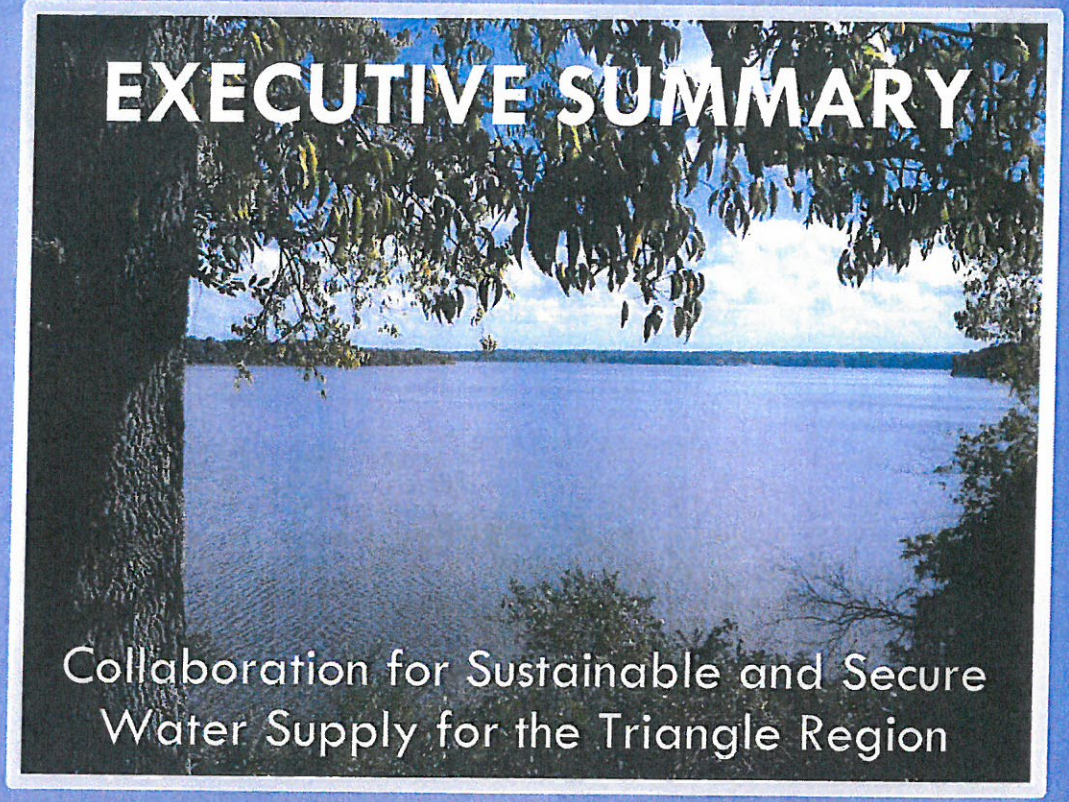
TRIANGLE REGIONAL WATER SUPPLY PLAN



Prepared For:

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Executive Summary

What is the Triangle Regional Water Supply Plan?

The Triangle Regional Water Supply Plan (TRWSP) is a collaborative assessment of projected water demands and sources in the Triangle Region of North Carolina, developed by the Jordan Lake Partnership (JLP), that demonstrates the ability of existing and new or expanded sources of supply to meet demands through 2060.

What is the Jordan Lake Partnership?

The JLP is a consortium of 13 local governments and water systems (Partners) that was created in 2009 to collaboratively plan for the future of water supply in the Triangle Region, including the use of Jordan Lake. Figure 1 lists the thirteen Partners and shows their 2060 water service areas.

