REPORT

Water Infrastructure Competitiveness Analysis

Prepared for

NC Chamber Foundation

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DRAFT

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Executive Summary

North Carolina consistently ranks among the national leaders for business and industrial growth and investment over the past decades—a reflection of its strong programs, people, and institutions driving economic growth. These rankings are bolstered by the state's strengths of a strong local economy and workforce, business-friendly regulations and low corporate taxes. To ensure the state sustains this momentum, the North Carolina Chamber Foundation commissioned this report to explore the connection between economic development and water and wastewater infrastructure and availability; a topic not often immediately at the forefront of investment but one that is critically important for business development and growth. These systems are imperative to the continued investment in business and industrial growth as they directly support operations, enable long-term investment and protect public health and economic productivity. Without reliable systems and infrastructure for water and wastewater, businesses can face significant unplanned costs and operational disruptions while a well-planned and strong infrastructure system can provide a tremendous boost in attracting and retaining new business and jobs. Developed by INTERA Incorporated and LDA Engineering, this study identifies opportunities to streamline development and ensure that infrastructure supports continued economic success.

Sustainable growth depends on understanding the capacity and constraints of water and wastewater systems. As the state's population expands—particularly in regions like the Research Triangle, Charlotte metro area, and along the coastal regions—strategic coordination among industrial and business developers, utilities, and state agencies becomes essential. Water infrastructure underpins housing, industry, and job creation, yet planning efforts are often slowed by fragmented data and siloed decision-making.

This report examines how better coordination and information-sharing can accelerate development and reduce risk, focusing on:

- Improving communication of utility capacity and expansion timelines;
- Leveraging regionalization to enhance resilience and economic opportunity;
- Integrating water resource data into early-stage land-use planning; and
- Aligning development proposals with the actual capacity of natural and built systems.

By closing information gaps, North Carolina can advance a more resilient and efficient growth model—one that promotes economic prosperity while protecting public health, the environment, and long-term water security. The report outlines current infrastructure challenges and their impacts on utilities and industries; as well as, measures we found already underway, forming a foundation for strategies to strengthen infrastructure and sustain economic growth.

Effectively managing North Carolina's rapid growth requires early, coordinated planning among developers, utilities, and regulators. Long-term success depends on moving beyond traditional infrastructure planning to also account for the capacity and limits of natural water systems. A more integrated, forward-looking approach is needed—one that balances economic opportunity with environmental responsibility.

Findings and Recommendations

The recommendations identified herein build directly on the key findings outlined in the report. They intend to translate analysis into action by addressing the identified challenges and leveraging opportunities for improvement. Collectively, these recommendations provide a roadmap for continuing and strengthening economic growth within the state, ensuring North Carolina remains a national leader for industrial and business investment. By supporting water and wastewater infrastructure, improving financial stability, and fostering collaboration across jurisdictions, these recommendations aim to create the foundation needed for sustainable development. In doing so, they reinforce North Carolina's ability to remain competitive, encourage private investment, and promote balanced economic opportunities across the state.

The recommendations are summarized here under the following categories:

1. Strengthen data collection and water availability studies
2. Incentivize and fund regionalization studies
3. Expand the existing readiness programs
4. Create a State Water Competiveness Plan
5. Fund infrastructure investments and promote Public Private Partnerships

Strengthen data collection and water availability studies

The Division of Water Resources (DWR) plays a central role in managing supply and quality, yet limited data constrains its ability to conduct comprehensive statewide assessments. A key finding of this study is the knowledge gap in understanding how water availability and withdrawals vary across North Carolina. This gap limits the state's ability to evaluate long-term supply reliability, anticipate conflicts among users, and plan effectively for growth and climate change.

Current data on withdrawals, streamflow, aquifer recharge, and ecological needs are fragmented and largely project-specific, creating uncertainty for planners and utilities alike. Our recommendations for increased data management include the following.

1. **Maintain comprehensive water withdrawal reporting and enhance spatial and temporal data accuracy**. A thorough assessment of historical water use and supply is needed to predict future availability under increasing demand and climate variability. Accurate, statewide reporting across *all sectors* is vital for understanding true water availability, forecasting demand, and ensuring sustainable growth. Current thresholds—1,000,000 gallons per day for irrigators versus 100,000 for others—limit data accuracy. If uniform requirements are not feasible, continued and expanded voluntary reporting should be strongly encouraged to improve planning and resource management.
2. **Update streamflow statistics.** North Carolina's flow data, used to determine water availability and discharge limits, are more than 30 years old. The ongoing USGS update is essential and must be completed, funded, and integrated into DWR's planning and permitting programs.
3. **Integrate groundwater data into basin model.** DWR's basin models cover all 17 river basins and provide valuable insights but currently omit detailed agricultural and groundwater data.

Integrating both would create a more accurate, statewide picture of total water supply and demand.

4. **Advance a Water Data Modernization Initiative.** North Carolina should unify withdrawal, discharge, and infrastructure data through a shared digital platform. Integrating geospatial and temporal data would strengthen forecasting, drought response, permitting efficiency, and alignment of water and economic development goals.

North Carolina should modernize its water data and modeling systems to support science-based decision-making. By improving data completeness, updating hydrologic statistics, and expanding modeling to include all major water sources, the state can better manage competing demands, enhance water security, and ensure that economic growth remains sustainable and resilient.

Incentivize and fund regionalization studies

Regional collaboration among utilities can enhance efficiency, improve system reliability, strengthen financial stability, and—in many cases—increase affordability for customers. By pooling resources and aligning infrastructure planning, regional approaches also create a stronger foundation for long-term growth. Regional studies, such as the US-421 Study (Section 9.1), offer a valuable template for evaluating how collaboration can benefit an area. These studies demonstrate how shared planning and coordinated investment can identify infrastructure constraints, highlight opportunities for interconnection, and guide strategic decisions that support both community needs and economic development.

Regionalization enables utilities to share water resources across jurisdictions, moving supplies from areas of surplus to areas of need and improving both water availability and wastewater capacity. Though neither the state nor regional groups have direct implementation authority, their coordination roles are vital. Strengthening collaboration among state agencies, regional councils, and local utilities will be essential to advancing sustainable water management and supporting North Carolina's continued economic growth. Finding neutral parties, such as regional councils, to act as the convenor or coordinator to lead regionalization efforts can help remove the political barriers that often hinder progress to regional solutions.

1. **Fund regionalization studies.** Funding regionalization studies will encourage collaboration among municipalities and utilities to optimize water and wastewater management. Regional partnerships demonstrate how shared planning can enhance efficiency, strengthen systems, and support balanced, sustainable growth.
2. **Plan and coordinate regionally.** Joint planning among utilities improves reliability, financial stability, and long-term affordability. Regional studies like the US-421 Study show how coordinated investment can identify infrastructure gaps, foster interconnections, and guide growth aligned with community and economic needs.
3. **Enhance procedural efficiency of interbasin transfers.** Interbasin transfers (IBTs) offer another way to balance water availability by moving supplies from areas of surplus to areas of need, complementing regionalization efforts. Interbasin transfers can help balance regional supply and demand but must include rigorous environmental reviews to protect source and receiving basins. While the impact assessments are necessary and should be continued, the process of

obtaining a Certificate of Transfer can be streamlined. Enhancing procedural efficiency while upholding environmental protections would improve site readiness, support regional water planning, and strengthen the state's ability to manage growth sustainably. When well-managed, interbasin transfers provide flexibility for growth while safeguarding North Carolina's long-term water sustainability.

Expand the existing Readiness programs

Programs such as the Megasite and the Selectsite Readiness Program play a critical role in positioning North Carolina for future economic development. These initiatives help identify, prepare, and market sites capable of supporting large-scale industrial and commercial projects, thereby enabling the state to remain competitive in attracting major employers and investment. Continued funding and support for these programs is essential—because they not only accelerate site readiness but also align infrastructure and utility planning with regional growth strategies. By sustaining and expanding these efforts, North Carolina can strengthen its ability to respond rapidly to business opportunities, support local communities, and maintain its reputation as a leader in economic development.

1. **Continue to fund the Readiness Programs.** The two existing readiness programs, The Megasite and SelectSite Readiness, were funded by legislative action, making economic development a priority. With the loss of the American Rescue Plan Act (ARPA) funding, the responsibility for supporting critical water and wastewater investments will increasingly fall to the state. This shift places a greater burden on state resources and underscores the importance of developing sustainable, long-term funding mechanisms to ensure that infrastructure needs are met.
2. **Enhancing Site Readiness Beyond Funding.** In addition to direct funding, North Carolina can improve site readiness through process streamlining, pre-permitting of key industrial sites, and enhanced interagency coordination among DEQ, Commerce, and local governments. Reducing permitting timelines and aligning regulatory processes with infrastructure planning will help communities move more quickly from planning to implementation. These actions complement funding programs by improving predictability and reducing uncertainty for businesses considering investment.

Maintaining and enhancing the Megasite and Selectsite Readiness programs will give North Carolina a competitive edge in attracting large-scale investment by ensuring that both the land and the infrastructure are ready. These efforts support utility planning, economic development, and sustainable growth.

Develop a State Water Competiveness Plan

North Carolina should develop a State Water Competitiveness Plan (Plan) that provides a comprehensive strategy to ensure sustainable and safe use of its water resources for current and future needs. The Plan would integrate infrastructure and natural system constraints with population, industry, and growth forecasts to guide long-term investment priorities. By linking regional analyses to a statewide strategic framework, North Carolina can ensure that economic development, permitting, and resource management decisions are coordinated and sustainable.

1. **Water availability connected to Plan.** The comprehensive regional water availability assessments should serve as the foundation for the Statewide Water Competitiveness Plan.
2. **Show water availability statewide.** Create a map to show water availability and water infrastructure availability state-wide.
3. **Connect the Water Competitiveness Plan to Funding.** Specific infrastructure projects and enhancements identified in the Competitiveness Plan should be funded through state funding.

A coordinated statewide plan will ensure sustainable, well-informed economic and environmental decision-making. It will help water managers, districts, and local governments to guide investments and planning.

Fund infrastructure investments and Public Private Partnerships

Building reliable and resilient water systems will require innovative, long-term financing strategies that go beyond traditional grants and short-term federal aid. North Carolina should explore new models—such as public-private partnerships (PPPs), infrastructure banks, and expanded revolving loan programs—to attract private investment and distribute project risk more effectively.

Adopting PPPs in North Carolina would strengthen the state's infrastructure competitiveness, diversify funding sources, and accelerate progress toward modern, resilient, and sustainable water systems—supporting both economic growth and environmental stewardship.

1. **Sustain water investment with innovative funding.** Incorporating PPPs into North Carolina's water strategy would align with the state's broader infrastructure competitiveness goals and provide new pathways for funding modernization, reuse, and resilience projects.
2. **Fund water workforce training programs**. North Carolina's water sector is facing a critical workforce crisis. The average age of water and wastewater professionals is steadily rising, bringing the state to the brink of what industry leaders call the "Silver Tsunami." Within the next five to ten years, a large percentage of experienced operators, engineers, and maintenance staff are expected to retire. This mass exit creates an urgent and substantial need to recruit, train, and retain the next generation of skilled water professionals. The State should support targeted workforce training programs, in partnership with community colleges and professional associations, to develop skilled operators, managers, and engineers. Technical assistance should include asset management planning, rate design, and operational benchmarking to build long-term viability across systems of all sizes.

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Acronyms and Abbreviations

CCPCUA	Central Coastal Plain Capacity Use Area
COG	Council of Governments (Lumber River Council of Governments)
CWA	Clean Water Act
DEQ	Department of Environmental Quality
DMAC	Drought Management Advisory Council
DWI	Division of Water Infrastructure
DWR	Division of Water Resources
EDPNC	Economic Development Partnership of North Carolina
EPA	U.S. Environmental Protection Agency
LWSP	Local Water Supply Plan
MRF	Merger/Regionalization Feasibility
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
SDWA	Safe Drinking Water Act
SRP	Selectsite Readiness Program
VUR	Viable Utility Program / Viable Utility Reserve
WSRP	Water Shortage Response Plan
WWTPs	Wastewater Treatment Plants

1.0 Introduction

North Carolina has ranked among the top three states in America for doing business over the past five years – a testament to the strength of its programs, people, and institutions that drive economic growth and development. To sustain this momentum and further enhance the state's economic development efforts, the North Carolina Chamber Foundation commissioned this report to examine the intersection between economic development and water and wastewater infrastructure. The objective is to identify opportunities to improve and streamline the development process, ensuring that infrastructure supports, rather than hinders, continued economic success. This report written by the project team—a partnership between INTERA Incorporated and LDA Engineering—offers target recommendations to make development more efficient, responsive, and resilient.

