number, driving rapid growth in large-capacity facilities. As of 2023, hyperscale servers constituted approximately 30% of all servers and are forecast to account for nearly 40% by 2028. These hyperscalers are also supporting and driving AI innovation, which comes with significantly greater and more consistent energy and cooling demands.

Data center developers vary in their location preferences and strategies. Some, such as Amazon, are expanding into areas without established infrastructure, including municipal water, wastewater and power grid systems, while others, such as Google, tend to locate near existing utilities. Siting preferences prioritize flat, available land near power transmission, fiber, and transportation infrastructure. In addition, developers show a clear preference for connecting to existing water supply and wastewater systems. Time-to-market improves when sites are located immediately adjacent to existing high-voltage infrastructure. Access to existing wastewater collection and treatment facilities

---

[21] Ohio Environmental Protection Agency. *Understanding public water systems*. Ohio EPA. https://epa.ohio.gov/divisions-and-offices/drinking-and-ground-waters/about-ddagw/understanding-public-water-systems

[22] Ohio Environmental Protection Agency. *Understanding your drinking water*. Ohio EPA. https://epa.ohio.gov/divisions-and-offices/drinking-and-ground-waters/about-ddagw/understanding-your-drinking-water

[23] National Association of State Utility Consumer Advocates. *2025-06-10-NASUCA-Data-Centers-Final-Schneider.pdf*. NASUCA. https://www.nasuca.org/wp-content/uploads/2025/02/2025-06-10-NASUCA-Data-Centers-Final-Schneider.pdf

[24] Brown, R.E., Masanet, E., Nordman, B., Tschudi, B., Shehabi, A., Stanley, J., Koomey, J., Sartor, D., and Chan, P. 2007. Report to Congress on Server and Data Center Energy Efficiency: Public Law 109-431. LBNL-363E, 929723. Lawrence Berkeley National Lab. http://www.osti.gov/servlets/purl/929723-4d6s1A/

[25] Brown, R.E., Masanet, E., Nordman, B., Tschudi, B., Shehabi, A., Stanley, J., Koomey, J., Sartor, D., and Chan, P. 2007. Report to Congress on Server and Data Center Energy Efficiency: Public Law 109-431. LBNL-363E, 929723. Lawrence Berkeley National Lab. http://www.osti.gov/servlets/purl/929723-4d6s1A/

can also eliminate the need for water discharge permits under Clean Water Act's (CWA) National Pollutant Discharge Elimination System (NPDES) and related state and federal requirements. As data centers expand into more rural areas beyond established water infrastructure systems, the need for individual permits and additional regulatory approvals increases.

Data Center Cooling Technologies

Cooling technology choice is a core strategic decision for data center developers and operators because it directly shapes energy use, water consumption, cost, and site feasibility. As computing density rises—especially in hyperscale and AI facilities—the trade-offs among these systems are becoming more pronounced, making hybrid approaches and newer technologies such as direct liquid cooling increasingly important.

As electricity flows through data center microchips to perform computing functions, the natural electrical resistance within the chips generates heat. For example, NVIDIA's Blackwell B300 chip launched in 2025 for high-performance, large-scale AI and computing infrastructure, can generate up to 1,400 watts of heat or 4777 British thermal units (BTUs).[26] Data centers contain thousands to millions of chips that generate significant heat during operation; in general, nearly all electricity consumed is ultimately converted to heat. To maintain peak performance, data center equipment should operate within a temperature range of 10–30°C.[27] Because of the significant heat generated, data centers require extensive cooling, which has historically depended on water-intensive technologies. While newer cooling technologies seek to reduce water use, analysts forecast that data centers could account for 4% to 7% of total U.S. public water consumption by 2030, compared with an average of roughly 12% for other public water users.[28,29]

At a high level, data centers rely on four primary cooling technologies: air cooling, evaporative cooling, free cooling and economizers, and direct liquid cooling. In practice, operators may combine multiple cooling technologies within a single facility to optimize efficiency and reduce cooling costs.

Air cooling systems draw in air and use refrigerant or chilled water to cool it. Chilled air is then circulated into the room housing the data servers. Air cooling systems use minimal water; however, they can be energy intensive and are generally most effective for small to medium-sized data centers.[30] Because of these limitations, they are best suited to cooler climates or water-scarce regions. In 2023, air cooling systems were used in 77% of small data centers, 33% of midsize and colocation data centers, and only 1% of hyperscale data centers.[31] In an open-loop system, evaporative cooling relies on either

---

[26] Yahoo Finance. Nvidia's next-gen B300 GPUs. Yahoo Finance.

[27] Equinix. (2025, October 1). Top 3 myths about data center operating temperatures. Equinix Blog. https://blog.equinix.com/blog/2025/10/01/top-3-myths-about-data-center-operating-temperatures/

[28] arXiv. Small Bottle, Big Pipe: Quantifying and Addressing the Impact of Data Centers on Public Water Systems. arXiv. https://arxiv.org/pdf/2603.02705

[29] U.S. Geological Survey. (n.d.). Public supply water use. U.S. Geological Survey.

[30] Hegde, G. (2026, January 23). Myths vs. reality: Data centers and water usage. Florida Water & Pollution Control Operators Association.

[31] Shehabi, A., Smith, S. J., Hubbard, A., Newkirk, A., Lei, N., Siddik, M. A. B., Holecek, B., Koomey, J., Masanet, E., & Sartor, D. (2024). 2024 United States data center energy usage report (LBNL-2001637). Lawrence Berkeley National Laboratory.

a cooling tower or an evaporative chiller. A cooling tower draws air through hot, recirculated water, causing some of the water to evaporate. This evaporation removes heat from the water, producing chilled water that is then pumped to the data servers for cooling before the water is recirculated to continue the process. In an evaporative chiller, dry air passes it through a water-soaked membrane or heat exchanger, cooling the air. Both systems are open-loop, they must continuously draw additional water to continue the process as water evaporates. As data center capacity has grown over the past decade, evaporative cooling has emerged as a more energy- and cost-efficient alternative to air cooling systems. However, these systems are also significantly more water intensive.

Some data centers also use closed-loop evaporative cooling systems, which circulate water through a sealed loop without direct exposure to air. This approach helps limit evaporation and reduce water loss, although some loss still occurs.[32] Closed-loop systems use less water than open-loop systems, but their broader adoption is constrained by higher capital costs and greater design and operational complexity.

Free cooling systems and economizers offer an alternative to water and energy intensive systems by using readily available cool outdoor air or water. As a result, their effectiveness depends heavily on local climate and geography. Some data centers can use these systems seasonally, so developers and operators often pair them with other cooling technologies.

The final cooling technology is direct liquid cooling, a newer approach that includes both direct-to-chip and immersion cooling. This method cools servers by bringing them into direct contact with a liquid coolant. Direct liquid cooling often uses a heat exchanger to remove heat. Because the liquid is applied directly to the heat source, this method is much more energy efficient and does not use water. Due to greater cooling effectiveness (up to 202 W/cm2 compared to 37 W/cm2 for air cooling), developers and operators are considering deploying these systems in hyperscale and AI data centers, which have much higher server-rack power densities.

When evaluating the performance of cooling systems, analysts use the metric water usage effectiveness (WUE). WUE is defined as total data center water consumption (measured in liters) divided by the total IT equipment energy consumption, measured in kilowatt-hours (kWh). Although the industry-average WUE is 1.8 L/kWh, many colocation providers and hyperscalers report much lower WUE across their portfolio of data centers.[33] Table 1 provides an overview of cooling classifications, including their WUE, advantages, and disadvantages.

---

[32] Solomon, S. (2024, December 9). Sustainable by design: Next-generation datacenters consume zero water for cooling. Microsoft Cloud Blog. https://www.microsoft.com/en-us/microsoft-cloud/blog/2024/12/09/sustainable-by-design-next-generation-datacenters-consume-zero-water-for-cooling/

[33] Amazon. (n.d.). *AWS cloud. Amazon Sustainability*. https://sustainability.aboutamazon.com/products-services/aws-cloud; Meta. (2025). 2025 environmental data index. https://sustainability.atmeta.com/wp-content/uploads/2025/10/Meta_2025-Environmental-Data-Index.pdf; Microsoft. (n.d.). *Measuring energy and water efficiency for Microsoft datacenters*. https://datacenters.microsoft.com/sustainability/efficiency/; Equinix. (2024). *2024 sustainability data summary*.; Q.com. (2024). *2024 sustainability report*; Edged. (n.d.). *Sustainability*. Retrieved April 27, 2026.; CyrusOne. (2024). *CyrusOne 2024 sustainability report*. https://www.cyrusone.com/hubfs/Website Documents 2025/2024_CyrusOne_Sustainability_Report.pdf

Table 1. Overview of Cooling Technologies. Source: https://escholarship.org/content/qt32d6m0d1/qt32d6m0d1.pdf, https://www.datacenterknowledge.com/cooling/data-center-cooling-methods-costs-vs-efficiency-vs-sustainability

Cooling Technology	WUE (L/kWh)	Advantages	Disadvantages
Air Cooling	0.001	Low capital costs	Energy inefficient, limited capacity for medium to large data centers, low heat dissipation
Evaporative Cooling	0.45 – 3.0	Low capital costs, energy efficient, effective for medium to large data centers	High operational costs, high water consumption
Free Cooling/ Economizer	0.001 – 1.5	Low capital costs	Dependent on climate and seasonal limitations, may require pairing with additional cooling technologies, humidity control can become a challenge
Liquid Cooling	0.001 – 0.45	Energy efficient, high heat dissipation, low operational costs	Capitally intensive, complex implementation, and requires specialized maintenance

Energy Demands from Data Centers and Power Plant Water Needs

A data center's water footprint is not limited to its on-site water use; it also includes the potentially significant water required to generate the electricity that powers its cooling systems. In Ohio, that indirect water demand could become more localized and more acute if new data center load is increasingly served by water-intensive generation built nearby under PJM's proposed "Bring Your Own New Generation" (BYONG) rules.

Although some cooling technologies used in data centers have low or almost no water intensity, all of them require energy to operate. Because electricity generation can be highly water intensive, cooling-related water impacts may still be significant even when on-site water use is limited. The Energy Information Administration reported that Ohio power plants consumed 37 billion gallons of water in 2024.[34] For broader context, Ohio industry used approximately 350 million gallons of water per day in 2015, equivalent to roughly 128 billion gallons annually.[35] Thermoelectric power plants generate electricity by burning fuels to produce steam, that drives turbines. In addition to serving as the working

---

[34] U.S. Energy Information Administration. (2025, November 6). *Thermoelectric cooling water data.*

[35] Ohio Department of Natural Resources. (n.d.). *Water conservation for manufacturing & commercial facilities.* Retrieved April 27, 2026.

fluid, water is used for cooling and cleaning. Although some plants use advanced cooling technologies to cool steam and reuse water, very few systems can recycle all withdrawn water and fully eliminate water loss. Nuclear power plants can consume 100–845 gallons of water per megawatt-hour (MWh) of electricity generated, depending on cooling technology.[36] Coal-fired power plants consume 42–1,100 gallons of water per MWh depending on both cooling technology and combustion technology (e.g., subcritical, supercritical, or integrated gasification combined cycle)[37] and most consume more than 500 gallons of water per MWh. Natural gas-fired power plants primarily use water for cooling, though combined-cycle plants may also use waste heat to create steam and generate additional electricity, increasing efficiency; because that steam is typically a byproduct, water consumption is generally lower, at roughly 2–600 gallons per MWh.[38] Renewables such as wind, solar photovoltaic (PV), and hydropower consume very little water[39]; wind requires none and solar PV uses 25–35 gallons per MWh for cleaning.[40] Geothermal, concentrated solar plants (CSP), and biogas plants also use steam to generate power and consume 170-5,200 gallons per MWh, but very few of these plants exist in Ohio.

Although power planners have historically sought to site electricity generation near load centers, that is not always possible. As a result, the water consumed to generate electricity does not always occur where electricity is used. However, Ohio's regional transmission operator and electricity market operator, PJM's proposed "Bring Your Own New Generation" (BYONG) rules—which would allow large loads, such as data centers, to fast-track interconnection by developing their own generation to meet demand—would likely increase the locational overlap between energy consumption and generation. Because PJM's proposed rules require BYONG resources to provide firm capacity, such as coal, natural gas, nuclear, or renewables paired with storage, and because the availability and energy density of renewables in Ohio make it difficult to develop sufficient renewable generation plus storage to support data centers, most new BYONG is likely to be water intensive. This could further increase water demand in regions where data centers are located.

---

[36] Macknick, J., Newmark, R., Heath, G., & Hallett, K. C. (2011). *A review of operational water consumption and withdrawal factors for electricity generating technologies (NREL/TP-6A20-50900).* National Renewable Energy Laboratory. https://docs.nrel.gov/docs/fy11osti/50900.pdf

[37] Macknick, J., Newmark, R., Heath, G., & Hallett, K. C. (2011). *A review of operational water consumption and withdrawal factors for electricity generating technologies (NREL/TP-6A20-50900).* National Renewable Energy Laboratory. https://docs.nrel.gov/docs/fy11osti/50900.pdf

[38] Macknick, J., Newmark, R., Heath, G., & Hallett, K. C. (2011). *A review of operational water consumption and withdrawal factors for electricity generating technologies (NREL/TP-6A20-50900).* National Renewable Energy Laboratory. https://docs.nrel.gov/docs/fy11osti/50900.pdf

[39] While hydroelectric facilities may lose water due to natural evaporation occurring in reservoirs, due to the complexities of accounting for water management practices such as water supply, recreation, and flood control, and the small percentage (~6%) of electricity they produce in Ohio, this study assumes water consumption from hydroelectric facilities is negligible.

