

***Petition for Interbasin Transfer
Certificate for the
Towns of Cary and Apex***

*for the Increase in Interbasin Transfer from the
Haw River Basin to the Neuse River Subbasin*

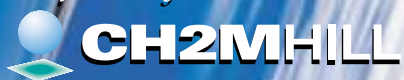
Prepared for

**Town of Cary
Town of Apex
Town of Morrisville
RTP South/Wake County**

Submitted to

**North Carolina Environmental
Management Commission**

Prepared by



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Acronyms/Abbreviations

ACOE	U.S. Army Corps of Engineers
ADD	average daily demand
AWI	Available Water Index
CFRBM	Cape Fear River Basin Hydrologic Model
cfs	cubic feet per second
DENR	North Carolina Department of Environment and Natural Resources
DWQ	North Carolina Division of Water Quality
DWR	North Carolina Division of Water Resources
EIS	environmental impact statement
EMC	North Carolina Environmental Management Commission
FEMA	Federal Emergency Management Agency
IBT	interbasin transfer
MDD	maximum daily demand
mgd	million gallons per day
NCEPA	North Carolina Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
NSW	Nutrient Sensitive Waters
OWASA	Orange Water and Sewer Authority
RDU Airport	Raleigh/Durham Airport Authority
RTP South	Research Triangle Park South
WRF	water reclamation facility
WTP	water treatment plant
WWTP	wastewater treatment plant

Executive Summary

The Towns of Cary, Apex, and Morrisville along with Research Triangle Park South (RTP South) located in Wake County, North Carolina are jointly requesting an increase from the existing Cary/Apex Interbasin Transfer (IBT) certificate of 16 million gallons per day (mgd) to 27 mgd (maximum day basis). The transfer is from the Haw River subbasin (Jordan Lake) to the Neuse River subbasin. This will allow Cary, Apex, Morrisville, and RTP South (Wake County) to meet projected water supply demands for their communities through the year 2030. While the IBT certificate will be held by Cary/Apex, the IBT will be managed such that Morrisville and Wake County can fully utilize their Jordan Lake water supply allocations as currently planned. RTP South is the portion of RTP located in Wake County and does not own or operate a water system. Therefore, the County of Wake is representing RTP South.

In conjunction with the IBT request, Cary, Apex, Morrisville and Wake County are also requesting that the Environmental Management Commission (EMC) grant the Jordan Lake water supply allocations recommended by the Division of Water Resources (DWR) in 1997. The DWR recommended an increase from the current Cary/Apex allocation of 16 mgd to a total allocation of 25 mgd (average annual basis, with separate allocations for Cary/Apex, Morrisville and Wake County), subject to the applicants obtaining the associated IBT certificate. The requested water supply allocations will be withdrawn from the Cary/Apex raw water intake on Jordan Lake and treated at the Cary/Apex Water Treatment Plant (WTP).

Per the requirements of General Statute 143-215.22I, an environmental evaluation was conducted to support the IBT Petition. An Environmental Impact Statement (EIS) evaluated the direct, secondary, and cumulative environmental impacts of the IBT on the source and receiving basins. Hydrologic impacts were evaluated using the Cape Fear River Basin Hydrologic Model recently developed by North Carolina Division of Water Resources.

The final EIS (FEIS) concluded that direct environmental impacts of the proposed IBT increase are not significant. There may be some secondary and cumulative impacts resulting from additional growth and development. The proposed IBT is one of many planned activities by the applicants that are a response to the rapid growth in the project area, rather than the cause of such growth. The secondary and cumulative impacts of the alternatives to the IBT were similar to those of the proposed action. Measures to mitigate the potential indirect and cumulative impacts associated with continued growth and development are included in this IBT Petition.

The evidence suggests that the benefits of the proposed action outweigh the impacts. Direct impacts of the IBT are considered insignificant and secondary and cumulative impacts will be mitigated. Therefore, the applicants request that the EMC grant a 27-mgd IBT certificate and approve the water supply allocations for each applicant recommended by DWR in 1997.

Requested Action

1.1 Requested Action

The Towns of Cary and Apex, North Carolina are jointly requesting an increase from the existing Cary/ Apex Interbasin Transfer (IBT) certificate of 16 million gallons per day (mgd) to 27 mgd (maximum day basis). The transfer is from the Haw River subbasin (Jordan Lake) to the Neuse River subbasin. This will allow Cary and Apex, along with Morrisville and Research Triangle Park (RTP) South (Wake County), to meet projected water supply demands through the year 2030. While the IBT certificate will be held by Cary/ Apex, the IBT will be managed such that Morrisville and Wake County can fully utilize their Jordan Lake water supply allocations as currently planned.

In conjunction with the IBT request, Cary/ Apex, Morrisville and Wake County are also asking the Environmental Management Commission (EMC) to grant the Jordan Lake water supply allocations recommended by the Division of Water Resources (DWR) in 1997 to complete the second round of water allocations. The DWR recommended an increase from the current Cary/ Apex allocation of 16 mgd to an annual average of 21 mgd, in addition to separate allocations for Morrisville (2.5 mgd) and Wake County (1.5 mgd) subject to the applicants obtaining the associated IBT certificate.

This IBT petition provides supporting documentation as required by North Carolina General Statute 143-215.22I; more detailed documentation of the environmental impacts of the requested action are contained in the *Final Environmental Impact Statement* (CH2M HILL, 2000) submitted to the State Clearinghouse on August, 2000. Appendix A contains the Record of Decision for the FEIS.

1.2 Background

When the initial water supply allocations for Jordan Lake were made in 1988, the Towns of Cary and Apex, North Carolina were granted a 16-million gallon per day (mgd) water supply allocation. In 1996, DWR opened the second round of water supply allocations. The Towns of Cary, Apex, and Morrisville along with Wake County/ RTP South requested additional or new water supply allocations to meet the water demands of their growing communities. The allocation requests and DWR's recommendations are summarized in Table 1.

TABLE 1
Water Supply Allocation Recommendations for Interbasin Transfer Applicants

Allocation Applicant	Current Allocation (mgd)	DWR Total Allocation Recommendation (mgd)¹
Apex and Cary	16.0	21.0
Morrisville	0	2.5
Wake County/RTP South	0	1.5

Note: ¹ Based on projected 2015 average day demands (see the *Final Environmental Impact Statement*, CH2M HILL, 2000).

Using the existing 16-mgd allocation for Cary and Apex, the Cary/Apex water treatment plant (WTP) currently treats raw water from Jordan Lake and supplies finished water on a regular basis to Cary, Apex, Raleigh/Durham Airport Authority (RDU Airport), RTP South, and the Town of Morrisville. Although the DWR recommended individual allocations for Morrisville and RTP South, as shown in Table 1, the Cary/Apex WTP will continue to treat and supply finished water to the RDU Airport, Morrisville, and RTP South.

The basin boundary between the Cape Fear River basin and the Neuse River basin runs through the Towns of Cary and Apex (see Figure 1). Raw water is withdrawn from Jordan Lake in the Haw River subbasin (in the Cape Fear River basin) and treated at the Cary/Apex WTP. Treated water is supplied to customers in both the Haw River subbasin and the Neuse basin. The Cary/Apex raw water intake and WTP station is located on the east side of Jordan Lake near US Highway 64 and have existing capacities of 16 mgd. Treated water is conveyed through a 42-inch and a 30-inch transmission main to the Town of Cary. Treated water is delivered to the Town of Apex through an interconnection and master meter located on a 16-inch transmission main near NC Highway 55. An secondary interconnection between the Cary and Apex water systems is located at Penny Road and Ten-Ten Road. Treated water is provided to the Town of Morrisville through interconnections on Evans Road, NC Highway 54, McKimmon Parkway, and Weston Parkway. Treated water is delivered to RTP South through interconnections with then Town of Morrisville.

There are three wastewater treatment plants (WWTPs) that currently serve Cary, Apex, Morrisville, RTP South, and RDU Airport. The North Cary Water Reclamation Facility (WRF) has a permitted capacity of 12 mgd and serves northern, western, and central Cary as well as Morrisville, RDU Airport, and RTP South. RTP South conveys wastewater to the North Cary WWTP through a gravity sewer interceptor. All wastewater from the Town of Morrisville is conveyed to North Cary WWTP through two force mains from pump stations located at Aviation Boulevard and Perimeter Park, or a gravity sewer interceptor located along NC Highway 54. The South Cary WRF has a permitted capacity of 16 mgd and serves eastern, central, and southern Cary. Apex has a WWTP with a permitted capacity of 3.6 mgd that serves residents within the Apex town limits. The three WWTPs discharge treated wastewater to the Neuse basin. Therefore, a transfer of water occurs from the Haw River

subbasin to the Neuse River basin. Eventually, the Apex WWTP will be phased out, and a new Cape Fear Regional Water Reclamation Facility (WRF) is planned that will discharge to the Cape Fear River. The locations of existing facilities involved in the IBT are shown on Figure 1 and existing and planned capacities are summarized in Table 2.

TABLE 2.
Existing Capacity of Facilities Involved in IBT

Facility	Existing Capacity (mgd)	Planned 2030 Capacity (mgd)
Cary/Apex Raw Water Intake	16 ¹	60 ^{1,3}
Cary/Apex WTP	16 ¹	60 ^{1,3}
North Cary WRF	12 ²	12 ²
South Cary WRF	16 ²	16 ²
Apex WWTP	3.6 ²	0
Cape Fear Regional WWTP	--	18 ^{2,4}

1. Maximum day basis
 2. Maximum month basis
 3. Will require additional Jordan Lake allocation
 4. Will require new NPDES permit
- WRF = Water Reclamation Facility

Cary/Apex currently has an IBT certificate for 16 mgd (maximum day basis). The Towns of Cary and Apex are requesting an IBT certificate of 27.0 mgd, an increase of 11.0 mgd over the existing IBT certificate held by Cary/Apex. The water supply allocations recommended by DWR for Cary, Apex, Morrisville, and RTP South (Table 1) are contingent upon the issuance of an IBT certificate by the EMC.

1.3 Project Description

The Towns of Cary and Apex are requesting an IBT certificate of 27 mgd from the EMC. The proposed IBT involves transfer of water from the Haw River subbasin (source basin) to the Neuse River subbasin (receiving basin), as shown in Figure 1 and described below:

- **Haw River Basin Study Area (source basin):** Jordan Lake and the watershed areas of 03-06-05 and 03-06-06, and the Haw River arm of Jordan Lake (and its floodplain). The Haw and Cape Fear rivers from the Jordan Lake dam to the town of Lillington are also included.
- **Neuse River Basin Study Area (receiving basin):** The general area contained within the outer boundary of the existing/projected Utility Service Area contributing to the proposed IBT (North Cary, South Cary, and Apex WWTPs), as well as Crabtree Creek and Middle Creek extending from the WWTP service area boundary to their individual confluence with the Neuse River.

The North Cary WRF, the South Cary WRF and the Apex WWTP will not be expanded as a result of the proposed IBT. No additional WWTP capacity will be requested in the Neuse River basin in conjunction with this IBT request.

