

# Water Conservation Plan

*Prepared for*

Kerr Lake Regional Water System

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# Acronyms and Abbreviations

GPCD	gallons per capita per day
IBT	Interbasin Transfer
Kerr Lake	John H. Kerr Reservoir
KLRWS	Kerr Lake Regional Water System
LWSP	Local Water Supply Plan
mgd	million gallons per day
MMD	average day of a maximum month
NCDWR	North Carolina Division of Water Resources
NC EMC	North Carolina Environmental Management Commission
NCGS	North Carolina General Statute
WSRP	Water Shortage Response Plan
WTP	water treatment plant

# Water Conservation Plan

The Kerr Lake Regional Water System (KLRWS) was awarded an Interbasin Transfer (IBT) certificate on November 5, 2015 by the North Carolina Environmental Management Commission (NC EMC) (NC EMC, 2015). The IBT certificate provides the KLRWS with a permitted transfer of 14.2 million gallons per day (mgd) from the Roanoke River basin, calculated as a daily average of a calendar month. The KLRWS includes an intake on John H. Kerr Reservoir (Kerr Lake) and a water treatment plant (WTP) owned by the City of Henderson, the City of Oxford, and Warren County (collectively referred to as the Partners) and managed by the City of Henderson. Water is then distributed to the Partners and their wholesale customers in the Roanoke River, Tar River, Neuse River, and Fishing Creek basins.

## 1.1 Introduction

Under the authority of North Carolina General Statute (NCGS) 143-215.22L, the NC EMC included a certificate condition requiring the development of a Water Conservation Plan that specifies the water conservation measures that will be implemented by the KLRWS to ensure the efficient use of the transferred water. This Water Conservation Plan is structured to:

- Summarize the KLRWS's water resources planning efforts and water conservation programs
- Summarize the KLRWS's implementation plans for the water conservation strategy that meets the intent of the NCGS language for such a plan
- Highlight the regional cooperation of the KLRWS, its Partners and their wholesale customers with regards to efficient water resources management and water loss prevention

### 1.1.1 Water Resources Planning History

The keys to maintaining successful, long-term water resources agreements amongst the Partners and their wholesale customers are:

- A long-term, shared regional vision for a sustainable, reliable water resources supply
- Cooperation on its protection

These efforts include:

- Coordinated planning efforts, which led to the determination that water demands in their service areas would necessitate a request to increase IBT beyond their grandfathered amount in the future
- Contract provisions that state each wholesale customer must follow KLRWS's lead when KLRWS implements steps of its Water Shortage Response Plan (WSRP)
- An established notification system via phone tree so that if KLRWS must implement a step in its WSRP that each Partner and their wholesale customers are notified prudently
- Regular coordination among water system users including bi-monthly meetings of the KLRWS Board and (on opposite months) KLRWS Partner and wholesale customer operators
- Participation in the Roanoke River Basin Bi-State Commission

## 1.1.2 Water Conservation Program History

The KLRWS provides water to its three Partners who then distribute it to their wholesale customers. The KLRWS, via their website and other outreach programs at the WTP and public events, provides education regarding water conservation. The KLRWS is also continuously improving its operations to limit water loss. In addition to these efforts by the KLRWS, each Partner and major wholesale customer has its own water conservation ordinances, programs, and efforts.

Generally speaking, water usage is primarily household, commercial, and industrial usages. Residential water uses include very little irrigation across the distribution area. KLRWS supplies little irrigation water, as evidenced by their relatively low peak day to average day ratio (peaking factor) of 1.3 (compared with many systems that have peaking factors of 1.5 and above). Most water is used for indoor purposes and, while conservation helps reduce demand, these reductions are typically modest. Therefore, per capita water use across the KLRWS system is low compared to more urbanized areas of North Carolina as evidenced by publically available Local Water Supply Plan (LWSP) data. Past and projected water demand uses are presented in Table 1.

**Table 1**  
**Past and Projected Total Average Day of a Maximum Month (MMD) Demands and Sales for KLRWS (mgd)**

<b>Partner (Total Including Sales)</b>	<b>2013</b>	<b>2020</b>	<b>2030</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2060</b>
City of Henderson	4.62	7.38	9.06	10.28	10.87	11.47	12.57
City of Oxford	1.63	2.65	3.32	4.00	4.40	4.68	5.20
Warren County	1.27	1.69	1.84	2.00	2.07	2.15	2.30
<b>KLRWS TOTAL</b>	<b>7.5</b>	<b>11.7</b>	<b>14.2</b>	<b>16.3</b>	<b>17.4</b>	<b>18.3</b>	<b>20.1</b>

Source: CH2M, 2015

A key component to water conservation by the KLRWS's strategy for water conservation is the ability to implement its WSRP across its entire distribution area. Each Partner, through an ordinance adopting its WSRP and per its contract language with the KLRWS, must enact water conservation measures when notified by the KLRWS that is necessary to do so. These measures must be put into action across the entire distribution area, spanning basin boundaries. These WSRPs are described in more detail in the KLRWS's Drought Management Plan and are accessible from the North Carolina Division of Water Resources (NCDWR) website,

[http://www.ncwater.org/Water\\_Supply\\_Planning/Water\\_Shortage\\_Response\\_Plans/](http://www.ncwater.org/Water_Supply_Planning/Water_Shortage_Response_Plans/).

