

**2003 ANNUAL REPORT on INTERBASIN TRANSFERS**  
**For**  
**RTP South and the Towns of Cary, Apex, and Morrisville**

Prepared for:

**Town of Apex**

**Town of Cary**

**Town of Morrisville**

**RTP South/Wake County**

Submitted to:

**North Carolina Division of Water Resources**

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# Table of Contents

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Executive Summary.....	ES-1
1. Jordan Lake Allocation Monitoring.....	1-1
2. IBT Monitoring.....	2-1
3. Compliance with Certificate Conditions .....	3-3
Appendix A: Daily Tracking of Combined Jordan Lake Water Supply Allocations for 2003.....	A-1
Appendix B: Daily Interbasin Transfer Estimates for 2003.....	B-1

## Executive Summary

The 2003 Annual Report on Interbasin Transfers for RTP South and the Towns of Cary, Apex, and Morrisville includes monitoring data for daily tracking of IBT amounts and combined Jordan Lake allocations held by the certificate holders. The 2003 Annual Report also includes information pertaining to new conservation easements in Research Triangle Park and new buffer rules in Wake County (pertaining to condition 8 of the IBT certificate).

In 2003, the certificate holders complied with all conditions of their IBT certificate. The maximum daily IBT amount for Cary, Apex, Morrisville, and RTP South was 17.8 million gallons per day (mgd). The annual average IBT amount was 13.4 mgd. IBT amounts and a summary of Jordan Lake withdrawals are provided in Table ES-1. The daily IBT amounts in 2003 for Cary, Apex, Morrisville, and RTP South are shown in Figure ES-1.

