Interbasin Transfer Annual Report Calendar Year 2019

Submitted by

Kerr Lake Regional Water System

March 2020

This document has been prepared in accordance with the Kerr Lake Regional Water System's 2015 Interbasin Transfer Certificate.

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Executive Summary

The 2019 Annual Report on Interbasin Transfers (IBTs) for the Partners of the Kerr Lake Regional Water System (KLRWS) includes monitoring data for tracking of IBT amounts as well as documentation of compliance with all 2015 IBT Certificate conditions. The Partners include the City of Henderson, City of Oxford, and Warren County. Transfer amounts for their wholesale customers listed as co-applicants in the IBT Certificate are also included.

On November 5, 2015, the North Carolina Environmental Management Commission (EMC) approved the Partners' IBT certificate, authorizing a total transfer from the Roanoke River basin of 14.2 million gallons per day (mgd) measured as the maximum month transfer's average day (MMAD). As the KLRWS IBT certification is comprised of transfer to three separate basins, each must be considered independently. The EMC approved an IBT of 10.7 mgd to the Tar River basin, 1.7 mgd to the Fishing Creek basin, and 1.8 mgd to the Neuse River basin.

In 2019 the Partners complied with all conditions of their IBT Certificate. The actual MMAD amount of water transferred from the Roanoke River basin to the Tar River basin was 4.1 mgd, approximately 38% of the authorized value. Similarly, the MMAD transferred from the Roanoke River basin to the Fishing Creek basin was 0.8 mgd, approximately 47% of the authorized amount. In addition, the MMAD amount of water transferred from the Roanoke to the Neuse River basin was 0.3 mgd, approximately 16% of its authorized amount. In total, the MMAD amount of water transferred from the Roanoke was approximately 37% of the authorized amount. IBT amounts for 2019 are provided in Table ES-1 and Figure ES-1.

Table ES-1

IBT Maximum Month Average Day Demands for the KLRWS

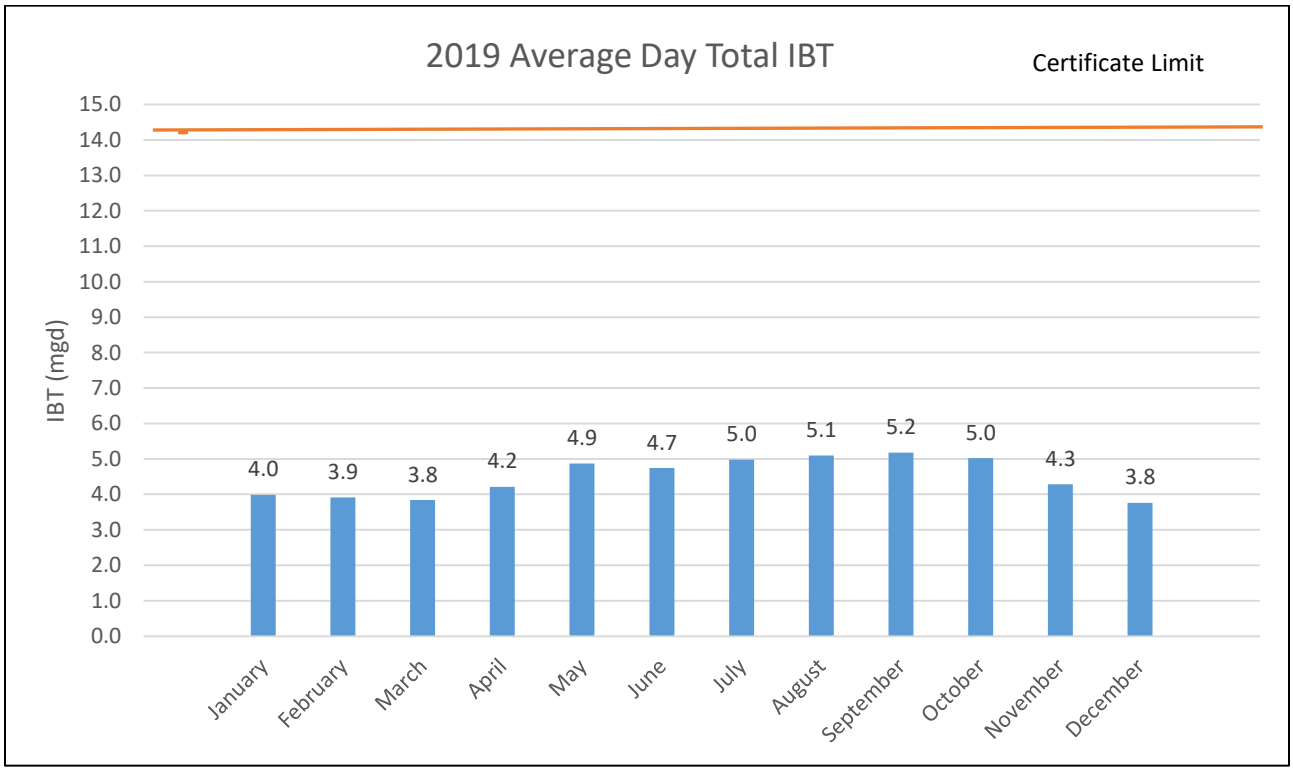
	Total Transfer	**Tar River Basin**		**Fishing Creek Basin**		**Neuse River Basin**	
Year	**Water Transfer (mgd)**	**Water Transfer (mgd)**	**IBT as % of Certificate**	**Water Transfer (mgd)**	**IBT as % of Certificate**	**Water Transfer (mgd)**	**IBT as % of Certificate**
	MMAD	MMAD	%	MMAD	%	MMAD	%
2016	5.4	4.0	37.5	1.2	70.6	0.2	11.1
2017	5.2	4.2	39.2	0.8	47.1	0.2	11.1
2018	5.2	3.0	28.0	0.8	47.1	0.2	11.1
2019	5.2	4.1	38.3	0.8	47.1	0.3	16.6
2020	TBD	TBD	TBD	TBD	TBD	TBD	TBD

