Water Supply Planning: Current and Future Water Demands

Broad River Basin Council Meeting

June 9, 2022
Water Supply Planning: Current and Future Water Demands

- Statutory Requirements
- Water Use Registration
- Water Use Management
- Broad River Basin Water Use Demand and Outlook
- Challenges
- Q&A
Water Supply Planning

• Assures the availability of adequate supplies of good quality water to protect public health and support economic growth.

• Water supply planning and management requires an understanding of both available water resources (sources of supplies) and demands being placed on those resources.
Water Use Permitting & Registration

• No State-wide Water Use Permitting Program

• Limited Regional Permitting
  • Central Coastal Plain Capacity Use Area (CCPCUA)
  • Eno River Management (Voluntary)

• Only State-wide Water Use Registration
  • Local Water Supply Plan (LWSP)
  • Water Withdrawal Registration (WWR)
Local Water Supply Planning

• Law was established in 1989 by §143-355(l)
• Requires all unit of local governments and large community water systems to prepare a Local Water Supply Plan (LWSP)
  • Applies to systems with >1000 connections or >3000 people
• A LWSP is an assessment of a water system's current and future water needs and its ability to meet those needs
• A LWSP contains a systems water shortage response plan, water efficiency plan and surface water transfer worksheets (if needed)
LWSP Components

- Water System Information
  - Contact Information
  - Distribution Data
  - Maintenance
  - Conservation Programs

- Water Use
  - Service area
  - Water Use by Type
  - Water Sales & Purchases
  - Ground Water Sources
  - Surface Water Sources
  - Surface Water Transfers
  - Water Treatment Facilities
  - Wastewater Information

- System Planning
  - 50-Year Projections
  - Future Sale and Purchase Contracts
  - Future Supply Sources
  - Plan for Meeting Future Water Supply Needs

A Local Water Supply Plan is an assessment of a water system's current and future water needs and its ability to meet those needs. By understanding current and future needs, local governments will be better able to manage water supplies and better prepared to plan for water supply system improvements.

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

North Carolina Administrative Code [1SA NCAC 02E .06] requires all systems subject to General Statute § 143-355(f) to electronically submit an annual water use update based on their water use and system conditions by April 1 of every year for the period of January 1st to December 31st of the prior year.
• Covers 15 eastern Counties in NC
• Intended to prevent “de-watering” & salt water encroachment in aquifer
• Registration required for withdrawals > 10,000 gpd
• Permit required for withdrawals > 100,000 gpd
• 54 active registrations at this time
• 320 active permits at this time
• Phased reduction of withdrawals were mandated for some water users
• 2018 was the last phase of 3 reductions from 30-75% from initial base rate
Water Withdrawal Registration Program

Requirements:

• G.S. 143-215.22H was established in 1991
• Agricultural users > 1,000,000 gallons any single day
• Non-agricultural users > 100,000 gallons any single day
• Registered water users have until April 1st to report water usage for the previous year
• Completing the Agricultural Water Use Survey does not fulfill this reporting requirement > 1 mgd
Agricultural Water Use Survey

• **Session Law 2008-143**
  • Prior to 2008, no official data set to represent agriculture existed
  • Required NCDACS – ASD to collect annual information
  • Required for entities that withdraw 10,000 gpd or more in any one day
  • Surveys remain confidential & combined with other reports to produce totals
  • 9th statewide survey

Data from 2020 NC Agricultural Water Use Survey, NCDACS-ASD
Water Use Management

- Water Users
  - Agricultural
  - Domestic
  - Energy
  - Industrial
  - Mining
  - Public Water Supply Systems
  - Recreational (Golf, Snow making, Water sports, etc.)
  - Aquatic Wildlife, Habitat, and Associated Floodplain
- Future Water Users
Basinwide Hydrologic Models

Requirements:

• GS 143-355(o) – Subsection was created by S.L. 2010-143

• The model shall specifically be designed to predict the places, times, frequencies, and intervals at which any of the following may occur:
  - Yield may be inadequate to meet all needs.
  - Yield may be inadequate to meet all essential water uses.
  - Ecological flow may be adversely affected.

• OASIS – Operational and Simulations of Integrated Systems

• A patented, mass balance, water resources simulation/optimization model

• Limitations – Do not include water quality or groundwater systems
Drought Planning

• Minimize harmful impacts of drought and water supply emergencies on public health and safety, environmental quality, and the economy.