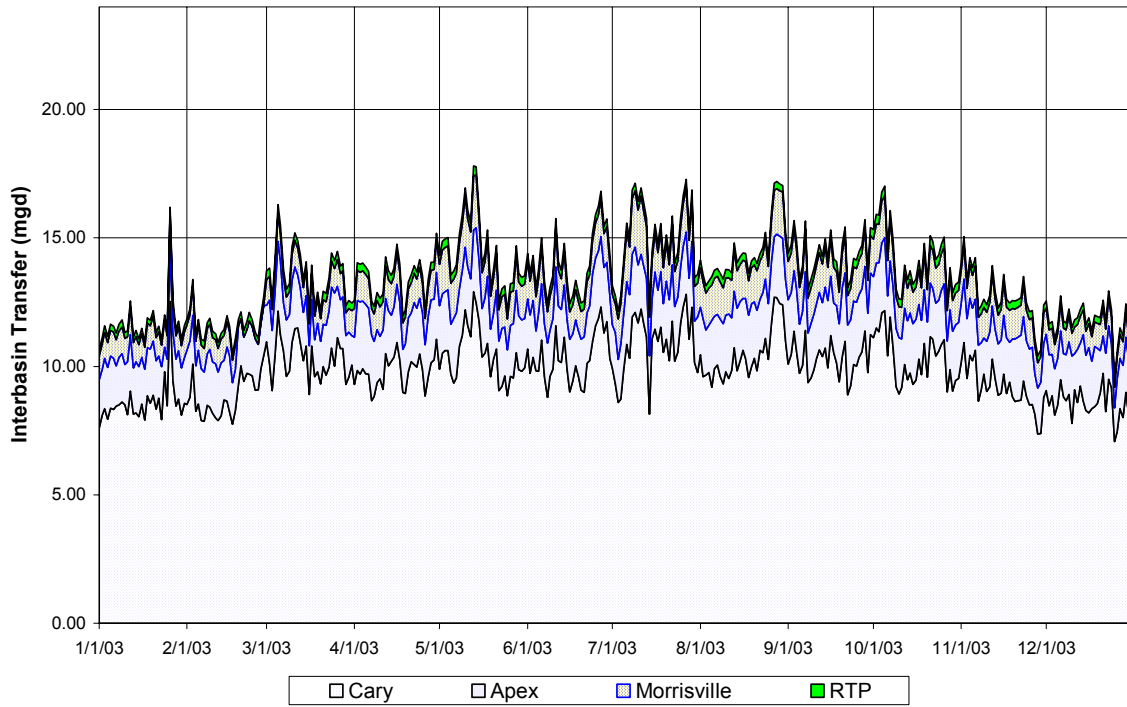
**TABLE ES-1.**

Summary of InterBasin Transfers for Cary, Apex, Morrisville and RTP South

Calendar Year	Withdrawal from Haw Subbasin (mgd) <sup>1</sup>		Total Return to Haw Subbasin (mgd)		Interbasin Transfer (mgd)		IBT as % of Certificate
	Average Annual	Max. Day	Average Annual	Max. Day	Average Annual	Max. Day	Max.
1998	10.8	15.7	1.7	3.5	9.0	14.3	90%
1999	9.2	15.6	1.6	4.2	7.6	12.9	81%
2000	7.3	14.2	1.1	4.4	6.2	11.8	74%
2001 <sup>2</sup>	9.7	18.8	2.8	9.4	6.8	15.0	63% <sup>3</sup>
2002	16.9	29.2	3.5	10.3	13.5	22.5	94%
2003	15.9	22.7	2.5	5.5	13.4	17.8	89%

1. Includes water use by Cary, Apex, Morrisville, and RTP South.
2. Withdrawals in 2001 were unusually high due to construction activities at the Cary/Apex WTP and do not reflect actual potable water demands.
3. Permitted IBT amount increased from 16 mgd to 24 mgd in July 2001. The maximum day IBT of 15.0 mgd occurred after the permitted amount increased to 24 mgd.

**Figure ES-1: Daily Interbasin Transfer for Cary, Apex, Morrisville and RTP South  
[Haw Sub-Basin to Neuse Sub-Basin]**



## 1.0 Jordan Lake Allocation Monitoring

The combined Jordan Lake water supply allocation for Cary, Apex, Morrisville, and RTP South can be tracked on a daily basis. Daily tracking of the combined Jordan Lake allocation for the period January 1, 2003 through December 31, 2003 is included in [Appendix A](#). The water supply pools for each allocation holder were full on January 1, 2003.

For 2003, the maximum day withdrawal for all certificate holders was 22.7 mgd, which occurred on May 14. The average daily withdrawal for all certificate holders was 15.9 mgd during 2003 (Table 1-1).

**TABLE 1-1**  
Summary of Jordan Lake Withdrawals<sup>1</sup>

Year	Average Annual Withdrawal (mgd)	Maximum Daily Withdrawal (mgd)
1998 <sup>2</sup>	10.8	15.7
1999 <sup>2</sup>	9.2	15.6
2000	7.3	14.2
2001	9.7	18.8
2002	16.9	29.2
2003	15.9	22.7

1. Withdrawals from Jordan Lake at the Cary/Apex raw water intake. Includes water use by Apex, Cary, Morrisville and RTP South. Does not include water use by Durham.
2. Includes water use by Holly Springs from 1/1/98 to 6/30/99