Notes:

TBD – to be determined
Values in table may not appear to sum due to rounding.

Figure ES-1

Total transfer from the Roanoke River Basin on the average day of each calendar month during 2019



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Acronyms and Abbreviations

EA	Environmental Assessment
FONSI	Finding of No Significant Impact
I&I	Inflow and infiltration
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
NCDEQ	North Carolina Department of Environmental Quality
NCDWR	North Carolina Division of Water Resources
NC EMC	North Carolina Environmental Management Commission
SGWSA	South Granville Water and Sewer Authority
WSRP	Water Shortage Response Plan
WWTP	Wastewater Treatment Plant

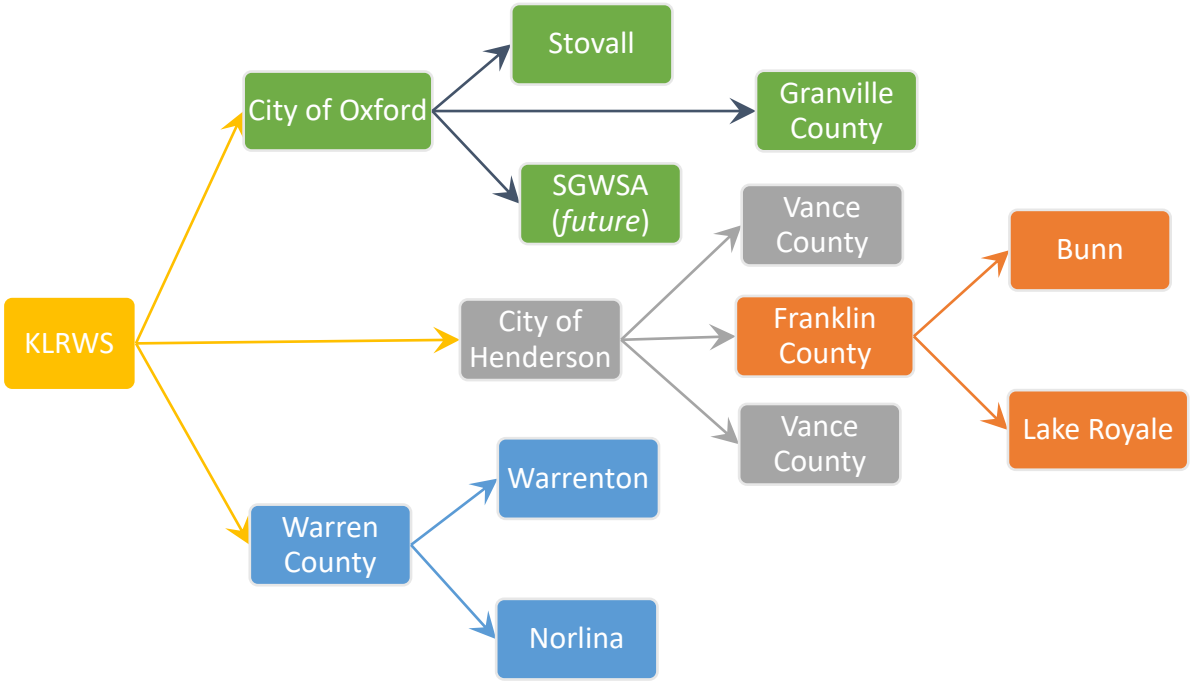
1 Introduction

On November 5, 2015, the North Carolina Environmental Management Commission (EMC) granted an interbasin transfer (IBT) certificate to the Kerr Lake Regional Water System (KLRWS). Permitted transfers from the Roanoke River basin include: 10.7 million gallons per day (mgd) to the Tar River basin, 1.7 mgd to the Fishing Creek basin, and 1.8 mgd to the Neuse River basin measured as the maximum month transfer's average day (MMAD).

The owners of the KLRWS and primary bulk customers served by the system are the City of Henderson, the City of Oxford, and Warren County, known as the "Partners." Ownership responsibility is 60 percent, 20 percent, and 20 percent, respectively. They also currently sell water to secondary bulk customers listed as co-applicants in their IBT Certificate including Stovall, Warrenton, Norlina, Vance County and Franklin County. Future sales will occur from Oxford to South Granville Water and Sewer Authority (SGWSA) for use in Creedmoor's service area. Franklin County owns the Youngsville water system and also sells water to Bunn and Lake Royale. Water sales are shown in Figure 1-1.

Figure 1-1

Diagram of sales from the Partners of the KLRWS to their secondary bulk customers



2 Interbasin Transfer Monitoring

The combined transfer from the Roanoke River basin and the amount of transfer to each river basin will be calculated and presented as average values for each calendar month. The methodology for calculating the daily IBT amount is consistent with NCDWR guidelines for estimating IBT amounts as part of the local water supply planning process (NCDWR, 2009) and is described in detail in the Partners' Interbasin Transfer Compliance and Monitoring Plan (CH2M, 2016a).