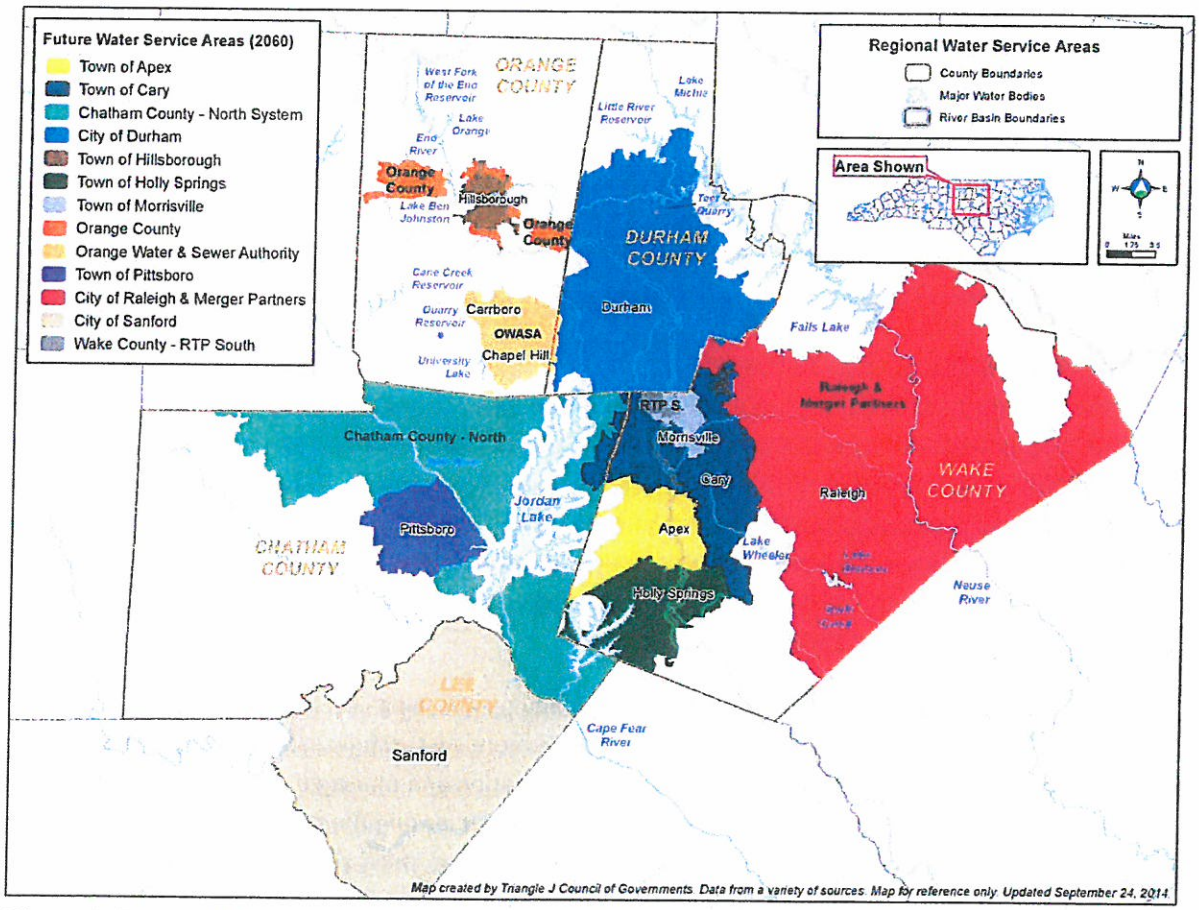

Figure 1. Future (2060) water service areas of the Jordan Lake Partners.

What are the Key Conclusions of the Plan?

- The Partners' current total water supply of 199 million gallons per day (MGD) is projected to meet their combined needs through approximately 2030.
- An additional 95 MGD of supply is needed to meet 2060 water supply needs (total 294 MGD).
- The 2060 demands can be met in an environmentally and economically sound manner through a combination of:
    - 36.4MGD: Allocation of most of the remaining Jordan Lake water supply storage (Apex, Cary, Chatham County, Durham, Orange County, Hillsborough, Pittsboro);
    - 20.6-22.6MGD: Expansion of existing reservoirs, off-stream quarry storage, and run-of-river withdrawals (Hillsborough, Orange County, OWASA, Pittsboro, Sanford); and
    - 41.1 MGD: Development of a combination – still to be determined – of new or expanded sources including reallocation from Falls Lake, a new intake in the Neuse River, off-stream quarry storage, and/or a new reservoir in eastern Wake County (Raleigh).
- Implementation of water use efficiency and conservation practices and expanded use of reclaimed water will continue to be essential strategies for meeting the region's future water needs.
- Hydrologic modeling has shown that the Triangle's water needs can be met without compromising the ability of downstream communities to meet their own water supply needs.
- The region's ability to meet projected water demands in 2060 may be compromised if any of the TRWSP's recommended future water supply sources are not implemented as planned.