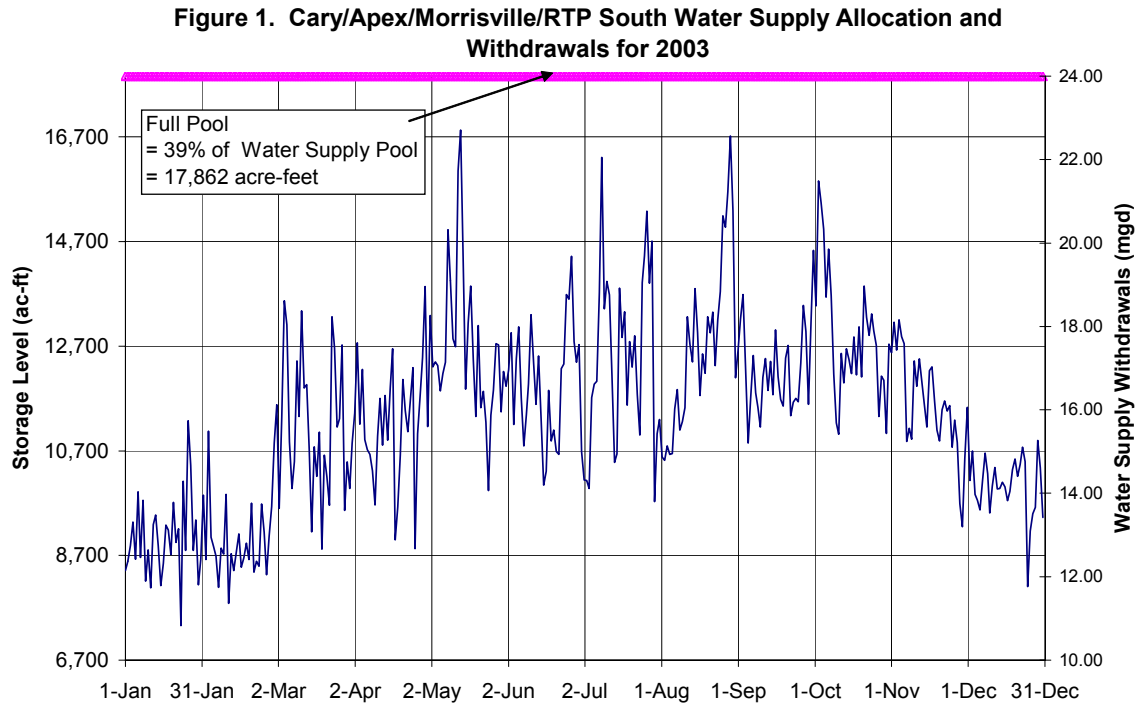
Table 1-2 presents historical water use for the certificate holders (Cary, Apex, Morrisville, and RTP South) based on finished water produced at the Cary/Apex WTP. In 2003, finished water demands averaged 14.0 mgd and the maximum day demand was 19.9 mgd. The maximum day peaking factor was 1.43 in 2003.

**TABLE 1-2**  
Summary of Finished Water Demands

Year	Average Annual Demand (mgd)	Maximum Daily Demand (mgd)	Maximum Day/Average Day Peaking Factor
1998 <sup>2</sup>	12.2	20.1	1.64
1999 <sup>2</sup>	12.6	21.5	1.70
2000	13.0	21.6	1.66
2001	14.1	22.0	1.56
2002	14.9	25.6	1.72
2003	14.0	19.9	1.43

1. Includes finished water delivered to the distribution system by the Cary/Apex WTP.
2. Includes water use by Holly Springs from 1/1/98 to 6/30/99.

Water use for Morrisville and RTP South is not measured on a daily basis. Therefore, accurate daily tracking of Jordan Lake water supply allocations can only be performed for the combined Jordan Lake water supply allocation for Cary, Apex, Morrisville, and RTP South. Figure 1 shows the water supply withdrawals and the allocation storage level for 2003. The combined allocated storage stayed at 100 percent full for all of 2003.



Individual Jordan Lake water allocations are estimated on a daily basis by estimating daily water usage for Morrisville and RTP South from monthly records. Daily water use for Morrisville is estimated from monthly or more frequent retail meter readings by assuming that water usage variations between meter readings follow the same patterns as the total combined water use ("Net Cary" use). Daily water use for RTP South is estimated similarly using monthly retail meter readings, by assuming that water usage trends throughout the month follow similar patterns as for Cary. For a given day, the ratio of daily Net Cary water use to average net Cary water use for the period between meter readings is applied to Morrisville and RTP South metered water use.

Levels in individual water supply pools are calculated on a daily basis using daily water use estimates and daily lake inflows. Lake inflow data is obtained from the US Army Corps of Engineers and allocated to each water supply pool according to the percentage allocation held. Any inflow amount that would fill the allocated storage above 100 percent is not stored. Any time the elevation in Jordan Lake is at or above 216 feet mean sea level, the water supply pools are reset to 100 percent full. If any allocation holder or larger pool has excess inflow, it is first distributed within that pool to another user, if needed, before being "spilled".

