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## Acronyms

ACOE	U.S. Army Corps of Engineers
ADD	average daily demand
AQI	Air Quality Index
BFE	base flood elevation
BMP	best management practice
cfs	cubic feet per second
CGIA	North Carolina Center for Geographical Information and Analysis
CMU	Charlotte-Mecklenburg Utilities
COG	Council of Government
CP&L	Carolina Power and Light
CWMTF	North Carolina Clean Water Management Trust Fund
DENR	North Carolina Department of Environment and Natural Resources
DPR	North Carolina Division of Parks and Recreation
DLR	North Carolina Division of Land Resources
DWM	North Carolina Division of Waste Management
DWQ	North Carolina Division of Water Quality
DWR	North Carolina Division of Water Resources
EA	environmental assessment
EEP	North Carolina Ecosystem Enhancement Program
EIS	environmental impact statement
EMC	North Carolina Environmental Management Commission
EPA	U.S. Environmental Protection Agency
FDA	U.S. Food and Drug Administration
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FONSI	finding of no significant impact
fps	feet per second
FY	fiscal year
GIS	geographic information system
gpcd	gallons per capita day
HHW	household hazardous waste
HQW	high quality water
IBT	interbasin transfer
MCDEP	Mecklenburg County Department of Environmental Protection

MDD	maximum daily demand
MGD	million gallons per day
MOA	Memorandum of Agreement
MPL	Mecklenburg Priority List
MS4	municipal separate storm sewer system
NAAQS	National Ambient Air Quality Standard
NCDOT	North Carolina Department of Transportation
NCEPA	North Carolina Environmental Policy Act
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NHEO	Natural Heritage Element Occurrence
NHP	Natural Heritage Program
NO <sub>x</sub>	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
RRR	Rocky River Regional
SCDHEC	South Carolina Department of Health and Environmental Control
SCI	Secondary and Cumulative Impacts
SMP	Shoreline Management Plan
SNHA	Significant Natural Heritage Area
SSO	sanitary sewer overflow
SWAC	North Carolina Stormwater Advisory Committee
SWIM	Surface Water Improvement Management Program
TMDL	total maximum daily load
TPL	Trust for Public Land
TSD	treatment, storage, or disposal
UDO	Unified Development Ordinance
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	volatile organic compound
WQI	water quality index
WRC	North Carolina Wildlife Resources Commission
WRP	North Carolina Wetlands Restoration Program (now known as EEP)
WSACC	Water and Sewer Authority of Cabarrus County



WTP            water treatment plant  
WWTP        wastewater treatment plant

# Executive Summary

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The Cities of Concord and Kannapolis are requesting an interbasin transfer (IBT) certificate from the North Carolina Environmental Management Commission (EMC) for 24 million gallons per day (MGD) on an average day basis from a combination of the Catawba River basin and the Yadkin-Pee Dee River basin to the Rocky River subbasin. The associated maximum day IBT would be up to 38 MGD from the Catawba River Basin and up to 10 MGD from the Yadkin-Pee Dee River Basin. The proposed IBT is the preferred alternative that was identified through the development and analysis of many alternatives that also included the Yadkin River as a potential source basin as well as non-IBT alternatives. The preferred alternative provides the best solution to a regional water supply problem in an area of limited water resources. The EIS contains an alternative analysis of all the alternatives considered in the development of the document.

Combined, Concord and Kannapolis water systems supply almost 100 percent of the public water supply in Cabarrus County. Cabarrus County is located in the upper reaches of the Rocky River subbasin, which has a limited watershed for water supply development. Recent master planning for Cabarrus County indicates its available water supply is 31 MGD (50 year safe yield). Based on a 30-year planning period, a 24 MGD available supply shortfall is anticipated by 2035. Section 6 of the *State Water Supply Plan* requires the submittal of a plan by 2007 to eliminate the projected supply shortfall. Therefore, the Concord and Kannapolis water systems must look to the Catawba River or Yadkin River basins and receive approval of an IBT to obtain additional water supply.

Approval of the proposed IBT would be the first step in meeting North Carolina Department of Environment and Natural Resources (NCDENR) water supply planning criteria. Approval to withdraw water from the Catawba River or the Yadkin River will also require subsequent approval from the Federal Energy Regulatory Commission (FERC).

The purpose of this EIS is to evaluate the direct, indirect, and cumulative impacts of the proposed IBT on both the source and receiving basins. Included is an analysis of potential impacts on: wetlands, urban lands, prime agricultural lands, forestry resources, public and recreational lands, archaeological and historical resources, fish and wildlife resources, sensitive aquatic and terrestrial species and habitats, water quality and water resources, air quality, groundwater, noise, and toxic substances.

The report concludes that the direct impacts of the IBT on both the source and receiving basins would be insignificant. The project will not significantly change lake elevations, minimum dam releases, surface water hydrology, or water quality in the source or receiving basins.

Secondary and cumulative environmental impacts of future buildout of the portion of the receiving basin in the project area are also evaluated in this EIS. Although these impacts may be potentially significant (due to the possibility that the IBT will facilitate growth and development in Cabarrus County through the eventual provision of water services to the region), the implementation of the various mitigation measures presented in the EIS reduces these impacts to a level of insignificance.

The EIS for the proposed IBT focuses on the movement of water from one basin to another. Although the EIS recognizes potential indirect impacts of the proposed action, the document does not evaluate specific water treatment, wastewater treatment, and pipeline facilities. These future facilities will be evaluated under the North Carolina Environmental Policy Act (NCEPA) when they are planned and designed (see Table ES-1).

TABLE ES-1

Areas of Potential Direct Impacts to be Addressed by Permitting & NCEPA Processes for Identified Projects in the Source and Receiving Basins

Environmental Resource	Source Basin		Receiving Basin				
	Proposed IBT	Water Line Extensions	Proposed IBT	Future WTP Expansions	Future WWTP Expansions	Sewer Line Extensions	Water Line Extensions
Wetlands	PI	PI	LI	PI	PI	PI	PI
Urban / Developed Land	LI	PI	LI	PI	PI	PI	PI
Public Land / Recreation Uses	PI	PI	LI	PI	PI	PI	PI
Prime Agricultural Land	LI	PI	LI	LI	LI	PI	PI
Forestry Land	LI	PI	LI	PI	PI	PI	PI
Archaeological / Historical Areas	LI	PI	LI	PI	PI	PI	PI
Wildlife Habitat	PI	PI	LI	PI	PI	PI	PI
Fisheries and Aquatic Resources	PI	PI	LI	PI	PI	PI	PI
Sensitive and Threatened Species & Habitat	PI	PI	LI	PI	PI	PI	PI
Water Resources	PI	PI	LI	PI	PI	PI	PI
Water Quality	PI	PI	LI	PI	PI	PI	PI
Air Quality	LI	PI	LI	PI	PI	PI	PI
Groundwater	LI	LI	LI	LI	LI	PI	LI
Noise	LI	PI	LI	PI	PI	PI	PI
Toxic & Hazardous Substances	LI	LI	LI	PI	PI	PI	LI

**Notes:**

PI = Areas of Potential Impact (major relevance in NCEPA documents and permitting applications)

LI = Areas of Limited Impact (minor relevance in NCEPA documents and permitting applications)

This table is meant to show the relevance of each of the environmental issues for each particular project. **“PI” indicates areas where there is a potential for impacts to occur as a direct consequence of the project.** This table is not meant to conclude the significance of the direct impacts of each project on these environmental resources. The individual NCEPA documents prepared for each of these projects will address whether or not these impacts will be significant.

Table ES-2 presents a summary of potential secondary and cumulative impacts to environmental resources and the local programs proposed as mitigation. Currently, the Cities of Concord and Kannapolis are working cooperatively to update their Unified Development Ordinances (UDO) to offset these potential impacts related to growth. By working cooperatively, the Cities are managing natural resources on a watershed scale instead of by political boundaries. These efforts represent a comprehensive approach to mitigating the potential impacts as a result of continued growth and development supported by the additional water supply.

TABLE ES-2

Areas of Potential Secondary and Cumulative Impacts to be Addressed by Permitting and Mitigation in the Receiving Basin

Environmental Resource	Potential for SCI	Mitigation Programs
Wetlands	LI	Riparian Buffers (all) County Zoning Ordinance, 150-foot buffer required around reservoirs Section 404 and Section 401 regulations
Urban / Developed Land	PI	UDOs (Concord and Kannapolis) and Zoning ordinances (all) - buffers required between adjacent land uses Encouragement of use of Low Impact Development (Concord) Water Supply Watershed Regulations limit development densities Land Use Planning recently updated by County, Concord, and Kannapolis
Public Land / Recreation Uses	LI	Land Use Planning recently updated by County, Concord, and Kannapolis – plans include greenway and park plans and open space considerations Subdivision Ordinance – Recreational Areas requirements (all) County Zoning Ordinance – Recreational District Overlay Zone; Watershed Overlay Zone provides for 150 foot buffer surrounding reservoirs.
Prime Agricultural Land	PI	Land Use Planning recently updated by County, Concord, and Kannapolis
Forestry Land	PI	Riparian buffers (all) UDO open space requirements for new development (Concord and Kannapolis) County Zoning Ordinance, 150-foot buffer required around reservoirs
Archaeological / Historical Areas	LI	Land Use Planning recently updated by County, Concord, and Kannapolis Concord-Center City Plan for historic area
Wildlife Habitat	PI	Riparian buffers provide habitat and corridors (all) County Zoning Ordinance, 150-foot buffer required around reservoirs UDO open space requirements (Concord and Kannapolis)
Fisheries and Aquatic Resources	LI	Riparian buffers (all) State SSO regulations NPDES permitting including Phase II stormwater regulations UDO (Concord and Kannapolis)
Sensitive and Threatened Species & Habitat	LI	Endangered Species Act NEPA and NCEPA regulations Cabarrus County Natural Heritage Inventory
Water Resources & Water Quality	PI	Riparian buffers (all) Stormwater Ordinances (all) & UDO (Concord and Kannapolis) County Sediment and Erosion Control Ordinance Clean Water Management Trust Fund projects Cabarrus County and Rowan County Zoning Ordinances-Water Supply Watershed Overlay Zones
Air Quality	LI	Public transportation available

TABLE ES-2

Areas of Potential Secondary and Cumulative Impacts to be Addressed by Permitting and Mitigation in the Receiving Basin

Environmental Resource	Potential for SCI	Mitigation Programs
		Land Use Plans encourage connectivity for pedestrians proper thoroughfare planning (all) Encourage use of Low Impact Development (Concord)
Groundwater	LI	Failing septic systems taken offline as infrastructure developed Availability of infrastructure reduces future increase in septic tanks.
Noise	LI	Land use planning (all) encourages transportation planning Landscape buffers between adjacent land use types to reduce noise levels (County Zoning Ordinance; Concord and Kannapolis UDOs)
Toxic & Hazardous Substances	LI	Land use planning and zoning encourage growth in appropriate areas. NPDES Phase II stormwater education programs Brownfield Assessment Demonstration Pilot Project (Concord)

**Notes:**

PI = Areas of Potential Impact (major relevance in NCEPA documents and permitting applications)

LI = Areas of Limited Impact (minor relevance in NCEPA documents and permitting applications)

This table is meant to show the relevance of each of the environmental issues in terms of potential for secondary and cumulative impacts. “PI” indicates areas where there is a **potential for secondary and cumulative impacts to occur without adequate mitigation programs in place**. The listed mitigation programs will reduce these impacts to below a level of significance. Coordination with public agencies contributed to the mitigation plans outlined in this document.

# Section 1 - Purpose and Need

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## Background

North Carolina Statute G. S. 143- 215.22G & G. S. 143.215.22I and North Carolina Administrative Code Section T15A: 02G. 0400, were adopted in January of 1994 and modified in 1997 and 1998 regulate surface water transfers in the state. An interbasin transfer (IBT) certificate is required from the North Carolina Environmental Management Commission (EMC) for new transfers of 2 million gallons per day (MGD) or more (maximum daily demand [MDD]) or once the amount of water transferred from one subbasin to another reaches the full capacity of the transfer facilities that were existing or under construction as of July 1, 1993 (referred to as the *grandfathered capacity*). This environmental impact statement (EIS) evaluates all reasonable alternatives, and identifies potential mitigation measures. The EIS provides the basis to assess the direct and indirect impacts of the transfer request being made by the Cities of Concord and Kannapolis.

## Existing Water Supplies

The City of Concord is located in Cabarrus County, which is adjacent to Mecklenburg County where the City of Charlotte is located. The Concord water system supplies the Concord city limits and adjacent county areas. The City of Kannapolis is located in northern Cabarrus County and southern Rowan County. The Kannapolis water system supplies the Kannapolis city limits in both Cabarrus County and Rowan County, and adjacent Cabarrus county areas. Combined, Concord and Kannapolis water systems supply almost 100 percent of the public water supply in Cabarrus County.

Concord's current raw water supplies include withdrawals from Lake Howell (Coddle Creek Reservoir) operated by the Water and Sewer Authority of Cabarrus County (WSACC), as well as Lake Concord Reservoir and the Lake Fisher Reservoir. All are located in the Rocky River Subbasin, see Figure 1.

Kannapolis' raw water supply, Kannapolis Lake (Rocky River Subbasin), has a limited watershed of approximately 10 square miles. Kannapolis Lake is classified as a Class I reservoir. However, Kannapolis Lake is supplemented with raw water transfers from Lake Howell (Rocky River Subbasin) and Second Creek (South Yadkin River Subbasin). The transfer from Second Creek is a grandfathered IBT of 6 MGD, but only increases the safe yield of Kannapolis Lake by approximately 2.5 MGD.

**Insert Figure 1 Existing Raw Water Surfaces**

Reservoirs are classified by the Division of Environmental Health, Public Water Supply Section as well as by the Division of Water Quality. These water supply classifications are shown in Table 1.

**TABLE 1**  
Water Supply Classifications  
*Concord/Kannapolis IBT Environmental Impact Statement*

<b>Water Supply</b>	<b>Division of Water Quality<sup>1</sup></b>	<b>Division of Environmental Health Public Water Supply Section</b>
Kannapolis Lake	WS-III	Class I
Lake Fisher	WS-IV	Class I
Lake Concord	WS-IV	Class I
Lake Howell (Coddle Creek Reservoir)	WS-II; HQW; CA	Class I

1. See Section 2 Water Resources/Water Quality for definitions of water supply classes.

Table 2 presents the 50-year and 100 year safe yield amounts available from current water supply sources in Cabarrus County. The combined 50-year safe yield of the local governments is approximately 31 MGD. Table 2 also indicates the available supply can drop by nearly 50 percent to 16.5 MGD during severe droughts like the one experienced in 2002.

**TABLE 2**  
Safe Yield Analysis for Existing Water Supply Reservoirs in Cabarrus County  
*Concord/Kannapolis IBT Environmental Impact Statement*

<b>Water Source</b>	<b>Drainage Area (mi<sup>2</sup>)</b>	<b>50 Year Safe Yield (MGD)</b>	<b>100 Year Safe Yield (MGD)</b>
Lake Howell	47.0	16.20	7.05
Lake Fisher	18.7	5.15	3.00
Lake Concord	4.7	1.20	0.70
Kannapolis Lake	10.6	8.50	5.70
Second Creek	55.6		
<b>Total Combined Safe Yield</b>		<b>31.05</b>	<b>16.45</b>

Source: Cabarrus County Water and Wastewater System Master Plan – Safe Yield Update July 2003.

The most recent drought that ended during the fall/winter of 2002 and 2003 has caused the Cities of Concord and Kannapolis to pursue water distribution system improvements with the Cities of Charlotte (< 5 MGD), Albemarle (< 2 MGD) and Salisbury (< 2 MGD) to increase available supply during emergency conditions. IBT that occurs from the CMU interconnections utilize unused permitted IBT capacity. The Salisbury and Albemarle interconnections are limited to < 2 MGD to be in compliance with IBT statutes. The long-



range plan for Concord and Kannapolis is to maintain these interconnections as emergency water sources.

## Population Growth

Concord and Kannapolis continue to experience a growing demand for drinking water as part of the rapidly growing Charlotte metropolitan area. The primary cause of the area's growth is a bustling economy despite the recent decline in manufacturing and textile industries in the region. As a result of higher wages and low unemployment brought on by this economic growth, the metropolitan area has experienced a steady influx of new workers and residents. Many of these workers and residents are locating in Cabarrus County and the Cities' water service areas, as demonstrated by the recent 2001 Census. Cabarrus County, in which the Cities are primarily located, grew 32 percent between 1990 and 2000. During this same time period Concord grew 105 percent while Kannapolis grew approximately 24 percent. In addition, the incorporated area of Concord has grown from 23 square miles in 1990 to 51 square miles in 2000, a 125 percent increase in size.

An extensive population and land use analysis done by WSACC for its 2002 Water and Wastewater System Master Plan (2002 Master Plan) based future population projections for Cabarrus County on historical and regional growth trends. Table 3 illustrates these projections.

**TABLE 3**  
Population Projections for Cabarrus County Water Service Areas  
*Concord/Kannapolis IBT Environmental Impact Statement*

<b>Service Area</b>	<b>2000</b>	<b>2010</b>	<b>2020</b>	<b>2050</b>
Concord/Harrisburg/Mt. Pleasant	72,816	111,311	156,122	281,700
Kannapolis	40,032	63,722	86,207	136,587
Cabarrus County Total	112,848	175,033	242,329	418,287

Source: Cabarrus County Water and Wastewater System Master Plan. December 2002

## Water Demand Projections

Continued population growth has resulted in substantial increases in water demand since the 1997 Local Water Supply Plan was submitted to North Carolina Department of Environment and Natural Resources' (DENR) Division of Water Resources (DWR) in 1998. Current water demand projections, Table 4, predict the combined demand will be about 34 MGD average daily demand (ADD) by 2020, and 52 MGD in the year 2050.

TABLE 4

Current and Projected Water System Demands for the Cabarrus County Water Service Areas  
*Concord/Kannapolis IBT Environmental Impact Statement*

Service Area	2000		2010		2020		2050	
	ADD	MDD	ADD	MDD	ADD	MDD	ADD	MDD
Concord/Harrisburg/Mt. Pleasant	10.96	17.55	16.61	28.23	21.91	36.64	36.22	59.66
Kannapolis	8.6	11.75	10.83	15.54	12.94	18.92	17.58	26.39
Combined Total	19.6	29.3	27.4	43.8	34.9	55.6	53.8	86.1

Source: Cabarrus County Water and Wastewater System Master Plan. December 2002

## Water Supply Shortage

Adequate water supply can be determined by comparing the total existing 50-year safe yield (available supply) of the current sources to the predicted ADD. Section 6 of *State Water Supply Plan* requires the submittal of a plan to alleviate the available supply shortfall when the ADD is greater than 80 percent of available supply (80 percent criteria). The ADD should be less than 80 percent of the system's 50-year safe yield to allow for contingencies in the safe yield analysis. Also, this supply buffer can ensure adequate water supply during the planning period needed for securing additional supply if water demands are expected to continue growing in the future. Water demand projections listed in Table 4 indicate the ADD will reach 80 percent of the available supply (31 MGD) in about 2007.

Future water demand projections predict the combined ADD will increase to 53.8 MGD in 2050 (including Mt. Pleasant) requiring a minimum available supply of 67.3 MGD to meet the 80 percent criteria, creating a projected shortfall of 36 MGD.

The proposed IBT certificate(s) will be based on a 30-year planning period. Therefore, the IBT evaluation will be prorated to year 2035, when the ADD is projected to be 44.4 MGD. In order to meet the 80 percent criteria mentioned above, an available supply of 55.4 MGD would be needed. Based on the safe yield of existing supplies, there is a 24 MGD ADD shortfall in available supply for the year 2035.

## Potential Supply Alternatives

The Concord and Kannapolis water and sanitary sewer services areas are located entirely in the Rocky River Subbasin of the Yadkin River Basin. This location is almost equidistant to the two major rivers that serve this region of North Carolina--the Catawba River and the Yadkin River. The Rocky River flows eastward into the Yadkin River between Lake Tillery and Blewett Falls Lake.

Both of these river basins are a potential source for eliminating the water supply deficit. Both raw water and finished water alternatives have been identified to address the projected 24 MGD (based on ADD) shortfall. Alternatives for additional raw water would replenish the existing reservoirs in Cabarrus County and result in increasing the available supply of

the combined systems. Therefore, the IBT certificate for raw water alternatives would be for 24 MGD.

Finished water alternatives will require meeting daily fluctuations of peak demands of the distribution systems. Table 3-6 of the 2002 Master Plan indicates historical maximum day factors between 1995 and 1999 range from as low as 1.21 to a high of 2.2. For master planning purposes, a maximum day factor of 1.6 was used in the 2002 Master Plan. To be consistent with the 2002 Master Plan, a maximum day peak factor of 1.6 is used for finished water alternatives. Therefore, the amount of IBT required for finished water alternatives is 38 MGD on a maximum day basis (24 MGD times 1.6). Alternatives with a combination of finished and raw water sources are adjusted accordingly to the amount of finished water and raw water transferred.

Listed below is a description of the potential sources that can meet the entire supply shortfall by source basin:

### **Alternative 1 - Catawba River Basin**

Alternative 1 is a combination of obtaining finished water from CMU and raw water from Lake Norman for a total IBT of 28 MGD. 18 MGD of raw water would be transferred from Lake Norman that would pump through a new raw water main and discharge into Lake Howell in Cabarrus County and Kannapolis Lake in Rowan County. The remaining 10 MGD (6 MGD ADD times 1.6) of finished water would be obtained by utilizing existing and proposed interconnections between the CMU water system and the Concord water system. Currently, Concord uses these interconnections for emergency supply. Alternative 1 would require the development of a water supply contract for 10 MGD with CMU to fund capacity upgrades to the CMU water system.

### **Alternative 2 - Yadkin-Pee Dee River Basin**

Alternative 2 would obtain an IBT of up to 38 MGD (24 MGD ADD) of finished water from Tuckertown Reservoir or Badin Lake. 38 MGD of finished water would be supplied from the Albemarle water system by expanding its system capacity, or expand the existing Albemarle intake(s) and transfer 38 MGD of raw water to a future water treatment plant in northeastern Cabarrus County.

### **Alternative 3 - Yadkin-Pee Dee River Basin**

Alternative 3 would obtain an IBT of 24 MGD of raw water from High Rock Lake. The 24 MGD would be transferred from High Rock Lake and pumped through a new raw water main that would discharge into Lake Howell in Cabarrus County and Kannapolis Lake in Rowan County.

### **Preferred Alternative**

The Preferred Alternative is a combination of Alternatives 1 and 2 where an IBT from both the Yadkin-Pee Dee River and the Catawba River to the Rocky River subbasin will occur. This alternative would continue the utilization of the interconnections with the Cities of Charlotte, Salisbury, and Albemarle to meet short-term increases in demands, and allow Concord and Kannapolis the opportunity to expand the amount of finished water obtained from Charlotte and Albemarle or obtain raw water from Lake Norman. The Preferred Alternative IBT certificate would be for up to 38 MGD (MDD) from the Catawba River Basin and up to 10 MGD (MDD) from the Yadkin-Pee Dee River Basin; however, the total IBT from both sources will not exceed a MDD of 38 MGD or an ADD of 24 MGD. The Preferred

Alternative represents a regional solution to meeting water supply needs through cooperation with neighboring communities. A water balance table that indicates the existing and projected IBT by source basin for Concord and Kannapolis in the years 2010, 2020, and 2035 for the Preferred Alternative is provided in Appendix E.

## Non-IBT Alternatives

### Alternative 4A - Rocky River Supply (Indirect Reuse)

Alternative 4A would withdraw 24 MGD from Rocky River near Midland approximately 10 miles downstream of the Rocky River WWTP and pump raw water up to Lake Howell. This alternative would take advantage of increased river flows due existing grandfathered and previously approved IBTs from upstream waste water treatment plants in the Town of Mooresville, Mecklenburg County, and the Rocky River Regional WWTP in Cabarrus County.

### Alternative 4B - Reverse IBT

Alternative 4B would transfer 24 MGD of raw water from Lake Norman to Lake Howell, and simultaneously withdraw 24 MGD from Rocky River near Midland and pump it over to McAlpine Creek near Mint Hill in the Catawba River Basin to mitigate the IBT.

## No Action Alternative

Individual systems or community systems would serve future growth areas. These systems would be reliant on groundwater for water supply. An IBT does not occur with this alternative. A summary of the alternatives is listed in Table 5 below.

TABLE 5  
Summary of Interbasin Transfer Alternatives (MGD)  
*Concord/Kannapolis IBT Environmental Impact Statement*

Alternative	Alt#1		Alt#2		Alt#3		Preferred Alt		Alt#4A, 4B & No Action	
	ADD	MDD	ADD	MDD	ADD	MDD	ADD	MDD	ADD	MDD
<b>Source Basin</b>										
Yadkin-Pee Dee River	0	0	24	38	24	24	<6	<10	0	0
Catawba River	24	28	0	0		0	<24	<38	0	0
Total IBT		28		38		24	24	38		0
<b>Receiving Basin</b>										
	Rocky River		Rocky River		Rocky River		Rocky River		N/A	

# Section 2 - Existing Environment and Environmental Consequences

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This section, pertaining to the existing environment for the IBT study area as illustrated in Figure 2, is divided into two subsections:

- **Source Basins**, which describes the four different potential sources of raw water located in the Catawba and Yadkin Pee-Dee River Basins
- **Receiving Basin**, which describes the portion of the study area where wastewater is discharged in the Rocky River Subbasin

Each basin is further divided and described by the following potentially affected areas: wetlands, land use, fish and wildlife resources, water resources/water quality, air quality, groundwater resources, noise level, and toxic substances/hazardous waste. The North Carolina Environmental Policy Act (NCEPA) requires environmental documents if these areas are impacted due to a proposed action; therefore, these topics will require further discussion. In addition, this section addresses potential environmental justice issues.

For **Source Basins**, the existing environment is described for each area studied, followed by a discussion of the primary and secondary/cumulative consequences, if any, on the area. “Cumulative Effects” are defined in 15A NCAC 1C .0101(d)(2) as “resulting from the incremental impact of the proposed activity when added to other past, present, and reasonably foreseeable future activities regardless of what entities undertake such other activities.” “Indirect Effects” or secondary, are “caused by and result from the proposed activity although they are later in time or further removed in distance, but they are still reasonably foreseeable” (15A NCAC 1C .0101(d)(4)).

For the **Receiving Basin**, the existing environment is described for each area studied, followed by a discussion of the primary consequences, if any, for the area. Secondary and cumulative impacts in the receiving basin are discussed in Section 4.

The data for both sections were gathered through literature reviews, internet searches, geographic information system (GIS) queries, phone conversations, letters, and meetings with various resource agencies.

## Source Basins

The Concord and Kannapolis service areas are located entirely in the Rocky River Subbasin (Receiving Basin) of the Yadkin River Basin. This location is almost equidistant to the two major rivers that serve this region of North Carolina, the Catawba River and the Yadkin-Pee Dee River (Source Basins). Four potential water sources are being considered for this study: Lake Norman on the Catawba and High Rock Lake, Tuckertown Reservoir, and Badin Lake on the Yadkin-Pee Dee. In order to evaluate potential impacts on downstream water users, the study area for the source basin was extended to Lake Wylie Dam in the Catawba River Basin and to Blewett Falls Dam in the Yadkin-Pee Dee River Basin when analyzing water resource/water quality impacts of the proposed project.

Insert Figure 2 Study Area

## Lake Norman

One of the raw water source alternatives is to transfer water from Lake Norman, an impoundment of the Catawba River and located within the CTB 3-1 subbasin (as defined in G.S. 143.215.22G). Draining from the north, the 150 square mile study area forms the border between Catawba, Iredell, Lincoln, and Mecklenburg Counties in southwestern piedmont region of North Carolina. Lake Norman is the largest man-made lake in the state with approximately 520 miles of shoreline and 50 square miles (32,510 acres) of open water. It drains approximately 1790 square miles of the Catawba River beginning in the mountains upstream of Lake James. At full pool elevation (760 feet), the lake has available storage of approximately 1,070,000 acre-feet. Located approximately 10 miles west of Concord and Kannapolis and north of Charlotte, the Lake Norman area includes portions of the cities of Catawba, Mooresville, Cornelius, Davidson, and Huntersville. The boundary of the study area around water bodies is offset 0.5 mile from the shoreline to incorporate floodplain areas as shown on Federal Emergency Management Agency (FEMA) flood zone maps and generally illustrated in Figure 2.

## High Rock Lake

The second potential source is High Rock Lake, an impoundment of the Yadkin River straddling the border of Davidson and Rowan Counties (Figure 2). The Yadkin River is part of the larger Yadkin-Pee Dee River Basin that drains central North Carolina and northeastern South Carolina. High Rock Lake, along with Tuckertown Reservoir and Badin Lake, is part of the Yadkin Hydroelectric Project operated by Yadkin-APGI (Alcoa). The project's Federal Energy Regulatory Commission (FERC) license expires in 2008. The drainage area above High Rock Dam is 3,973 square miles. The dam impounds an available storage capacity of approximately 234,000 acre-feet at a full pool elevation of 623.9 feet, resulting in a surface area of approximately 15,180 acres.

