



WATER MANAGEMENT

CITY OF DURHAM

Water System Risk & Resiliency

City Council | October 21, 2021

Presentation Outline

- Water Sources
- Water Treatment
- Water Distribution
- America's Water Infrastructure Act of 2018
- Risk & Resilience Assessment
- Emergency Response Plan
- Source Water Resiliency and Response Plan
- Preparing for the Future



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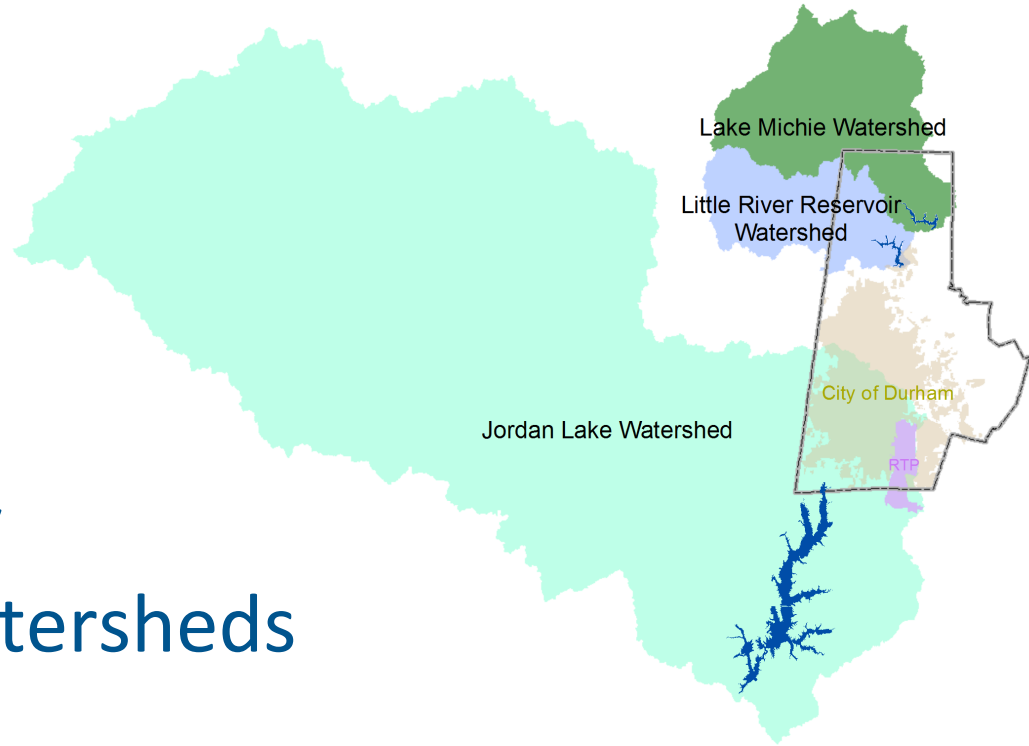
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Water Supply Reservoir Watersheds



Lake Michie

- Built in 1926 to replace dependence on run of river (Eno)
- Expected Yield = 10.5 MGD



Little River Dam & Reservoir

- Built in 1988 to meet growing demands
- Expected Yield = 17.4 MGD



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B. Everett Jordan Lake

- Increased allocation in 2017
- Expected Yield = 16.5 MGD



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Water Supply Reservoirs

Reservoir	Usable Storage	Watershed Area	Expected Yield
Lake Michie	2.8 BG	168 Miles ²	10.5 MGD
Little River Reservoir	4.8 BG	97 Miles ²	17.4 MGD
Jordan Lake Allocation	2.5 BG	1690 Miles ²	16.5 MGD
Total =			44.4 MGD