The KLRWS is a complex network of water systems and, to calculate IBT, tracking of sales to other parties and wastewater discharges is necessary. Water is transferred (and not returned to the Roanoke River basin) via potable water consumptive use and wastewater discharge. Daily IBT is calculated based on a combination of sales data and assumptions including the percentage of each customer's service area in each river basin as reported in the previous year's Local Water Supply Plans (LWSPs). Daily IBT data are then used to calculate the IBT certificate compliance metric – IBT calculated as the daily average of a calendar month.

2.1 Service Area Water Demand

Table 2-1 presents 2019 annual average water use of the IBT Certificate Holders based on the amount of water withdrawn from the source basin (Roanoke River Basin). The total water use is the sum of the daily withdrawal from Kerr Lake, found in the "data entry" section of IBT Tracking spreadsheet, which is equal to 2,502 mgd. Similarly, the average day withdrawal from the Kerr Lake during 2019 was 6.9 mgd, which is less than the USACE allocated water storage amount of 20 mgd. In addition, the highest usage occurred during May, with an average of 7.7 mgd withdrawn.

Table 2-1

Withdrawal from Kerr Lake for 2019

	Withdrawal (mgd)
Total Water Use	2,502
Annual Average Day	6.85
Maximum Month Average Day (May)	7.69

2.2 Interbasin Transfers

In 2019, the greatest amount of water was transferred during September. During this month, 4.1 mgd was transferred to the Tar River Basin, 0.8 mgd was transferred to the Fishing Creek Subbasin and 0.3 mgd was transferred to the Neuse River Basin. A total of 7.5 mgd was withdrawn from the Roanoke River Basin and 2.2 mgd was returned. Therefore, the total IBT from the source basin during the maximum month average day in 2019 was 5.2 mgd (Table 2-2). Figures 2-1 through 2-4 summarize the water use and transfers by month. Figure 2-5 summarizes the amount of water returned to the source basin by month.