In the past, providing water infrastructure for new industrial developments was viewed primarily as an engineering challenge, one that was resolvable with sufficient time for design and construction coupled with available funding. Today, water infrastructure is recognized as a pivotal factor that can delay, or even halt, proposed developments if not addressed proactively. The challenge is no longer financial or regulatory; the inability to extend water and wastewater services swiftly to prospective sites creates a barrier to economic growth.

1.1 Integrating Water Infrastructure into Economic Planning and Development

Effective and sustainable development depends on a clear understanding of the capacities and constraints of existing water and wastewater systems. As North Carolina continues to grow—especially in high-demand regions such as the Research Triangle, Charlotte metro area, and coastal areas—the need for strategic coordination between developers, state agencies, and utilities becomes increasingly urgent. Water infrastructure, often operating behind the scenes, plays a foundational role in supporting housing, industry, and job creation. Yet, planning for this infrastructure can be hampered by fragmented data and siloed decision-making.

Three key factors related to water and wastewater must be identified and aligned early in the planning process (**Figure 1**):

1. **The Location and Scale of New Demand**
   Economic development is driven by planned growth: new housing subdivisions, industrial parks, commercial centers, and mixed-use developments. These projects vary widely in their water and wastewater demands, both in quantity and quality. Forecasts of where and how much new demand will occur are basic needs for infrastructure planning and environmental impact assessments.
2. **The Availability of Water Supply and Discharge Capacity Within Natural Systems**
   Growth can only occur where there is sufficient natural resource capacity, both in terms of water availability and the ability of surrounding water bodies to assimilate treated wastewater without ecological harm. This aspect is regulated at the state level, with agencies monitoring water source conditions, setting discharge limits, and issuing permits to protect ecosystems and

public health. Misalignment between desired development and natural system capacity can lead to permit denials or prolonged delays.

3. **The Capacity of Existing Drinking Water and Wastewater Infrastructure**
Local utilities are responsible for operating and maintaining the physical infrastructure that serves new developments. This includes treatment plants, pump stations, water lines, sewer mains, and storage facilities. Many systems, especially in smaller or older communities, are operating at or near capacity and may require substantial upgrades before they can support additional users. Understanding current infrastructure limits and the cost and timeline for expansion is fundamental to determining whether proposed developments are feasible.

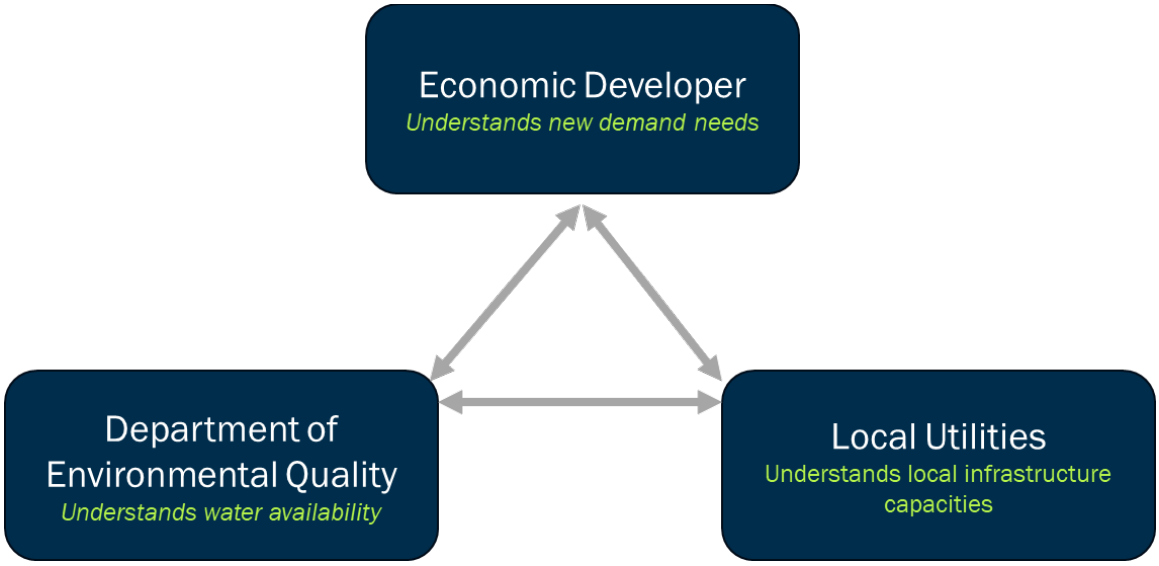


Figure 1. Successful economic development requires coordination and communication between local utilities, the state agencies, and the developer.

1.2 Bridging the Gaps: The Need for Coordination

Despite their interdependence, these three core components – projected demand, environmental capacity, and infrastructure readiness – are assessed and managed by separate entities:

- **Developers** and local planning departments define land use and growth patterns, often with tight timelines and significant financial implications.
- **State agencies**, such as the Division of Water Resources (DWR) and Division of Water Infrastructure (DWI) within the Department of Environmental Quality (DEQ), regulate water withdrawals and wastewater discharges based on monitoring and compliance obligations.
- **Water and wastewater utilities**, whether municipal or regional, public or private, oversee the infrastructure that physically delivers water and treats wastewater and are responsible for ensuring reliable, compliant service.

The lack of an integrated data sharing system among these stakeholders leads to inefficient planning, redundant studies, delayed projects, and—ultimately—missed opportunities for economic growth. In

some cases, development is approved by local authorities only later to encounter roadblocks at the permitting stage or discover that utility infrastructure cannot support the proposed demand without costly upgrades.

This study focuses on the intersection of these three domains and examines how improved coordination and information-sharing between developers, regulatory agencies, and utilities can accelerate project timelines and reduce risks. Specifically, it explores:

- How utilities can better communicate infrastructure capacity and expansion timelines to planners and developers,
- How regionalization can increase resilience to benefit utilities and increase opportunities for economic development,
- How state agencies can integrate water resource data into early-stage land-use planning, and
- How developers can align project proposals with the actual capacities of both the natural systems and built infrastructure.

By bridging these information and communication gaps, North Carolina can move toward a more resilient, proactive, and efficient model for growth; one that supports economic development while safeguarding public health, environmental integrity, and long-term water security.

2.0 Project Approach

Water-related programs in North Carolina span a wide array of functions, from regulation and permitting to infrastructure funding, planning, conservation, and data management. These responsibilities are often distributed across multiple agencies, utilities, non-profits, and collaborative working groups, each with its own mission, tools, and priorities. While this diversity enables specialized expertise, it can also lead to fragmented communication, inconsistent data sharing, and duplicated efforts.

The central aim of this study is to assess whether the current network of water-related entities has access to the resources, data, and communication mechanisms needed to carry out their missions effectively. Additionally, the study seeks to determine whether improved coordination, enhanced data quality, or increased information sharing could yield tangible benefits for the state—not only in terms of more effective water management, but also in support of economic growth, development planning, and public service excellence.

2.1 Understanding the Landscape

The initial phase of the project focused on evaluating existing data sources and publicly available information to map out the active water-related programs and initiatives across the State. This included a review of the following:

- General Statutes related to water governance
- Agency reports and strategic plans
- Funding program guidelines
- Public dashboards and datasets
- Interagency agreements and partnerships
- Published studies on water infrastructure and economic development

The goal was to understand how these programs connect and contribute to statewide objectives, particularly those related to infrastructure planning, regulatory compliance, and economic growth.

2.2 Interviews with Key Stakeholders

After establishing an understanding of the landscape, the team—a partnership between INTERA Incorporated and LDA engineering—conducted a series of interviews with representatives from key organizations. These interviews were designed to provide firsthand insight into:

- The roles and responsibilities of each agency or group
- The challenges they face in planning, data management, and coordination
- Their perspectives on system-wide improvements, including communication tools, policy alignment, and data accessibility

Interview participants were selected based on their direct involvement in water supply planning, policy development, infrastructure funding, or regulation. Additional participants were identified through a

snowball sampling method, with referrals gathered from early interviewees to ensure a comprehensive and representative range of perspectives.

In total, we spoke with 33 individuals representing 11 organizations, including state agencies, regional utilities, nonprofit groups, and intergovernmental collaborations. A complete list of the organizations and individuals interviewed is provided in **Appendix A**.

Figure 2. Organizations participating in interviews.

3.0 Creating a Roadmap

This report outlines the significant infrastructure challenges currently facing the State and examines how they limit opportunities for economic development. The sections detail specific concerns identified, the impact of these issues on utilities and industries, and the current measures to address them. Together, these findings establish the basis for evaluating future strategies to strengthen infrastructure and support sustainable economic growth.

The final section of the report presents a series of key conclusions. Each conclusion is supported by data and analysis, ensuring that the findings are both well-grounded and actionable. In addition, the report outlines specific steps available to address the challenges identified, offering policymakers, local leaders, and stakeholders a practical roadmap for implementation. Together, these conclusions and recommended actions form the foundation for advancing infrastructure improvements and unlocking economic development opportunities across the State.

4.0 Water Infrastructure – A State and National Problem

Maintaining and upgrading water supply and wastewater infrastructure is one of the most pressing and costly public service challenges facing communities across the United States today. Much of the country's water infrastructure was built decades ago and is nearing or exceeding its intended lifespan. As systems age, they become increasingly prone to failure, causing frequent service disruptions, water quality concerns, and rising maintenance costs.

According to a 2023 estimate from the U.S. Environmental Protection Agency (EPA), the nation needs approximately $625 billion in investments to repair, replace, or modernize its clean water and wastewater systems. While this number is staggering, the need is both real and urgent. Across the country, utilities are grappling with issues such as:

- Water main breaks, which can waste millions of gallons of treated water and disrupt service to entire communities.
- Aging wells and pumping systems that must be replaced to maintain reliable water access.
- Increased treatment costs as water sources become more polluted or scarce.
- Regulatory compliance pressures, especially related to emerging contaminants like PFAS (per- and polyfluoroalkyl substances).

North Carolina is no exception. The state faces a complex challenge in maintaining and upgrading its water and wastewater infrastructure. It is one of just ten states with more than 5,000 public water systems, and the sheer number of systems to manage and support makes statewide planning, oversight, and funding distribution difficult (Ballotpedia, 2015). As of 2025, North Carolina is home to approximately 5,867 public water systems, including 1,980 community water systems and over 3,600 wastewater systems, many of which are aging, financially fragile, or lack the technical capacity to address long-term infrastructure needs independently.

The financial scale of North Carolina’s infrastructure needs is substantial. According to recent estimates from the DEQ, the state requires:

- $5.2 billion in investments for wastewater systems and sanitary sewers, and
- Over $10 billion to address drinking water infrastructure needs (NC Water Infrastructure, 2017).

However, these estimates tell only part of the story. The figures are based only on needs eligible under EPA-funded programs, such as the Clean Water and Drinking Water State Revolving Funds (SRF), and do not represent total infrastructure needs across the state. In fact, the DWI has emphasized that many utilities—particularly smaller, rural systems—lack comprehensive 20-year planning documents or asset inventories, which are necessary for estimating future needs. As a result, the state’s actual infrastructure funding gap is almost certainly greater than the official estimates suggest.

This challenge is particularly acute for small and rural systems. In North Carolina, nearly one-third of community water systems serve 100 or fewer customers. These systems often operate with:

- Extremely limited revenue, generated from small customer bases,
- Aging or deteriorating infrastructure, often installed decades ago with little or no long-term maintenance planning,
- Limited staff capacity, sometimes with only one or two full-time employees, and
- Minimal access to technical or financial expertise, making it difficult to navigate grant applications or regulatory requirements.

Without outside support, many of these small systems are unable to conduct the proactive planning necessary to prevent service disruptions, health hazards, or financial insolvency. In many cases, systems are forced to operate reactively, addressing issues only after they become emergencies, which often results in higher costs and greater risk to public health.

