SECTION 4. CURRENT WATER SUPPLY ISSUES

Almost all of the counties and river basins in the state have some water supply issues that are at least of local significance. However, numerous water supply issues currently have more regional or even statewide significance. These issues are touched on in various other sections of this report and in the basin summaries, however, they are presented here in greater detail.

4.1 Ground Water Issues in Eastern North Carolina

Ground water is an extremely important water supply source in North Carolina. Half of the state's population relies on ground water for water supply. For most public water systems in the coastal plain, ground water is the primary water source.

Ground water is the water that fills the pores and cracks in the soil and rocks below ground level. In the Piedmont and Mountain regions of the state, wells typically tap into water in the cracks in rock formations. In the coastal plain, wells typically tap into water contained within numerous layers of water-bearing sediments (or aquifers) that yield water of varying quantity and quality, depending on the depth and location of the well. Many of these coastal plain aquifers are capable of yielding large volumes of high-quality water. The amount of ground water available depends on the amount of natural recharge that occurs from rainfall slowly seeping into the aquifers.

4.1.1 Capacity Use Area #1

The Water Use Act of 1967 allows the Environmental Management Commission to designate an area as a Capacity Use Area (CUA) if it finds that the long-term sustainability of the water resource is threatened or that water use in an area requires coordination to protect the public interest. Within a designated CUA, all persons withdrawing more than 100,000 gallons of water per day must first obtain a permit from the Division of Water Resources (DWR).

Capacity Use Area # 1 (CUA #1) was formed in 1976 in response to pumping of the Castle Hayne aquifer associated with a phosphate mining operation in Beaufort County. Pumping of tens of millions of gallons of ground water per day to dewater the mine near the town of Aurora affected water levels in wells tens of miles away. CUA#1 includes all or parts of eight eastern North Carolina counties surrounding the mine, as shown in Figure 4-1.

Water use throughout much of CUA#1 currently appears to be at sustainable levels. Even though water use by many existing and new permittees has increased, the high recharge to the Castle Hayne aquifer, coupled with decreased pumping at the phosphate mine, have lessened the impacts of increased water use. However, DWR has recognized some areas of concern with respect to salt water intrusion and is currently working with the affected parties to mitigate the problem.

DWR is currently working to improve the management of the water resources within CUA#1. DWR has established a field office in New Bern to monitor and maintain wells in