[40] Macknick, J., Newmark, R., Heath, G., & Hallett, K. C. (2011). *A review of operational water consumption and withdrawal factors for electricity generating technologies (NREL/TP-6A20-50900).* National Renewable Energy Laboratory. https://docs.nrel.gov/docs/fy11osti/50900.pdf

Water Quality & Data Centers

Although data centers create localized water quality concerns—particularly where cooling-related discharges enter small or impaired streams—those risks appear limited in Ohio today because most facilities discharge through existing wastewater treatment systems with sufficient current and planned capacity.

Water quality is affected by water withdrawals, wastewater discharges, stormwater runoff, and land development. Although industry is not typically the dominant statewide source of water-quality impacts, it can be a meaningful contributor in specific watersheds, particularly near drinking water intakes and already impaired streams or lakes. Depending on their cooling design, data centers can be high-demand water users and may discharge cooling-related wastewater. Cooling tower blowdown[41] can concentrate dissolved minerals and treatment chemicals—including total dissolved solids (TDS), biocides, and anti-scaling agents—and thermal discharges can create localized stress on receiving waters if not properly managed.[42]

From a regulatory perspective, data center wastewater is typically less chemically distinct and less complex than wastewater from many manufacturing processes. The primary pollutant of concern is TDS, which can increase as cooling water is cycled and naturally occurring minerals become concentrated. TDS is generally managed through dilution while concerns related to additives are more site-specific; for example, phosphate-based additives may pose issues where a Total Maximum Daily Load (TMDL) applies. These concerns are largely avoided when data centers are connected to existing water infrastructure systems that treat wastewater prior to discharge. Where such infrastructure is unavailable, data centers may need permits to discharge directly to surface waters, particularly in areas with small or already impaired streams where dilution is more limited.

TDS and similar wastewater pollutants do not currently appear to present a significant concern for Ohio data centers, as only one data center facility statewide discharges directly rather than routing wastewater through a treatment plant. The pollutants associated with data center wastewater are already commonly managed by existing wastewater treatment systems and do not currently require new infrastructure or treatment methods. The main potential issue is added treatment capacity demand, but with existing capacity and planned upgrades, that risk appears limited.

---

[41] Cooling tower blowdown, also called bleed-off, is the controlled discharge of a portion of the circulating water from a cooling tower system. Its purpose is to prevent dissolved minerals, salts, and other impurities from becoming too concentrated as water evaporates during cooling. Without blowdown, those contaminants can build up and cause scaling, corrosion, fouling, and microbiological growth, which reduces cooling efficiency and can damage equipment. In practice, blowdown is used to maintain acceptable water quality and cycles of concentration, and it can be managed manually or automatically based on conductivity or TDS levels. https://www.epa.gov/system/files/documents/2023-05/ws-commercial-watersense-at-work_Section_6.3_Cooling_Towers.pdf

[42] Groundwater World. *Ohio EPA issues draft permit for data center wastewater discharges.* Groundwater World. https://groundwaterworld.org/ohio-data-center-wastewater-permit/

Governance and Regulatory Landscape

Ohio has a multi-agency regulatory framework for managing water use, wastewater discharges, and aquatic-resource impacts associated with data center development. For most projects, the practical implication is that permitting requirements, development timelines, and the level of public scrutiny will depend on site conditions—especially access to existing sewer infrastructure and the extent of wetland or stream impacts.

Ohio's water governance is shared across several state agencies. Key programs, permits, and regulatory frameworks relevant for data centers siting include:

- Public Water System oversight (Ohio EPA) under the Safe Drinking Water Act and Ohio Revised Code (ORC) Section 6109
- Biennial water-quality monitoring and assessment reporting (Ohio EPA) conducted to meet Clean Water Act requirements
- Water Withdrawal Facility Reporting and Registration Program (ODNR) under ORC Section 1521.16 (>100,000 gallons/day capacity)
- Water Inventory and Planning Program (ODNR) including water-use data management, large-user registration, and water withdrawal/consumptive use permitting; implements the Great Lakes–St. Lawrence River Basin Water Resources Compact and related agreement
- National Pollutant Discharge Elimination System (NPDES) permits (Ohio EPA) under the Clean Water Act and Ohio Water Pollution Control Act, including a new/updated data center discharge permitting approach covering wastewater (e.g., non-contact cooling water, cooling tower blowdown) and industrial stormwater

Additionally, the legislature is considering a bill to establish a temporary "Data Center Study Commission" to study impacts of rapid data center developments in Ohio.[43]

Permitting

Projects discharging cooling water, blowdown, or industrial stormwater to surface waters may require Ohio EPA NPDES permits—particularly where sites lack existing sewer infrastructure—making water and wastewater connectivity an important siting and permitting consideration. The Clean Water Act and the Ohio Water Pollution Control Act require that pollutants discharged from data center facilities into state waters must be authorized under an NPDES permit. "Wastewater discharges include non-contact cooling waters (once through or recirculated water that does not come into contact with the process operations of a facility and is used only to convey heat from the facility), low volume wastewaters

---

[43] Ohio Legislature. *The Ohio Legislature data center commission House Bill 646 | 136th General Assembly.* Ohio Legislature.

(such as, cooling tower blowdown, boiler blowdown, and air compressor condensate yet excludes some waste streams like sanitary wastes) and stormwater associated with industrial activities at the site."[44,45]

In general, facilities—not just data centers—are often cautious about operating under permit-based regulatory frameworks, because those frameworks can increase compliance costs and expand direct liability in cases of noncompliance. Currently, only one NPDES permit has been issued for a data center in Ohio. Most existing data centers are connected to sanitary sewer systems, which reduces the need for individual permit applications. If new data centers are proposed in areas lacking this infrastructure, the number of individual NPDES permits may increase. The Ohio EPA is capable of regulating individual data center discharge to surface waters and protecting water quality via NPDES permits as needed.

Multiple policy actions and related strategies are underway to provide greater clarity to communities and stakeholders and to better align data center growth with critical resource management. This includes opportunities to better align community needs and expectations with data center development and broader economic growth. One important opportunity is to improve transparency and public communication. In Ohio, stakeholder concern appears to stem not only from the physical impacts of data center development, but also from uncertainty and limited visibility into facility operations and resource demands.

Wetlands and Mitigation Banking Credits

Data center site selection and design must account for potential wetland and stream impacts, since projects that cannot avoid those impacts may require federal and state permits, compensatory mitigation, and—depending on the extent of the impact—more extensive regulatory review. Like other large construction projects, data centers undergo early environmental screening to determine whether proposed construction could affect wetlands or streams. When impacts are anticipated, authorization typically involves permitting under U.S. Army Corps of Engineers (USACE) permitting under CWA Section 404 for dredge-and-fill activities, along with Ohio EPA review and CWA Section 401 water quality certification to ensure compliance with state water quality standards. Where impacts are identified, compensatory mitigation is documented through a detailed plan consistent with federal and state standards and is frequently satisfied via purchase of mitigation bank credits, in-lieu fee programs, or permittee-responsible restoration or enhancement, typically organized by Hydrologic Unit Code (HUC) service areas.

---

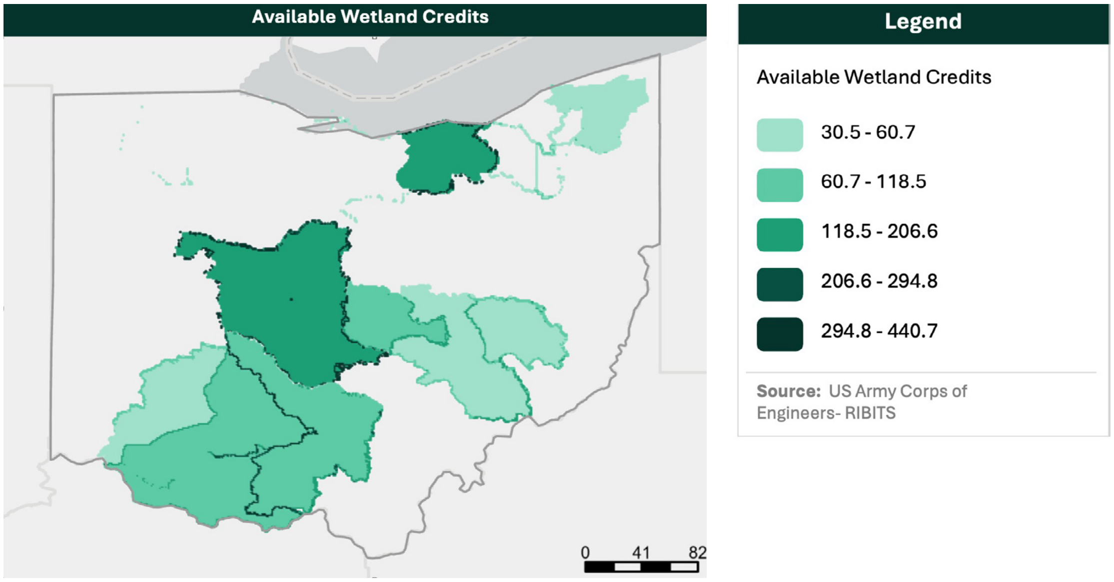
[44] Ohio Environmental Protection Agency. Wastewater discharges from data centers - general permit. Ohio Environmental Protection Agency. https://epa.ohio.gov/divisions-and-offices/surface-water/permitting/wastewater-discharges-from-data-centers--general-permit

[45] Ohio Environmental Protection Agency. *Fact sheet for National Pollutant Discharge Elimination System (NPDES) general permit for discharges from data center facilities*. Ohio Environmental Protection Agency. OHD000001_Draft.fs.pdf

Section 401 (wetlands) permit applications and certification requests uniformly require compensatory mitigation to offset impacts. Recent Ohio EPA experience indicates that data center projects use a range of application pathways, and many are able to minimize wetland and stream impacts sufficiently to qualify for U.S. Army Corps of Engineers (USACE) Section 404 Nationwide Permits. Ohio EPA review is triggered when impacts exceed Nationwide Permit eligibility thresholds, including stream-length thresholds for higher-quality streams.

Based on the current inventory of accredited mitigation banks, Ohio appears to have sufficient wetland mitigation credits, as reflected in Figure 2, although potential shortages have been identified in certain areas of Northwestern Ohio. At the same time, public concern has emerged regarding whether increased industrial uses, including data centers, could diminish available wetland credits. Continued coordination and evaluation of Regulatory In-Lieu Fee and Bank Information Tracking System (RIBITS) credit-availability data and remaining mitigation credits will be crucial for future projects. Operationally, however, developers do not appear to be encountering substantially greater difficulties with wetland permits than those observed for other industrial developments.

Figure 2. Wetland mitigation credit availability by bank service area was assessed using a fishgrid methodology to sum available wetland credits within each service area. Source: U.S. Army Corps of Engineers-Regulatory In-Lieu Fee and Bank Information Tracking System (RIBITS). Data as of March 19,2026 Scale: as shown.



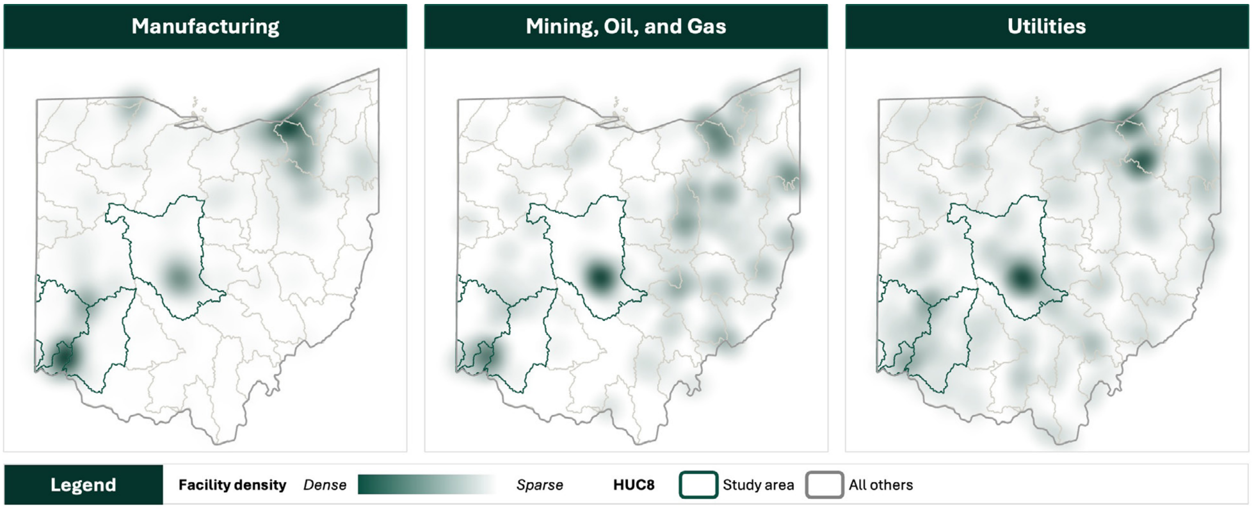
Source: US Army Corps of Engineers- RIBITS

Ohio Industries and Cumulative Impact

No major cumulative impacts are expected in the short term, through 2030. In the long-term, Ohio's water outlook could become more constrained in the context of cumulative impact as potential drought and competing water demands from agriculture, power generation, industry, population growth and data centers may increase pressure on shared water resources.