While state and federal funding is available through programs administered by the DWI, demand far exceeds available resources. Competition for grants and low-interest loans is intense, and systems with the greatest needs often struggle to complete the planning and engineering work required to submit competitive applications. This creates a cycle where the least-resourced systems are also the least likely to secure funding, further widening the gap between infrastructure needs and available support.

In 2024, the University of North Carolina School of Government conducted a survey of the water and wastewater utilities in the state (UNC, 2024). The survey was funded and developed in partnership with DWI and updated the previous survey done in 2018. The goal was to examine the technical, managerial, and financial capacity of utilities across the state. A total of 241 out of 496 invited utilities responded to the survey. Some highlights of the survey include:

- Over half of survey respondents (56.3%) said that their system does not engage in long term supply or demand forecasting.
- About a fifth of utilities (19%) reported covering operations and maintenance (O&M), debt service (all or a portion), and reserves—including short-term capital needs—with their current revenues.
- The most common methods of collaboration with others were sharing information and knowledge with their neighbors (54.6%) and establishing mutual aid/emergency contracts with others (41.1%).
- More than a quarter of respondent utilities (26.3%) are already engaged in formal regional or partnership arrangements. Another 28.4 percent are interested in exploring regional and/or partnership options.
- The biggest deterrent for utilities considering regional and partnership arrangements was the desire to remain autonomous (54.1%), followed closely by the uncertainty of these arrangements on rates for customers (49.5%). Respondents also cited lack of knowledge about other systems (25.7%) and about how to establish these partnerships (20.2%), indicating a potential opportunity for increased education regarding these topics.
- Almost half of respondents (47.3%) either have no plan to replace lead service lines or are unaware of such a plan.

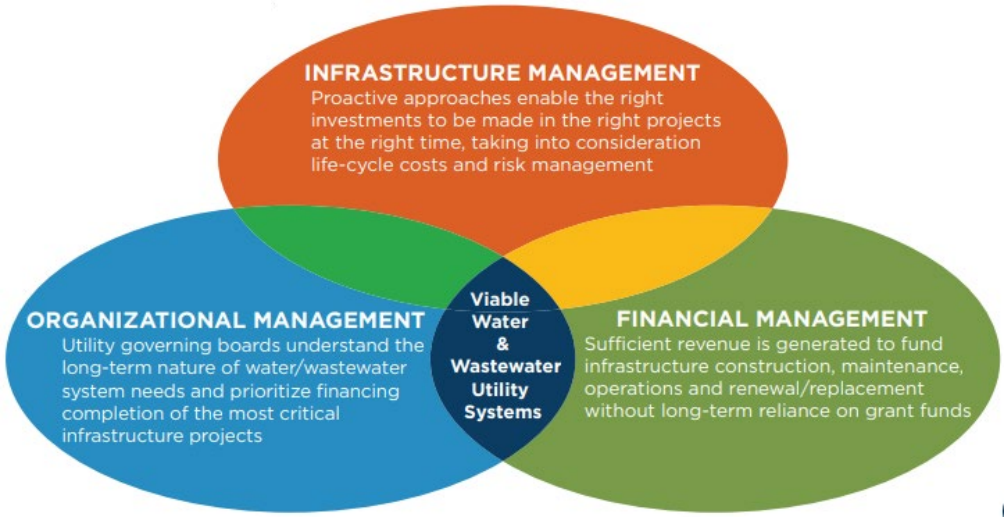
4.1 Statewide Infrastructure Plan of 2017

To address the challenges facing North Carolina's water and wastewater systems, the State Water Infrastructure Authority developed the Statewide Infrastructure Plan (Plan). Released in 2017, this document serves as a strategic roadmap for helping water and wastewater utilities across the state fulfill their critical missions: to safeguard public health, protect the environment, support vibrant communities, and enable sustainable economic development (NC Water Infrastructure, 2017).

The plan is structured around three core pillars of utility success:

1. **Infrastructure Management** – ensuring that physical assets (e.g., pipes, treatment plants, pump stations) are maintained, upgraded, and expanded in a planned, sustainable manner.
2. **Organizational Management** – strengthening utility governance, staffing, and leadership capacity to support strategic decision-making and long-term planning.
3. **Financial Management** – building the fiscal health of utilities through rate structures, budgeting practices, capital planning, and access to funding.

Each of these focus areas is addressed in detail, with the plan outlining key challenges, recommended practices, and supporting resources to guide utilities toward long-term viability and resilience.



Three Essentials for Achieving Statewide Viability

The Plan identifies three strategies that must be pursued collectively at the utility, regional, and state levels to achieve viability across all water and wastewater systems in North Carolina:

1. **Partnerships Among Agencies and Organizations**
   - Collaboration is critical to overcome the fragmented nature of the water sector. The Plan calls for coordinated efforts across state agencies, utilities, non-profit organizations, and regional partnerships to share knowledge, reduce duplication, and improve service delivery.

2. **Resources and Tools to Support Proactive Management**
   - Many utilities, especially small and rural systems, struggle to shift from reactive to proactive management. The Plan emphasizes the importance of technical assistance, training, and decision-support tools that help utilities assess risk, plan capital investments, and manage assets effectively.
3. **Prioritized Funding Linked to Viability**
   - Recognizing that funding is finite, the Plan advocates for a strategy that prioritizes projects based on long-term viability criteria, such as asset management readiness, organizational capacity, and regional collaboration. By linking funding decisions to sustainability indicators, the state can better ensure that investments produce lasting results.

Together, these strategies reflect a holistic approach to infrastructure planning—one that recognizes the interdependence of technical, organizational, and financial systems. The Plan not only charts a path toward improved service reliability and public health protection but also supports broader goals around economic competitiveness, environmental stewardship, and intergovernmental cooperation.

4.2 Infrastructure and Development

The Statewide Infrastructure Plan recognizes that strong and reliable water and wastewater systems are not only fundamental to protecting public health and the environment but also critical drivers of economic growth. By emphasizing asset management, financial sustainability, and regional collaboration, the Plan provides utilities with tools and guidance to improve long-term planning and resilience. State funding programs administered under this framework play an important role in sustaining and rehabilitating existing infrastructure. These programs help communities avoid service disruptions, comply with public health standards, and maintain the minimum capacity needed to support daily life and commerce.

Despite these benefits, the Plan leaves a persistent funding gap unaddressed: existing programs provide relatively little financial support for system expansion into new service areas. Communities seeking to extend water and wastewater service to industrial parks, commercial corridors, or residential developments often lack the resources to advance these projects, even when such expansions could unlock substantial local and regional economic opportunities. The result is a tension between maintaining essential infrastructure and financing system growth. Without additional investment mechanisms targeted at expansion, many promising development sites remain unserved, limiting the state's ability to capitalize fully on economic development prospects.

By acknowledging both the successes and limitations of current programs, the State Infrastructure Plan underscores the importance of aligning infrastructure investment with North Carolina's long-term economic and community development goals. It calls for strategies that not only preserve and modernize existing systems but also create pathways for extending infrastructure where it is most needed to support growth, resilience, and prosperity.

The gap between maintaining existing infrastructure and funding system growth creates a significant barrier to economic development, leaving many proposed projects stalled despite strong local interest and potential benefits.

4.3 Water Industry Workforce and Technical Capacity

North Carolina's water sector is facing a critical workforce crisis. The average age of water and wastewater professionals is steadily rising, bringing the state to the brink of what industry leaders call the "Silver Tsunami." Within the next five to ten years, a large percentage of experienced operators, engineers, and maintenance staff are expected to retire. This mass exit creates an urgent and substantial need to recruit, train, and retain the next generation of skilled water professionals.

As these seasoned employees leave the field, utilities face the loss of invaluable institutional knowledge — the practical, experience-based understanding of treating water, maintaining infrastructure, and managing emergencies that only years on the job can provide. A shortage of certified operators and technically trained personnel threatens the continuity of essential services, from water treatment and distribution to wastewater collection and processing.

This challenge is particularly acute for small and rural utilities, which often operate with limited staff, modest budgets, and few training resources. Many of these systems depend on a single operator or a small team to manage complex infrastructure, making workforce continuity and technical capacity critical to maintaining compliance, reliability, and public health protection.

According to the U.S. Environmental Protection Agency (EPA), roughly one-third of the national water-sector workforce will be eligible to retire within the next decade. More specifically, studies indicate that approximately 37% of water utility employees and 31% of wastewater utility employees are expected to retire during this period. In response to these growing concerns, the EPA launched America's Water Sector Workforce Initiative in 2020 — a coordinated effort to collaborate with industry stakeholders to build a resilient, well-trained, and sustainable water workforce.

For North Carolina, this transition underscores the importance of investing in targeted workforce development. Partnerships between state agencies, community colleges, technical assistance providers, and professional associations will be essential to cultivating the next generation of operators, managers, and engineers. Beyond workforce training, utilities must also receive support in asset management, rate design, and operational benchmarking to strengthen long-term sustainability and ensure reliable service across systems of all sizes.

5.0 Water Governance

Water governance refers to the overarching framework through which water resources are managed, protected, and allocated. This includes not only the formal laws, regulations, and administrative policies that govern water use and quality but also the customs, institutions, and decision-making processes that shape how the public sector, private sector, and civil society engage in water-related issues.

At its core, water governance addresses two primary priorities:

1. **Water Quality** – ensuring that water used for drinking, recreation, agriculture, and industrial processes is safe and compliant with environmental and health standards.
2. **Water Quantity** – managing the availability, allocation, and use of water resources to meet the needs of households, businesses, agriculture, and ecosystems.

5.1 Federal and State Roles in Water Governance

In the United States, water governance is shared between the federal and state governments, with a division of responsibilities:

- The federal government, primarily through the EPA, has set national standards for water quality, including:
  - Drinking water standards (e.g., Safe Drinking Water Act)
  - Wastewater discharge requirements (e.g., Clean Water Act)
- States, however, are primarily responsible for:
  - Implementing and enforcing federal water quality standards
  - Allocating water rights and managing water quantity
  - Regulating water use and permitting within their jurisdiction

Each state has significant autonomy and authority in how it structures its water governance systems, resulting in diverse approaches across the country. North Carolina is no exception, maintaining its own institutions and legal frameworks to manage water at the state level.

5.2 North Carolina's Water Governance Framework

In North Carolina, the DWR is the lead agency responsible for both water quality and water quantity management. Under North Carolina General Statute §143-355, DWR is charged with ensuring that the state maintains an adequate and reliable supply of water to protect public health, environmental quality, and economic development. The statute outlines several key responsibilities for DWR, including:

- Assessing statewide water supply availability
- Supporting water use planning and conservation efforts
- Facilitating inter-basin transfer permitting
- Reviewing local water supply plans
- Coordinating drought response strategies

Despite its broad mandate, the statute provides limited regulatory authority to DWR in matters of water quantity. Unlike its stronger role in implementing federally mandated water quality programs, DWR's capacity to control or allocate water use is largely constrained. Most water quantity decisions, such as who can withdraw how much water and when, are governed by customary use practices, limited permitting requirements, and voluntary planning mechanisms rather than enforceable state-level allocation laws. The following subsections describe some features of the State Water Governance.

5.2.1 Registration and Reporting of Water Withdrawals

North Carolina General Statute § 143-215.22H requires surface water and ground water withdrawers to register their water withdrawals and surface water transfers with the State and update those registrations at least every five years. Agricultural water users that withdraw one million gallons of water a day or more, and non-agricultural water users that withdraw one hundred thousand gallons of water a day, are required to register. Registrants must also report on their water usage annually to the Department of Environmental Quality.

Data on agricultural withdrawals of less than one million gallons per day is gathered through a voluntary survey. The NC General Assembly passed legislation (SL2008-143) that directed the NC Department of Agriculture & Consumer Services (NCDA&CS) to conduct an annual agricultural water use survey for farms that use 10,000 gallons/day. The results are provided to the state in a spatially aggregated format to prevent identification of water use at the level of individual farms. While this arrangement offers a broad picture of agricultural consumption, it falls short of delivering the detailed, site-specific information needed for accurate planning, drought preparedness, or conflict resolution among competing users.