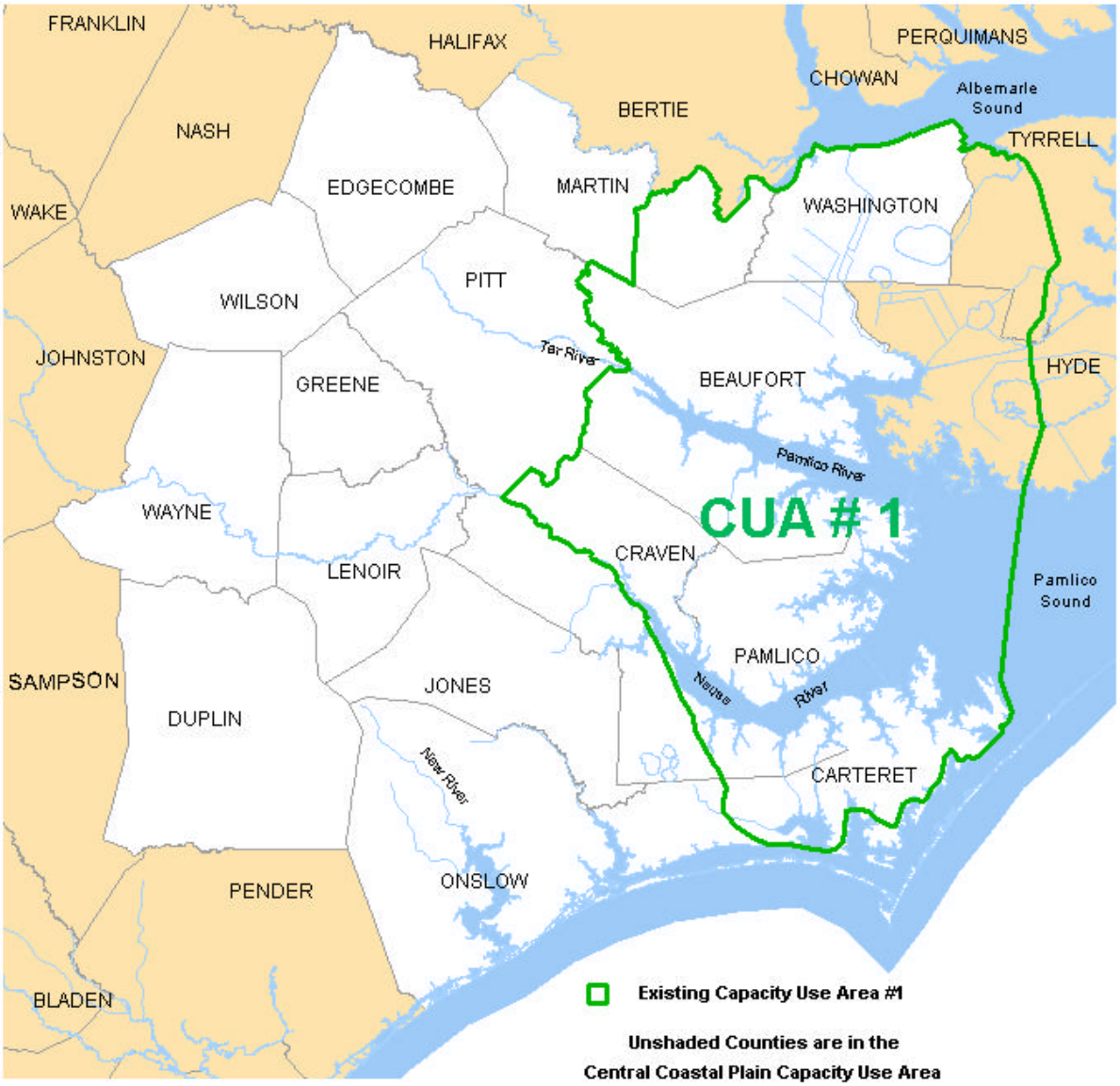

Figure 4-1. Vicinity Map of Capacity Use Area #1

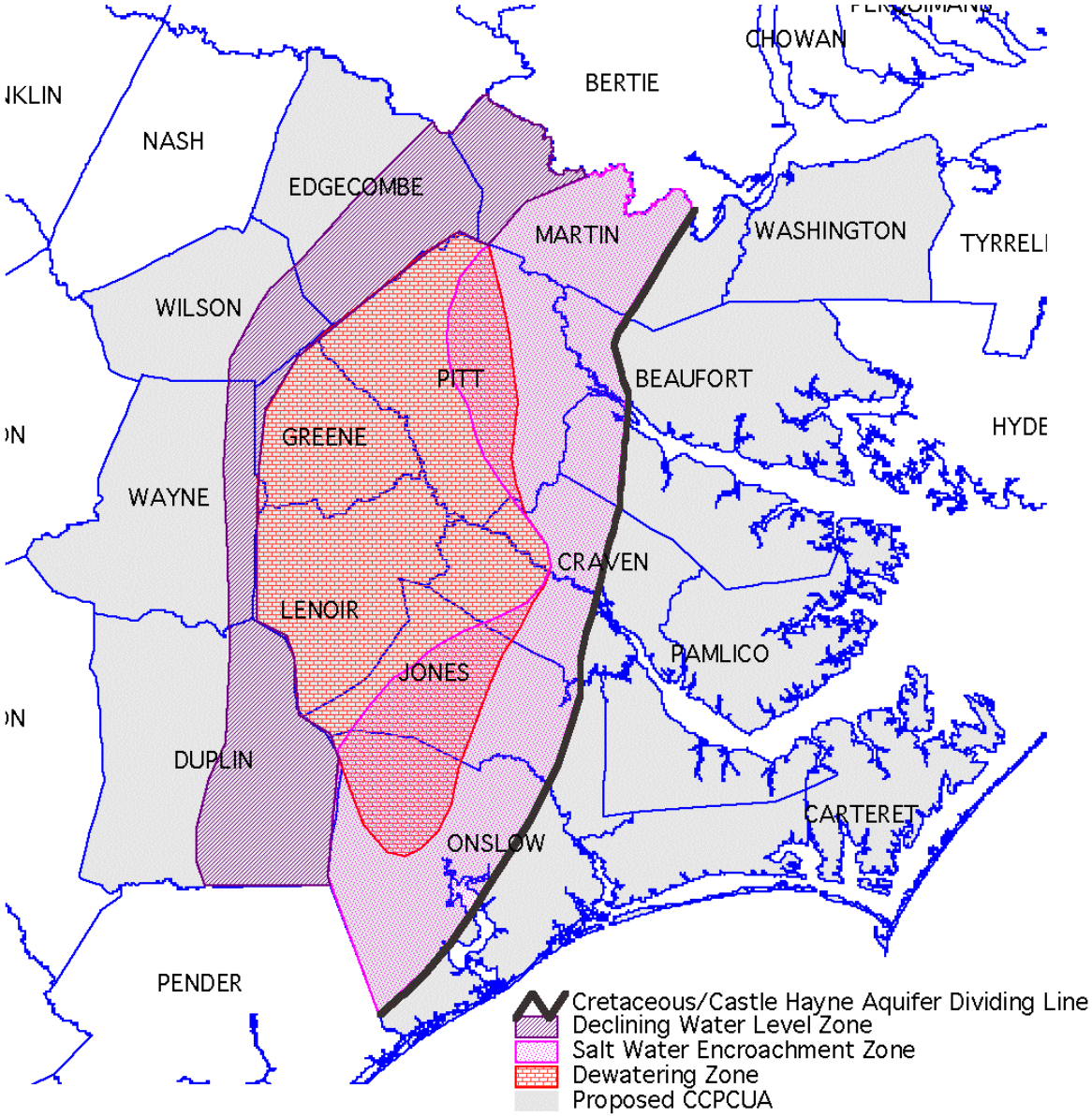

Figure 4-2. Cretaceous Aquifer Zones for Central Coastal Plain Capacity Use Area

the monitoring well network. Well data is being digitized and stored in a water use database that will allow for easier interpretation and greater public access to this data. In addition, DWR is developing a hydrogeologic framework model of the Castle Hayne aquifer to allow assessment of the cumulative impacts of multiple water withdrawals within CUA#1.

4.1.2 Central Coastal Plain Ground Water Issues

Ground water levels in the confined aquifers of the Central Coastal Plain have been declining for decades as ground water withdrawals have increased. Up to a certain point, water level declines are a normal and acceptable part of ground water use. However, if water levels continue to decline without stabilizing, it is an indication that ground water is being withdrawn faster than it can be recharged, which can lead to reduced water yield and damage to the aquifers. The Division of Water Resources has been tracking coastal plain ground water levels for a number of years. In early 1998, new monitoring data indicated that the declines had increased somewhat faster than predicted, and that in some areas water levels are falling below the top of the aquifer. This dewatering of the aquifer may result in serious impairment to the aquifer and ground water quality.

Water levels in the Black Creek and Upper Cape Fear aquifers have been declining since the late 1960s. Information from the 1920s indicated that water flowed freely from some wells at the time they were constructed. In some areas, water levels are now more than 200 feet below the land surface. This continued decline indicates that current withdrawals of water from these aquifers exceed the available supply that can be used on a sustainable basis.