The daily Cary/Apex withdrawal amounts are estimated by subtracting the estimated daily Morrisville and RTP amounts from the metered total daily use; Cary amounts are then estimated by subtracting the daily recorded Apex use from the remainder. Cary/Apex holds a water supply storage allocation equal to 32 percent of the water supply pool or 9,618 acre-feet.

The allocated storage for each of the four users – Cary, Apex, Morrisville and RTP South – remained at 100 percent full for all of 2003.

## 2.0 IBT Monitoring

Daily IBT estimates for the certificate holders are included in Appendix B. Estimates are provided for the period January 1, 2003 through December 31, 2003. *The maximum day IBT transfer during the calendar year 2003 was 17.8 mgd, which occurred on May 13, 2003.* This represents 74 percent of the permitted IBT transfer under the certificate approved by the EMC on July 12, 2001. The annual average IBT transfer was 13.4 mgd during calendar year 2003.

The average daily consumptive use was 10% for the period January 1, 2003 through December 31, 2003. Historical consumptive use is shown in [Table 2-1](#).

The distribution of consumptive uses between the Haw, Cape Fear, and Neuse River subbasins for 2003 was based on historical water use in each basin as determined by billing records for each certificate holder. For 2003, it was assumed that 23% of water use occurred in the Haw subbasin, 0.6% of water use occurred in the Cape Fear subbasin, and 76.4% of water use occurred in the Neuse River subbasin. The certificate holders have begun tracking historical use by assigning a subbasin to each customer. Data on the distribution of water use between subbasins for each entity from 2000 through 2003, based on billing records, is shown in [Table 2-2](#).

In 1998, 1999, and 2000 Apex and Cary implemented mandatory irrigation restrictions due to water supply limitations and IBT permit restrictions. The Town of Morrisville asked residents to voluntarily conserve water beginning in 1998, and implemented mandatory water use restrictions in July 1999. The restrictions reduced consumptive water use from what would normally be expected during those years. In 2002 all the Towns had mandatory restrictions because of regional drought conditions, but they were implemented after June, which was when all-time high water use occurred. There were no water restrictions in 2003.

**TABLE 2-1**  
Historical Consumptive Use for Cary, Apex, Morrisville, and RTP South

Year	Average Daily Finished Water Demand (mgd)	Average Daily Consumptive Use (mgd)	% Consumptive Use
1998 <sup>1</sup>	12.2	2.4	19.7%
1999 <sup>1</sup>	12.6	2.1	16.7%
2000	13.0	1.8	13.8%
2001	14.1	2.0	14.7%
2002	14.9	3.0	20.0%
2003	14.0	1.4	10.0%

1. Includes some water use by Holly Springs. Holly Springs purchased water from Apex in 1998 and 1999.



**TABLE 2-2**  
Distribution of Water Billed to Retail Customers by River Subbasin

Year	Cary			Apex					Morrisville <sup>1</sup>			RTP South		
	Total Water Use (mgd)	Water Use in Haw (mgd)	% Use in Haw	Total Water Use (mgd)	Water Use in Haw (mgd)	% Use in Haw	Water Use in Cape Fear (mgd)	% Use in Cape Fear <sup>1</sup>	Total Water Use (mgd)	Water Use in Haw (mgd)	% Use in Haw <sup>2</sup>	Total Water Use (mgd)	Water Use in Haw (mgd)	% Use in Haw
2000	9.29	0.82	8.8%	1.65	0.82	49.9%	0.07	4.3%	0.86	0.05	6.20%	0.27	0.27	100%
2001	10.73	1.07	10.0%	1.88	1.03	54.8%	0.08	4.3%	1.05	0.06	6.20%	0.31	0.31	100%
2002	10.23	1.23	12.0%	2.15	1.29	60.0%	0.08	3.7%	1.18	0.14	11.2%	0.39	0.39	100%
2003	9.02	0.75	8.3%	1.94	1.15	59.3%	0.073	3.8%	1.10	0.15	14.0%	0.36	0.36	100%

1. Water use by basin for the Town of Morrisville is unavailable for 2000, and so was assumed to be the same as in 2001.

Table 2-3 shows the combined water use for each of the certificate holders and the percentage water use in the Haw and Cape Fear River Subbasins.