5.2.2 Central Coastal Plain Capacity Use Areas

The Central Coastal Plain Capacity Use Area (CCPCUA) in North Carolina is a designated region where groundwater use requires coordination and has limited regulations to protect the public interest. Aquifers in this region were being overused to the point of jeopardizing the region’s future water supply. Regulation is needed to decrease withdrawals from these aquifers to a sustainable rate of use. The area includes 15 counties on the coastal plain.

The Environmental Management Commission has approved the CCPCUA rules, which create a groundwater use permitting process. Groundwater users exceeding 100,000 gallons per day are required to obtain a water use permit and report water use. Annual registration and reporting of withdrawals is required for surface and groundwater users of more than 10,000 gallons per day.

These rules aim to protect the long-term productivity of aquifers and ensure that groundwater use remains below the recharge rate of the aquifers within the designated area.

5.2.3 Local Water Supply Planning

North Carolina General Statute § 143-355(l) requires all units of local government that provide or plan to provide public water service to prepare a Local Water Supply Plan (LWSP). All community water systems that regularly serve 1,000 or more service connections or serve more than 3,000 people are required to

prepare a LWSP. All systems must submit an annual water use update based on their water use and system conditions by April 1st of every year.

All systems that submit a LWSP are also required to prepare a Water Shortage Response Plan (WSRP). A WSRP establishes authority for declaration of a water shortage, defines different phases of water shortage severity, and outlines appropriate responses for each phase.

5.2.4 Interbasin Transfer Certification

An interbasin transfer moves water between river subbasins to address shortages or optimize resources for development. The North Carolina Legislature enacted General Statute G.S. §143-215.22I as part of An Act to Regulate Interbasin Transfers in 1993. The law mandates that large surface water transfers between basins require a certificate from the Environmental Management Commission. A transfer certificate is necessary for new transfers of 2 million gallons per day or more. Transfer facilities that were operational before July 1, 1993, are exempt; those facilities are allowed to transfer water to their full capacity without a certificate.

The application process requires an environmental impact statement or assessment and repeated public notice and input. The process can take up to 3 to 5 years to complete. Currently, there are nine approved Certificates in the state.

5.2.5 Water Supply Development Assistance

The North Carolina DEQ offers a Water Supply Development Assistance process to help water systems of any size request assistance with environmental review and permitting processes. This process includes cooperation with local governments, assessment of alternatives, engineering studies, and development of plans for obtaining necessary permits. The DEQ also assists in applying for state and federal permits for regional water supplies. The process is designed to streamline the approval of water supply projects and ensure they meet environmental standards.

5.2.6 River Basin Plans

Session Law 2013-413 resulted in the DWR developing data management schemes and planning initiatives supporting the creation of integrated basin plans designed to address both water quality and quantity issues. Information presented in the combined plans supports a variety of state and local programs aimed at protecting and improving water resources in North Carolina's streams, rivers, estuaries, and groundwater.

The basin-based approach includes addressing permits, modeling, evaluating waste-load allocations, conducting nonpoint source assessments, performing special studies, and routine monitoring on a basin-wide scale. The basin planning and implementation process is a collaborative effort that includes state and local resource agencies and the public. The process is comprehensive and includes aquatic sampling, water quality sampling, and evaluation and review of human health standards.

Water availability is addressed in the basin plans by the Water Supply Planning Branch and Groundwater Resources Section. Water use reporting and Local Water Supply Plans are rolled up into a basin-scale assessment of water availability.

Figure 3. Major river basins across North Carolina. The state is divided into river basin planning regions for water management (Map from NC Office of Recovery & Resiliency).

5.3 Planning-Based Water Management

As described previously in this section, North Carolina's approach to water quantity governance is *planning-based* rather than *regulatory-based*. While existing statewide programs have proven effective in capturing major water withdrawals and usage across most sectors, the absence of a comprehensive water withdrawal reporting system presents a notable limitation. Without such a framework, the DWR faces challenges in confidently assessing and assuring the long-term sustainability of water supplies across the state. This data gap complicates efforts to manage resources proactively and equitably, particularly in the face of population growth, economic development, and increasing climate variability.

6.0 Water Availability

Water availability assessment, water use planning, and regulation of wastewater treatment plant effluent are central elements of state-level water governance. In North Carolina, these responsibilities are primarily carried out by the DWR within the DEQ. Through a combination of monitoring, modeling, permitting, and planning, the DWR plays a key role in ensuring that water demands are balanced with the capacity of the state's natural hydrologic systems.

Water is withdrawn from rivers, reservoirs, aquifers, and other natural sources to support a range of uses, including residential, commercial, industrial, agricultural, and energy production. After use, sanitary water is collected and treated at wastewater treatment facilities before being discharged, typically into surface waters, where it reenters the hydrologic cycle. While this circular use of water enables resource reuse and sustainability, it is ultimately constrained by the natural limits of the hydrologic system.

Water availability in North Carolina is shaped by seasonal and interannual variability in precipitation and streamflow, as well as the capacity of surface waters to assimilate wastewater discharges safely. Key constraints include:

- **Streamflow levels**, which determine how much water can be withdrawn reliably without harming aquatic ecosystems or violating downstream rights
- **Groundwater recharge rates**, which limit long-term sustainable pumping from aquifers
- **Reservoir levels**, which reflect inflows, withdrawals, evaporation, and managed releases
- **Low-flow conditions**, which are critical thresholds for both water supply withdrawals and effluent discharge permitting

Periods of drought or unusually low streamflow can significantly reduce water availability, increasing the risk of water use restrictions, inter-jurisdictional conflicts, and strain on wastewater systems. As population growth, urban expansion, and industrial development increase demands for water and wastewater capacity, these natural limitations become more pronounced, especially in fast-growing or drought-prone regions of the state.

6.1 How North Carolina Measures and Assesses Water Availability

To understand and manage these constraints, the DWR leads a comprehensive and ongoing water availability assessment program. This work is both technically complex and data-intensive, requiring sustained investments in monitoring infrastructure and data analytics.

Key Elements of DWR's Water Availability Assessment:

1. **Hydrologic Data Collection**
   DWR works in collaboration with federal agencies (e.g., USGS) and local partners to collect and maintain statewide datasets that include:
   - **Daily streamflow measurements** from gauging stations
   - **Precipitation records** across multiple climate zones

- **Reservoir storage data**, including water levels, inflows, and outflows
- **Groundwater levels** from monitoring wells across aquifers
- **Water use data** from public water systems, industries, and agricultural operations

2. **Modeling and Forecasting Tools**
   DWR employs advanced hydrologic and hydraulic modeling tools to simulate current and future water availability. These models:
   - Estimate safe yield from reservoirs
   - Predict low-flow conditions for surface waters under different climates and demand scenarios
   - Analyze watershed-scale water balance, incorporating land use, evapotranspiration, and infiltration
3. **Drought Monitoring and Low-Flow Analysis**
   The DWR monitors drought conditions through its participation in the North Carolina Drought Management Advisory Council (DMAC) and performs regular low-flow analysis using indicators such as:
   - 7Q10 (the lowest 7-day average flow that occurs once every 10 years)
   - Monthly and seasonal flow variability - These analyses are crucial for discharge permitting, ensuring that wastewater effluent remains within the assimilative capacity of receiving waters during critical low-flow periods.
4. **Water Supply Planning Tools**
   North Carolina requires Local Water Supply Plans (LWSPs) from community water systems, which DWR aggregates and analyzes to:
   - Estimate regional water demand
   - Evaluate capacity-use trends
   - Support interbasin transfer reviews and long-term water supply development
5. **Regional Water Availability Assessments**
   In regions where water availability is particularly constrained or contested, DWR conducts targeted regional assessments, which integrate:
   - Supply and demand modeling
   - Growth and development projections
   - Infrastructure constraints

   These assessments help define reliable water availability limits and guide resource allocation and permitting decisions.

6.2 The Need for Proactive, Regionally Coordinated Assessment

Because water availability varies both geographically and temporally, continuous monitoring and dynamic, real-time analysis are important. Without this proactive, science-based approach, water management decisions may be based on outdated or incomplete information, increasing the risks of over-allocation, environmental degradation, or failed development.

Moreover, economic development efforts will increasingly be shaped by infrastructure capacity and by the natural limits of water availability and wastewater discharge potential. Communities and industries that lack clear, up-to-date information on regional water availability may face:

- Delays in project approvals due to uncertainty in water access
- Rejected discharge permits due to assimilative capacity limitations
- Increased costs associated with infrastructure expansion or alternative water sourcing
- Heightened conflict among users during times of scarcity

In this context, the state's ongoing commitment to regional water availability assessments, improved data integration, and the communication of findings to stakeholders is not just a technical priority; it is a strategic imperative for resilient and sustainable growth.

7.0 The Intersection of Economic Development and Water Availability

Economic development and water governance are deeply interconnected, particularly when new industries, commercial developments, or residential expansions increase demands on local water resources and wastewater systems. Every new facility, whether it's a manufacturing plant, data center, or housing subdivision, requires a reliable supply of clean water and produces a wastewater stream that must be safely treated and discharged.

These requirements place pressure on both the built environment (water and wastewater infrastructure) and the natural environment (surface and groundwater systems). While infrastructure limitations (such as undersized pipes, insufficient treatment capacity, or inadequate storage) are often solvable through engineered solutions and capital investment, natural system limitations are more difficult to overcome. Local utilities play a central role in enabling growth by providing essential services. However, they often face both capacity limitations: infrastructure capacity limitations and natural system limitations.

7.1 Infrastructure Capacity Limitations

Infrastructure capacity limitations involve the physical systems required to deliver safe drinking water and to collect, treat, and discharge wastewater. These systems are the backbone of community health and economic activity, yet many are strained by aging assets, deferred maintenance, and rising demand. In some cases, treatment plants are already operating at or near their design capacity, leaving little room for growth. Similarly, water distribution and wastewater collection networks may be reaching the end of their useful life, leading to increased service disruptions, higher repair costs, and greater risk of environmental compliance issues.

While such challenges are significant, they are generally solvable with well-established engineering solutions. Options include expanding treatment capacity, upgrading existing facilities to improve efficiency and resilience, or consolidating smaller systems to achieve economies of scale. These interventions, however, require substantial investment of both time and resources. Large-scale upgrades can take years to plan, permit, and construct, while also demanding funding strategies that balance state, local, and private sector contributions.

For industries considering new facilities or expansions, these infrastructure constraints can be decisive. If water or wastewater capacity is unavailable in the required timeframe, projects may be delayed, scaled back, or relocated to areas with stronger utility support. These dynamics place added pressure on utilities and governments to anticipate demand and proactively address system limitations. Without such foresight, communities risk losing valuable opportunities for economic development and long-term job creation.

7.2 Natural Limitations on Water Availability and Wastewater Discharge

Natural limitations are more complex and include (1) insufficient local water availability due to hydrologic constraints (e.g., low stream flows, aquifer depletion, drought conditions) or (2) limited assimilative capacity of receiving streams to absorb additional treated wastewater without violating

water quality standards. Unlike infrastructure challenges, natural limitations may not be solvable by traditional engineering alone. They are dictated by seasonal and interannual variability in precipitation and flow, regulatory thresholds for pollutant loading, ecological sensitivity of receiving waters, and upstream and downstream water use.

When natural limits are reached, they can constrain economic growth, regardless of local interest or investment. For example:

- A proposed industrial facility may be denied permits due to the lack of sufficient flow in a receiving stream to handle additional discharge, even with advanced wastewater treatment.
- A new development may be delayed or downsized because the local watershed cannot support additional water withdrawals without jeopardizing ecological flow thresholds.
- Utilities may be unable to meet the timing or scale of demand due to the slow pace of permitting or the need to engage in complex water transfer negotiations.

This creates a critical planning gap, especially when economic development decisions (e.g., site selection, permitting, zoning) are made without full consideration of natural system limitations.

In cases of natural limitations, it falls to the utilities and planners to identify potential solutions. Some potential solutions are finding alternative water sources (e.g., interconnections, reclaimed water, desalination, new reservoirs), advanced treatment technologies to reduce discharge volume or improve effluent quality, or regional or basin-level planning to shift demand or redistribute supply.