At the national level, water withdrawals occur at a massive scale and are driven primarily by thermoelectric power, irrigation, and public supply rather than by industry alone. According to the U.S. Geological Survey (USGS), those categories remain the largest water-use sectors and represent more than 90% of national water use.[46] Industrial and digital infrastructure growth, alongside agricultural demand, has increased attention to water availability in Ohio. The state's industrial profile includes a large manufacturing base and substantial oil and gas extraction activity, concentrated primarily in the Columbus, Cincinnati, and Cleveland regions and within a broader Midwest economy where agriculture also remains a prominent water use. While Ohio manufacturing is projected to grow gradually through 2030, with historical scenarios indicating a 1.54% CAGR for 2020-2025.[47] No comparable statewide CAGR was identified for mining, oil, and gas; however, recent increases in oil production and investment suggest positive near-term momentum for parts of the sector.

Figure 3. Spatial density of large-footprint industrial facilities (≥ 10,000 sq ft) across Ohio by NAICS sector, including manufacturing (NAICS 31–33), mining, oil, and gas (NAICS 21), and utilities (NAICS 22). Darker shading indicates higher facility concentration. Source: Esri Business Analyst. Data as of March 19, 2026.



Projections of continued growth in data center capacity reinforce concerns that water withdrawals could increase in the long-term, particularly when combined with irrigation demand and population growth. As industry grows, new developments may alter local runoff patterns and increase the importance of stormwater management, particularly during high-flow events and drought periods, with implications for water quality, habitat conditions, and long-term supply planning.[48]

---

[46] U.S. Geological Survey. (2025). *Water use across the conterminous United States, water years 2010–20*. U.S. Geological Survey https://pubs.usgs.gov/publication/pp1894D/full

[47] Bureau of Labor Statistics. (2026). *SMU39181403000000001*. Bureau of Labor Statistics. https://data.bls.gov/timeseries/SMU39181403000000001?amp%253bdata_tool=XGtable&outputview=data&include_graphs=true

[48] Ohio Environmental Protection Agency. Central Ohio Regional Water Study: Water Quality Approach. Ohio.gov. https://dam.assets.ohio.gov/image/upload/epa.ohio.gov/Portals/0/water/CORWS-Water-Quality-Approach.pdf

02

SCREENING AND CORRIDOR SELECTION ANALYSIS

This section explains why a statewide screening approach was used to assess water-related development constraints in Ohio and how that approach was structured to capture geographic variations.

Analysis Approach

A statewide perspective was adopted because Ohio does not exhibit a single, uniform pattern of water scarcity; rather, development feasibility varies across the state based on watershed hydrology, utility system configuration and asset condition, demand concentration, regulatory sensitivity, and local water security conditions. Accordingly, the analysis was structured as a screening exercise to identify the metropolitan areas or development corridors where water-related limitations are most likely to emerge, as well as the forms those constraints are most likely to take—water supply availability, drinking water treatment and distribution capacity, wastewater collection and treatment capacity, discharge constraints, and water quality or regulatory considerations. This framing is consistent with broader evidence that water quantity and quality risks vary substantially by location, source conditions, infrastructure context, and existing demand pressures across the Midwest.

At the statewide level, the screening combined quantitative, geographic, and qualitative factors to identify where projected data center growth, infrastructure readiness, population and urban growth, and water-sector conditions are most likely to coincide. Quantitative and spatial screening criteria included existing and planned data center development, enabling infrastructure such as fiber density and substations, population patterns, existing water-intensive industrial base, Water Resources Institute indicators, and broader water-sector context. Qualitative criteria were used to supplement the spatial screening and included the diversity of watershed conditions, notional drinking water and wastewater constraints, water security considerations, and stakeholder input. Together, these inputs were used to prioritize corridors for more detailed review.

For prioritized corridors, the analysis then assessed conditions across three dimensions. First, on water supply, it evaluated each watershed's reliable supply, including drought-related stress, and considered whether existing water infrastructure could meet the incremental and peak demand associated with data center development. Demand scenarios were then modeled to identify likely binding supply-side constraints by corridor. Second, on wastewater it assessed baseline collection and treatment capacity and modeled corridor-level scenarios to evaluate potential effects on discharges, in order to identify possible wastewater or discharge constraints. Third, on the demand side, it analyzed data centers growth facility types, and likely build phasing by corridor, including both existing and announced developments, and evaluated how different cooling technologies and operating modes could affect water demand profiles.

This analysis was designed to inform regional planning and prioritization rather than parcel- or site-specific evaluation. In this report, limitations refer to conditions that may constrain development or affect communities by reducing water availability, limiting drinking water or wastewater system capacity, or restricting the ability of receiving waters to assimilate discharges under applicable regulatory requirements.

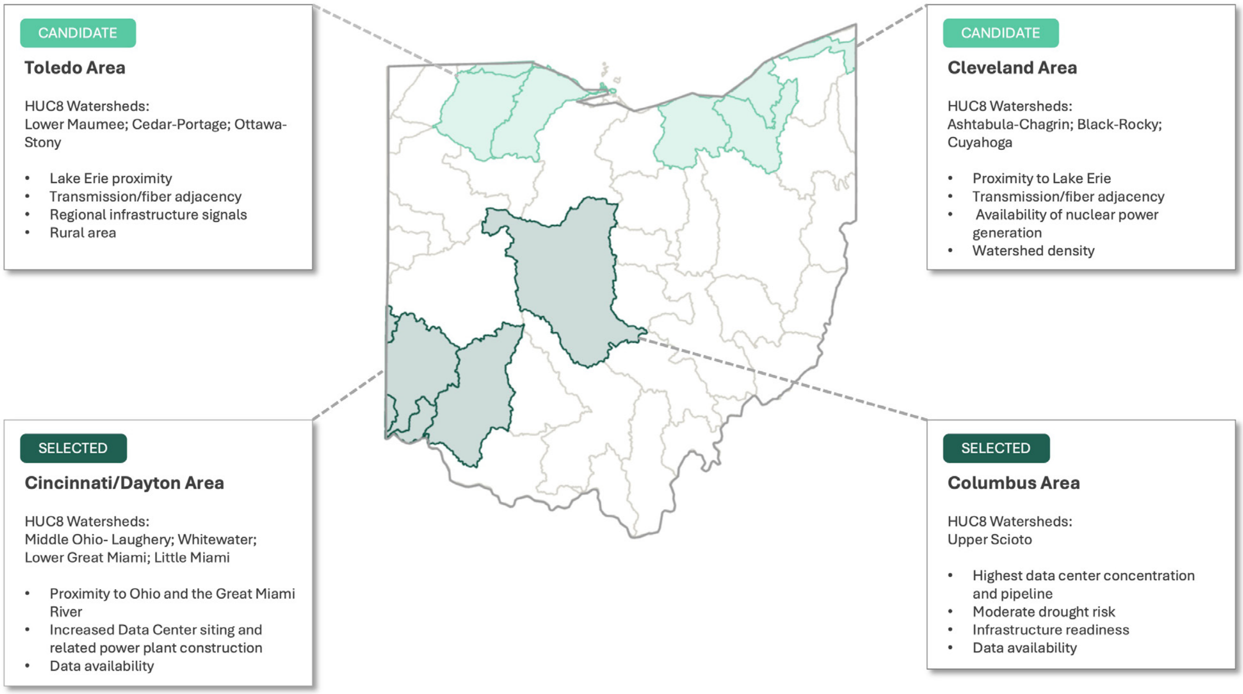
Rationale for Selected Corridors

Data center development corridors were selected through a collaborative process involving the Ohio Chamber of Commerce, moving from a statewide scan to a set of priority corridors based on multiple criteria. These criteria included existing and planned data center locations from publicly available sources, along with access to enabling infrastructure such as broadband, fiber, energy, and water. This process produced a shortlist of watersheds around Columbus, Cincinnati, Cleveland, and Toledo, with corridor-specific rationale reflecting existing and projected data center activity, infrastructure readiness (e.g., fiber and transmission), proximity to major water bodies (e.g., Lake Erie and the Ohio River), and localized impact considerations. To provide a consistent regional planning unit across Ohio, the analysis was standardized at the Hydrologic Unit Code level 8 (HUC8), with inputs drawn from publicly available datasets.

The corridor screening and selection process identified two priority corridors for deeper analysis: (1) the Columbus corridor (Upper Scioto HUC-8 watershed, Franklin, Union, Delaware, and parts of Morrow, Crawford, Marion, Fairfield, Pickaway, Madison, Champaign, Logan, and Hardin Counties) and (2) the Cincinnati–Dayton corridor (including the Middle Ohio-Laughery, Whitewater, Lower Great Miami, and Little Miami HUC-8 watersheds; Hamilton, Butler, Warren, and parts of Clermont, Brown, Clinton, Greene, Clark, Montgomery, and Preble Counties). These corridors were selected based on the concentration of existing and planned data center activity and their connection to enabling infrastructure and major freshwater resources. For the two selected corridors, a deep dive was conducted to illustrate localized water availability, water quality, data center growth, and 2030 impact projections. The deep dive includes: (1) watershed characterization of available freshwater resources including streamflow gauge data, reservoir storage volumes, and groundwater contained in aquifers, (2) baseline demand and competing-use profiling across municipal, industrial, and upstream and downstream users, and (3) water quality and permitting, and regulatory considerations, with an emphasis on multi-jurisdictional coordination and discharge and intake requirements in the Ohio River context.

Statewide Screening

Figure 4. Candidate and selected priority corridors.



CANDIDATE

Toledo Area

HUC8 Watersheds:
Lower Maumee; Cedar-Portage; Ottawa-Stony

- Lake Erie proximity
- Transmission/fiber adjacency
- Regional infrastructure signals
- Rural area

CANDIDATE

Cleveland Area

HUC8 Watersheds:
Ashtabula-Chagrin; Black-Rocky; Cuyahoga

- Proximity to Lake Erie
- Transmission/fiber adjacency
- Availability of nuclear power generation
- Watershed density

SELECTED

Cincinnati/Dayton Area

HUC8 Watersheds:
Middle Ohio- Laughery; Whitewater; Lower Great Miami; Little Miami

- Proximity to Ohio and the Great Miami River
- Increased Data Center siting and related power plant construction
- Data availability

SELECTED

Columbus Area

HUC8 Watersheds:
Upper Scioto

- Highest data center concentration and pipeline
- Moderate drought risk
- Infrastructure readiness
- Data availability

DEEP DIVE ON THE SELECTED PRIORITY REGIONS/CORRIDORS

Columbus Corridor

Columbus corridor appears broadly capable of supporting substantial additional data center growth without creating major near-term water supply constraints. Available evidence suggests that central Ohio's water resources are abundant relative to current withdrawals, and even high-end projections of data center water demand remain modest compared with other major regional uses. At the same time, the findings underscore that water availability alone will not determine development feasibility; planning, coordination, and the timely expansion of intake, treatment, and distribution infrastructure will be critical to keeping pace with the speed of data center development. In practical terms, the principal challenge in the corridor is less one of resource scarcity than of infrastructure readiness and coordinated implementation.

Overview of Findings

A range of publicly available state, local, and federal sources were reviewed to assess existing water-related opportunities and impacts in the Columbus metropolitan area, with a focus on the Upper Scioto HUC-8 watershed. Based on the available data, the corridor does not appear to face significant water-related constraints on near-term data center development. The watershed is supported by substantial river flows, storage, and groundwater resources, suggesting capacity to accommodate incremental demands, including continued data center growth. This conclusion is contingent upon withdrawals planned against dependable drought-period supply and matched with adequate intake, treatment, and distribution capacity for local utilities. The Upper Scioto watershed appears to have substantial water capacity of more than 10,700 MGD, and total consumption[49] is estimated to be less than 5% of total available water supply.

The sections that follow build on these findings to provide a structured view of current conditions and how they may evolve over time.

---

[49] Total consumption is defined in the watershed as the total volume of water people and human systems remove or divert from surface water or groundwater for human uses, such as public water supply, industrial use, irrigation, mining, or power generation, among others.

Table 2. Columbus Corridor Analysis: Findings

Highlighted Findings
Finding 1: Data center capacity in the area stands at roughly 1.9 GW today and could grow five- to eightfold, reaching 10–15 GW by 2030.
Finding 2: Power generation—not data center cooling—is the primary driver of water demand in Columbus.
Finding 3: Central Ohio is generally water-rich with ample surface water resources (e.g. lakes and rivers).
Finding 4: Even under the highest consumption scenario, data center water demand remains small relative to other major water uses in Central Ohio.
Finding 5: Planning and coordination are primary areas of opportunity as data center development often outpaces water infrastructure expansion.