DWR held a workshop with ground water users from the Central Coastal Plain in Greenville in March 1998 to review the monitoring data and discuss what responses should be made to assure a sustainable water supply for the coastal plain. Based on the available data and on this discussion with water users, DWR has developed a three-point program to assure good ground water management in the coastal plain:

Monitoring: The ground water level monitoring well network is currently being expanded and rehabilitated as needed to provide accurate data on the amount and rate of ground water level declines. This information is needed to guide management efforts to minimize damage to the aquifers and to track progress in reversing water level declines through improved management. Information on water usage in the region must be monitored so the relationship between pumping and water level changes can be understood and used by all water users to make management decisions.

Planning: The solution to the water supply problems in the Central Coastal Plain will involve careful management of ground water to make the best use of the sustainable yield while, at the same time, developing additional water sources to meet needs beyond those which can be met from the Black Creek and Upper Cape Fear aquifers. Communities have a number of options for using existing water sources more efficiently or developing additional water supply sources, including water

conservation, water reuse, switching to aquifers which are less stressed, developing new surface water sources, aquifer storage and recovery, and others.

Since 1998, local governments in North Carolina have been updating their Local Water Supply Plans (LWSPs) for a twenty-year period into the future. DWR held a special water supply plan workshop for Central Coastal Plain communities in Kinston in May 1998 to emphasize the need for planning for supplemental sources to ground water. During the LWSP review process, DWR has been working with systems to help them develop sustainable water supply plans that reflect the current conditions of regional water resources. In February 2000, DWR held a well-attended water conservation workshop in Kinston for Central Coastal Plain communities and other large water users.