Williams Water Treatment Plant

- Built in 1917
- Capacity = 22 MGD



Brown Water Treatment Plant

- Built in 1976
- Capacity = 30 MGD
- 2020 expansion = 42 MGD



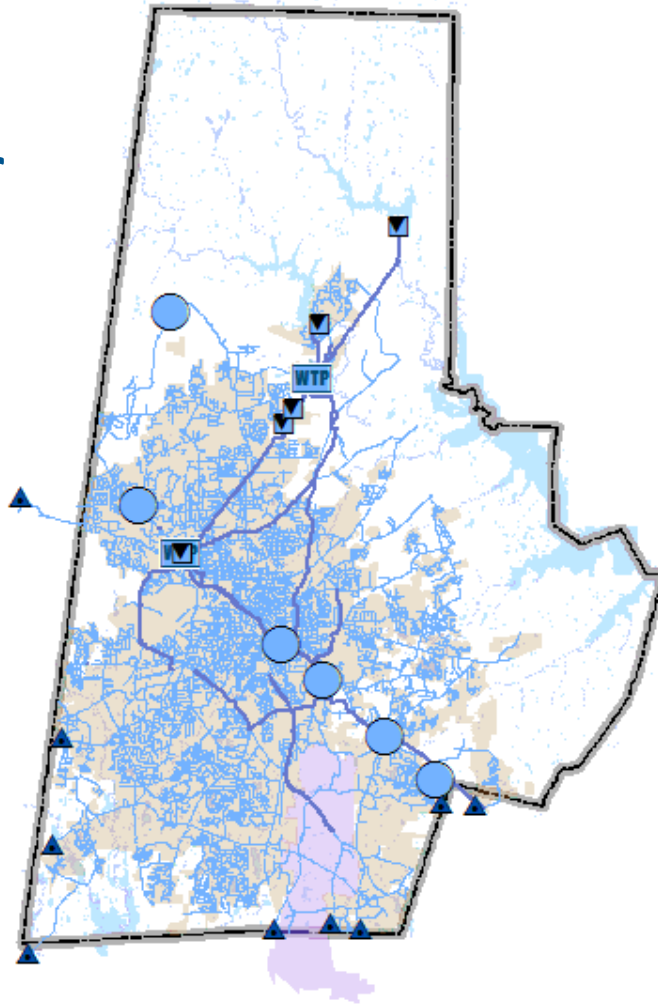
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Drinking Water Treatment Capacity

Water Treatment Plant	Terminal Reservoir	Treatment Capacity	Clear Well Storage
Williams operational	45 MG	22 MGD 12 MGD	2 MG
Wade G. Brown	90 MG	42 MGD	10 MG
	Total =	54 MGD	