Table 2-2

Water transfer summary by month for 2019

	Monthly Summary (mgd)					
Date	**Withdrawal**	**Return to**	**Interbasin Transfer to**			**Total IBT**
Month	Roanoke	Roanoke	Tar	Fishing Creek	Neuse	
			10.7	**1.7**	**1.8**	**14.2**
January	**6.0**	2.2	3.1	0.8	0.1	**4.0**
February	**6.3**	2.2	3.2	0.7	0.1	**3.9**
March	**6.5**	2.5	3.1	0.6	0.1	**3.8**
April	**6.6**	2.3	3.3	0.8	0.1	**4.2**
May	**7.7**	2.3	4.1	0.6	0.2	**4.9**
June	**7.4**	2.4	3.7	0.9	0.2	**4.7**
July	**7.4**	2.3	3.8	0.9	0.3	**5.0**
August	**7.1**	2.2	4.0	0.8	0.3	**5.1**
September	**7.5**	2.2	4.1	0.8	0.3	**5.2**
October	**7.5**	2.3	4.0	0.8	0.3	**5.0**
November	**6.3**	2.3	3.3	0.8	0.2	**4.3**
December	**5.8**	2.4	2.9	0.7	0.2	**3.8**
Maximum Month Average Day	**7.7**	**2.5**	**4.1**	**0.9**	**0.3**	**5.2**

Note: Water sales to Henderson, Oxford, and Warren Co. are metered as water leaves the KLRWS WTP. Each manages its own water distribution network, including storage tanks, and wastewater treatment systems. Due to the large expanse of the total water service area and the use of storage tanks, water age can average up to 3 days. This impacts IBT data calculation in that water returned and transferred on average does not exactly match the water withdrawn for a given period.

Figure 2-1

Transfer from the Roanoke River Basin to the Tar River Basin for the average day of each calendar month during 2019

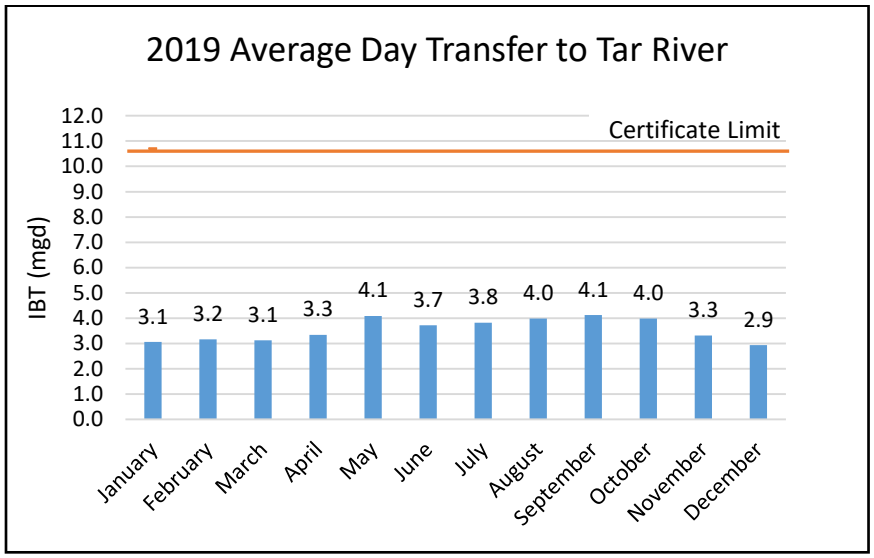


Figure 2-2

Transfer from the Roanoke River Basin to the Fishing Creek Subbasin for the average day of each calendar month during 2019