One or more WWTPs and/or water reclamation facilities, assumed to discharge to the mainstem of the Cape Fear River, are being considered or planned and will likely serve Cary, Apex, and the Wake County portion of RTP, as well as other portions of western Wake County. These planned facilities will limit the amount of water discharged to the Neuse River basin, thereby minimizing the IBT amount in the future. At present, several alternative discharge locations below the Jordan Lake dam are being investigated for those proposed facilities. The requested IBT in this petition represents the maximum IBT that will occur during the planning period through 2030 (24.1 mgd), plus an additional contingency factor that brings the total requested IBT amount to 27 mgd (Table 3).

TABLE 3
Projected IBT for Cary, Apex, Morrisville, and RTP South¹

Year	IBT Maximum Day (mgd)
2000	12.3
2010	17.9
2020	18.4
2030	24.1

Notes:

¹ Projected IBT calculations are estimates assuming an IBT increase of 11 mgd is granted.

SECTION 2

Summary of IBT Certification Process

In 1996, the Towns of Cary, Apex, and Morrisville and Wake County each requested additional or new water supply allocations for Jordan Lake. In 1997, the DWR published recommendations for water supply allocations. The allocations for Cary, Apex, Morrisville and Wake County are contingent upon the issuance of an IBT certificate.

In compliance with NC General Statute 143.215.22I, an EIS was developed to examine the impacts of the proposed IBT and for use in the certification process. The EIS process has included involvement, input, and comment from federal and state agencies, local municipalities, other stakeholders, and the public. The draft scoping document was submitted to the State Clearinghouse in September 1997 and comments were received in October 1997. These comments were reviewed and the final scoping document was completed in cooperation with DWR.

In addition to the comments received through the Clearinghouse, a number of meetings and contacts were made with many resource agencies before and after formal comments from the Clearinghouse were received. Particularly, organizations that responded to the State Clearinghouse scoping process of 1997 were contacted again in October 1999. At this time, these organizations were notified of the EIS process and were provided with one additional opportunity to submit comments.

The draft EIS was submitted to DENR in January 2000 and comments were received in March 2000. A revised draft EIS was submitted to the State Clearinghouse in May 2000, which included extensive mitigation measures in response to DENR concerns about secondary and indirect impacts related to growth. A public hearing was held on July 13, 2000, and comments from state and federal agencies, stakeholders, and the public were received through July 31, 2000. The FEIS was submitted to the Clearinghouse in August 2000, incorporating responses to the comments.

A summary of the comments from resource agencies, stakeholders, and the public from the scoping process through the completion of the FEIS is presented in Appendix B.

SECTION 3

Evaluation Considerations

For ease of review, this section is organized according to the items the EMC is required to evaluate according to North Carolina General Statute 143-215.22I.

3.1 Need for Proposed IBT

3.1.1 Population Projections

Since 1988, the towns of Cary and Apex and the surrounding areas have grown rapidly. A special U.S. Census completed in April 1998 documented Cary’s population at 85,400. Morrisville had an average population increase of 19 percent annually between 1980 and 1990; however, development slowed in the early 1990s because of the shortage of water and limited sewer capacity.

Population projections are presented in Table 4 and are based on development of available acreage within each Town’s jurisdiction using historical records or development density. Population projections are not calculated for Wake County since the water supply allocation is for RTP South, which is exclusively office and industrial.

TABLE 4
Population Projections

Year	Apex	Cary	Morrisville
1997	11,500	82,700	2,100
2000	22,000	94,400	6,500
2010	48,800	120,900	14,700
2020	74,600	154,700	20,800
2030	100,400	198,000	27,000

Source: FEIS (CH2M HILL, 2000)

3.1.2 Water Demand Projections

The average daily water demand (ADD) projections presented in Table 5 have been updated since the 1995-1996 Jordan Lake allocation applications. Average day water demands for the towns, before reductions for conservation and reuse, are based on historic per capita treated water demands of 102, 110, and 213 gallons per capita per day for Cary, Apex and Morrisville, respectively. Raw water demands are approximately 8 percent higher than treated water demands due to losses during water treatment such as filter backwashing. The maximum day demands (MDDs) were calculated based on historical MDD/ADD peaking factors of 1.65 for Cary, Apex, and Morrisville, and 1.5 for RTP South.

Cary, Apex, and Morrisville plan to utilize conservation measures, and these demand reductions are included in the water demands in Table 5. Cary and Morrisville have goals to reduce per capita water demands by 20 percent (from 1998 levels) by 2015, and Apex plans to reach 20 percent reductions in per capita demands by 2027. Also, Cary is planning

to implement a water reclamation and reuse program to reduce the projected MDD by 2.2 mgd in 2002 and 3.8 mgd in 2015.

TABLE 5
Raw Water Demand Projections

Year	Cary		Apex		Morrisville		RTP South	
	ADD	MDD	ADD	MDD	ADD	MDD	ADD	MDD
1997	10.3	16.5	1.2	2.0	0.5	0.7	0.2	0.3
2000	10.7	17.6	2.6	4.3	0.5	0.8	0.5	0.7
2010	9.9	16.3	5.2	8.6	2.9	4.8	2.0	2.9
2020	11.8	19.5	7.15	12.4	3.8	6.3	2.5	3.7
2030	15.7	25.8	9.6	15.8	5.0	8.3	2.5	3.7

Notes:

ADD = Average Day Demand (mgd)

MDD = Maximum Day Demand (mgd)

Source: FEIS (CH2M HILL, 2000)

3.1.3 Need for Additional Water Supply

The Cary/Apex WTP has a rated capacity of 16 mgd; Cary owns 77 percent of this amount (12.32 mgd), while Apex owns the remaining 3.68 mgd. Cary currently cannot produce enough treated water to supply the entire Town’s water needs, and has bulk purchase contracts with both the City of Raleigh and the City of Durham on a “take or pay” basis. The contract with the City of Raleigh stipulates that 4.5 mgd of treated water is purchased a minimum of 280 days each year through September 30, 2003. The City of Durham contract guarantees the purchase of 3.5 mgd of treated water daily through April 30, 2002. Morrisville also has a contract with Durham for the purchase of 1.5 mgd through April 2002. Expansion of the Cary/Apex WTP to 40 mgd is being planned. Both Raleigh and Durham have indicated that they are not willing to supply water past the expiration dates of the current contracts or on any long-term basis; therefore, the requested allocations and IBT are necessary to replace the water currently being purchased from Raleigh and Durham.

3.1.4 Reasonableness of IBT Request

Based on the water demand projections presented in Table 5 and the estimated wastewater discharge to the Cape Fear River basin, the future IBT amounts (see Table 6) were calculated based on the following assumptions:

- Customer consumptive use includes in-basin water uses such as irrigation and septic systems and is assumed to be 22 percent of raw water withdrawal based on discussions with the DWR staff. In addition to customer consumptive use, total consumptive uses include WTP losses of 8 percent in the Haw River Basin.
- A regional WWTP that will discharge to the Cape Fear River will be on-line prior to the year 2010 and will treat all the discharges to the Haw River basin shown in Table 5.

TABLE 6

Interbasin Transfer Water Balance Table (Maximum Day Basis – All Figures in mgd)

Year	Withdrawal from Haw River	Consumptive Use		Estimated Wastewater Discharge ¹		Total Return to Haw River Basin ^{2, 3}	Interbasin Transfer ⁴
		Haw River Basin	Neuse River Basin	Haw River Basin	Neuse River Basin		
2000	16.0	3.7	3.3	0.0	16.4	3.7	12.3
2010	32.6	5.4	7.0	9.2	11.0	14.7	17.9
2020	41.8	6.9	8.7	16.5	9.7	23.5	18.4
2030	53.6	8.6	10.3	20.9	13.8	29.5	24.1

Notes:

¹Estimated wastewater discharges represent the amount of water withdrawal that is discharged as wastewater. They do not include the impacts of inflow and infiltration or seasonal consumptive use variations on actual wastewater discharge amounts.

²Total Return to Haw River Basin = Haw River Basin Consumptive Use + Haw River Basin Wastewater Discharge.

³Analysis using the Cape Fear Hydrologic Model (Appendix B in the FEIS, CH2M HILL, 2000) showed that discharge of wastewater to the Cape Fear River basin upstream of Lillington was equivalent to discharge into Jordan Lake (Haw River basin). It is assumed that the discharge will be to the mainstem of the Cape Fear River.

⁴Interbasin Transfer = Withdrawals from Haw River Basin – Total Return to Haw River Basin

While the future IBT is 24.1 mgd in 2030 based on the calculations presented in Table 6, the requested IBT of 27 mgd allows for about a 10 percent contingency to account for uncertainty in the projections. A limited sensitivity analysis shows the potential for the proposed IBT to reach a peak of 27 mgd during the planning period based upon considering the following factors:

- Historically the region's growth has exceeded projections, and all the towns are predicting growth at slower rates than have occurred recently.
- The towns are working toward aggressive conservation goals, but potential savings are hard to quantify and program success can vary greatly among different communities.
- It may take longer than expected to obtain permits for Cary's planned reuse system.

It may take longer than expected to obtain permits and construct the planned WWTP discharging to the Cape Fear River basin.

3.2 Alternatives to the Proposed IBT

Alternatives to the proposed IBT increase are summarized in Table 7. Each alternative is assumed to be potentially feasible and incorporates consideration of physical and environmental constraints based on current available information.

TABLE 7
Summary of Alternatives

Item	Alternatives						
	Proposed Action	1A No Action	1B No Action	2 Water From Neuse	3 Move WWTP Discharges	4 Merger with Durham	5 No Regional WWTP
Increase in IBT (mgd)	11	0	0	0	0	0	29
Additional Jordan Lake Allocations	Yes	No	Yes	Yes	Yes	Yes	Yes
2030 MDD Water Demands (mgd)	53.6	19	43.8	53.6	53.6	53.6	53.6
Maximum IBT (mgd)	25 ¹	16	16	16	16	19 (Neuse to Haw)	45
Total Capital Cost (million)	\$225.7	\$11.1	\$206.6	\$206.9	\$279	\$248	\$84.0
Water Reuse	3.8 mgd	3.8 mgd	3.8 mgd	3.8 mgd	3.8 mgd	3.8 mgd	3.8 mgd
Construct Regional WWTP (2030 max month capacity)	18.0 mgd	No	18.0 mgd	18.0 mgd	18.0 mgd	18.0 mgd	No
Finished Water Purchases (2030 max day demand)	No	No	No	9.2 mgd	No	No	No
Expand Cary/Apex WTP (capacity beyond 40 mgd, max day basis)	20.0 mgd	No	9.0 mgd	9.0 mgd	20.0 mgd	20.0 mgd	20.0 mgd

Note: ¹Projected IBT in 2030 is approximately 25 mgd. The requested amount of 27 mgd includes some contingency.

Order-of-magnitude cost estimates were developed for each alternative in 1999 dollars using available information (conceptual layouts, unit costs, and previously prepared cost estimates). Final project costs and resulting feasibility will depend on actual labor and material costs, competitive market conditions, actual site conditions, final project scope, implementation schedule, continuity of personnel and engineering, and other variable factors, and may vary from the estimates presented here.