Regulation: The Water Use Act of 1967 allows for regulation of water withdrawals by permit in areas where water use is exceeding the capacity of local water resources. In December 2000, the EMC establish a Central Coastal Plain Capacity Use Area to coordinate the usage of water in the most critical areas. Regulation under the Water Use Act alone cannot solve the water supply problem in the Central Coastal Plain, but is needed to protect the resource and to assure fairness among water users. Resolving water supply issues in the region will require the effective coordination of monitoring and water supply planning and development along with reasonable regulations.

The major ground water impacts are being observed in two principal aquifers, the Black Creek and Upper Cape Fear, which have been a desirable source of high-quality, low-cost drinking water throughout the coastal plain. The most threatened portions of these aquifers lie beneath the following fifteen North Carolina counties: Beaufort, Carteret, Craven, Duplin, Edgecombe, Greene, Jones, Lenoir, Martin, Onslow, Pamlico, Pitt, Washington, Wayne and Wilson.

DWR proposed Central Coastal Plain Capacity Use Area (CCPCUA) rules to the Environmental Management Commission (EMC) in early 1999 for the 15 counties listed above. Draft rules went to public hearing on July 14, 1999. Based on comments received during the hearing and the public comment period, a collaborative stakeholder process was undertaken during February, March, and April 2000 to address specific concerns about the proposed rules. A revised set of CCPCUA rules were developed and taken before the EMC in May 2000. Following a second set of public hearings on August 8, 2000, the EMC approved the final rules on December 14, 2000. The CCPCUA rules must be approved by the Rules Review Commission during 2001 and are subject to review and revision by the General Assembly through the 2002 session. The CCPCUA rule could then become effective August 1, 2002.

In general, the CCPCUA rules will require anyone withdrawing more than 100,000 gallons of ground water per day to first obtain a water use permit from DWR. Withdrawal rates that will cause or continue to cause adverse impacts on the resource, such as dewatering of aquifers, encroachment of salt water, and land subsidence or sinkhole development will not be permitted. In addition, users

of ground water from zones of the Cretaceous (Black Creek and Upper Cape Fear) aquifers that are being most affected by overpumping will be required to reduce water use from these aquifers over a 16-year period. These zones, the Declining Water Level Zone, the Saltwater Encroachment Zone, and the Dewatering Zone, are shown in Figure 4-2.

The Saltwater Encroachment and Dewatering Zones are the areas of most concern. Reductions in pumping from these two aquifers of up to 75 percent over a 16-year period may be required to reduce water use from these sources to sustainable levels. Twenty-five (25) percent reductions in pumping from these sources would occur at the end of six years and also at the end of 11 years and 16 years if further reductions are needed. In the Declining Water Level Zone, reductions in pumping of up to 30 percent over a 16-year period may be required, with 10 percent reductions occuring in each of the three time intervals noted above.

Development of supplemental water sources to meet growing water demands will be critical to offset the reductions in water use from these aquifers. Equally important will be water conservation to make the most efficient use of the available water supplies.

Several significant water supply projects are already underway or under development in the Central Coastal Plain that will help to meet long-term water demands. Water systems in Lenoir County are planning an intake on the Neuse River. Greenville is planning an aquifer storage and recovery project, whereby unused, treated drinking water from the Tar River will be injected and stored under ground during low demand periods for later withdrawal and use during summer months. A private company is also pursuing development of a regional pipeline that would make available ground water from the PCS Phosphate mining operations that would otherwise be discharged into the Pamlico River. In addition, Onslow County has begun to use ground water from the Castle Hayne aquifer to reduce their reliance on the Black Creek aquifer.

To further assist water systems with water supply planning efforts, a steering committee has been convened by the NC Rural Economic Development Center to assist local governments with water supply alternatives development, water conservation, cost assessments, public education, and other aspects of this water supply problem.

4.1.3 Other Ground Water Issues

Several other areas of eastern North Carolina have ground water concerns. Some of these are newly emerging concerns and some are issues that have been ongoing. A brief discussion of these problems is given below. More detailed information can be obtained from the Ground Water Branch of the Division of Water Resources.