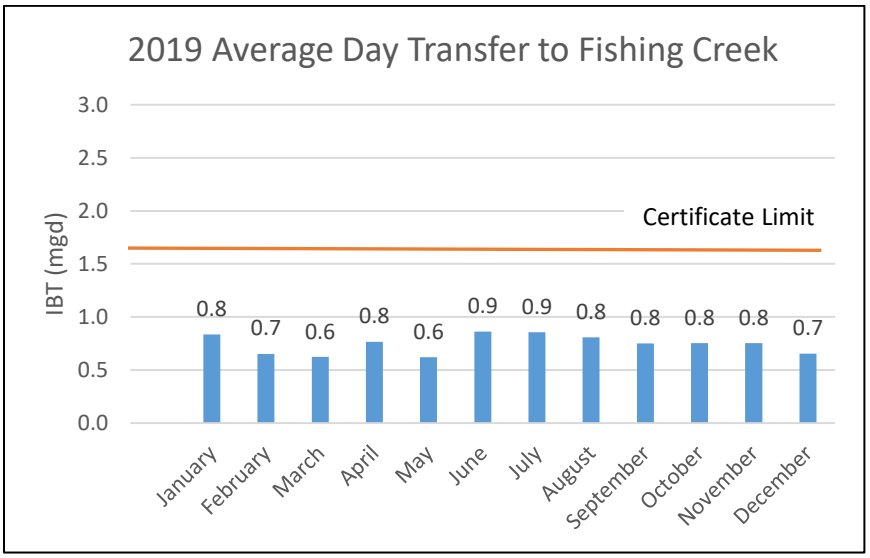


Figure 2-3

Transfer from the Roanoke River Basin to the Neuse River Basin for the average day of each calendar month during 2019

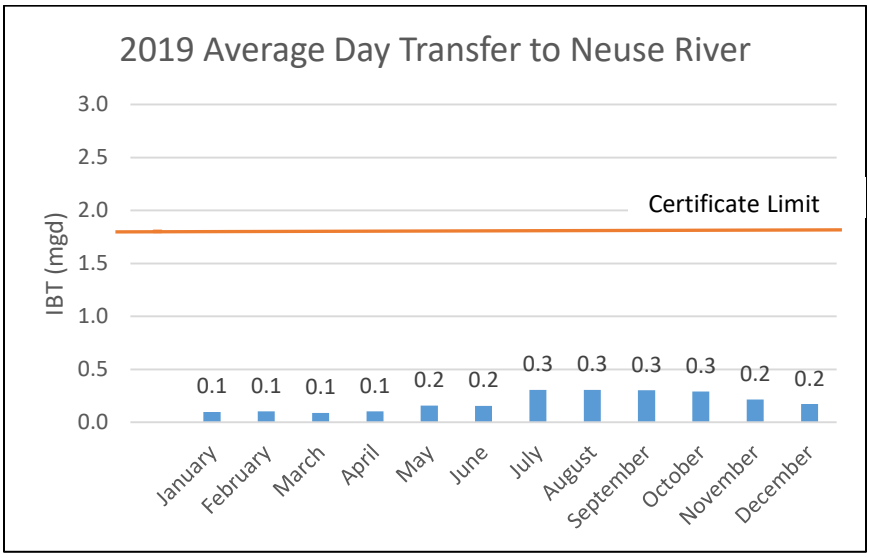


Figure 2-4

Total transfer from the Roanoke River Basin on the average day of each calendar month during 2019