**TABLE 2-3**

Historical Water Use in the Haw and Cape Fear River Subbasins for Cary, Apex, Morrisville, and RTP South

<b>Year</b>	<b>Total Billed Water Use (mgd)</b>	<b>Water Use in Haw Subbasin (mgd)<sup>1</sup></b>	<b>Percent Use in Haw Subbasin</b>	<b>Water Use in Cape Fear Subbasin (mgd)<sup>1</sup></b>	<b>Percent Use in Cape Fear River Subbasin</b>
2000	12.07	1.97	16.3%	0.07	0.6%
2001	13.97	2.47	17.7%	0.08	0.6%
2002	13.95	3.05	21.8%	0.08	0.6%
2003	12.42	2.41	19.4%	0.07	0.6%

1. Water use by subbasin for the Town of Morrisville is unavailable for 2000, and so was assumed to be the same as in 2001.

For purposes of calculating daily IBT amounts in 2003, the certificate holders used 23% for the portion of their water use that occurred in the Haw subbasin and 0.6% as the portion used in the Cape Fear subbasin. For purposes of calculating daily IBT amounts in 2004, the certificate holders estimate that 21% of their water use will occur in the Haw subbasin and that 0.6% of their water use will occur in the Cape Fear subbasin.



### 3.0 Compliance with Certificate Conditions

A summary of the conditions of the IBT certificate dated July 12, 2001 along with the current status of compliance for each is provided below.

#### Condition 1 (2010 Required Return)

*The holders of the certificate, after 2010, shall return water supplied from the Haw River Basin used in the Neuse River Basin to either the Haw or Cape Fear River Basins as described below.*

- a) *Any water use in the Neuse Basin in excess of 16 million gallons per day adjusted on an average daily basis shall be returned.*
- b) *Water used for consumptive purposes in the Neuse Basin will not be subject to this condition*

Compliance with this condition is not required until after 2010. However, the calculations for determining compliance with Condition 1 are shown in Table 3-1. Note that revised calculations for 2001 result in different values than were included in the 2001 Annual Report.

Wake County, Cary, Apex and Morrisville are participating in the Western Wake County Regional Wastewater Treatment Study along with Holly Springs and Fuquay-Varina. The partners expect to select an alternative for implementation in the summer of 2004. More information about the status of the study can be found on Cary’s website at <http://www.townofcary.org/depts/pwdept/capefear/index.htm>.

**TABLE 3-1**  
Summary of Compliance with Certificate Condition No. 1

Year	Neuse Finished Water from the Haw (mgd)	Peaking Factor	16 mgd MDD adjusted to ADD	Consumptive Use Factor (%)	Neuse Consumptive Use (from the Haw) (mgd)	Required Return if After 2010 (mgd)	Amount Returned (mgd)
	(a)	(b)	(c)=16/(b)	(d)	(e)=(a)*(d)	(f)=(a)-(c)-(e)	(g)
2001	6.8	1.64	9.8	20%	1.4	0.0	0
2002	13.5	1.64	9.8	20%	2.7	1.0	0
2003	13.4	1.64	9.8	20%	2.7	1.0	0

**TABLE 3-1**  
Summary of Compliance with Certificate Condition No. 1

Year	Neuse Finished Water from the Haw (mgd)	Peaking Factor	16 mgd MDD adjusted to ADD	Consumptive Use Factor (%)	Neuse Consumptive Use (from the Haw) (mgd)	Required Return if After 2010 (mgd)	Amount Returned (mgd)
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a = Average annual transfer from Haw to Neuse (see Table B-1)  
 b = Peaking factor specified in Certificate for first year, and to be approved by DWR thereafter  
 d = Percent consumptive use specified in Certificate for first year and to be approved by DWR thereafter  
 g = Average annual wastewater discharges and water reuse in Haw and Cape Fear Basins (see Table B-1)

**Condition 2 (Facilitate Allocation Use)**

*The holders of this certificate shall manage the authorized transfer amount in such a way that none of the individual petitioners (Towns of Cary, Apex, Morrisville, and Wake County [for RTP South]) are prevented from fully using their respective Jordan Lake water supply allocations.*

The IBT was not a limitation on Jordan Lake withdrawals for any of the allocation holders in 2003.