Why was the Partnership Formed?

The Partners elected to be proactive in identifying potential water shortfalls and mutually acceptable and beneficial solutions for meeting future needs. The region experienced two historic droughts in 2002 and 2007-2008. Regional planning and collaboration – developing solutions on a geographic scale larger than individual water suppliers – will increase the resilience of our water supply under similar extreme conditions. In addition, the Partners wanted to use hydrologic modeling to confirm that other upstream and downstream water needs within the Cape Fear and Neuse River Basins would not be impacted by a proposed strategy that met the needs of the Triangle.

The challenges associated with utility management including increasing costs, greater regulatory requirements and increasing drought vulnerability can be more successfully met through inter-local collaboration in facility planning, design, construction, operation and management. The Partners, in various combinations, are engaged in joint projects including increasing the number and size of interconnections between water supply systems and consolidating utility systems through merger agreements. Some efforts include water supply planning over the entire hydrologic cycle where water, wastewater and stormwater service delivery are integrated to protect watersheds and improve response during drought or other water shortage conditions. The JLP was formed to complement these efforts, continuing to better prepare the Triangle Region to address water shortages on a regional basis.

What has the Partnership Accomplished?

The first step was for JLP members to develop demand projections through 2060, and a key part of this effort was engaging in a careful peer review of each other's demand projections. The Partners also shared information about conservation and water use efficiency efforts, identified existing interconnections and evaluated new interconnection opportunities. After determining future needs, the Partners developed a pool of potential water supply source options, and coordinated with the NCDENR Division of Water Resources (DWR) to use the combined Cape Fear-Neuse River Basin hydrologic model to define and evaluate alternatives. The result is the mutually-supported Triangle Regional Water Supply Plan for meeting the future water supply needs of the Triangle Region.

What are the Region's Water Supply Needs?

The region's existing and planned water supplies (Figure 2) are associated primarily with man-made reservoirs, along with a few run-of-river withdrawals and supplemental quarry storage. The region does not import water from outside the Neuse and Cape Fear River basins; though the Partners currently have a combined net transfer of surface water from the Neuse basin to the Cape Fear basin.