## 1.2 Water Conservation Plan

Water is a valuable natural resource as every living thing needs it to survive. Overuse in one area diminishes the availability of the resource to communities and ecosystems downstream. KLRWS recognizes the value of this resource and has been implementing water conservation, education, and water loss reduction measures. Efficient use of water from the KLRWS's source basin, the Roanoke River basin, must be accomplished year-round and not just during drought periods. Measures to accomplish this include both supply-side and demand-side management strategies, which will result in the efficient use of water in both the source and receiving river basins.

## 1.2.1 Supply-side Management

For the KLRWS, the supply-side management strategy focuses on the accounting of water usage and minimizing water loss, with the overall objective of the efficient use of water for system operations. The following bullets highlight the KLRWS approaches to achieving efficient water use within the potable water supply distribution system:

- Reduce non-revenue loss through the expansion and treatment improvements of the WTP and decrease the need for system flushing
- Improve tracking devices and conduct meter audits
- Further programs to monitor unaccounted for and non-revenue losses.

### 1.2.1.1 KLRWS WTP Improvements

The KLRWS is planning for a WTP expansion, and with it, treatment system improvements. These improvements could reduce the need for system flushing and therefore reduce water losses, although some flushing for water quality reasons will remain necessary given the large geographic size of the distribution area. The KLRWS is also currently evaluating other methods to reduce water age and disinfection byproduct accumulation in the system, which may further reduce the need for flushing.

### 1.2.1.2 Meter Audits

The KLRWS monitors and audits its main meters with each Partner. Beyond that, each Partner and Franklin County regularly conduct large meter audits to ensure accurate water use. Other programs to detect water leaks are being developed by the Partners.

### 1.2.1.3 Valve Network Improvements

Each Partner and Franklin County will start or continue a valve-mapping and improvement program to control losses during unanticipated situations, such as a water line break. The City of Oxford currently has an active program and is continuing to add valves to better control and isolate sections of the water distribution network. Valve installation enables utility managers to efficiently isolate affected areas, minimizing water loss and the number of affected customers during an incident.

## 1.2.2 Demand-side Management

The KLRWS's demand-side management strategy focuses on influencing customers to use water efficiently, resulting in reduced water demand. Long-term water use reductions are achieved through a combination of changing behaviors (for example, fixing leaks and avoiding water waste) and technologies (for example, low-flow toilets).

### 1.2.2.1 KLRWS Strategy

The KLRWS's strategy is based on a two-pronged approach that includes the following elements:

- **Education and Outreach**
  - KLRWS's continued investment in education programs and water conservation messaging helps ensure the long-term objectives for water use are met.
  - Messages include educating customers on the value of water, wise water use practices, water-efficient technology, available incentives, and current water use regulations.
  - The KLRWS WTP has been increasing the number of facility tours given annually to school and civic groups. Water conservation is an important discussion topic during the tours.

- The KLRWS promotes public stewardship through water conservation tips on their website. This website will be updated often with informational messages. For example, messages currently include:
  1. Look for leaks – and repair them right away.
    - Most leaks are easy to detect and repair. For sinks, check faucets and pipes for dripping water. Replace washers, and repair or replace fixtures, if needed.
    - For toilets, add food coloring to the tank water and check the bowl in 15 minutes. (Don't flush.) If there's color in the toilet bowl, it means there's a leak.
  2. Install water-saving devices.
    - If you don't already have water-efficient or low-flow fixtures, you can cut your water use with:
      - aerators (devices that mix air with water)
      - low-flow fixtures (such as shower heads), flow restrictors or cut-off valves
      - displacement devices (to reduce the amount of water used in older toilets)
    - Make sure all devices are properly installed.
  3. Wash dishes wisely.
    - If you use a dishwasher, wash only full loads.
    - If you wash dishes by hand:
      - Scrape dishes (but don't pre-rinse) and soak pots and pans before washing.
      - Don't run the water continuously.
      - Limit your use of the garbage disposal. Better yet-compost!
  4. Use less water to clean your home.
    - Use a pail or basin instead of running water. Also, use a sponge mop instead of a string mop (sponge mops use less water and take less water to keep clean).
  5. Check hoses and irrigation systems.
    - Use a hose nozzle that you can shut off or adjust to a fine spray. When finished, shut it off at the house to avoid leaks.
- The KLRWS is investing in and preparing materials that could be used at events such as fairs, festivals, and other public events. These materials will be made available to all Partners and wholesale customers on a reservation basis.
- The KLRWS will continue to prepare messages that can be printed and inserted in water bills. These materials will be made available to all Partners and wholesale customers for their distribution with billing.
- **Regulations and Contracts**
  - Regulations including the WSRP provide enforceable requirements to ensure the efficient use of water throughout the entire utility service area.
  - Water contracts support the efficient use of water by requiring wholesale customers to follow their WSRP.