Drinking Water System

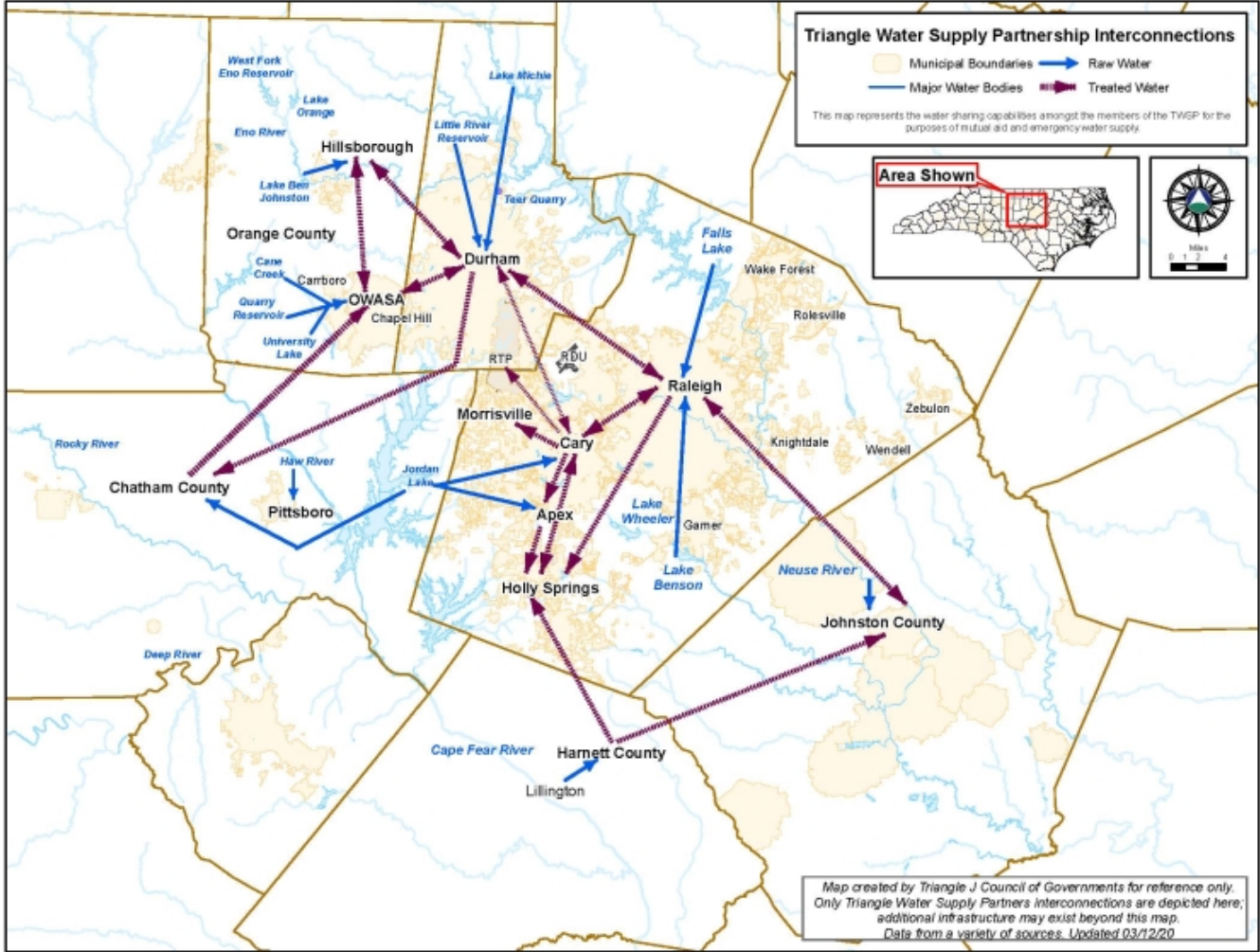


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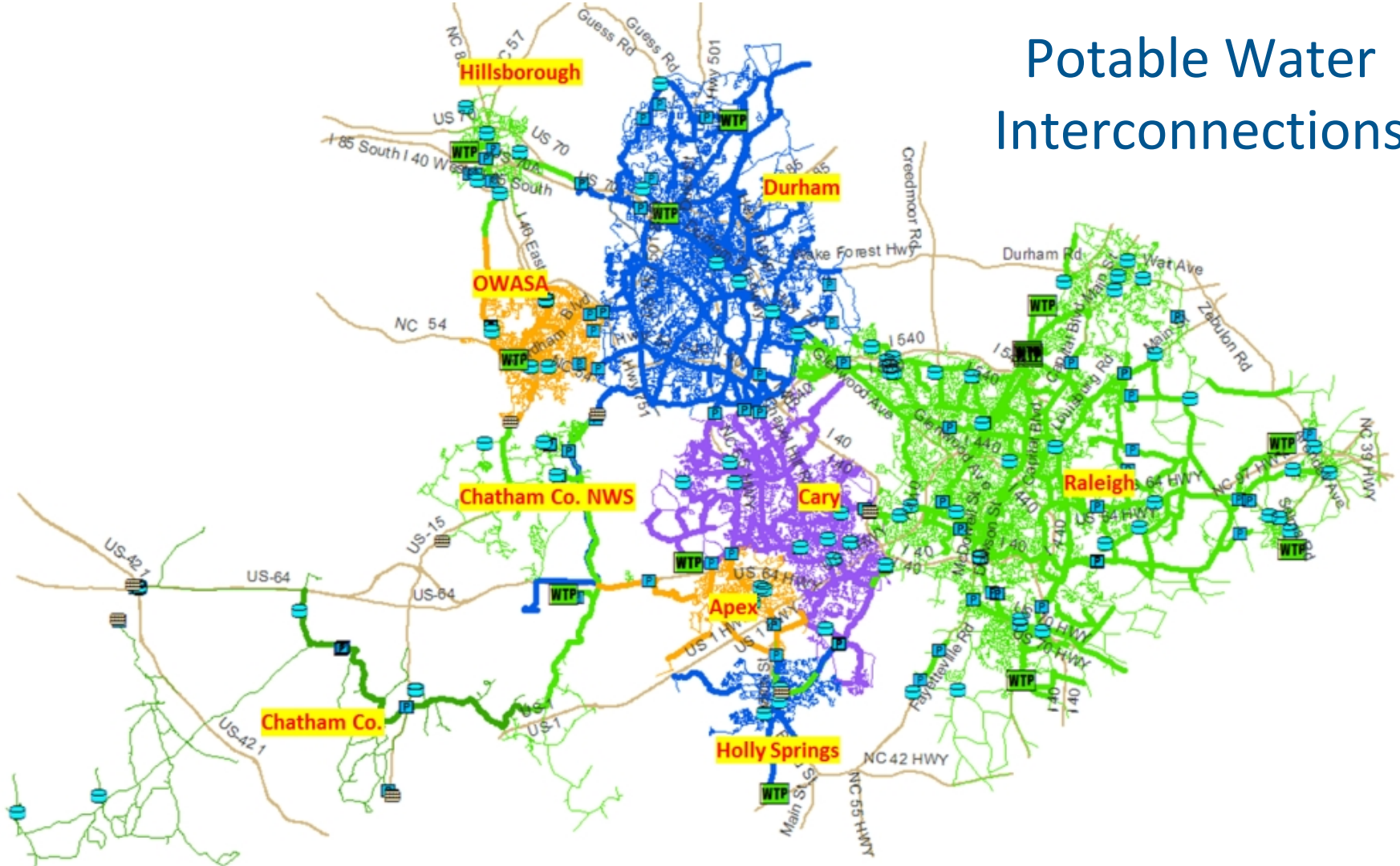