3.2.1 Alternative 1A: No IBT Increase and No Additional Allocations

3.2.1.1 Description

Alternative 1A is defined as:

- No increase in the existing 16-mgd (average day basis) Jordan Lake allocation
- No increase in the existing IBT certificate (16 mgd on a maximum day basis)
- No construction of a regional treatment and water reclamation facility
- No other additional discharges to the source basin, in western Wake County

The applicants would need to search for other water sources to meet water demands such as the Cape Fear River via a Haw River intake, or small community and individual wells. It is unlikely that any of these options would allow sufficient water supply to satisfy water demands based on current growth projections. Local governments would be forced to implement even more stringent water conservation measures than are already in place, work with industries to lower water usage, and limit new water connections. Under this alternative, growth would be expected to decrease sharply as a result of these policies.

3.2.1.2 Summary of Analysis

Alternative 1A is the least costly alternative at \$11 million, but it would not provide enough water supply to satisfy water demands based on current growth projections. It is being rejected as an alternative because it does not satisfy the objectives of the applicant. This alternative also results in shifting secondary growth impacts to more rural areas that lack strong environmental protection controls and increasing the inefficiencies and environmental problems associated with sprawl.

3.2.2 Alternative 1B: No IBT Increase with Additional Lake Allocations

3.2.2.1 Description

Alternative 1A is defined by the following:

- Increases in Jordan Lake water supply allocations
- No increase in existing IBT certificate (16 mgd on maximum day basis)

Increases in the IBT would be limited by concurrent decreases in customer demand, through very significant conservation and reuse programs, and by a regional discharge to the Cape Fear River basin. This alternative will limit water supply to the current capacity of 19 mgd (MDD) until 2005, when a regional treatment and water reclamation facility is expected to be in operation. Growth in the study area would continue at a slower rate until the regional WWTP is operational.

3.2.2.2 Summary of Analysis

Although Alternative 1B is more economical than the proposed alternative, it may actually facilitate land use changes and development pressures to move closer to Jordan Lake than currently planned in the short term. This alternative does not meet water demands for the affected communities until a regional treatment and water reclamation facility is constructed in the Cape Fear River basin. In addition, this alternative involves too much uncertainty since it may be difficult to obtain additional Jordan Lake allocations without an increase of the IBT. Therefore, this alternative is not being recommended. Other indirect and cumulative impacts of this alternative would be similar to the proposed action.

3.2.3 Alternative 2: Obtain Water From the Neuse River Basin

3.2.3.1 Description

This alternative is defined by:

- No increase in existing IBT certificate (16 mgd)
- Regional Cape Fear WWTP
- Purchase of finished water from the Neuse River basin

There would likely be slower growth until 2005, when the regional treatment and water reclamation facility in western Wake County is expected to be in operation. Beyond 2005, growth and development would follow the projected patterns. Additional water supply could be obtained through purchase of finished water from the City of Durham and/or the City of Raleigh. This would require purchase of average day amounts of 2.4 mgd in 2000, increasing to about 5.6 mgd in 2030. Both the City of Durham and the City of Raleigh have expressed concern for maintaining sufficient capacity to satisfy their own demands, and indicated that they do not intend to provide the applicants with finished water on a long-term basis.

3.2.3.2 Summary of Analysis

Alternative 2 would cost approximately \$207 million. The Cities of Durham and Raleigh do not currently have sufficient water supply capacity to meet the needs of their service areas and the needs of Cary, Apex, Morrisville, and RTP South. Therefore, additional supplies would need to be secured in order for finished water purchases from the Neuse River basin to continue. The capital costs of developing new water supplies will increase the cost of this alternative to exceed considerably the \$207 million estimate. In addition, the direct and indirect environmental impacts of expanding existing supplies or utilizing new sources could be significant. Therefore, this alternative is not recommended on the basis of cost and potentially more adverse environmental consequences than the proposed action. The indirect and cumulative impacts of this alternative would be similar to the proposed action.

3.2.4 Alternative 3: Increase Wastewater Discharges to Cape Fear River Basin

3.2.4.1 Description

This alternative is defined by:

- No increase in existing IBT certificate (16 mgd)
- Additional Jordan Lake water supply allocations
- Relocation of existing Apex and Cary WWTP discharges to Cape Fear basin
- Regional Cape Fear WWTP

Relocation of the discharge from the Apex WWTP could be completed as early as 2002. Prior to 2002, this alternative would limit maximum day withdrawals from Jordan Lake to about 19 mgd until the Apex discharge is relocated, similar to the no action alternative. All of the wastewater flows from the South Cary WWTP would be relocated to the Cape Fear River basin. However, only a portion of the flows from North Cary WWTP would need to be discharged to the Cape Fear River basin in order to maintain an IBT of 16 mgd or less.

3.2.4.2 Summary of Analysis

Alternative 3 is the most expensive of the evaluated alternatives, at \$279 million. The relocation of outfalls would have additional direct impacts on the local environment due to construction activities, some of which may be significant. Of particular importance would be the natural resources of Harris Lake and the Shearon Harris Game Lands, adjacent to this potential interceptor route and pump stations. This alternative is not recommended since less costly and more environmentally friendly alternatives have been identified. The indirect and cumulative impacts of this alternative ultimately would be similar to the proposed action.

3.2.5 Alternative 4: Merger of Water and Sewer Utilities

3.2.5.1 Description

This alternative involves the merger of the water and sewer utility operations of the Town of Cary and the City of Durham. The City of Durham has an IBT from the Neuse River basin to the Haw River basin, while Cary/Apex has an IBT from the Haw River basin to the Neuse River basin; the current net IBT is from the Neuse to the Haw. If these two systems merged, then the overall net IBT would be reduced.

This alternative assumes that the City of Durham would continue to meet its water supply needs from the Neuse River basin and the Town of Cary would continue to meet its water supply needs from the New Hope Creek/Jordan Lake subbasin (Haw River basin). This alternative assumes that no wastewater flows from Cary, Apex, Morrisville, or RTP South would be transferred to Durham. Therefore, this alternative does not differ physically from the proposed action except for the expansion of the existing interconnection to provide additional reliability in the merged system.

3.2.5.2 Summary of Analysis

Alternative 4 costs more than the proposed action by over \$20 million. The feasibility of this alternative is in doubt, since the opportunities and challenges of a merger of the Cary and Durham water and sewer utilities could present institutional and political challenges. Until institutional issues are resolved, this alternative will result in a drastic decrease of water supply for the affected communities in the very short term. This alternative bears too much uncertainty on the institutional framework and does not meet water demands in the short term. Therefore, this alternative is not recommended. Direct impacts are expected to be insignificant. The indirect and cumulative impacts of this alternative would be similar to the proposed action.

3.2.6 Alternative 5: No Regional Treatment and Water Reclamation Facility

3.2.6.1 Description

This alternative assumes that no regional treatment and water reclamation facility in the Cape Fear basin is constructed, and thus, this alternative represents the maximum IBT (45 mgd) possible. Wastewater discharges to the Cape Fear River basin remain at zero, and the quantity of the IBT increases as water withdrawals from Jordan Lake increase and are discharged through existing wastewater treatment facilities in the Neuse River basin.

3.2.6.2 Summary of Analysis

Alternative 5 is the second least expensive alternative to the proposed alternative, at \$84 million. The most significant impact of this alternative will be the inducement for expanding the use of privately-owned package treatment plants, spray irrigation systems, and septic systems in the Cape Fear River basin to accommodate growth in western Wake County. This may lead to significant impacts to the lake's water quality and the natural habitats around the lake, including increased nutrient loadings to Jordan Lake and increased algal blooms and decreased dissolved oxygen in the already eutrophic lake. Taste and odor problems may increase in drinking water from the Jordan Lake water supply. The potential for pathogens to be present in the lake water would increase. Impacts on public recreation uses may be significant. Degradation of water quality may have a significant impact on wetland habitat, and aquatic plant and animal species, and may significantly affect recreational fisheries in Jordan Lake.

This alternative presents a policy challenge since the EMC may not approve additional Jordan Lake allocations for an estimated IBT of 45 mgd without provisions for returning water to the source basin in the long term. In addition to these indirect impacts to Jordan Lake, the indirect and cumulative impacts of growth from Alternative 5 would be similar to the proposed IBT increase. This alternative is rejected due to these potentially significant impacts to Jordan Lake. In addition, the IBT will increase from 16 mgd to more than 45 mgd, a three-fold increase.

3.2.7 Conclusions of Alternatives Analysis

Except for Alternative 1A, which does not serve the existing water supply needs of the communities, the six alternatives proposed will not substantially reduce the expected significant impacts of the proposed IBT increase. In fact, as discussed above, a few of the alternatives actually create additional direct and indirect impacts that may be significant. Alternative 1A may potentially shift growth and development and their associated impacts to other communities in Wake County or in the RTP region.

The direct impacts of the proposed IBT are not considered to be significant. The significant impacts are from growth and development that the proposed action will facilitate. All of the alternatives to the proposed IBT increase (except 1A) will create essentially the same indirect impacts associated with the facilitated growth and development in the project area, as in the proposed alternative. Therefore, none of the identified alternatives will significantly reduce the indirect and cumulative impacts of the project. The proposed alternative has clear advantages over all other alternatives in terms of cost, feasibility, levels of direct impacts, and meeting the water demands of the affected communities. The proposed action is the preferred alternative.

3.3 Present and Future Impacts on Haw River Subbasin (Source Basin)

This section summarizes the findings of the EIS regarding the present and future impacts within the Haw River basin on the following:

- Water supply needs of municipalities, industries, and the agricultural sector
- Wastewater assimilation
- Water quality
- Fish and wildlife
- Navigation
- Recreation

A summary of measures to mitigate adverse impacts is included in Appendix C.

3.3.1 Water Supply

The impacts of the proposed IBT on water supplies were evaluated using the Cape Fear River Basin Model (CFRBM), which was recently developed by the DWR with assistance from Moffat & Nichol and the Danish Hydraulic Institute. The model considers all major water withdrawals (municipal, industrial, and agricultural) and discharges within the Cape Fear River basin, including those into and out of Jordan Lake. The model has been used to evaluate the impact of the requested IBT on Jordan Lake surface water elevation, minimum releases from the dam, water quality pool levels, the target flows at Lillington, flows at Fayetteville, and water quality pool levels. A technical memorandum is included in Appendix B of the FEIS (CH2M HILL, 2000) that provides detailed information on the modeling scenarios as well as results and conclusions. Two modeling scenarios, *Proposed B* and *Proposed C*, were added to address comments received subsequent to the public hearing held on July 13, 2000.

The modeling scenarios that were developed to assess impacts on the Jordan Lake and downstream flows are summarized in Table 8. The numbers at the beginning of the scenario names represent the corresponding alternative number as presented in the EIS. The potential impacts of Alternatives 2 and 4 are the same as those of other alternatives, as noted below, so they were not modeled separately.

The *Base 1998* scenario represents the existing conditions in 1998. Thus, water supply withdrawals and discharges throughout the basin are set to actual 1998 values. Withdrawals from Jordan Lake include Cary/Apex and Chatham County with annual average withdrawals of 10.7 and 0.8 mgd, respectively.

The *Base Future* scenario includes full use of the Jordan Lake water supply pool (total withdrawals = 100 mgd). Potential impacts of the requested IBT are evaluated in comparison to the *Base Future* scenario in order to isolate IBT impacts from the impacts of full Jordan Lake allocation use. For all scenarios except *Base 1998*, withdrawals from Jordan Lake total 100 mgd, with 50 percent of the "Other Jordan Lake withdrawals" returned to Jordan Lake. Discharges from Cary/Apex are returned downstream of Jordan Lake and upstream of Lillington.