• Establish minimum standards and practices for:
  • water shortage response planning,
  • water use reporting,
  • water conservation, and
  • water reuse during droughts and water supply emergencies.

• Rules governing water use during droughts and water emergencies

• New Water Withdrawal Reporting
# Water Systems in the Broad River Basin

<table>
<thead>
<tr>
<th>PWSID</th>
<th>Water System</th>
<th>County</th>
<th>Service Area Population 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>01-23-025</td>
<td>Boiling Springs</td>
<td>Cleveland</td>
<td>4769</td>
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<tr>
<td>01-81-040</td>
<td>Bostic</td>
<td>Rutherford</td>
<td>850</td>
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<tr>
<td>01-81-035</td>
<td>Broad River Water Authority</td>
<td>Rutherford</td>
<td>17400</td>
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<tr>
<td>01-81-107</td>
<td>Chimney Rock Water Works</td>
<td>Rutherford</td>
<td>177</td>
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<tr>
<td>01-23-055</td>
<td>Cleveland County Water</td>
<td>Cleveland</td>
<td>52618</td>
</tr>
<tr>
<td>01-75-015</td>
<td>Columbus</td>
<td>Polk</td>
<td>999</td>
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<tr>
<td>01-81-050</td>
<td>Concord Community WS</td>
<td>Rutherford</td>
<td>1831</td>
</tr>
<tr>
<td>01-81-038</td>
<td>Ellenboro</td>
<td>Rutherford</td>
<td>2068</td>
</tr>
<tr>
<td>01-23-035</td>
<td>Fallston Water System</td>
<td>Cleveland</td>
<td>590</td>
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<tr>
<td>01-81-010</td>
<td>Forest City</td>
<td>Rutherford</td>
<td>21366</td>
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<tr>
<td>01-23-030</td>
<td>Grover</td>
<td>Cleveland</td>
<td>705</td>
</tr>
<tr>
<td>01-23-020</td>
<td>Kings Mountain</td>
<td>Cleveland</td>
<td>11000</td>
</tr>
<tr>
<td>01-81-020</td>
<td>Lake Lure</td>
<td>Rutherford</td>
<td>1068</td>
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<tr>
<td>01-23-045</td>
<td>Lawndale</td>
<td>Cleveland</td>
<td>636</td>
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<tr>
<td>10-75-010</td>
<td>Polk County Water System</td>
<td>Polk</td>
<td>585</td>
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<tr>
<td>01-75-020</td>
<td>Saluda</td>
<td>Polk</td>
<td>1400</td>
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<tr>
<td>01-23-010</td>
<td>Shelby</td>
<td>Cleveland</td>
<td>20353</td>
</tr>
<tr>
<td>01-75-010</td>
<td>Tryon</td>
<td>Polk</td>
<td>5334</td>
</tr>
<tr>
<td>01-45-010</td>
<td>Hendersonville (10%)</td>
<td>Henderson</td>
<td>6837</td>
</tr>
<tr>
<td>CWSs (12)</td>
<td>CWSs (LWSPs Not required)</td>
<td>All Counties</td>
<td>6050*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Total LWSP</strong> 150586</td>
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## Population, Demand and Supply
### 2007 - 2070

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
<th>Demand</th>
<th>Supply</th>
<th>%Demand vs. Supply</th>
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<tbody>
<tr>
<td>2007</td>
<td>149392</td>
<td>24.817</td>
<td>119.143</td>
<td>21%</td>
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<tr>
<td>2012</td>
<td>148822</td>
<td>23.757</td>
<td>97.127</td>
<td>24%</td>
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<tr>
<td>2018</td>
<td>143169</td>
<td>26.452</td>
<td>89.198</td>
<td>30%</td>
</tr>
<tr>
<td>2020</td>
<td>150586</td>
<td>28.55</td>
<td>97.388</td>
<td>29%</td>
</tr>
<tr>
<td>2030</td>
<td>163012</td>
<td>41.789</td>
<td>97.388</td>
<td>43%</td>
</tr>
<tr>
<td>2040</td>
<td>173662</td>
<td>44.266</td>
<td>97.388</td>
<td>45%</td>
</tr>
<tr>
<td>2050</td>
<td>188396</td>
<td>47.107</td>
<td>97.388</td>
<td>48%</td>
</tr>
<tr>
<td>2060</td>
<td>203693</td>
<td>50.431</td>
<td>97.388</td>
<td>52%</td>
</tr>
<tr>
<td>2070</td>
<td>226029</td>
<td>54.221</td>
<td>97.388</td>
<td>56%</td>
</tr>
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Water Demand & Population
2007-2070
Supply, Demand and Residential use rate
2007-2070
Water Demand by Category
(2020 LWSP data)