7.2.1 Assessment of Natural Limitations

In North Carolina, laws and regulations related to water quality are primarily governed by federal statutes, most notably the Clean Water Act (CWA) and the Safe Drinking Water Act (SDWA). The Clean Water Act mandates the issuance of National Pollutant Discharge Elimination System (NPDES) permits for all point source discharges into surface waters. Within the state, the NPDES program is administered by the DEQ, ensuring that discharges meet both federal and state water quality standards designed to protect human health and aquatic ecosystems.

A critical consideration in issuing and managing NPDES permits, especially for Wastewater Treatment Plants (WWTPs), is the assimilative capacity of the receiving stream. Assimilative capacity refers to the stream's natural ability to dilute, absorb, and process discharged pollutants without causing harm to water quality or violating environmental standards. This capacity is intrinsically tied to the low-flow characteristics of the stream. The 7Q10 stream flow is a widely used hydrologic statistic that represents the lowest average flow over seven consecutive days, expected to occur once in ten years. The 7Q10 is frequently used as a benchmark in regulatory and permitting decisions because it reflects critical low-flow conditions under which stream systems are most vulnerable.

Many of the assumptions that underpin current permitting and water infrastructure planning rely on statistical analyses of low stream flow data; in North Carolina, these analyses are currently outdated. The last statewide assessment of 7Q10 values and other low-flow statistics was conducted by the USGS and published in 1993 (Giese and Mason, 1993). While this work provided important benchmarks, it does not reflect the hydrologic changes that have occurred over the past three decades due to climate variability, urbanization, changes in land cover, and growing water demands.

A more recent USGS study published in 2016 (Weaver) focused on select streamflow gaging stations and provided updated low-flow characteristics through 2012. This study revealed a concerning trend: in many locations across the state, 7Q10 values have declined, suggesting that baseflows may be diminishing over time. These trends have major implications for water resource management. Reduced baseflows translate to lower assimilative capacities, more restrictive discharge limits, and—ultimately—fewer opportunities for industrial and municipal growth if stream systems cannot support additional stress.

As federal and state permitting programs continue to rely heavily on low-flow statistics, North Carolina's ability to manage and plan for water infrastructure, particularly wastewater treatment and industrial development, will depend on having access to modern, site-specific, and scientifically rigorous low-flow data. Investing in updated assessments and expanded streamflow monitoring is essential for maintaining water quality, supporting economic development, and ensuring the long-term sustainability of the state's water resources.

Water availability assessments also rely on low-flow statistics; the critical assessment periods for water availability are the dry summer and fall periods, in which low stream flows are dominated by groundwater discharge. Low flow conditions provide a lower bound on water availability. Current low flow analyses are important for assessing both water quality and quantity.

In recognition of the growing need for up-to-date hydrologic data, the USGS—in coordination with the DWR and the NC Office of Recovery and Resilience—has initiated a statewide effort to update low-flow statistics across North Carolina. Scheduled for completion in 2025, this project aims to update low-flow metrics at all relevant USGS stream gaging stations across the state. The updated analysis will include streamflow records through the 2021 water year (October 2020 through September 2021), thereby capturing more recent hydrologic conditions shaped by evolving climate patterns, land use changes, and increasing water demands.

A key deliverable of this initiative is the development of regional regression equations that will enable reliable estimation of low-flow statistics at ungaged sites, a critical need for permitting and planning in rural or rapidly urbanizing areas. These regression models will be integrated into the USGS StreamStats program, a powerful, web-based application that allows users to delineate drainage basin boundaries, extract basin characteristics, and generate streamflow statistics for any user-defined point along a stream (Ries et al., 2024). The integration of updated low-flow values and regression tools into StreamStats will significantly enhance the technical capacity of water resource professionals, utilities, and permitting agencies across the state.

As this new suite of hydrologic information becomes available, it will be imperative for federal, state, and local agencies to adopt and incorporate the updated low-flow statistics into their regulatory frameworks, permitting processes, and resource planning activities. Doing so will ensure that decisions related to wastewater discharge, infrastructure development, water allocation, and ecological protection are grounded in the most current understanding of streamflow behavior.

In an era of increasing hydrologic uncertainty, this initiative marks a vital step toward strengthening North Carolina's ability to manage its water resources proactively, equitably, and sustainably, ensuring that both human and ecological communities are protected now and into the future.

8.0 Economic Development Site Readiness

North Carolina has established a suite of programs designed to support and accelerate economic development, with a strong emphasis on infrastructure readiness to attract large-scale industrial and manufacturing investments. These efforts have been particularly focused on preparing designated "Megasites" and "Select Sites" – strategically located, development-ready tracts of land equipped with the foundational infrastructure necessary to support advanced industrial operations. These programs are structured to reduce uncertainty for potential investors by streamlining site selection, minimizing permitting delays, and ensuring that essential services, such as water, wastewater, energy, and transportation access, are either in place or quickly deployable. The structure, objectives, and operational details of these programs are outlined in the following subsections, highlighting how North Carolina is positioning itself to remain competitive in attracting transformative economic opportunities.

8.1 Megasite Readiness Program

In 2022, North Carolina took a significant step to strengthen its economic development strategy by establishing the Megasite Readiness Program through legislative action. The program was initially funded with $1 million to support the identification and advancement of five designated "Megasites" across the state. A Megasite is defined as a contiguous parcel of land exceeding 1,000 acres that is considered viable for large-scale industrial development. These sites are intended to be "shovel-ready," fully prepared to accommodate the infrastructure demands of high-impact industries such as automotive manufacturing, clean energy, aerospace, food processing, and semiconductor production. The program's overarching goal is to attract major employers, generate substantial job creation, and stimulate long-term economic growth. A prime example of its success is the Greensboro-Randolph Megasite, now home to North America's first Toyota battery manufacturing plant.

Initially, the Megasite Readiness Program directed the Economic Development Partnership of North Carolina (EDPNC) to engage a qualified firm to evaluate potential sites and identify the most suitable five. In 2023, the program was amended to expand the list to seven preferred Megasites in recognition of continued interest from global industries and the need for strategic site readiness. The amendment also authorized significant additional funding: $10 million for fiscal year 2023–2024 and $97.8 million for fiscal year 2024–2025, reflecting the state's ongoing commitment to positioning itself as a national leader in advanced manufacturing and innovation. Designated Megasites are eligible to apply for funding under the program, which can be used for a wide range of preparatory activities, including:

1. The acquisition of Megasite property for development,
2. The analysis, planning, installation, or upgrading of public infrastructure, *including publicly owned water, gas, and sewer systems, transportation infrastructure*, and the electrical utility lines necessary to meet the needs of prospective employers
3. On-site preparation, including clearing, grading, or other related expenses for Megasites
4. Due diligence activities, such as environmental assessments and permitting studies

To streamline development and ensure a coordinated regulatory process, the DEQ has appointed the Director of Intergovernmental Affairs and Economic Development as a single point of contact for all

Megasite-related permitting. This Director works closely with both EDPNC and DEQ's permitting divisions to guide prospective companies through North Carolina's regulatory landscape, ensuring that reviews are efficient, transparent, and comprehensive.

8.2 Selectsite Readiness Program

In 2023, the NC General Assembly established the Selectsite Readiness Program (SRP) as a strategic complement to the state's existing Megasite initiative. Designed to support the development of industrial sites smaller than 1,000 acres, the SRP aims to enhance North Carolina's economic competitiveness by preparing a broader range of properties to attract major manufacturing projects. While Megasites are intended for large-scale, high-impact developments, the Selectsite Readiness Program focuses on medium-sized sites that offer flexibility and faster timelines for companies seeking to establish or expand operations within the state.

The program is administered by the EDPNC, which plays a central role in site evaluation, technical assistance, and promotion. In a recent milestone, the EDPNC released the inaugural Selectsite Readiness Program Report, which identifies 15 strategically located sites across North Carolina that demonstrate strong potential to meet the needs of advanced manufacturers. Site selection criteria included proximity to infrastructure, utility capacity, workforce availability, and readiness for development.

By investing in the readiness of these sites, North Carolina is broadening its economic development portfolio, ensuring that communities of varying sizes across the state can participate in and benefit from industrial growth. The SRP is particularly important for regional and rural economic development, enabling areas outside major metropolitan hubs to compete for high-value projects in sectors such as automotive, life sciences, clean technology, and precision manufacturing. The program represents a proactive effort to remove barriers to site development, accelerate project timelines, and deliver more "shovel-ready" options to prospective employers evaluating North Carolina as a location for investment.

8.3 North Carolina Railroad Company

The North Carolina Railroad Company (NCRR) is a private railroad company that owns 317 miles of railway throughout the state. The Build Ready Sites (BRS) Program is NCRR's flagship grant initiative focused on preparing industrial sites for immediate development. The goal is to make rail-served sites more competitive to attract new industrial companies and job creation. NCRR invests in business development both within the railroad corridor and outside of it. They have economic development programs with funding available to help encourage business growth and relocation to the state. The grant funding supports site development and infrastructure readiness. The BRS program provides grant funding to communities to undertake crucial pre-development work that removes common roadblocks for incoming companies. Funds can be used for land preparation, critical utility extensions, or other costs associated with making the site viable for rail service. Projects may receive up to $500,000 of the total project cost. For sites located along the NCRR-owned corridor, the limit may be increased.

8.4 Program Success

A key factor in the success of the NCRR, Megasite, and Selectsite Readiness Programs has been the strategic sharing of detailed, site-specific information. By compiling and disseminating comprehensive

data on each site's physical characteristics, infrastructure assets, and development readiness, these programs have enabled more informed decision-making by site selectors, developers, and prospective employers. In particular, information related to water and wastewater infrastructure capacity has been critical. Understanding the availability, limitations, and upgrade potential of utility services allows companies to assess quickly whether a site can meet their operational needs, saving valuable time and reducing project uncertainty.

This transparency benefits site owners and industrial prospects, creating a more efficient marketplace for development. Owners can position their properties effectively by highlighting key assets, while developers can more easily identify sites that align with project specifications, timelines, and permitting requirements. The proactive preparation and communication of these data, supported by close coordination among the EDPNC, state agencies, and local utilities, has significantly enhanced North Carolina’s ability to attract and retain high-quality industrial investment across diverse regions of the state.

9.0 Regionalization Efforts

Utility regionalization refers to efforts to combine, consolidate, or more closely coordinate water and wastewater utilities across municipal, county, or special district boundaries. Regionalized systems share resources, governance, infrastructure, and/or services. The purpose is to improve efficiency, reliability, financial stability, environmental compliance, service quality, and often affordability.

Some of the forms it takes:

- Merger / Consolidation: Fully combining two or more utility systems into one system (shared management, assets).
- Acquisition of systems by private utilities: private utilities can provide benefits of shared services and economies of scale administratively without requiring systems to be contiguous.
- Shared services / management agreements: Utilities may still be separate legally but share certain services (maintenance, billing, technical staff, emergency support).
- Feasibility / planning studies to determine if merging is viable.
- Interconnections: physically connecting systems so that one can supply another in emergencies and/or for load balancing.
- Regional governance over water/wastewater systems.

North Carolina has several state programs encouraging and supporting regionalization, especially for water and wastewater utilities:

- Merger/Regionalization Feasibility (MRF) Grants: These grants help utilities pay for studies to evaluate consolidation, interconnection, or shared service.
- Viable Utility Program / Viable Utility Reserve (VUR): This is focused on identifying “distressed” water or wastewater utilities (e.g., ones that cannot sustain themselves financially, maintain their infrastructure, or meet regulatory standards) and supporting them toward long-term viability.
- State Laws & Legislative Action: Recently, HB 694 (SL 2025-77) directed the University of North Carolina School of Government’s Environmental Finance Center to study water/wastewater regionalization, among other water system reforms.

The State of North Carolina has crafted enabling laws to establish and support regionalization efforts to suit a variety of local government needs, from fostering cooperation to allowing for the incorporation of separate local authorities. For example, jurisdictions may take advantage of inter-local agreements to develop partnerships and joint utilities, while still maintaining some separate governance responsibilities.

A recent example is the Stowe Regional Water Resource Recovery Facility being constructed in the Charlotte region, which will serve three municipalities with one regional facility, providing both a high level of protection to the environment and economic benefits to the communities at large. In its most basic form, a regionalization effort may be a bulk water or wastewater purchase contract. More elaborate regional models have combined utility systems, with either one governmental unit or a

separate board governing the system. Two successful examples of recent regionalization efforts are described in the following subsections.

