

NICHOLAS INSTITUTE
FOR ENVIRONMENTAL POLICY SOLUTIONS
DUKE UNIVERSITY

The Future of Water in North Carolina: Drought, Population Growth, and the New Water Economy

RiverLink Community Drought Forum

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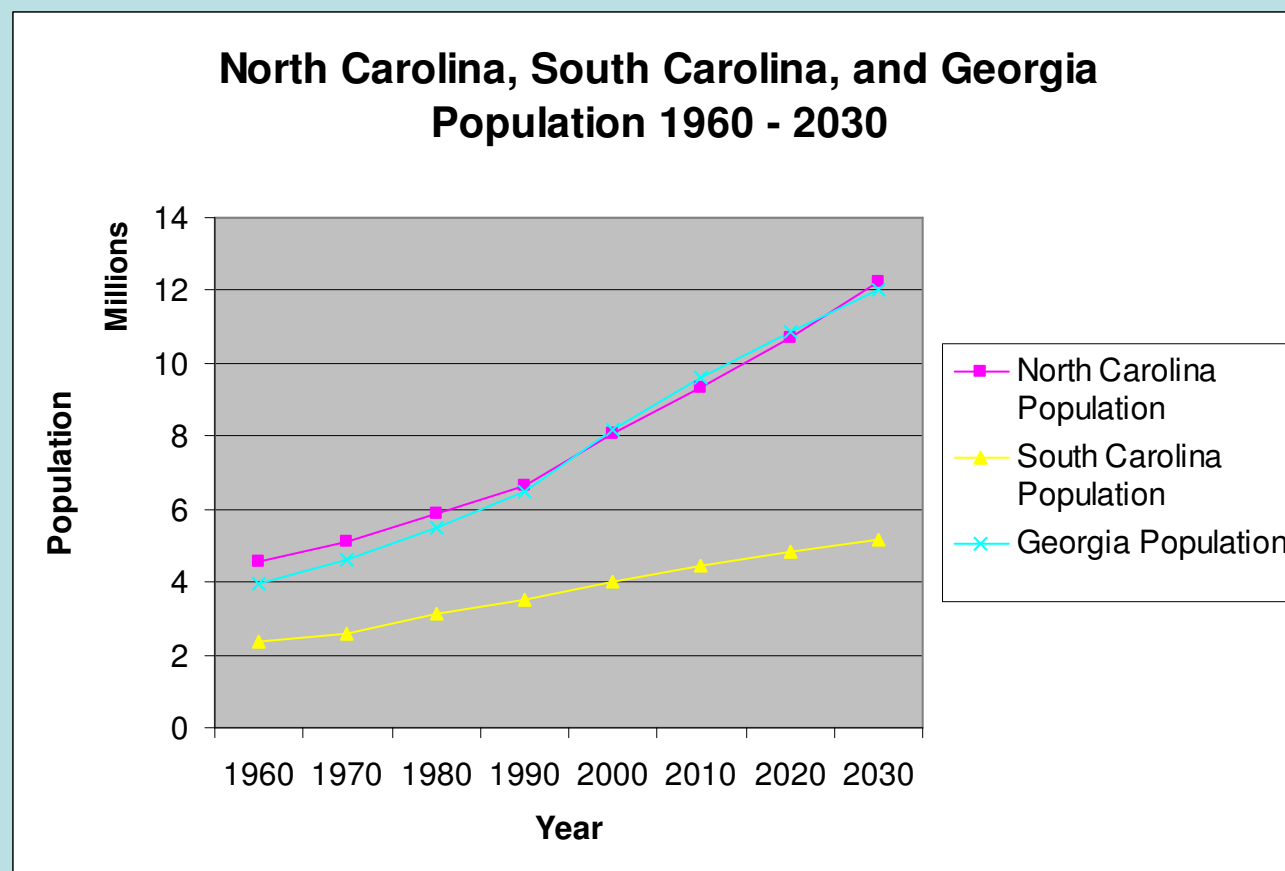
Overview

- Population Growth
- 2007-2008 Drought
- Water Supply & Demand in the 21st Century Economy



Population Increase

Water demand is expected to increase with population growth, such that by 2030 daily water use will increase by 35% - to 2.2 billion gallons consumed per day.