Corridor Overview

Columbus, Ohio's largest city (~933,263 residents in 2024), is expected to continue growing, while new industrial and data center development increases pressure on the reliability of the region's water supply and the condition of the rivers and reservoirs that sustain it. Columbus, within the Upper Scioto HUC-8 watershed, was identified as a priority because it is Ohio's primary data center hub, with the strongest combined concentration of existing and planned development across the shortlisted corridors, supported by dense fiber infrastructure and a strong substation presence. By 2026, the Columbus metro area hosted more than 95% of Ohio's data center.[50] The city depends heavily on surface water from the Scioto River system, including the Griggs and O'Shaughnessy reservoirs, which are critical drinking-water sources for central Ohio.

The World Resources Institute (WRI)'s Aqueduct Water Risk Atlas generally characterizes much of the eastern United States and the Great Lakes region, including Ohio, as having relatively low baseline water stress compared with more water-limited regions of the country. In the Upper Scioto watershed, supply is dominated by Upper Scioto River flows (~94%), with limited groundwater and reservoir contribution, and the system is surface water and river prevalent, meaning upstream changes can be transmitted quickly to downstream conditions, particularly during warm, low-flow periods when dilution is reduced. The watershed drains to Griggs and O'Shaughnessy reservoirs, which are drinking

---

[50] S&P Global Market Intelligence. *Datacenter Energy Intelligence*. S&P Global Market Intelligence. https://www.spglobal.com/market-intelligence/en/solutions/products/datacenter-energy-intelligence

water sources for the City of Columbus.[51] Surface water supplies are generally more susceptible to drought because rivers, lakes, and reservoirs depend on recent rainfall and snowmelt, and they can decline quickly when inflows decline and evaporation increases. In the Columbus region, drought occurred in 25% of weeks (about 75 weeks per decade), and the most severe D4 conditions, the U.S. Drought Monitor's categorization of "exceptionally dry" with 0th–2nd percentile on drought indicators, occurred in just 0.2% of weeks (about one week per decade)[55]; even so, drought has not materially reduced the region's water sources, though it has prompted the Columbus area to begin drawing on its water reserves.[56]

Columbus Water Snapshot[52]

Overall, the area has relatively low baseline water stress, but it still represents periodic drought conditions. Most dry periods are mild to moderate and manageable.

- WRI Water Stress Index: Relatively Low
- 75 weeks per decade: D0 or higher, "abnormally dry," going into or coming out of drought
- 34 weeks per decade: D1 or higher, "moderate drought," some damage to crops, voluntary use restrictions, and some water shortages developing
- 1 week per decade: D4, "exceptional dry," widespread crop losses and shortages of reservoir, stream, and wells creating water emergencies
- Future indicators suggest drought conditions in central Ohio may become more frequent over time, increasing the importance of proactive water-resource planning[53,54]

Given central Ohio's water resources, Columbus appears to be well-positioned to accommodate data center growth from a water perspective, with sufficient planning, funding, coordination, and transparency, as described below.

Water Consumption from Data Centers

Current data center capacity in the area is ~1.9 GW, with growth scenarios reaching a total capacity between 10-15 GW by 2030. Columbus' water demand is driven more by power-generation demand than by data-center cooling demands.

---

[51] These indicators show how often the area experiences different levels of dryness and drought over a typical 10-year period. The drought categories range from D0 ("abnormally dry") to D4 ("exceptional drought"), with higher levels indicating more severe impacts on water supplies, agriculture, and communities. "Weeks per decade" refers to the total number of weeks these conditions occurred over 10 years, not necessarily all in a row. The WRI Water Stress Index is a separate measure of baseline pressure on water resources; "relatively low" means overall water demand is comparatively low relative to available supply.

[52] https://climate.osu.edu/news/ohios-historic-drought-2024-how-early-warning-systems-mitigated-crisis#:~:text=March%2014%2C%202025-,Ohio's%20Historic%20Drought%20of%202024:%20How%20Early%20Warning%20Systems%20Mitigated,Response%20Team%2C%20which%20quickly%

[53] https://19january2017snapshot.epa.gov/sites/production/files/2016-09/documents/climate-change-oh.pdf

[54] Ohio Environmental Protection Agency. *Biological and Water Quality Reports*. Ohio EPA. https://epa.ohio.gov/divisions-and-offices/surface-water/reports-data/biological-and-water-quality-reports

[55] National Integrated Drought Information System. *Ohio*. Drought.gov.

[56] WOSU. *Columbus Dips Into Water Reserves as Drought Continues in Central and Southeast Ohio*. WOSU. https://www.wosu.org/2024-09-17/columbus-dips-into-water-reserves-as-drought-continues-in-central-and-southeast-ohio

Scenario analysis shows that by 2030, direct data center water use could rise significantly, but water consumption from associated with supporting electricity generation could be even larger, especially if the generation mix leans heavily on water-intensive fuels like nuclear or steam-based thermal plants. The high-end case is considered unlikely, but it is still useful as a planning stress test because it shows how fast local water demand could escalate under aggressive growth and less efficient technology assumptions. In practical terms, the analysis suggests Columbus should plan for water and energy infrastructure together, with particular attention to where new generation is sited and what technologies it uses.

To assess water demand from data centers, the analysis examined the compounded annual growth rate of data center capacity in the Columbus corridor, the Water Usage Effectiveness (WUE) for existing data centers, the projected WUE of future data centers, as well as the additional power-plant buildout to support the added energy demands from the new data centers. Base-, low-, and high-water consumption scenarios were developed to illustrate the range of potential outcomes for data center water consumption and the corresponding water consumption from power plants supporting data center energy needs.

To identify data center capacity growth by 2030, the analysis used DC Byte data to estimate operational data center capacity (in MW), data center capacity under construction for 2027, committed capacity for 2028, and early-stage capacity for 2029, and then applied a growth rate for 2030 based on aggregated capacity through 2029. The analysis evaluated 30% and 45% CAGR scenarios, with 30% representing an aggressive national average growth case and 45% representing a higher-growth scenario. The 45% scenario should be viewed as a high-water-mark benchmark, rather than a base-case forecast. The 45% rate aligns with American Electric Power (AEP) Ohio's signed electricity service agreements (ESAs) in 2025 for 12.2 GW of new data center demand and February 2026 announcement of signed ESAs for an additional 5.6 GW.[57] Although AEP Ohio's data center tariff allows a four-year ramp up period for customers to meet contracted capacity, limited visibility into ESAs led the analysis to assume that electricity generation would supply 100% of the forecasted data center capacity that comes online in a given year. The 17.8 GW increase would represent a 58% increase over Ohio's 2024 peak demand of 30.5 GW.[58]

Operational and forecasted data center capacity, together with each facility's year of operation were used to estimate data center water consumption. While industry analysts report an average WUE of 1.8 L/kWh for data centers, sustainability and operational reports from the major colocation and hyperscale

---

[57] Public Utilities Commission of Ohio. *Document available via PUCO Docketing Information System, CMID A1001001A26B12B61453D00940*. PUCO.

[58] DataCenter Knowledge."A Guide to Data Center Water Usage Effectiveness (WUE) and Best Practices." January 17, 2025. https://www.datacenter-knowledge.com/cooling/a-guide-to-data-center-water-usage-effectiveness-wue-and-best-practices

developers and operators indicate achieved WUE levels randing from 0.2–1.15 L/kWh, with an average of 0.45 L/kWh.[59,60] For future data centers, analysts project that emerging cooling technologies could reduce WUE between 0.001 L/kWh and 0.6 L/kWh.[61,62]

Due to the significant energy demands of data centers, utilities will need to procure new generation to meet steady-state demand. The state of Ohio prevents electric utilities from owning and operating their own generation. As a result, utilities purchase electricity from the PJM wholesale electricity market. Although PJM's proposed BYONG rule for data centers may help alleviate utilities and PJM's need to secure energy supply and invest heavily in transmission upgrades, the siting of generation near data centers could place additional pressure on local water availability. This analysis presents the water consumption from electricity generation under the assumption that the generation is located in Columbus/Central Ohio region. In practice, however, that generation would likely be dispersed across the state and the broader PJM region.

Several generation portfolio buildout scenarios were analyzed: (1) a current-portfolio scenario, in which future power plant buildout aligns with Ohio's current generation fuel mix; (2) a renewable energy and natural gas scenario, in which future generation supports additional data center capacity that will consist of 45% natural gas combustion, 15% nuclear, and 40% renewable energy; and (3) a nuclear and natural gas focused scenario in which new generation consists of 10% coal, 40% natural gas, 45% nuclear, and 5% renewable energy. Fuel type has a significant effect on water consumption from electricity generation. Fuels that rely on steam turbines to generate electricity, such as coal and conventional nuclear, can consume up to 950 gallons of water per megawatt-hour of electricity generated.[63] By contrast, more than 85% of natural gas power plants in Ohio use combustion turbines, which consume closer to 200 gal/MWh, substantially less than coal and conventional nuclear. Renewable energy technologies, such as wind, solar photovoltaic, and hydropower consume a negligible amount of water.

Table 3 shows inputs for the three scenarios in the forecasts for data center and corresponding power plant water consumption in the Columbus-Central Ohio region. Although it is unlikely that all or even a majority of the generation needed to support data centers in the Columbus/Central Ohio region will be located in the corridor, the analysis assumes that due to PJM's proposed BYONG rules, data centers will bring their own generation or will receive supply from generation locally.

---

[59] DataCenter Knowledge."A Guide to Data Center Water Usage Effectiveness (WUE) and Best Practices." January 17, 2025. https://www.datacenterknowledge.com/cooling/a-guide-to-data-center-water-usage-effectiveness-wue-and-best-practices

[60] Equinix. "What Is Water Usage Effectiveness (WUE) in Data Centers?" *Equinix Blog*, November 13, 2024. https://blog.equinix.com/blog/2024/11/13/what-is-water-usage-effectiveness-wue-in-data-centers/

[61] Vantage Data Centers. "Sustainability." *Vantage Data Centers*. https://vantage-dc.com/features/sustainability/

[62] Shehabi, Arman, Alex Newkirk, Sarah J. Smith, et al. *2024 United States Data Center Energy Usage Report*. Lawrence Berkeley National Laboratory, December 19, 2024. DOI: 10.71468/P1WC7Q.

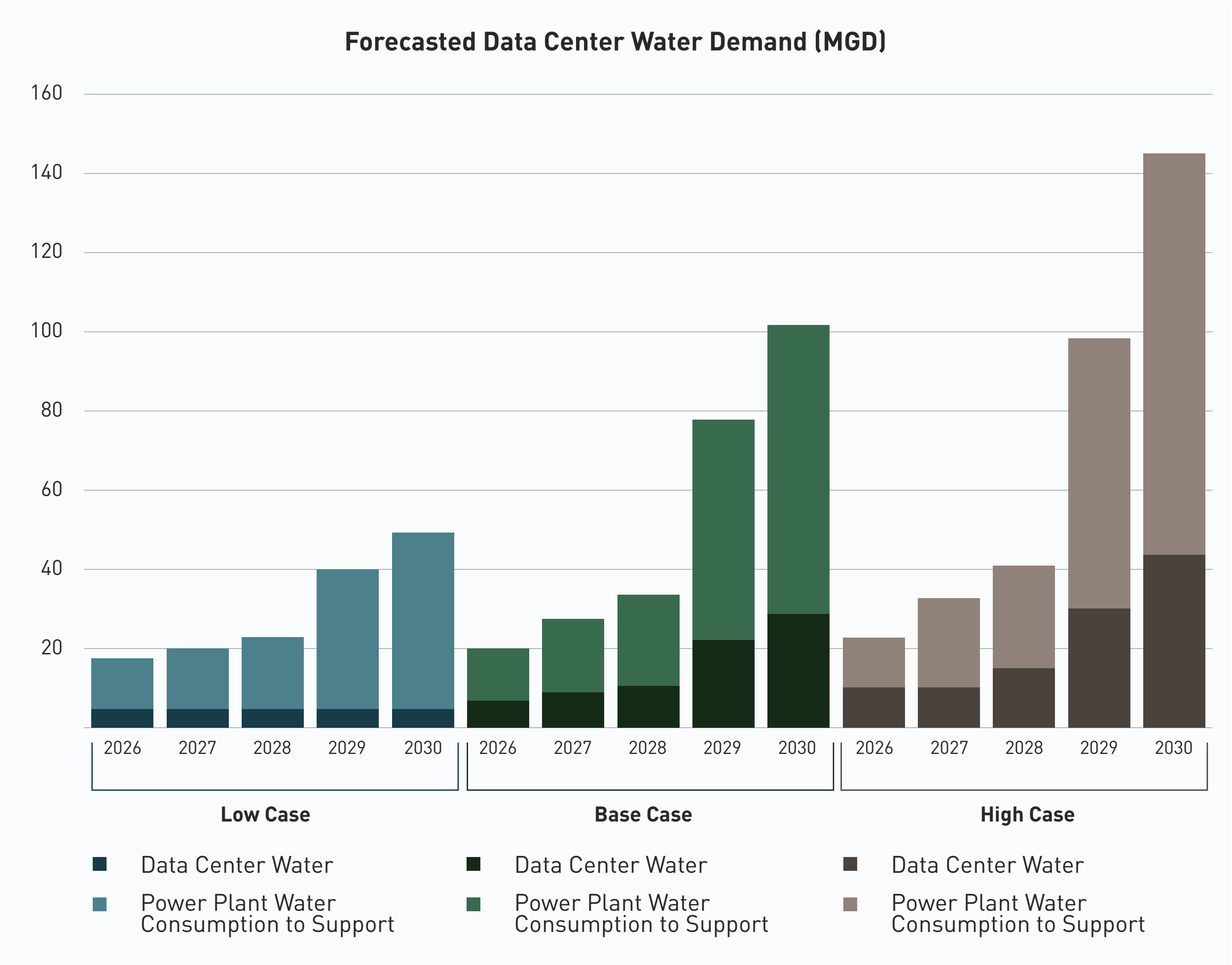
[63] Macknick, Jordan, Robin Newmark, Garvin Heath, and K.C. Hallett. *A Review of Operational Water Consumption and Withdrawal Factors for Electricity Generating Technologies*. NREL/TP-6A20-50900. National Renewable Energy Laboratory, March 2011.https://docs.nrel.gov/docs/fy11osti/50900.pdf