9.1 US Highway 421 Corridor Study

DEQ prepared the regionalization report for the US Highway 421 Corridor (Study) as directed by General Assembly Session Law 2023-134 (DEQ, 2024). The report was commissioned because many communities along the corridor face aging or insufficient water and sewer systems, constrained capacity, and limited regional interconnections. Additionally, future growth is expected to exacerbate demands on water supply and wastewater treatment, especially where infrastructure is already stressed.

The report aimed to present a concept-level plan to guide policy makers, utility providers, and local governments on regional infrastructure development needs for all utility services, including water and wastewater. The plan explores options such as shared regional systems, interconnections, consolidations (mergers), new pipeline corridors, and modular upgrades to existing systems. It identifies priority “segments” or zones where infrastructure improvements would yield the greatest benefit in terms of coverage, resilience, and cost-effectiveness. The plan emphasizes adaptability: infrastructure must be scalable, allow modular growth, and accommodate phased deployment.

The Study serves as a guide and a resource for the public water and wastewater providers and stakeholders in the Study Area, as well as for decision-makers who provide oversight and funding for water and wastewater infrastructure projects. In particular, the Plan highlights regionalization opportunities for water supply and wastewater treatment within each of the counties in the corridor.

The Study also recommends next steps, including additional detailed studies, finance and funding strategies, and a phased roll-out structure. Importantly, DEQ recommends encouraging regional cooperation and promoting consolidation or interconnection of smaller systems to realize economies of scale.

Timely completion of the study required a significant collaborative effort within the DEQ and with engineering and financial consulting firms. This plan should serve as a template for future regionalization studies in the state. Importantly, it highlights the need for up-front and continuing coordination with the DEQ DWR.

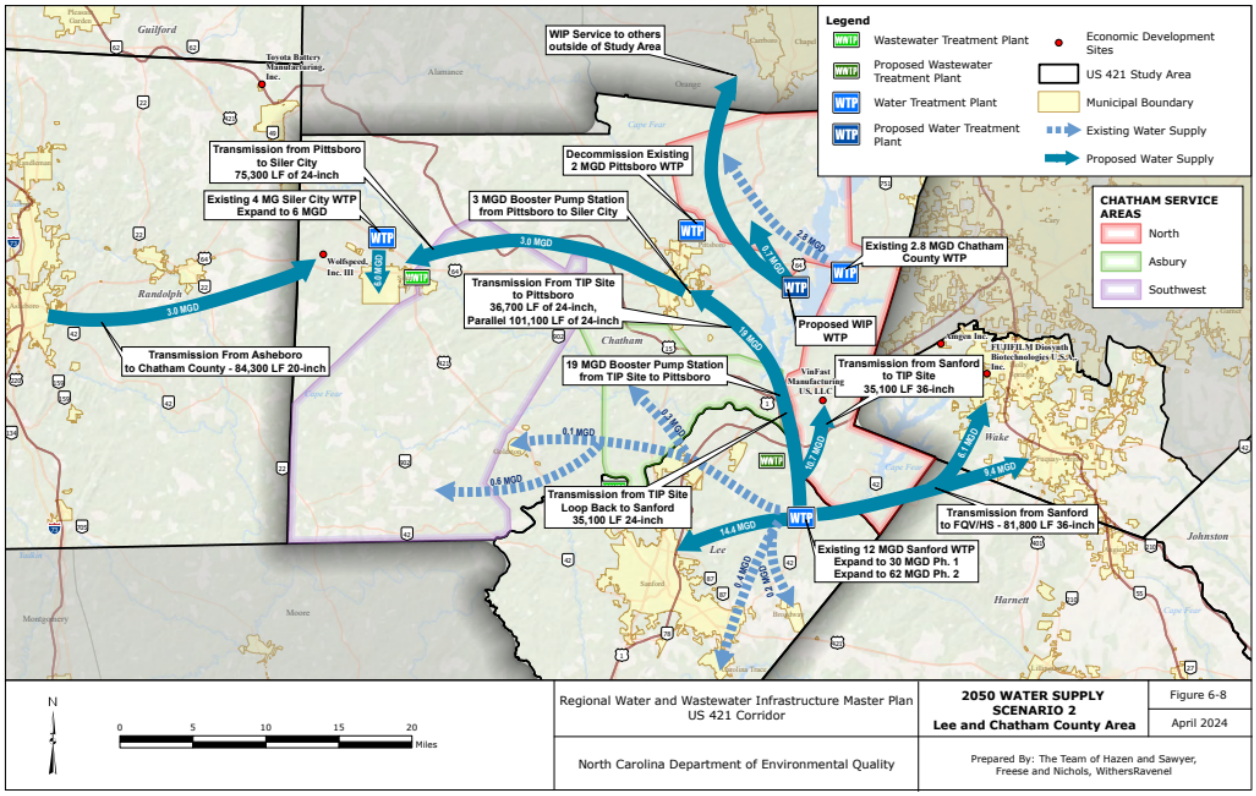


Figure 4. Example water supply scenario within the Regional Water & Wastewater Infrastructure Concept Plan – US Highway 421 Corridor (NC DEQ, 2024).

9.2 Lumber River Council of Governments Study

The Lumber River Council of Governments (COG) worked with six towns in Robeson and Columbus Counties to explore forming a regional water and sewer authority (LRCOG, 2025). Five of the towns were already interconnected through agreements for wastewater treatment and maintenance, primarily linked to Fairmont's wastewater treatment plant. The purpose of the study was to evaluate the challenges, benefits, and implications of full regionalization, with the long-term goal of creating a cooperative regional utility. The results of the study included the following:

- Established a foundation for exploring regionalization, with engineering, financial, and governance insights compiled.
- Identified cost and infrastructure requirements for regional interconnections.
- Provided local leaders with organizational and financial options for forming a joint regional authority.
- Built momentum among the six towns toward more formal regional utility cooperation.

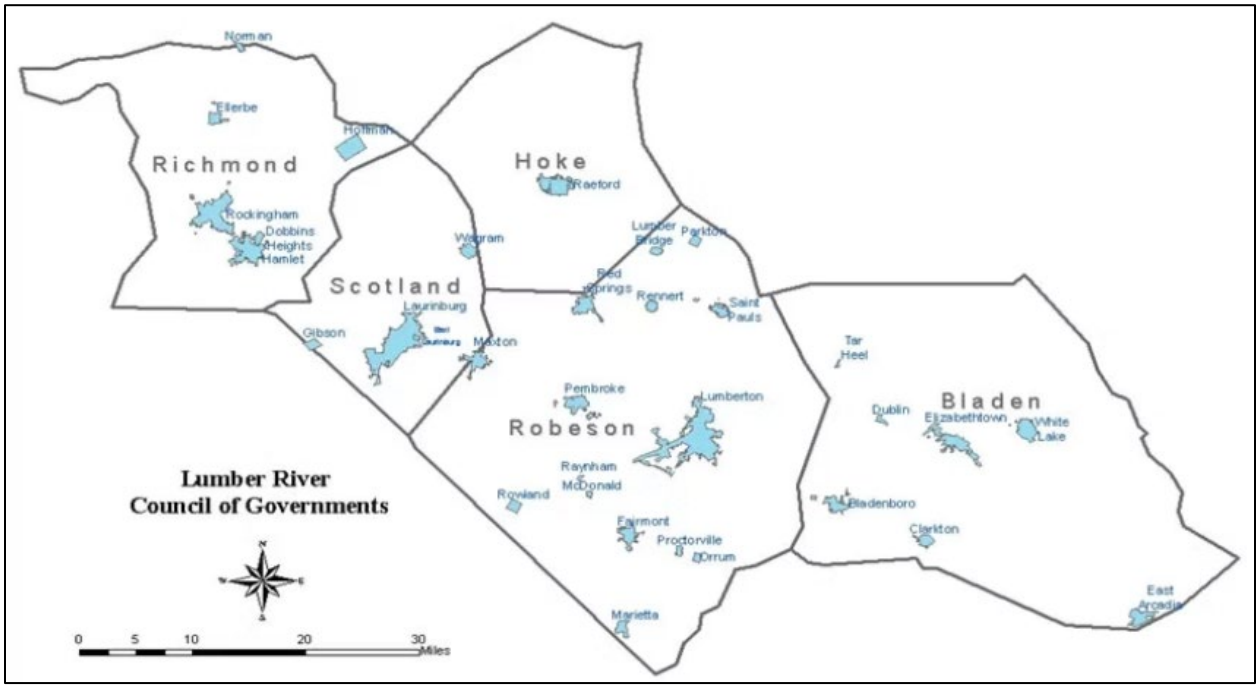


Figure 5. Map showing the Lumber River Council of Governments.

10.0 Key Findings

To address the challenges posed by rapid growth and economic development effectively, early and coordinated planning among developers, utilities, and environmental regulators is essential. Successful long-term strategies must move beyond traditional infrastructure planning to account also for the capacity and limitations of natural water systems. This requires a more integrated, forward-thinking approach to resource management, one that balances economic opportunity with environmental responsibility.

Key components of effective growth planning should include:

- Integrated water availability assessments that account for both infrastructure capacity (e.g., treatment plants, pipelines, and storage) and natural system constraints, such as streamflow variability, aquifer recharge rates, and ecological flow needs;
- Clear and consistent communication of hydrologic limitations to local and regional planners, ensuring that water resource realities are embedded in land use and development decisions;
- Proactive permitting strategies, including the designation of pre-permitted development zones where water and wastewater capacity, along with environmental assimilative capacity, have been pre-evaluated to expedite responsible growth;
- Ongoing investment in data and modeling tools that enable planners and decision-makers to assess future water supply vulnerabilities under a range of growth and climate scenarios, helping communities avoid overextension of finite resources.

In summary, while built infrastructure can often be expanded or upgraded to meet increasing demand, the limitations of natural water systems are fixed and must be managed carefully. Exceeding those limits can lead to regulatory non-compliance, degraded ecosystems, and diminished water security. Therefore, aligning economic development strategies with a clear understanding of both infrastructure and environmental thresholds is not only prudent; it is essential. Doing so will help ensure that North Carolina's communities grow in a way that is resilient, sustainable, and water-secure for generations to come.

10.1 Data and Analysis

One key finding of this study is that the existing knowledge gap for the spatial and temporal variation in water availability and water withdrawals across the state. This knowledge gap makes it difficult to evaluate long-term supply reliability, anticipate conflicts among users, or plan effectively for future growth and climate variability.

The state DWR plays a central role in managing water supply and quality; however, its ability to conduct comprehensive, statewide assessments of water availability is limited by current tools, authority, and staffing levels. As a result, data on withdrawals, stream flows, aquifer recharge, and ecological flow needs are often fragmented and drawn primarily from localized studies or project-specific evaluations.

Without comprehensive water availability assessments, communities face uncertainty when planning for new development, utilities struggle to anticipate long-term capacity needs, and the state, as a whole, is less equipped to balance economic growth with the protection of natural resources.

1. **Assessing Water Availability**. A thorough assessment of historical water use and availability is essential for predicting how supplies may shift under the combined pressures of increased demand and climate variability. Understanding past patterns of withdrawals, seasonal fluctuations, and regional supply constraints provides the foundation for reliable forecasting and informed decision-making about future water security.

   North Carolina, like many other states that rely on planning rather than regulation as the primary tool of water governance, does not operate under a system of permitted water allocations. Instead, water users are required to register and report their monthly withdrawals to the state. While this approach supports data collection and monitoring, it offers limited mechanisms for proactively managing conflicts among users or ensuring that withdrawals remain within sustainable limits.

   This planning-based model provides flexibility for water users and reduces regulatory burden, but it also places greater responsibility on the state to compile accurate information, assess long-term trends, and communicate potential risks. Without robust data and analysis, the system is vulnerable to gaps in oversight that may hinder both resource protection and the ability to support continued economic growth.

2. **Incomplete Water Use Data.** Reliable water use data is essential for projecting future demand and assessing statewide water availability. In North Carolina, however, agricultural withdrawals are reported differently than those of other users, which can make it more challenging to develop a complete picture of water use across the state.