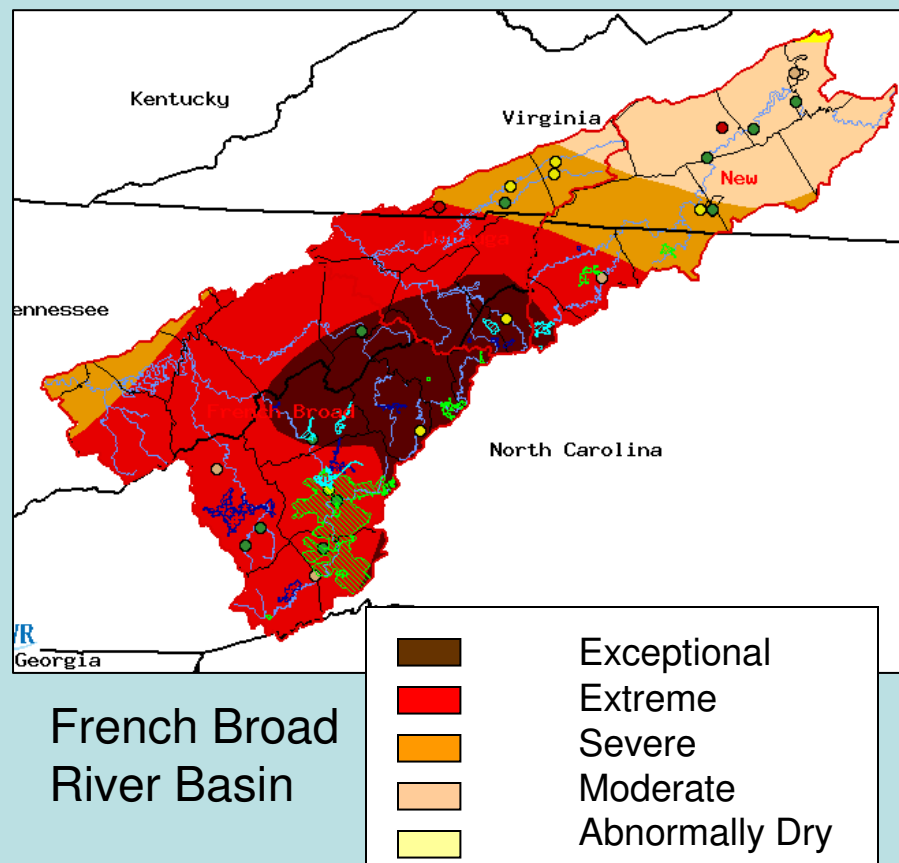




2007-2008 Drought French Broad & Tennessee Rivers



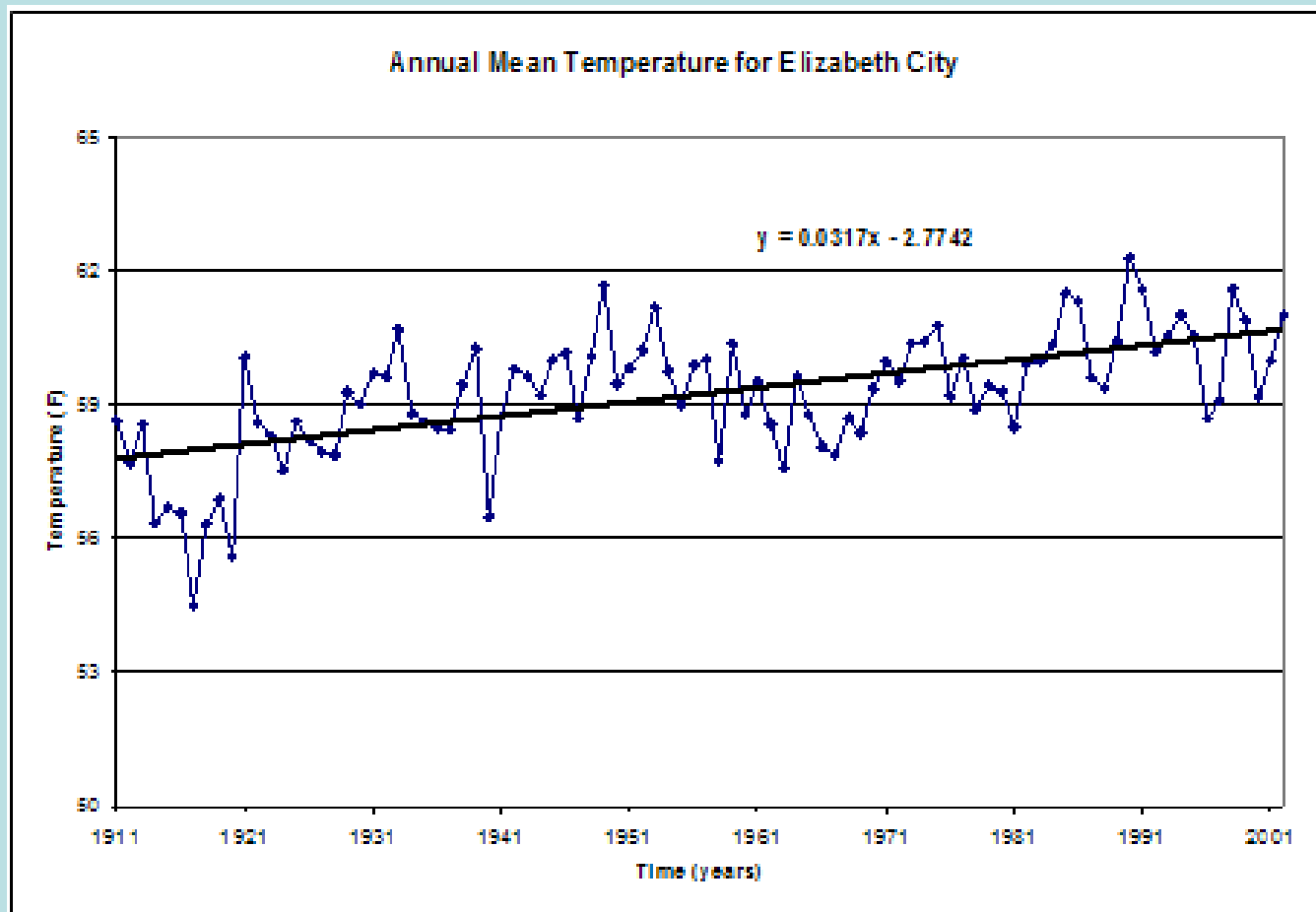
Little Tennessee River Basin



French Broad
River Basin



Temperature Trends, 1911-2001

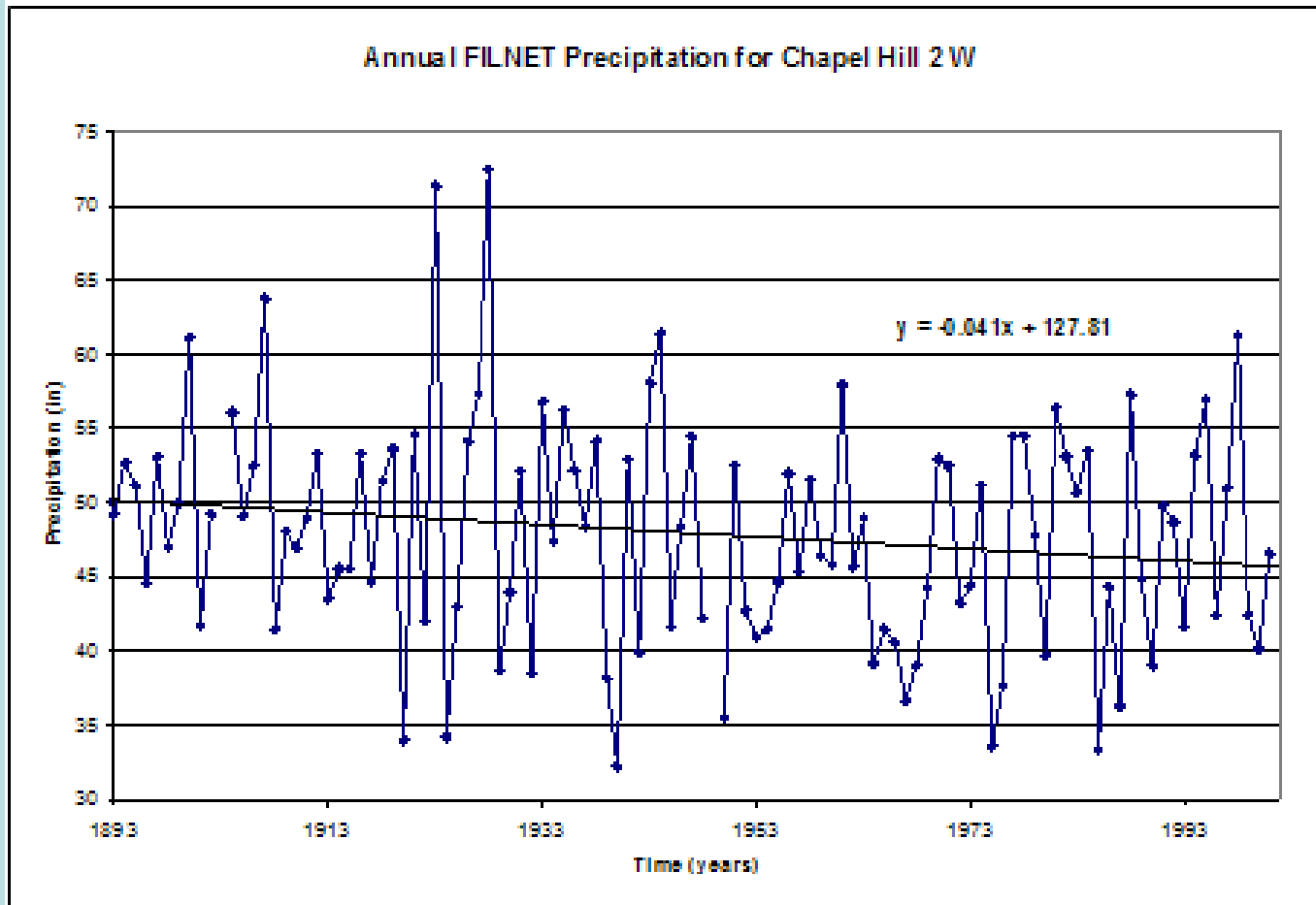


Graph 1. Plot of annual mean temperature for Elizabeth City

State Climate Office of North Carolina



Precipitation Trends, 1893-1995



Graph 2. Plot of annual precipitation for Chapel Hill 2 W
State Climate Office of North Carolina



Era of Cheap and Abundant Water (and Electric Power) is Over





Asheville Water Supplies

- Bee Tree Lake, built in early 1920's, cost \$?
 - 520 million gallon capacity
- North Fork Reservoir, built from 1953-55, cost \$?
 - 5.1 billion gallon capacity
- 17,356 acre-watershed permanently conserved
- Mills River Water Treatment Plant, completed 1999.
 - On average draws 3-4.5 MGD; During the 2007-08 drought drawing 5 MGD
 - Cost \$39 million for plant, engineering, and transmission lines
 - Future cost \$?



New Sources of Water?

The greatest and most cost-effective source of “new” water to sustain population, economic growth, and the environment is ***water efficiency***.



Conservation Pricing: Sending Signals



Cheap water indicates
Water is not a valuable
resource and results in
less efficient use

- Irrigation rates
- Increasing block rates
- Detailed, monthly,
easily translatable bills
- Drought surcharges



Consumer awareness of
true costs results in
more efficient use



Rates Dashboard

- A useful tool from the UNC-CH Environmental Finance Center
- Compare water bills, conservation price signals, operating ratio, and water bills as a percent of mean household income
- Asheville and Brevard value and price water services accordingly. Hendersonville and Waynesville charge about 50% less for water.
- <http://www.efc.unc.edu/RatesDashboards/index.html>