Table 3. Data Center Water Consumption Scenarios

Scenario	CAGR	Operational Data Center WUE (L/kWh)	Future Data Center WUE (L/kWh)	Generation Buildout
Base Case	30%	1	0.45	Current Portfolio
Low Water Consumption	30%	0.45	0.001	Renewable Energy and Natural Gas focused
High Water Consumption	45%	1.8	0.6	Conventional Nuclear and Natural Gas focused

Figure 5 shows the forecasted water demand in MGD for the Columbus/Central Ohio corridor through 2030 in the base case, low-water consumption case, and high-water consumption case. Due to the aggressive assumptions required for the high water consumption scenario—namely, that current data centers in the region have a WUE of 1.8 L/kWh (it is likely to be significantly lower), future WUE will be 0.6 L/kWh (most industry analysts forecast hyperscale and AI data centers will move to liquid cooling to support high cooling requirements), and that future electricity generation will include up to 40% nuclear generation (current construction timelines for new, traditional nuclear reactors are 10-15 years), this scenario is considered highly unlikely. These scenarios highlight the unlikely water consumption demand from data centers alone, even in the most aggressive scenarios may reach 43.7 MGD by 2030, however, water consumption from generation will be the larger driver of total water demand, adding as much as 100 MGD by 2030. This scenario is meant to illustrate a “worst-case” scenario for planning purposes.

Figure 5: Data Center Water Demand



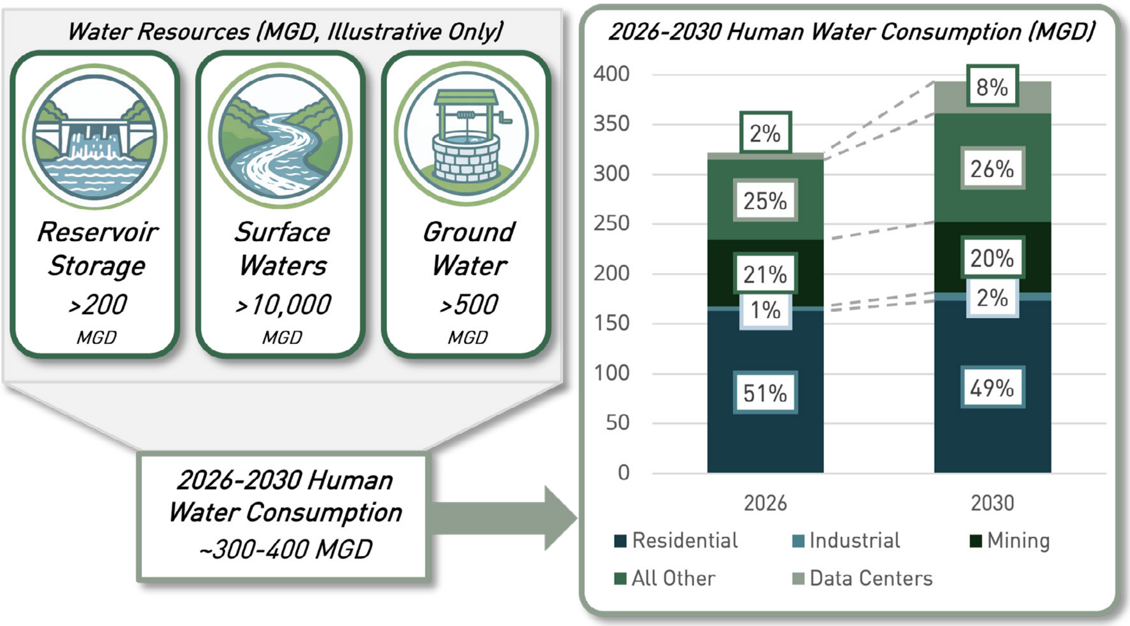
Water Resources Availability

Total water consumption in the Central Ohio region is estimated to account for less than 5% of available water resources, while forecasted data center water demand is estimated at approximately 0.25% to 0.5% of total available water resources.

The Columbus corridor has a substantial water resource base that is supported primarily by surface water flows, with smaller contributions from storage and groundwater. As shown in Figure 7, Upper Scioto River gauge flows, according to USGS, represent more than 4 trillion gallons annually, or 94% of the available supply. The remaining supply is split between groundwater availability of approximately 189,000 MG (about 4%) and reservoir storage of approximately 90,000 MG (about 2%). This supply is then distributed across demand sectors, with the largest sectors being Residential (156 MGD), Mining (64 MGD), and Non-residential utilities (54 MGD).

Estimated total consumption is less than 5% of total water available, according to the Ohio Department of Natural Resources (ODNR) Water Withdrawals Atlas, as shown in Figure 6.

Figure 6. Water Withdrawals Compared to Available Water Resources, Columbus. Source: ODNR, OEPA, USGS



When comparing estimated data center water use with overall water consumption, data centers account for less than 5% of total water consumed in 2026. All other non-personal demands— including golf courses, manufacturing, industrial uses, agriculture, and mining—account for approximately 44%, while residential water use accounts for approximately 50%. The largest portion of water consumed is residential use, estimated at 70 gallons per day per person, according to the Central Ohio Regional Water Study.[64]

This scale of surface water availability positions the Central Ohio region to accommodate incremental demand associated with increased total consumption, including data center growth, provided that sufficient planning and coordination to meet rising infrastructure needs occur in a timely manner.

Manufacturing Outlook and Other Industry Competition

In the short term, there is no evidence of a major short-term impact by 2030. Manufacturing growth is projected to be modest at about 1.54% CAGR with gradual demand growth rather than a sharp step-change. The more meaningful near-term concern is localized pressure: Columbus is concentrated in water-intensive sectors like chemicals, food, pharmaceuticals, bottling, and some existing data centers that use evaporative cooling. That means utilities and planners may see site-specific capacity, permitting, and infrastructure strain in fast-growing corridors, even if the broader region does not face an immediate water crisis.

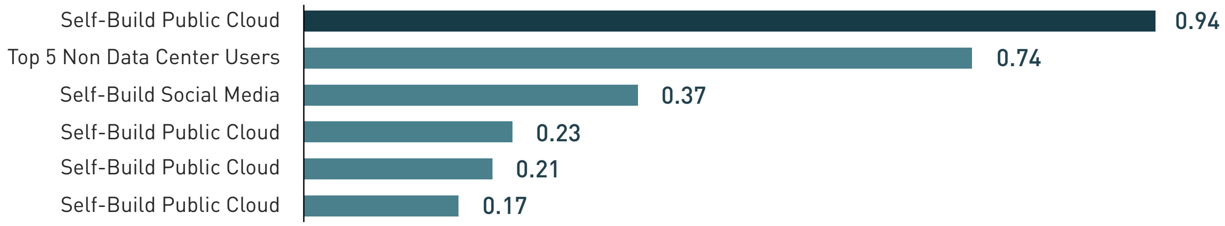
---

[64] Central Ohio Regional Water Study, OEPA

In Central Ohio, residential demand represents a significant share of overall use, while nonresidential demand spans manufacturing, industrial activity, agriculture, mining, and other commercial uses. Regarding manufacturing growth potential, manufacturing as a whole in Ohio is projected to grow slowly through 2030, and employment in the sector has rebounded to match pre-pandemic highs from 2019.[65,66] Based on historical data from 2020 to 2025, the projected compound annual growth rate (CAGR) is 1.54%.[67]

Columbus has a relatively high concentration of water-intensive industries, particularly in pharmaceutical chemicals and bottling. The region also shows strength in Chemicals (NAICS 325), Plastics & Rubber (NAICS 326), and Food (NAICS 311), with chemicals standing out as the most water- and energy-intensive segment. This industrial profile aligns with the region's broader growth trajectory, as JobsOhio identified semiconductors, data centers, and precision manufacturing as priority sectors in 2025.[68] That momentum is reinforced by Intel's 2022 announcement of its Ohio One chip factories in Licking County.[69]

Figure 7. Columbus Industrial Water Withdrawals, MGD. Source: City of Columbus EnergyStar Benchmarking Program and DC Byte



A comparison of select Central Ohio data centers suggests their water demand may exceed that of other industries, as shown in Figure 7. Using publicly available City of Columbus Energy Star Benchmarking data, where select facilities report water use efficiency according to square footage of their facility and footprint, the analysis found that some of the largest reporting facilities have higher water use on a per-facility basis. However, these existing data centers rely on water-intensive evaporative cooling, and future facilities are expected to use less water as cooling technologies evolve.

Conclusions and Considerations

Central Ohio can likely support continued data center growth, but success depends on early coordination to keep infrastructure and permitting aligned with the pace of development.

---

[65] Ohio Department of Job and Family Services, Bureau of Labor Market Information. (n.d.). *2030 job outlook: JobsOhio Network, West Ohio.* https://ohiolmi.com/_docs/proj/jobsohio/west.pdf; Ohio Department of Job and Family Services, Bureau of Labor Market Information. (n.d.). *Current Employment Statistics (CES) by industry sector*. Retrieved April 28, 2026. https://ohiolmi.com/home/CES/cesSector

[66] U.S. Bureau of Labor Statistics. (n.d.). *Business employment dynamics in Ohio*. Retrieved April 28, 2026. https://www.bls.gov/regions/midwest/news-release/businessemploymentdynamics_ohio.htm

[67] U.S. Bureau of Labor Statistics. (n.d.). *Series report: SMU39181403000000001*.

[68] Jobs Ohio. (2024). *Annual report 2024*. Jobs Ohio. https://www.jobsohio.com/newsroom/reports-publications/annual-report-2024

[69] Intel Corporation. (2025, February 28). *Press kit: Intel invests in Ohio*. Intel Newsroom. https://newsroom.intel.com/press-kit/intel-invests-ohio

Central Ohio is already responding to rapid growth pressures with actions that can support continued data center development, including Columbus Water exploration of water reuse, targeted rate and tariff structures that better align large industrial loads with infrastructure costs, and planned treatment expansions. However, the biggest determinant of success will be whether cross-sector planning keeps pace with the speed of data center development and with evolving technology and resource constraints. In practice, developers and utilities should plan early for scenarios where projects are located outside existing service areas or in which interconnection timelines become a constraint, potentially requiring a "bring your own generation, water, and water treatment" approach, while also recognizing that Ohio EPA and Ohio DNR have established permitting pathways for both withdrawals and discharges when developers choose not to interconnect with existing infrastructure.

Overall, Central Ohio appears positioned to accommodate growth, but the timing mismatch between fast-moving development and slower water and wastewater infrastructure delivery increases the value of early coordination among developers, utilities, regulators, and other affected sectors to align siting, permitting, and capacity buildout with dependable drought-period supply and realistic project schedules.

Cincinnati Corridor

Water availability is unlikely to be a binding constraint on data center growth in the Cincinnati–Dayton Corridor. Even if data center capacity scales from roughly 65 MW today to 450-550 MW by 2030, forecasted cooling demand remains small relative to the region's broader water uses-especially power generation-and Southwest Ohio's large groundwater resources provide meaningful supply headroom. More broadly, the Midwest's reliance on both surface water and aquifers helps support that resilience, although water quality and infrastructure stress can still increase as precipitation and runoff become more variable. The practical implication is that the corridor's challenge is less about absolute water scarcity and more about proactive planning, siting, and infrastructure coordination to convert resource strength into development readiness.

Overview of Findings

A range of publicly available state, local, and federal sources were reviewed to characterize water availability, water quality, demand, and growth considerations in the Cincinnati–Dayton Corridor, with a focus on the Middle Ohio–Laughery, Little Miami, Lower Great Miami, and Whitewater Hydrologic Unit Code 8 (HUC 8) watersheds.

Current data center capacity in the area is considerably lower than in Columbus, with about 65 MW of available capacity. Growth scenarios for data center capacity, based on 30% and 45% CAGRs, forecast that 2030 capacity could reach between 450-550 MW. Water use in the region has been increasing slightly in recent years, with water withdrawals increasing by 2% between 2021 and 2023.[70]

Table 4. Cincinnati Corridor Analysis: Findings

Highlighted Findings
Finding 1: Current data center capacity in the area is ~65 MW, with growth scenarios between 450-550 MW by 2030
Finding 2: Power generation—not data center cooling—is the primary driver of water demand in Cincinnati and Dayton
Finding 3: Southwest Ohio benefits from abundant freshwater resources, with groundwater supplying most withdrawals
Finding 4: Data centers are expected to be a relatively minor contributor to overall water demand in the Cincinnati–Dayton region—even at peak consumption

The Cincinnati–Dayton corridor is poised to handle this growth, as their freshwater resources can support over 4,000 MGD in withdrawals, owing largely to its extensive aquifers.