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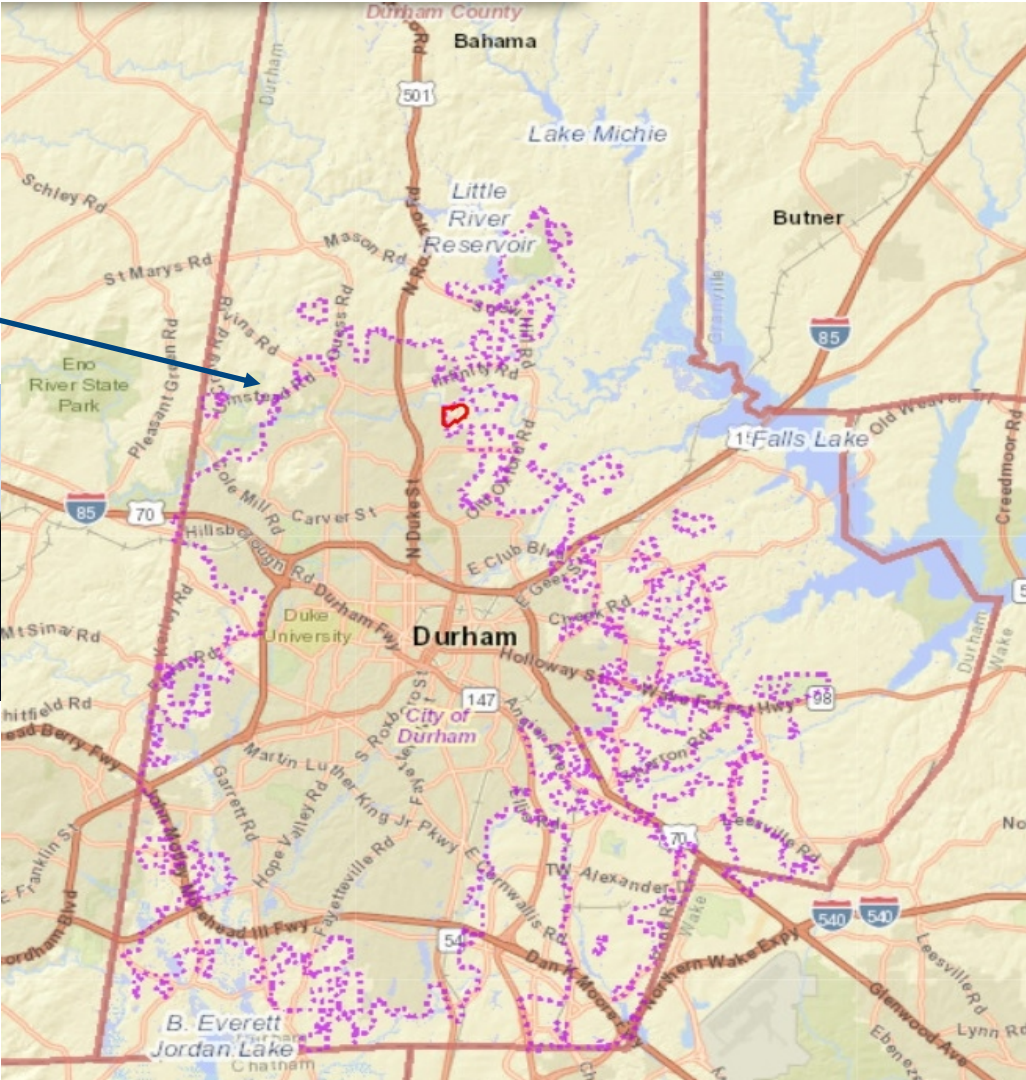
Regional Water Mobility