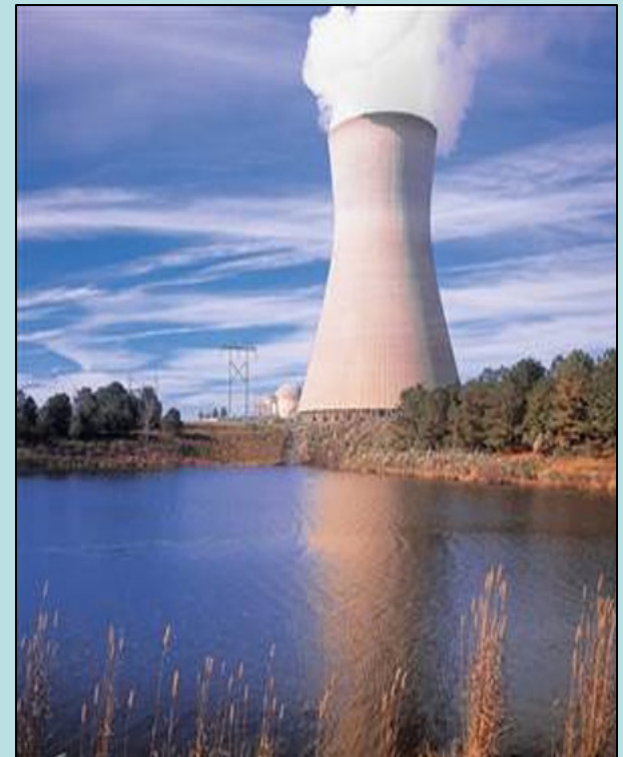
Year-Round Conservation

- Short-term conservation asks water users to forgo or reduce uses to which they expect to return
- Year-round, long-term programs result in the ability for water supplies to meet needs with less water
- Examples:
 - Water systems cost-share or provide free water audits
 - Incentive programs to retrofit existing buildings with water efficient fixtures
 - Restructure building codes to require more efficient fixtures in new construction
 - Regional and statewide water conservation marketing campaigns



Cross-Cutting Water Efficiency

- Nuclear and coal-fired power plants require large supplies of water for cooling.
- New power plants will increase demands for water.
- AWWA estimates that 20% of municipal electricity use is to pump and treat water and wastewater.
- Water efficiency and energy efficiency are linked.





Leak Detection and Repair

- Old and leaky infrastructure is the most common source of lost water reported to the NC Division of Water Resources (Local Water Supply Plans)
- Lost water = lost revenue
- Investments in leak detection and repair pay for themselves



Storm Water and Wastewater

- Valuable resources!
- Potential sources of water for irrigation and cooling
- Collection and treatment of storm water reduces flooding, stream erosion, and protects water quality
- Investigate the benefits of requiring regional storm water collection systems like rain barrels and cisterns
- Using treated wastewater will help wastewater systems comply with stricter nutrient standards and improve water quality in receiving basins





Landscaping

- Local governments could encourage or require more drought resistant plants and landscaping practices
- Use of compost, soil amendments, and mulch conserves water
- Soil and Water Conservation Districts and Cooperative Extension Services help educate homeowners, landscapers, and others



What's next?

North Carolina Water Allocation Study (SL 2007-518)

- Principal Investigators: Bill Holman, Duke's Nicholas Institute and Richard Whisnant, UNC-CH School of Government
- "The Environmental Review Commission, with the assistance of the Department of Environment and Natural Resources, shall study the allocation of surface water resources and their availability and maintenance in the State"
- May also consider:
 - Statewide water efficiency ideas, such as improving water use reporting by agriculture, electric utilities, and community water systems
 - Strengthening the plumbing code
 - Clarifying the use of grey water
 - Providing more authority to counties to regulate withdrawal of water from private wells.



Climate Change in the Southeast

- More extreme weather
 - Longer droughts
 - Larger storms and floods
- Changes in precipitation patterns
 - Wetter winters when water demand is lower
 - Hotter summers when water demand is higher
- Sea level rise





Climate Change: Effects on Water Resources

- Hotter summers will result in increased rate of evaporation and:
 - Warmer water – more nutrient sensitive, less cooling capacity
 - Lower stream flows (7Q10) and new waste load allocations



Resources

- North Carolina's Universities provide great resources for local governments
- Duke's efforts to cut water use and work with Durham is a good model



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