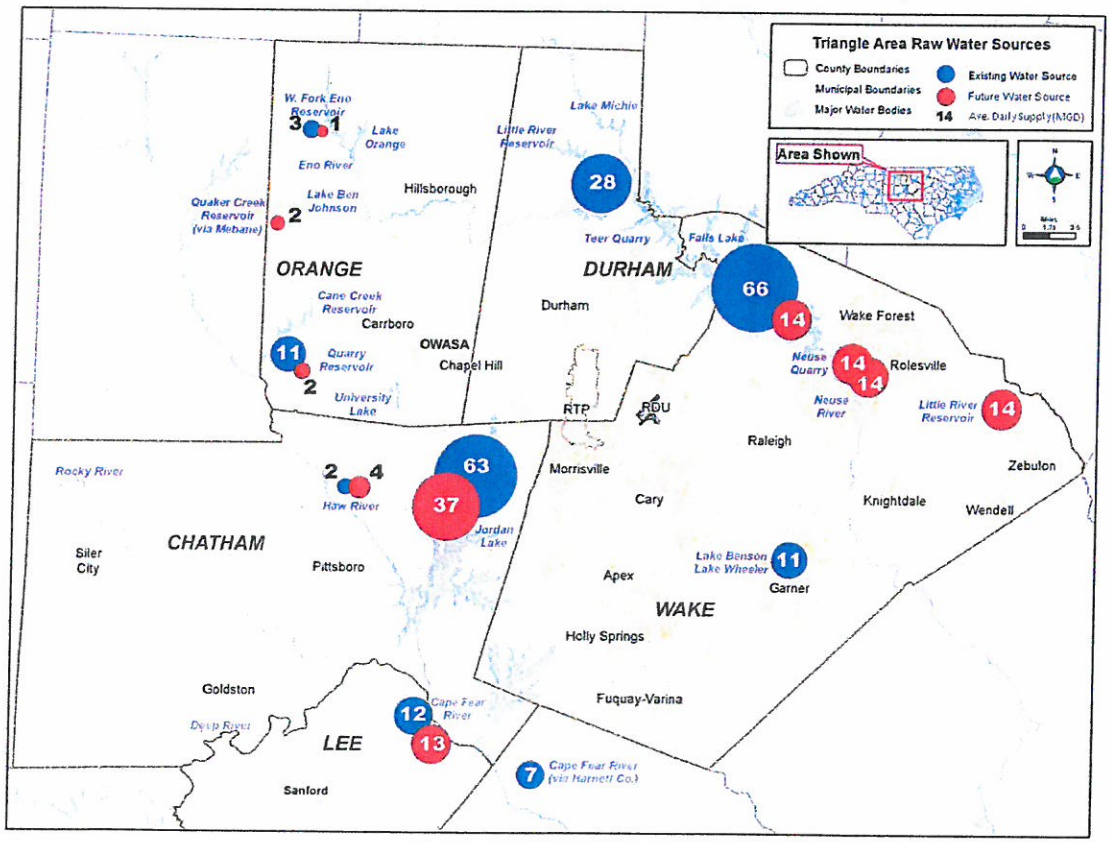

Figure 2. Existing and future water supply sources; JLP Recommended Alternative. Single dots sometimes represent multiple sources that are geographically close (e.g., OWASA's reservoirs) and/or more than one utility using the same source (e.g., Jordan Lake). The numbers by each source represent approximate yield in MGD, but have been rounded to whole numbers in this graphic. Details of each source are provided in the TRWSP.

The Triangle area is one of the fastest growing regions in the country, and as a result, the combined JLP water service area population is projected to increase from 1,066,000 in 2010 to 2,774,000 by 2060, a compounded rate of increase of about 1.9 percent. The corresponding water demands are projected to increase from 118 MGD in 2010 to 294 MGD by 2060, a compounded rate of increase of about 1.8 percent. The fact that water use is projected to grow slower than service area population illustrates the impact of the Partners' water efficiency and conservation programs, including increased use of reclaimed water.

While existing water supplies of 199 MGD are expected to meet the region's needs through approximately 2030, new water supplies of 95 MGD will be needed to meet 2060 estimated demands of 294 MGD. Figure 3 illustrates the growth in water demand for each partner. Raleigh makes up almost half of the JLP's combined demands – making the implementation of their future water supply projects essential to successfully meeting the needs of the Triangle Region.