TABLE 8
Modeling Scenarios for Interbasin Transfer Impact Evaluation

Scenario	Description	Base Year ¹	Average Day Flows (mgd)				Resulting 2030 IBT ⁴
			Withdrawal at Cary/Apex Intake	Cape Fear Basin Discharges	Other Jordan Lake Withdrawals ²	Other Return Flows ³	
Base 1998	Existing Conditions	1998	10.7	None	None	None	--
Base Future	Existing, plus Jordan Withdrawals = 100 mgd	1998	10.7	None	89.3	44.3	--
Alternatives for Incremental Impacts Evaluation							
Proposed Incremental A	Requested IBT Increase	1998	32.8	12.7	67.2	33.2	25
<i>Proposed Incremental B⁵</i>	<i>Requested IBT Increase (1998 Jordan withdrawals)</i>	<i>1998</i>	<i>32.8</i>	<i>12.7</i>	<i>0.81</i>	<i>0.0</i>	<i>25</i>
<i>Proposed Incremental C⁵</i>	<i>Requested IBT Increase (No regional WWTP)</i>	<i>1998</i>	<i>20.0</i>	<i>0</i>	<i>80.0</i>	<i>39.6</i>	<i>25</i>
Alt. 1A Incremental	No IBT Increase and No Additional Allocation	1998	11.6	None	88.4	43.8	16
Alt. 1B	Additional Allocation with No IBT Increase	1998	26.8	12.7	73.2	36.2	16
Alt. 2	Obtain Water from Neuse Basin			Same as Alt. 1B			
Alt. 3	Relocate WWTP Discharges to Cape Fear	1998	32.8	17.6	67.2	33.2	16
Alt. 4	Merger with Durham			Same as Proposed-Incremental A			
Alt. 5	No Regional WWTP	1998	32.8	0	67.2	33.2	45
Alternatives for Cumulative Impacts Evaluation							
Proposed Cumulative	Requested IBT Increase	2030	32.8	12.7	67.2	33.2	25
Alt. 1A Cumulative	No IBT Increase and No Additional Allocation	2030	11.6	None	88.4	43.8	16

Notes:

¹ The Base Year is the data year used for all other nodes other than those listed, and as discussed in the preceding section.

² "Other Jordan Lake Withdrawals" is calculated such that total Jordan Lake withdrawals = 100 mgd, considering Cary/Apex withdrawal (except for *Proposed Incremental B*).

³ "Other Return Flows" represents the return of 50 percent of "Other Jordan Lake Withdrawals" (excluding Chatham County's withdrawal of 0.8 mgd) to Jordan Lake.

⁴ From the Cape Fear Basin to the Neuse Basin on a maximum day basis, in mgd.

⁵ Scenarios not included in FEIS. Scenarios added in response to public and stakeholder comments subsequent to Public Hearing.

⁶ From the Neuse Basin to the Cape Fear Basin, including Durham's grandfathered amount.

All scenarios except the *Base 1998* scenario are based on the assumption that the water supply pool of Jordan Lake is fully utilized. Current allocation holders (Chatham County, Orange County, and the Orange Water and Sewer Authority [OWASA]) are assumed to be fully utilizing their water supply allocations, and the balance of the total Jordan Lake withdrawal is attributed to a "DWR" node in the CFRBM.

The *Proposed A* scenario represents the requested IBT increase and includes planned Jordan Lake withdrawals in 2030 as well as planned 2030 discharges from a regional water reclamation facility to the mainstem of the Cape Fear River, downstream of Jordan Lake and upstream of Lillington. The modeling results for this proposed action also represent the impacts of *Alternative 4 - Cary/Durham Merger*.

The *Proposed B* scenario represents the requested IBT increase, but does not include full utilization of the Jordan Lake water supply pool (100 mgd). This variation of the proposed scenario includes 1998 Jordan Lake withdrawals and discharges.

Similar to the *Proposed A* scenario, the *Proposed C* scenario represents the requested IBT increase and includes planned Jordan Lake withdrawals and discharges in 2030. However, this scenario assumes that a regional water reclamation facility that discharges to the mainstem of the Cape Fear River is not implemented. Therefore, ADD must be kept at or below 20 mgd to maintain an IBT of 27 mgd or less.

Alternative 1B and *Alternative 2* are represented by the same modeling scenario since the impacts on Jordan Lake and the Cape Fear River would be the same for those two alternatives.

Alternative 3 (Relocate WWTP Discharges) includes the proposed water reclamation facility discharging to the Cape Fear River. In addition, the existing WWTP discharges to the Neuse River basin are relocated to the mainstem of the Cape Fear River below Jordan Lake and upstream of Lillington, such that the IBT remains at the currently permitted amount of 16 mgd.

Alternative 5 (No Cape Fear WRF) also does not include the proposed regional water reclamation facility. This alternative represents the maximum IBT that could occur, with no wastewater discharges to the Cape Fear River basin to offset the IBT as in the proposed action without the limitation on ADD as included in *Proposed C*.

Based on the modeling results, the proposed IBT will not have any significant impacts on water supplies in Jordan Lake or in the Cape Fear River downstream of the dam. The model results indicate that there are no significant changes in Cape Fear River flows downstream of the dam compared to the other EIS alternatives and the base scenarios (Table 9). The model results also indicate that there are no significant changes in Jordan Lake outflows, lake elevation, and water quality pool levels compared to the other EIS alternatives and the base scenarios (Table 9). The model results did indicate impacts on Jordan Lake and Cape Fear River flows downstream of the dam. However, comparison of the results from the Base 1998 and Base Future scenarios with results from the proposed action and all other scenarios suggest that the impacts are related to the transition from current Jordan Lake withdrawals (ADD = 11.6 mgd) to the full use of the water supply pool (ADD = 100 mgd).

The CFRBM does not include drought management practices by Jordan Lake allocation holders. Therefore, the impacts on Jordan Lake and downstream Cape Fear River flows are expected to be less than presented in Appendix B of the FEIS once drought management is incorporated into the CFRBM by DWR.

3.3.2 Wastewater Assimilation

Changes in the existing assimilative capacity of the surface waters in the source basin are not expected since the CFRBM indicates there would not be any major changes in Cape Fear River flows downstream of Jordan Lake that are associated with the proposed IBT increase. Table 9 illustrates that Cape Fear River flows at Lillington will be less than the target flow of 600 cfs 35.5% of the time under Base Future conditions and 34.9% of the time under the proposed action.

3.3.3 Water Quality

No water quality models have been developed by the State for Jordan Lake or for the upper segment of the Cape Fear River (above Buckhorn Dam). The Triangle J Council of Governments is currently leading efforts for the development of a water quality model for Jordan Lake. This model is expected to be complete in 2002. The Town of Cary has developed a QUAL2E model for the Cape Fear River from the Jordan Lake Dam to the Buckhorn Dam, but this model has not yet been approved by the North Carolina Division of Water Quality (DWQ). Therefore, direct impacts on the water quality of the source basin cannot be assessed with a modeling tool at this time. However, changes in the existing assimilative capacity of the surface waters in the source basin are not expected since the CFRBM indicates there would not be any major changes in Cape Fear River flows downstream of Jordan Lake that are associated with the proposed IBT increase (Table 9).

However, there may be impacts from growth that may be facilitated by the proposed IBT since additional water supply capacity will enable additional growth and development to occur in the source basin. Dense urban development from full buildout (worst-case scenario) of the Utility Service Area may affect water quality through:

- Sedimentation and erosion from construction activities (short-term impacts)
- Increased amounts of non-point sources of pollution (longer term impacts)
- Increased stormwater runoff and more frequent flooding (longer term impacts)

Growth and development will necessitate the approval, construction, and operation of a variety of additional water and sewer projects in the source basin including expansion of the existing Cary/Apex WTP, construction and operation of a proposed treatment and water reclamation facility in western Wake County, and installation and operation of new or extended water and sewer conveyance systems.

Secondary impacts of growth, which may be facilitated by the proposed IBT, on water quality will be mitigated through the construction of regional public water and wastewater collection and treatment systems in the Utility Service Area, which will have the following benefits:

- Eventual elimination of privately owned package treatment plants
- Eventual elimination of septic systems

TABLE 9
Comparison of Hydrologic Impacts of EIS Alternatives¹

Scenario	Description	Jordan Lake Outflow < 100 cfs	Jordan Lake Level < 210 ft. MSL	Water Quality Pool < 20%	Flows at Lillington < 600 cfs	Flows at Fayetteville < 600 cfs
Base 1998	Existing Conditions	12.6%	4.9%	4.2%	34.3%	2.0%
Base Future	Existing, plus Jordan Withdrawals = 100 mgd	15.2%	8.7%	3.8%	35.5%	1.9%
Alternatives for Incremental Impacts Evaluation						
Proposed Incremental A	Requested IBT Increase	16.0%	8.6%	3.5%	34.9%	1.8%
Proposed Incremental B	Requested IBT Increase (1998 Jordan withdrawals)	14.0%	5.9%	4.0%	34.1%	2.0%
Proposed Incremental C	Requested IBT Increase (No regional WWTP)	15.4%	8.9%	3.9%	35.6%	1.9%
Alt. 1A Incremental	No IBT Increase and No Additional Allocation	15.2%	8.7%	3.8%	35.5%	1.9%
Alt. 1B	Additional Allocation with No IBT Increase	15.9%	8.4%	3.4%	34.8%	1.8%
Alt. 2	Obtain Water from Neuse Basin	15.9%	8.4%	3.4%	34.8%	1.8%
Alt. 3	Relocate Existing WWTP Discharges to Cape Fear	16.2%	8.3%	3.4%	34.5%	1.8%
Alt. 4	Merger with Durham	16.0%	8.6%	3.5%	34.9%	1.8%
Alt. 5	No Regional WWTP	15.8%	9.2%	4.1%	35.7%	2.0%
Alternatives for Cumulative Impacts Evaluation						
Proposed Cumulative	Requested IBT Increase	13.7%	6.2%	2.6%	33.9%	1.8%
Alt. 1A Cumulative	No IBT Increase and No Additional Allocation	13.0%	6.3%	2.7%	34.5%	1.9%

Note: ¹Data represent percentage of days in which value was below the threshold.

- Adequate maintenance of sewer lines to prevent overflows
- Public enforcement actions on failing septic systems that will together protect surface waters from discharges of wastewater in the project area

Secondary impacts of growth, which may be facilitated by the proposed IBT, on water quality will also be mitigated through compliance with federal and state regulations as well as local regulations and programs such as open space preservation, land use planning, growth management, riparian buffers, and pollution prevention programs. The applicants have taken a number of steps to address Governor Hunt's Smart Growth and Open Space initiatives. A summary of measures to mitigate adverse impacts is included in Appendix C.

3.3.4 Fish and Wildlife Resources

In total, there appears to be a significant number of rare natural communities, Significant Natural Areas, and sensitive species potentially existing in the source basin project area, as well as a substantial number of recreational fishery species. Results of the CFRBM indicate that the proposed IBT will not significantly alter lake elevations or minimum lake releases compared to the other alternatives or the Base Future scenario. Therefore, no direct impacts of the proposed IBT on aquatic and terrestrial resources that inhabit lake or streamside habitat, including aquatic and wetland plants, freshwater mussels, and fisheries in the source basin, are expected. Also, the proposed transfer does not require the construction of additional water intake structures in Jordan Lake and therefore will not cause any direct impacts to fish or wildlife resources.