**Condition 3 (Disaggregation of IBT Amount)**

*If the certificate holders discontinue their cooperative service agreement with each other, the maximum day permitted transfer will be adjusted by the Division of Water Resources based on the 2030 projected of each applicant at that time.*

The cooperative service agreements between the certificate holders have remained in effect during 2003.

**Condition 4 (Compliance and Monitoring Plan)**

*Prior to transferring water under this certificate, the holders of this certificate shall work with the Division of Water Resources to develop compliance and monitoring plan subject to approval by the Division. The plan shall include methodologies and reporting schedules for reporting the following information: maximum day transfer amounts, compliance with permit conditions, progress on mitigation measures, drought management, and reporting. A copy of the approved plan will be kept on file with the Division for public inspection. The Division of Water Resources shall have the authority to make modifications to the compliance and monitoring plan as necessary to assess compliance with the certificate.*

Cary, Apex, Morrisville, and RTP South submitted a Compliance and Monitoring Plan concurrent with the submittal of the 2001 report. In 2003 the Division of Water Resources agreed to modify the submittal date of each annual report to be May 1 of the following year.

**Condition 5 (EMC Consideration of Impacts)**

*If either the EIS is found at a later date to be incorrect or new information becomes available such that the environmental impacts associated with this transfer are substantially different from those projected impacts that formed the basis for the above Findings of Fact and this certificate, the Commission may reopen the certificate to adjust the existing conditions or require new conditions to ensure that the detriments continue to be mitigated to a reasonable degree.*

This condition requires no action by the certificate holders.

### **Condition 6 (Intake Access)**

*The Towns of Cary and Apex shall be required to provide access at their existing intake site to other Jordan Lake water allocation holders that need access to utilize their allocation to the extent that this additional use is determined to be feasible by the Division of Water Resources. The cost associated with getting the necessary permits, engineering design, and associated construction costs are the responsibility of the allocation holder(s) requesting the access and not Cary and Apex.*

The Town of Cary has continued to provide retail water service to RTP South and has a bulk purchase agreement with the Town of Morrisville. The Towns of Cary and Apex have also entered into an agreement to allow Chatham County access to the Cary/ Apex raw water intake on Jordan Lake.

### **Condition 7 (Drought Management Plan)**

*Prior to transferring water under this certificate, the Towns of Cary, Apex, and Morrisville, and Wake County (for RTP South) shall develop individual water shortage response plans subject to approval by the Division. The holders of this certificate shall develop a drought management plan for the interbasin transfer, incorporating the individual water shortage response plans and subject to approval by the Division. The plans shall tie specific water conservation actions to the percent storage remaining in each of the petitioners' Jordan Lake water supply accounts. A copy of the approved plans shall be kept on file with the Division for public inspection. The Division of Water Resources shall have the authority to approve modifications to the drought management plan as necessary.*

Water Shortage Response Plans for each certificate holder were submitted as attachments to the 2001 Annual Report.

### **Condition 8 (Stream Buffer Rules)**

*Within six months from the effective date of this certificate, the Towns of Cary, Apex, and Morrisville, and Wake County (for RTP South) shall enact ordinances similar to or more protective than the Neuse River buffer rules (15A NCAC 2B.0233) for the parts of their jurisdictions that are within the Jordan Lake watershed. These buffer requirements shall be subject to approval by the Division of Water Resources after consultation with the Division of Water Quality and shall be adopted as local ordinances.*

Each Town's buffer ordinance was submitted with the 2001 Annual Report. In 2003 there were two changes:

1. The Research Triangle Foundation put 15,240 feet of 50-foot wide stream buffers under a conservation easement.
2. Wake County prohibited development in the floodplain, and expanded the buffers required in water supply watersheds from 50 feet on each side to 100 feet on each side of the stream.

## **Appendix A:**

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### **Daily Tracking of Combined Jordan Lake Water Supply Allocations for 2003**

## **Appendix B**

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### **Daily Interbasin Transfer Estimates for 2003**