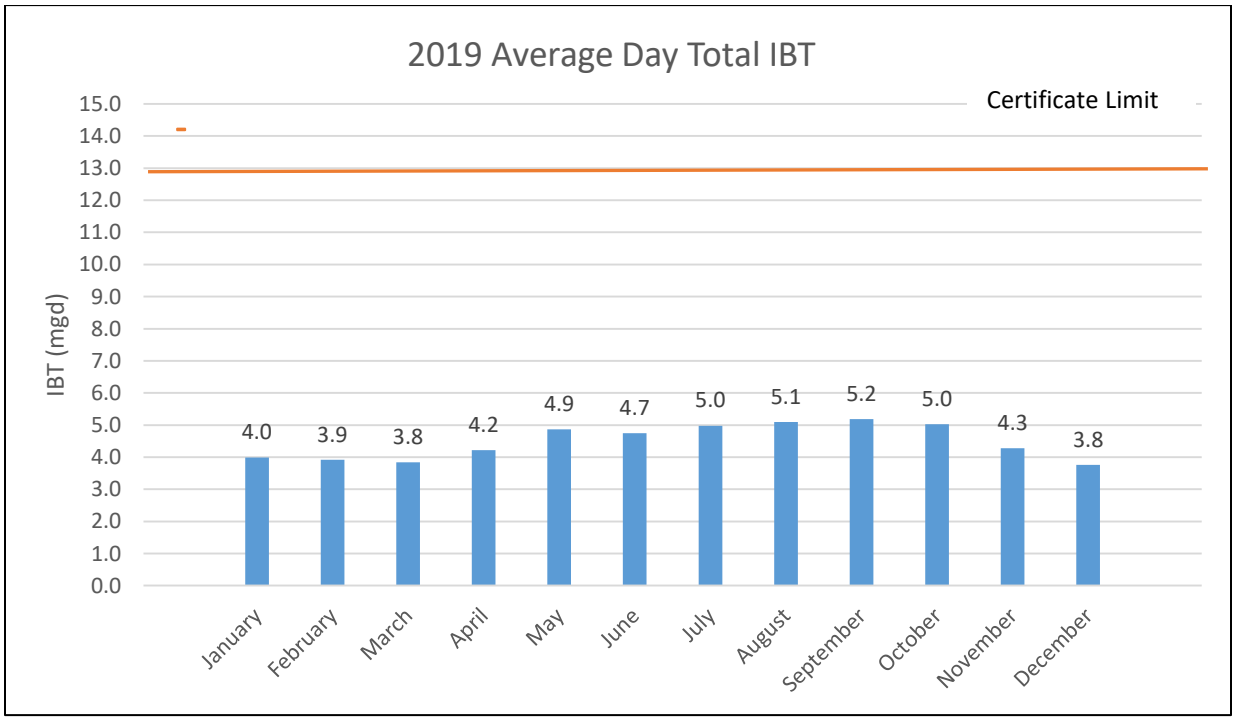
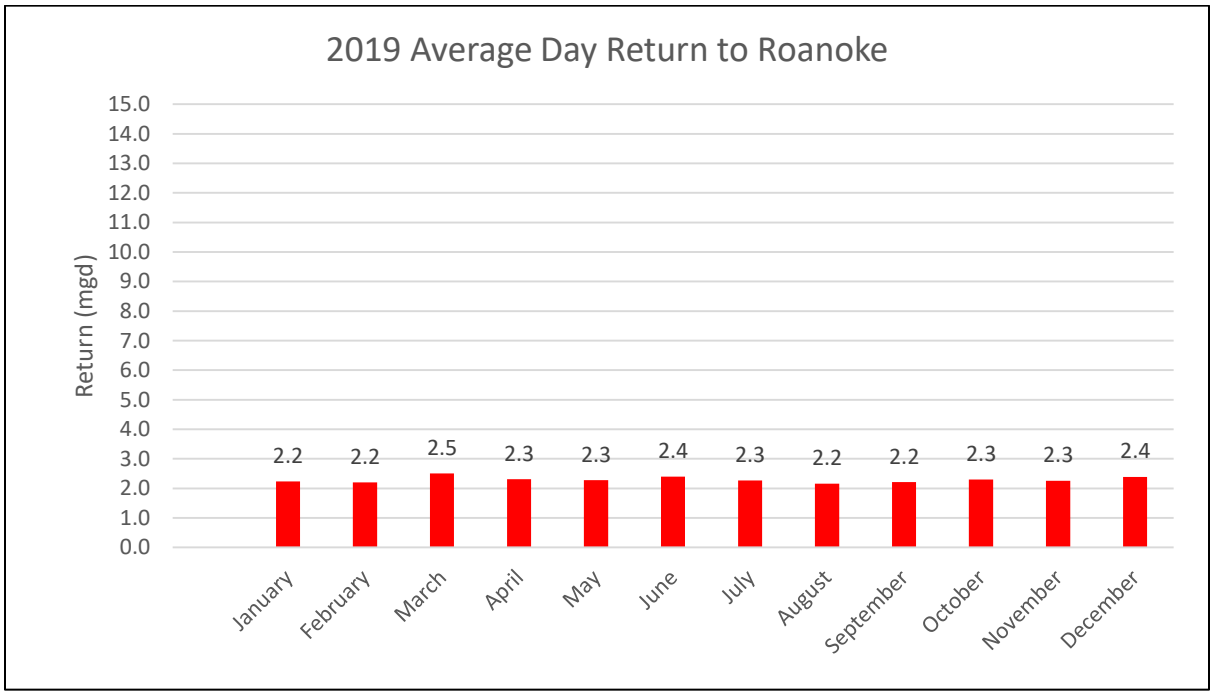


Figure 2-5

The amount of water returned to the source basin for the average day of each calendar month during 2019



3 Compliance with Certification Conditions

A summary of the conditions of the IBT Certificate approved on November 5, 2015 as well as a description of the current status of each condition is provided below. A quotation from the corresponding passage in the IBT Certificate is italicized, followed by the 2019 actions for each condition, if applicable.