- **Residential**
  - 7.8 mgd
  - 27%

- **Non-residential** (Commercial, Industrial, Institutional)
  - 16.4 mgd
  - 57%

- **Process/Unaccounted**
  - 4.5 mgd
  - 16%

**Total Demand = 28.550 mgd**
## WW&TR Water Use and Sources

### 2020

<table>
<thead>
<tr>
<th>WW&amp;TR Category</th>
<th>Total Use (mgd)</th>
<th>Surface Water (mgd)</th>
<th>Ground Water (mgd)</th>
<th>Number of Facilities</th>
<th>Total Ground &amp; Surface Water Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>465.141</td>
<td>465.141</td>
<td>0.000</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Mining</td>
<td>2.021</td>
<td>2.021</td>
<td>0.000</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Public Water Supply</td>
<td>0.335</td>
<td>0.000</td>
<td>0.335</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td>Recreation</td>
<td>0.105</td>
<td>0.105</td>
<td>0.000</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>467.602</td>
<td>467.267</td>
<td>0.335</td>
<td>13</td>
<td>30</td>
</tr>
</tbody>
</table>
**Water Demand by Use Type**

**2020**

*Includes both LWSP & WW&TR data*
Challenges to NC Water Supply Planning

NC Water Law – Riparian Rights State

- No comprehensive plan for water quantity management in NC
- No federal oversight of / nor federal requirements for water quantity management
- No permitting program

• Pros
  - Less government regulation & permitting
  - Equal right to the water for all “reasonable use”

• Cons
  - No plan to ensure availability of water for future water supply, agriculture, industry, continued economic growth, & ecological health on NC’s water bodies
  - Courts would have to make the determination of reasonable use
Challenges to NC Water Supply Planning

• Lack the ability to plan and manage all water uses
  • Water use must be reported (especially large users)
  • Need better agricultural data
  • Need to consider Ecological flows (Instream uses)

• Difficult to quantify availability of water supply
  • How much surface water will be available?
  • How much ground water will be available?

• Coordination between water users
Water Supply Planning or Drought Response?

Towns desperate for water

Above, Clint Dean, a Shelby firefighter, monitors a fire truck system that draws water from the city of Kings Mountain through the Cleveland County water system to Shelby. Using the fire truck as a pumping station, 870 gallons per minute are processed.

Steff phot5 by WCt MURTHARDON

Worst-hit Piedmont communities begin pumping or trucking in water and further tightening restrictions
Manage our limited water supply for sustainability…
Linwood Peele, Supervisor
Water Supply Planning Branch
Division of Water Resources
Linwood.Peele@ncdenr.gov
919-707-9024
Water Resources Condition

North Carolina Annual Average Precipitation

Map generated by the State Climate Office of North Carolina, based on 1981-2010 annual normals from the PRISM Climate Group
Estimated Water Use In North Carolina 1970-2015
Excluding Power Generation

- Public supply
- Domestic self-supplied
- Industrial (including commercial and mining)
- Irrigation (including golf course)
- Livestock-aquaculture
Water Resources Outlook

![Graph showing population and water demand trends from 1970 to 2035. The x-axis represents the years 1970 to 2035, and the y-axis represents population in millions (Population) and water demand in MGD (Million Gallons per Day). The graph shows an increasing trend in both population and water demand.]

- Population: 4,000,000, 6,000,000, 8,000,000, 10,000,000, 12,000,000, 14,000,000
- Water Demand (MGD): 2,000, 3,000, 4,000, 5,000, 6,000, 7,000, 8,000, 9,000, 10,000

Legend:
- Blue bars: Demand (MGD)
- Red line: Population
Comparison of Statute Changes and Certifications

153A-285
- Piedmont Triad Regional Water Authority
- Cary & Apex

143-215.22I
- Cary, Apex, Morrisville, Wake County
- Charlotte Mecklenburg Utilities
- Concord & Kannapolis
- Greenville Utilities Commission
- Charlotte Mecklenburg Utilities

143-215.22L
- Union County
- Cary, Apex, Morrisville, Wake County
- Town of Fuquay-Varina

143-215.22I(o)
- Kerr Lake Regional Water System

143-215.22I(w)
- Brunswick County
- Pender County Utilities

153A-285 and GS 143215.1 have been repealed. GS 143215.22I current active statute.