   Currently, data on agricultural withdrawals are collected through a voluntary survey conducted by the NCDA&CS with results shared with the state in a spatially aggregated format to protect individual farm information. This approach provides a useful broad picture of agricultural consumption; however, it omits the detailed, site-specific data that could further enhance planning, drought preparedness, and the resolution of potential conflicts among competing users.

   The Farm Bureau has expressed concerns about proposals to make agricultural reporting mandatory or to require disclosure of information that could reveal individual farm-level withdrawals. Given that agriculture represents a large water use and has the most variable demands on the state's water resources, the lack of more detailed data makes it difficult for the state to forecast future needs fully, evaluate regional vulnerabilities, and design equitable water management strategies. Continuing to work with the NCDA&CS and the Farm Bureau on processes to better account for water consumption is key to better data sets state wide.

3. **Incomplete Low Flow Statistics.** The streamflow statistics North Carolina currently uses to establish limits on water availability and set conditions for wastewater discharge permits are based on datasets that are more than 30 years old. This lack of updates represents a weakness in water resource management, as the period of missing data coincides almost entirely with the era in which climate variability has significantly begun to affect hydrologic patterns.

Without incorporating more recent observations, the state's regulatory framework relies on assumptions that may no longer reflect actual conditions in rivers and streams. Shifts in rainfall intensity, seasonal distribution of flows, drought frequency, and storm events all have direct impacts on water supply reliability, ecological flow requirements, and the assimilative capacity of receiving waters. Outdated statistics, therefore, introduce uncertainty into both water availability assessments and wastewater permitting decisions, potentially leading to over-allocation of resources, ecological harm, or inadequate protection of downstream users.

Updating these streamflow records with contemporary data and incorporating climate-adjusted projections are essential steps to ensure that the state's water management decisions are scientifically defensible, environmentally sustainable, and resilient to future variability.

The USGS is currently under contract to update low-flow statistics and regression equations for ungaged sites across North Carolina. These updates are critically important, as the state's existing streamflow statistics are more than 30 years old and do not reflect the hydrologic shifts that have occurred during a period marked by climate variability and increasing water demand.

To maximize the value of this effort, the state must take two key steps:

- Ensure timely completion of the USGS study. Adequate funding, oversight, and interagency coordination are necessary to avoid delays and guarantee the delivery of high-quality, updated flow statistics.
- Integrate the new data into the state's permitting and planning programs. Once completed, the updated flow statistics and regression tools should be embedded into DWR's models, basin assessments, and permitting frameworks. Doing so will enable more accurate projections of water availability, support compliance with environmental regulations, and improve the resilience of North Carolina's water management systems under changing climatic conditions.

By fully leveraging the USGS study, the state can modernize one of its most important technical foundations for water governance and ensure that decisions are grounded in the best available science.

4. **Existing Tools.** The DWR within DEQ currently prepares basin assessments for each of North Carolina's 17 river basins. These assessments compile information on water resources, incorporate and summarize Local Water Supply Plans submitted by utilities, and identify areas of potential conflict between competing users. This basin-scale planning framework provides a valuable platform for understanding water availability and demand across the state.

   In addition, DWR has developed hydrologic models for every river basin. These models primarily evaluate surface water availability and rely on publicly available datasets. While they represent a significant technical achievement, tools that many other states still lack, they remain incomplete because they exclude detailed information on agricultural withdrawals, which are reported only in aggregated form. As a result, one of the largest and most variable categories of water use is only partially captured in statewide availability assessments.

   Expanding these models to incorporate groundwater withdrawals would provide a more comprehensive and accurate picture of total water supply and demand. Groundwater is a critical

resource for many communities, industries, and farms, particularly in areas with limited surface water access. Including both surface and groundwater in a unified modeling framework would more effectively allow the state to assess historical trends, evaluate the impacts of increased demand, and prepare for the uncertainties of climate variability.

With these improvements, North Carolina's basin assessments and hydrologic models could serve as the foundation for a robust statewide assessment of water availability, both current and projected, providing decision-makers with a science-based tool to guide sustainable growth and resource management.

10.2 Regionalization

Regionalization of public and private water and wastewater utilities offers a direct approach to optimize water availability and the capacity of streams to receive wastewater. Through regionalization, water supplies can be moved from areas of excess availability to areas of insufficient availability.

In general, the governance of water and wastewater utilities can hinder regionalization efforts. In North Carolina, utilities are typically governed by elected bodies (Municipal Governance) or by a board of directors (Authority Governance). The philosophy of Municipal Governance is accountability through a political process, while the philosophy of Authority Governance is focused on financial stability. Both forms of governance offer roadblocks to implementing regionalization plans. The willingness of elected bodies to enter regionalization planning or agreements is tied to local politics and the election cycle. It can be difficult to get political support for the long-term planning needed for regionalization, as the benefits may not be immediate. A board of directors may hesitate to enter an agreement that promotes business development in the state but negatively impacts the utilities' financial stability. While state economic development can be a strong motivation for regionalization, plans can collapse under local political or financial concerns.

Two regionalization plans were discussed in Section 9.0 of this report, the first coordinated by the DEQ (2024) and the second by the Lumber River Council of Governments (2025). Although they have no authority to drive implementation of any regional plan, the State DEQ is a critical partner. Similarly, a Council of Governments has no authority to implement regionalization plans but is likely to have a closer relationship and more influence with City and County operated utilities with membership in the Council. Collaboration and cooperation between regional planning groups and the state is critical to promoting and enhancing economic development. Together they can ensure that the water resources are utilized in a sustainable manner while promoting regional development.

10.3 Interbasin Transfers

Interbasin transfers provide another approach to optimize water availability and the capacity of streams to receive wastewater. Like regionalization, it allows water supplies to be moved from where they are available to where they are needed.

While regionalization relies on agreements between local utilities, interbasin transfers require state review and approval by the Environmental Management Commission. The time required for the DEQ to approve a transfer certificate is a deterrent for utilities. The application process requires an

environmental impact statement or assessment and repeated public notice and input. The process can take up to 3 to 5 years to complete. However, DEQ's *Study of Subbasin Transfers* highlights opportunities to modernize or shorten parts of the IBT review process for certain circumstances. Procedural efficiency such as this can improve site readiness and streamline regionalization.

While the process for obtaining a certificate could be streamlined, the requirement for an environmental impact assessment cannot be removed: transfers have the potential to alter hydrologic conditions irreparably in both basins involved in a transfer. There can be unintended hydrological and ecological impacts, as well as impacts on the potential for future development in both basins. A lengthy timeline is necessary to investigate all potential consequences before issuing a certificate.

The Interbasin Transfer process is politically divisive. In the 2025 legislative session, two bills related to transfers were introduced: House Bill 850 proposed a temporary moratorium on the issuance of transfer certificates, while House Bill 694 proposed removing the need for transfer certificates between certain basins indicating the diverse opinions on both side of the Interbasin transfer discussion.

10.4 Infrastructure Funding

The DWI manages infrastructure funding programs, such as the Drinking Water State Revolving Fund (DWSRF), the Clean Water State Revolving Fund (CWSRF), Community Development Block Grant-Infrastructure program (CDBG-I), State Wastewater and Drinking Water Reserve programs, Merger/Regionalization feasibility grants (MRF), Asset and Inventory Assessment Grants (AIA), and the Viable Utility program (VUR). These are the standard sources for funding water infrastructure improvements; however, only the MRF grant directly supports economic development through regionalization.

The Megasite and SelectSite Readiness programs were funded by legislative action, as was the US-Highway 421 Corridor Regionalization Study. While the traditional funding for water and wastewater infrastructure improvements managed by the DWI do not address economic development directly, the state has made economic development a priority for funding by legislative action. With the loss of the American Rescue Plan Act (ARPA) funding, the responsibility for supporting critical water and wastewater investments will increasingly fall to the state. This shift places a greater burden on state resources and underscores the importance of developing sustainable, long-term funding mechanisms to ensure that infrastructure needs are met.

10.5 Structure of the Department of Environmental Quality

State water governance is the responsibility of the DEQ DWR. As a planning-based governance, the DEQ does an admirable job to fulfill its responsibilities to the state using limited regulatory tools, limited data, and limited staff. As water use and wastewater discharges approach the natural hydrologic capacity, the role of DWR will need to expand, or economic development will stall.

The role of Director of Intergovernmental Affairs and Economic Development has been essential in the past few years to promote business development in the state. The position was formerly held by David Lambert, who was responsible for making the position relevant and necessary. Currently, the position is held by David Payne. This existence of this position shows DEQ has made a priority of partnering with

industry to generate a healthy economy and environment. This has motivated developers to be proactive in including the DEQ up front in discussions and planning.

11.0 Recommendations

The recommendations presented in this subsection build directly on the key findings outlined in the previous section. They intend to translate analysis into action by addressing the identified challenges and leveraging opportunities for improvement. Collectively, these recommendations provide a roadmap for continuing and strengthening economic growth in the state. By supporting water and wastewater infrastructure, improving financial stability, and fostering collaboration across jurisdictions, these recommendations aim to create the foundation needed for sustainable development. In doing so, they reinforce North Carolina's ability to remain competitive, encourage private investment, and promote balanced economic opportunities across the state.

11.1 Add More Regulation in Critical Regions

North Carolina currently maintains a planning-based approach to water governance. This is an effective model that provides flexibility for water users and reduces regulatory burden, but it also places greater responsibility on the state to compile accurate information, assess long-term trends, and communicate potential risks. Without robust data and analysis, the system is vulnerable to gaps in oversight that may hinder both resource protection and the ability to support continued economic growth.

In areas that are growing rapidly or are already water-stressed, more regulatory oversight will be necessary. For example, North Carolina is already doing this in the Central Coastal Plain Capacity Use Areas where groundwater levels have declined historically. In these areas water withdrawal permits and lower thresholds of reporting are required.

11.2 Encourage Comprehensive Data Collection of Water Withdrawals

1. **Ensure continued water withdrawal reporting**. Accurate water withdrawal reporting across all sectors is essential to understanding the state's true water availability. Without reliable data, it is difficult to evaluate current use, forecast future demand, or design effective strategies to balance growth with long-term resource sustainability.

2. **Continue to encourage voluntarily reported irrigation data**. Ideally, all sectors would report water withdrawals using the same threshold to ensure consistency and comparability across the state. At present, irrigators are only required to report withdrawals exceeding 1,000,000 gallons per day (and voluntarily at 10,000 gallons per day), while other sectors report at the much lower threshold of 100,000 gallons per day. This discrepancy limits the accuracy of statewide water use assessments and makes it difficult to understand demand fully. If adjusting the reporting requirements to align irrigators with other sectors is infeasible, it is important that irrigators be strongly encouraged to continue and expand voluntary reporting. Reliable and consistent data from the agricultural sector will significantly improve the state's ability to

forecast future needs, evaluate regional vulnerabilities, and design fair and effective water management strategies.

3. **Data Modernization Initiative.** In addition to improving reporting thresholds and consistency, North Carolina should pursue a coordinated *Water Data Modernization Initiative* to unify withdrawal, discharge, and infrastructure capacity data across agencies. A shared digital platform integrating geospatial and temporal data would enhance forecasting, drought preparedness, and permitting efficiency. Modernized data systems would also improve the transparency of water availability assessments and support alignment between infrastructure investment and economic development priorities.

4. **Use withdrawal data with spatial and temporal accuracy**. Currently, irrigation water withdrawals are reported to DWR in aggregated form, which limits the ability to understand fully how and where water is being used. To ensure sound planning, it is critical that withdrawal data maintain sufficient spatial and temporal accuracy to provide a complete picture of water use across the state. If the DWR can provide clear assurances that individual pumping information will remain confidential and not be released to the public, perhaps irrigators will be willing to report withdrawals at the individual level. Gaining access to this level of detail would greatly improve the state's capacity to assess regional demands, anticipate future needs, and design management strategies that balance agricultural viability with long-term water resource sustainability. Reliable, detailed reporting is not only a matter of water management but also a foundation for supporting resilient communities and sustainable economic growth.

11.3 Determine Regional Availability Assessments for the State

1. **Determine water availability for the whole state**. A comprehensive regional water availability assessment should be updated and completed for the entire state, using both a complete water withdrawal dataset, groundwater, and updated streamflow statistics. Having accurate, current information is essential for understanding the balance between water supply and demand across regions, evaluating the impacts of growth, and ensuring that water resources can support long-term economic development. Updated assessments will also strengthen the permitting process, improve drought preparedness, and provide utilities, developers, and state agencies with the clarity needed to plan responsibly for future infrastructure and community needs.