Potable Water Interconnections



Teer Quarry



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Western Intake Partnership

- City of Durham
- Chatham County
- Orange Water & Sewer Authority (OWASA)
- Town of Pittsboro
- Goal of collaboration - Jordan Lake Regional Water Treatment Facility online 2031-2035



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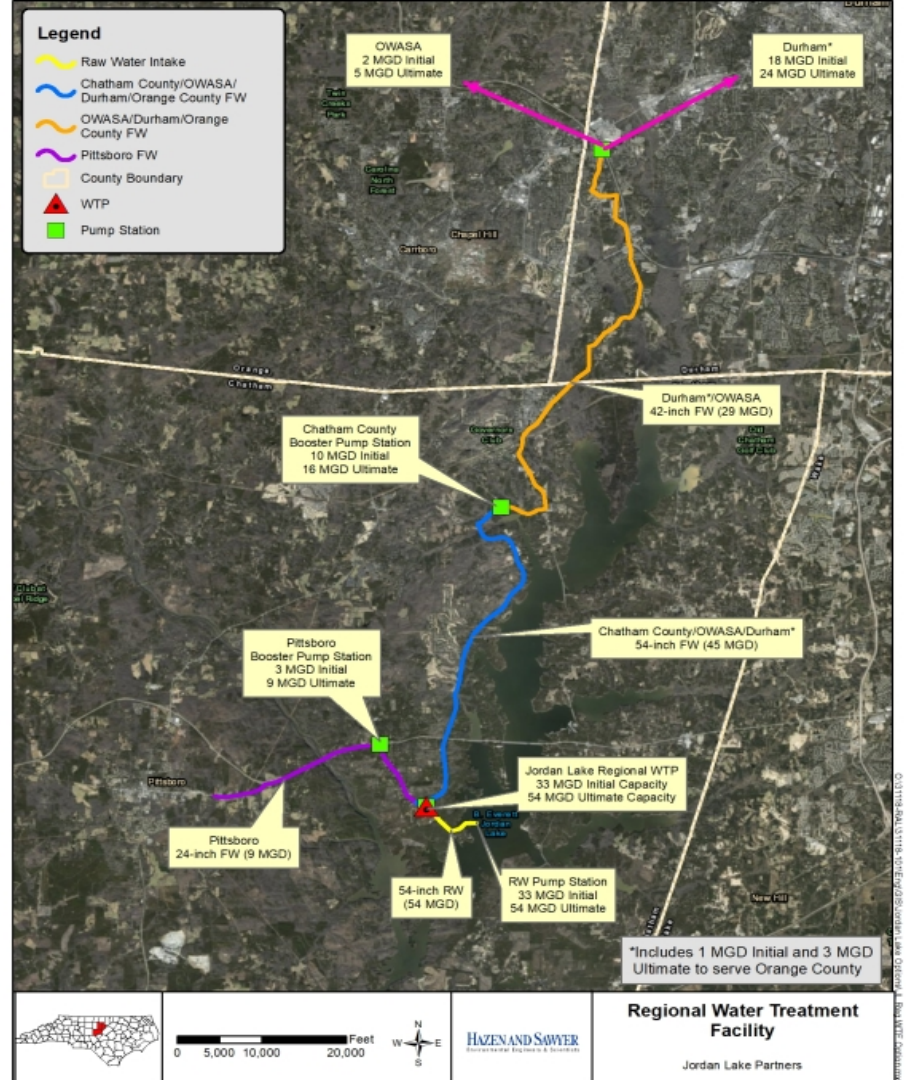
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Western Intake Partnership