#### 1.2.2.2 Partner and Wholesale Customer Strategies and Programs

- **Billing inserts**

- The City of Henderson regularly includes inserts with billing that promote water conservation and is committed to increasing this effort with the availability of additional materials from the KLRWS.
- Franklin County, regularly includes inserts with billing that promote water conservation.
- Others, including the City of Oxford and Vance County, will begin programs to send inserts with billing as materials become available from KLRWS.
- ***New user education***
  - Franklin County and Vance County have policy brochures that are distributed to each new customer and other members of the community as requested. Franklin County's "Customer Billing and Collections Policy Overview" documents policies and procedures related to water use and emphasizes the need for water conservation (Franklin County, 2015).
- ***Ongoing education***
  - As mentioned above, each utility receiving water from KLRWS will have access to educational materials and signage that can be reserved and used for presentations to civic groups, schools, and at public events such as festivals.
  - Each utility with a website will be updating its availability of on-line water conservation educational materials.
- ***Irrigation***
  - While little irrigation demand is present within the KLRWS's distribution area as a whole, some does occur in the newer residential communities within Franklin County.
  - Franklin County's Board of Commissioners adopted a year-round limited irrigation schedule and began enforcing it in 2008. Franklin County adopted this schedule in response to increasing demand on the water system for non-essential uses. The current irrigation schedule is outlined in Table 2.
  - Non-essential outdoors water use including pressure washing of driveways, sidewalks, decks, and exterior building surfaces is limited to Saturdays and Sundays. The commercial use of power washers is permitted under these conditions.
  - Franklin County's water use restrictions also apply to customers in the Town of Bunn and Lake Royale.
- ***Incentives***
  - Franklin County has a rate structure that incentivizes customers to use water efficiently by charging customers based on individual usage; the less water customers use, the more money they save.
  - Most of the water systems in the KLRWS distribution area have rates structured with a relatively high rate service fee then with a rate per 1,000 gallons. This approach provides for a relatively consistent income for these utilities, which is necessary to meet their debt service and aging infrastructure needs as well as create the financial security necessary to undergo the WTP expansion. Rate structures are evaluated often and if per capita water usage starts to increase, utilities will consider a tiered rate structure.

**Table 2**  
**Franklin County Irrigation Schedule**

<b>Water Use</b>	<b>Irrigation Schedule</b>	<b>Times</b>
Automatic/non-automatic irrigation systems	ODD – Tuesdays & Saturdays	12 am – 10 am
	EVEN – Wednesdays & Sundays	12 am – 10 am
Hose end sprinklers	ODD – Tuesdays & Saturdays	6 am – 10 am/6 pm – 10 pm
	EVEN – Wednesdays & Sundays	6 am – 10 am/6 pm – 10 pm
Hand-held hoses	ODD – Tuesdays & Saturdays	6 am – 10 am/6 pm – 10 pm
	EVEN – Wednesdays & Sundays	6 am – 10 am/6 pm – 10 pm
Vehicle washing	No restrictions	All
Pressure washing (personal)	Saturday & Sunday	All
No watering allowed	Mondays, Thursdays, & Fridays	N/A

Source: Franklin County, 2015

These programs are examples of how the KLRWS, its Partners, and its wholesale customers will continue to promote water conservation. To the extent that these programs influence customer behavior and achieve water conservation will be evaluated and programs will be modified over time to improve results.

### 1.3 Reporting

The KLRWS, each Partner, and each wholesale customer whose usage meets the minimum required by statute is required to submit a LWSP annually to NCDWR. As part of this submission, the annual gallons per capita per day (GPCD) (residential and overall system-wide GPCD) is calculated and can be used to track the long-term status of water use efficiency on a per capita basis. The LWSP updates will serve as the reporting mechanism regarding water conservation effectiveness.

Additionally, compliance with the Water Conservation Plan will be documented in the Annual Report submitted to NCDWR as required by the IBT certificate.

# References

CH2M HILL, Inc. (CH2M) 2015. Interbasin Transfer Petition for the Transfer of Water from the Roanoke River Basin. Prepared for the Kerr Lake Regional Water System. Raleigh, NC.

<http://www.ncwater.org/?page=294>.

Franklin County. 2015. Customer Billing and Collections Policy Overview.

<http://files.www.franklincountync.us/services/public-utilities/maintenance/POLICY2016.pdf>

North Carolina Environmental Management Commission (NC EMC). 2015. Certificate Authorizing the Towns of Cary and Apex to Transfer Water from the Haw River Basin to the Neuse and Cape Fear River Basins. November 5, 2015. <http://www.ncwater.org/?page=294>.

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