2. **Update streamflow statistics**. Low-flow stream characteristics in North Carolina have not been comprehensively updated in more than 30 years. This information is essential for making accurate assessments of water resource availability and for determining the assimilative capacity of receiving waters when issuing NPDES permits. Without current data, utilities, regulators, and developers face uncertainty in planning for growth, ensuring compliance, and protecting water quality. Updating low-flow statistics will provide a stronger scientific foundation for decisions, help identify regional vulnerabilities, and support infrastructure investments that balance environmental protection with economic development needs.

3. **Statewide Water Competitiveness Plan**. The regional water availability assessments described above should serve as the foundation for a broader ***Statewide Water Competitiveness Plan***. This plan would integrate infrastructure and natural system constraints with population, industry, and growth forecasts to guide long-term investment priorities. By linking regional analyses to a statewide strategic framework, North Carolina can ensure that economic development, permitting, and resource management decisions are coordinated and sustainable.

11.4 Promote Regionalization

1. **Promote regionalization at the municipal level or regional, above the utility level.** Regionalization can play a critical role in optimizing the use of available water resources and effectively managing wastewater. However, these efforts are often hindered by the understandable desire of individual utilities to maintain independence and local control. Promoting collaboration at a regional or multi-jurisdictional level can help overcome these barriers by shifting the focus from individual systems to shared benefits. The Lumber River COG provides a strong example of how regional entities can facilitate coordination, align priorities, and create solutions that serve both community needs and economic development goals (Section 9.2). By encouraging similar approaches across the state, North Carolina can strengthen utility systems while fostering more balanced and sustainable growth.

2. **Do planning and coordination at the regional level.** Regional collaboration among utilities can enhance efficiency, improve system reliability, strengthen financial stability, and—in many cases—increase affordability for customers. By pooling resources and aligning infrastructure planning, regional approaches also create a stronger foundation for long-term growth. Regional studies, such as the US-421 Study (Section 9.1), offer a valuable template for evaluating how collaboration can benefit an area. These studies demonstrate how shared planning and coordinated investment can identify infrastructure constraints, highlight opportunities for interconnection, and guide strategic decisions that support both community needs and economic development.

3. **Continue Interbasin Transfer Impact Assessments.** Interbasin transfers offer an important regional strategy for optimizing the use of available water resources while managing the capacity of receiving streams to handle wastewater discharges. As growth pressures increase, interbasin transfers can provide flexibility by moving water to areas where demand exceeds local supply. While the process for obtaining a Certificate of Transfer could be optimized to support timely economic development, it remains essential that environmental safeguards are upheld. Thorough environmental impact assessments ensure that transfers do not negatively alter hydrologic conditions, degrade ecosystems, or create unintended consequences in either the source or receiving basin. When carefully managed, interbasin transfers can serve as a valuable planning tool that supports regional growth while protecting the long-term sustainability of North Carolina's water resources.

11.5 Regionalization Studies and Site Readiness Program Enhancements

1. **Expand and continue to fund the Site Readiness Programs**. Programs such as the Megasite and SelectSite Readiness Programs play a critical role in positioning North Carolina for future economic development. These initiatives help identify, prepare, and market sites that are capable of supporting large-scale industrial and commercial projects, ensuring that the state remains competitive in attracting major employers and investment. Continued funding for these programs is essential, as they not only accelerate site readiness but also align infrastructure planning with regional growth strategies. By sustaining and expanding these efforts, North Carolina can strengthen its ability to respond quickly to business opportunities, support local communities, and maintain its reputation as a leader in economic development.

2. **Enhancing Site Readiness Beyond Funding**. In addition to direct funding, North Carolina can improve site readiness through process streamlining, pre-permitting of key industrial sites, and enhanced interagency coordination among DEQ, Commerce, and local governments. Reducing permitting timelines and aligning regulatory processes with infrastructure planning will help communities move more quickly from planning to implementation. These actions complement funding programs by improving predictability and reducing uncertainty for businesses considering investment.

3. **Fund Regionalization Plans**. Regionalization plans, such as the US-421 Study and the Lumber River Study (Section 9.0), provide critical information and guidance to utilities, regional groups, and economic developers. These plans clearly communicate existing infrastructure capacities while also identifying potential constraints on future growth. By outlining where infrastructure is sufficient and where improvements are needed, regionalization studies give developers, utilities, and state agencies a shared understanding of the opportunities and challenges ahead. This clarity helps decision-makers prioritize investments, streamline planning, and ensure that water and wastewater systems are prepared to support new industries, housing, and community expansion. In this way, regionalization planning serves as a vital tool for aligning infrastructure readiness with North Carolina's long-term economic development goals.

4. **Provide Incentives for Regionalization**. Regionalization helps optimize the use of North Carolina's natural resources and utility infrastructure, ensuring they are managed more efficiently and sustainably. By fostering collaboration among utilities, state agencies, and private developers, regionalization creates the foundation for growth that is both resilient and cost-effective. This coordinated approach not only supports expanding communities and industries but also strengthens the state's competitive edge in attracting investment. With regionalized systems in place, North Carolina is better positioned to lead in economic development, balancing growth with responsible resource management. Funding and incentive programs should incorporate performance-based criteria that reward utilities for measurable improvements in efficiency, resiliency, and asset management. Linking funding to outcomes, rather than solely to project type, will drive continuous improvement and accountability across the state's water systems.

5. **Water Workforce and Technical Capacity**. Sustainable regionalization requires sufficient human and technical capacity, particularly among small and rural utilities. The State should support targeted workforce training programs, in partnership with community colleges and professional associations, to develop skilled operators, managers, and engineers. Technical assistance should include asset management planning, rate design, and operational benchmarking to build long-term viability across systems of all sizes.

11.6 Introduce Innovative Financing and PPP Models

1. **Financing and Innovation Tools to Sustain Water Investment.** Ensuring reliable and resilient water systems will require new financing mechanisms and partnerships that extend beyond public grants or short-term federal programs. North Carolina should explore innovative financing models, including public-private partnerships (PPPs), infrastructure banks, and revolving loan expansions, to attract private capital and share project risk. Several states provide relevant precedents: Virginia's regional water authorities use PPPs for plant expansion and shared distribution; Texas' SWIFT program leverages state credit enhancement to attract private financing; and Florida's desalination projects demonstrate risk-sharing between municipalities and private operators. Incorporating PPPs into North Carolina's water strategy would align with the state's broader infrastructure competitiveness goals and provide new pathways for funding modernization, reuse, and resilience projects.

12.0 References

[Ballotpedia, 2015] https://ballotpedia.org/Public_water_system,_1974-2017.

[LRCOG, 2025] Lumber River Council of Governments Regional Water and Wastewater MRF (MRF-M-VUR-0004), May 1, 2025.

[DEQ, 2024] Regional Water and Wastewater Infrastructure Concept Plan, US 421 Corridor, North Carolina Department of Environmental Quality, May 1, 2024.

[NC Water Infrastructure, 2017] North Carolina's Statewide Water and Wastewater Infrastructure Master Plan, The Road to Viability, NC Water Infrastructure, 2017.

[Giese and Mason, 1993] G.L. Giese and R.R. Mason Jr., Low Flow Characteristics of Streams in North Carolina, USGS Water Supply Paper 2403, 1993.

[Ries et al., 2024] K.G. Ries, P. Steeves, and P. McCarthy, StreamStats—A quarter century of delivering web-based geospatial and hydrologic information to the public, and lessons learned, USGS Circular 1514, 2024.

[UNC, 2024] UNC School of Government, Environmental Finance Center, Results of the 2024 North Carolina Water and Wastewater Utility Management Survey, https://efc.sog.unc.edu/results-of-the-2024-north-carolina-water-and-wastewater-utility-management-survey/

[Weaver, 2016] J.C. Weaver, Low-Flow Characteristics and Flow-Duration Statistics for Selected USGS Continuous-Record Stream-gaging Stations in North Carolina Through 2012, USGS Scientific Investigations Report 2015-5001, Version 1.1, March 2016.

APPENDIX A

List of Interviewees

Meetings and Interviews

- **Water Infrastructure Resources Task Force**
  - **February 27, 2025**
  - **Shannon Becker – President, AQUA North Carolina**
  - **John Gant – Dir. of Sustainability, Glen Raven**
  - **Dana Martinez – Corporate Affairs Site Lead, Amgen**
  - **Mark McIntire – Director, Government Affairs, Duke Energy**
  - **Lankford Ruffin – Director of Environmental Affairs and Sustainability, Butterball**
  - **Jim Spangler – President, Spangler Environmental**
  - **Steve Whitt – Director, Environmental Services**
  - **Dana Magliola – Sr. Director, Infrastructure Competitiveness, North Carolina Chamber Foundation**
  - **Alyssa Morrissey – Director of Regulatory and Legislative Affairs, North Carolina Chamber**
- **421 Corridor Study**
  - **March 20, 2025**
  - **David Lambert – Director of Intergovernmental Affairs & Economic Development, NC Department of Environmental Quality**
- **Economic Development Partnerships of North Carolina,**
  - **March 31, 2025**
  - **Austin Rouse – Director of Business Recruitment, Economic Development Partnership of North Carolina**
  - **Garrett Wyckoff – Product Development Manager, Economic Development Partnership of North Carolina**
- **Division of Water Resources, Drinking Water / Wastewater, DEQ**
  - **April 2, 2025**
  - **Michael Montebello – NPDES Permitting Section Chief, NC Department of Environmental Quality**
  - **Richard Rogers – Director of the Division of Water Resources, NC Department of Environmental Quality**
  - **Michael Pjetraj – Deputy Director of the Division of Water Resources, NC Department of Environmental Quality**
  - **Julie Grzyb – Deputy Director of the Division of Water Resources, NC Department of Environmental Quality**
  - **David Lambert – Director of Intergovernmental Affairs & Economic Development, NC Department of Environmental Quality**
- **Division of Water Resources, Water Supply Planning, DEQ**
  - **April 14, 2025**
  - **Harold Brady – Water Supply Development Coordinator, NC Department of Environmental Quality**
  - **Karen Higgins – Chief of Water Planning Section for Water Resources, NC Department of Environmental Quality**

  - Michelle Raquet – Branch Chief of Basin Planning for Water Resources, NC Department of Environmental Quality
  - Pamela Behm – Branch Chief of Modeling and Assessment for Water Resources, NC Department of Environmental Quality
  - Richard Rogers – Director of the Division of Water Resources, NC Department of Environmental Quality
  - Julie Grzyb – Deputy Director of the Division of Water Resources, NC Department of Environmental Quality
  - David Lambert – Director of Intergovernmental Affairs & Economic Development, NC Department of Environmental Quality
- Division of Water Infrastructure, DEQ
  - April 28, 2025
  - Matthew Rushing – Water Infrastructure Project Engineer, NC Department of Environmental Quality
  - Shadi Eskaf – Director of the Division of Water Infrastructure, NC Department of Environmental Quality
  - Victor Damato – Water Infrastructure Viable Utilities Unit Supervisor, NC Department of Environmental Quality
  - David Lambert – Director of Intergovernmental Affairs & Economic Development, NC Department of Environmental Quality
- Chamber member, Aqua Water Company
  - May 16, 2925
  - Shannon Becker – President, AQUA North Carolina
- NC Railroad Company
  - May 20, 2025
  - Trish Haver, Strategy, Business and Sustainable Industrial Development, North Carolina Railroad Company
  - Nicole Brisman, Executive Assistant, North Carolina Railroad Company
- Chamber member, NC Regulatory
  - May 23, 2025
  - Alyssa Morrissey – Director of Regulatory and Legislative Affairs, North Carolina Chamber
- NC Regional Council of Governments
  - July 1, 2025
  - David Richardson, Executive Director, Lumber River Council of Governments
- NC Economic Development Association
  - July 2, 2025
  - Liz Dobbins-Smith, Managing Director, North Carolina Economic Development Association
  - Josh Grant, Director of Public Policy and Government Relations, Smith Anderson
- Town of Clayton
  - July 23, 2025
  - Rich Cappola, Town Manager, Town of Clayton North Carolina

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