However, there may be secondary impacts on fish and wildlife resources through increased growth and development, which may be facilitated by the proposed IBT. Fish and wildlife may be impacted by changes in the following:

- Water quality
- Stormwater runoff
- Frequency and intensity of flooding
- Land use

Mitigation measures for secondary impacts are presented in Appendix C.

3.3.5 Navigation

No direct impacts of the proposed IBT on navigation in the receiving basin are expected since results of the CFRBM indicate that lake levels in Jordan Lake and flows in the Cape Fear River are similar to those in other EIS alternatives and the Base Future scenario. Model results suggest that impacts on lake elevations and downstream flows may be expected during drought conditions and as water supply withdrawals from Jordan Lake increase from 1998 levels to the design yield of approximately 100 mgd. These impacts are not associated with the proposed IBT, but with the full use of Jordan Lake's water supply.

3.3.6 Recreation

The proposed IBT will not have any direct impacts on recreation in the Haw River subbasin, since no construction is planned for the proposed IBT. No recreational lands will be subject to additional threats of flooding as a direct result of the proposed IBT. The proposed IBT

will not impact recreation on Jordan Lake since results of the CFRBM indicate that lake levels and downstream flows in the Cape Fear River will not be significantly altered compared to other EIS alternatives and the Base Future scenario.

3.4 Present and Future Impacts on the Neuse River Subbasin (Receiving Basin)

This section summarizes the findings of the EIS regarding the present and future impacts within the Neuse River subbasin on the following:

- Water quality
- Wastewater assimilation
- Fish and wildlife
- Navigation
- Recreation
- Flooding

A summary of measures to mitigate adverse impacts is included in Appendix C.

3.4.1 Water Quality

The proposed IBT will not result in an increase of existing permitted wastewater flows being discharged into the receiving basin. No increase in wastewater treatment plant capacity will be requested in the Neuse River Basin as the result of this transfer, since current permitted discharge amounts are adequate. Primary impacts due to the wasteflows of the wastewater facilities receiving the transfer of water have been addressed through previous NPDES permitting and NCEPA processes for those facilities discharging into the receiving basin (i.e. Crabtree Creek and Middle Creek). Both the NPDES and NCEPA rules require that all environmental impacts must be adequately addressed and mitigated before any permit to discharge is issued.

Water quality modeling analyses have been previously conducted in Crabtree Creek and Middle Creek to determine the water quality impacts of existing and proposed discharges in those streams (Diehl & Phillips, 1993; DWQ, 1992). Wasteload allocations and current oxygen-consuming management strategies for facilities discharging into these streams have been based on those modeling analyses. In addition, the DWR conducted studies on flooding, streambank erosion, and fish habitat in both Crabtree Creek and Middle Creek (DWR, 1985; DWR, 1987). These studies concluded that there was not a significant impact on water quality, flooding, streambank erosion, and fish habitat due to currently permitted wasteflows.

However, there may be secondary impacts in the Neuse River subbasin related to additional growth and development, which may be facilitated by the proposed IBT increase. Growth in the study area is fueled by a strong local economy, as well as proximity to Research Triangle Park and its top-notch universities and state-of-the-art medical and research facilities. The proposed IBT will provide additional water supply to support continued growth and development. Similar to the source basin (see Section 3.3.3), dense urban development from full buildout (worst-case scenario) of the Utility Service Area may affect water quality in the Neuse River subbasin through sedimentation and erosion from

construction activities, increased amounts of non-point source pollution, and increased stormwater runoff and more frequent flooding.

Secondary impacts on water quality related to additional growth and development, which may be facilitated by the proposed IBT increase, will be mitigated through compliance with federal and state regulations as well as local regulations, programs, and initiatives such as:

- Open space preservation
- Land use planning
- Growth management
- Riparian buffers
- Pollution prevention programs
- Construction of regional water and wastewater facilities

A summary of measures to mitigate adverse impacts is included in Appendix C.

3.4.2 Wastewater Assimilation

No wastewater treatment plants in the Neuse River subbasin will be expanded and no additional treatment facilities will be constructed as a result of the proposed IBT.

Additional wastewater treatment facilities for the study area are being planned that will discharge to the Cape Fear River subbasin. Direct impacts on wastewater assimilation from the proposed IBT are not expected since previous water quality modeling analyses conducted in Crabtree Creek and Middle Creek determined that currently permitted wastewater discharges have no significant impact on water quality, flooding, streambank erosion, or fish habitat (Diehl & Phillips, 1993; DWQ, 1992; DWR, 1985; DWR, 1987).

3.4.3 Fish and Wildlife Resources

In total, there appears to be a significant number of rare natural communities, Significant Natural Areas, anadromous species, and threatened or endangered species existing in the receiving basin project area, as well as a substantial number of recreational fishery species. The proposed IBT will not have any significant direct impacts on fisheries, wildlife, or sensitive species or their habitats in the receiving basin since the additional amount of wastewater planned to be discharged from the Cary and Apex WWTPs as a result of the proposed IBT will not require existing plants to be expanded. Although the total amount of treated effluent discharged from these plants will increase as a result of the proposed IBT, these discharges will not exceed their current permit limits. In addition, these facilities are required to reduce total nitrogen by 30%, as per the Neuse River NSW Management Strategy Rules. There will therefore be no significant water quality impacts to the receiving basin as a direct result of the proposed IBT. The effects of increased flows in the receiving basin were analyzed at the time the original NPDES permits were issued. Specifically, DWR conducted studies to determine instream flow needs for fish habitat in Crabtree Creek and Middle Creek. The studies concluded that the current permitted wasteflows for the Cary WWTPs would not exert a significant impact on fish habitat (DWR, 1985; DWR, 1987). The proposed IBT will also not have any direct impacts on fish or wildlife or natural areas in the receiving basin due to construction since no construction for the proposed IBT is planned.

However, there may be secondary impacts on fish and wildlife resources through increased growth and development, which may be facilitated by the proposed IBT as discussed in Section 3.3.4. Additional growth and development in the receiving basin may impact water quality, stormwater runoff, frequency and intensity of flooding, and land use. Mitigation

measures for secondary impacts related to growth and development are similar to those discussed in Section 3.3.3 and presented in Appendix C.

3.4.5 Navigation

No direct impacts of the proposed IBT on navigation in the Neuse River subbasin are expected since streamflows in the Neuse River subbasin are not expected to change significantly. No expansion of existing WWTPs or construction of new wastewater plants is planned within the receiving basin.

3.4.6 Recreation

The proposed IBT will not have any direct impacts on recreation in the Neuse River subbasin. Increased wastewater discharges into Middle and Crabtree Creeks as a result of the proposed IBT will be within existing permit limits and will not significantly affect recreational resources along the receiving stream corridors. No recreational lands will be subject to additional threats of flooding as a direct result of the proposed IBT.

3.4.7 Flooding

The proposed IBT will not have any direct impacts on flooding in the Neuse River subbasin. Increased wastewater discharges into Middle and Crabtree Creeks as a result of the proposed IBT will be within existing permit limits and will not significantly affect streamflows and flooding along the receiving stream corridors.

However, there may be secondary impacts within the receiving basin related to growth and development which may potentially increase both stormwater runoff from construction activities and impervious surface area and result in a higher risk of flooding. A summary of measures to mitigate adverse impacts is included in Appendix C.

3.5 Impoundment Storage

Cary, Apex, Morrisville, and RTP South plan to use existing and requested water supply allocations from Jordan Lake, and the Cary/Apex WTP does not have an impoundment onsite. Therefore, the plans to use impoundment to store water at high flows for use during low-flow periods is not applicable to this IBT petition.

3.6 Jordan Lake Purposes and Water Supply Allocations

Jordan Lake is a multi-purpose lake located in Chatham County, North Carolina operated by the U.S. Army Corps of Engineers (ACOE). The construction of the dam started in 1967 and Jordan Lake completed filling in 1982, covering an area of 14,300 acres. Jordan Lake Dam is located on the Haw River just downstream of the confluence of the Haw River and the New Hope Creek.

Jordan Lake is designed to provide for water supply, recreation, flood control, fish and wildlife management, and flow augmentation to maintain downstream Cape Fear River water quality during natural low flow periods. The water supply component of the Jordan Lake storage volume is estimated to provide a safe yield of 100 mgd. The State of North Carolina has been assigned the use of the entire water supply storage in Jordan Lake. The

DWR receives and reviews requests for water supply allocations and makes recommendations to the EMC.

Currently Chatham County, Cary/Apex, Holly Springs, and OWASA have allocations for water supply from Jordan Lake (Table 10). During the second round of allocations in 1996, Cary, Apex, Morrisville, and Wake County requested additional or new water supply allocations from Jordan Lake. Although the DWR recommended additional allocations in 1997 for Cary/Apex, Morrisville, and RTP South as shown in Table 9, the allocations are contingent upon the issuance of an IBT certificate by the EMC, as requested in this petition.

TABLE 10
DWR Jordan Lake Water Supply Allocation Recommendations

Applicant	Current Allocations (mgd)		DWR Recommendation (mgd)	
	Level I	Level II	Recommendation	Total ¹
Chatham Co.	4.0	2.0	0	6.0
Durham			0	0
Fayetteville			0	0
Greensboro			0	0
Holly Springs	2.0 ²		0	2.0
Cary-Apex ²	16.0		5.0	21.0
Morrisville ²			2.5	2.5
Wake County/RTP ²			1.5	1.5
OWASA		10.0	0	10.0
Orange Co.		1.0	0	1.0
Total	22.0	13.0	9.0	44.0

Notes:

¹Total allocations if all DWR recommendations are approved.

² DWR recommended a 0.5mgd allocation in 1997. Holly Springs has since then requested and been granted an allocation of 2.0 mgd.

³Allocation contingent on obtaining IBT certification. The recommendations provided are for informational purposes and public comment only at this time.

Source: NC Division of Water Resources, 1997

The use of the requested IBT amount to meet water supply demands through 2030 is based on obtaining additional allocations from Jordan Lake. The applicants will be participating in the recently initiated third round allocation process.

3.7 Other Considerations

3.7.1 Regional Water Supplier

The Towns of Cary and Apex currently provide and plan to continue to provide the Town of Morrisville, the RDU International Airport, and the Wake County portion of RTP with finished water. Although Morrisville and Wake County have requested water supply allocations from Jordan Lake and are included in this IBT petition, they do not own or operate raw water intake or water treatment facilities, and must purchase 100 percent of

their finished water. Therefore, Cary and Apex will continue to treat raw water from Jordan Lake at the Cary/Apex WTP to provide Morrisville and Wake County their water supply allocations from Jordan Lake.

3.7.2 Water Conservation and Reuse

The Town of Cary has an active water conservation program with a goal to reduce per capita water demand by 20 percent by 2015 (from the 1998 level). In 1996, Cary adopted a Water Conservation Ordinance as part of its Water Shortage Response Plan that determines certain conditions in which the Town can implement water restrictions for various levels of water emergencies. The Town of Cary also has a permanent Water Conservation Specialist and adopted a Water Conservation Demand Management Program. In April 2000, Cary enacted an ordinance restricting outdoor irrigation to alternate days for customers served by the Town, and prohibiting outdoor irrigation on Mondays. Cary has an increasing block rate that discourages excessive use of potable water for irrigation through higher water rates for higher levels (blocks) of consumption.