Beginning just south of the Yadkin River's confluence with the South Yadkin River, the 24 square mile High Rock Lake is located in water-planning subbasin 18-1. The boundary of the study area around the lake is based on a half-mile buffer from the Lake's 356 mile shoreline to incorporate floodplain areas as shown on FEMA flood zone maps. Located approximately 20 miles northeast of Concord and Kannapolis, the source basin study area includes a small portion of the cities of Lexington to the north and Spencer to the west. Similar to the Catawba source basin, the water resources and water quality impacts will be examined down to Blewett Falls Lake dam.

## Tuckertown Reservoir

Tuckertown Reservoir is a third potential raw water source for Concord and Kannapolis. The lake is located just south of High Rock Lake. This impoundment of the Yadkin River is located in the 18-1 subbasin and straddles the apex of Davidson, Rowan, Stanley, and Montgomery Counties. The 23 square mile study area around Tuckertown Reservoir source basin is based on a half-mile buffer from the Lake's shoreline to incorporate floodplain areas as shown on FEMA flood zone maps. The study area is approximately 17 miles east of Concord and Kannapolis, contains no incorporated areas, and much of the basin is managed as Alcoa game lands.

The drainage area above Tuckertown Dam is 4,080 square miles. The dam impounds an available storage capacity of approximately 6,700 acre-feet at the full pool elevation of 564.7 feet. At full pool, the surface area of the reservoir is approximately 2,560 acres. The mean depth of the reservoir is 16 feet with a maximum depth of 55 feet (Yadkin-APGI, 2002).

## Badin Lake (Narrows Reservoir)

Badin Lake is the fourth potential raw water source for Concord and Kannapolis. It is located just downstream of Tuckertown Reservoir and is formed by Narrows Dam. This impoundment of the Yadkin River is located in the 18-1 subbasin and straddles the apex of Davidson, Rowan, Stanley, and Montgomery Counties. The Badin Lake study area is based on a half-mile buffer from the Lake's shoreline to incorporate floodplain areas as shown on FEMA flood zone maps. The study area contains one incorporated area, the Town of Badin, which is approximately 30 miles east of Concord and Kannapolis.

The drainage area above Narrows Dam is 4,180 square miles. The dam impounds an available storage capacity of approximately 129,100 acre-feet at the full pool elevation of 509.8 feet. At full pool, the surface area of the reservoir is approximately 5,355 acres. The maximum depth of the reservoir is 175 feet (Yadkin-APGI, 2002).

## Wetlands

According to the U.S. Environmental Protection Agency (EPA), wetlands are lands in transition between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water at least part of the year. For regulatory purposes under the Clean Water Act, the term wetlands means "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas." In general, wetlands share three key characteristics: wetland hydrology, wetland soils, and wetland plants. Wetlands and vegetated riparian areas are valuable because they are biologically productive natural ecosystems in the world, protect wildlife and provide natural open spaces, protect water quality, control erosion, and prevent flooding damage.

## Lake Norman

### Existing Environment

Lake Norman is located in the western Piedmont physiographic province of the state and is characterized by gently sloping to strongly sloping, well-drained and moderately well drained soils that have a clay or loamy subsoil (U.S. Department of Agriculture ([USDA], 1980). Soils in the region consist of an association of Cecil-Hiwassee-Goldston-Badin series.

National Wetlands Inventory (NWI) data developed by the U.S. Fish and Wildlife Service (USFWS) show approximately 576 acres of wetlands within the Lake Norman basin (Figure 3, Table 6) excluding the predominately open water wetlands which account for 31,546 acres. Forested wetlands represent over half, 53 percent, of the total wetland acreage and are mostly located in the upper reaches of the impoundment near the cities of Catawba and Troutman. A wetland field delineation was not performed for the source basin study area due to the large size of the study area.



Insert figure 3 NWI Wetlands

TABLE 6

NWI Wetlands – Lake Norman  
 Concord/Kannapolis IBT Environmental Impact Statement

Description	Acres	Percent of Total
Forested wetlands	307	53%
Non-tidal, emergent vegetation	64	11%
Non-tidal, scrub-shrub	202	35%
Other	3	1%
Total	576	100%

### Primary Impacts

Primary impacts to wetlands can result from removal of the water. Any construction of proposed intakes, pumping stations, and conveyance lines associated with the transfer that could impact existing wetlands will be permitted separately under appropriate state and federal programs and their wetland and environmental impacts evaluated under a separate NCEPA or National Environmental Policy Act (NEPA) process.

As discussed further in the aquatic resources section of this EIS, many of the rare plants in the Catawba River Basin grow in the wet soils of bogs and can be indirectly affected by water quality and quantity changes. A modeling analysis was previously conducted by Duke Power for a proposed increase in CMU's withdrawal from Mountain Island Lake. The analysis was based on an ADD of 165 MGD in 2030 and indicated there will be no changes in the surface water elevations of Lake Norman, Mountain Island Lake, and Lake Wylie under normal and drought conditions due to the proposed increased withdrawal (ENTRIX, 2001). Under extreme drought conditions (when Duke Power manages the lakes primarily to maintain lake levels to protect nuclear and fossil fuel plants and to meet minimum release requirements), the surface water elevations of the eleven lakes on the Catawba River are managed collectively and are impacted principally by the consumptive losses from the system. These consumptive losses include any use that does not result in a return of water to the system such as evaporative cooling, irrigation, and interbasin transfers. The average consumptive losses for the entire system in North and South Carolina were estimated at about 187 MGD in 2000 and projected to be 250 MGD in 2030. With these cumulative losses, negligible effects on lake levels were predicted through the Duke Power modeling. Thus, increasing the withdrawal up to 24 MGD (ADD) should not significantly impact wetland resources. Information regarding other potential impacts to the Catawba-Wateree Project is provided at the end of this section.

With no significant changes to lake elevation, basin hydrology, or water quality, the interbasin transfer project will not have any significant direct impact on wetlands within the Lake Norman study area.

### Secondary and Cumulative Consequences

Based on current information, the IBT will not affect the provision of water or sewer services in the Lake Norman study area. However, an updated water supply study is expected to be developed as a part of the FERC relicensing of the Catawba-Wateree Project. The IBT will

not change the existing pattern or rate of growth expected in the source basin. The IBT will therefore not have any secondary or cumulative impacts (SCI) to wetlands in the Lake Norman study area.

## High Rock Lake

### Existing Environment

NWI data developed by USFWS identify approximately 1,464 acres of wetlands within the High Rock Lake study area (Figure 3, Table 7) excluding the open water wetlands which account for approximately 13,496 acres. Forested wetlands represent the majority, 87 percent, of the total wetland acreage and are mostly located in the upper reaches of the impoundment around Interstate 85 (I-85) near the Alcoa and Linwood Game Lands and the Crane Creek embayment. This area consists of a large system of more than 1,000 acres of backwater sloughs, pools, potholes, sand and mud bars, islands, channels, alluvial flats, and broad, gently sloping terraces. The remaining wetlands in the reservoir are almost all relatively small fringe wetlands situated in coves and low-lying areas associated with streams entering the reservoirs. (Yadkin-APGI, 2002). A wetland field delineation was not performed due to the large size of the study area.

TABLE 7

NWI Wetlands – High Rock Lake  
Concord/Kannapolis IBT Environmental Impact Statement

Description	Acres	Percent of Total
Forested wetlands	1,279	87%
Non-tidal, emergent vegetation	8	1%
Non-tidal, scrub-shrub	176	12%
Other	1	0%
Total	1,464	100%

### Primary Impacts

Primary impacts to wetlands can result from removal of the water. Any construction of proposed intakes, pumping stations, and conveyance lines associated with the transfer that could impact existing wetlands will be permitted separately under appropriate state and federal programs and their wetland and environmental impacts evaluated under a separate NCEPA or NEPA process.

As discussed further in the Fish and Wildlife Resources section of this EIS, many of the rare plants in the Yadkin River Basin grow in the wet soils of bogs and can be indirectly affected by water quality and quantity changes. Based on information provided by ALCOA, (Appendix C), High Rock Lake is operated with a maximum drawdown of 16 to 18 feet. Straight line projections of impacts to lake levels for 9 MGD out to 24 MGD in preliminary calculations provided by ALCOA (Appendix C) have been performed. This analysis indicates a monthly reduction in lake levels from 0.19 to 0.48 feet depending on the lake levels. This conservative analysis is based on the assumption that inflow into the lake is zero. Thus, increasing the withdrawal up to 24 MGD (ADD) should not significantly impact wetland resources. Information regarding other potential impacts to the Yadkin Hydroelectric Project is provided at the end of this section.

However, with no significant changes to lake elevation, river flow, basin hydrology, or water quality, the interbasin transfer project will not have any significant direct impact on wetlands or SNHA with wetland components within the study area.

### **Secondary and Cumulative Consequences**

Based on current information, the IBT will not affect the provision of water or sewer services in the source basin around High Rock Lake. However, an updated water supply study is expected to be developed as a part of the FERC relicensing of the Yadkin-Pee Dee Project. The IBT will not change the existing pattern or rate of growth expected in the study area. The IBT will therefore not have any secondary or cumulative impacts to wetlands in the High Rock Lake study area.

### **Tuckertown Reservoir**

#### **Existing Environment**

NWI data developed by the USFWS identify only 10 acres of forested wetlands within the Tuckertown Reservoir basin (Figure 3) with the exception of the open water wetlands which account for 2371 acres. Typically these wetlands are fringing type wetlands with submerged/emergent vegetation in the water to depths of 6 to 8 feet, and scrub/shrub type wetlands along the shoreline. The most significant areas of wetlands on Tuckertown Reservoir occur in the Flat, Ellis, and Riles Creeks embayments, (Yadkin-APGI, 2002). A wetland field delineation was not performed due to the large size of the study area.

#### **Primary Impacts**

Primary impacts to wetlands can result from removal of the water. Any construction of proposed intakes, pumping stations, and conveyance lines associated with the transfer that could impact existing wetlands will be permitted separately under appropriate state and federal programs and their wetland and environmental impacts evaluated under a separate NCEPA or NEPA process.

As discussed further in the Fish and Wildlife Resources section of this EIS, many of the rare plants in the Yadkin River Basin grow in the wet soils of bogs and can be indirectly affected by water quality and quantity changes. Based on information provided by ALCOA (Appendix C), Tuckertown Reservoir is operated with a maximum drawdown of 3 feet. Straight line projections of impacts to lake levels for 14 MGD out to 24 MGD in preliminary calculations provided by ALCOA (Appendix C) have been performed. This analysis indicates a monthly reduction in lake levels from 0.93 to 1.03 feet depending on the lake levels. This conservative analysis is based on the assumption that inflow into the lake is zero. Thus, increasing the withdrawal up to 24 MGD (ADD) should not significantly impact wetland resources. Information regarding other potential impacts to the Yadkin Hydroelectric Project is provided at the end of this section.

With no significant changes to lake elevation, basin hydrology, or water quality, the interbasin transfer project will not have any significant direct impact on wetlands or SNHA with wetland components within the study area.

### **Secondary and Cumulative Consequences**

The IBT will not affect the provision of water or sewer services in the study area. The IBT will not change the existing pattern or rate of growth expected in the study area. The IBT will therefore not have any secondary or cumulative impacts to wetlands in the Tuckertown Reservoir study area.

## Badin Lake

### Existing Environment

NWI data developed by the USFWS identify 27 acres of forested wetlands and one acre of scrub-shrub wetlands within the Badin Lake basin study area (Figure 3), and open water wetlands account for 6223 acres. Typically these wetlands are fringing type wetlands with submerged/emergent vegetation in the water to depths of 6 to 8 feet, and scrub/shrub type wetlands along the shoreline. A wetland field delineation was not performed due to the large size of the study area.

### Primary Impacts

Primary impacts to wetlands can result from removal of the water. Any construction of proposed intakes, pumping stations, and conveyance lines associated with the transfer that could impact existing wetlands will be permitted separately under appropriate state and federal programs and their wetland and environmental impacts evaluated under a separate NCEPA or NEPA process.

As discussed further in the Fish and Wildlife Resources section of this EIS, many of the rare plants in the Yadkin River Basin grow in the wet soils of bogs and can be indirectly affected by water quality and quantity changes. Based on information provided by ALCOA (Appendix C), Badin Lake (Narrows Reservoir) is operated with a maximum drawdown of 3 feet. Straight line projections of impacts to lake levels for 14 MGD out to 24 MGD in preliminary calculations provided by ALCOA (Appendix C) have been performed. This analysis indicates a monthly reduction in lake levels from 0.41 to 0.51 feet depending on the lake levels. This conservative analysis is based on the assumption that inflow into the lake is zero. Thus, increasing the withdrawal up to 24 MGD (ADD) should not significantly impact wetland resources. Information regarding other potential impacts to the Yadkin Hydroelectric Project is provided at the end of this section.

With no significant changes to lake elevation, basin hydrology, or water quality, the interbasin transfer project will not have any significant direct impact on wetlands or SNHA with wetland components within the study area.

### Secondary and Cumulative Consequences

The IBT will not affect the provision of water or sewer services in the study area. The IBT will not change the existing pattern or rate of growth expected in the study area. The IBT will therefore not have any secondary or cumulative impacts to wetlands in the Badin Lake source basin study area.

## Land Use

### Lake Norman

#### Existing Environment

##### *Urban/Developed Lands*

Due to Lake Norman's close proximity to the Charlotte metropolitan area and its popularity as a recreational destination, the southeastern portion of the source basin consists of extensive residential development and some commercial development around Davidson, Cornelius, and Mooresville. Table 8 and Figure 4 illustrate the distribution of developed lands in the Lake Norman study area.

TABLE 8  
Land Cover Around Lake Norman  
*Concord/Kannapolis IBT Environmental Impact Statement*

Land Use	Acres	Percent of Total Land
Agriculture	16,017	17%
Forested Land	44,768	47%
High Intensity Developed	1,347	1%
Low Intensity Developed	1,023	1%
Mixed Shrubland	950	1%
Unconsolidated Sediment	0	0%
Water bodies	31,918	33%
Wetlands	0 <sup>1</sup>	0%
Total	96,021	100%

1. The acres shown for wetlands in this table are from the 1996 land cover database available from CGIA while the wetlands data shown in Table 6 are from the National Wetlands Inventory data available from USFWS. Most of the wetlands coverage identified through NWI are included in the water body land use category in this table.

##### ***Public Lands (Parks/Recreation Areas and Greenways)***

The Lake Norman study area provides many benefits to the public, including recreation, boating, fishing, hiking, camping, wildlife preservation, and aesthetic enjoyment. Due to its large size and proximity to the Charlotte metropolitan area, the lake and adjoining recreational lands are popular destinations for local residents. This section describes park and conservation lands primarily associated with human recreational activities; public game lands are discussed under the wildlife habitat and resources sections.

The main recreational lands found in this study area are part of the Lake Norman State Park, formed in September 1962, when Duke Power donated 1,328 acres of land on the northeastern shore. Located in Iredell County, the state park provides approximately 8 miles of hiking trails, RV/tent camping, picnic areas, and a boat launch. Duke Power also maintains 2 bank fishing areas and 8 public boating access areas along the shoreline, (Duke Power, 2002). One of these sites is leased to Mecklenburg County and one to Iredell County. Table 9 lists all of the public access areas on Lake Norman.

Insert Figure 4 Land Use

**TABLE 9**  
 Lake Norman Public Access Areas  
 Concord/Kannapolis IBT Environmental Impact Statement

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**Upper Section**

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Long Island Access Area  
 Lake Norman State Park  
 Bill's Marina  
 Long Island Marina  
 Stumpy Creek Access Area (Leased to Iredell County)  
 McCrary Creek Access Area  
 Pinnacle Access Area  
 Marshall Fishing Area  
 North Bridge Marina  
 River City Marina  
 Skipper's Marina

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**Lower Section**

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Lake Norman Marina  
 Mountain Creek Marina  
 Lake Norman Motel, Restaurant & Marina  
 The Boat Rack Marina  
 Hager Creek Access Area  
 Little Creek Access Area  
 Westport Dry Storage  
 Holiday Harbor  
 Beatties Ford Access Area  
 Jetton Road County Park (Operated by Mecklenburg County)  
 Ramsey Creek Access Area (Leased to Mecklenburg County)  
 McGuire Fishing Area  
 Energy Explorium  
 Blythe Landing County Park (Operated by Mecklenburg County)  
 All Seasons Marina  
 Stutts Bait & Tackle  
 Inland Sea Marina

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Source: Duke Power, 2002



### ***Prime Agricultural and Forestry Land***

North Carolina Executive Order 96 charges all state agencies to minimize the loss of prime agricultural and forested lands as defined in the Federal Farmland Protection Policy Act. Prime farmland is of major importance in meeting the nation's short- and long-range needs for food and fiber. Primarily based on soil characteristics, these lands are best suited for producing high yields of food, feed, forage, fiber, and oilseed crops with minimal input of energy and economic resources and the least damage to other environmental resources. Soils that have a high water table and are frequently flooded have severe limitations to manage and use for agriculture even if those soils qualify as prime agricultural land. These limitations would exclude almost all of the soils in the floodplains of the water bodies in the study area from being considered of significant importance as prime agricultural land.

The forested areas in the Lake Norman study area are primarily a mix of pine and hardwood forests. Due to severe storms in 1989 and infestation by Southern Pine Beetles, the pine forests exist as smaller pockets surrounded by a forest of hardwoods. Hickories, sweet gum, red maple, dogwood, and oaks are the prevalent species. Mountain laurel, wild hydrangea, box elder, strawberry bush, and other small trees and shrubs comprise the understory. Stream banks are dominated by sweet gum, ironwood, and river birch while beech may be found in the coves. Alder and willow thickets grow along the lake's edge, and marsh communities include a variety of grasses, rushes, and sedges. (DPR, 2002).

According to the 1996 land use information, Table 8 and Figure 4, forest lands represent approximately 44,768 acres or about 47 percent of the study area. Agricultural lands represent 16,017 acres or about 17 percent of the study area.

### ***Cultural Resources/Archaeological and Historic Areas***

NCEPA requires the conservation and protection of the state's natural resources and preservation of "the important historic and cultural elements of our common inheritance." Archaeological sites are important since they contain the only material remains of extinct Native American cultures dating back 12,000 years, throughout North Carolina. Historic structures are significant since they preserve North Carolina history. Historic districts consist of whole blocks of downtown areas including many structures that are culturally and historically significant.

The National Register of Historic Places (NRHP) is the formal repository of information pertaining to historic structures and districts. Figure 5 and Table 10 illustrate the 2 NRHP historic districts and 12 structures located within the Lake Norman study area.

Insert Figure 5 NRHP

**TABLE 10**

National Register Historic Sites – Lake Norman  
*Concord/Kannapolis IBT Environmental Impact Statement*

<b>Site Name</b>	<b>Acres</b>	<b>Description</b>
Alexander Moore Farm	27	1843 Federal farmhouse
Bunker Hill Covered Bridge	<1	1895 covered bridge
Catawba Historic District	70	19th Century farmhouses, residential/commercial district
Centre Presbyterian Church	18	1854 Greek Revival Church
Cornelius House	33	Circa 1820-30 Georgian/Federalist house
Eumenean Hall, Davidson College	0.5	1849 Greek Revival 2-story brick structure
Falls-Hobbs House	2.18	Circa 1820-30 Federalist w/Greek Revival
George Houston House	31.5	Circa 1818 Federalist 2-story House with log cabin
Johnson-Neel House	9.9	Circa 1830 Federalist 2-story brick
Munday House	5	19 <sup>th</sup> Century small log house
Neill-Turner-Lester House	<1	19 <sup>th</sup> Century Federalist/Italian house
Perkins House	9	1790 Federalist 2-story brick
Philanthropic Hall, Davidson College	0.5	1849 Greek Revival 2-story brick
Terrell Historic District	150	Late 19th Century residential /commercial district

The area surrounding the Catawba River is rich in history. Artifacts including pottery shards, flint chips and arrowheads, as well as burial sites near the river, indicate the presence of Native Americans long before European settlement. The Catawba Indians had an estimated population of 5,000 in 1600, but their number declined steadily due to disease and warfare with Iroquoian tribes. By 1760, the Catawba tribe was reduced to 60 fighting men. The Catawba left the area in 1762 and moved south. In the mid 1700s, Fort Dobbs was built to protect area settlers during the French and Indian War. Daniel Boone helped to defend this fort against the Cherokees. During the Revolutionary War, Lord Cornwallis set up a camp in the area and a skirmish was fought at Cowans Ford, an area now covered by Lake Norman (DPR, 2002). Due to the size of the project's source and receiving basins, and the fact that no construction will occur with the project, no archeological survey was prepared for the project.

### **Primary Consequences**

The IBT will not have any direct impacts on urban/developed land, public lands, prime agricultural land, forest land, or archeological or historic resources in the study area. The expansion of raw water transmission lines, water treatment plants, and the finished distribution system in Mecklenburg County that will implement the IBT may have a direct impact on these land uses; however, the projects associated with the transfer of water will be permitted separately under appropriate state and federal programs and their environmental

impacts evaluated under separate NCEPA documents. Many of the infrastructure improvements that transfer finished drinking water to the Rocky River Subbasin are already in place.

### Secondary and Cumulative Consequences

The interbasin transfer will not affect the provision of water or sewer services in the study area around Lake Norman. The IBT will not significantly alter the availability of water to the study area to serve existing and projected land uses and long-term water demand in the study area. The interbasin transfer will not, when considered with other water withdrawal projected from the reservoir system, cause significant cumulative elevation changes in any of the Catawba-Wateree project lakes, nor will water quality in any of the water bodies change substantially. Minimum releases of water from the various reservoirs in the chain will not change, even under severe drought conditions.

The project will therefore not change the existing pattern or rate of growth, use of land or water, or change in land uses from what is currently expected in the study area. No land uses, private properties, public areas, recreational sites, archeological sites, historic structures, or water dependent structures will be flooded or drained with the transfer. The project will not induce, impede, or alter growth from what is currently planned. The IBT will not have any secondary or cumulative impacts to land uses or land resources in the source basin.

### High Rock Lake

#### Existing Environment

##### *Urban/Developed Lands*

Based on land use information developed for the Yadkin Project relicensing project in September 2002, residential development is the second largest land use category, accounting for 34 percent of shoreline land use. Most residential development is concentrated in the middle and lower sections of High Rock Lake below Swearing Creek. Of the 193 miles of shoreline found below Swearing Creek, 48 percent is residential development. The majority of residences are found in subdivisions along the Abbots, Crane, Second, Flat Swamp, and Swearing Creeks tributary arms of the reservoir. In addition, several large new residential subdivisions are being developed along Flat Swamp Creek and Panther Creek. Figure 4 illustrates the digital 1996 land cover data that are available, but the information described here is based on more recent information compiled by Yadkin Inc.

Yadkin Inc. has reviewed EAs for several new subdivisions on High Rock Reservoir, including Yachtman's Point, and major subdivisions on Panther, Flat Swamp, and Abbots Creeks. Yadkin Inc. estimates that approximately 300 new lots adjoining the Project will be created as a result of these subdivisions. Yadkin Inc. anticipates that most of the individuals purchasing these properties will request private access to the reservoir (Yadkin-APGI, 2002).

Yadkin-APGI has prepared a shoreline management plan (SMP) for the Yadkin Project, which includes High Rock Lake, Tuckertown Reservoir, and Badin Lake, to address the continuing recreational and residential development in these study areas. The SMP is a guide for future management of the reservoirs in the face of ever-increasing shoreline development, including increasing requests for private piers (owned by individual property owners or shared by owners of two adjoining lots) and multi-use recreation facilities (for public, commercial, or private group use) (Yadkin-APGI, 2002).

### ***Prime Agricultural and Forestry Land***

Agricultural use accounts for 5 percent of the shoreline land uses for High Rock Lake. The largest areas of agricultural land are found at the upper end of the reservoir. Large pockets of agricultural land also occur along Second and North Potts Creeks, while smaller scattered pockets occur throughout the reservoir (Yadkin-APGI, 2002).

The Yadkin Project is located within the Piedmont Province of the Southern Pine Region. The Southern Pine Region lies generally east of the Texas and Oklahoma prairies and south of the Missouri, Ohio, and Potomac Rivers. Forested lands are the predominant land use along the High Rock Lake shoreline, accounting for approximately 57 percent of shoreline use. Forested areas occur primarily at the upper, more riverine end of the High Rock Lake study area. Of the 167 miles of shoreline found along High Rock Lake above Swearing Creek, 79 percent is forested. Some significant tracts of forested land also exist at the extreme upper ends of Crane, Swearing, Abbotts, and Flat Swamp Creeks. These areas of the reservoir are generally shallower and, therefore less attractive for shoreline development. On the lower portion of the main reservoir there are still some sizable tracts of forested land on the eastern shore between Flat Swamp and Abbotts Creeks, where the railroad runs along the shoreline, and on the western side between Panther and Dutch Second Creeks (Yadkin-APGI, 2002).

### ***Public Lands (Parks/Recreation Areas and Greenways)***

The High Rock Lake study area provides many benefits to the public, including recreational boating, fishing, hiking, wildlife preservation, and aesthetic enjoyment. Due to its proximity to Salisbury, the Lake and adjoining recreational lands are popular destinations for local residents.

Recreational use is particularly high at High Rock Lake where shoreline residents make up a significant portion of the total recreational users. There are 15 multi-use access areas open to the public, 9 of which provide boat launching areas and 3 of which are commercially operated marinas. In total, there are 15 boat launch ramps with a total of 19 boat launching lanes. Parking at public recreation facilities is ample, with available space for an estimated 763 vehicles. Of the 15 public access areas located on the lake, 4 are primarily used for bank fishing. Bank fishing also occurs at many of the larger boat launch areas, as well as at many informal locations around the reservoir. Public recreation facilities also provide areas for picnicking, swimming, and day uses, as well as a canoe portage trail around High Rock Dam. One commercial facility operates a campground with approximately 80 campsites available for public use at a fee (Yadkin-APGI, 2002).

### ***Cultural Resources/Archaeological and Historic Areas***

Table 11 lists the NRHP sites located within the High Rock Lake study area. The three NRHP sites, totaling 12.5 acres, are all located in Davidson County on the north side of the Lake and just south of the city of Lexington.

TABLE 11

National Register Historic Sites – High Rock Lake  
*Concord/Kannapolis IBT Environmental Impact Statement*

Site Name	Acres	Description
Becks Reformed Church Cemetery	2.5	1787; 500 gravestones
Jersey Baptist Church Cemetery	3.5	1755; 225 gravestones
Jersey Settlement Meeting House	6.5	1755 brick Greek Revival

The Upper Piedmont has enjoyed a rich history since being settled by Europeans in the early 1700s. Several important historic sites and architecturally significant buildings have been identified and protected in the area also. The Yadkin Pee Dee River Basin contains many archeological sites that have been surveyed and several sites where significant archeological resources have been found from many native groups that lived in the region up until 200 years ago. Due to the size of the project's source and receiving basin study areas, and the fact that no construction will occur with the project, no archeological survey was prepared for the project.

### **Primary Consequences**

The IBT will not have any direct impacts on urban/developed land, public lands, prime agricultural land, forestlands, or archeological or historic resources in the High Rock Lake study area. The expansion of raw water transmission lines, water treatment plants, and the finished distribution system in the Cities that will implement the IBT may have a direct impact on these land uses; however, the projects associated with the transfer of water will be permitted separately under appropriate state and federal programs and their environmental impacts evaluated under separate NCEPA documents.

### **Secondary and Cumulative Consequences**

The interbasin transfer will not affect the provision of water or sewer services in the study area around High Rock Lake. The IBT will not significantly alter the availability of water to the source basin to serve existing and projected land uses and long-term water demand in the source basin. The interbasin transfer will not cause significant cumulative change in instream flows in the Yadkin River, nor will water quality change substantially.

The project will therefore not change the existing pattern or rate of growth, use of land or water, or change in land uses from what is currently expected in the source basin. No land uses, private properties, public areas, recreational sites, archeological sites, historic structures, or water dependent structures will be flooded or drained with the transfer. The project will not induce, impede, or alter growth from what is currently planned. The IBT will not have any secondary or cumulative impacts to land uses or land resources in the study area.

### **Tuckertown Reservoir**

#### **Existing Environment**

##### ***Urban/Developed Lands***

The 75-mile shoreline of Tuckertown Reservoir consists mostly of a Yadkin-Managed Buffer surrounded by other game lands, a small housing development along the west-central section of the reservoir, and a few other scattered residences. The nearest communities to the Tuckertown Reservoir are the towns of Richfield and New London. There are some industrial uses (about one percent of the shoreline) along the reservoir, including the City of Albemarle water intake and the Town of Denton water intake and treatment plant discharge (Yadkin-APGI, 2002).

##### ***Prime Agricultural and Forestry Land***

The predominant land use along the Tuckertown Reservoir shoreline is forested, 81 percent, while agricultural lands represent 6 percent of the total shoreline. The composition of the forested lands is similar to that described in the High Rock Lake section.

##### ***Public Lands (Parks/Recreation Areas and Greenways)***

There are portions of two state game lands adjacent to Tuckertown Reservoir; Alcoa has game lands located on both sides of the reservoir while there are also small pockets of

Uwharrie State Game Lands straddling the Davidson/Montgomery County line. The Alcoa game lands include approximately 11 acres utilized as an archery zone.