3.1 Condition 1—Water Conservation Plan

Within 90 days of receipt of the Interbasin Transfer Certificate, the Kerr Lake Regional Water System shall prepare and submit a water conservation plan subject to approval by the Division of Water Resources (Division) that specifies the water conservation measures, including a rate pricing structure, to be implemented by the partners to ensure the efficient use of the transferred water. Except in circumstances of technical or economic infeasibility or adverse environmental impact, the water conservation plan shall provide the mandatory implementation of water conservation measures that equal or exceed the most stringent water conservation plan implemented by a public water system that withdraws water from the source basin. All bulk water customers of the Kerr Lake Regional Water System, as identified in this Interbasin Transfer Certificate, shall implement a water conservation plan at least as stringent as the requirements imposed on the Kerr Lake Regional Water System. The Certificate Holders shall not transfer any water to any other unit of local government unless that unit of local government agrees to be bound by this condition in full.

The Water Conservation Plan was submitted within 90 days to NCDWR and is available on both the KLRWS website and NCDWR's website (CH2M, 2016b).

In 2019, the following improvements were made by the Partners and their wholesale customers to conserve water:

- Completion of a master meter audit for wholesale customers
- Augmentation of the meter auditing and leak detection programs
- Development of education and outreach programs for the public and increased outreach activities and tours of the KLRWS water treatment plant

3.2 Condition 2—Drought Management Plan

Within 90 days of receipt of the Interbasin Transfer Certificate, the Kerr Lake Regional Water System shall prepare and submit a drought management plan subject to approval by the Division that specifies how the transfer shall be managed to protect the source river basin (Roanoke River basin) during drought conditions or other emergencies that occur within the source river basin. Except in circumstances of technical or economic infeasibility or adverse environmental impact, this drought management plan shall include mandatory reductions in the permitted amount of the transfer based on the severity and duration of a drought occurring within the source river basin and shall provide for mandatory implementation of a drought management plan by the Kerr Laker Regional Water System that equals or exceeds the most stringent drought management plan implemented by a public water system that withdrawals water from the source river basin. All bulk water customers of Kerr Lake Regional Water System, as identified in this Interbasin Transfer Certificate, shall implement a drought management plan at least as stringent as the requirements imposed on the Kerr Lake Regional Water System. The Certificate Holders shall not transfer any water to any other unit of local government unless that unit of local government agrees to be bound by this condition in full.

The 2015 Drought Management Plan was submitted within 90 days and is available on both the KLRWS website and NCDWR's website. The plan describes the chain of events to occur in the event of a water shortage, as declared by the City Manager of the City of Henderson given specified elevations of the lake. Each wholesale customer's WSRP is at least as stringent as that of the KLRWS (CH2M, 2016c).

Table 3-1 includes an overview of the Kerr Lake level over the course of the year and corresponding drought response measures taken, if any. During 2019, drought management steps were not initiated due to sufficiently elevated lake levels.

Table 3-1
Periods of Drought and Normal Conditions in Kerr Lake

Drought Stage (by Lake Elevation)	Drought Monitor Classification	Duration of Condition	Action by Partners and Customers
	Normal	All of 2019	N/A
Below 294 feet	Voluntary Conservation	N/A	N/A
Below 289 feet	Mandatory Conservation	N/A	N/A
Below 284 feet	Water Shortage Emergency	N/A	N/A

3.3 Condition 3—Compliance and Monitoring Plan

Within 90 days of receipt of the Interbasin Transfer Certificate, the Kerr Lake Regional Water System shall prepare and submit a quarterly compliance and monitoring plan subject to approval by the Division. The plan shall include methodologies and reporting schedules for reporting the following information: daily transfer amount calculated as the average daily over the maximum month, compliance with certificate conditions, progress on mitigation measures, drought management, and reporting. A copy of the approved plan shall be kept on file with the Division for public inspection. The Division shall have the authority to make modifications to the compliance and monitoring plan as necessary to assess compliance with the certificate. The quarterly compliance and monitoring report shall be submitted to the Commission no later than 30 days after the end of the quarter. The Kerr Lake Regional Water System shall employ any methods or install and operate any devices needed to measure the amount of water that is transferred during each calendar quarter, calculated as daily average of a calendar month.