Corridor Overview

Cincinnati is Ohio's third-largest city (population of about 315,000 in 2024[71]), and the broader Cincinnati–Dayton corridor (combined population of ~450,000[72]) is a major economic hub with durable-goods manufacturing, logistics, and technology growth. As data centers expand in Southwest Ohio, the practical question is whether local water supplies and utility systems can reliably serve new, concentrated demand without creating bottlenecks for existing customers.[73]

Cincinnati Water Snapshot

- WRI Water Stress Indices: Low Water Stress
- 69 weeks per decade: D0 or higher, "abnormally dry," going into or coming out of drought
- 30 weeks per decade: D1 or higher, "moderate drought" some damage to crops, voluntary use rest,rictions, and some water shortages developing
- 2 weeks per decade: D2 or higher, "severe drought," crop losses likely, water shortages common
- Primary industries: Automotive, Advanced Manufacturing

WRI's Aqueduct Water Risk Atlas groups Ohio with the Eastern United States, as having relatively low water stress compared with

---

[70] ODNR Water Withdrawals Atlas

[71] U.S. Census Bureau. (n.d.). QuickFacts: Cincinnati city, Ohio. Retrieved April 28, 2026. https://www.census.gov/quickfacts/fact/table/cincinnaticityohio/PST045224

[72] Data Commons. (n.d.). Ohio City. Retrieved April 28, 2026. https://datacommons.org/place/geoId/3921000

[73] U.S. Census Bureau. (2024). QuickFacts.

drought-prone areas in the Western and Great Plains regions. For the Cincinnati corridor, the water story is shaped by two strengths: the Ohio River, which is the primary drinking-water source for much of the Cincinnati area through Greater Cincinnati Water Works (GCWW), and significant groundwater resources that support communities and industrial users across the region, including the Great Miami Buried Valley Aquifer system supporting the Dayton region. This combination generally positions the corridor well from a water-supply standpoint, while still requiring coordination and planning among large users, and where withdrawals must be planned against dependable drought-period supply.[74]

Surface water supplies are less drought-tolerant and depend on inflows from recent precipitation events, causing surface waters to deplete rapidly as evaporation increases. In the Cincinnati region, drought occurred for approximately 31 weeks per decade, and the most severe D4 conditions occurred in just one week over the last decade.

Given Southwest Ohio's water resources, the region does not appear to face major water-availability constraints and appears positioned to accommodate incremental demand, including data center growth, provided withdrawals are matched with adequate intake, treatment, and distribution capacity in coordination with local utilities.

Water Consumption from Data Centers

Current data center capacity in the area is ~65 MW, with growth scenarios between 450-550 MW by 2030. Cincinnati and Dayton water demand is driven more by power-generation demand versus data-center cooling demands.

The same methodology was used in the Columbus-Central Ohio data center water demand forecast was applied to the Cincinnati corridor. The analysis used data from DC Byte to determine operational and planned data center capacity (in MW) through 2028 before applying a CAGR through 2030. Current operational capacity in the Cincinnati region is ~60 MW. Scenarios with a 30% and 45% CAGR were assessed with 30% based on an aggressive national average and the 45% rate accounting for recent announcements about new facilities with incremental operations through 2033.[75] As noted earlier, the 45% scenario should be viewed as a high-water-mark benchmark rather than a base-case forecast.

---

[74] WRI Aqueduct Water Risk Atlas; GCWW

[75] Data Center Dynamics. (n.d.). *Prologis details plans for data center campus outside Cincinnati, Ohio.* Retrieved April 28, 2026. https://www.datacenterdynamics.com/en/news/prologis-details-plans-for-data-center-campus-outside-cincinnati-ohio/

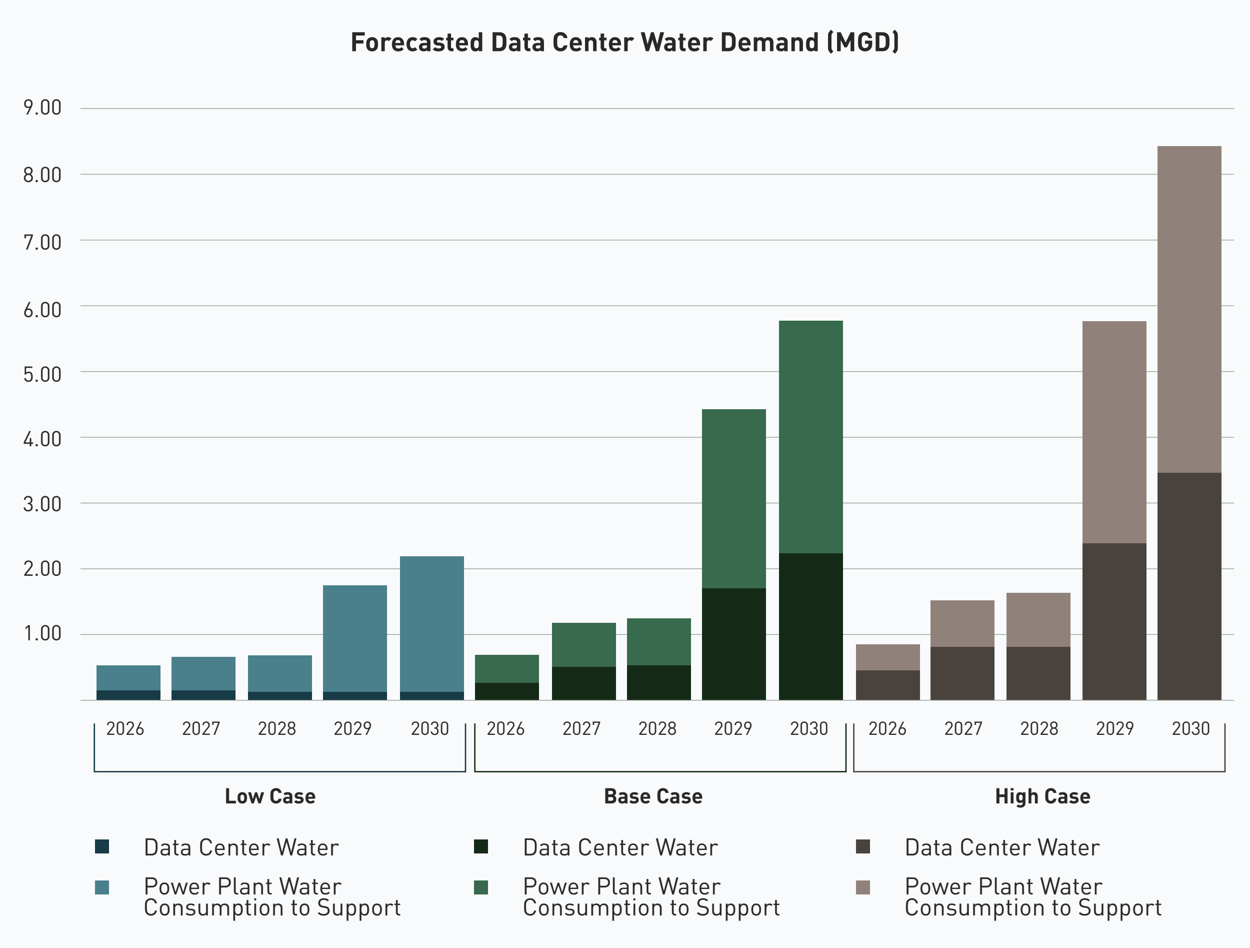
Table 5. Data Center Water Consumption Scenarios

Scenario	CAGR	Operational Data Center WUE (L/kWh)	Future Data Center WUE (L/kWh)	Generation Buildout
Base Case	30%	1	0.45	Current Portfolio
Low Water Consumption	30%	0.45	0.001	Renewable Energy and Natural Gas focused
High Water Consumption	45%	1.8	0.6	Nuclear and Natural Gas focused

Table 5 shows the inputs for the three scenarios in the forecasts for data center and corresponding power plant) water consumption in the Cincinnati region. Although it is unlikely that all or even a majority of the generation needed to support data centers in the Cincinnati region will be located in the corridor, the analysis is assumes that, due to PJM's proposed bring-your-own-generation rules, data centers will bring their own generation or will receive supply from generation locally.

Figure 8 shows the forecasted water demand in MGD for the Cincinnati corridor through 2030 in the base case, low-water consumption case, and high-water consumption case. Due to the aggressive assumptions required for the high water consumption scenario, namely, that current data centers in the region have a WUE of 1.8 L/kWh (though it is likely significantly lower), that future WUE will be 0.6 L/kWh (as most industry analysts forecast that hyperscale and AI data centers will move to liquid cooling to support high cooling requirements), and that future electricity generation will include up to 40% nuclear (given that current construction timelines for new, traditional nuclear reactors are 10-15 years), this scenario is considered highly unlikely. These scenarios highlight that water consumption demand from data centers alone, in the most aggressive scenarios may reach 3.5 MGD by 2030, with another 5 MGD from electricity generation to support the data centers.

Figure 8. Cincinnati Data Center Water Consumption



Water Resource Availability

Southwest Ohio has plentiful freshwater resources, with most withdrawals coming from groundwater. Total consumption is marginal when compared with total available water resources.

Cincinnati has plentiful water resources, but this depends largely on the abundant Great Miami Buried Valley Aquifer. As a "single source" aquifer (an aquifer that provides all drinking water to a certain area) throughout the greater Cincinnati area, it has approximately 1.5 trillion gallons of total storage with an underground depth of 250 ft and estimated yields of 300 MGD, accounting for 51% of the region's freshwater.[76] Other notable freshwater features include surface water in the region, including the Little Miami River's streamflow of 64.04 MGD[77], which accounts for 11% of water availability, and reservoirs accountable for the remaining 38%.[78]

---

[76] *Five facts about the Great Miami River Watershed.* (2013, November 9). *Columbus CEO.*

[77] U.S. Geological Survey. (n.d.). *Statistics for Ohio River at Cincinnati, OH - USGS Water Data for the Nation.*

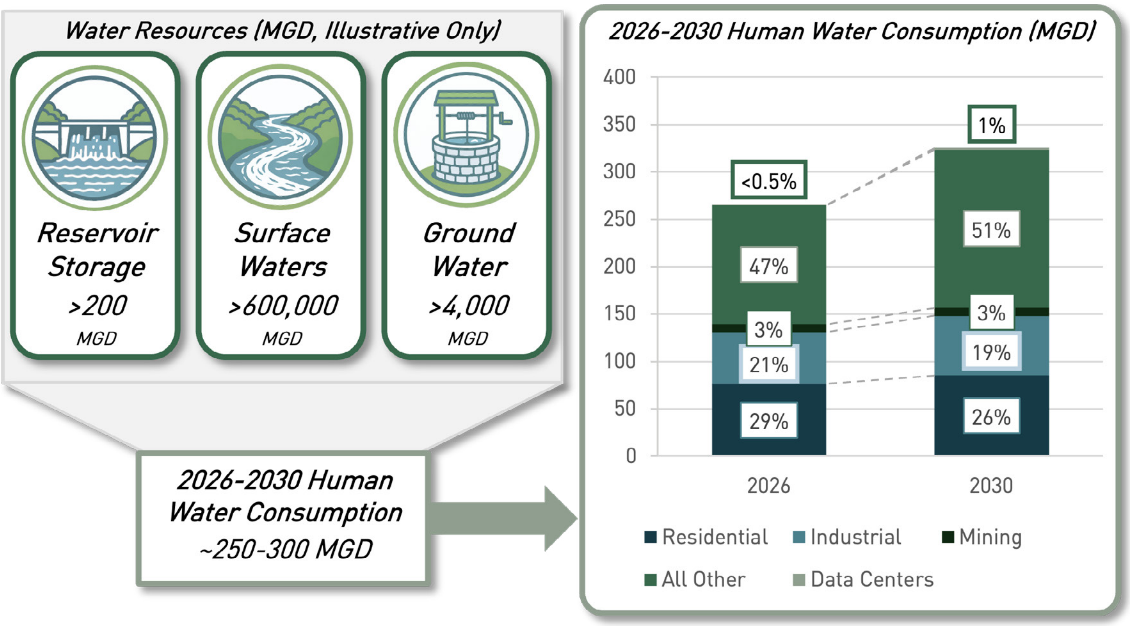
[78] Ohio Department of Natural Resources. (n.d.). *Ohio Dam Locator.*

Among competing water demands in the Cincinnati area, data centers currently represent a less significant source of demand. This is likely due to their decreased concentration compared to the Columbus area, while public utilities are the region's largest water users. Data centers are likely to draw water from existing public utility water lines if new construction occurs in more developed areas of the corridor.

The Cincinnati area's freshwater availability is dominated by groundwater (approximately 109,000 MG, or 51%), and smaller contributions from reservoir storage (approximately 81,000 MG, or 38%), and Little Miami River Gauge flow (23,375 MG, or 11%). Total reported freshwater withdrawals are 232.9 MGD in 2023, the most recent ODNR reporting year, and 2026 withdrawals projected to reach 244 MGD based on baseline water consumption growth.