Recreational lands represent 10 percent of the Tuckertown Reservoir shoreline. It supports 12 public multi-use recreation and access areas, 4 of which accommodate boat launching. These boat access points provide a total of 5 boat launch ramps and parking for an estimated 298 vehicles. There are no commercially operated marina facilities and no boat slips or dry dock storage spaces available to the public. The remaining public recreation facilities are primarily fishing access (including tailrace fishing below High Rock Dam). There are also a number of informal bank fishing areas located around the reservoir. Other public access facilities include a canoe portage trail around Tuckertown Dam and a highway overlook (Yadkin-APGI, 2002).

### *Cultural Resources/Archaeological and Historic Areas*

There is one NRHP site located within the Tuckertown Reservoir study area. Located along the eastern shore of the Reservoir just north of Cabin Creek, the 206 acre Reid Farm originally held mid-1800s Greek Revival structures which have since been relocated. Due to the size of the project's source and receiving basin study areas, and the fact that no construction will occur with the project, no archeological survey was prepared for the project.

### **Primary Consequences**

The IBT will not have any direct impacts on urban/developed land, public lands, prime agricultural land, forest lands, or archeological or historic resources in the study area. The construction or expansion of raw water intake facilities that will implement the IBT may have a direct impact on these land uses; however, the projects associated with the transfer of water will be permitted separately under appropriate state and federal programs and their environmental impacts evaluated under separate NCEPA documents.

### **Secondary and Cumulative Consequences**

The IBT will not affect the provision of water or sewer services in the study area around Tuckertown Reservoir nor will it significantly alter the availability of water to the study area to serve existing and projected land uses and long-term water demands. The interbasin transfer will not, when considered with other water withdrawal projected from the reservoir system, cause significant cumulative elevation changes in any of the project lakes, nor will water quality in any of the water bodies change substantially. Minimum releases of water from the various reservoirs in the chain will not change, even under severe drought conditions.

The project will therefore not change the existing pattern or rate of growth, use of land or water, or change in land uses from what is currently expected in the study area. No land uses, private properties, public areas, recreational sites, archeological sites, historic structures, or water dependent structures will be flooded or drained with the transfer. The project will not induce, impede, or alter growth from what is currently planned. The IBT will not have any secondary or cumulative impacts to land uses or land resources in the study area.

### **Badin Lake**

#### **Existing Environment**

##### *Urban/Developed Lands*

The land uses of the 115-mile shoreline of Badin Lake are predominantly forest (48 percent) and residential development (43 percent). Nearly 10 miles of the eastern shoreline are part of the Uwharrie National Forest. Badin Lake is more developed than High Rock or

Tuckertown Reservoirs, with moderate to large subdivisions concentrating along Garr Creek, Beaverdam Creek, and the Palmerville area. Approximately 8 percent of the shoreline is recreational lands. There are some industrial uses (about one percent of the shoreline) along the shoreline, including the Alcoa's Badin Works Plant and the Narrows Dam and Powerhouse (Yadkin-APGI, 2002).

#### ***Prime Agricultural and Forestry Land***

Most of the Badin Lake shoreline is forested, 48 percent. Agricultural lands are almost non-existent, comprising less than one percent of the total shoreline. The composition of the forested lands is similar to that described in the High Rock Lake section.

#### ***Public Lands (Parks/Recreation Areas and Greenways)***

At 2,698 acres, almost 15 percent of the source basin's total 18,338 acres is managed as state game lands (Figure 6). Alcoa owns 592 acres, while 2,106 acres are Uwharrie State Game Lands, which are publicly owned by the U.S. Forest Service. The Uwharrie State Game Lands are predominantly clustered on the southeastern shore of the lake. Alcoa owns the islands on the lake as well as a portion of the western shore downstream of the Tuckertown Reservoir dam.

Recreational lands represent 8 percent of the Badin Lake shoreline. It supports 17 public multi-use recreation and access areas, four of which are commercially operated marinas with 13 commercial boat slips. There are five fishing access areas, including tailrace fishing below Tuckertown Dam and the Uwharrie National Forest pier. There are also a number of informal bank fishing areas located around the reservoir. Other public access facilities include picnicking, swimming, and a canoe portage trail around Narrows Dam. Nearly 600 vehicles can be accommodated at the lake's facilities (Yadkin-APGI, 2002).

#### ***Cultural Resources/Archaeological and Historic Areas***

There are three NRHP sites located within the Badin Lake study area. The 72 acre Narrows Dam and Powerhouse, completed in 1917, was then the world's highest overflow dam. Two commercial and residential historic districts, West Badin, circa 1920s, and Badin, 1912, are recognized at 87 and 170 acres, respectively. Due to the size of the project's source and receiving basin study areas, and the fact that no construction will occur with the project, no archeological survey was prepared for the project.

#### **Primary Consequences**

The IBT will not have any direct impacts on urban/developed land, public lands, prime agricultural land, forest lands, or archeological or historic resources in the source basin. The construction or expansion of raw water intake facilities that will implement the IBT may have a direct impact on these land uses; however, the projects associated with the transfer of water will be permitted separately under appropriate state and federal programs and their environmental impacts evaluated under separate NCEPA documents.

#### **Secondary and Cumulative Consequences**

The IBT will not affect the provision of water or sewer services in the source basin around Badin Lake nor will it significantly alter the availability of water to the source basin to serve existing and projected land uses and long-term water demands. The interbasin transfer will not, when considered with other water withdrawals projected from the reservoir system, cause significant cumulative elevation changes in any of the project lakes, nor will water quality in any of the water bodies change substantially. Minimum releases of water from the various reservoirs in the chain will not change, even under severe drought conditions.



Insert Figure 6 NHEO SNHA

The project will therefore not change the existing pattern or rate of growth, use of land or water, or change in land uses from what is currently expected in the source basin. No land uses, private properties, public areas, recreational sites, archeological sites, historic structures, or water dependent structures will be flooded or drained with the transfer. The project will not induce, impede, or alter growth from what is currently planned. The IBT will not have any secondary or cumulative impacts to land uses or land resources in the source basin.

## Fish and Wildlife Resources

### Lake Norman

#### Existing Environment

##### *Wildlife Habitat and Resources*

The Lake Norman study area contains multiple pockets of land dedicated to wildlife, mostly on the northern half of the Lake. While mainly focused on active recreation activities such as hiking and picnicking, Lake Norman State Park on the northeastern shore of the Lake does provide some undeveloped habitat for wildlife. In addition to the state park lands, 853 acres of the privately owned Catawba Game Lands are located within the source basin along the Lake's northwestern shore generally south of Balls Creek and north of Mountain Creek (Figure 6). Some 2,000,000 acres of public and private lands in North Carolina are managed by the NC Wildlife Resources Commission (WRC) for public hunting, trapping and fishing, and are designated collectively as Game Lands (WRC, 2002).

At least 35 species of mammals have been found in the area around Lake Norman State Park (DPR, 2002). Upland communities are home to Virginia opossum, eastern cottontail, gray squirrel, red and gray foxes, and white-tailed deer, as well as the eastern mole and several species of shrews and mice. Muskrat and raccoon may be seen in the marshes along the creeks and lake. Amphibians and reptiles are abundant and diverse. Frogs, turtles and water snakes inhabit wetlands along the creeks and the perimeter of the lake.

Bird life in the park is typical of the Carolina Piedmont. Carolina chickadees, pine warblers, rufous-sided towhees, and bobwhite quails make their homes in the uplands. Red-tailed hawks are common, and raptors and osprey also may be seen near the lake. The waters of Lake Norman attract a variety of waterfowl. Mallards, wood ducks, teal, and other ducks, as well as geese, may be seen during certain seasons. Wading birds, including great blue herons, green-backed herons, and egrets, may be encountered along lake shallows in summer. Shorebirds rest in these areas during spring and fall migrations.

##### *Fishery Habitat and Aquatic Resources*

The Lake Norman study area contains important fisheries and aquatic resources. Popular game fish in Lake Norman include crappie, bluegill, and yellow perch, as well as striped, largemouth, and white bass. A smaller lake located in Lake Norman State Park is also known for good fishing. These lakes also support high recreational use by boaters, water skiers, and swimmers as discussed under the Land Use section of this document.

According to WRC records, the Catawba River Basin contains 88 fishery species, not including hybrids. Two species, Highfin carpsucker and Carolina darter, are listed as Special Concern by the State. One fourth of the species (22) are considered game species by the WRC. Other popular sport fish include several catfish and sucker species. Most fishing effort by anglers is targeted at a limited number of species including trout, Largemouth and Smallmouth bass, Striped bass, White bass, Walleye, crappie, and sunfish.

Fisheries management activities within the Catawba River Basin by the WRC include monitoring the abundance of fish populations, establishing harvest and size limit regulations, stocking fish, and manipulating habitat. Largemouth bass and Smallmouth bass in the basin are managed under the WRC's Black Bass Management Plan. Striped bass are maintained in Lake Norman through annual stockings of fingerling fish. Occasionally, threadfin shad are collected in the spring and stocked in the upper four lakes to boost forage fish densities (WRC, 1998).

#### *Rare and Protected Species or Habitats*

Specific regulations exist at the state and federal levels to protect endangered and threatened species and their habitats from impacts due to public or private projects and land-disturbing activities. The primary law that protects sensitive wildlife species is the Federal Endangered Species Act of 1973. Some of these species may or may not be present in the specific 0.5-mile project area around Lake Norman. Since the proposed certificate does not propose the construction of any specific facilities, a field survey was not performed to substantiate North Carolina Natural Heritage Program (NHP) records. Site specific follow up studies will survey and address any potential rare and protected species or habitats.

Information obtained in September 2002 from the NHP's Natural Heritage Element Occurrence (NHEO) and Significant Natural Heritage Area (SNHA) databases as supplied by CGIA were utilized to identify locations of rare and endangered species populations and occurrences of exemplary or unique natural ecosystems (terrestrial and palustrine) and special wildlife habitats in the study area. Figure 6 illustrates the distribution of these areas and occurrences within the IBT study area. One vertebrate animal of special concern to the state and two that are considered significantly rare are known to exist in the proximity of the Lake Norman study area. There are also 3 vascular plant sites in proximity to the Lake Norman study area, but two of these have been destroyed, and one is a significantly rare peripheral species that has a known historic occurrence, and there is no data to indicate it has been destroyed. In addition to these state designated occurrences, there are 3 natural communities clustered around Lake Norman State Park and one special animal habitat located just east of Cowans Ford Dam near Ramsey Creek. The Natural Heritage Program has also identified the following locally significant natural heritage areas within the study area.

- Lake Norman Slopes and Shoreline – 285 acres
- Lyle Creek Corridor – 3 acres
- Lyle Creek Wetland – 17 acres

- **Primary Consequences**

In total, there are 3 rare natural communities, one special animal habitat, 2 rare and one special concern vertebrate animal species, and one sensitive vascular plant species potentially existing in the source basin. There is also a substantial number of recreational fishery species that exist in the lake that compose the source basin. No construction is associated with this project; thus there are no direct impacts on rare communities. Construction activities will need to be permitted separately.

Both aquatic and terrestrial resources that inhabit lake or stream-side habitat, including aquatic and wetland plants, freshwater mussels, and fisheries in the source basin, could be directly affected by water quality and quantity changes from transfers of water out of the basin, if lake elevations or the volume or rate of flow between reservoirs change dramatically. Such changes could lead to either flooding or draining of sensitive species or habitat areas, or shifts in water quality, depending on how the hydrology in the system

changes. With no significant changes to lake elevation, lake and basin hydrology, or water quality in the source basin, the interbasin transfer project will not have any significant direct impact on fish, aquatic, wildlife, or sensitive resources within the study area.

### **Secondary and Cumulative Consequences**

The interbasin transfer will not affect the provision of water or sewer services or other infrastructure in the source basin around Lake Norman. The project will not change the existing pattern or rate of growth expected in the study area. The interbasin transfer will not, when considered with other water withdrawal projected from the reservoir system, cause significant cumulative lake elevation changes or water quality impacts. The project will therefore not have any secondary or cumulative impacts to fish, aquatic or terrestrial wildlife resources, or sensitive species in the Lake Norman study area.

## **High Rock Lake**

### **Existing Environment**

#### ***Wildlife Habitat and Resources***

There is an abundance of wildlife that uses the lands around High Rock Lake for nesting, bathing, and as a source of food and water. Animals such as white-tailed deer, fox, gray squirrels, and chipmunks may be found in the mature timber stands. Along the edge of the timber stands and in the fields, animals such as bobcats, red and gray foxes, field mice, cotton rats, several species of reptiles, weasels, shrews, and moles may be found.

Bald eagles, osprey, great blue heron, and several egret species have been observed to use the shoreline and open waters of High Rock Lake, Tuckertown Reservoir, and Badin Lake on a regular basis. Other birds using the shoreline area include the wild turkey, bobwhite quail, finches, robins, grosbeaks, bluebirds, warblers, nuthatches, flycatchers, vireos, doves, wrens, and chickadees. Various species of woodpeckers such as the red-headed, pileated, downy, and red-bellied, as well as the flicker and yellow-bellied sapsucker, can both nest and feed in the mature timber. Also nesting in the mature hardwoods and feeding in the fields are owls, such as the barred, great horned, screech, and barn owls. Hawks are also found nesting in the hardwoods and feeding in and around the edges of the open shoreline area. The common hawk species found include the red-tail, red-shouldered, Coopers, and sharp-shinned hawks (Yadkin-APGI, 2002).

Waterfowl in the High Rock Lake study area include such species as mallards, teal, wood duck, black duck, and Canada geese. Wetlands located in the upper section of High Rock Lake from west of I-85 to the large south bend in the reservoir are significant because of their habitat value for waterfowl. These wetlands provide valuable foraging, nesting, and roosting habitat to resident and migratory waterfowl. This area of the source basin probably has the highest concentration of waterfowl in the Project area (Yadkin-APGI, 2002).

#### ***Fishery Habitat and Aquatic Resources***

The High Rock Lake study area provides important fishing and boating opportunities to the area and is particularly known for its crappie and largemouth bass fisheries. The Lake is actively managed by the WRC as a warm water sport fishery and is currently stocked with striped bass. Fish populations primarily consist of sunfish (bluegill, redbreast, pumpkinseed, redear, and green sunfish), largemouth bass, striped bass, white and black crappie, yellow and white perch, catfish (8 species), shad (gizzard and threadfin), carp, suckers, and minnows. Historical records show approximately 31 species associated with High Rock Lake (Yadkin-APGI, 2002).

The WRC considers the High Rock Lake natural shoreline very important to the fisheries resource, especially backwater areas and wetlands that are extremely important as fish nursery and refuge areas. During the development of the SMP, the WRC recommended that Yadkin Inc. protect these valuable fish habitat areas and also suggested implementing and maintaining a 100 foot vegetated buffer zone around the reservoir. The SMP requires a 100 foot forested setback for new subdivision lots, platted and recorded after July 1, 1999, as a condition of eligibility for new piers or private access to Project lands and waters across the Yadkin-Managed Buffer, Appendix A. In order to protect wetlands and areas of aquatic vegetation in High Rock, Yadkin Inc. has designated 119 miles of shoreline (38 percent of the total shoreline) around High Rock as Conservation Zone (Yadkin SMP, 1999).

DWQ has collected some limited data that describe the aquatic resources/macroinvertebrate communities in the tributaries of High Rock Lake and Tuckertown Reservoir but not in the impoundments themselves. The most recent collections were made in 1996 and 2001. Available macroinvertebrate data are used by DWQ to classify streams in terms of impairment due to water pollution. Classifications range from Poor to Excellent based on the number of Taxa present in the pollutant intolerant groups Ephemeroptera, Plecoptera, and Tricoptera (EPT). Higher EPT Taxa Richness is associated with better water quality (Yadkin-APGI, 2002). The macroinvertebrate data record for Grants Creek, a tributary to High Rock Lake, supports a classification of Fair, a decline in its quality rating of Good-Fair in 1996. The North Carolina Index of Biotic Integrity (NCIBI) was used to evaluate the fish communities in streams. Classifications range from Poor to Excellent. The fish community monitoring on Grants Creek in 2001 was classified as Good-Fair. It was not evaluated in 1996. (DWQ, 2002).

#### ***Rare and Protected Species or Habitats***

Figure 6 illustrates the distribution of SNHA areas and NHEO occurrences within the IBT study area. The NHEO database identifies two state endangered vertebrate animals, and two significantly rare vascular plants, that were historically listed, but there are no recent data on them as potentially located in the High Rock Lake study area. The vascular plants are clustered around I-85 at the northern end of the lake while the endangered animals are located in the lake. There are four significant natural heritage areas located in the High Rock study area. The Flat Swamp Gabro Forest, located in Davidson County on the eastern shore just above where Flat Swamp Creek enters the Lake, is considered an area of state significance and is the location of 3 NHEO natural communities. High Rock Mountain, an area of regional significance, is located directly east of the dam and south of Flat Swamp Creek. A NHEO natural community is located on another SNHA site, Smith Grove Slopes, near Swearing Creek. Leonard Road Slopes is a locally significant natural heritage area. There is also a special animal habitat area located on Alcoa game lands along Crane Creek.

The bald eagle is listed under the Endangered Species Act as threatened and is classified in North Carolina as endangered. In the spring of 2001, three bald eagle nests were located, two active and one inactive, in the Project vicinity. One active nest is located along the east shoreline of High Rock Reservoir in an area known as the Smith Grove Slopes on a bluff between the mouths of North Potts Creek and Swearing Creek (Yadkin-APGI, 2002).

#### **Primary Consequences**

In total, there are 4 SNHAs, 8 rare natural communities, 2 endangered vertebrate animal species, and 2 significantly rare sensitive vascular plant species potentially existing in the High Rock Lake study area. In addition, there is a substantial number of recreational fishery species that exist in High Rock Lake.

Both aquatic and terrestrial resources that inhabit lake or stream-side habitat, including aquatic and wetland plants, freshwater mussels, and fisheries in the source basin, could be directly affected by water quality and quantity changes from transfers of water out of the basin, if lake elevations or the volume or rate of flow between reservoirs change dramatically. Such changes could lead to either flooding or draining of sensitive species or habitat areas, or shifts in water quality, depending on how the hydrology in the system changes.

The drought that concluded in 2002 created low-water conditions in numerous North Carolina reservoirs. High Rock Lake on the Yadkin River experienced the most pronounced decrease in water levels. The WRC notes that fish populations—particularly fish populations in highly productive reservoirs such as High Rock Lake—are typically resilient to short-term (less than one year) environmental changes. It is likely that many of the fish that were in the lake proper have moved into the main river channel and should avoid being trapped in any isolated pools created by the draw down of High Rock Lake (WRC, 2002).

WRC fisheries biologists most recently conducted surveys on High Rock Lake in 2000 for crappie and 2001 for largemouth bass. Both 2000 and 2001 surveys indicated good population conditions for crappie and bass. These surveys also indicated that reproduction has been fairly constant during the past few years (WRC, 2002).

However, with no significant changes to lake elevation, lake and basin hydrology, or water quality in the source basin due to the IBT, the project will not have any significant direct impact on fish, aquatic, wildlife, or sensitive resources. The proposed IBT does not require the construction of additional water intake structures in High Rock Lake. Any proposed pumping stations and conveyance lines associated with implementing the transfer will be permitted separately under appropriate state and federal programs and their fish, wildlife, and sensitive species impacts evaluated under a separate NC EPA or NEPA process.

### Secondary and Cumulative Consequences

The IBT transfer will not affect the provision of water or sewer services or other infrastructure in the source basin around High Rock Lake. The project will not change the existing pattern or rate of growth expected in the source basin. The interbasin transfer will not, when considered with other water withdrawal projected from the reservoir system, cause significant cumulative lake elevation changes or water quality impacts. The project will therefore not have any secondary or cumulative impacts to fish, aquatic or terrestrial wildlife resources, or sensitive species in the source basin.

### Tuckertown Reservoir

#### Existing Environment

##### *Wildlife Habitat and Resources*

A significant portion, 4,960 acres of the source basins total 14,625 acres or 34 percent, of the Tuckertown Reservoir study area is managed as state game lands (Figure 6). While the majority of these lands are owned privately by Alcoa, 84 acres of the Uwharrie State Game Lands are publicly owned by the U.S. Forest Service. The Uwharrie State Game Lands are clustered to the east of Tuckertown dam on the Davidson and Montgomery County line. There is an abundance of wildlife similar to that of High Rock Lake that use the Tuckertown Reservoir study area lands for nesting, bathing, and as a source of food and water (Yadkin-APGI, 2002).

### ***Fishery Habitat and Aquatic Resources***

Tuckertown Reservoir is actively managed by the WRC as a warm water sport fishery and is currently stocked with striped bass. Fish populations primarily consist of sunfish (bluegill, redbreast, pumpkinseed, redear, and green sunfish), largemouth bass, striped bass, white and black crappie, yellow and white perch, catfish (8 species), shad (gizzard and threadfin), carp, suckers, and minnows. Historical records show approximately 36 species as associated with the Reservoir. (Yadkin-APGI, 2002). The SMP identified fairly extensive areas of aquatic vegetation and submerged/emergent wetlands in many of the shallow coves and embayments of Tuckertown Reservoir, which are important for water quality, fish cover, and fish nurseries. As a result, 49 miles of the reservoir's shoreline (65 percent of the total) has been designated as Conservation Zone to protect the habitat.

Macroinvertebrate data from Lick and Cabin Creeks, tributaries to Tuckertown Reservoir, support a bio-classification of Fair and Good-Fair, respectively. Cabin Creek drains an agricultural and forested area while Lick Creek receives both urban runoff and a wastewater treatment plant discharge. Long-term data from Cabin Creek suggested no change in water quality based on macroinvertebrate data, but long-term data from Lick Creek suggest a decline in water quality (DENR, 1997). The North Carolina Index of Biotic Integrity (NCIBI) was used to evaluate the fish communities in streams. Classifications range from Poor to Excellent Lick Creek and Cabin Creek received ratings of Good-Fair and Good, respectively in both 1996 and 2001. (DWQ, 2002).

### ***Rare and Protected Species or Habitats***

Figure 6 illustrates the distribution of SNHA areas and NHEO occurrences within the IBT study area. The NHEO database identifies 2 threatened vertebrate animals. There are also 5 occurrences of significantly rare vascular plants and one historical account of a state endangered vascular plant. There are three significant natural heritage areas:

- Tuckertown Bluffs– 42 acres
- Newsom Bluffs and Slopes – 21 acres
- High Rock Mountain – 87 acres

Tuckertown Bluffs is located on the western shore of the reservoir, just south of Flat Creek while Newsom is located on the eastern side approximately 3 miles upstream of the dam. Both SNHAs as well as the one natural community occurring north of Riles Creek in the source basin are located on Alcoa game lands.

### ***Primary Consequences***

In total, there are 3 SNHAs, three natural communities, 2 threatened vertebrate animal species, and 5 significantly rare sensitive vascular plant species and one state endangered vascular plant potentially existing in the study area. In addition, there is a substantial number of recreational fishery species that exist in Tuckertown Reservoir.

Both aquatic and terrestrial resources that inhabit lake or stream-side habitat, including aquatic and wetland plants, freshwater mussels, and fisheries in the source basin, could be directly affected by water quality and quantity changes from transfers of water out of the basin, if lake elevations or the volume or rate of flow between reservoirs change dramatically. Such changes could lead to either flooding or draining of sensitive species or habitat areas, or shifts in water quality, depending on how the hydrology in the system changes.

However, with no significant changes to lake elevation, lake and basin hydrology, or water quality in the source basin due to the IBT, the project will not have any significant direct impact on fish, aquatic, wildlife, or sensitive resources. The proposed IBT does not require

the construction of additional water intake structures in the Reservoir. Any proposed pumping stations and conveyance lines associated with implementing the transfer will be permitted separately under appropriate state and federal programs and their fish, wildlife, and sensitive species impacts evaluated under a separate NCEPA or NEPA process.

### **Secondary and Cumulative Consequences**

The IBT will not affect the provision of water or sewer services or other infrastructure in the source basin around Tuckertown Reservoir nor will it change the existing pattern or rate of growth. The interbasin transfer will not, when considered with other water withdrawal projected from the reservoir system, cause significant cumulative lake elevation changes or water quality impacts. The project will therefore not have any secondary or cumulative impacts to fish, aquatic or terrestrial wildlife resources, or sensitive species in the source basin.

### **Badin Lake**

#### **Existing Environment**

##### ***Wildlife Habitat and Resources***

At 2,698 acres, almost 15 percent of the source basin's total 18,338 acres is managed as state game lands (Figure 6). Alcoa owns 592 acres, while 2,106 acres are Uwharrie State Game Lands, which are publicly owned by the U.S. Forest Service. The Uwharrie State Game Lands are predominantly clustered on the southeastern shore of the lake. Alcoa owns the islands and the western shore downstream of the Tuckertown Reservoir dam. There is an abundance of wildlife similar to that of High Rock Lake that use Badin Lake for nesting, bathing, and as a source of food and water (Yadkin-APGI, 2002).

##### ***Fishery Habitat and Aquatic Resources***

Badin Lake is actively managed by the WRC as a warm water sport fishery and is currently stocked with striped bass. Fish populations primarily consist of sunfish (bluegill, redbreast, pumpkinseed, redear, and green sunfish), largemouth bass, striped bass, white and black crappie, yellow and white perch, catfish (8 species), shad (gizzard and threadfin), carp, suckers, and minnows. Historical records show approximately 35 species as associated with the Reservoir. (Yadkin-APGI, 2002). The SMP identified fairly extensive areas of aquatic vegetation and submerged/emergent wetlands in many of the shallow coves and embayments of Badin Lake, which are important for water quality, fish cover, and fish nurseries. As a result, 54 miles of the reservoir's shoreline (47 percent of the total) has been designated as Conservation Zone to protect the habitat. No macroinvertebrate data for tributaries to Badin Lake were available.

##### ***Rare and Protected Species or Habitats***

Figure 6 illustrates the distribution of SNHA areas and NHEO occurrences within the IBT study area. There are five significant natural heritage areas:

- East Badin Basic Forest – 32 acres
- Pee Dee River Bald Eagle Foraging Habitat – 831 acres
- Machine Branch Mafic Area – 26 acres
- Uwharrie Mafic Rock Area – 17 acres
- Uwharrie Mafic Rock Area – 16 acres

East Badin Basic Forest is located on the southernmost shore of the reservoir. The bald eagle foraging habitat is near the Narrows Dam tailrace. The mafic areas are located within the Uwharrie National Forest along the southeastern shore of Badin Lake.



### Primary Consequences

In total, there are 5 SNHAs, 7 natural communities, one endangered and one special concern vertebrate animal species, and one threatened and one significantly rare vascular plant species potentially existing in the Badin Lake study area. In addition, there is a substantial number of recreational fishery species that exist in the study area.

Both aquatic and terrestrial resources that inhabit lake or stream-side habitat, including aquatic and wetland plants, freshwater mussels, and fisheries in the source basin, could be directly affected by water quality and quantity changes from transfers of water out of the basin, if lake elevations or the volume or rate of flow between reservoirs change dramatically. Such changes could lead to either flooding or draining of sensitive species or habitat areas, or shifts in water quality, depending on how the hydrology in the system changes.

However, with no significant changes to lake elevation, lake and basin hydrology, or water quality in the source basin due to the IBT, the project will not have any significant direct impact on fish, aquatic, wildlife, or sensitive resources. The proposed IBT does not require the construction of additional water intake structures in the lake. Any proposed pumping stations and conveyance lines associated with implementing the transfer will be permitted separately under appropriate state and federal programs and their fish, wildlife, and sensitive species impacts evaluated under a separate NCEPA or NEPA process.

### Secondary and Cumulative Consequences

The IBT will not affect the provision of water or sewer services or other infrastructure in the source basin around Badin Lake nor will it change the existing pattern or rate of growth. The interbasin transfer will not, when considered with other water withdrawals projected from the reservoir system, cause significant cumulative lake elevation changes or water quality impacts. The project will therefore not have any secondary or cumulative impacts to fish, aquatic or terrestrial wildlife resources, or sensitive species in the source basin.

### Water Resources/Water Quality

The State of North Carolina Division of Water Quality (DWQ) identifies the extent of protected and critical areas (CA) and stream classifications for areas around water supply watersheds in which development directly affects a water supply intake. These classifications are as follows:

- Class WS-I: Waters protected as water supplies that are in natural and uninhabited drainage basins, and by definition also classed as High Quality Waters (HQW)
- Class WS-II: Waters protected as water supplies that are generally in predominantly undeveloped drainage basins, and by definition also classed as HQW
- Class WS-III: Waters protected as water supplies that are generally in low to moderately developed drainage basins
- Class WS-IV: Waters protected as water supplies that are generally in moderately to highly developed drainage basins
- Class WS-V: Waters protected as water supplies that are generally upstream of and draining to Class WS-IV waters

#### Catawba River Basin

##### Existing Environment

##### *Lake Norman*

Lake Norman is formed by Cowans Ford Dam and is located in subbasin 030832. Its primary tributaries include Mountain, Reeds, Cornelius, and Rocky Creeks. The water of Lake Norman is used in two ways to provide electricity to the Carolina Piedmont. It is used

to power the generators at Cowans Ford Hydroelectric Station and by Marshall Steam Station and McGuire Nuclear Station to cool the steam that drives the turbines. This steam is condensed back to water so it can be pumped back through the plants and used again. (Duke Power, 2002).