Cary is also planning to implement a water reclamation and reuse program at its North Cary WWTP. The reclamation and reuse program is expected to reduce maximum day demands by 1.6 mgd by 2002, increasing to 3.2 mgd by 2015 by supplying treated wastewater to customers for non-potable uses such as irrigation and cooling tower makeup water. Several major customers have agreed to participate in the program and Phase I has been designed and permitted. Additionally, Cary designed a water reuse project at the South Cary WWTP with projected reuse demands of approximately 0.6 mgd MDD in 2001. Several parks, schools, and ball fields have been identified as potential reuse customers. Therefore, the implementation of water reuse at both plants is expected to reduce the MDD by 2.2 mgd in 2002 and 3.8 mgd in 2015. This system is currently permitted and is under design.

The Town of Apex adopted a Water Conservation Ordinance that mandates certain water conservation measures whether or not a water shortage exists. In addition, the Town Manager may initiate and enforce five stages of conservation ranging from voluntary, different levels of mandatory, and finally, rationing. As of July 20, 1999, Apex no longer offers irrigation meters to customers, and the rate for existing irrigation customers was increased to \$4.65/1000 gallons. The Town of Apex is also pursuing a water reclamation program at the Apex WWTP. Reuse opportunities with local industries such as Cooper Tools and Ready-Mix have been identified which have a potential demand of approximately 0.1 mgd.

The Town of Morrisville has also adopted an ordinance establishing water shortage conservation measures. The Town Manager is authorized to adopt and enforce water conservation measures when it has been determined that an emergency exists in Morrisville. In addition, contract terms specify that Morrisville must implement any conservation measures implemented by Cary.

RTP South does not own or operate the water system that serves those customers. Since RTP South has a contract to purchase treated water from the Town of Cary, RTP South must implement any water conservation measures that the Town of Cary puts into effect.

SECTION 4

Compliance and Monitoring Plan

The proposed compliance and monitoring plan for the requested Cary/Apex interbasin transfer certificate includes the following four elements, which are described in the sections below:

1. Monthly Reports
2. Annual Reports
3. Status Reports
4. Drought Management Reporting and Coordination

The details of monitoring and compliance will be specified in a Compliance and Monitoring Plan approved by DWR. 4.1 Monthly Reports

At the end of each month, Cary/Apex will calculate the daily interbasin transfer amounts for that month and provide this information to DWR in monthly reports. The reports will be submitted to DWR on the same schedule that Daily Monitoring Reports for water reclamation facilities are provided to the Division of Water Quality - within 30 days of the end of the month.

Figure 2 provides an example of the calculations that will be submitted. The calculation methodology was developed in conjunction with DWR staff, and is based on the guidance developed by DWR for estimating interbasin transfer amounts as part of the Local Water Supply Planning process.

Consumptive use for each day is assumed to be the difference between total water use and total wastewater discharged, or zero if discharge is greater than potable water use. This may underestimate consumptive use in the winter months (when water use is typically lower than wastewater discharge), but the effect will be to slightly overestimate the resulting IBT amount. When discharge is greater than water use, the portion of raw water withdrawal that is discharged as wastewater in each basin is assumed to be proportional to the actual wastewater discharges in that basin. In effect, this is assuming that the same degree of inflow and infiltration occurs in the sewer system in each basin. These assumptions will not impact evaluation of compliance with the requested IBT certificate, since the maximum IBT is expected to occur in the summer.

The portion of consumptive use that occurs in the source basin will be estimated as the portion of the water service area in the source basin, and will be updated annually to reflect changes to the service area.

FIGURE 2.
Sample Daily Calculations for Interbasin Transfer

DATE	Raw Water Withdrawal from Haw Basin (mgd)	Water Purchase from Neuse Basin (mgd)	Consumptive Use (mgd)		Portion of Water Use Discharged as Wastewater (mgd)		Total Return to Haw Basin (mgd)	Interbasin Transfer (mgd)	IBT as % of Withdrawal	
			Haw Basin	Neuse Basin	Haw Basin	Neuse Basin				
05/01/00	5.6	6.3	0.2	0.0	0.1	11.7	0.2	5.4	96%	
05/02/00	6.3	7.2	0.8	0.0	0.1	12.5	0.9	5.4	86%	
05/03/00	6.2	7.0	0.6	0.1	0.1	12.4	0.7	5.5	89%	
05/04/00	6.7	7.1	0.9	0.5	0.1	12.2	1.0	5.7	85%	
05/05/00	8.7	7.0	2.0	1.6	0.1	12.0	2.1	6.6	76%	
05/06/00	9.6	7.0	1.9	2.5	0.1	12.0	2.0	7.5	79%	
05/07/00	11.5	7.0	2.8	3.4	0.1	12.3	2.9	8.7	75%	
05/08/00	8.4	7.5	1.8	1.6	0.1	12.3	1.9	6.5	77%	
05/09/00	10.0	8.4	3.2	4.4	0.1	10.7	3.3	6.8	67%	
05/10/00	11.6	8.5	3.3	2.8	0.1	13.8	3.4	8.2	71%	
05/11/00	10.2	8.4	2.5	4.0	0.1	12.0	2.6	7.6	75%	
05/12/00	12.1	8.3	3.6	4.7	0.1	12.0	3.7	8.4	69%	
05/13/00	12.7	8.4	4.0	5.2	0.1	11.8	4.1	8.6	68%	
05/14/00	14.1	8.3	4.9	5.9	0.1	11.5	5.0	9.1	65%	
05/15/00	9.1	8.3	3.2	2.2	0.1	11.9	3.2	5.9	64%	
05/16/00	11.1	8.7	3.5	4.6	0.1	11.6	3.6	7.5	68%	
05/17/00	11.1	8.7	3.7	4.3	0.1	11.7	3.8	7.3	66%	
05/18/00	11.7	7.8	3.3	4.2	0.1	11.9	3.4	8.3	71%	
05/19/00	14.2	8.6	4.6	6.3	0.1	11.7	4.7	9.5	67%	
05/20/00	13.4	8.9	4.6	5.6	0.1	12.0	4.6	8.7	65%	
05/21/00	10.2	9.0	3.4	3.1	0.1	12.6	3.5	6.7	65%	
05/22/00	5.2	9.1	1.1	0.3	0.1	12.9	1.2	4.0	78%	
05/23/00	7.4	9.0	2.0	2.3	0.1	12.0	2.1	5.3	71%	
05/24/00	9.8	9.0	3.0	3.9	0.1	11.8	3.1	6.7	69%	
05/25/00	10.1	9.1	3.1	4.0	0.1	12.0	3.2	6.9	68%	
05/26/00	12.0	9.0	4.4	5.1	0.1	11.5	4.5	7.5	63%	
05/27/00	10.9	9.1	4.3	4.3	0.1	11.3	4.4	6.5	59%	
05/28/00	8.7	9.1	3.1	3.3	0.1	11.3	3.2	5.5	63%	
05/29/00	5.7	9.1	1.9	0.7	0.1	12.1	2.0	3.7	64%	
05/30/00	6.9	9.2	1.7	2.5	0.1	11.8	1.8	5.2	74%	
05/31/00	9.6	9.0	2.8	4.3	0.1	11.4	2.9	6.7	70%	
Minimum									3.7	
Maximum									9.5	
Average	9.7	8.3	2.8	3.2	0.1	12.0	2.9	6.8	70%	

4.2 Annual Reports

At the end of each calendar year, the monthly IBT reports will be summarized in an annual report to DWR. The annual report will also document compliance with conditions, if any, that the EMC includes in the certificate.

4.3 Status Reports

At the end of each calendar year, if requested by DWR, Cary/Apex will provide status reports on specific measures or other activities discussed in the EIS or IBT petition. DWR will identify the specific measures/activities to be addressed. One example of an activity to be included would be the applicants' progress toward returning water to the Cape Fear basin.

4.4 Drought Management Reporting and Coordination

When one or more of the allocated Jordan Lake water supply pools for Cary/Apex, Morrisville, or Wake County/RTP falls below the level needed to sustain demands for 63 days, Cary/Apex will notify DWR of drought management measures being implemented, and will begin coordinating drought management activities with DWR staff.

SECTION 5

Drought Management Plan

The Towns of Cary, Apex, and Morrisville have adopted Water Shortage Response Plans to provide the Towns with the authority to establish water conservation measures during droughts or other water emergencies. These water shortage conservation policies of each Town are summarized below.

5.1 Town of Cary

In 1996 the Town of Cary adopted a Water Shortage Conservation Ordinance which authorizes the Town Manager to enact voluntary conservation measures, mandatory conservation measures, or water shortage emergency measures depending on the extent of the water emergency. The ordinance also defines three classes of water users. Class 1 is: essential water use. Class 2 represents socially or economically important water use, and Class 3 is non-essential water use.

Cary's Water Shortage Conservation Ordinance defines the various levels of conservation that can be enacted by the Town Manager, which are described below. Following DWR's guidance in the *Water Shortage Response Handbook for North Carolina Water Supply Systems* (1998), the Town of Cary will evaluate the need for implementing water conservation or proceeding to the next level of conservation when the following thresholds of storage in the Town's Jordan Lake water supply allocation are reached:

1. Voluntary conservation measures (63 days storage remaining).
2. Mandatory conservation measures (49 days storage remaining) – encourage voluntary water conservation measures, and shall impose a scheduled water use program or an outright ban on all Class 3 uses.
3. Water shortage emergency measures (28 days storage remaining) – Class 1 essential water uses shall be specifically identified as targets for voluntary conservation measures. Class 2 socially or economically important uses may be restricted or banned, and Class 3 nonessential uses shall be restricted or banned.
4. Rationing (14 days storage remaining) – The Manager can direct the Director of Public Works and Utilities to prepare a mandatory rationing policy and implementation plan during the emergency period to balance demand and limited available supplies and to assure that sufficient water is available to preserve public health and safety.

Table 11 summarizes the percent of remaining storage from the Cary/ Apex Jordan Lake water supply pool.

TABLE 11.
Jordan Lake Water Supply Pool Conservation Thresholds for Cary/Apex

Average Day Demand from Jordan Lake (mgd)	Days of Storage in Cary/Apex Water Supply Pool Remaining			
	63	49	28	14
	Percent water supply storage remaining			
14.0	28%	22%	13%	6%
16.0 (existing allocation)	32%	25%	14%	7%
18.0	36%	28%	16%	8%
20.0	40%	31%	18%	9%
21.0 (recommended allocation)	42%	33%	19%	9%

Upon a declaration of mandatory conservation or a declaration of water shortage emergency, the City Council may adopt water shortage rates designed to encourage conservation of water. The Town also includes provisions for enforcing mandatory water conservation and provisions for fining violators of the Town’s policy.

In April 2000, Cary adopted an ordinance restricting outdoor irrigation to alternate days. The outdoor irrigation schedule is determined by the customers’ street address.