Southern Coastal Plain: Lumber River Council of Governments (LRCOG) has expressed concern about falling ground water levels in the Black Creek and Upper Cape Fear aquifers in Robeson, Bladen, and Columbus Counties. The Division of Water Resources will team up with LRCOG and the U.S. Geological Survey (USGS) in 2001 to determine the hydrogeologic

framework and an appropriate management plan for the region. USGS is currently collecting ground water levels for the LRCOG.

Saltwater Intrusion: Several coastal areas, particularly in New Hanover, Brunswick, and Onslow Counties, are experiencing saltwater intrusion in water supply aquifers. Daily pumping that exceeds the freshwater recharge rate allows saltwater to migrate into the freshwater zone. As overpumping continues, saltwater moves further inland and water from wells become saltier over time and may become unusable or require advanced treatment such as reverse osmosis. To raise public awareness of this problem, the Division of Water Resources is working with local water systems to help them understand their susceptibility to saltwater intrusion and also communicate that information to private well users. In addition, the division has begun improving the monitoring well network to improve prediction of future problem areas.

North Albemarle: The North Albemarle region is the six-county area north of the Albemarle Sound and east of the Chowan River. DWR has completed a water resources availability survey of this region. Survey objectives included quantifying existing water resources, estimating future water needs, and identifying future water supply sources. This region must deal with the problems of saline water threatening surface and ground water supplies and low yielding wells. To support that effort, the Division monitored water levels and drilled new wells to fill in gaps in our understanding of the subsurface geology. Data on the subsurface structure have been collected using Time Domain Electromagnetic Survey methods. A better understanding of how ground water flows through the system of aquifers will improve the estimates of the amount of ground water supply available for use. A report entitled "Hydrogeologic Framework and Ground Water Resources of the North Albemarle Region, North Carolina" (Sep 98) is available. The division will continue working with public water systems in this region to plan for future water supplies.

Currituck Outer Banks: Currituck County Commissioners, county officials, and citizens of the Currituck Outer Banks requested that the DWR look into their water supply situation in late 1987. The division did an extensive investigation and published the Currituck County Outer Banks Water Supply Study in 1991, analyzing the ground water resources of the island. Alternatives were suggested to augment water supply and allow planned development. Currituck County officials are using this document as a basis for water supply planning and have formed a task force to develop a strategy for providing adequate future water supplies. The division will continue providing technical and planning assistance as regional plans develop.