The waters of Lake Norman are classified WS-IV CA from Lookout Shoals Dam to Lyle Creek and WS-IV, B CA from Lyle Creek to Cowans Ford Dam (DWQ, 2000). WS-IV waters have moderately to highly developed watersheds and the water requires a high degree of treatment. Municipal and industrial point sources are allowed in WS-IV waters. Waters classified as B waters are protected for recreation on an organized basis. According to the Division of Water Quality (DWQ) (DENR, 1998), Lake Norman is oligotrophic and fish tissue samples analyzed from the Lake have not exceeded US Food and Drug Administration (FDA) or EPA criteria. In addition, other water quality parameters sampled in the lake indicate that the lake water quality is good.

#### *Mountain Island Lake*

Mountain Island Lake is classified as WS-IV from Cowans Ford Dam to the water intake at the River Bend Stream Station and as WS-IV, B from the water intake to Mountain Island Dam. The major tributaries to Mountain Island Lake are Gar Creek and McDowell Creek.

Mountain Island Lake has been classified as oligotrophic. Elevated nutrient concentrations have been observed in the McDowell Creek arm of the lake from discharges from the McDowell Creek WWTP and nonpoint source runoff.

#### *Lake Wylie*

Lake Wylie is classified as WS-IV CA from Mountain Island Dam to I-85, WS-IV, B CA from I-85 to the upstream side of the Paw Creek arm, and WS-V B from the Paw Creek arm to the state line. The South Carolina portion of Lake Wylie has been classified as FW, which is similar to the WS-V classification within North Carolina.

DWQ has classified Lake Wylie as eutrophic (elevated biological productivity related to an abundance of available nutrients; eutrophic lakes have the potential for water quality problems associated with algal blooms). A similar classification was assigned by SCDHEC (SCDHEC, 1996).

#### **303(d) Listed Streams**

Section 303(d) of the Clean Water Act requires that states develop a list of waters not meeting water quality standards or which have impaired uses. DWQ must prioritize these water bodies and prepare a management strategy or total maximum daily load (TMDL). Lake Norman, Mountain Island Lake, and Lake Wylie are not included on North Carolina's 303(d) list for the Catawba River Basin. However, Long Creek, a tributary of Lake Wylie, is included on North Carolina's 303(d) list for turbidity. Catawba Creek, a tributary to Lake Wylie, and McDowell Creek, a tributary to Mountain Island Lake, are included for biological impairment. In South Carolina, the Crowders Creek arm of Lake Wylie has been included on its 303(d) list due to fecal coliform violations.

#### **Primary Consequences**

In a previous study for a proposed 163 MGD ADD withdrawal by CMU, Duke Power has stated that they expect to operate the reservoirs of the Catawba-Wateree Project within the same elevation ranges that they have been historically operated. Duke Power currently operates its system to meet a minimum daily average flow of 411 cubic feet per second (cfs).

In 2001, ENTRIX, Inc. conducted an Environmental Assessment (EA) for Charlotte Mecklenburg Utilities (CMU) to increase the maximum withdrawal rate from its Catawba River Raw Water Pumping Station on Mountain Island Lake. Included in Section 4

“Environmental Effects” are the modeling results by ENTRIX on the impacts to operations to the Catawba – Wateree Project associated with increasing CMU’s proposed average annual withdrawal rate to 163 MGD by 2030.

The approach used to analyze the impacts of the proposed IBT of 24 MGD on the Catawba River – Wateree Project was to perform a “desk top” analysis of the impacts by using the results of the CHEOPS (Computer Hydro-Electric Operations and Planning Model Software) model run for the CMU impact analysis. Duke Power is in the process of conducting several studies related to FERC relicensing including the development of a water supply plan and updating the CHEOPS model. The completion of this effort was not available at the time this document was prepared, so the results of the existing analysis were used to determine the impacts of using Lake Norman as a water supply source on water resources in the Catawba River Basin.

The results of the CHEOPS modeling were modified to include the proposed 24 MGD IBT as if it had been included in the original modeling effort. The focus of this analysis is utilizing the modeling results for the 2030 cumulative scenario for the year 2030 used in the CHEOPS model. This scenario is based on a projected 96 MGD increase in consumptive use in the Catawba River basin in Lake Wylie and upstream (from an estimated 243 MGD in 2000 to 339 MGD in 2030). This of course does not include CMU’s return of water to the basin downstream of Lake Wylie. The minimal effect of the projected increase in consumptive use from 96 to 120 MGD, by including the proposed 24 MGD IBT, results in little or no changes to the conclusions regarding lake levels, downstream flows, water supply withdrawals, and hydroelectric power generation that were presented in the original study are provided at the end of this section. The details of our analysis based on utilizing the prior CHEOPS modeling results are located in Appendix C.

During a drought situation, CMU, Concord, and Kannapolis would be following their Water Shortage Response Plans, which include either voluntary or mandatory conservation measures depending on the severity of the drought. The results of the CHEOPS modeling results previously discussed do not consider conservation measures customarily implemented in a drought period which tend to reduce water use rates. Therefore, the expected impacts on lake surface elevations and cumulative reservoir outflows during a drought would be less severe than those presented.

There are no expected significant direct impacts in water quality in the source basin as the result of the 24 MGD transfer of water from Lake Norman. Direct impacts in the water quality of surface waters in the source basin are not expected because there will not be any major changes in the hydrology of the system due to the increased withdrawal. Since the hydrology of the system will not be affected in any major manner due to the proposed transfer, water quality should not be affected in Lake Norman or the downstream lakes. Therefore, the assimilative capacity of the surface waters in the source basin is not expected to change due to the proposed transfer of water.

### **Secondary and Cumulative Consequences**

Indirect impacts associated with expanding pumping facilities, existing wastewater treatment plants, raw water transmission lines, water treatment plants, and the finished distribution system will be permitted separately under appropriate state and federal programs. Their environmental impacts will therefore be evaluated under a parallel NCEPA process.

The interbasin transfer will not affect the provision of water or sewer services in the Catawba source basin. The project will therefore not change the existing pattern or rate of

growth expected in the source basin. There are no secondary or cumulative impacts in the source basin directly related to the transfer of water.

## Yadkin River Basin

### Existing Environment

#### *High Rock Lake*

The study area of the Yadkin River source basins begins with the water resources of the Yadkin River south of its confluence with the South Yadkin River just upstream of High Rock Lake. To examine the direct impacts on water quality and water resources, the source basin was extended down to Blewett Falls Dam for this section. The following tributaries also form part of the water resources in the vicinity of High Rock Lake in the source basin:

- Rowan County – Grants Creek, Crane Creek, Second Creek (near the City of Rockwell), and Panther Creek
- Davidson County – Potts Creek, Swearing Creek, Abbotts Creek, and Flat Swamp Creek

Due to lack of measured data, Yadkin-APGI, Inc. has historically calculated streamflows into High Rock Reservoir on a daily basis. The streamflows were computed using monitored changes in reservoir elevation, flow releases through the powerhouse, and flow releases through the spillway. The records reflect information determined based on the original project reservoir storage elevation curve and the original turbine performance curves. The average daily streamflow during the 1980 to 2000 time period ranged from a high of approximately 11,000 cfs in the spring to a low of less than 1,800 cfs in the late fall/early winter. The average daily streamflow in the Yadkin River at High Rock Reservoir was 4,435 cfs for the 1980 to 2000 time period (Yadkin-APGI, 2002).

A flow duration curve of the Yadkin River at High Rock Reservoir has also been developed using the High Rock Reservoir streamflow data. A flow duration curve is a graphical representation of the flow rate in a river and the duration of time that the flow is equaled or exceeded. The flow duration curve was developed using the available data from High Rock Reservoir for the period of 1980 to 2000 and results in a median flow (exceeded 50 percent of the time) at High Rock Reservoir during this time period of 3,020 cfs (Yadkin-APGI, 2002).

The only stream gage located in this portion of the Yadkin-Pee Dee River is located 3.3 miles downstream of Blewett Falls Dam. According to the period of record established at this gage, 90 percent of the flows exceed 1644 cfs, and the average annual flow is 7967 cfs.

The upper portion of High Rock Lake is classified as WS-V to Crane and Swearing Creeks. The classification then changes to WS-IV, B to a point within 0.6 miles of the dam. At this point, the classification becomes WS-IV, B, CA. Water quality in High Rock Lake is considered fair and some degree of eutrophication has led to high algal productivity and reduced dissolved oxygen concentrations (Yadkin-APGI, 2002).

#### *Tuckertown Reservoir*

Tuckertown Reservoir is a long narrow impoundment, basically a widening of the original river channel, covering an area of 2,560 acres at full pool (564.7 feet). It receives most of its water from High Rock Lake and is classified as WS-IV, B, CA. Its main tributaries include Riles, Ellis, Flat, Cabin, and Lick Creeks. WS-IV waters have moderately to highly developed watersheds and the water requires a high degree of treatment. Municipal and industrial point sources are allowed in WS-IV waters. According to the DWQ (2002), Tuckertown Reservoir is eutrophic as evidenced by high surface dissolved oxygen and pH concentrations along with secchi depths less than one meter. Fish tissue samples analyzed from the lake have not exceeded FDA or EPA criteria. In addition, other water quality parameters sampled in the lake indicate that the lake water quality is good.

***Badin Lake***

Badin Lake is also a hydroelectric power reservoir controlled by Yadkin, Inc. A relatively broad body with two major arms, the lake covers an area of 5,355 acres at full pool (509.8 feet). The area just below Tuckertown Dam, the main inflow source, is 175 feet deep, which creates a notable thermocline. It is classified as WS-IV, B, CA. Municipal and industrial point sources are allowed in WS-IV waters. Historically, DWQ considered the lake to be eutrophic, but based on data collected in 1990 and 1994, the state considers the lake to now be mesotrophic. This shift in trophic status may partially be influenced by higher levels of precipitation in the early 1990s. Although the lake is now considered mesotrophic, there are algal blooms on the lake. In 2001, a nuisance blue-green algal bloom formed. In 2000 and 2001, fish kills involving striped bass, sunfish, and catfish were reported to DWQ. Fish tissue samples analyzed from the lake have not exceeded FDA or EPA criteria. Overall water quality is considered better than in High Rock or Tuckertown Reservoirs (DWQ, 2002).

***Falls Lake***

Falls Lake is formed by Falls Lake Dam. The lake is basically a wider portion of the river. Sampling data collected in 1994 indicated that the lake is oligotrophic. Falls Lake is classified as WS-IV, B to a point 0.5 miles above its dam. At that point, the supplemental critical area (CA) designation is added to the classification.

***Lake Tillery***

Lake Tillery is also a hydroelectric power lake, but it is owned by Carolina Power and Light (CP&L). The lake is rated as mesotrophic. The lake is classified as WS-IV, B, CA.

***Blewett Falls Dam***

Blewett Falls Dam is the last Yadkin-Pee Dee chain lake in North Carolina. It is also a hydroelectric power impoundment operated by CP&L. The Rocky River enters the Pee Dee River between lake Tillery and Blewett Falls Lake. The reservoir is considered eutrophic and has elevated surface dissolved oxygen and pH and low secchi depths. The reservoir has a short retention time, which has helped prevent algal blooms. Blewett Falls Lake is rated as WS-V, B to Turkey Top Creek. At this location, the classification changes to WS-IV, B to a point 0.8 miles downstream of Savannah Creek. At this location, the supplemental critical area (CA) designation is added.

**303(d) Listed Streams**

Section 303(d) of the Clean Water Act requires that states develop a list of waters not meeting water quality standards or which have impaired uses. DWQ must prioritize these waterbodies and prepare a management strategy or TMDL. The 2002 list identifies Grants Creek, a tributary to the Yadkin River just upstream of High Rock Lake, as listed as impaired for fecal coliform, turbidity, and biological impairment mainly due to agriculture, construction, municipal point sources, and urban run-off. DWQ has assigned a low priority to this stream. The 2002 list also includes a tributary to Second Creek. The Pee Dee River including Blewett Falls Lake has been listed due to low dissolved oxygen values. Lick Creek, a tributary to Tuckertown Reservoir is also listed as impaired due to biological impairment.

**Primary Consequences**

There are no expected significant direct impacts in water quality in the source basin as the result of the transfer of water from the Yadkin lakes. Direct impacts in the water quality of surface waters in the source basin are not expected because there will not be any major changes in the hydrology of the system due to the increased withdrawal. Removing 24 MGD of water from the Yadkin system is less than 2 percent of the low flow estimated by

Yadkin Inc between 1980 and 2000 coming into High Rock Lake. By the time the water reaches Blewett Falls Lake, a large portion of the water will be returned to the Pee Dee River through the Cabarrus County discharge into the Rocky River. Thus the impact on downstream flow will be minimal. Therefore, the assimilative capacity of the surface waters in the source basin is not expected to change due to the proposed transfer of water.

### Secondary and Cumulative Consequences

The proposed transfer does not require the construction of additional water intake structures. Indirect impacts associated with expanding pumping facilities, existing wastewater treatment plants, raw water transmission lines, water treatment plants, and the finished distribution system will be permitted separately under appropriate state and federal programs. Their environmental impacts will therefore be evaluated under a parallel NCEPA process.

The proposed transfer will not result in significant adverse impacts related with water availability for other existing and future users of water in the source basin.

There are no secondary impacts on water quality or water supply related to growth due to the transfer of water from the source basin. There are no significant cumulative impacts in the source basin directly related to the transfer of water.

## Air Quality

### Existing Environment

A new, stringent National Ambient Air Quality Standard (NAAQS) for ozone was established by EPA in 1997, and the Charlotte-Mecklenburg region has been struggling to meet this new standard. The new 0.08 parts per million (ppm) 8-hour average standard took effect in 1997; and, on February 27, 2001, the U.S. Supreme Court upheld the new standard, and directed EPA to create an implementation plan. The State of North Carolina has recommended a 9 county area, including 2 counties in South Carolina, be designated as a non-attainment area.

Ozone is not directly emitted, but is formed when sunlight reacts with volatile organic compounds (VOCs) and nitrogen oxides (NO<sub>x</sub>). According to the NC Air Awareness program, NO<sub>x</sub> is the limiting factor on the formation of ozone in North Carolina because of the abundance of naturally occurring VOCs from trees, which cannot be controlled. In North Carolina urban areas, more than 60 percent of NO<sub>x</sub> emissions are from automobiles.

### Lake Norman

Air Quality Index (AQI) is used to report ambient air quality conditions, and the AQI ranges from good, moderate, unhealthy, very unhealthy, to hazardous. According to the *2002 State of the Environment Report: Mecklenburg County, NC* (MCDEP, 2002), the overall ambient air quality has steadily improved since 1983. In 2001, Mecklenburg County recorded the AQI as “good” on 51.5 percent of the days, and “moderate” on another 44.7 percent of the days. DENR’s web site provides AQI reports for the Charlotte-Mecklenburg region (also includes counties of Cabarrus, Gaston, Lincoln, Rowan, Union, and York County in South Carolina). For 2001, this region recorded an AQI as “good” on 64.3 percent and “moderate” on 32.4 percent of the days. The county had been a non-attainment area for ozone and carbon monoxide but was re-designated in 1995 as an attainment area.

### High Rock Lake, Tuckertown Reservoir, and Badin Lake

An AQI is used to report ambient air quality conditions, and the AQI ranges from good, moderate, unhealthy, very unhealthy, to hazardous. The DENR web site provides AQI reports for the Charlotte-Mecklenburg region (also includes counties of Cabarrus, Gaston,

Lincoln, Rowan, Union, and York County in South Carolina). In 2001, Rowan County recorded the AQI as “good” on 59.5 percent of the days, and “moderate” on another 29.8 percent of the days. For 2001, the Charlotte-Mecklenburg region recorded an AQI as “good” on 64.3 percent and “moderate” on 32.4 percent of the days.

### Primary Consequences

There is no construction associated with the IBT, and the increased withdrawal of water will not affect air quality. Therefore, there are no primary air quality impacts in the source basin.

### Secondary and Cumulative Consequences

Any change in lake elevations due to the IBT will not affect air quality. The IBT will also not affect the provision of water, sewer, or other infrastructure elements in the project source basin; therefore, there are no secondary or cumulative air quality impacts in the source basin.

## Groundwater Resources

### Existing Environment

All four water sources are located in the physiographic region described as the Piedmont region, which is between the Blue Ridge and the Coastal Plain regions. According to the North Carolina Cooperative Extension Service, the crystalline bedrock aquifer in the Piedmont region has relatively little storage capacity, and the well yields tend to be low (around 5 to 35 gal/min). The U.S. Geographic Survey (USGS) indicates that the major groundwater related issues in North Carolina are (1) declining water levels (especially in the Coastal Plain region), (2) contamination from hazardous wastes and landfill leachate, and (3) effects of land use on water quality (especially the effects of urbanization). While individuals and some community systems in the region use groundwater, it is not an appropriate source for centralized use by the Cities because of insufficient yield and the costs associated with combining surface and groundwater resources.

### Primary Consequences

There is no construction associated with the IBT, and the increased withdrawal of water will not affect groundwater resources. According to *Basic Elements of Ground-Water Hydrology with References to Conditions in North Carolina* (Heath, 1980), groundwater recharge occurs by precipitation in all inter-stream areas (areas except along streams and their adjoining floodplains). Streams and floodplains are, under most conditions, discharge areas for groundwater; therefore, there are no primary impacts to groundwater resources due to the project.

### Secondary and Cumulative Consequences

As described in the Primary Consequences section above, any change in lake elevations (which would only occur during extreme droughts) due to the IBT will not affect groundwater resources; therefore, there will be no significant secondary or cumulative impacts expected on groundwater resources as a result of the project.

## Noise Level

### Existing Environment

Quiet is conducive to psychological and physiological well-being for humans. Just as excessive noise has been documented to negatively affect human health and welfare,

elevated noise levels from human activities can disrupt the normal behavior patterns of wildlife, interfering with migration, breeding, hunting, and predator avoidance.

The source basins currently exhibit the day-to-day normal noise conditions representative of mainly forested and open land cover areas surrounding the four lakes. Seasonal use of the lakes for recreational purposes contributes to increased mobile sources, as well as watercraft, noise during the warmer months. Lake-front living continues to be popular; therefore, construction of new subdivisions, homes, and commercial development surrounding the lakes results in increased noise.

### **Primary Consequences**

There is no construction associated with the IBT, and therefore no increase in noise levels from the IBT. The increased withdrawal of water will not affect noise levels in the source basins; therefore, there are no primary noise impacts in the source basins.

### **Secondary and Cumulative Consequences**

The IBT will not facilitate growth or recreational use in the source basins, therefore, no secondary or cumulative noise impacts will result from the proposed project.

## **Toxic Substances/Hazardous Wastes**

### **Existing Environment**

Potential sources for toxic substances present in the source basins of the study area are agricultural-related substances such as fertilizers, weed control chemicals, and pesticides. Other common toxic substances are employed in the construction of homes and commercial buildings such as glues, solvents, and paints. Typical household hazardous wastes would include oils, cleaners, solvents, paints, herbicides, and fertilizers. Figure 7 shows the location of hazardous waste disposal sites and concentrated livestock operations within the source basins.

### **Lake Norman and Tuckertown Reservoir**

There are no operating hazardous waste disposal sites or concentrated livestock operations in the Lake Norman or Tuckertown Reservoir study areas.

### **High Rock Lake**

The only hazardous substance disposal site in the High Rock Lake study area is 6 acres owned by Fieldcrest Mills and located just upstream of I-85's intersection with the Lake. There are two concentrated livestock operations in the High Rock Lake study area, each with one waste lagoon, (DWQ, 2000). This includes a swine operation on the south side of



Insert Figure 7 haz disposal

Cranes Creek with approximately 3,150 animals and a cattle operation located on the east side of Potts Creek with approximately 250 animals.

### **Badin Lake**

There is one operating hazardous substance disposal site in the Badin Lake study area—133 acres at the Alcoa Badin Works. No concentrated livestock operations are in the basin.

### **Primary Consequences**

There is no construction associated with the IBT. There are, therefore, no potentially significant impacts to the environment from releases of toxic substances or hazardous wastes associated with the proposed IBT.

### **Secondary and Cumulative Consequences**

Any change in lake elevations due to the IBT will not affect the potential release of toxic substances or hazardous wastes; therefore, there are no secondary or cumulative impacts expected.

## **Environmental Justice**

### **Existing Conditions**

Population information was obtained from the Census 2000 data prepared by the U.S. Census Bureau and summarized by the North Carolina State Data Center at [www.census.state.nc.us](http://www.census.state.nc.us). According to the information on that website, the State of North Carolina as a whole has a median income of \$39,184 and 12 percent of the state's population is below the poverty level.

### **Lake Norman**

In each of the Counties surrounding Lake Norman (Lincoln, Catawba, Iredell, and Mecklenburg), the median incomes are higher than the state's median incomes, and there is a lower percentage of people below the poverty line. Iredell County's median income for the black population was lower than the state average (95 percent of state average); the median income for the black population in each of the other Counties exceeded the state median.

### **High Rock Lake**

Rowan and Davidson Counties border High Rock Lake. These Counties compare reasonably well to state averages in terms of median income. In Rowan County, the median income is approximately 96 percent of the state average, and the median income among the Black population is 97 percent of the state average. Ten percent of the County is below the poverty line as compared to 12 percent throughout the state. Davidson County shows similar numbers among the population as a whole. The median income is 99 percent of the state average, and 10 percent of the population is below the poverty level. However, the black population earns 88 percent of the state's median income.

### **Tuckertown Reservoir**

Rowan, Davidson and Stanly Counties border Tuckertown Reservoir. These Counties compare reasonably well to state averages in terms of median income. In Rowan County, the median income is approximately 96 percent of the state average, and the median income among the Black population is 97 percent of the state average. Ten percent of the County is below the poverty line as compared to 12 percent throughout the state. Davidson County shows similar numbers among the population as a whole. The median income is 99 percent of the state average, and 10 percent of the population is below the poverty level. However, the black population earns 88 percent of the state's median income. Stanly County has

lower income than the other counties. The population as a whole earns 94 percent of the state's median income, but the Black population earns 81 percent of the state median. Approximately 10 percent of the population live below poverty level.

### **Badin Lake**

Montgomery, Davidson, and Stanly Counties border Badin Lake. These Counties compare reasonably well to state averages in terms of median income. In Montgomery County, the median income is approximately 84 percent of the state average, and the median income among the Black population is 80 percent of the state average. Fifteen percent of the County is below the poverty line as compared to 12 percent throughout the state. Davidson County shows similar numbers among the population as a whole. The median income is 99 percent of the state average, and 10 percent of the population is below the poverty level. However, the black population earns 88 percent of the state's median income. Stanly County has lower income than the other counties. The population as a whole earns 94 percent of the state's median income, but the Black population earns 81 percent of the state median. Approximately 10 percent of the population live below poverty level.

### **Primary Consequences**

There is no construction associated with this project so there are not direct environmental justice issues.

### **Secondary and Cumulative Consequences**

This IBT will not facilitate growth in the source basins. In addition, there will be no direct impacts to water resources and other resources within the source basins. Thus, there are not environmental justice issues within the source basins.

## **Potential Impacts on Hydroelectric Projects**

### **Catawba – Wateree Project**

In 2001, ENTRIX, Inc. conducted an Environmental Assessment (EA) for Charlotte Mecklenburg Utilities (CMU) to increase the maximum withdrawal rate from its Catawba River Raw Water Pumping Station on Mountain Island Lake. The impacts of increasing CMU's proposed average annual withdrawal rate to 163 MGD by 2030 on the operations of the Catawba – Wateree Project were modeled (Section 4, ENTRIX, 2001). The CHEOPS (Computer Hydro-Electric Operations and Planning Model Software) model was used to evaluate the increased annual withdrawal and the associated increase in consumptive use for individual reservoirs in the system (due to withdrawal and discharge downstream, IBT, and other consumptive uses). This analysis is currently being updated as part of re-licensing studies being conducted for Duke Power but results of this analysis are not available as of August, 2004.

The approach used to analyze the impacts of the proposed IBT of 24 MGD on the Catawba River – Wateree Project was to perform a “desk top” analysis of the impacts by using the results of the CHEOPS model run for the CMU impact analysis. Duke Power is in the process of conducting several studies related to FERC relicensing including the development of a water supply plan and updating the CHEOPS model. The completion of this effort was not available at the time this document was produced, so the results of this analysis are based on the existing model.

The results of the CHEOPS modeling were modified to include the proposed 24 MGD IBT as a consumptive use as if it had been included in the original modeling effort. The focus of this analysis is utilizing the modeling results for the 2030 cumulative scenario for the year

2030 used in the CHEOPS model. This scenario is based on a projected 96 MGD increase in consumptive use in the Catawba River basin in Lake Wylie, Mountain Island Lake, Lake Norman and upstream (from an estimated 243 MGD in 2000 to 339 MGD in 2030). This of course does not include CMU's return of water to the basin downstream of Lake Wylie. The minimal effect of the increasing the projected increase in consumptive use from 96 to 120 MGD, by including the proposed 24 MGD IBT, results in little or no changes to the conclusions regarding lake levels, downstream flows, water supply withdrawals, and hydroelectric power generation that were presented in the original study.

During a drought situation, CMU, Concord, and Kannapolis would be following their Water Shortage Response Plans, which include either voluntary or mandatory conservation measures depending on the severity of the drought. The results of the CHEOPS modeling results previously discussed do not consider conservation measures customarily implemented in a drought period which tend to reduce water use rates. Therefore, the expected impacts on lake surface elevations and cumulative reservoir outflows during a drought would be less severe than those presented.

Shown below is a summary description of the potential impacts on lake levels, downstream flows, water supply withdrawals, hydroelectric power generation.

#### Potential Impacts on Lake Levels

Lake Norman and Lake Wylie must maintain certain levels for nuclear and fossil power plants. Table 12 indicates the average daily Lake Wylie water surface elevations remain unchanged for existing conditions (Year 2000) and future water withdrawals (Year 2030). This occurs for both the average and dry year modeling scenarios for average annual river flows as well as during the summer and fall low flow (July, August, September, October (JASO)) period.

TABLE 12

Average Daily Lake Wylie Elevations for Existing and Future Water Withdrawal Scenarios  
Concord/Kannapolis IBT Environmental Impact Statement

Modeling Scenarios	Average Year Elevations (ft)		Dry Year Elevations (ft)		Drought Year Elevations (ft)	
	Annual	JASO <sup>1</sup>	Annual	JASO <sup>1</sup>	Annual	JASO <sup>1</sup>
Existing 2000	566.66	566.46	566.48	566.43	566.09	565.78
CMU 2030	566.65	566.46	566.48	566.43	566.09	565.79
CMU 2030 Minus Existing 2000	-0.01	0.00	0.00	0.00	0.00	0.00
Cumulative 2030	566.65	566.46	566.47	566.43	566.09	565.79
Cumulative 2030 Minus Existing 2000	-0.01	0.00	0.00	0.00	0.00	0.00

Source: modified Table F-1 ENTRIX (2001)

1. JASO includes the months of July, August, September, and October

Information from the original FERC application for CMU (CH2M HILL, 1999) estimated that CMU's proposed future 163 MGD withdrawal impacts on lake levels during an extreme drought would be 0.1 inches per week in all reservoirs upstream of Lake Wylie and 0.5 inches per week for cumulative withdrawals. The future cumulative scenario is based on a projected 96 MGD increase in consumptive use in the Catawba River basin in Lake Wylie

and upstream (from an estimated 243 MGD in 2000 to 339 MGD in 2030) as indicated in Table 13.

**TABLE 13**

Consumptive Water Use for Subbasins Draining into the Catawba – Wateree River  
*Concord/Kannapolis IBT Environmental Impact Statement*

Catawba – Wateree Project Reservoir	Estimated Consumptive Use (MGD)	
	Existing 2000	Projected 2030
Lake James	3	5
Lake Rhodhiss	17	24
Lake Hickory	11	23
Lookout Shoals Lake	1	9
Lake Norman	53	105
Mountain Island Lake	113	127
Lake Wylie	45	46
<b>Consumptive Use in Lake Wylie and upstream</b>	<b>243</b>	<b>339</b>
Fishing Creek Lake	-56	-83
Great Falls Lake	-9	-18
Rocky Creek Lake	1	1
Lake Wateree	8	11
<b>Consumptive Use downstream of Lake Wylie</b>	<b>-56</b>	<b>-89</b>
Total Consumptive Use	187	250

Source: modified Table 4-4 ENTRIX (2001)

### Potential Impacts on Downstream Flows

To develop a conservative analysis, the results presented in Table 14 indicate the frequency impacts on the low flow releases from Lake Wylie during drought year if the proposed 24-MGD IBT transfer were added to the results presented in table 4-10 of the ENTRIX analysis.

TABLE 14

Percent of Time Daily Flow Releases from Lake Wylie Equal or Exceed Selected Low-Flow Thresholds During a Drought Year  
*Concord/Kannapolis IBT Environmental Impact Statement*

CHEOPS Scenario	Selected Low-Flow Thresholds (cfs)					
	411 <sup>1</sup>	500	683 <sup>2</sup>	700 <sup>3</sup>	750	1000
Existing 2000	100%	85%	82%	82%	81%	70%
CMU 2030	100%	84%	82%	82%	78%	62%
Cumulative 2030 (CMU)	100%	84%	81%	79%	76%	55%
Cumulative 2030 plus 24 MGD	100%	83%	78%	78%	76%	52%

Source: modified Table 4-10, ENTRIX (2001)

1. Lake Wylie minimum release

2. Celanese Acetate LLC NPDES Permit basis

3. Basis of NPDES permits for discharges downstream of Lake Wylie

## Potential Impacts to Water Supply Withdrawals

Modeling scenarios used to predict future impacts of the proposed CMU withdrawal for the year 2030 were based on consumptive use projections for the entire Catawba River basin. Estimates of future water use by municipal, industrial, power, and irrigation users were developed to account for future demands (Appendix E ENTRIX, 2001). Therefore future water supply uses have already been accounted in the CHEOPS model. Duke is in the process of updating this information as part of a Water Supply Study associated with FERC relicensing but the results of this analysis will not be available until early 2005.