The Town of Cary has also developed a methodology for tracking water demand and water supply to evaluate the Town’s ability to meet water demand on a daily basis. Cary uses an indicator called the Available Water Index (AWI). The AWI represents a measure of the available treated water on a given day stored in the Town's elevated water tanks and ground storage reservoir at the water treatment plant. The AWI informs Town staff when there is a trend toward critically low storage levels so that corrective action can be taken for the protection of public health and safety. The AWI normally ranges between 60 and 80, but when the AWI falls below 50, the Town takes immediate action to reduce demand and ensure water system viability.

5.2 Town of Apex

In June 2000, the Town of Apex adopted a revised version of the February 1999 Water Conservation Ordinance. The Ordinance outlines permanent conservation measures that are required at all times. The Ordinance also stipulates conservation measures when the various stages of conservation are enacted by the Town Manager in response to a water shortage. The Town Manager will assess a potential water shortage and evaluate the need for implementing water conservation or proceed to the next stage of conservation when the following thresholds of water supply storage from the Town’s Jordan Lake allocation have been reached:

- Stage I (Voluntary Conservation) – 63 days storage remaining
- Stage II (Moderate Mandatory Conservation) and Stage III (Severe Mandatory Conservation) – 49 days storage remaining
- Stage IV (Stringent Mandatory Conservation) – 28 days storage remaining
- Stage V – Rationing – less than 14 days remaining.

Table 11 summarizes the levels of Jordan Lake water supply allocation at the various thresholds in which water conservation measures should be considered.

The Town's revision to the ordinance in 2000 includes the promotion of voluntary outdoor irrigation on alternate days (similar to Cary's policy above). Properties with odd-numbered addresses can irrigate on Tuesdays, Thursdays, and Saturdays, while properties with even-numbered addresses can irrigate on Wednesdays, Fridays, and Sundays.

5.3 Town of Morrisville

The Town of Morrisville adopted a Water Shortage Conservation Ordinance in 1995 that authorizes the Town Manager to adopt and enforce water conservation measures when a water shortage from extended drought or emergency involving the Town's treated water supply or distribution system exists. In addition, Morrisville is required by contract terms to implement any conservation measures adopted by Cary.

The Town Manager can impose conservation measures on all customers of the Town's water system. Potential water conservation measures that may be implemented include restriction of:

- Certain business and industrial water uses
- Irrigation
- Washing of vehicles, equipment, outdoor surfaces, buildings and machinery
- Water use in ornamental fountains and swimming pools
- Conservation measures also include provisions for implementing schedules for certain water uses and interruption of water service.

The Town Manager will assess a potential water shortage and evaluate the need for implementing water conservation or proceed to the next stage of conservation when the following thresholds of water supply storage from the Town's Jordan Lake allocation have been reached:

- 63 days storage remaining
- 49 days storage remaining
- 28 days storage remaining
- less than 14 days remaining.

Table 12 summarizes the levels of Jordan Lake water supply allocation at the various thresholds in which water conservation measures should be considered.

TABLE 12

Jordan Lake Water Supply Pool Conservation Thresholds for the Town of Morrisville

Average Day Demand from Jordan Lake (mgd)	Days of Storage in Morrisville Water Supply Pool Remaining			
	63	49	28	14
Percent water supply pool remaining				
0.5	8%	7%	4%	2%
1.0	17%	13%	8%	4%
1.5	25%	20%	11%	6%
2.0	34%	26%	15%	8%
2.5 (requested allocation)	42%	33%	19%	9%

5.4 RTP South

RTP South does not own or operate a water system, but rather purchases treated water from the Town of Cary. RTP South is contractually obligated to implement any water conservation measures that the Town of Cary puts into effect. Therefore the Town of Cary Drought Management Plan also applies to RTP South.

Table 13 summarizes the levels of Jordan Lake water supply allocation at the various thresholds in which water conservation measures should be considered.

TABLE 13

Jordan Lake Water Supply Pool Conservation Thresholds for RTP South

Average Day Demand from Jordan Lake (mgd)	Days of Storage in RTP South Water Supply Pool Remaining			
	63	49	28	14
Percent water supply pool remaining				
0.50	14%	11%	6%	3%
0.75	21%	16%	9%	5%
1.00	28%	22%	13%	6%
1.25	35%	27%	16%	8%
1.50 (recommended allocation)	42%	33%	19%	9%

SECTION 6

References

CH2M HILL. August 2000. Final Environmental Impact Statement for RTP South and the Towns of Cary, Apex, and Morrisville in Wake County for the Increase in Interbasin Transfer from the Haw River Basin to the Neuse River Basin.

Diehl & Phillips. 1993. DRAFT Environmental Impact Statement – Expansion of North Cary Wastewater Treatment Plant. Cary, NC.

North Carolina Division of Water Quality. 1992. A Water Quality Analysis of the Proposed and Existing Discharges to Middle Creek below Sunset Lake. Raleigh, N.C.

North Carolina Division of Water Resources. 1985. Memorandum on the Proposed Cary WWTP discharge to Crabtree Creek dated August 30, 1985.

North Carolina Division of Water Resources. 1987. Potential Effects of Proposed Wastewater Discharges to Middle Creek on Flooding, Streambank Erosion, and Fish Habitat. Raleigh, N.C.

North Carolina Division of Water Resources. 1998. Water Shortage Response Handbook for North Carolina Water Supply Systems.

North Carolina Division of Water Resources. 1999. Draft of IBT write-up for the Cape Fear River Basinwide Water Quality Management Plan.

APPENDIX A

Record of Decision for the Final EIS

The Record of Decision (ROD) for the FEIS should be completed by early October and will be attached to this IBT Petition.

APPENDIX B

Resource Agency and Stakeholder Comments

TABLE B-1
State Clearinghouse Scoping Process Summary

Agencies/Organizations	Date of Comment Submittal		Concerns Addressed in Letter ¹	Section of EIS Where Concerns are Addressed
City of Dunn	Memorandum dated:	October 9, 1997	Cape Fear River water quality; impact on downstream users	3.1.4.4; Section 6
Granville County, NC	Correspondence dated:	September 25, 1997	No comment	
Harnett County Department of Public Utilities	Letter dated:	October 7, 1997	Impacts on downstream users	3.1.4.4
North Carolina Department of Cultural Resources	Correspondence dated:	October 7, 1997	No comment	
DENR: NC Division of Water Resources	Scoping Document		Scoping Document attached	EIS prepared in accordance with Scoping Document
DENR: NC Division of Water Resources	Memorandum dated:	November 10, 1999 ²	Guidance on preparation of the EIS	EIS prepared in accordance with provided guidance
DENR: NC Division of Parks & Recreation	Letter dated:	November 10, 1999 ³	Secondary and cumulative impacts; Cape Fear shiner; dwarf-wedge mussel; alternatives; mitigation	3.1.3; 3.2.3; Section 4; Section 5; and Section 6

TABLE B-1
State Clearinghouse Scoping Process Summary

Agencies/Organizations	Date of Comment Submittal	Concerns Addressed in Letter¹	Section of EIS Where Concerns are Addressed
DENR: Division of General Services (Natural Heritage Program)	Memorandum dated: October 15, 1997	Direct effects; secondary impacts	3.1.3.2; 3.2.3.1; Section 4; Section 6
North Carolina Wildlife Resources Commission	Memorandum dated: October 10, 1997	Increased effluent in Neuse River (?); impacts on federally and state listed species in receiving basin; secondary impacts; habitat loss; potential impacts on recreation, sport fisheries and water quality in source basin; wetland impacts; West Cary WWTP water quality impacts	1.2; 2.3; 3.1.3.; 3.2.3.; 3.1.4.4; 3.2.4.2; 3.1.2.2; 3.1.1.2; 3.2.1.2; Section 4; Section 6
Public Works Commission of the City of Fayetteville	Letter dated: June 23, 1997	Hydrologic Modeling; Increased effluent in Neuse River (?); secondary/cumulative impacts; adherence to SEPA;	Appendix B; 1.2; 3.2.4.2; Section 4; Appendix B (Scoping Document); 3.1.4.2
Public Works Commission of the City of Fayetteville	Letter dated: October 9, 1997	Secondary impacts; additional effluent to Neuse River; water need; safe yield; Cape Fear River assimilative capacity; alternatives	Section, 4; 1.2; 3.2.4.2; Section 2; Appendix B; 3.1.4.4; Section 5
Public Works Commission of the City of Fayetteville	Letter dated: November 8, 1999 ²	Modeling scenarios; cumulative impacts; alternatives	Appendix B; Section 4; Section 5

Notes:

¹ Comment letters included in Appendix C of FEIS.

² Not part of the Clearinghouse Scoping Process.

³ Agency Response on additional request for comments on EIS process in Fall 1999.

TABLE B-2
Resource Agencies Contacted Directly

Resource Agencies Contacted	Mode of Contact	Major Concerns/Issues Addressed ¹	Section of EA Where Concerns are Addressed
National Marine Fisheries Service	Telephone Record dated: May 5, 1997 Meeting: (*) March 4, 1998	Impacts on anadromous fish; include short nose sturgeon as species of concern	3.1.3; 3.2.3
NC Department of Cultural Resources	Correspondence dated: June 10, 1998 June 21, 1999	Majority of resources not affected by IBT	3.1.2.2; 3.2.2.2
NC Division of Coastal Management	Telephone Record dated: May 6, 1997	Recommended to work through Melba McGee	
NC Division of Marine Fisheries	Meeting: May 28, 1997 (Raleigh)	Impacts on anadromous fish; include American shad as species of concern	3.1.3; 3.2.3
	Meeting: (*) March 5, 1998 (Washington)	Include hickory shad, striped bass, shortnose sturgeon and Atlantic sturgeon as species of concern	
	Meeting: (*) March 5, 1998 (Wilmington)	Impacts on anadromous fish	
NC Division of Parks & Recreation	Meeting: May 8, 1997	Include warf wedge mussels, squaw foot mussels, Atlantic pig-toe mussels, Cape Fear Shiner and Bald Eagle as species of concern; Increased effluent from Cary WWTPs (?)	3.1.3; 1.2; 3.1.2.2; 3.1.4.4;
	Meeting: June 5, 1997	Impacts of IBT on lake surface elevations/recreation	
	Meeting: (*) March 4, 1998	Include <i>Gomphus septima</i> , <i>Phacelia ranunculacea</i> and <i>Ptilimnium nodosum</i> as species of concern. Consult NHP surveys conducted by Legrand	
NC Division of Pollution Prevention	Meeting: May 27, 1997	Water reuse and conservation	2.2; 2.3; Section 6

TABLE B-2
Resource Agencies Contacted Directly

Resource Agencies Contacted	Mode of Contact		Major Concerns/Issues Addressed ¹	Section of EA Where Concerns are Addressed
NC Division of Water Quality	Meeting:	May 30, 1997 & June 12, 1997	No expansion of existing WWTPs needed; wetlands; secondary impacts (meeting documentation is not available)	1.2; 3.1.1.2; 3.2.1.2; Section 4
NC Wildlife Resources Commission	Meeting:	(*) March 4, 1998	Secondary impacts, riparian buffers, gamelands buffers, greenways	Section 4; 3.1.2; 3.2.2
US Army Corp of Engineers	Meeting: Informal Meeting:	May 13, 1997 & March 4, 1998	Water withdrawal will have no impact on current operations of the lake; Cape Fear River water quality	3.1.4.4; Section 6
US Fish and Wildlife Service	Telephone Record dated:	May 6, 1997	No biological data concerning instream flows needs.	3.1.3; 3.2.3
	Meeting:	(*) March 4, 1998	Threatened/endangered species	

Note:

¹ Comments and correspondence from resource agencies and stakeholders are included in Appendix C of the FEIS (CH2M HILL, 2000).