Components of Project:

- Raw water intake
- Regional water treatment facility
- Pump stations
- Transmission lines



Regulatory framework

America's Water Infrastructure Act (AWIA) of 2018

- Signed on October 23, 2018
- Amended the Safe Drinking Water Act (SDWA)
- Public Law 115-270

Comprehensive Act to provide for:

- Improvements to rivers and harbors
- The conservation and development of water and related resources
- Water pollution control activities
- Community Water System (CWS) risk and resilience



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AWIA Risk and Resilience Requirements

Community Water Systems serving more than 3,300 persons must:

- 1 Conduct Risk and Resilience Assessment (RRA)
- 2 Update Emergency Response Plan (ERP)
- 3 Submit Certification Letter to EPA for each
- 4 Review and update both every 5 years thereafter
- 5 Maintain records (keep copies of RRA & ERP and any updates for 5 years after certification submittal)

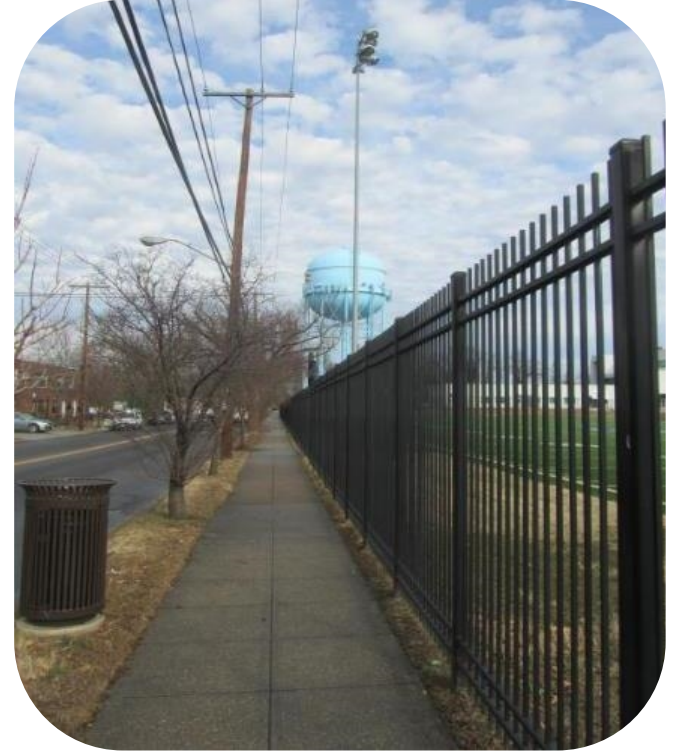
Required RRA Considerations

- Risks to the system from malevolent acts and natural hazards
- Resilience of system components
- Monitoring best practices
- Financial infrastructure of the utility
- Use, storage, or handling of various chemicals
- Operation and maintenance
- Evaluation of capital and operational needs for risk and resilience management (may include)



Required ERP Considerations

- Strategies and resources to improve the resilience of the system
- All-hazards approach
- Physical security and *cybersecurity*
- Alternative source water options
- Detection of malevolent acts or natural hazards
- Actions, procedures, and equipment which can avert or significantly lessen the impact of all-hazards events
- Coordination with existing local emergency planning committees



ERP Development Process

- Prioritize risks
- Define emergency response needs
- Utilize industry guidance
- Review previous ERP and other emergency plans
- Stakeholder engagement
- Integrate relevant plans and procedures
- Coordinate with SWRRP development