In addition, potential impacts to water supply withdrawals due to the proposed additional 24 MGD withdrawal are almost negligible since lake levels are maintained for project operation purposes as discussed previously.

## Potential Impacts to Hydroelectric Power Generation

Impacts to hydroelectric power generation capabilities have been assessed using the same approach for analyzing downstream flow releases except the analysis has been done for “average” and “dry” year flow scenarios when river flows are available for hydroelectric power generation. To complete the analysis, Tables 15 and 16 were created to indicate changes in daily flow releases from Lake Wylie that would occur if the proposed 24-MGD IBT transfer were included in the results originally presented Tables F-21 and F-22 (ENTRIX, 2001). The original tables have been modified by subtracting the proposed 24 MGD IBT (or 37 CFS) from the daily discharges to identify the additional impact due to the increased withdrawals during an “average” and “dry” year modeling scenarios.

Tables 15 and 16 indicate the addition of another 24 MGD of withdrawal, to the cumulative 2030 case to the ENTRIX analysis results for the average year and dry year, has little or no additional impact on the downstream releases from Lake Wylie. This result occurs on an average annual basis as well as during the summer-fall low flow (July, August, September, October (JASO)) period.

TABLE 15

Percent of Time Daily Flow Releases from Lake Wylie Equal or Exceed Selected Daily Flow Thresholds During the Entire Year  
*Concord/Kannapolis IBT Environmental Impact Statement*

Modeling Scenario	Selected Daily Flow Thresholds (cfs)						
	400	500	700	1,000	1,250	1,500	2,000
<b>Average Year</b>							
Existing 2000	100%	100%	97%	87%	82%	82%	79%
Cumulative 2030 (CMU)	100%	100%	96%	87%	82%	82%	79%
Cumulative 2030 plus 23 MGD	100%	100%	95%	86%	82%	81%	79%
<b>Dry Year</b>							
Existing 2000	100%	95%	88%	81%	76%	73%	61%
Cumulative 2030 (CMU)	100%	95%	88%	81%	75%	70%	59%
Cumulative 2030 plus 23 MGD	100%	94%	88%	80%	75%	68%	59%

Source: modified Table 4-6 modified, ENTRIX (2001)

TABLE 16

Percent of Time Daily Flow Releases from Lake Wylie Equal or Exceed Selected Daily Flow Thresholds During the Summer-Fall Low-Flow (JASO) Period  
*Concord/Kannapolis IBT Environmental Impact Statement*

Modeling Scenario	Selected Daily Flow Thresholds (cfs)						
	400	500	750	1,000	1,250	1,500	2,000
<b>Average Year</b>							
Existing 2000	100%	100%	93%	82%	71%	71%	71%
Cumulative 2030 (CMU)	100%	100%	93%	82%	71%	71%	71%
Cumulative 2030 plus 23 MGD	100%	100%	89%	78%	71%	71%	71%
<b>Dry Year</b>							
Existing 2000	100%	93%	78%	71%	71%	71%	46%
Cumulative 2030 (CMU)	100%	93%	78%	71%	71%	62%	40%
Cumulative 2030 plus 23 MGD	100%	93%	75%	71%	71%	62%	39%

Source: modified Table 4-7, ENTRIX (2001)  
 Data from Table F-13 and F-14 were also used

## Yadkin Hydroelectric Project

Alcoa Power Generating Inc. responded to a request to evaluate the potential impacts on lake levels, stream flows, and power generation on High Rock Lake, Tuckertown Reservoir, and Badin Lake/Narrows Reservoir of the Yadkin Hydroelectric Project. The original request indicated the IBT request would be for a total of 23 MGD and not 24 MGD ADD as now proposed. In addition, ALCOA presents information for either 3 or 9 MGD to be withdrawn from High Rock Lake and either 2 or 14 MGD from Tuckertown or Narrows Reservoirs for a total potential of 23 MGD. Therefore, the results provided by ALCOA for the 23 MGD withdrawal have been extrapolated to 24 MGD, and the 14 MGD results are used for the 10 MGD alternative. Listed below is a summary of the information provided by ALCOA and the extrapolated results. A full copy of Alcoa's response is provided in Appendix C.

### Potential Impacts on Lake Levels

Based on information provided by ALCOA (Appendix C), the High Rock Lake is operated with a maximum drawdown of 16 to 18 feet. Both Tuckertown Reservoir and Badin Lake are operated with a maximum drawdown of 3 feet. Straight line projections of impacts to lake levels for use in preliminary calculations provided by ALCOA (Appendix C) have been performed. These parameters are shown in Table 17. This analysis indicates a monthly reduction in lake levels from 0.19 to 1.03 feet for the three lakes, depending on the lake levels. This conservative analysis is based on the assumption that inflow into the lake is zero.

TABLE 17  
Yadkin Hydroelectric Project – Potential Impacts on Lake Levels  
*Concord/Kannapolis IBT Environmental Impact Statement*

Yadkin Hydroelectric Project	Maximum Drawdown (ft)	Straight Line Projection of Lake Level Impacts Parameters (MGD)	Monthly Reduction in Lake Level (ft)
High Rock Lake	16 to 18	9 to 24	0.19 to 0.48
Tuckertown Reservoir	3	14 to 24	0.93 to 1.03
Badin Lake	3	14 to 24	0.41 to 0.51

### Potential Impacts on Downstream Flows

ALCOA has evaluated the potential impacts of the proposed IBT on monthly inflows summed for each of the three reservoirs during “wet”, “average”, and “dry” years, summed for a yearly basis. A summary of the results are presented in the Table 18 below.



TABLE 18

Potential Impacts of the Proposed IBT on Lake Inflows  
*Concord/Kannapolis IBT Environmental Impact Statement*

Annual Inflow	Wet Year Inflow	Average Year Inflow	Dry Year Inflow
<b>High Rock Lake</b>	<b>4,995,963 ac-ft</b>	<b>3,114,306 ac-ft</b>	<b>1,572,257 ac-ft</b>
9 MGD IBT as % of Stream Flow	0.20%	0.32%	0.64%
24 MGD IBT as % of Stream Flow <sup>1</sup>	0.53%	0.85%	1.71%
<b>Tuckertown Reservoir</b>	<b>5,136,494 ac-ft</b>	<b>3,236,488 ac-ft</b>	<b>1,669,727 ac-ft</b>
14 MGD IBT as % of Stream Flow	0.31%	0.48%	0.94%
24 MGD IBT as % of Stream Flow <sup>1</sup>	0.53%	0.82%	1.61%
<b>Badin Lake/Narrows Reservoir</b>	<b>4,995,963 ac-ft</b>	<b>3,114,306 ac-ft</b>	<b>1,572,257 ac-ft</b>
14 MGD IBT as % of Stream Flow	0.29%	0.45%	0.90%
24 MGD IBT as % of Stream Flow <sup>1</sup>	0.50%	0.77%	1.54%

1. Extrapolated data

### Potential Impacts to Water Supply Withdrawals

ALCOA reports that the only likely potential impact on water supply withdrawals would be on the Tuckertown Reservoir, since this is where the largest potential impact to lake levels occurs. As stated above, this analysis indicates a monthly reduction in lake levels from 0.93 to 1.03 feet depending on the lake levels. This conservative analysis is based on the assumption that inflow into the lake is zero.

### Potential Impacts to Hydroelectric Power Generation

ALCOA reports that for a 23 MGD IBT, it has the potential to lose 5,000 to 7,000 mega-watt hours per year of power generation. Therefore, the proposed 24 MGD IBT would be similar.

## Receiving Basin

The 399 square mile study area within the receiving basin includes Cabarrus County, a small portion of Rowan County, and the mainstem of the Rocky River to Norwood (Figure 2). It encompasses existing and potential future sewer service areas for Concord and Kannapolis, as well as Mount Pleasant and Harrisburg. With the exception of the far northeast corner of Cabarrus County, the service areas are entirely located in the Rocky River subbasin (18-4) of the Yadkin River Basin and include Coddle, Irish Buffalo, and Coldwater Creeks.

This section describes the existing environment for the receiving basin as illustrated in Figure 2, followed by a discussion of the primary consequences of the proposed IBT, if any, for the area. Secondary and cumulative impacts in the receiving basin are discussed in Section 3.

## Wetlands

### Existing Environment

Figure 3 and Table 19 illustrate the distribution of the approximately 3,769 acres of wetlands located in the receiving basin study area as identified by NWI data excluding open water wetlands which account for 2118 acres. A wetlands field delineation was not performed for the receiving basin due to the large study area.

TABLE 19

NWI Wetlands – Receiving Basin  
*Concord/Kannapolis IBT Environmental Impact Statement*

Description	Acres	Percent of Total
Forested wetlands	3411	91%
Non-tidal, emergent vegetation	133	4%
Non-tidal, scrub-shrub	221	6%
Other Wetlands	4	0%
Total Wetlands	3,769	

The majority, 91 percent, of this wetland acreage represents forested wetlands, including larger clusters of wetlands along Coddle Creek, Rocky River, and Clarke Creek in the western quarter of Cabarrus County. Included in this acreage is the 37-acre Clarke Creek Wetlands and Rookery site acquired by the Land Trust of Central North Carolina and located near the western edge of Cabarrus County on Clarke Creek.

### Primary Consequences

There is no construction proposed, and therefore no direct impacts to wetlands possible, as a result of the IBT. In addition, the Rocky River Regional Wastewater Treatment Plant (WWTP) in the receiving basin will not require expanded or amended National Pollutant Discharge Elimination System (NPDES) permits to process the increased wastewater expected in the basin as a result of the IBT. Current NPDES permits for these facilities have complied with NCEPA requirements. The IBT will therefore not significantly impact wetlands in the receiving basin. Overall, the potential direct impacts of the IBT on wetlands in the receiving basin are considered insignificant.

## Land Use

### Existing Environment

#### Urban/Developed Lands

The analysis of land uses using 1996 GIS data layers from the North Carolina Center for Geographical Information and Analysis (CGIA), was utilized to characterize lands in the receiving basin (Figure 4). At that time, there were a total of 13,167 acres of high and low intensity urban development, 147,278 acres of forest, 90,184 acres of agricultural cropland and pasture, and 2,592 acres of vacant shrubland in this area.

### Public Lands (Parks/Recreation Areas and Greenways)

There are no state parks or recreation areas within the study area. Cabarrus County has two parks: Frank Liske Park and North Cabarrus Park. Both parks have recreational fields and trails. A portion of Frank Liske Park is designated as a significant natural heritage area.

### Prime Agricultural and Forestry Land

According to the Soil and Water Conservation District for Cabarrus County, 21 percent of the total soils in the County are considered suitable for prime farmland.

The original forest communities of Mecklenburg, Cabarrus, Union, and Stanly Counties are being progressively cleared out for wood products, crop production, and residential and industrial development. Wetland forests known to exist in the receiving basin are listed in the Wetlands Section.

Common trees found today in these forest lands are beech, red maple, tuliptree, scarlet oak, chestnut oak, white oak, loblolly pine, shortleaf pine, southern red oak, Spanish oak, post oak, mockernut hickory, pignut hickory, Carolina shagbark hickory, red hickory, Virginia pine, yellow-poplar, and sweetgum (Schafale and Weakley, 1990; USDA, 1980).

Undeveloped forest land currently occupies a total of approximately 147,278 acres or about 58 percent of the receiving basin study area. The distribution of forest land is presented in Figure 4.

### Cultural Resources/Archeological and Historic Areas

Table 20 lists the 21 NRHP sites located within the study area. This includes 7 historic districts and 14 NRHP structures, totaling 1,761 acres, all located in Cabarrus County.

TABLE 20

National Register Historic Sites – Receiving Basin  
Concord/Kannapolis IBT Environmental Impact Statement

Site Name	Acres	Description
Barber-Scotia College Historic District	4	1867 Italianate style
Bost Mill Historic District	265	1811-1912 trading center
Cabarrus County Courthouse	2	1875 Victorian government architecture
Favoni (burned 1990)	10.65	1840 Greek Revival
First Congregational Church	1.3	1918-21 Gothic Revival
George Matthias Bernhardt	323	1850s Greek Revival plantation
John Bunyan Green Farm	371.2	1880 Italianate farmhouse
Lentz Hotel	0.5	1853 "bracketed mode"
McCurdy Log House	9.5	1773 log construction
Mill Hill	9	1821 Federal/Greek Revival
Mt Pleasant College Historic District	10	1852 vernacular frame/brick
Mt Pleasant Historic District	42	19th Century residential / business
North Union Street Historic District	131.4	Mid-19th Century residential

TABLE 20

National Register Historic Sites – Receiving Basin  
*Concord/Kannapolis IBT Environmental Impact Statement*

Site Name	Acres	Description
Odell-Locke-Randolph Cotton Mill	11.9	L-19th Century textile mill
R H Morrison House	27.7	E-19th Century Greek Revival
Reed Gold Mine (NHL)	350	19th Century
Rev John E Presley House	21.26	1837-51 Federal/Greek Revival
Rocky River Presbyterian Church	43	1839 Greco-Italianate
South Union Street Historic District	13.5	19th Century resident
Spears House	38.5	19th Century log dogtrot house
Stonewall Jackson Trail School Historic District	76.25	1909-30 Colonial Revival

The Upper Piedmont has enjoyed a rich history since being settled by Europeans in the early 1700s. Several important historic sites and architecturally significant buildings have been identified and protected in the area also. The Catawba River Basin and the Yadkin Pee-Dee River Basin contain many archeological sites that have been surveyed and several sites where significant archeological resources have been found from many native groups that lived in the region up until 200 years ago. Due to the size of the project's source and receiving basins, and the fact that no construction will occur with the project, no archeological survey was prepared for the project.

### Primary Consequences

The IBT will not have any direct impacts on urban/developed land, public lands, prime agricultural land, forest land, or archeological or historic resources in the receiving basin since no construction related to the IBT is planned.

## Fish and Wildlife Resources

### Existing Environment

#### Wildlife Habitat and Resources

There are no state game lands within Cabarrus County. However, a recent inventory completed in Cabarrus County revealed the presence of several significant natural heritage areas, which are described in the Rare and Protected Species and Habitats section below.

#### Fishery Habitat and Aquatic Resources

Rocky River supports an important recreational fishery and is known for its flathead catfish fishery. Other fish species caught include sunfish, carp, crappie, and largemouth bass. Both hook and line fishing and grabbling (taking fish by hand) are popular. Rocky River grapplers have reported catching flathead catfish in the range of 30 to 60 pounds. Grabbling exposes citizens to prolonged contact with the waters of the Rocky River.

The WRC's Fisheries Management Plan for the Basin identified fish species in the four basic stream habitats in the watershed: coldwater, coolwater, warmwater of the Piedmont, and warmwater of the Coastal Plain. The warmwater streams of the Piedmont, which are more turbid and generally support fewer game fish than the coolwaters of the foothills, contain various sunfish, catfish, minnows, and suckers.

Although seven mainstream reservoirs are located on the main corridor of the Yadkin-Pee Dee River, none are located within the project receiving basin area. Many small lakes and thousands of ponds are scattered throughout the basin. Impounded waters generally provide a warmwater fishery consisting of largemouth bass, crappie, other sunfish, catfish, and miscellaneous species (WRC, March 1998).

Fishing pressure and angler utilization of the fishery resource varies within the basin. Heavy fishing pressure and harvest occurs on mainstream reservoirs. Stream fishing pressure is moderate to heavy on coldwater and coolwater streams. Fishing pressure is light on most of the warmwater streams where low populations of game fish occur due to persistent water turbidity (WRC, March 1998). Non-point source pollution is a major contributor to water quality problems in the Rocky River (DWQ, 1997).

#### Rare and Protected Species or Habitats

Figure 6 illustrates the distribution of SNHA areas and NHEO occurrences within the IBT study area. There are several additional rare animal species that exist in the basin that require pools or ponds in floodplains for all or part of their lifecycles, including rare amphibians like the mole salamander, four-toed salamander, and bog turtle (WRC, March 1998; DWQ, 1997). Due to the programmatic nature of this document, specific locations and species types within the precise boundaries of the receiving basin were not field surveyed. Site specific field studies will be performed for follow-up NEPA documents.

One rare fish species, the Carolina darter (*Etheostoma collis*), is listed in the Rocky River drainage basin. The Carolina darter (central Piedmont population) is classified as a state species of special concern. The Carolina darter is found in the Clarke Creek drainage. Other reports of the species has been made in Afton Run, Coddle Creek, Mill Creek and Dutch Buffalo Creek (NHP, 2002).

Several rare mussels have also been found in the study area. The Eastern Creekshell (*Villosa delumbis*), a significantly rare species, has been found in Cabarrus County. In addition, the Carolina Creekshell (*Villosa vaughaniana*), a Federal and State species of concern, has been found in Clarke, Jennie Wolf, Back/Fuda, and Dutch Buffalo Creeks. Finally, historic occurrences of the Carolina Heelsplitter (*Lasmigona decorata*) have been noted in the area.

Of all the rare species potentially existing in the source basin, the one known to be present in the receiving basin is Schweinitz's sunflower (*Helianthus schweinitzii*). Schweinitz's sunflower is a federally listed endangered plant species that is endemic to the upper Piedmont area of North Carolina. Thirty-five populations are known—19 are centered around Charlotte, and the others are around Rock Hill, South Carolina. This species occurs in relatively open habitats—early successional fields, forest ecotonal margins, or forest clearings. It thrives in full sun but also grows in the light shade of open stands of oak-pine-hickory. Schweinitz's sunflower generally occurs in moist to dry clay soils or soils that are clay-loams or sandy-clay loams with high gravel content. Formerly, the species probably occurred in prairie-like habitats or oak savanna maintained by fires set by lightning or Native Americans. Loss of this open habitat to fire suppression and urbanization has resulted in the decline of the species and its reduction to marginal and vulnerable sites such as roadsides, power line easements, and old pastures (USFWS, 1994). There are four occurrences of Schweinitz's sunflower in the study area (NHP, 2002).

In total, there are 8 vertebrate species of concern within the receiving basin. There are 5 invertebrate animal occurrences with 3 being state endangered, one being significantly rare, and one being extirpated. There are a total 53 rare vascular plant species occurrences with 5 of them being extirpated, 41 being significantly rare, 2 being threatened, and 5 being state endangered. In addition, the following significant natural heritage areas are found within the study area:

- New Testament Baptist Church Knoll and Seep – 724 acres
- Old Bell Mission Church – 69 acres
- Suther's Wet Prairie – 9 acres
- Charity Church Hardwood Forest – 430 acres
- Dutch Buffalo Creek Dam – 750 acres
- Lower Butcher Branch Depression Swamps – 255 acres
- Butcher Branch Forest – 73 acres
- Lentz Harness Shop Road Upland Depression – 84 acres
- Miami Church Hill Schweinitz's Sunflower Site – 291 acres
- Stephens Church Forest – 18 acres
- Georgeville Schweinitz's Sunflower Site – 5 acres
- Reed Gold Mine Forests – 831 acres
- Hartsville Road Mesic Forest – 16 acres
- Everett Voncannon Property – 29 acres
- Jesse Slagle Knoll - 55 acres
- Blackwelder Hill Plant Site - 54 acres
- Reedy Creek Knoll and Beaver Pond - 103 acres
- Back Creek Gabbro Hill - 29 acres
- Bellefont Church Oak-Hickory Forest - 128 acres
- Concord Ring Dike/Jackson School Natural Area - 13 acres
- Frank Liske Park - 183 acres
- Rocky River Corridor - 158 acres
- Clarke Creek Heron Rookery - 264 acres
- Lake Howell - 1286 acres
- Richardson Creek Slopes - 16 acres
- Kinza Slate Bluffs - 52 acres
- Rocky River/Morgans Bluff - 27 acres
- Long Creek Slate Slopes – 47 acres
- Goose Creek/Duck Creek Aquatic Habitat – 58 acres

## Primary Consequences

The IBT itself will not have any direct impacts on natural communities, SNHAs, fisheries, or sensitive species and their habitats in the study area since no construction is planned with the IBT.

## Water Quality/Water Resources

### Existing Environment

#### *Upper Rocky River*

The upper reach of the Rocky River and its tributaries in subbasin 030711, including Mallard Creek, drain the populous area of eastern Mecklenburg County. Mallard Creek is an urban stream that receives the discharge of CMU/Mallard Creek WWTP. DWQ has no ambient monitoring stations on Mallard Creek, but Mecklenburg County monitors two locations on Mallard Creek. DWQ has done biological monitoring on Mallard Creek, and the creek received Good/Fair (in 1985) and Good (in 1996) biological ratings below the CMU/Mallard Creek WWTP (DENR, 1997). In 2001, fisheries data were collected on Mallard Creek which resulted in an excellent rating (DWQ, 2002). The Rocky River at SR 2420 has been sampled on several occasions. The most recent data collected in 2001 resulted in a Fair bioclassification. Fish data collected in Reedy Creek resulted in a Good-Fair rating. The Reedy Creek site is downstream of an area that has a number of package plants. Coddle Creek at NC 49 was sampled in 1996 and 2001, and both resulted in a Fair biological rating. Middle and Lower Rocky River.

The Rocky River, below the confluence of Mallard Creek, drains the watersheds of Irish Buffalo, Dutch Buffalo, Anderson, Muddy, Clear, Goose, and Crooked Creeks. This section of the Rocky River receives the discharge of the Rocky River Regional WWTP located just upstream of the confluence of the Rocky River and Irish Buffalo Creek.

There is an ambient monitoring station (at U.S. 601) in this section of the Rocky River, near Concord. This ambient station monitors water quality conditions in this middle section of the river. The ambient data indicate concentrations above the NC action levels for copper, iron, and zinc. The same parameters have been reported in similar concentrations upstream, in the Rocky River at NC SR 2420 near Davidson. These parameters are included as action levels versus standards in the State rules because total recoverable measurements for these parameters are not necessarily indicative of toxicity related problems associated with bio-available fractions of the metals. A Fair water quality rating was given to this section of the Rocky River based on data collected in 2001 (DWQ, 2002).

Benthic data collected on Irish Buffalo Creek, Coldwater Creek, and Dutch Buffalo Creek in 2001 all resulted in Good-Fair water quality ratings. Fish data collected on these creeks resulted in a Good rating for Irish Buffalo and Dutch Buffalo Creeks and a Good-Fair rating for Coldwater Creek.

DWQ has also monitored Kannapolis Lake, Lake Concord and Lake Fisher in this subbasin. Kannapolis Lake is classified as WS-III and supplies drinking water to the City of Kannapolis. Access to the lake is strictly controlled, and the watershed consists of residential, agricultural and forested land. The monitoring data indicate that the lake is eutrophic. Lake Fisher is classified as WS-IV and supplies water to the City of Concord. Access to the lake is strictly controlled, but the data indicate eutrophic conditions. Lake Concord is used as a back-up water supply for the City of Concord and is classified as WS-IV. The watershed is primarily urban, but there is a forested buffer surrounding the lake. Monitoring data indicate the lake is eutrophic (DWQ, 2002). Lake Howell (Coddle Creek

Reservoir), which is classified as WS-II, HQW, CA, was not monitored by DWQ during the last five year sampling period.

There are three continuous gauging stations on the mainstem of the Rocky River. They are located above Irish Buffalo Creek (0212433550), near Stanfield (02124742) and at Norwood (02126000). The two upstream stations have been in existence since April 2000 while the gage at Norwood has been operating since 1930. The USGS recently drafted a low flow report for the Rocky River Basin, and the low flow statistics outlined in Table 21 were outlined in the report (USGS, 2003). The average flow near Norwood is approximately 1333 cfs.

**TABLE 21**

Low Flow Statistics at Gauging Stations in the Rocky River  
Concord/Kannapolis IBT Environmental Impact Statement

Site	Drainage Area (sq mi)	7Q10 (cfs)	30Q2 (cfs)
Rocky River above Irish Buffalo Creek (0212433550)	278	25.2	40.6
Rocky River near Stanfield (02124742)	628	42.3	103
Rocky River near Norwood (02126000)	1372	45.7	114

### 303(d) Listed Streams

According to North Carolina's Draft 2004 303(d) list, Coddle Creek and the Rocky River from its source to the mouth of Dutch Buffalo Creek are listed as impaired. Coddle Creek is listed based on impaired biological integrity, and has been listed since 1998. The Rocky River also has been listed since 1998 for impaired biological integrity and water quality standard violations for fecal coliform and turbidity. Sources of impact include, but are not limited to, urban runoff and storm sewers. A fecal coliform TMDL for the segment of river in Mecklenburg County was approved in 2002 by the EPA.

### Primary Consequences

The transfer of water will result in additional wastewater being discharged into the receiving basin through the Rocky River Regional WWTP (existing). It is estimated that in addition to the proposed IBT, previously approved IBTs and grandfathered amounts will be added cumulatively to the Rocky River from this point source. No increase in the permitted flow at the treatment plant will be needed to accommodate the increased flows from the IBT.

Primary impacts to water quality from the IBT originate from the operation of existing wastewater treatment facilities. These NPDES permits were issued to protect instream water quality. The permitting process for each of these facilities has complied with the NCEPA requirements. DWQ's anti-degradation policy requires that only the alternative that causes the least amount of environmental damage can be permitted under the NPDES program.

Direct impacts related to flooding and streambank erosion due to an increase in stream flow are not expected to be significant. Again, the permitted NPDES flows will handle the proposed IBT flow amounts. Average annual stream flow in the Rocky River, downstream



from Crooked Creek, is expected to increase from 663 cfs to approximately 690 cfs at permitted flows, or about 4 percent. The expected increase is minor and well within the historical stream flow variability based on a flow duration analysis conducted in conjunction with the Raleigh Office of USGS.

Finally, the ratio of the additional wastewater (26 cfs) to the drainage area of the Rocky River (683 mi<sup>2</sup>), below Crooked Creek, is less than 0.40. DWR has asserted, based on studies conducted in Piedmont streams (DWR, 1987), that floodwater carrying capacity, streambank erosion, and fish habitat need not be considered in detail for NCEPA documentation or for NPDES permit decisions when the aforementioned ratio is less than 0.40. In light of the above and the fact that current NPDES permitted flows will accommodate the IBT, the proposed IBT is not expected to result in significant flooding and/or additional streambank erosion from current levels. Therefore, further analyses, such as stream flow modeling or estimates of streambank erosion, were not deemed necessary.

## Air Quality

### Existing Environment

An AQI is used to report ambient air quality conditions, and the AQI ranges from good, moderate, unhealthful, very unhealthful, to hazardous. The DENR web site provides AQI reports for the Charlotte-Mecklenburg region (also includes counties of Cabarrus, Gaston, Lincoln, Rowan, Union, and York County in South Carolina). In 2001, Cabarrus County recorded the AQI as “good” on 62.5 percent of the days, and “moderate” on another 36.7 percent of the days. For 2001, the Charlotte-Mecklenburg region recorded an AQI as “good” on 64.3 percent and “moderate” on 32.4 percent of the days.

However, a new, more stringent NAAQS for ozone was established by EPA in 1997, and the Charlotte-Mecklenburg region has been struggling to meet this new standard. The new 0.08 ppm 8-hour average standard took effect in 1997; and on February 27, 2001, the U.S. Supreme Court upheld the new standard, and directed EPA to create an implementation plan. The State of North Carolina has recommended a 9 county area, including 2 counties in South Carolina, be designated as a non-attainment area.

Ozone is not directly emitted, but is formed when sunlight reacts with VOCs and NO<sub>x</sub>. According to the NC Air Awareness program, NO<sub>x</sub> is the limiting factor on the formation of ozone in North Carolina because of the abundance of naturally occurring VOCs from trees, which cannot be controlled. In NC urban areas, more than 60 percent of NO<sub>x</sub> emissions are from automobiles.

### Primary Consequences

There is no construction associated with the IBT, and the additional discharge to the Rocky River Subbasin due to the IBT will not affect air quality. Therefore, there are no primary air quality impacts.

## Groundwater Resources

### Existing Environment

Cabarrus County is located in the physiographic region described as the Piedmont region, which is between the Blue Ridge and the Coastal Plain regions. According to the North Carolina Cooperative Extension Service, the crystalline bedrock aquifer in the Piedmont region has relatively little storage capacity, and the well yields tend to be low (around 5 to 35 gal/min). The USGS indicates that the major groundwater related issues in North Carolina are (1) declining water levels (especially in the Coastal Plain region); (2)

contamination from hazardous wastes and landfill leachate; and (3) effects of land use on water quality (especially the effects of urbanization). While groundwater is used by individuals and some community systems in the receiving basin, it is not an appropriate source for centralized use because of insufficient yield and the costs associated with combining surface and groundwater resources.