* The last document in this Appendix, Cary IBT Agency Meeting Summary dated March 9, 1998, represents meetings with various agencies as referenced in this table.

TABLE B-3
 Summary of Major DENR Comments on Draft EIS (March 1, 2000)

Agencies Concerned	Major Comment ¹	Section of EIS Where Concerns are Addressed
DENR, Division of Water Quality, Division of Parks and Recreation, Wildlife Resources Commission, Division of Forest Resources	Preserve Open Space to meet Governor Hunt's goal of conserving 20% open space, to preserve wildlife, meet recreation needs, conserve forest land and protect water quality	6.2.1.1, 6.2.1.2, 6.2.1.3, 6.2.1.4
DENR, Division of Parks and Recreation	Establish a regional greenway system to connect greenways and parks	6.2.1.5
DENR, Division of Water Quality, Division of Parks and Recreation, Wildlife Resources Commission	Maintain and restore wetlands and riparian buffers to protect water quality and wildlife.	6.2.2.1, 6.2.2.2
DENR, Wildlife Resources Commission	Regulate development in the floodplain	6.2.3.3
DENR, Division of Water Quality	Consolidate water and wastewater in Western Wake County to minimize future IBTs	2.3, 6.2.4
DENR	Develop local policies to encourage water conservation and reuse	6.2.3.4, 6.2.3.5
DENR, Division of Water Quality	Develop local policies to prevent water pollution	6.2.3

Note:

¹ Comments and correspondence from resource agencies and stakeholders are included in Appendix C of the FEIS (CH2M HILL, 2000).

TABLE B-4
Public Comment Summary

Name/Organization	Date of Comment Submittal	Summary of Comments ¹	Section of Response Summary Where Comments are Addressed	
Mick Noland, Chief Operating Officer for City of Fayetteville Public Works Commission	Statement at public hearing: July 13, 2000	- IBT amount assumes construction of a proposed regional wastewater treatment plant with discharge to the Cape Fear River	III.A	
		- The alternative to purchase water from Raleigh should be reevaluated	II.A	
		- The model does not simulate the low flow conditions experienced in 1998	I.A	
		- The Jordan Lake water quality pool is insufficient for downstream water quality needs	I.B	
		- The current safe yield estimate of 100 mgd from Jordan Lake is questionable	I.C	
		- EIS needs to provide information on whether the cumulative impacts of all water withdrawals and transfers are acceptable	I.D	
		- EIS should be evaluated objectively without consideration of construction already underway on water treatment plant	IV.F	
John Malzone, Cumberland County Chamber of Commerce	Statement at public hearing: July 13, 2000	- IBT may inhibit growth in the Fayetteville region	I. M	
Elton Hendricks, President of Methodist College	Statement at public hearing: July 13, 2000	- If aggressive conservation was used as an assumption in the IBT, there may be significant direct impacts	III.B	
		- Triangle should put the water back in the Cape Fear River after they use it.	I.E, IM, II.B	
Senator Tony Rand, 24 th District	Letter dated:	July 13, 2000	- Triangle communities should put water back in Cape Fear River after they remove it	I.E, I.M, II.B
Lura S. Tally, former member of North Carolina Senate	Letter dated:	July 7, 2000	- If Triangle communities do not replace water they remove from Cape Fear, they will cause problems downstream	I.E, I.H
Rollin S. Shaw, City Council	Correspondence dated:	July 30, 2000	- Cary should return water it removes from the Cape Fear	I.E, I.M, II.B

TABLE B-4
Public Comment Summary

Name/Organization	Date of Comment Submittal	Summary of Comments ¹	Section of Response Summary Where Comments are Addressed
Member, Fayetteville and Dr. Frank S. Shaw			
David Brook, Deputy State Historic Preservation Officer, NC Department of Cultural Resources	Memorandum dated: July 3, 2000	- IBT will not impact property eligible for listing in National Register of Historic Places	N/A
Rick Givens, Chairman, Chatham County Board of Commissioners	Letter dated: July 18, 2000	- Downstream users need assurance that there will be adequate water supply and adequate water quality	I.B, I.E, I.H
Larry B. Thomas, Director of Public Works, City of Sanford	Letter dated: July 20, 2000	- Transfer of water will have negative environmental impact on Cape Fear River Basin. Each transfer should not be reviewed individually. - Transfer of water will have negative economic impact on Cape Fear River Basin	I.B, I.D, I.E I.B, I.C, I.E
Mick Noland, Chief Operating Officer of Water Resources Division, Public Works Commission, City of Fayetteville	Letter dated: July 27, 2000 *	- Future agricultural water withdrawals should be described. - Randleman Lake should be simulated in the model - A modeling scenario should be included that compares the proposed alternative, with only current and recommended Jordan Lake allocations, to the Base 1998 case.	I.J I.K I.L
Hugh T. Caldwell, Director of Public Utilities, City of Wilmington	Letter dated: July 27, 2000	- The proposed IBT may impact downstream water quality and assimilative capacity - The EIS did not consider the affects of Durham obtaining an allocation from Jordan Lake	I.E, I.H I.O

TABLE B-4
Public Comment Summary

Name/Organization	Date of Comment Submittal		Summary of Comments ¹	Section of Response Summary Where Comments are Addressed
Rodney Tart, Director, Harnett County Department of Public Utilities	Letter dated:	July 31, 2000	- EIS indicates there will be minimal impact on downstream water supply at Lillington and does not object to the IBT. However, as growth continues, water resources will become more limited. Therefore, plans should begin to return water to the Cape Fear	II.B
			- Support DWR's efforts to develop a comprehensive model of future Cape Fear River use	IV.G
Hal Broadfoot, citizen of Fayetteville	Correspondence dated:	July 13, 2000	- Triangle financing its growth by using water resources that belong to downstream users	I.G
			- Fayetteville, unlike upstream neighbors, have invested in state-of-the-art water and wastewater treatment	IV.D
Reid Gannt, citizen of Fayetteville	Correspondence dated:	July 13, 2000	- Allowing this interbasin transfer will be disastrous for Cape Fear River	I.E, I.H
Marie Tinnin Stewart, citizen of Fayetteville	Correspondence dated:	July 13, 2000	- Build a treatment plant that will correct the interbasin transfer prior to withdrawing more water from Jordan Lake	II.B

TABLE B-4
Public Comment Summary

Name/Organization	Date of Comment Submittal	Summary of Comments ¹	Section of Response Summary Where Comments are Addressed
Scott M. Bigelow, citizen of Lumberton	Correspondence dated: July 13, 2000	<ul style="list-style-type: none"> - What conservation measures are being undertaken in Triangle? - Build a new WWTP that discharges to the Cape Fear - Look at 100 year drought; in drought impacts of pollution are amplified - Did study account for pollution in Cape Fear? - Good planning would dictate that state grow in areas where there are resources to support the growth - Legislature should fund study to ensure that North Carolina will not experience the water problems of the west - Use supply and demand to dictate who gets water - Make the IBT certificate temporary. If water quality in the Cape Fear declines, revoke or cut back the transfer - Hold hearing downstream in Cape Fear and not in Cary - Triangle does not need water 	<p>II.C</p> <p>II.B</p> <p>I.D</p> <p>I.H</p> <p>IV.A</p> <p>IV.B</p> <p>IV.E</p> <p>I.I</p> <p>I.N</p> <p>IV.C</p>
Colonel W. S. Crumlish, USA Retired, Corps of Engineers	Letter dated: July 11, 2000	- Water should remain in Cape Fear Basin	I.E
Walter D. Dietrich, citizen of Fayetteville	Letter dated: July 16, 2000	<ul style="list-style-type: none"> - State has underestimated the drinking water capacity of Jordan Lake - Interbasin transfer should not be allowed; plant that will return water to Cape Fear River should be built first 	<p>I.C</p> <p>II.B</p>
James and Jenny Rosser, citizens of Fayetteville	Correspondence dated: July 30, 2000	- Apex should return water it removes from the Cape Fear	II.B
Maryann and Bob McCoy, citizens of Fayetteville	Correspondence dated: July 30, 2000	- Cary should return water it removes from the Cape Fear	II.B

TABLE B-4
Public Comment Summary

Name/Organization	Date of Comment Submittal	Summary of Comments ¹	Section of Response Summary Where Comments are Addressed
D. R. Himocks, Jr., citizen of Fayetteville	Correspondence dated: July 31, 2000	- Towns that remove water from the Cape Fear should return it to avoid situation similar to Colorado River	II.B, IV.B

Notes:

¹ Comments and correspondence from resource agencies and stakeholders are included in Appendix C of the FEIS (CH2M HILL, 2000).

* Many of the comments submitted in this letter were identical to the oral statement provided on July 13, 2000 at the public hearing. Only those comments that were not included in the July 13, 2000 statement are summarized in this table.

Summary of Local Regulations and Programs for Mitigation of Adverse Impacts

The IBT certificate request is one of many planned activities that are a response to the rapid growth in the project area, rather than the cause of such growth. Nevertheless, because such projects facilitate the urban growth that is occurring, it was determined that the scope of this EIS would include the indirect and cumulative impacts associated with the development that will be facilitated by the proposed IBT increase. Table C-1 summarizes the local regulations and programs, which go beyond federal and state requirements, that may mitigate the potential indirect and cumulative impacts discussed in Section 3 above and in Section 4 of the FEIS. This discussion of the measures to mitigate adverse impacts can also be found in Section 6 of the FEIS (CH2M HILL, 2000).

TABLE C-1 Local Government Initiatives Beyond State Regulations to Protect Water Quality and Wildlife Habitat	Open Space Plans	Land Use Plans	Growth Management Plans	Unified Development Ordinance	Parks and Greenway Plans	Erosion/Sediment Control	Stormwater Programs	Impervious Surface Limits	Floodplain Dev Regs	Water Conservation Ordinances	Education	Reuse Plans	Stormdrain stenciling	Incentives	Wastewater planning	Stream Restoration
Initiative																
Open Space Planning																
Local/state land acquisition around Jordan Lake	X	X	O	O	X											
Local/state land acquisition to connect parks and gamelands	X	X	O	O	O											
Local/state land acquisition around Umstead	X	X	O	O	O											
Implement Wake Co Open Space Study	X	X	O	O	O		O	O								
Gov. Hunt's goal to conserve 20% land in new development	O	O	O	O	O		O	O								
Regional Greenway System																
Regional Greenway that builds on American Tobacco Trail	O	O			X											
Riparian Buffers and Wetlands																
Local regulations requiring buffers as strict as Neuse rules		O	O	O		O	O									
Restoration of wetlands and buffers		O		O												X
Floodplain																
Local regulations prohibiting flood plain development		X		X					X							
Public Utilities and Services																
Consolidation of utilities in Wake Co																X
Design and construct regional WWTP																X
Water conservation				X						X	X			X		
Water reuse												X				
Pollution Prevention																
Local policies to prevent water pollution	X	X	X	X	O	X	X	X	X	X	X	X	X	X		

Key to Symbols:

X: Program in place

O: Town working on program to address issue or is considering program