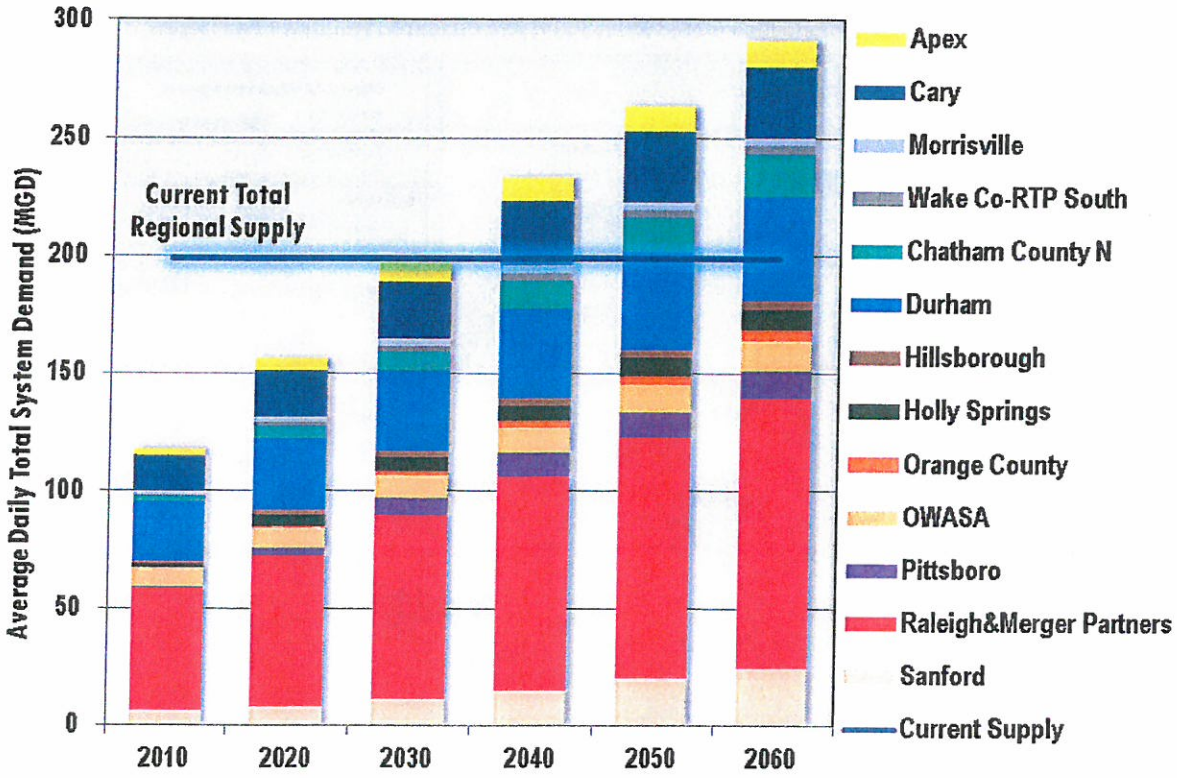

Figure 3: Regional demand projections and current supplies, including Jordan Lake allocations.

How will the Partners Meet 2060 Water Demands?

Many of the Partners have their own long-range master plans in which they have identified and evaluated a variety of water supply options. Using the information from these plans as a foundation, the JLP identified potentially feasible strategies for meeting the region's long-term water supply needs. These strategies were evaluated relative to each other according to their ability to meet regional water supply demands, costs, regulatory complexity and environmental impacts; and the strategy selected by the Partners is presented in detail in the TRWSP (JLP Recommended Alternative).

The JLP Recommended Alternative meets the region's cumulative 2060 water supply needs of 294 MGD with 36.4 MGD of new allocations from Jordan Lake, and development of about 63 MGD in water supply from increased and new withdrawals from river sources, increased and new supplemental quarry storage and a new reservoir on the Little River in eastern Wake County. Implementation of the JLP Recommended Alternative would decrease the existing net interbasin transfer from the Neuse River Basin to the Cape Fear River basin.

Currently, 63 percent of Jordan Lake's water supply pool has been allocated (a 1 percent storage allocation is estimated to yield approximately 1 MGD of average day supply). The JLP Recommended Alternative includes the same or increased allocations for all existing allocation holders (each is also a member of the JLP), as well as new allocations for several of the Partners. While the JLP is planning for 2060, the next round of Jordan Lake allocations (Round 4) will be based on 2045 needs. Table 1 presents current allocations and the total Jordan Lake allocation needs for 2045 (proposed Round 4 allocation requests) and 2060.

Table 1. JLP Recommended Alternative Jordan Lake Allocations (MGD).