### Primary Consequences

There is no construction associated with the IBT, and the additional discharges of water will not affect groundwater resources. According to *Basic Elements of Ground-Water Hydrology with References to Conditions in North Carolina* (Heath, 1980), groundwater recharge occurs by precipitation in all inter-stream areas (areas except along streams and their adjoining floodplains). Streams and floodplains are, under most conditions, discharge areas for groundwater and therefore there should be no primary impacts to groundwater. However, according to the USGS (2003), there is a losing reach in the lower Rocky River where surface water flows into groundwater. Since NPDES permits are written to protect water quality standards, and no increase in permitted flow will be necessary to accommodate the IBT, there are no primary impacts to groundwater associated with the project.

## Noise Level

### Existing Environment

Quiet is conducive to psychological and physiological well-being for humans. Just as excessive noise has been documented to negatively affect human health and welfare, elevated noise levels from human activities can disrupt the normal behavior patterns of wildlife, interfering with migration, breeding, hunting, and predator avoidance.

The receiving basin currently exhibits the day-to-day normal noise conditions representative of forested and open land cover areas. With the growth that is anticipated in the area, the noise level will increase temporarily during construction of new subdivisions, homes, and commercial development. A long-term increase in noise levels can be expected due to increasing mobile source traffic.

### Primary Consequences

There is no construction associated with the IBT, and the additional discharge to the Rocky River Subbasin due to the IBT will not affect noise levels. Therefore, there are no primary impacts expected due to noise.

## Toxic Substances/Hazardous Wastes

### Existing Environment

The North Carolina hazardous substance disposal site database identifies 20 sites totaling 1487 acres in the receiving basin study area, Table 22 and Figure 7. Other common toxic substances are employed in the construction of homes and commercial buildings such as glues, solvents, and paints. Typical household hazardous wastes would include oils, cleaners, solvents, paints, herbicides, and fertilizers.

**TABLE 22**

Hazardous Substance Disposal Sites – Receiving Basin  
*Concord/Kannapolis IBT Environmental Assessment*

<b>Company</b>	<b>Acres</b>
Hartsoe Brothers	1
Cannon Mills / Fieldcrest Plant #1	237
Cannon Mills Plant #1	277
Martin's Battery Salvage, Inc.	8
Rainbow Drive Battery Site	1
S & S Metals Recycling	23
Cabarrus County Landfill	195
Reichhold Chemical	1
Concord Coal Gas Plant	2
Southern Latex Corp	5
Bypass 601 groundwater contamination	7
Love Battery Site	4
Brey McNar WWTP	25
Whites Gravel Pit	2
Harrisburg Battery	1
Mineral Research & Development Corp	107
Cabarrus Disposal Company, Inc	3
Concord Rocky River Regional WWTP	55
Carolina Solite Corp/Aquadale	524
Galvan Industries, Inc	8

In addition to agricultural-related hazardous substances such as fertilizers, weed control chemicals, and pesticides, the receiving basin also includes two concentrated livestock operations (Figure 7). A cattle operation with approximately 190 animals and 2 waste lagoons is located on Reedy Creek in South Cabarrus County. There is also a 2,100 head swine operation with one waste lagoon on Dutch Buffalo Creek south of Mount Pleasant. Further downstream, along the Union County side of the Rocky River, is an 1,100 head swine operation with one waster lagoon.

**Primary Consequences**

There is no construction associated with the IBT. The additional discharge to the Rocky River Subbasin due to the IBT could affect the release of toxic substances and hazardous wastes; however, the NPDES permitted capacity is sufficient to accommodate the IBT flows. The NPDES permit is written to protect water quality standards.

**Environmental Justice****Existing Environment**

Cabarrus County's median income is approximately 117 percent of the state's median income. The median income of the Black population is approximately 116 percent of the state's. Approximately 7 percent of the population within Cabarrus County is below poverty level as compared to 10 percent of the state's population.

**Primary Consequences**

The IBT will have no construction associated with it and will therefore have no direct environmental justice impacts.

# Section 3 - Secondary and Cumulative Impacts in the Receiving Basin Study Area

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This section provides a broad evaluation of the potential secondary<sup>1</sup> and cumulative<sup>2</sup> impacts that may result from development facilitated by the proposed action. Secondary and cumulative impacts are only expected to occur in the receiving basin portion of the study area. This section contains an overview of the potential secondary impacts for the receiving basin. This evaluation considers the potential general impacts of growth, on a large scale, associated with full build-out of the study area, including the development of water and sewer lines, other public infrastructure projects, and private development. A build-out scenario is being considered as a conservative assumption representing a “worst case” scenario. The secondary and cumulative impacts of build-out are discussed because the IBT approval is an important step in facilitating future growth of a community. It is important to recognize that the IBT is one of several projects being implemented to accommodate growth.

The discussion provided in the following section reflects a general analysis of the potential for urbanization to impact specific resources in the receiving basin, given current trends and literature records. This analysis is broad and may reflect a “worst-case” scenario of secondary and cumulative impacts. Methods to mitigate these impacts are presented in Section 5. Consultation with agencies within DENR and local agencies in Cabarrus County contributed to the mitigation planning for this project.

## Secondary Impacts

### Installation of Water and Sewer Lines

Although many major water lines are in place, the provision of additional water supply may induce demands for additional water distribution and municipal wastewater collection systems in the receiving basin, given the following:

- Regional soils are often unable to handle on-site septic systems.
- DWQ may not permit additional package treatment plants in the receiving basin study area given the proximity to municipal treatment plants. In addition, smaller tributaries may have zero flow under low flow conditions although the USGS was unable to develop a drainage area threshold where flows are likely zero (USGS, 2003).
- Constructing and operating water and sewer lines in the receiving basin (considered a secondary impact of the IBT) may have direct environmental impacts. However, due to a lack of specific details regarding these potential future projects at this time (including their type, size, location, design, operational details, and information on the potential environmental resources they may impact), this EIS cannot adequately address the potential direct impacts of these future infrastructure projects. These impacts may or

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<sup>1</sup> “Indirect Effects” (secondary impacts) are “caused by and result from the proposed activity although they are later in time or further removed in distance, but they are still reasonably foreseeable.” (15A NCAC 1C .0101(d)(4))

<sup>2</sup> “Cumulative Effects” are defined as “resulting from the incremental impact of the proposed activity when added to other past, present, and reasonably foreseeable future activities regardless of what entities undertake such other activities.” (15A NCAC 1C .0101(d)(2))

may not be found to be significant, once adequate details are known. The direct impacts will be assessed during the planning and environmental review phase of specific projects. Secondary and cumulative impacts are being assessed in this document.

## Build-out of the Receiving Basin Study Area

Policies of Concord, Kannapolis, and other communities in Cabarrus County accommodate managed growth within defined future utility service areas. In accordance with these defined utility service areas, the northeastern portion of the county should remain relatively rural with the exception of residential growth supported by private well and on-site wastewater disposal systems. The regional transportation improvements planned for the area, including the new I-485 outer loop, and local thoroughfare improvements, have been collectively planned to accommodate growth. The availability of municipal water or sewer services is a component of the planning for growth.

The absence of an IBT in Cabarrus County by itself will not impede growth in the receiving basin study area. However, the subsequent installation and operation of the water and sewer lines as a secondary effect of the IBT, in combination with other infrastructure projects, may change the pattern and rate of growth. Some urban development has occurred in the receiving basin without public water and sewer services (through the installation of private or community wells and on-site wastewater disposal systems or package treatment plants). However, the provision of water and sewer systems may lead to more intense land use types and densities than currently possible on limited capacity private systems.

Changes in land uses facilitated by the proposed IBT, combined with the cumulative effects of road construction and development of other urban infrastructure and public services, could create potentially significant direct, indirect (or secondary), and cumulative impacts on environmental and human resources in the receiving basin, as discussed in detail below.

The most significant indirect impact of the proposed IBT is predicted to be growth and development in the underdeveloped and rural portions of southern and western Cabarrus County in the receiving basin. Growth will not be facilitated in the river corridor portions of the receiving basin study area within Mecklenburg, Union, and Stanly Counties, since those areas will not receive any of the transferred water from the IBT. In addition, the northeastern portion of the County is not expected to grow at the rates predicted for other portions of the County. Mount Pleasant and areas to the north of it, including the Dutch Buffalo Creek watershed, are expected to remain rural. Impacts from growth will not be felt in this rural area. In addition to land use planning, this growth philosophy is consistent with the WSACC 50-year infrastructure master plan.

## Wetlands

As discussed in Section 2, wetland habitat found in the receiving basin includes 3,769 acres of forested, non-tidal, emergent vegetation, and non-tidal, scrub-shrub in Cabarrus County. Full build-out of the area could have significant impacts on these wetlands. Impacts could be direct, in terms of filling or draining of wetlands for construction of roads, building sites, or utilities. Urban development could also have significant secondary impacts to wetlands, in terms of increased levels of silt and sediment from grading activities and the increasing amount of non-point source pollutants entering the wetlands over the long term from upland development activities and urban land uses.

Typical urban stormwater pollutants include sediment, nutrients (nitrogen, phosphorus), bacteria (fecal coliform as indicators), and potential toxicants (metals, oil and grease,

hydrocarbons, and pesticides). It is widely accepted that in general, increased amounts of stormwater runoff from elevated impervious surfaces in developed areas could cause erosion and collapse of stream banks, leading to loss of riparian canopy trees and degraded stream habitat.

For example, the NC Ecosystem Enhancement Program (EEP), formerly the Wetlands Restoration Program (WRP), showed that in Rocky River subbasins 11 and 12 (within the Yadkin-Pee Dee River basin), there were 19 acres of wetlands drained or filled due to development activities during 1996 and 1997 (WRP, 1998B). The acreage of wetlands impacted by growth may increase as the level and intensity of land use changes increase in the basin.

### Land Use

Impacts of land use changes would result from converting more rural land to urban uses. For example, the loss of forest and open shrub lands not only means a loss of timber resources, but also means the loss of wildlife habitat, which can have significant impacts to various sensitive species in the area. Impacts of land use changes could also include a degradation of the resource through the introduction of incompatible urban land uses adjacent to the resource. For example, the loss of viable farm income can occur when subdivisions are built adjacent to farmland. Because the value of the farmland rises as urbanization of the area occurs, farmers can be forced out of business due to increased property taxes. In addition, the new residential growth forces the farmer to stop using chemicals, vandalism of crops begins to occur, associated farming businesses move away, and the use of farm equipment on public roads in the area becomes more dangerous with increased traffic.

### Fish and Wildlife Resources

Further urbanization of the region may have significant secondary impacts on fish and wildlife resources through the continued:

- loss, fragmentation or degradation of sensitive and non-sensitive aquatic and terrestrial species and their habitats through conversion of land and wetland areas and filling or piping of streams for residential, business or public facility uses.
- degradation of water quality and negative impacts on aquatic resources, fisheries and wetlands through increasing erosion and sedimentation from construction activities; changed hydrology from increased impervious surfaces; and increased stormwater runoff containing high levels of non-point source pollutants.
- degradation of air resources through increased automobile usage and traffic congestion related to urban sprawl.
- loss of species diversity through the combined impacts listed above.

Both the water quality and sensitive species aquatic habitat in the receiving subbasins may be significantly impacted without protective measures in place. As urban land uses replace rural land uses in the receiving basin project area, increases in impervious cover and watershed hydrology occur. These changes lead to increased sedimentation and can deliver more stormwater pollutants to the system, reduce the stability of stream banks, and cause significant other channel modifications. The Federally endangered status of the Carolina heelsplitter may have been caused in part by sedimentation and erosion (Fridell, 1997). While this species does not exist in the receiving basin, it is found downstream in Goose Creek, a tributary to the Rocky River in Union County. Its Recovery Plan, prepared by

USFWS, lists the Rocky River as potential habitat. However, this species is unlikely to be released in the Rocky River. Other rare mussel species, including the state-listed Eastern creekshell and Federal Species of Concern Carolina creekshell, are present within Cabarrus County and could possibly be impacted due to habitat degradation if adequate mitigation is not in place.

Further loss of terrestrial natural communities to urban development is a concern, since many of the threatened or endangered species in the basin are vascular plant species living in marginal habitats such as the Schweinitz's sunflower, (USFWS, 1994, 1997). A maintenance plan for Schweinitz's sunflower populations along NC Department of Transportation (NCDOT) right-of-ways is in place to promote continued existence of the species along roadside marginal areas.

### Water Quality/Water Resources

Dense urban development from full build-out of the receiving basin may continue this downward trend for water quality in the receiving basin. Potentially significant indirect or secondary impacts on water quality and aquatic habitat in areas adjacent to and downstream of the receiving basin area may occur with full urbanization.

Short-term declines in water quality from installation of sewer and water lines, public facility construction projects, and long-term declines in water quality from land use changes may have significant impacts on water quality and subsequent impacts on aquatic habitat, wetlands, and sensitive aquatic and amphibian species in the receiving basin.

Changes in land use have a major effect on both the quantity and quality of stormwater runoff. Urbanization and land use development, if not properly planned and managed, can dramatically alter the natural hydrology and riparian buffers of an area. Impervious surfaces increase the volume and rate of stormwater runoff. These changes lead to more frequent and severe flooding and also lead to degradation of water quality from the various stormwater pollutants that wash off impervious areas during rain events (e.g. sediments, nutrients, pathogen-indicators). As imperviousness increases, the more impacted surface waters become from pollution and flooding. The cumulative effects of stormwater runoff are evident in the frequent correlation between the location of a stream and its water quality, where urban streams overall have poorer water quality than rural streams.

A major positive secondary impact of the IBT and the construction of regional public water and wastewater collection systems in the receiving basin will be the eventual elimination of privately owned package treatment plants. Potential reductions of discharges into low flow streams from existing public WWTPs, adequate maintenance of sewer lines to prevent overflows, and public enforcement actions on failing septic systems will protect surface waters from discharges of wastewater in the project area.

### Air Quality

The Charlotte-Mecklenburg region has been struggling to comply with the new ozone standard of 0.08 ppm. Ozone is not directly emitted, but is formed when sunlight reacts with VOCs and NO<sub>x</sub>. According to the NC Air Awareness program, NO<sub>x</sub> is the limiting factor on the formation of ozone in North Carolina because of the abundance of naturally occurring VOCs from trees, which cannot be controlled. In NC urban areas, more than 60 percent of NO<sub>x</sub> emissions are from automobiles. As growth occurs within the County, traffic volumes will increase, and NO<sub>x</sub> emissions will likely increase. This may lead to more ozone pollution and ozone action days.



## Groundwater Resources

Development of most urban areas has followed major roads. These roads facilitate the installation of water supply systems from municipal sources. This is expected to be the case during development of the receiving basin study area. The increased roads, houses and other infrastructure will increase the imperviousness in the receiving basin study area.

Land use activities and growth in the receiving basin could potentially impact groundwater quality by introducing toxic contaminants into or onto the soil, where it can seep into the groundwater aquifer. Such contamination can ruin drinking water wells for communities and individual homes. Potential sources of groundwater contamination include solid waste disposal sites, storage or use of hazardous substances, poorly designed or maintained septic systems, accidental spills, and leaking underground storage tanks.

As more of the area is served by centralized water and wastewater services, a significant number of septic tank/ground absorption systems serving residences will be eliminated. This will result in a beneficial secondary impact to groundwater in the study area by reducing the public health risk of groundwater contamination in the service area from leaking or failing septic tanks.

## Noise Level

The predicted full urbanization and build-out of the project service area will produce greater amounts of noise from greater density of land uses, more people living in the study area, more businesses and industries operating in the area, and a significant increase in number of vehicles using local roads and highways. As development occurs with the provision of sewers in the project area, existing residential developments, once isolated in the countryside, will be joined by additional subdivision developments next to them. Businesses and industries will move into the area also, potentially bringing elevated noise levels to existing residential areas. The continued growth and development of the study area will significantly impact the community noise levels through the introduction of additional domestic and commercial traffic and intensification of industry. Urbanization will also increase the base level of noise in the receiving basin, potentially impacting wildlife behavior.

## Toxic Substances/Hazardous Wastes

As urbanization continues in the receiving basin, the potential for release of toxic substances from residential and commercial sources increases. The improper disposal of these substances could have adverse impacts on the environment by entering the groundwater system through landfill leachate or entering the sewer system and reaching the WWTPs.

As the amount of traffic and urban uses in the receiving basin increase, stormwater runoff will contain increasing levels of water pollutants, some of them toxic. Typical urban stormwater pollutants include sediment and silt, nitrogen and phosphorus, oils and greases, rubber deposits, toxic chemicals, pesticides and herbicides, and road salts. Unless contained and treated before entering into surface waters, this urban stormwater could significantly impact the water quality and sensitive species living within the receiving basin.

The long-term impact of new toxic discharges to the surface and ground waters from urban stormwater, landfill leachate, and accidental and/or intentional spill of household and industrial chemicals in the receiving basin will likely lead to declines in water quality. This could contribute to the potential loss of wildlife, and potentially the elimination of the existing endangered species in the subbasin.

## Cumulative Impacts

Cumulative impacts related to growth are expected to be essentially the same as those identified as secondary impacts in the previous section. Full urbanization of portions of Cabarrus County may cumulatively cause degradation and loss of certain wetlands, forest resources, prime agricultural land, sensitive wildlife habitat, and archeological resources. Conversion of these land uses and the resultant urban development activities that normally accompany these changes in the receiving basin may cumulatively impact water quality and aquatic habitat adjacent to and downstream of this urbanizing area. Streams, lakes, and other surface waters in Cabarrus County may be impacted by the cumulative effect of urban non-point source pollutants and hydrologic modification. Increased levels of silt and sediment and the increasing amount of non-point source pollutants entering surface waters in the project area from development activities and urban land uses pose a long-term threat to the natural system. Long-term declines in water quality from ongoing non-point pollution and urban stormwater can have significant impacts on aquatic habitat, wetlands, and sensitive aquatic and amphibian species in urbanizing areas. According to USFWS studies, such impacts have historically occurred in the Charlotte-Mecklenburg area as a result of urbanization, and may have led to the decline of sensitive aquatic species, (USFWS, 1997; Keferl and Shelley, 1988). In general, unless stormwater is properly managed, and wetlands and stream buffers are protected, erosion and urban stormwater could cause significant cumulative impacts to the water quality and/or the sensitive species living within the project area and in downstream environments, (USFWS, 1997; Keferl and Shelley, 1988).

As land uses change and open spaces are developed and cut off from other open areas, fish and wildlife habitat will be lost and fragmented, and species diversity potentially diminished. Loss of terrestrial natural communities to urban development is a particular concern for the sensitive vascular plant species living on marginal habitats (such as the Schweinitz's sunflower) in the receiving basin (USFWS, 1994). Sensitive terrestrial and aquatic species and their habitats may be lost to development or may be degraded over time by the negative impacts of urban uses in close proximity, especially as a result of degradation of water and air resources. Both the water quality and sensitive species habitat in the receiving subbasins may be significantly impacted through the increase in stormwater, increased sedimentation and erosion, loss of stream banks, and increased amount of non-point source pollutants entering into the surface waters from urban land uses (USFWS, 1997).

Public and recreational lands and waters could receive additional use from an increased population, creating stress on wildlife that are trying to occupy the few natural areas remaining. Overall, the project study area will evolve from a fairly quiet, rural area to an urban and suburban area, with greater numbers of noise sources combining cumulatively to raise the base exterior noise level in the area. The cumulative effect of lawn mowers, leaf blowers, barking dogs, et cetera will rise accordingly.

Urbanization of the area will result in a loss of acres of prime agricultural and forestland. Stormwater runoff may increase, causing stream bank erosion and increased amount and severity of flooding damage to public and private properties. Archeological and historical sites may be lost to development activities. The additional vehicle miles traveled due to increased population growth will likely result in higher concentrations of ozone formed during the hot summer months. Urbanization in high growth areas like the Charlotte-Mecklenburg region has in the past contributed to a decrease in air quality, and this trend is likely to continue as a result of the proposed project.

A potentially negative impact to groundwater availability is the reduced infiltration capacity due to increase of impervious areas as a cumulative impact of full build-out of the project area—thus affecting the recharge capacity of the groundwater storage. Land use activities and growth could also potentially impact groundwater quality by introducing toxic contaminants in recharge areas. The long-term impact of new toxic discharges to the surface and ground waters from urban stormwater, landfill leachate, and accidental and/or intentional spill of household and industrial chemicals in the receiving basin could potentially lead to declines in water quality. This contributes to the potential loss of wildlife, and potentially the elimination of the existing endangered species in the subbasin.

# Section 4 - Alternatives Analysis

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## Introduction

The Concord and Kannapolis water and sanitary sewer services areas are located entirely in the Rocky River Subbasin of the Yadkin River Basin. This location is almost equidistant to the two major rivers that serve this region of North Carolina—the Catawba River and the Yadkin River. The Rocky River flows eastward into the Yadkin River between Lake Tillery and Blewett Falls Lake.

Both of these rivers are a potential source for eliminating the water supply deficit. Both raw water and finished water alternatives have been identified to address the projected 24 MGD (based on ADD) shortfall. Alternatives for additional raw water could replenish the existing reservoirs in Cabarrus County or be taken directly to the water treatment facilities for treatment.

Finished water alternatives will require meeting daily fluctuations of peak demands of the distribution systems. Table 3-6 of the Cabarrus County Water and Wastewater System 2002 Master Plan indicates historical maximum day factors between 1995 and 1999 range from as low as 1.21 to a high of 2.2. For master planning purposes, a maximum day factor of 1.6 was used in the 2002 Master Plan. To be consistent with the 2002 Master Plan, a maximum day peak factor of 1.6 is used for finished water alternatives. Therefore, the amount of IBT required for finished water alternatives is 38 MGD on a maximum day basis (24 MGD times 1.6). Alternatives with a combination of finished and raw water sources are adjusted accordingly to the amount of finished water and raw water transferred.

### Alternative 1 – Lake Norman/Catawba

Alternative 1 is a combination of obtaining finished water from CMU and raw water from Lake Norman for a total IBT of 28 MGD. 18 MGD of raw water would be transferred from Lake Norman that would pump through a new raw water main and discharge into Lake Howell in Cabarrus County and Kannapolis Lake in Rowan County. The remaining 10 MGD (6 MGD ADD times 1.6) of finished water would be obtained by utilizing existing and proposed interconnections between the CMU water system and the Concord water system. Currently, Concord uses these interconnections for emergency supply. Alternative 1 would require the development of a water supply contract for 10 MGD with CMU to fund capacity upgrades to the CMU water system.

### Alternative 2 – Tuckertown or Badin Lake/Yadkin

Alternative 2 would obtain an IBT of up to 38 MGD (24 MGD ADD) of finished water from Tuckertown Reservoir or Badin Lake. 38 MGD of finished water would be supplied from the Albemarle water system by expanding its system capacity, or expand the existing Albemarle intake(s) and transfer 38 MGD of raw water to a future water treatment plant in northeastern Cabarrus County.

### Alternative 3 – High Rock Lake/Yadkin

Alternative 3 would obtain an IBT of 24 MGD of raw water from High Rock Lake. The 24 MGD would be transferred from High Rock Lake and pumped through a new raw water

main that would discharge into Lake Howell in Cabarrus County and Kannapolis Lake in Rowan County.

## Preferred Alternative

The most recent drought that ended during the fall/winter of 2002 and 2003 has caused the Cities of Concord and Kannapolis to pursue water distribution system improvements with the Cities of Charlotte (< 5 MGD), Albemarle (< 2 MGD) and Salisbury (< 2 MGD) to increase available supply during emergency conditions. IBT that occurs from the CMU interconnections utilize unused permitted IBT capacity. The Salisbury and Albemarle interconnections are limited to less than 2 MGD to be in compliance with IBT statutes. The long-range plan for Concord and Kannapolis is to maintain these interconnections as emergency water sources.

The Preferred Alternative is a combination of Alternatives 1 and 2 where an IBT from both the Yadkin-Pee Dee River and the Catawba River to the Rocky River subbasin will occur. This alternative would continue the utilization of the interconnections with Charlotte, Salisbury, and Albemarle to meet short-term increases in demands, and allow Concord and Kannapolis the opportunity to expand the amount of finished water obtained from Charlotte and Albemarle or obtain raw water from Lake Norman. The Preferred Alternative IBT certificate would be for up to 38 MGD (MDD) from the Catawba River Basin and up to 10 MGD (MDD) from the Yadkin-Pee Dee River Basin; however, the total IBT from both sources will not exceed a MDD of 38 MGD or an ADD of 24 MGD. The Preferred Alternative represents a regional solution to meeting water supply needs through cooperation with neighboring communities.

## Non-IBT Alternatives

### Alternative 4A – Indirect Reuse/Rocky River Supply

Alternative 4A would withdraw 24 MGD from Rocky River near Midland approximately 10 miles downstream of the Rocky River WWTP and pump raw water up to Lake Howell. This alternative would take advantage of increased river flows due existing grandfathered and previous approved IBTs from upstream waste water treatment plants in the Town of Mooresville, Mecklenburg County, and the Rocky River Regional WWTP in Cabarrus County.

### Alternative 4B - Reverse IBT/Catawba

Alternative 4B would transfer 24 MGD of raw water from Lake Norman to Lake Howell, and simultaneously withdraw 24 MGD from Rocky River near Midland and pump it over to McAlpine Creek near Mint Hill in the Catawba River Basin to mitigate the IBT.

## No Action Alternative

Individual systems or community systems would serve future growth areas. These systems would be reliant on groundwater for water supply. An IBT does not occur with this alternative.

## Alternative Analysis Evaluation Criteria

To effectively evaluate and compare these alternatives to each other; each alternative has been evaluated to the same criteria concerning costs, environmental impacts; and other considerations. Ratings are given to each alternative to be used as a comparison between

the alternatives to create a relative ranking and not a technical or scientific assessment of the alternative. The following sections provide a description of each of the criteria.

## Capital Cost

Conceptual capital cost estimates have been developed for each alternative. Capital costs are the anticipated total cost to implement each alternative. Since each of the alternatives is similar in nature, the operation and maintenance costs will also be similar. Capital costs need to be considered because of the potential impacts to the service rates of the water system customers. Since each of the alternatives provides the same amount of water supply; comparisons shall be made to the least cost alternative. Listed below are the assumptions used to develop conceptual costs of alternatives:

- New WTP facilities and capacity purchase costs are \$2.50 per gallon.
- Expansion of existing WTP facilities is \$1.50 per gallon.
- Pipeline unit costs are based on WSACC Water and Wastewater Master Plan unit costs.

Listed below is a summary of infrastructure improvements and costs for each alternative:

### Alternative 1 – Lake Norman/Catawba

1. System interconnections with CMU (Already Exist)	\$0
2. 10 MGD water system capacity contract with CMU	~ \$25.0M
3. PS/Intake & 16-miles raw water main from Lake Norman	~ \$37.3M
4. Expand Existing WTP Capacity	~ <u>\$22.5M</u>
<b>Total:</b>	<b>\$84.8M</b>

### Alternative 2 – Tuckertown or Badin Lake/Yadkin

1. 36 MGD new WTP or 36 MGD capacity contract w/Albemarle	~ \$90.0M
2. 18 Miles of water main w/ booster station	~ <u>\$31.5M</u>
<b>Total:</b>	<b>\$121.5M</b>

### Alternative 3 – High Rock Lake/Yadkin

1. PS/Intake & 24-miles raw water main from Yadkin River	~ \$49.1M
2. Expand Existing WTP Capacity	~ <u>\$37.5M</u>
<b>Total:</b>	<b>\$86.6M</b>

### Preferred Alternative

1. System interconnections with CMU (Already Exist)	\$0
2. PS/Intake & 34-miles raw water main from Lake Norman	~ \$37.3M
3. 18 Miles of water main	~ \$20.0M
4. Expand Existing WTP Capacity	~ <u>\$37.5M</u>
<b>Total:</b>	<b>\$94.8M</b>

### Alternative 4A – Indirect Reuse/Rocky River Supply

1. PS/Intake & 34-miles raw water main w/ booster station from Rocky River	~ \$70.2M
2. Expand Existing WTP Capacity	~ <u>\$37.5M</u>
<b>Total:</b>	<b>\$107.7M</b>

### Alternative 4B – Reverse IBT/Catawba

1. PS/Intake & 16-miles raw water main from Lake Norman	~ \$39.3M
2. Expand Existing WTP Capacity	~ \$37.5M
3. PS/Intake & 16-miles raw water main from Rocky River	~ <u>\$34.8M</u>
<b>Total:</b>	<b>\$111.6M</b>

Table 23 provides a summary of the conceptual costs of each alternative and its rating.

**TABLE 23**  
Capital Cost Evaluation  
*Concord/Kannapolis IBT Environmental Impact Statement*

<b>Alternative with Water Source(s) Listed</b>	<b>Approx. Length of Pipe (Miles)</b>	<b>Approximate Cost (\$Million)</b>	<b>Relative Capital Cost Rating</b>
Alt. 1 - Lake Norman/Catawba	16	\$84.8M	Low
Alt. 2 - Tuckertown-Badin Lake/Yadkin	18	\$121.5M	Highest
Alt. 3 - High Rock Lake/Yadkin	24	\$86.6M	Low
Preferred Alternative	34	\$94.8 M	Low
Alt. 4A - Indirect Reuse/Rocky River	34	\$107.7M	High
Alt. 4B - Reverse IBT/Catawba	32	\$111.6M	High
No Action	Unknown <sup>1</sup>	Unknown <sup>1</sup>	High <sup>1</sup>

1. Estimating the length of pipe and capital costs cannot be done at this time. Generally the cost to customers for private and community systems is higher than public systems.