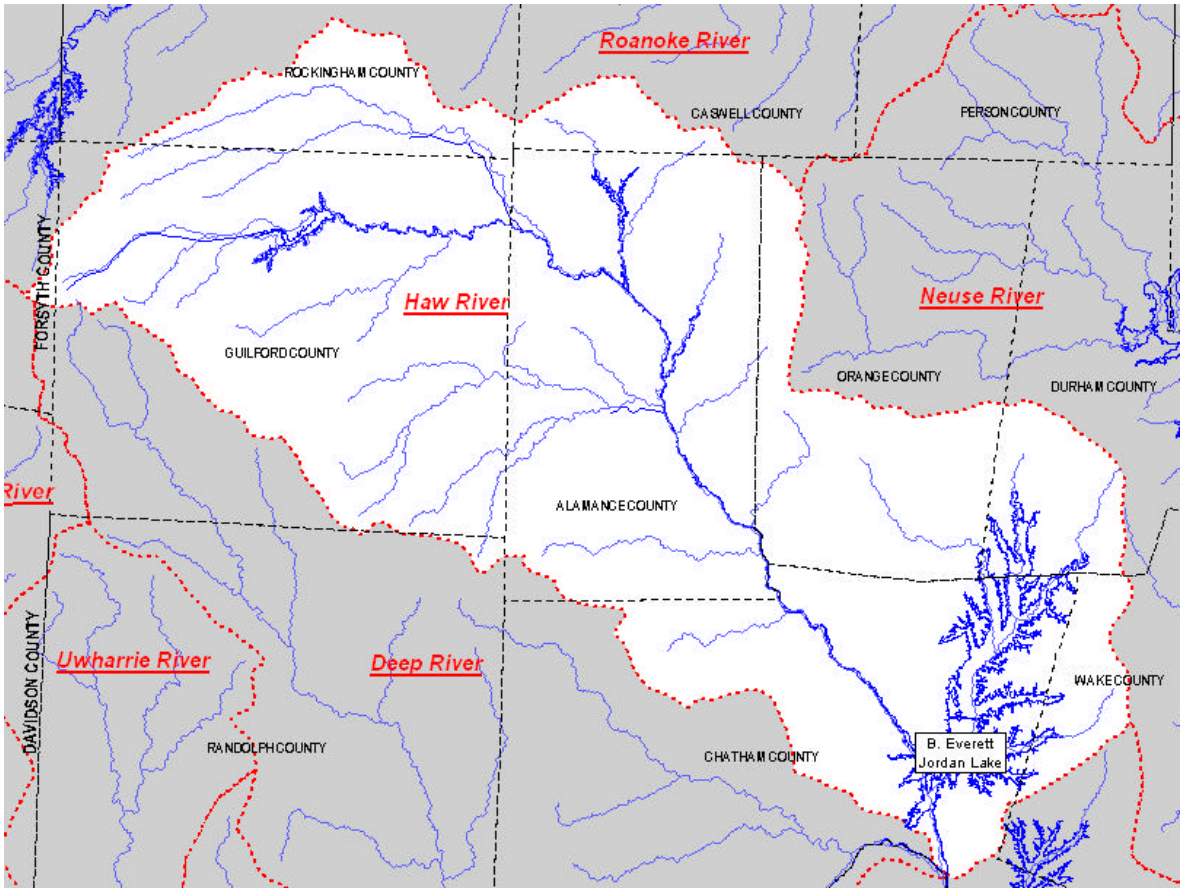

Figure 4-3. Haw River Basin Showing Jordan Lake

4.2 Allocation of Water Supply Storage in B. Everett Jordan Lake

Occupying 22 square miles, B. Everett Jordan Lake is a prominent geographic feature in the Research Triangle region and an important water source for the growing population of central North Carolina. Jordan Lake is a multi-purpose reservoir authorized by Congress for flood control, water supply, downstream flow augmentation, recreation, and fish and wildlife management.

Swimming, fishing, boating, and other water-based activities have become very popular with over 1.2 million persons visiting the Jordan Lake State Recreation Area in 1997 alone. Jordan Lake is already used by the Chatham County and Cary/Apex water systems as a source of drinking water, and many other communities in the region have expressed interested in the lake as a future water supply.

4.2.1 Description of Jordan Lake

Jordan Lake is located on the Haw River just downstream of the confluence of the Haw and New Hope Rivers. The watershed of the lake covers most of the Haw River basin, about 1690 square miles north and northwest from the dam as shown in Figure 4-3. At the normal lake level of 216 feet above sea level, approximately 140,400 acre-feet of water is available for water supply and water quality releases. About a third of this storage (45,800 acre-feet or about 15 billion gallons) is designated for water supply, providing an estimated safe yield of 100 million gallons per day (MGD).

The remaining two-thirds (94,600 acre-feet) is used for significant downstream flow augmentation during naturally occurring low flow periods. This water quality storage is used by the Corps of Engineers to maintain a minimum flow target of about 600 cubic feet per second (cfs), or about 388 MGD, at the stream gage at Lillington. Prior to Jordan Lake's operation, the 7-day, 10-year low-flow (a statistical low flow commonly used for setting wastewater discharge limits) at Lillington was just under 80 cfs and the minimum recorded streamflow was only 11 cfs.

The water quality storage and water supply storage are managed as if they were separate reservoirs. For bookkeeping purposes releases for flow augmentation are deducted from the water quality storage and water supply withdrawals are deducted from the water supply storage, meaning that water quality storage and water supply storage can be depleted at different rates. This was the case during the 1998-99 drought when the water supply storage remained nearly full (because less than 20 percent of the water supply storage is currently being used), while only about 25 percent of the water quality storage remained at one point.

4.2.2 Status of Jordan Lake Allocations

The State of North Carolina controls the water supply storage in Jordan Lake and, under G.S. 143-354(a)(11), can assign this storage to any local government having a need for water supply. Any system receiving an allocation must enter into a contract with the State of North Carolina to repay the costs associated with its storage allocation amount. Administrative Rule T15A: 02G .0500 describes

the specific procedures to be used by the Environmental Management Commission (EMC) in allocating the Jordan Lake water supply storage.

The two main criteria for evaluating Jordan Lake water supply allocations requests are (1) documented future water needs and (2) the availability of alternative water supplies. The EMC must reserve half of the lake's water supply storage for allocations within the lake's watershed, however, the EMC may review and revise this limit based on experience managing the lake. If any of the allocation requests involve an interbasin transfer, the EMC must also coordinate their review with the interbasin transfer certification.