Partner	Current Allocation		Total 2045 Need (Round 4 Allocation Basis)		Total 2060 Need	
Apex	8.5	32.0	10.6	46.2	11.6	48.5
Cary	23.5		28.6		29.8	
Morrisville	3.5		3.5		3.6	
Wake County (RTP South)	3.5		3.5		3.5	
Chatham County - N	6		13		18.2	
Durham	10		16.5		16.5	
OWASA	5		5		5	
Orange County	1		1.5		2	
Holly Springs	2		2		2.2	
Hillsborough	0		1		1	
Pittsboro	0		6		6	
Raleigh & Merger Partners	0		0		0	
Sanford	0		0		0	
TOTAL JLP	63		91.2		99.4	

Table 2 summarizes additional water supply (62-64 MGD) from sources other than Jordan Lake in the JLP Recommended Alternative. While most of the sources are expansions of existing water supplies, about 41 MGD of the proposed water supply – nearly half of the 95 MGD in new supplies needed to meet regional 2060 demands – will come from a combination of new projects that are planned by the City of Raleigh.

Table 2. JLP Recommended Alternative Water Supplies (MGD).

Partner	Source Name	Basin	Type	Projected New Supply (MGD)
Hillsborough	W. Fork Eno Expansion	Neuse	Reservoir Expansion	1.2
Orange County	Purchase from Town of Mebane	Haw	Purchase	0.5 - 2.5
OWASA	Quarry Reservoir Expansion	Haw	Quarry Expansion	2.1
Pittsboro	Haw River - Increased Withdrawal	Haw	River Withdrawal	4.0
Raleigh	Exploring 4 options; must develop 3	Neuse	New Reservoir; Reallocation of Falls Lake Storage; Neuse River Withdrawal; Quarry	41.1
Sanford	Cape Fear River - Increased Withdrawal	Cape Fear	River Withdrawal	12.8
TOTAL	All New Sources			61.7-63.7

Can Downstream Communities Meet 2060 Needs under the TRWSP?

Yes. The JLP used DWR's combined hydrologic model of the Neuse and Cape Fear River Basins to simulate 2060 water demands, including the JLP Recommended Alternative, under the entire 80+ year range of hydrologic conditions and historic droughts. The results indicate that the long term water supply needs of the Partners, as well as those of downstream water users, can be met under the TRWSP. A preliminary modeling analysis by DWR, as they work toward development of a Cape Fear Basin Water Supply Plan, confirmed these results.

What Could Affect the Success of the TRWSP?

The TRWSP conclusion that the Triangle Region will have enough water to meet projected water demands through 2060 hinges on the accuracy of many assumptions, on Jordan Lake water supply allocations consistent with Table 1, and on each Partner implementing its water supply projects. The JLP Recommended Alternative will require implementation of many complex projects, with numerous regulatory and environmental challenges. Key uncertainties include:

- Rate of population growth;
- Adoption of water efficiency and conservation practices including reclaimed water use;
- Water quality policies, environmental permits, endangered species impacts, environmental justice concerns or evolving regulations, especially as they relate to the development of new water supply sources;
- Legislative and/or regulatory actions regarding competing water uses; and

- Declining source yields due to issues such as hydrologic variability (from climate and/or land use impacts), faster than assumed sedimentation of reservoirs or changes in required downstream releases.

What are the Partnership's Next Steps?

Consistent with the TRWSP and Table 1, those Partners who use or plan to use Jordan Lake submitted draft allocation requests to DWR on May 1, 2014; final applications will be submitted later in 2014 and the JLP will continue to coordinate with DWR on the allocation process and development of the Cape Fear Basin Water Supply Plan.

The Partners are developing a regional water distribution system computer model that will be used to evaluate system interconnection capacities and performance under different demand scenarios, with the goal of identifying joint projects to increase reliability for all customers and optimize water supplies during times of water shortage.

Several of the Partners have begun planning for the design and development of a new intake, water treatment plant and transmission facilities on the western side of Jordan Lake. Working together to build new infrastructure minimizes environmental impacts, and decreases both capital and operational costs due to economies of scale. A new intake and treatment plant at Jordan Lake, along with major interconnections between systems, would also provide redundancy in the event the existing Cary-Apex intake had to be taken offline for any reason.

The Partners will continue to work together toward successful implementation of the TRWSP, and to look for areas where they can improve the region's ability to address water supply needs and effectively prepare for and respond to water shortage conditions through cooperation and preparation.