## Environmental Consequences

The potential environmental consequences of each alternative are considered in terms of its primary impacts and secondary and cumulative consequences on the environment that would be caused by the IBT. Since the receiving basin is constant among the alternatives, only the consequences on the source basins will be considered.

Section 2 identified the primary potential impacts to the existing environment in the source basins would be due to the loss of water due to the IBT. Potential impacts could occur to both wetlands, and fish and wildlife resources. Since the survival of existing fish and wildlife can also be attributed to survival of existing wetlands, alternatives that utilize source basins with the largest areas of wetlands would have the highest potential for negative impacts on the existing environment. Table 24 provides a summary of the potential environmental consequences of each alternative and its rating.

**TABLE 24**  
Environmental Consequences Evaluation in the Source Basin Based on Non-Forested Wetlands  
*Concord/Kannapolis IBT Environmental Assessment*

<b>Alternative with Water Source(s) Listed</b>	<b>Approx. Area (Acres)</b>	<b>Interbasin Transfer Amount from Source Basin(s) (MGD)</b>		<b>Environmental Consequences Rating</b>
		<b>ADD</b>	<b>MDD</b>	
Alt. 1 - Lake Norman/Catawba	269	24	28	High
Alt. 2 - Tuckertown-Badin Lake/Yadkin	1	24	38	Highest
Alt. 3 - High Rock Lake/Yadkin	185	24	24	Low
Preferred Alternative -	269	24	38	Low
Alt. 4A - Indirect Reuse/Rocky River	0	0	0	Lowest
Alt. 4B - Reverse IBT/Catawba	0	0	0	Lowest
No Action	0	0	0	Lowest

## Secondary and Cumulative Impacts on Receiving Basin

The secondary and cumulative impacts on the receiving basin due to anticipated growth in the water distribution system to meet future demands are described in Section 3. However, implementation of several of the alternatives would result in the extension of finished water transmission mains through underdeveloped areas in the receiving basin that could spur unplanned growth and accelerate projected increases in water demands.

Alternatives that result in the construction of the most finished water transmission main to increase the water supply would have a greater impact on the secondary and cumulative impacts on the receiving basin over alternatives that only increase the raw water supply. Table 25 provides a summary of the potential secondary and cumulative impacts of each alternative and its rating.

TABLE 25

Secondary and Cumulative Impacts on Receiving Basin  
*Concord/Kannapolis IBT Environmental Impact Statement*

Alternative with Water Source(s) Listed	Approx. Length of Finished Water Transmission Main inside Cabarrus County (Miles)	Secondary/Cumulative Impacts on Receiving Basin Rating
Alt. 1 - Lake Norman/Catawba	0	Lowest
Alt. 2 - Tuckertown-Badin Lake/Yadkin	18	Low
Alt. 3 - High Rock Lake/Yadkin	0	Lowest
Preferred Alternative	18	Lowest
Alt. 4A - Indirect Reuse/Rocky River	0	Lowest
Alt. 4B - Reverse IBT/Catawba	0	Lowest
No Action	Unknown <sup>1</sup>	N/A <sup>2</sup>

1. Estimating the length of pipe cannot be done at this time

2. Not applicable

## Impacts on Hydroelectric Power Projects

Since each of the potential source basins are a component of hydroelectric power generation projects, the amount of the IBT for each alternative can have a direct impact on power generation. Listed below is a brief description of each alternative and water transfers that would impact the hydroelectric projects. Table 26 provides a summary of the potential impacts to hydroelectric power project of each alternative and its rating.

### Alternative 1 (Catawba River Basin) :

Alternative 1 would transfer 24 MGD ADD from Lake Norman in the Catawba River basin to the Rocky River subbasin which discharges to the Yadkin-Pee Dee River basin between Falls Lake and Blewett Falls Lake.

### Alternative 2 (Yadkin River Basin – Tuckertown/Badin Lake) :

Alternative 2 would transfer 24 MGD ADD from either Tuckertown Reservoir or Badin Lake/Narrows Reservoir in the Yadkin River basin to the Rocky River subbasin which discharges back to Yadkin-Pee Dee River basin between Falls Lake and Blewett Falls Lake.



**Alternative 3 (Yadkin River Basin – High Rock Lake) :**

Alternative 3 would transfer 24 MGD ADD from High Rock Lake in the Yadkin River basin to the Rocky River subbasin which discharges back to Yadkin-Pee Dee River basin between Falls Lake and Blewett Falls Lake.

**Preferred Alternative:**

The Preferred Alternative would transfer up to 38 MGD from the Catawba River Basin and 10 MGD from the Yadkin-Pee Dee River Basin to the Rocky River subbasin which discharges to the Yadkin-Pee Dee River basin between Falls Lake and Blewett Falls Lake. However, the total IBT from both sources will not exceed 24 MGD on an ADD basis.

**Alternative 4A Rocky River Supply (Indirect Reuse)**

Alternative 4A would withdraw 24 MGD from Rocky River near Midland approximately 10 miles downstream of the Rocky River WWTP and pump raw water up to Lake Howell. This alternative would take advantage of increased river flows due existing grandfathered and previous approved IBTs from upstream waste water treatment plants in the Town of Mooresville, Mecklenburg County, and the Rocky River Regional WWTP in Cabarrus County.

**Alternative 4B Reverse IBT**

Alternative 4B would transfer 24 MGD of raw water from Lake Norman to Lake Howell, and simultaneously withdraw 24 MGD from Rocky River near Midland and pump it over to McAlpine Creek near Mint Hill in the Catawba River Basin to mitigate the IBT. McAlpine Creek discharges downstream of Lake Wylie on the Catawba River.

TABLE 26

Evaluation of Impacts on Hydroelectric Power Generation  
*Concord/Kannapolis IBT Environmental Impact Statement*

<b>Alternative with Water Source(s) Listed</b>	<b>Impacts on Source Lake Levels</b>	<b>Impacts on Down Stream Flows</b>	<b>Impacts on Water Supply Withdrawals</b>	<b>Impacts of Hydroelectric Power Generation</b>	<b>Overall Rating</b>
Alt. 1 - Lake Norman/Catawba	Low	Low	Low	Low	Low
Alt. 2 – Tuckertown-Badin Lake/Yadkin	Low	Lowest	Low	Low	Low
Alt. 3 - High Rock Lake/Yadkin	Low	Lowest	Low	Low	Low
Preferred Alternative –	Low	Low	Low	Low	Low
Alt. 4A – Indirect Reuse/Rocky River	Lowest	Lowest	Lowest	Lowest	Lowest
Alt. 4B – Reverse IBT/Catawba	Low	Lowest	Low	Low	Low
No Action	Lowest	Lowest	Lowest	Lowest	Lowest

**Summary of Alternative Analysis**

Listed in Table 27 below are the results of the evaluation criteria for each alternative.

**TABLE 27**  
 Summary of Alternative Analysis  
*Concord/Kannapolis IBT Environmental Impact Statement*

<b>Alternative with Water Source(s) Listed</b>	<b>Capital Cost Rating</b>	<b>Environmental Consequences Rating</b>	<b>Secondary/Cumulative Impacts on Receiving Basin Rating</b>	<b>Impacts on Hydroelectric Power Generation Rating</b>
Alt. 1 - Lake Norman/Catawba	Low	High	Lowest	Low
Alt. 2 – Tuckertown-Badin Lake/Yadkin	Highest	Low	Low	Low
Alt. 3 - High Rock Lake/Yadkin	Low	Low	Lowest	Low
Preferred Alternative	Lowest	Low	Lowest	Low
Alt. 4A – Indirect Reuse/Rocky River	High	Lowest	Lowest	Lowest
Alt. 4B – Reverse IBT/Catawba	High	Lowest	Lowest	Low
No Action	High	Lowest	N/A	Lowest

# Section 5 - Mitigation of Adverse Impacts

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The proposed IBT of raw water to the Rocky River Subbasin will not have the potential to cause significant direct impacts to the environment, as discussed in Section 2. The IBT, however, may have the potential to significantly impact the environment through secondary and cumulative impacts as a result of facilitating growth in the receiving basin, as discussed in Section 3.

In order to evaluate the significance of the impacts listed in Section 3, CH2M HILL has reviewed existing regulations and programs at the federal, state and local levels to determine if these existing programs may mitigate the anticipated impacts of urbanization of the project area. A discussion of federal, state, and local programs is provided. Also included is a summary of planned updates to local ordinances.

With the existing regulatory and non-regulatory environmental protection programs in effect at the local, state and federal levels, the impacts from the proposed IBT will be minimal.

## Summary of Federal and State Regulations and Programs

The following is a brief description of existing regulations and programs at the federal and state levels in the receiving basin (Table 28). The discussion emphasizes the extent to which existing programs may adequately mitigate the anticipated impacts of urbanization of the project area.

This analysis does not attempt to measure the performance of these programs to improve specific environmental conditions in the field. Such an “efficiency” analysis of each of these regulations and programs could determine the exact level of benefit received from the programs. However, an “efficiency” analysis is beyond the scope of this discussion.

Therefore, the following discussion addresses relevant regulations and programs from an environmental management and land use policy analysis perspective. The discussion provides a general overview of the existing regulatory and non-regulatory mitigation framework that protects natural resources from the effects of urbanization. The evaluation is used to identify opportunities for local governments to enhance environmental protection, and therefore reduce or offset any environmental impacts.

TABLE 28

## Summary of Existing State and Federal Programs and the Environmental Resources They Protect

Program or Regulation	Local Govt. Program Required	Wetlands	Land Use	Fish and Wildlife	Sensitive Species	Water Quality	Air Quality	Ground-water	Noise	Toxics
Endangered Species Act		X	X	X	X	X				
CWA Section 404		X	X	X	X	X				
CWA Section 401		X	X	X	X	X				
National Flood Insurance Program		X	X	X	X	X				X
NPDES Stormwater	X	X		X	X	X				X
NC Ecosystem Enhancement Program		X		X	X	X				
Archaeological Protection			X							
Sediment & Erosion Control	X	X	X	X	X	X				
Sanitary Sewer Overflow Regulations.		X	X	X	X	X		X		X
Clean Water Management Trust Fund		(X)	(X)	(X)	(X)	(X)				
Groundwater			X					X		X
Water Supply Watershed	X	X	X	X	X	X				
Land Conservaion Incentives		(X)	(X)	(X)	(X)	(X)				

X = Demonstrates clear environmental benefits

(X) = Shows potential for environmental benefits (policy only, program not mandatory, or regulation not yet adopted)

## Federal Regulations

### Endangered Species Act

The 1973 Endangered Species Act conserves ecosystems upon which threatened and endangered species of fish, wildlife, and plants depend, through Federal action and State programs (USFWS, 1992). The Act:

- Authorizes the determination and listing of species as endangered and threatened
- Prohibits unauthorized taking, possession, sale, and transport of endangered species
- Provides authority to acquire land for the conservation of listed species, using land and water conservation funds
- Authorizes establishment of cooperative agreements and grants-in-aid to States that establish and maintain active and adequate programs for endangered and threatened wildlife and plants
- Authorizes the assessment of civil and criminal penalties for violating the Act or regulations
- Authorizes the payment of rewards to anyone furnishing information leading to arrest and conviction for any violation of the Act or any regulation issued thereunder
- Requires Federal agencies to ensure that any action authorized, funded, or carried out by them is not likely to jeopardize the continued existence of listed species or modify their critical

### Section 303(d) of Clean Water Act

Section 303(d) of the Clean Water Act requires states to identify waters that do not support their classified uses. These waters must be prioritized, and a TMDL must subsequently be developed. TMDLs are calculations that determine the maximum amount of a pollutant that a waterbody can assimilate and still maintain its uses. As part of the TMDL development process, the sources of the pollutant must be identified, and the allowable amount of pollutant must be allocated among the various sources within the watershed.

### Sections 404/401 of the Clean Water Act

Two main regulatory programs currently regulate impacts to jurisdictional waters, including streams and wetlands in the project area, both of which originate from the Federal Clean Water Act: Section 404, regulation of dredge and fill activities (which is administered by the US Army Corps of Engineers [ACOE]), and Section 401, certification that a project does not violate the State's water quality standards (which is administered by DWQ). All private and public construction activities over a specific acreage that affect jurisdictional waters are required to obtain certifications and permits from DWQ (Section 401 WQ Certification) and ACOE (Section 404 Permits), respectively.

Although the State's 401 Water Quality Certification Program and the Federal 404 Wetlands Protection Programs protect jurisdictional waters by requiring avoidance and mitigation for wetlands across the state, it is possible for permits to be issued under both the State and Federal programs that allow small impacts to jurisdictional waters.

A common problem in the adequate protection of jurisdictional waters is inadequate personnel at both State and Federal levels to enforce the regulations. Effective March 1999, DWQ stepped up the enforcement of regulations for wetlands protection, particularly those related to hydrologic conditions necessary to support wetlands function (15A NCAC 2B.0231(b)(5)) and biological integrity (15A NCAC 2B.0231(b)(6)). DWQ is joined in this initiative by the North Carolina Division of Land Resources (DLR), which also will be looking at possible violations of the State Sedimentation Pollution Control Act.

### National Flood Insurance Program (NFIP)

A federal non-regulatory program that may afford some protection to stream riparian areas and wetlands, and also protect water quality by restricting floodplain development, is the NFIP. NFIP, which is managed by FEMA, was created in the 1960's in response to the rising cost of taxpayer funded disaster relief for flood victims and the increasing amount of damage caused by floods. The NFIP makes federally-backed flood insurance available in communities that agree to adopt and enforce floodplain management ordinances to reduce future flood damage. The NFIP, through partnerships with communities, the insurance industry, and the lending industry, helps reduce flood damage by nearly \$800 million a year.

Floodplain management under the NFIP is an overall program of corrective and preventative measures for reducing flood damage. It includes but is not limited to emergency preparedness plans, flood control works, and floodplain management regulations, and generally covers zoning, subdivision, or building requirements and special-purpose floodplain ordinances. Examples include mapping communities to identify flood-prone areas, elevating buildings above the base flood, and relocating structures out of the floodplain.

An important element in making flood insurance available to home and business owners is a community's agreement to adopt and enforce floodplain management ordinances, particularly with respect to new construction. It is up to local governments to adopt and enforce ordinances that meet or exceed the minimum floodplain management requirements of NFIP. (FEMA, NFIP).

All local governments in the receiving basin project area (including Cabarrus County, Concord, and Kannapolis) are participating in the FEMA Flood Insurance Program. This program prohibits filling in the floodways. It also limits construction of buildings in the floodplain fringe area unless an engineer certifies that the bottom floor of the structure is at least one foot above the 100-year base flood elevation. Concord had implemented a more stringent policy, requiring bottom finished floor of a structure to be at least two feet about the 100-year base flood elevation. In addition, Concord requires that any fill placed in the floodplain be balanced by an equal removal of material.

## State Regulations

### North Carolina Ecosystem Enhancement Program

The Ecosystem Enhancement Program, formerly known as the NC Wetlands Restoration Program, was established as a non-regulatory program within DENR to:

- Provide a systematic approach for meeting DOT's compensatory mitigation requirements
- Maximize the ecological benefit of compensatory mitigation projects

- Reduce delays in the construction of transportation improvement projects associated with compensatory mitigation requirements

While the program focuses on regional efforts and at a watershed scale, it does not specifically provide a mechanism to protect wetlands on a regional basis from widespread urban development impacts. (WRP, 1998A). The program has targeted two hydrologic units 11 and 12, within the project receiving basin for wetland restoration actions. (WRP, 1998A).

### Archaeological Protection

Archaeological resources are protected on private and public lands through the NC Archaeological Resources Protection Act, the Unmarked Human Burial and Human Skeletal Remains Protection Act, the NC Archaeological Record Program, the NC Environmental Policy Act, and various federal laws. Unfortunately, these laws are only applicable to projects that are state or federally approved, permitted or funded, or exist on state or federal lands. Although this often exempts many private development projects, the ACOE often catches some of these projects since they require archaeological reviews for any project that needs a Section 404 (federal wetlands) permit.

### Stormwater Regulations

Concord, Kannapolis and Harrisburg have developed and are in the process of implementing stormwater management programs under NPDES Phase II regulations. The Phase II permit applications have been submitted to the State and are included in Appendix E.

There are several components to the Phase II requirements including :

- Illicit discharge detection and elimination
- Construction site runoff control for sites one acre or more
- Post construction runoff control
- Pollution prevent and good housekeeping
- Public education and outreach
- Public participation and involvement

For the post-construction runoff control, DWQ requires local governments subject to Phase II to require new developments where density exceeds 24 percent built-upon area to treat the first inch of stormwater runoff volume. The discharge rate for this treatment volume must be at or below the predevelopment discharge rate.

The cities' stormwater programs are further discussed under the Local Regulations and Programs section. Concord has developed a Phase II stormwater program beyond the minimum requirements of Phase II regulations.

### Sediment and Erosion Control

The DLR administers programs to control erosion and sedimentation caused by land disturbing activities on one or more acres of land. Control measures must be planned, designed, and constructed to provide protection from the calculated peak rate of runoff from a 10-year storm, except for projects in HQW (High Quality Water) zones, which require control of 25-year storms. Enforcement of the program is at the State level, but can be delegated to local governments (usually counties or large municipalities) with certified erosion control programs. Cabarrus County enforces its own erosion and sedimentation control program based on DLR requirements. Concord currently uses the County's

program. Kannapolis plans to switch to the County program by the end of the year. Using the County's Program provides a greater level of local involvement and control for water quality protection.

### Water Supply Watershed Protection Programs

The Environmental Management Commission and DWQ have administered a Water Supply Watershed Protection Program since 1986. Initially, the program was administered voluntarily by counties and municipalities pursuing protective measures for their water supply watersheds. The measures included limitations on the number and type of wastewater discharges that were allowed in the water supply watersheds.

In 1989, the North Carolina General Assembly ratified the Water Supply Watershed Protection Act, codified as General Statutes 143-214.5 and 143-214.6. This Act mandated the Environmental Management Commission to adopt minimum statewide water supply protection standards by January 1, 1991, and to reclassify all existing surface water supply watersheds to the appropriate classification by January 1, 1992. The goals of the Water Supply Watershed Protection Program include:

- The protection of surface drinking water supplies in North Carolina from nonpoint source and point source pollution from urban runoff and wastewater discharges
- The provision of a cooperative program of watershed management and protection that is administered by local governments consistent with minimum statewide standards

DWQ manages the program through oversight of local planning ordinances and monitoring of land use activities. Local WSW programs must be approved by the Environmental Management Commission. The WSW program requires local governments to adopt various land use controls and limitations based on watershed classifications. This program:

- Limits impervious surfaces around water supplies unless stormwater controls are used
- Requires protection of riparian buffers (100-foot buffers in all development that exceeds the low-density option, or 30-foot buffers otherwise along perennial waters)
- Limits some land uses
- Limits dischargers (NPDES permits in certain situations)
- Allows the use of clustering and density-averaging to meet overall development density limits

Watersheds that are protected under the WSW Program have a classification of WS-I through WS-V, where WS-I has the most restrictive controls. The Coddle Creek watershed is classified as WS-II, the most stringent classification that can be provided for a relatively new water supply watershed in the Piedmont. Rules applying to WS-II watersheds are presented in Table 29. The headwaters of the Coddle Creek watershed are located in Rowan County. Rowan County has adopted water supply watershed protection rules into its Zoning Ordinance to create an overlay district. The rules comply with state requirements.



TABLE 29

Summary of Water Supply Watershed II Rules  
*Concord/Kannapolis IBT Environmental Impact Statement*

WS - II Watershed	Wastewater Discharges Allowed	Low Density Option	High Density Option <sup>3</sup>	Stream Buffers	Agriculture & Transportation BMPs	Landfills Allowed
Critical Area <sup>1</sup>	General Permits <sup>2</sup>	1 du/ 2 ac or 6% Built Upon Area	6 – 24% Built Upon Area	Low Density – 30' High Density – 100'	Yes	No New Landfills
Rest of Watershed	General Permits	1 du/ 2 ac or 12% Built Upon Area	12 – 30% Built Upon Area	Low Density – 30' High Density – 100'	Yes	No New Discharging Landfills

1. Critical Area – ½ mile and draining to water supply, including river intake or reservoir.
2. General Permits – cover relatively insignificant wastewater discharges.
3. High density option requires control of runoff from first one inch of rainfall.

### Regulations for Water Main and Sanitary Sewer Extensions.

State regulations (15A NCAC 01C .0100 – .0500) establishes procedures and regulations for the extension of water mains, sanitary sewer, and other utility infrastructure expansions and new facilities that must conform to the NCEPA. The regulations require the development of environmental documents for water and wastewater treatment plant development and expansions. In addition, water main extensions must comply if they are greater than 5 miles in length, and sewer mains if they are greater than 3 miles in length; unless site-specific adverse environmental consequences are identified.

### Sanitary Sewer Overflows (SSOs)

State regulations (15A NCAC 2B.05.06) require municipalities and other wastewater treatment operators to report wastewater spills from discharges of raw sewage from broken sewer lines and malfunctioning pump stations within 24 hours. DWQ has adopted the following policies, effective July 1, 1998:

- Municipalities and other wastewater treatment operators will be fined a minimum of \$4,000 if they do not comply with the reporting requirement within 24 hours for all spills exceeding 1,000 gallons that reach surface waters or the ground, regardless of whether they are contained or reach waters. A point system is used to determine whether to assess fines for reported spills.
- Wastewater collection system operators were required to prepare a Spill Response Plan Evaluation by July 1, 1998, and an Operation and Maintenance Evaluation of their systems by July 1, 1999. Operators must develop a plan including a schedule to deal with any maintenance and operational deficiencies uncovered. For spills occurring after July 1, 1999 related to maintenance or operational problems covered in the plan, the penalty will be increased.
- When a serious spill occurs, wastewater collection system operators could face not only higher fines but also requirements to publish public notices in local media, undergo training, or submit to an injunctive action and/or a moratorium on new connections to the system.

The NC Clean Water Bill of 1999 provides for the development of permits for collection systems that would include requirements for inspections, sewer maintenance and other operational items. DWQ developed a "shell" Wastewater Collection System Permit, and WSACC received its collection system permit in July 2001.

In addition, EPA is considering regulations that will address sanitary sewer overflows. EPA has prepared documents that provide draft language for proposed regulations to establish guidance and/or standard NPDES permit conditions for the following:

- Record keeping, reporting and public notification requirements for SSOs
- Capacity assurance, management, operation, and maintenance requirements for municipal sanitary sewer collection systems
- Prohibitions on SSO discharges to waters of the United States
- NPDES permit coverage for satellite municipal sewer collection systems

In addition to the above regulations dealing with SSOs, the following performance standards apply to proposed sewer collection system and pump station permits issued by DWQ.

- The wastewater collection system shall be effectively maintained and operated at all times so that there is no discharge to land or surface waters, nor any contamination of groundwater.
- The Permittee must maintain a contingency plan for pump failure at each pump station.
- The Permittee shall maintain on hand at least one fully-operational spare pump capable of pumping the design flow rate at the appropriate total dynamic head for each simplex pump station that serves more than one building.
- Each pump station shall be clearly and conspicuously posted with a pump station identifier and an emergency contact telephone number which is able to get to an individual that can initiate or perform emergency service for the collection system 24 hours per day, 7 days per week.
- An infiltration/exfiltration test shall be performed on all newly constructed sewer lines to ensure that the infiltration/exfiltration rate is less than 100 gallons per day per inch of pipe diameter per mile of pipe.
- At a minimum, an emergency power source or plugged emergency pumping connection shall be provided along with an approved contingency plan for all newly-constructed or modified pump stations.

#### North Carolina Clean Water Management Trust Fund (CWMTF)

The CWMTF was created by the 1996 Legislature to help finance projects that specifically address water pollution problems. It controls a non-regulatory program that focuses its efforts on upgrading surface waters in distress, eliminating pollution, protecting and conserving unpolluted surface waters, and establishing a network of riparian buffers and greenways for environmental, educational, and recreational benefits. According to the enabling legislation, 6.5 percent of the unreserved credit balance remaining in the State's General Fund at the end of each fiscal year is allocated to the CWMTF for disbursement. The minimum amount available must be \$30 million.

Possible use of CWMTF monies could be for wetland and/or riparian corridor identification and preservation (through acquisition and easement techniques) in the receiving basin portion of the study area to allow comprehensive protection of wetlands and riparian buffers in the project area to protect water quality and sensitive aquatic species.

### Groundwater Protection

Several regulations and programs exist at the state and local levels that protect groundwater from urban growth:

- Wellhead Protection Program
- Regulation of potential contamination sources
- Management of groundwater contamination incidents
- Ambient groundwater monitoring
- Regulation of well construction

These programs may afford some protection to groundwater wells from the most common forms of groundwater pollution – point sources such as chemical manufacturing facilities, underground storage tanks and accidental spills. However, more diffuse and evasive groundwater pollutants from agricultural uses (livestock facilities and chemical application on crops) and urban land uses (over-application of fertilizers and improper use of toxic household chemicals) may not be well managed under these programs.

### Miscellaneous Incentive Programs

Other, voluntary strategies exist at the federal and state levels that provide incentives to protect natural lands, wetlands, agricultural lands, and sensitive species habitat and forest lands from development. These non-regulatory approaches include providing tax credits for donating lands to specific organizations (usually land trusts) and providing funding for various grants and trust funds to purchase or protect undeveloped lands.

## Local Regulations and Programs

The following is a brief description of existing regulations and programs at the local government level in the project receiving basin, with specific effort given to determining if these existing programs may, when combined with existing federal and state regulations, adequately mitigate the anticipated impacts of urbanization of the receiving basin.

The following analysis addresses relevant regulations and programs from an environmental management and land use policy analysis perspective. These local initiatives to prevent impacts to natural resources will offset future impacts resulting from growth.

### Cabarrus County

#### Phase II Stormwater Programs

As previously mentioned, the cities have prepared Phase II permits and have submitted them to the state. The community working group involved representatives from Concord, Kannapolis, Harrisburg, Cabarrus County, developers, and area residents. Development of a Draft Stormwater Ordinance, with input from the community working group, was a result of this process. A copy of this ordinance is provided in Appendix E. The goal of the development of this ordinance was that each City could then modify and adopt the

ordinance as needed. Development of the Unified Development Ordinance (UDO) was a start to their programs.

### Water Supply Watershed Protection

The County has adopted a water supply watershed protection program, which has been approved by the State, to ensure sustainability of its current water supply reservoirs and their watersheds. Within the County Zoning Ordinance, a Watershed Overlay Zone is designated for the Coddle Creek and Dutch Buffalo Creek watersheds.

All lots within each watershed's critical area, defined as land within ½ mile of the high water mark of the reservoir, shall have a minimum size of two acres. In the case of cluster development, overall density of the site shall be the same, one dwelling per two acres of development. This clustering encourages the preservation of undisturbed open space. Within this critical area, no commercial or industrial development is permitted. A 150-foot buffer shall be maintained around each reservoir.

In the remainder of the watershed within Cabarrus County, one dwelling unit per acre or the requirements of the Cabarrus County Zoning Ordinance must be met, whichever is more stringent. Within Rowan County, development densities must meet the water supply watershed overlay district for the WS-II watershed. The entire Coddle Creek watershed, including its headwaters, is protected by water supply watershed ordinances.

### Unified Development Ordinance

The Cities of Concord, Kannapolis, Harrisburg, and Mount Pleasant have adopted a UDO. Cooperative efforts between all municipalities within the County contributed to the UDO's development. Updates to the UDO are planned to address, and go beyond, Phase II Stormwater Rule requirements and protect natural resources.

### Draft Stormwater Quality Management and Discharge Control Ordinance

Each City is developing a version of the Stormwater Quality Management and Discharge Control Ordinance (Stormwater Ordinance), to be adopted into each UDO. The City of Concord is also in the process of developing and approving the use of a Stormwater Technical Standards Manual (Manual). These collaborative efforts will limit the impacts of development in the Service Areas of the Cities. Discussion in this document pertains to aspects of the UDO, including the additional stormwater provisions, that address SCI that may result from the Project. Further details of the UDO include:

- Post-construction stormwater requirements that:
  - Require on-site stormwater management to attenuate runoff to predevelopment levels at the 1-year 24-hour storm level
  - Require 85 percent total suspended solids removal must be achieved by stormwater protection measures
  - Encourage the use of low impact development techniques
- No net loss in floodplain storage within the 100-year floodplain
  - Fill in the floodplain must be balanced by an equal cut
- Increase in stream buffer widths

As part of the UDO, developments that disturb above one acre or more than an additional 20,000 square feet at an existing facility will require preparation of a Stormwater Management Plan, which must be approved by the Stormwater Administrator. This process

gives the local government the ability to ensure proper preparations for stormwater treatment are being made in accordance with the UDO. Provisions are included to ensure continued protection of water quality over the long term. Maintenance of BMP structures, to be conducted by the owners, is required.

The City of Concord's manual also identifies stormwater drainage requirements that shall control and treat any increase in the volume of stormwater runoff from pre-development conditions, peak discharge, total suspended solids, fecal coliform, and other pollutants to levels identified in their Manual.

These efforts will help to prevent changes in stream hydrology and morphology, preserve floodplain storage, and limit sediment loading.