Current annual water demand in the Cincinnati region is approximately 250 million gallons per day (MGD), which is approximately less than 1% of total available freshwater supply of 4,000 MGD for groundwater supplies and over 600,000 MGD for surface supplies. This suggests that the region has sufficient freshwater availability to meet potential future demand. However, because much of this supply is sourced from groundwater, water use cannot approach total apparent availability without considering sustainable withdrawal rates and aquifer recharge. Utilities have the largest consumption of water, with 57% of that segment being residential and the rest attributed to commercial and some industrial users. Industry in the Cincinnati corridor is proportionally a larger consumer compared to Columbus due to the large footprint of durable goods manufacturers throughout the area, and the advanced manufacturing market specifically is projected to grow.

Figure 9. Water Withdrawals Compared to Available Water Resources, Cincinnati. Source: ODNR, OEPA, USGS



Manufacturing Outlook and Other Industry Competition

The Cincinnati–Dayton corridor is a major population and industrial hub, shaped by its automotive manufacturing legacy and access to the Ohio River. Today, the region remains anchored in durable-goods manufacturing and extends across a broader metro area that includes parts of Kentucky and Indiana. In Cincinnati, durable-goods manufacturing is especially concentrated in automotive and aerospace along the Miami River corridor. These industries are energy-intensive but generally less water-intensive than chemicals and pharmaceuticals. Manufacturing accounts for 13.5% of Hamilton County GDP, versus 6.4% in Franklin County, suggesting Cincinnati is more reliant on manufacturing, while Columbus is more oriented toward technology and innovation.[79] By 2030, the sector is expected to grow more rapidly and increase by 6% relative to its 2025 GDP.[80]

Conclusions and Considerations

Cincinnati–Dayton is likely to see meaningful data center growth, but not at a scale that would approach Columbus, so the near-term water risk is less about direct on-site use and more about whether the region's power and groundwater systems can sustainably support incremental demand.

Data center capacity in the Cincinnati–Dayton corridor is projected to grow seven to tenfold, but from a small base, leaving the region well below Columbus in total scale—up to 600 MW versus as much as 12,000 MW. As lower-water cooling technologies become more common, the largest water demand associated with data centers is expected to come from electricity generation rather than from on-site cooling.

Because the region relies heavily on groundwater, developers may also look to groundwater as a supply source. The Ohio EPA already administers Consumptive Use Permits to monitor and track permitted withdrawals across industries, and its Southwest Ohio Regional Study is expected to provide more detailed estimates of groundwater availability across the region when published.

---

[78] Ohio Department of Development. (2022). *Ohio Gross Domestic Product Report 2022.*
[80] Powell, C. (2025). *Advanced Manufacturing Builds a Strong Future for Cincinnati.* JobsOhio.

DATA CENTERS IMPACT ON WATER QUALITY

Water Quality Analysis

Water quality in Ohio is shaped by recurring impairments such as E. coli, nutrients, and stormwater runoff. While mitigation can reduce development-related impacts, sustained watershed-scale planning and controls are needed to manage cumulative effects as growth continues.

Across Ohio, water quality is assessed against state water quality standards and reported through the Ohio EPA's Integrated Water Quality Monitoring and Assessment Report, which is describes overall conditions and identify waters that do not meet water quality goals under Clean Water Act reporting requirements.[81] Ohio EPA also organizes much of its surface water assessment and reporting around Hydrologic Unit Code (HUC) watersheds, using HUC 12 watershed assessment units as the core reporting unit for most streams and separate large river assessment units where drainage areas are larger. This statewide framing is important for Columbus because the Upper Scioto system is river-dominated system, so shifts in river conditions can directly affect treatment complexity and environmental impacts, particularly during warm, low-flow periods when dilution is reduced.

In the Upper Scioto Watershed, the statewide assessment framework is especially relevant for Columbus because this river-dominated system can quickly transmit upstream changes to downstream conditions, particularly during warm, low-flow periods when dilution is reduced. The watershed drains to Griggs and O'Shaughnessy reservoirs, which are key drinking water sources for the City of Columbus.[82]

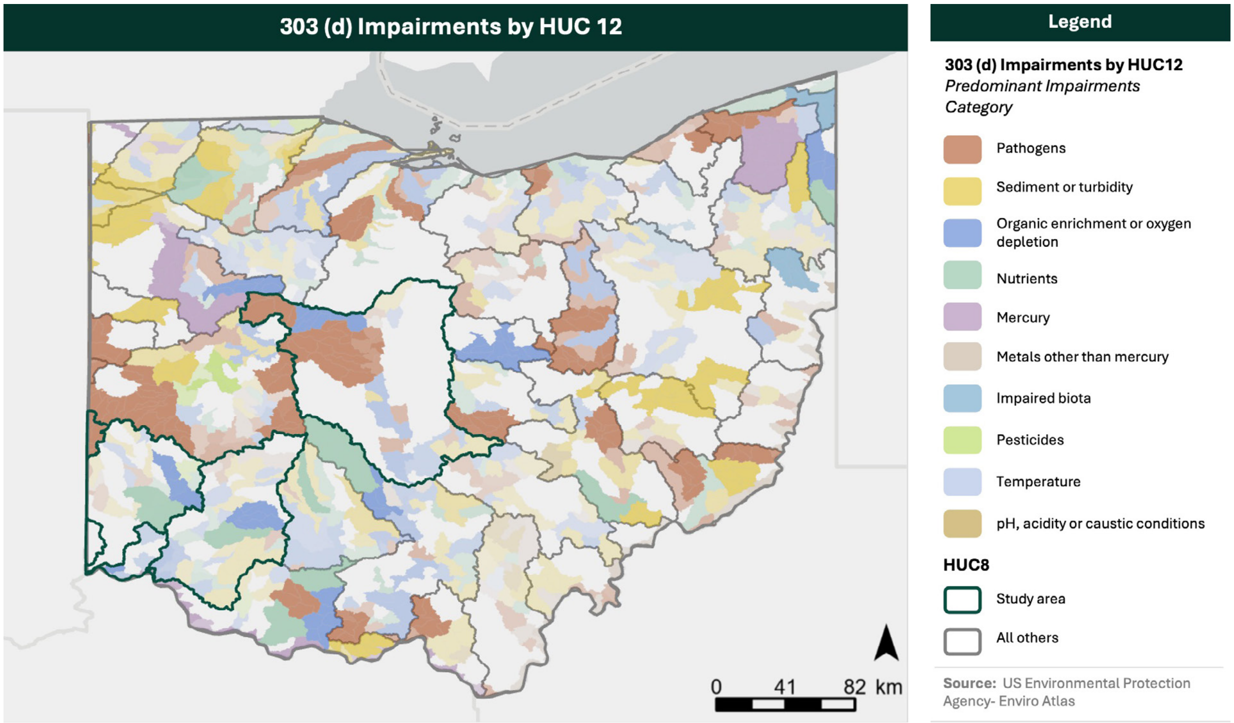
Ohio EPA evaluations in the Upper Scioto generally focus on whether waters support designated uses such as aquatic life and recreation, and they document mixed attainment at assessed locations where multiple stressors are present. Recurring concerns include E. coli exceedances that affect recreation, with sources commonly described as sewer overflows, failing household sewage treatment systems, wastewater discharges, livestock and manure impacts, and stormwater runoff as reflected in Ohio EPA water quality standards and associated E. coli assessment guidance.

---

[81] Ohio Environmental Protection Agency. (n.d.). *Ohio Integrated Water Quality Monitoring and Assessment Report*. Ohio EPA.
[82] Ohio Environmental Protection Agency. (n.d.). *Biological and Water Quality Reports*. Ohio EPA.

Nutrients are also a recurring focus, with phosphorus emphasized due to its role in freshwater productivity and in reservoir and stream responses, and nitrate-nitrogen noted as an episodic drinking-water concern when spikes increase treatment complexity.[83] A key recent planning milestone is Ohio EPA's Upper Scioto Loading Analysis Plan from April 2023, which outlines how impaired sites will be evaluated and advanced to actions such as additional monitoring, referrals, or Total Maximum Daily Load (TMDL) development.

Figure 10. Waterbody impairments by contaminant, study area outlined in black. (Scale: as shown), Source: US EPA.



Source: US Environmental Protection Agency- Enviro Atlas

Stormwater Impacts

Large data center campuses, like other large industrial buildings, can worsen local stormwater runoff, flooding, and erosion risks—even if basin-wide impacts appear modest—because added impervious cover changes how quickly and how much water moves offsite. This means site design and permitting cannot stop at parcel-level buildout: developers and regulators need watershed-scale stormwater controls, measurable performance standards, and mitigation strategies tailored to groundwater constraints to keep growth from creating cumulative water-management problems.

---

[83] Ohio Environmental Protection Agency. (2021, October 14). *Nutrient Pollution - Finding Solutions*. Ohio EPA.

Construction of new facilities can alter rainwater drainage and runoff dynamics. Hyperscale data center campuses, like other large industrial facilities, introduce large expanses of impervious cover such as roofs, pavement, and walkways, that reduce infiltration and increase both the volume of stormwater runoff and the speed at which it is conveyed to downstream ditches, culverts, and streams. While these changes can be difficult to detect at the scale of large basins, they can be consequential in small watersheds, where even a modest cluster of facilities may accelerate runoff, elevate peak flows, and increase localized flooding and erosion risks near sensitive receptors such as residential neighborhoods or schools.

The scenario below illustrates potential impacts based on an anonymized site using publicly available federal datasets and established engineering methodology. The analysis examines changes in stormwater runoff associated with a notional data center, or any other facility of similar size. The constructed site is similar in scale to a real hyperscale facility, including parking areas, internal access roads and fire lanes, ground-level cooling tower mechanical yards, a utility substation pad, fuel containment areas, and walkways. This approach produces a scenario that is realistic in its physical configuration and proportions without being tied to any specific operator, location, or permitting decision. A full description of the scenario structure, hydrologic methodology, and groundwater vulnerability assessment is provided in Appendix I-Scenario structure, hydrologic methodology, and groundwater vulnerability assessment.

The analysis centers on a 266.6-acre dissolved parcel in Warren County, Ohio, located within the Greater Miami River basin. Warren County was selected because it lies directly over the Greater Miami Buried Valley Aquifer, which supplies drinking water to more than one million residents in the Dayton, Middletown, and Hamilton service areas.[84]

The scenario, parcel, and county were selected for illustrative purposes only and do not represent any existing, proposed, or announced data center project or any specific site of concern.

Three data hall buildings were placed within the parcel alongside the full suite of supporting impervious infrastructure—parking, roads, cooling yards, a substation pad, fuel containment areas, and walkways—with feature proportions derived from published hyperscale benchmarks.[85,86,87,88,89] Figure 11 compares land cover across the two scenarios: in the standard buildout, roughly two-thirds of the campus is impervious, whereas the mitigated buildout converts a portion of that area into green roofs, pervious surfaces, and managed stormwater areas.

---

[84] Miami Conservancy District. (n.d.). *What is an aquifer?* MCD Water; U.S. Environmental Protection Agency. (1988, May 4). *Sole source aquifer designation—Greater Miami Buried Valley Aquifer System. Federal Register, 53(87)*, 15876.

[85] Uptime Institute. (2023). *Annual global data center survey results 2023.*

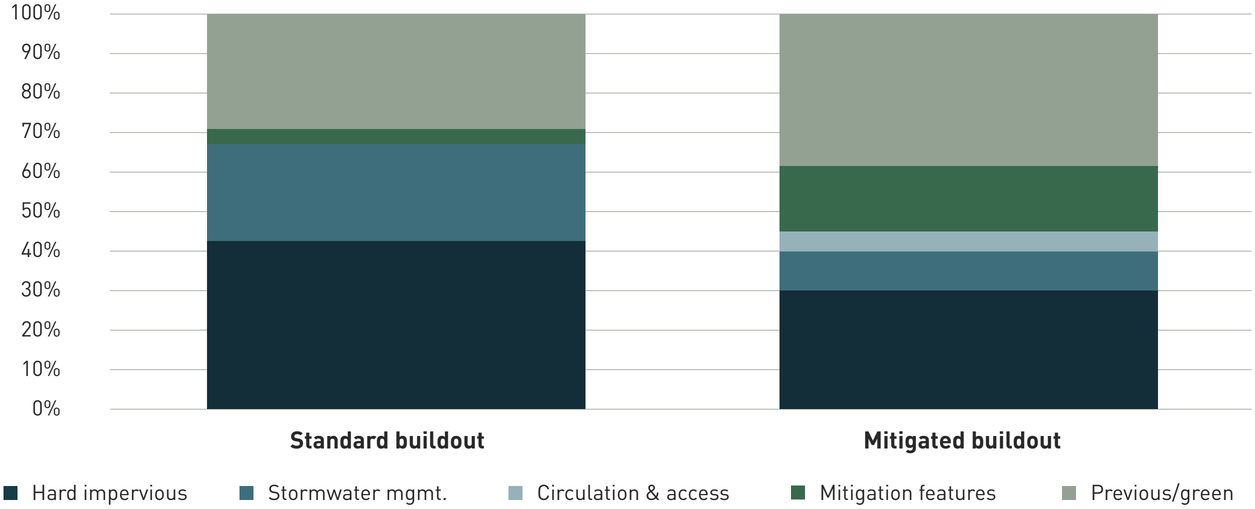
[86] CBRE. (n.d.). *North America data center trends H2 2024.* cbre.com

[87] National Fire Protection Association. (2023). *NFPA 1: Fire code* (2024 ed.).