The Compliance and Monitoring Plan was submitted within 90 days to NCDWR and is available on both the KLRWS website and NCDWR's website (CH2M, 2016a).

Data was compiled according to the methodology outlined in the 2015 Compliance and Monitoring Plan. The combined transfer from the Roanoke River basin was calculated on a monthly basis. Water transferred to each of the Partners or their customers was calculated individually on a daily basis if possible.

At the end of each quarter in 2019, the KLRWS calculated the daily average IBT amount for each month in the quarter and submitted a brief fact sheet summary to NCDWR. The KLRWS also posted this information on its website: (http://ci.henderson.nc.us/departments/public_utilities_departments/kerr_lake_regional_water_system/consumer_confidence_reports.php#).

3.4 Condition 4— Availability of Alternative Water Source

The Commission may amend the certificate to reduce the maximum amount of water authorized to be transferred whenever it appears that an alternative source of water is available to the certificate holder from within the receiving river basin, including, but not limited to, the purchase of water from another water supplier within the receiving basin or to the transfer of water from another sub-basin within the receiving major river basin.

This condition requires no action by the Partners.

3.5 Condition 5—Amendment of Authorized IBT Amount

The Commission shall amend the certificate to reduce the maximum amount of water authorized to be transferred if the KLRWS's actual future water needs are significantly less than the KLRWS's projected water needs at the time the certificate was granted.

This condition requires no action by the Partners.

3.6 Condition 6—Reselling of Water

The KLRWS shall not resell the water that would be transferred pursuant to the certificate to another public water system. This limitation shall not apply in the case of a proposed resale or transfer among public water systems within the receiving river basin as part of an inter-local agreement or other regional water supply arrangement, provided that each participant in the inter-local agreement or regional water supply arrangement is a co-applicant for the certificate and will be subject to all the terms, conditions, and limitations made applicable to any lead or primary applicant.

This condition requires no action by the Partners.

3.7 Condition 7—Limitation of Certificate

If the Commission determines that information in the record material to its Findings of Fact, pursuant to NCGS § 143-215.22L(k), was erroneous, incomplete, or otherwise contained material misrepresentations, misstatements, or misinterpretations the Commission may reopen and modify or revoke this Certificate to ensure continued compliance with NCGS Chapter 143, Article 21, Part 2A.

This condition requires no action by the Partners.

4 References

CH2M HILL, Inc. (CH2M). 2016a. Compliance and Monitoring Plan. Prepared for Kerr Lake Regional Water System. Raleigh, North Carolina. February 2016. https://ncdenr.s3.amazonaws.com/s3fs-public/Water%20Resources/files/ibt/Kerr/KLRWS_IBT_ComplianceMonitoringPlan_Final.pdf.

CH2M HILL, Inc. (CH2M). 2016b. Water Conservation Plan. Prepared for Kerr Lake Regional Water System. Raleigh, North Carolina. February 2016. https://ncdenr.s3.amazonaws.com/s3fs-public/Water%20Resources/files/ibt/Kerr/KLRWS_IBT_WaterConservation_Final.pdf.

CH2M HILL, Inc. (CH2M). 2016c. Drought Management Plan. Prepared for Kerr Lake Regional Water System. Raleigh, North Carolina. February 2016. https://ncdenr.s3.amazonaws.com/s3fs-public/Water%20Resources/files/ibt/Kerr/KLRWS_IBT_DroughtManagementPlan_Final.pdf.

North Carolina Division of Water Resources (NCDWR). 2009. *Regulation of Surface Water Transfers Statutory Guidance*. http://www.ncwater.org/files/IBT_guidance_v1.pdf. Accessed April 10, 2015.

North Carolina Environmental Management Commission (NC EMC). 2015. Certificate Authorizing the Interbasin Transfer from the Roanoke River basin by the Kerr Lake Regional Water System. https://ncdenr.s3.amazonaws.com/s3fs-public/Water%20Resources/files/ibt/Kerr/Signed-IBT-Certificate_11-05-2015.pdf.