Allocations are defined as a percent of the water supply pool. However, with an estimated yield of 100 MGD, a 1.0 percent allocation is approximately equal to 1.0 MGD. For convenience in this report allocations will be expressed in MGD, but it is important to remember that allocations are for a percentage of the water supply storage and not a rate of withdrawal.

In the initial round of allocations in 1988, the EMC allocated 42 MGD of the water supply storage; however, some original allocation holders later released their allocations, resulting in a net allocation of 33 MGD for the initial round. In May 1996, the Towns of Apex and Cary requested an increase in their initial water supply storage allocation. A second round of allocations was then opened to any local government interested in new or additional allocations.

Second-round allocation requests from local governments totaled 130.5 MGD, even though only 67 MGD was available to be allocated. After review of the applications received, the Division of Water Resources (DWR) recommended to the EMC that only 11.0 MGD of the requested 130.5 MGD be allocated. Refer to Table 4-1 for a summary of existing allocation amounts, requested allocation amounts, and recommended allocations.

Table 4-1. Jordan Lake Water Supply Allocation Status

Allocation Holder or Applicant	Existing Allocations in 1996	1997 Requested Allocations (MGD)		1997 State Recommendation (MGD)	
		System Request	Total[1]	Allocation	Total[1]
Chatham County	6.0	7.0	13.0	None	6.0
City of Durham		25.0	25.0	None	0
Fayetteville		20.0	20.0	None	0
Greensboro		25.0	25.0	None	0
Holly Springs		4.5	4.5	2.0	2.0[4]
Apex & Cary	16.0	29.0	45.0	5.0	21.0[2]
Morrisville		4.5	4.5	2.5	2.5[2]
Wake County/RTP[3]		3.5	3.5	1.5	1.5[2]
Harnett County		12.0	12.0	None	0
OWASA	10.0	No application this round			10.0
Orange County	1.0	No application this round			1.0
Totals	33.0	130.5	163.5	11.0	44.0

1-This column shows the total allocations if all the current requests or recommendations were approved
2-Allocation is contingent on obtaining interbasin transfer certification. The recommendations provided are for informational purposes only at this time.
3-Research Triangle Park
4-Approved by EMC

DWR used conservative allocation criteria that allocated water based on 20-year needs, instead of the allowable 30 years. Because the region of the state interested in water supply from Jordan Lake is growing so rapidly, accurately projecting longer term demands seemed somewhat unrealistic. Using the 20-year projections left more water supply storage available to accommodate future demand as development patterns solidified.

The EMC accepted DWR's allocation recommendations at its December 11, 1997 meeting. However, a final decision could only be made on Holly Spring's 2.0 MGD allocation, since all of the other recommended allocations (Apex and Cary, Morrisville, and Wake County/RTP) involved interbasin transfer issues. The EMC will make a final decision on both the allocation request and interbasin transfer petition after the interbasin transfer review process is completed. Following a public hearing sometime in March 2001, the EMC can make its final decision on these remaining round-two allocations.

Concurrent with the conclusion of the round-two allocations, the EMC decided in July 2000 to begin a third round of Jordan Lake water supply storage allocations, following an additional request by the City of Durham for an allocation. DWR then conducted a series of stakeholder meeting in August and September 2000 to develop application and evaluation criteria for round three allocation requests.

As part of this third round of allocations, DWR will be developing a long-range Water Supply Plan for the Cape Fear River Basin. This plan will complement the hydrologic model of the Cape Fear River basin recently developed to evaluate interbasin transfer impacts. Together, these tools will help to guide allocation decision-making and future water resources management in the Cape Fear basin.

4.3 FERC Relicensing Issues

Many of our Mountain and Piedmont waterways have been impounded for hydroelectric power generation. The Federal Energy Regulatory Commission (FERC) is responsible for licensing hydroelectric generating facilities on navigable waterways that are not operated by a Federal agency. The licenses for all the major hydroelectric facilities in the state will expire between 2001 and 2008.

Numerous communities, especially in the Catawba and Yadkin Basins, depend on hydropower reservoirs for their water supply or have their water supply intakes on rivers that are influenced by hydropower operations. With all the major hydropower operations due for relicensing in the near future and the increased emphasis on balancing the benefits of these projects, communities that depend on rivers affected by these projects have the opportunity to have concerns about water availability addressed in the relicensing process.