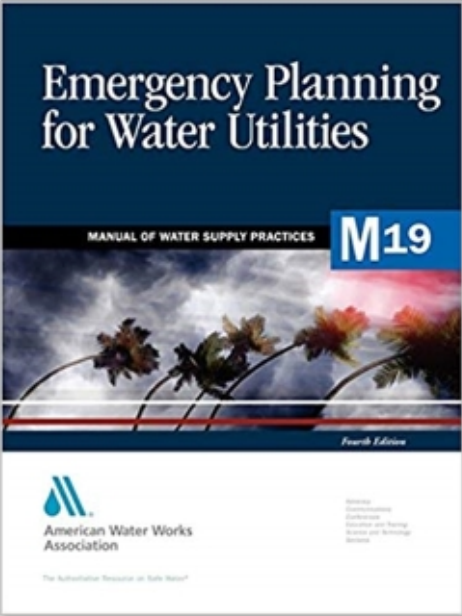
Risk and Resilience Assessment Results Inform the Development of an Emergency Response Plan



AWWA Voluntary Consensus Standards



G440, Emergency Preparedness Practices



M19, Emergency Planning for Water and Wastewater Utilities

Stakeholder Engagement

- Internal DWM stakeholders
- City / County Stakeholders
- Critical Customers
- Interconnected utility partners



Internal DWM Stakeholders

- Water treatment
- Water distribution
- Engineering
- Safety
- Security
- Emergency management
- IT/SCADA
- Laboratory and water quality
- Customer Billing Service



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Critical Customers

- Duke University
- NC Central University
- Research Triangle Park
- Duke Hospital
- Duke Regional Hospital
- Durham VA Hospital
- Etc.



Interconnected Utility Partners

- Raleigh Water
- OWASA
- Town of Cary
- Town of Hillsborough
- Chatham County



Integrating Relevant Plans and Procedures

- Dam Emergency Action Plans
- Water Shortage Response Plan
- Active assailant plans
- Treatment Plant SOPs

Training and Exercises

- Virtual training on the draft ERP
- Future tabletop exercises are planned



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Risk & Resilience Implementation Strategy

Short Term (As Soon As Possible)
Implement Recommended Financial Infrastructure Improvements
Continue Source Water Protection Activities
Implement Recommended SCADA System Improvements
Implement Emergency Preparedness and Response Recommendations
Mid Term (1 – 3 Years)
Develop a Source Water Resiliency and Response Plan (SWRRP)
Implement Recommended Insider Threat Mitigation Measures
Implement Mitigation Measures to Address Accidental Distribution System Contamination via a Backflow Incident
Develop and Implement a Security, Preparedness, and Resilience Specification

Mid Term (1 – 3 Years)
Develop and Implement Construction Security Procedure
Improve Physical Security at the WTPs and at Mist Lake
Improve Physical Security at the Remote Sites
Provide for Maintenance of Valves, Bypasses, and Security Equipment
Continue Developing the Asset Management Program
Improve Critical Staff Resilience
Establish a Critical Customer Program
Implement Training and Exercise Recommendation
Long Term (Greater than 3 Years)
Implement Recommended G430 and G440 Best Practices

Source Water Resiliency and Response Plan

- State Rule - 15A NCAC 18C .1305
 - Document potential contaminant sources (PCSs)
 - Identify foreseeable emergencies
 - Define emergency response strategies
 - Provide standard operating procedures
 - Describe public notification procedures
- Provide certification that governing body is aware of the plan's creation and implementation (Motion to acknowledge in agenda item)

Resiliency Bottom Line

- Redundant water supply sources
- Redundant water treatment plants
- Redundant water storage tanks
- Redundancy in pumping capacity
- Multiple robust interconnections with Orange Water and Sewer Authority (OWASA), Town of Cary, Raleigh Water, and Town of Hillsborough
- Example: During 2018-2019, the Williams WTP was taken out of service for over nine months for repairs and upgrades. DWM seamlessly continued to deliver quality tap water and only the key operation staff and partners knew.



Additional Future Resilience

- In 2011, Council approved 1¢ per tier dedicated to Watershed Protection
 - Generates approximately \$100,000 per year
 - Supports watershed protection beyond the Lake Michie and Little River Reservoir buffers
- Protected 168 acres and 12,710 linear feet of streams since 2018
 - Total cost = \$1,186,291
 - Durham's cost = \$317,600
- Source Water Protection Awards, 2018 & 2021
- Propose increase to 3¢ per tier dedicated to Watershed Protection
 - Raleigh's watershed protection fee = 8¢/ccf
 - Cary's watershed protection fee = 11¢/ccf





Further Questions?

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