### Buffer Requirements

Within the UDO, current stream buffer regulations set forth in the UDO will be enhanced by the Stormwater Ordinance addition to increase water quality and aquatic habitat benefits. Current County-wide buffers of USGS blue line streams will be improved in the City of Concord to include buffers along both perennial and intermittent streams. The City of Kannapolis's plan will be similar to that of the City of Concord's, and is still in development. The City of Concord's draft definitions are:

- A perennial stream buffer shall be an undisturbed area measured, at minimum, 50 feet from the top of stream bank plus 20 feet of vegetated setback, totaling 70 feet.
  - Concord's ordinance also includes an additional vegetated width based on slope.
  - The vegetated setback zone may be maintained by property owners.
  - No new structures are permitted.
- An intermittent stream buffer shall be an undisturbed area measured from the top of stream bank perpendicularly for a distance of 20 feet with an additional 10 feet of vegetated setback, totaling 30 feet.

In general, buffers along perennial streams within the City of Concord are wider than the minimum 70 feet. Slope is factored into the equation to determine buffer width. The greater the slope, the wider the stream buffer is. Implementation examples of stream buffers are provided in Table 30. Floodplain storage and riparian wetlands will be protected with this measure, further protected by a rule excluding buildings within the buffer.

**TABLE 30**  
 City of Concord Typical Stream Buffer Widths  
*Concord/Kannapolis IBT Environmental Impact Statement*

<b>Subdivision or Development Name</b>	<b>Average Stream Buffer Width (feet)</b>
Afton Village Subdivision	Parcels #619 and #620 have a buffer of 80' + 20' setback
Cannon School	Buffer of 70' + 20' setback
Glen Grove Subdivision	Buffer of 70' to 75' + 20' setback
Yates Meadow Subdivision	Buffer of 65' + 20' setback

Source: City of Concord, 2004

**The proposed stream buffer regulation includes:**

- No new on-site sewage systems, which utilize ground adsorption, within the buffer
- No new structures
- Maintenance of stream buffer to maintain sheet flow and provide for diffusion and infiltration of runoff and filtering pollutants to the maximum extent practicable

In addition, the Cities of Concord and Kannapolis have agreed to require that intermittent and perennial streams be delineated by a qualified consultant or staff member as part of the development plan review process. Intermittent streams will be determined based on guidance developed by the Division of Water Quality. This provides a more accurate determination of stream type and location than the current method of using USGS topographic quadrangles.

Implementation of these more stringent buffer rules, as well as BMPs described in the UDO to control and minimize the quantitative and qualitative impacts of stormwater on receiving streams are proposed as mitigation for the SCI addressed in this EIS. Including intermittent streams in this rule will help protect critical headwater habitat areas. Concord plans to adopt updates to the UDO in the first quarter of 2005. Kannapolis is planning to adopt changes to the UDO in 2005. This is before any of the IBT would occur, ensuring that measure to protect the service area's natural resources are in place well before the IBT, and subsequent impacts, occur.

**Parks and Open Space Program**

Cabarrus County's "Livable Community Blueprint" was initiated with the goal of developing a parks and recreation master plan in 2001. This completed plan now includes provisions for parks, greenways, leisure and recreational facilities, open space, and bicycle and pedestrian transportation routes. This multi-jurisdictional project was completed in response to rapid population growth and accompanying development that has been occurring in Cabarrus County over the past decade. Open space helps reduce the conversion of undeveloped lands to impervious surfaces, provides recreational

opportunities, and preserves riparian buffers and wetlands that directly help protect water quality.

Impacts to terrestrial natural resources such as forests and wildlife habitats will be limited by the open space requirements set forth in each City's UDO. Based on development densities, subdivisions must set aside anywhere from eight percent where densities are less than two dwellings per acre to thirty percent of their total sizes within cluster developments. These values are above and beyond the setbacks required for floodway areas, wetlands, and open water. Clustering developments, in process setting aside larger tracts of open space, will limit habitat fragmentation, provide wildlife corridors, and present recreational opportunities. In addition, Concord does encourage the use of Low Impact Development (LID) planning as part of its Phase II Stormwater Permit, but is not requiring the use of LID.

### NC Stream Watch Program

Cabarrus County Soil Conservation, in conjunction with NC Stream Watch, facilitates the "adoption" of streams in Cabarrus County. With Stream Watch, citizens groups "adopt" a stream segment and act on its behalf. The activities of a Stream Watch group range from monitoring, to organizing clean-ups, to working with local government to protect green space. In Cabarrus County, the group raises awareness by participating in a storm drain stenciling program and will soon begin placing signs at stream crossings.

### Land Use Planning

Cabarrus County is in the process of completing long range land use plans, referred to as the Envision Cabarrus plan. These plans are being prepared by area, with some approved by the County and some still in draft form. Public involvement has been a large factor in development of these plans. The goal of this planning process is to improve quality of life for those currently living in the community and for future residents.

The Concord Planning and Community Development Program adopted a land use plan in 2004. Goals of the plan include maintaining a balance of compatible land uses, providing vehicular and pedestrian connectivity, achieving a sustainable community, preservation of unique character, providing adequate infrastructure, promoting farmland, natural resource and open space preservation, and linking plans and strategies with neighboring towns and the County. Concord's plan focuses around mixed use districts and village centers, therefore not supporting sprawl. The use of LID practices is encouraged. It also preserves the historic nature of downtown with its Center City Plan.

Kannapolis has developed its Draft 2015 Comprehensive Land Use Plan, which was adopted on July 26, 2004. The purpose the land use plan is to establish policies to define the future city, such as quality of life indicators, rate of growth, and location of growth.

Overall, these plans provide the cities and county with decision making tools to guide appropriate development and growth. The development of a UDO is just one component of the efforts the area is undertaking to promote sustainable growth and protect natural resources as growth occurs. Another example is the Coddle Creek watershed; public water supply watersheds are afforded protection by limiting development densities and activities that may introduce toxic substances to the watershed. The Coddle Creek watershed is protected as a WS-II watershed, and this was taken into account during land use planning.

## Other Ordinances

The County has several ordinances that help protect environmental resources. These include:

- Allowance for cluster development – clusters of home sites on smaller lots, resulting in the remaining “saved” space being retained as open space.
- Subdivisions which contain 30 or more houses must include a mini-park.
- Decreased traffic in residential areas – part of a customized development standard to protect residential areas from high traffic volume, traffic speed, noise, and fumes.
- Flood Damage Prevention Ordinance: If a subdivision is planned within 150 feet of any water course, the prospective subdivider shall provide evidence to the Planning and Zoning Commission (by referencing maps prepared by FEMA [dated 1994]) that the lots within the subdivision will not be flooded. The prospective subdivider shall make a determination of the crest elevation of a flood of 100-year probable frequency in accordance with generally accepted engineering practice. During the construction, preparation, arrangement, and installation of subdivision improvements, and facilities in subdivisions located at or along stream bed, the developer shall maintain the stream bed of each stream, creek, or backwash channel contiguous to the subdivision in an unobstructed state.
- River Stream Buffer: All subdivisions containing or located adjacent to all rivers or streams shown on USGS Quadrangle Maps as a solid blue line shall be subject to all of the regulations set forth in Chapter 4, Part II (River/Stream Overlay Zone) in the Cabarrus County Zoning Ordinance. These current regulations include:
  - retaining natural vegetation to avoid erosion and reduce the velocity of overland flow
  - trapping sediment and other pollutants and keeping them from entering the waterway
  - using BMPs in farming
  - installing and maintaining 50-foot (minimum) to 120-foot (maximum) stream buffer, depending on development
  - submitting a progress report by those disturbing the land to the Planning and Zoning Department
- Cabarrus County Sediment and Erosion Control Ordinance
- Stormwater Drainage: Must provide adequate drainage of all surface water. Modifications of streams and other natural water courses are prohibited.
- Water and Sewer Systems: Private wells and septic tanks must be approved by the Cabarrus County Health Department.
- Connection to public water and sewer systems shall be in accordance with the policies and regulations of WSACC.

## Water Reclamation

The WSACC does not have a reclaimed water system at this time. The 2002 “Water and Wastewater System Master Plan” for WSACC provides the results of a conceptual



investigation of developing a start-up reclaimed water system by identifying current state compliance regulations, potential customers, infrastructure improvements, and capital cost estimates for a pilot project and a 2 MGD system.

### Water Conservation Programs

As a follow up to the completion of the WSACC Master Plan in 2002, a regional drought management plan was prepared. This report re-evaluated the safe yield of existing water sources available to Cabarrus County, and established a drought operations plan for the county (*Safe Yield Update and Regional Drought Operations*, Black and Veatch, 2003).

This plan is based on the implementation of drought operating curves for Lake Howell that indicate drought severity. Five conditions, normal and stages 1 through 4, were identified that are based on the useable volume available in the reservoir and the current reservoir inflow. The current reservoir inflow is compared to the historical mean monthly inflow for the current month and a historical percentage is identified. The ultimate goal of the five conditions is to preserve usable volume in the reservoir, and increase restrictions on the withdrawals as a drought increases in severity from “normal “ conditions up to Stage 4.

A copy of the “Safe Yield Update and Regional Drought Operations” report is included in Appendix D.

The cities of Concord and Kannapolis have been proactive in the development of city ordinances to protect and preserve its water supply. Concord amended its Water Management Plan Ordinance in March 2003 to address future connections and extensions of its water system. The city of Kannapolis has been following its amended ordinance since March 2001.

### Water Use Efficiency

A comparison of the per capita water use history for Concord and Kannapolis water systems to other similar sized water systems in the Charlotte region has been performed to demonstrate their commitment to water conservation especially in drought situations. To account for fluctuations in industrial and commercial water demands that can occur due to changes in the regional economy, the comparison is made on residential water demands only since they are the most consistent demands in the system. Information on residential water use was extracted from 1997 Local Water Supply Plans available on the DENR website (2002 LWSP updates were not available at the time of this writing). As shown in Table 31 below, the Concord and Kannapolis water systems have very similar per capita water use of other similar sized systems in the Charlotte region.

**TABLE 31**  
 1997 Local Water Supply Plan – Residential Water Use  
*Concord/Kannapolis IBT Environmental Impact Statement*

<b>Water System</b>	<b>Population Served</b>	<b>ADD (Res)</b>	<b>GPCD</b>
Concord/Harrisburg	53,985	3.301 <sup>1</sup>	61.313
Kannapolis	35,288	1.526 <sup>2</sup>	43.24
<b>Similar sized systems in Charlotte area</b>			
Monroe	23,051	1.640	71.15
Albemarle	24,105	0.920	38.17
Salisbury	28,077	2.450	87.26
Union County	41,810	3.162	75.63
Gastonia	65,343	4.746	72.63

1. Concord noted ~ 3 MGD of Commercial demand reported as Residential.

2. A portion of Kannapolis' Residential demand was likely reported in Industrial demand due to Pilotex.

Residential water use data from 2000, 2001, and 2002 were obtained from Concord and Kannapolis water systems to analyze their per capita water use during the severe drought. This information has been presented in Table 32, and indicates that even though these two water systems were experiencing growth in population served year over year, their water conservation plans were effective in maintaining consistent ADDs by reducing per capita consumption. Copies of the Concord and Kannapolis water conservation plans have been provided in Appendix D.

**TABLE 32**  
 Concord and Kannapolis Recent Water Use History  
*Concord/Kannapolis IBT Environmental Impact Statement*

<b>Water System</b>		<b>Population Served</b>	<b>ADD (Res)</b>	<b>GPCD</b>
Concord/Harrisburg	2000	57,714	4.138	71.70
	2001	60,325	3.711	61.52
	2002	63,136	3.791	60.04
Kannapolis	2000	45,387	2.74	60.37
	2001	46,633	2.62	56.18
	2002	47,557	2.61	54.88

## Summary

Table 33 presents a correlation between existing and proposed regulations and ordinances and the potential environmental impacts that may occur as a result of the IBT and associated infrastructure improvements. The local ordinances exceed State requirements or guidance in many areas and represent a comprehensive approach to mitigating the potential impacts as a result of continued growth and development supported by the additional water supply.

TABLE 33

Areas of Potential Secondary and Cumulative Impacts to be Addressed by Permitting and Mitigation in the Receiving Basin

Environmental Resource	Potential for SCI	Mitigation Programs
Wetlands	LI	Riparian Buffers (all) County Zoning Ordinance, 150-foot buffer required around reservoirs Section 404 and Section 401 regulations
Urban / Developed Land	PI	UDOs (Concord and Kannapolis) and Zoning ordinances (all) - buffers required between adjacent land uses Encouragement of use of Low Impact Development (Concord) Water Supply Watershed Regulations limit development densities Land Use Planning recently updated by County, Concord, and Kannapolis
Public Land / Recreation Uses	LI	Land Use Planning recently updated by County, Concord, and Kannapolis – plans include greenway and park plans and open space considerations Subdivision Ordinance – Recreational Areas requirements (all) County Zoning Ordinance – Recreational District Overlay Zone; Watershed Overlay Zone provides for 150 foot buffer surrounding reservoirs.
Prime Agricultural Land	PI	Land Use Planning recently updated by County, Concord, and Kannapolis
Forestry Land	PI	Riparian buffers (all) UDO open space requirements for new development (Concord and Kannapolis) County Zoning Ordinance, 150-foot buffer required around reservoirs
Archaeological / Historical Areas	LI	Land Use Planning recently updated by County, Concord, and Kannapolis Concord-Center City Plan for historic area
Wildlife Habitat	PI	Riparian buffers provide habitat and corridors (all) County Zoning Ordinance, 150-foot buffer required around reservoirs UDO open space requirements (Concord and Kannapolis)
Fisheries and Aquatic Resources	LI	Riparian buffers (all) State SSO regulations NPDES permitting including Phase II stormwater regulations UDO (Concord and Kannapolis)
Sensitive and Threatened Species & Habitat	LI	Endangered Species Act NEPA and NCEPA regulations Cabarrus County Natural Heritage Inventory

**TABLE 33**  
**Areas of Potential Secondary and Cumulative Impacts to be Addressed by Permitting and Mitigation in the Receiving Basin**

Environmental Resource	Potential for SCI	Mitigation Programs
Water Resources & Water Quality	PI	Riparian buffers (all) Stormwater Ordinances (all) & UDO (Concord and Kannapolis) County Sediment and Erosion Control Ordinance Clean Water Management Trust Fund projects Cabarrus County and Rowan County Zoning Ordinances-Water Supply Watershed Overlay Zones
Air Quality	LI	Public transportation available Land Use Plans encourage connectivity for pedestrians proper thoroughfare planning (all) Encourage use of Low Impact Development (Concord)
Groundwater	LI	Failing septic systems taken offline as infrastructure developed Availability of infrastructure reduces future increase in septic tanks.
Noise	LI	Land use planning (all) encourages transportation planning Landscape buffers between adjacent land use types to reduce noise levels (County Zoning Ordinance; Concord and Kannapolis UDOs)
Toxic & Hazardous Substances	LI	Land use planning and zoning encourage growth in appropriate areas. NPDES Phase II stormwater education programs Brownfield Assessment Demonstration Pilot Project (Concord)

**Notes:**  
 PI = Areas of Potential Impact (major relevance in NCEPA documents and permitting applications)  
 LI = Areas of Limited Impact (minor relevance in NCEPA documents and permitting applications)

This table is meant to show the relevance of each of the environmental issues in terms of potential for secondary and cumulative impacts. **“PI” indicates areas where there is a potential for secondary and cumulative impacts to occur without adequate mitigation programs in place.** The listed mitigation programs will reduce these impacts to below a level of significance. Coordination with public agencies contributed to the mitigation plans outlined in this document.

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# Appendices

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# Appendix A – Yadkin-APGI Shoreline Stewardship Policy

July 1, 1999 (Revision Date: July 1, 2002)

## I. General

The Yadkin Project (Project) includes four reservoirs: High Rock, Tuckertown, Narrows (Badin Lake), and Falls. The Project is licensed by the Federal Energy Regulatory Commission (FERC) as project number 2197. As a FERC licensee, Alcoa Power Generating Inc. (APGI), through its Yadkin Division (Yadkin), operates and manages the Project reservoirs in accordance with the terms of its license and the applicable rules and regulations of FERC. This responsibility includes providing adequate public access and public recreation facilities, and protecting important natural, environmental, cultural, and scenic resources. Yadkin takes its responsibility very seriously and is committed to the protection and enhancement of these resources within the FERC-licensed Project boundary (Project Boundary) and on lands adjacent to the Project reservoirs.

Generally, the Project Boundary follows the normal full-pool elevation of the four Project reservoirs. Any land or waters lying within the Project Boundary are regulated by FERC through the terms of the Project license and are covered under this Policy. Property owned by APGI or its parent company, Alcoa Inc. (Alcoa) includes the land below the waters of the reservoirs and the generating facilities.

In addition, along many areas of the reservoir shorelines, Yadkin manages property that is owned by APGI or Alcoa. Often, ownership of these shoreline parcels is to a specific elevation contour and, therefore, the width of these parcels can vary considerably depending on the shoreline topography. On Narrows Reservoir, APGI/Alcoa owns a narrow strip of shoreline property around nearly the entire reservoir, generally to an elevation of 545.0 feet (Yadkin datum), approximately 4 vertical feet above the normal full-pool elevation. APGI/Alcoa also owns some narrow strips of shoreline property around portions of High Rock Reservoir. Most of the High Rock shoreline strips are owned to a specified elevation. Collectively, these strips of shoreline property, to the extent they extend no more than 100 feet from the Project Boundary, are considered "Yadkin-Managed Buffer."

In other areas, APGI/Alcoa owns shoreline property that extends back from the water a considerable distance. In these areas, the first 100 feet of shoreline property from the normal full-pool elevation of the reservoirs is also considered "Yadkin-Managed Buffer." All other APGI/Alcoa lands more than 100 feet from the Project Boundary are referred to as "Yadkin-Managed Lands." Private access across or use of Yadkin-Managed Lands is generally not granted.

This Shoreline Stewardship Policy summarizes Yadkin's policies, procedures, and requirements regarding use of the Project lands and waters and the Yadkin-Managed Buffer by owners of property adjoining the Project Boundary or the Yadkin-Managed Buffer (adjoining property owners) and others. Some of these have been in place for a number of years and others are new and are effective for new development platted and recorded on or after July 1, 1999. This Policy also outlines a number of voluntary measures adjoining property owners can undertake to assist in caring for the reservoirs. As shoreline property owners, APGI and Alcoa are subject to this Policy.

Yadkin allows public access to Project lands and waters, so far as consistent with the proper operation of the Project, and also to portions of the Yadkin-Managed Buffer (such as game lands) for purposes of navigation and recreation, including fishing and hunting. All other uses of the Project lands and waters, or the Yadkin-Managed Buffer, including the

development of private access, subdivision access, multi-use recreation facilities (marinas, boat docks, fishing piers, boat launch ramps, etc.), and industrial uses/facilities, require Yadkin's written permission. This Policy identifies the procedures that must be followed by private individuals or developers seeking Yadkin's permission to use or occupy Project lands and waters or the Yadkin-Managed Buffer.

Any unauthorized use of, or change in the features or vegetation on, Project lands and waters or the Yadkin-Managed Buffer is prohibited and considered an encroachment. Such unauthorized activities include, but are not limited to, the following:

- construction, installation, or placement of structures, including retaining walls
- construction of roads, sidewalks, or pathways
- clearing or disturbance of land
- logging or removal of trees and vegetation
- installation of pipes and/or pumps
- dumping

Although all landowners are responsible for knowing and respecting the boundaries of their own property, Yadkin has a practice of marking the property boundaries of the Yadkin-Managed Buffer and other Yadkin-Managed Lands. Yadkin regularly patrols the property boundaries to ensure that they are marked. Yadkin periodically surveys its property to confirm or redefine property boundaries, at which time new boundary markers may be installed. Yadkin also encourages adjoining property owners to undertake a survey of their property before embarking on any construction, road building, or land clearing activities on their property. When a survey is done, Yadkin requests that the adjoining property owner notify Yadkin of the survey, so that Yadkin may conduct a follow-up survey to verify and mark the common boundary. Anyone with questions about property boundaries or surveying is encouraged to contact Yadkin at 1-888-886-1063 or 704-422-5678.

Under its FERC license, Yadkin has the authority to grant permission for certain types of use and occupancy of Project lands and waters and to convey certain interests in Project lands and waters. However, this can be done only if the proposed use and occupancy is consistent with the purposes of protecting and enhancing the scenic, recreational, and other environmental values of the Project. For those purposes, Yadkin has the continuing responsibility to supervise and control the uses and occupancies for which it grants permission, and to monitor the use of, and ensure compliance with, the covenants of the instrument of conveyance for any interests that it has conveyed under its FERC license. If a permitted use or occupancy violates any condition of Yadkin's FERC license or any other condition imposed by Yadkin for the protection and enhancement of the Project's scenic, recreational, or other environmental values, or if a covenant of a conveyance made under the authority of its FERC license is violated, Yadkin will take any lawful action necessary to correct the violation. For a permitted use or occupancy, that action includes, if necessary, (i) canceling permission to use and occupy Project lands or waters, (ii) requiring the removal, at the permittee's sole expense, of any non-complying structures and facilities, and (iii) restoring the reservoir or the shoreline to its original condition. Yadkin also has the right to take similar actions against permittees for violations regarding the Yadkin-Managed Buffer and other Yadkin-Managed Lands. Enforcement is discussed in more detail in Section XIV of this Policy.

Under its permitting programs, Yadkin conditionally permits adjoining property owners with eligible lots to access and use Project lands and waters and/or the adjacent Yadkin-Managed Buffer. Private use of Project lands and waters, or private use of or access across the Yadkin-Managed Buffer, by adjoining property owners is a privilege granted by Yadkin.

In exchange for this privilege, adjoining property owners must comply with all permits, this Policy, Yadkin's Specifications for Private Recreation Facilities at High Rock and Narrows Reservoirs (Specifications for Private Recreation Facilities), Yadkin's Subdivision Access Approval, Multi-use Facility Permitting, and Industrial Approval Procedures (Multi-use Procedures) and Yadkin's other applicable procedures and requirements. Failure to do so is subject to enforcement as discussed in more detail in Section XIV below.

Yadkin has endeavored to make this Policy clear and useable for adjoining property owners. However, from time to time there may be questions regarding interpretation of this Policy or matters not specifically addressed by this Policy. These will be resolved by Yadkin giving due consideration to the underlying goals reflected in this Policy as well as Yadkin's Shoreline Management Plan (SMP) filed with FERC on July 1, 1999.

## II. General Stewardship Provisions

Yadkin's highest priority under this Policy is to preserve the natural character of the shoreline. In certain circumstances described below, Yadkin will permit modifications to the shoreline and the Yadkin-Managed Buffer. Even where permitted by Yadkin, Yadkin expects alterations to the shoreline and the Yadkin-Managed Buffer to be minimized, and if such alteration will result in adverse impacts to reservoir or shoreline resources or Project operations, these impacts must be adequately mitigated. Yadkin encourages adjoining property owners to prepare plans for proposed development of houses, piers, yards, pathways, and other facilities that utilize natural materials and preserve the natural shoreline setting. Those who do so will minimize disturbance along the shoreline and will be rewarded by the benefits and beauty of a more natural environment.

Yadkin considers installation of any permitted facilities or structures in the reservoir, along the shoreline or on the Yadkin-Managed Buffer, to be temporary. Accordingly, Yadkin requires that all facilities, including piers, pathways, stairs, ramps, and retaining walls, be constructed of such materials and in such a manner that allow easy removal and restoration of the natural shoreline. Generally, wood and uncemented rock, stone, and paving block are the preferred materials. Concrete and masonry are not allowed.

Yadkin prohibits the operation of any equipment (vehicles, backhoes, bulldozers, skidders, tractors, all terrain vehicles, etc.) in the reservoirs, along the shoreline, or on the Yadkin-Managed Buffer, except by written permit.

## III. 100-foot Forested Setback Requirement

### A. Specifications

For all lots in new subdivisions platted and recorded on or after July 1, 1999, as a condition of eligibility for private individual piers, shared piers, or use of, or private access to the Project lands and waters across, the Yadkin-Managed Buffer, Yadkin requires satisfaction of the following minimum specifications for a 100-foot forested setback:

1. All structures (including but not limited to buildings, houses, driveways, roof overhangs, decks, porches, patios, cantilevered decks, stairs, posts, columns, fences, retaining walls, landscaping walls, and gazebos) must be set back at least 100 feet from the reservoir shoreline. The setback will be maintained as a forested area. The 100-foot forested setback will be measured along the ground surface from the normal full-pool elevation of the reservoir to the nearest structure(s).

**100-foot Forested Setback** —All structures (including but not limited to buildings, houses, driveways, roof overhangs, decks, porches, patios, cantilevered decks, stairs, posts,

columns, fences, retaining walls, landscaping walls, and gazebos) must be set back at least 100 feet from the reservoir shoreline. A septic field or well, however, will be allowed in the 100-foot forested setback to the extent that installation does not require removal of any vegetation other than as permitted in Section III.A.5, below. In addition, the 100-foot forested setback requirement does not apply to a pathway to a pier, an irrigation system, etc., that has been permitted by Yadkin in accordance with this Policy. The 100-foot forested setback will be measured along the ground surface from the normal full-pool elevation of the reservoir to the nearest structure(s).

**20-foot Construction Zone** — A 20-foot-wide construction zone will be permitted to intrude into the 100-foot forested setback to accommodate construction. Vegetation may be removed in the construction zone, but that portion of the construction zone intruding into the setback must be revegetated upon completion of the construction.

**Vegetation Removal** — Vegetation removal on the adjoining property owner's property is allowed within the 100-foot forested setback in accordance with Section III.A.5. No vegetation removal is allowed on the Yadkin-Managed Buffer without a written permit from Yadkin.

2. A septic field or well will be allowed in the 100-foot forested setback to the extent that installation does not require removal of any vegetation other than as permitted in Section III.A.5, below. In addition, the 100-foot forested setback requirement does not apply to a pathway to a pier, an irrigation system, etc., that has been constructed pursuant to a written permit issued by Yadkin in accordance with this Policy.

3. A 20-foot-wide construction zone will be permitted to intrude into the 100-foot forested setback to accommodate construction. Vegetation may be removed in the construction zone, but that portion of the construction zone intruding into the setback must be revegetated upon completion of the construction.

4. Variances will be granted only when a lot is unbuildable. Unbuildable means the inability to build the minimum size house required by the subdivision's restrictive covenants, or an 1,800 square foot home, if no minimum house size is specified, behind the 100-foot forested setback.

In instances where compliance with the 100-foot forested setback requirement would render a lot unbuildable, Yadkin may, but is not required to, approve variances granting a lesser setback on a lot-by-lot basis that would provide the maximum possible setback, which in no case will be less than 50 feet. For lots where Yadkin approves a setback of less than 100 feet, Yadkin will also designate an appropriate construction zone for that lot.

5. Vegetation in the 100-foot forested setback must be maintained as it existed prior to development. To provide opportunity for improved water views, adjoining property owners may remove some vegetation on their property in accordance with the following criteria:

Fifty percent (50%) of vegetation less than 5 feet in height may be removed; however:

- No tree greater than 2 inches in diameter (measured 1 foot above the ground level) may be removed.
- Within 30 feet of tributaries, ditches, swales, or drainageways that drain into the reservoir, no living vegetation, or dead vegetation root structure may be removed.
- Dead limbs of any height may be removed on trees. Living limbs may be removed up to a height of 8 feet above the ground.

- Fallen trees (blow-down), fallen limbs, and fallen branches may be removed, but all leaf litter (leaves, pine needles, etc.) must remain.
- No lap trees, trees, or vegetation of any type overhanging the reservoirs or within the reservoirs may be removed without specific permission from Yadkin.
- Any tree that poses an imminent threat to life or property may be removed.

6. In a permit to construct a private individual or shared pier (see Yadkin's Specifications for Private Recreation Facilities), Yadkin may allow movement or removal of identified lap trees where necessary for construction or installation of the facilities. In cases where movement or removal is necessary, Yadkin will require movement or removal in accordance with its Procedures For Implementation Of Those Portions Of The Shoreline Management Plan Relating To The Removal Or Relocation Of Lap Trees, approved by FERC on May 9, 2001.

7. For any lot in a new subdivision subject to the 100-foot forested setback requirement set forth above, the primary sanction for failure to comply with this requirement is a loss of eligibility for: (i) a private (individual or shared) permit within the Project Boundary (i.e., on a reservoir); and (ii) use of, or private access to the Project lands and waters across, the Yadkin-Managed Buffer. Once an adjoining property owner in a subdivision to which these setback requirements apply has a permitted private pier, subsequent removal of vegetation from the 100-foot forested setback, other than as allowed under the above criteria, is also subject to enforcement as set forth in Section XIV below.

8. Removal of any vegetation from any portion of the 100-foot forested setback within the Yadkin-Managed Buffer requires a written permit from Yadkin. For adjoining property owners in new subdivisions who satisfy the above requirements on their property, vegetation removal from the Yadkin-Managed Buffer will generally be considered, by written permit, in accordance with the criteria listed under Section III.A.5, above. Failure to secure a permit from Yadkin prior to removing any vegetation from the Yadkin-Managed Buffer, or removal in any manner other than as permitted by Yadkin, is subject to enforcement as set forth in Section XIV below.

9. In no case may management of the 100-foot forested setback be inconsistent with the requirements of North Carolina's watershed protection rules and county watershed protection ordinances.

# Appendix B – Agency Involvement



# Appendix C – Hydroelectric Power Generation Impacts

# Appendix D – Water Conservation & Drought Operations Plan

# Appendix E – Local Ordinances & Information