[88] U.S. Environmental Protection Agency. (n.d.). *40 CFR Part 112—Oil pollution prevention. Electronic Code of Federal Regulations.* ecfr.gov

[89] ASHRAE. (n.d.). *Data center design and operation guidance.* ashrae.org

Figure 11. Land cover distribution by category — standard and mitigated buildout scenarios



Impervious surfaces—such as roofs, pavement, and walkways that prevent rainfall from soaking into the ground—are the primary driver of hydrologic change because they reduce infiltration and speed up drainage, thereby increases runoff volume, raises peak discharges, and shortens the time to peak, often most noticeably at local drainage scales. Mitigation such as green roofs and green infrastructure with detention or retention and controlled release can reduce peak flows relative to an unmitigated buildout, but these measures may not fully restore predevelopment conditions due to the remaining impervious footprint, storage limits, and site constraints, including groundwater vulnerability, which may restrict infiltration approaches and shift solutions toward detention and water quality treatment. Because impacts can accumulate across a catchment (for example, a HUC12 watershed) as multiple projects are added, managing connected impervious area, using distributed storage, coordinating stormwater controls at the watershed scale, and setting measurable performance targets supported by operations and maintenance can help mitigate impacts and better align data center growth with water resource management.

SUMMARY OF FINDINGS

The two analyzed priority data center corridors—Columbus and Cincinnati–Dayton—appear broadly capable of supporting substantial additional data center growth from a water-resource perspective through 2030. Across both corridors, available evidence suggests that water availability is unlikely to be the primary limiting factor. Instead, the more important constraints are likely to be the pace of infrastructure expansion, the interaction between water and power planning, wastewater and discharge management in certain settings, and the cumulative local effects of stormwater runoff, siting, and public acceptance.

Overall Conclusion

The central finding of this study is that Ohio is generally positioned to accommodate additional data center development without creating major near-term water supply constraints, provided that growth is paired with timely planning, utility coordination, and site-specific mitigation. This conclusion holds in both corridors analyzed, although for different reasons.

In Columbus, the scale of expected data center growth is much larger, with current capacity already concentrated in the region and modeled growth scenarios reaching roughly 10–15 GW by 2030. Even at that scale, direct data center water demand remains small relative to total available regional water resources and other major uses. However, the speed of development heightens the importance of coordinated expansion of intake, treatment, distribution, wastewater, and electric infrastructure.

In Cincinnati–Dayton, current data center capacity is much smaller—approximately 65 MW today, with scenarios reaching roughly 450–550 MW by 2030. The corridor benefits from substantial groundwater resources and appears even less likely than Columbus to face water availability as a binding constraint over the study period. The key implication is that the region's challenge is not resource scarcity but the conversion of resource strength into development readiness through early planning and well-managed siting decisions.

Water Availability

Across both corridors, the study indicates that water availability is favorable relative to modeled data center demand. Central Ohio has major surface-water resources, including the Upper Scioto system and associated reservoirs, while Southwest Ohio has significant groundwater supply, including large aquifer systems. In both cases, current and projected data center water use is small relative to broader regional supply.

That said, water availability should not be interpreted as unlimited practical capacity. Dependable supply during drought periods, utility-specific treatment and delivery constraints, and the lead time required to construct new infrastructure remain important considerations. In other words, a corridor may be water-rich in aggregate while still facing local timing, siting, or service-area constraints. This is especially relevant where development moves faster than utilities can finance, permit, and deliver supporting infrastructure.

The analysis also shows that the largest water effect associated with data center growth may occur indirectly through electricity generation rather than directly through on-site cooling. As facilities become more efficient and certain emerging cooling technologies reduce on-site water use, the importance of generation-side water consumption grows. This means that future water impacts will depend not only on where data centers are built, but also on how incremental power is generated and where that generation occurs. For planning purposes, Ohio should therefore treat water and energy infrastructure as linked systems rather than as separate workstreams.

Water Quality and Stormwater

The study finds that water-quality risks associated with data center growth are generally manageable, but not negligible. Ohio's regulatory and permitting frameworks provide established pathways for withdrawals, wastewater discharges, and stormwater management. In addition, most existing data centers in Ohio appear to be served by to public water and wastewater systems, reducing the likelihood of direct untreated discharges to surface waters.

The most consistent local water-quality risk identified in this study is stormwater runoff associated with large impervious surfaces. Data center campuses typically include expansive roofs, paved areas, internal roadways, cooling yards, substations, and related infrastructure. Together, these features reduce infiltration, increase runoff volumes, accelerate time to peak, and can raise localized flooding and erosion risks, particularly in smaller watersheds and near sensitive receptors.

The notional site analysis reinforced this point. Under an unmitigated buildout scenario, modeled runoff increased materially relative to pre-development conditions. Low-impact infrastructure and detention-based mitigation can reduce those impacts, but they do not necessarily restore predevelopment hydrology, especially where large impervious footprints remain or where groundwater vulnerability constrains infiltration-based strategies. As a result, stormwater performance should be treated as a core siting and design issue, not a downstream compliance exercise.

Corridor-specific Implications

The two corridors do not present identical risk profiles.

Columbus is the higher-priority planning case because of its scale, concentration of existing facilities, and dependence on a river-dominated surface water system. The Upper Scioto system can transmit upstream water-quality changes quickly to downstream drinking water sources, particularly during warm, low-flow periods when dilution is reduced. For Columbus, the implication is not that data center growth should slow, but that it should be paired with stronger coordination on source-water protection, utility expansion, drought-period planning, and cumulative infrastructure forecasting.

The Cincinnati–Dayton corridor represents a smaller, but still important growth corridor. Its water outlook is strengthened by abundant groundwater resources and a much lower near-term data center demand base. However, the corridor is not risk-free. Localized stormwater impacts, groundwater-sensitive siting, and coordination across multiple jurisdictions remain important—particularly where development may occur over sensitive aquifer areas or in smaller catchments where cumulative runoff effects are less easily absorbed.

What Will Matter Most Going Forward

Based on the analysis, the most important enablers of responsible data center growth in Ohio are as follows:

- Plant water, wastewater, and power together. The water footprint of data center growth depends heavily on electricity supply, not just cooling technology.
- Prioritize early utility and regulator coordination. The main near-term risk is not absolute water scarcity, but misalignment in infrastructure timelines.
- Use site design to manage runoff from the outset. Impervious cover and drainage design are major determinants of local water quality impact.
- Match mitigation to local hydrogeology. In sensitive aquifer areas, detention, treatment, and controlled release may be more appropriate than aggressive infiltration.
- Account for cumulative impacts at the watershed scale. Multiple facilities in the same catchment can create meaningful aggregate runoff and infrastructure pressure even when individual sites appear manageable.

Improve transparency and public communication. In Ohio, stakeholder concerns stem as much from uncertainty and limited visibility as from the physical impacts of data center development itself.

Final Takeaway

Ohio’s near-term question is not whether the state has enough water to support data center growth, but whether planning, infrastructure delivery, siting discipline, and public transparency, including community engagement, can keep pace with that growth. The physical water resource base in both priority corridors appears strong. The more consequential need is effective governance: aligning utility capacity, permitting, facility design, watershed protection, and early community engagement to minimize local impacts, maintain delivery momentum, and preserve public confidence.

APPENDICES

Appendix I – Scenario structure, hydrologic methodology, and groundwater vulnerability assessment

Three-scenario structure

The analysis models three conditions. The pre-development scenario uses existing NLCD 2024 land cover without modification,[90] establishing the baseline runoff condition before any construction. The post-development scenario overlays the synthetic campus onto that base, representing full buildout with no stormwater mitigation. The mitigated scenario applies a low-impact development BMP suite to the post-development condition—green roofs on 60% of rooftop area, pervious pavement on 50% of parking, a lined retention pond, and perimeter rain gardens and bioswales.

Hydrologic methodology

Peak discharge for each scenario is computed using the TR-55 Graphical Peak Discharge Method,[91] the method specified by the Ohio Rainwater and Land Development Manual for post-construction stormwater analysis.[92] Composite curve numbers are derived spatially by combining NLCD 2024 fractional impervious surface data with SSURGO Hydrologic Soil Group classifications,[93] producing a spatially varying CN raster for each scenario rather than relying on single assumed value. Time of concentration is estimated using the TR-55 three-segment method with an Ohio DOT minimum of 20 minutes applied. Calculations are run for four design storms—the 2-year, 10-year, 25-year, and 100-year 24-hour events—using rainfall depths from NOAA Atlas 14, Volume 2.[94] A cumulative analysis is also performed at the HUC12 watershed scale, modeling one through five data center campuses within the same 7,187-acre catchment to illustrate how peak-flow impacts compound as multiple facilities are added within a drainage area.

---

[90] U.S. Geological Survey. (2024). Annual NLCD Collection 1 Science Products. doi:10.5066/P94UXNTS

[91] U.S. Department of Agriculture, Soil Conservation Service. (1986). Urban Hydrology for Small Watersheds, Technical Release 55 (TR-55) (2nd ed.). Engineering Division, Washington, D.C. nrc.gov

[92] Ohio Department of Natural Resources, Division of Soil and Water Conservation. (2006). Rainwater and land development: Ohio's standards for stormwater management, land development and urban stream protection (3rd ed.). epa.ohio.gov

[93] Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. websoilsurvey.nrcs.usda.gov

[94] Bonnin, G. M., Martin, D., Lin, B., Parzybok, T., Yekta, M., & Riley, D. (2006). *Precipitation-frequency atlas of the United States, Volume 2, Ohio RiverBasin and surrounding states* (NOAA Atlas 14). National Weather Service, Hydrometeorological Design Studies Center. hdsc.nws.noaa.gov

Groundwater vulnerability assessment

Each SSURGO soil polygon within a 10-mile study buffer is assigned a groundwater vulnerability score on a 0–15 scale, combining a Hydrologic Soil Group base score with a bonus for polygons that spatially intersect the Ohio Geological Survey's buried valley aquifer layer.[95] Polygons are classified into four risk tiers—Low, Moderate, High, and Very High. A site-level spatial assessment determines whether a parcel intersects both the EPA Sole Source Aquifer boundary[96] and the buried valley aquifer footprint, thereby establishing the dominant vulnerability class for the development site. That classification directly informs the BMP restriction matrix used in the mitigated scenario, where infiltration-based practices are either prohibited or required to incorporate engineered liner systems depending on the vulnerability tier.

Appendix II – Definitions

Operational and planned data center development. This factor captures the current footprint of operational data centers and the near-term pipeline of planned sites as an indicator of (i) rising water demand and (ii) clustering effects that may concentrate withdrawals, distribution upgrades, and wastewater loads in specific corridors.

Existing broadband, water, wastewater, and energy infrastructure. This factor reflects the enabling systems that support data center development: fiber availability (as a proxy for network connectivity), electrical transmission lines and substations, power generation adequacy, and the capacity and configuration of water and wastewater assets that determine whether incremental demand can be absorbed through operational optimization or will require capital upgrades. In the framework, “existing infrastructure” is treated as an integrated constraint set rather than a single-utility attribute, because bottlenecks can shift between water supply, distribution and storage, wastewater collection and headworks, and plant treatment.

Geographic metropolitan areas/population. This factor captures the metropolitan form that co-determines baseline water demand, competing municipal and industrial uses, and the density of interdependent infrastructure. Larger population centers also tend to have more complex governance and stakeholder environments and tighter service-reliability expectations, which can elevate the consequences of peak-day constraints even when average conditions appear sufficient.

---

[95] Ohio Department of Natural Resources, Ohio Geological Survey. (2000). *Aquifer - Unconsolidated Aquifers of Ohio* [GIS data layer]. Statewide AquiMapping Program. ohiodnr.gov

[96] Ohio Environmental Protection Agency, Division of Drinking and Ground Waters. (2025, July 8). *Ohio Sole Source Aquifers*. epa.ohio.gov

Water Sector Context. This factor summarizes the exposure of a corridor to water-related hazards and sensitivities relevant to reliable operation and permitting, including drought/heat-related stress signals and low-flow conditions that can tighten discharge constraints. In the framework, water sector resilience is explicitly connected to (i) reliable supply under drought, (ii) wastewater/discharge screening (including salinity/TDS/chloride where relevant), and (iii) environmental sensitivity under low-flow/heat scenarios.

Stakeholder input. This factor represents structured input from public agencies, utilities, economic development entities, and other stakeholders to validate growth expectations, identify non-public constraints (e.g., planned capital projects, known bottlenecks), and surface perceived bottlenecks likely to affect approvals, project timing, and public sentiment. In the framework, stakeholder input is treated as essential for confirming data sources, filling gaps (e.g., non-public planned deals), and refining corridor selection.

Notional water security considerations (including notional water/wastewater constraints). This factor captures corridor-level judgments about whether water and wastewater systems are likely to remain reliable under stress (heat/drought), growth (industrial and municipal competition), and operational variability (commissioning ramps, peak events). It is "notional" because it does not incorporate detailed hydraulic/process modeling, but it is grounded in the framework's emphasis on identifying areas of concern and their root causes.