Table 4-2 lists the major hydroelectric projects in North Carolina that are licensed by the Federal Energy Regulatory Commission and the date that the current license expires.

Table 4-2. Major FERC Hydroelectric Projects to be Relicensed

Project Name	Licensee	Expiration Date
Gaston / Roanoke Rapids	Virginia Power	1/31/2001
Queens Creek	Nantahala Power and Light, a division of Duke Energy Corp.	9/30/2001
Tapoco (Santeetlah, Cheoah, Calderwood)	Alcoa Power Generating, Inc., Tapoco Division.	2/28/2005
Bryson, Dillsboro, & Franklin	Nantahala Power and Light, a division of Duke Energy Corp.	7/31/2005
Mission	Nantahala Power and Light, a division of Duke Energy Corp.	8/01/2005
East Fork (Tanasee, Wolf Creek, Bear Creek, Cedar Cliff)	Nantahala Power and Light, a division of Duke Energy Corp.	1/31/2006
West Fork (Thorpe, Little Glenville)	Nantahala Power and Light, a division of Duke Energy Corp.	1/31/2006
Nantahala (Nantahala, Whiteoak, Dicks Creek)	Nantahala Power and Light, a division of Duke Energy Corp.	2/28/2006
Yadkin (High Rock, Tuckertown, Badin, Falls)	Alcoa Power Generating, Inc., Yadkin Division	4/30/2008
Yadkin - Pee Dee (Tillery, Blewett Falls)	Carolina Power & Light Co.	4/30/2008
Catawba - Wateree (James, Rhodhiss, Hickory, Lookout Shoals, Norman, Mountain Island, Wylie)	Duke Power	8/31/2008
The relicensing process begins at least 5 years before the expiration of the current license.		

Since issuance of the original licenses, the regulatory framework affecting these facilities has changed, requiring extensive environmental review and stakeholder participation during relicensing. Licence holders must notify FERC five years prior to the expiration of their license if they intend to apply for a new license. After this notification, the licensee, resource management agencies, and interested parties work together to identify concerns that need to be addressed in the application for a new license. Two years before expiration of the existing license, the applicant submits a draft application for a new license to FERC. The application is open to any interested party for review. The applicant is responsible for providing project information to resource agencies and the public and for conducting any engineering or environmental studies needed to address effects of the project. Applicants are also expected to review recreational needs in the area of the project.

FERC then conducts an independent analysis of the proposed project, which includes preparation of an environmental analysis document. FERC must ensure a proper balance of developmental and non-developmental interests in its licensing decisions and determine if the proposed project is consistent with any federal or state comprehensive plans for the affected waterways. FERC then attempts to resolve any disputed conditions with the resource agencies prior to preparation of a final environmental analysis document and the licensing terms and conditions.

Relicensing also requires the applicant to obtain water quality certification under Section 401 of the Clean Water Act, which is administered by the Division of Water Quality. Conditions can be attached to the 401 certification to maintain water quality standards and maintain uses of the water according to the waterway's water quality classification, such as water supply, aquatic habitat, and recreation.

4.4 Drought Monitoring and Response

Drought is a normal, recurring weather phenomenon that can have a profound impact on our state's water supplies. However, the extent to which an individual water system will be affected by drought depends on numerous factors, such as: (1) the severity, duration, and timing of the drought; (2) how early a community responds with its water shortage response measures, and (3) how closely a community's water demands are approaching its total available supply.

4.4.1 1998-2000 Drought

As year 2000 ends, the western half of North Carolina is still dealing with a drought that has been plaguing parts of the state since 1998. Rainfall deficits began back in May 1998 and gradually began to build during the summer as normal weather patterns were disrupted by La Nina, the cold water event in the Pacific Ocean. By late summer of 1998, the Mountains and western Piedmont portions of the state were beginning to feel the effects of the drought as lake levels and streamflows began to decline.

DWR held a Drought Preparedness Workshop in Asheville in September 1998 to increase awareness of potential water supply problems and provide water systems with strategies for dealing with the drought. By late fall, several systems in the Mountains and western Piedmont were dealing with water shortages and had instituted mandatory water restrictions, particularly Greensboro and Asheville, who were experiencing record low reservoir levels. Greensboro's and Asheville's aggressive water conservation efforts were commendable and helped ease the impacts on those systems. Figure 4-4 shows the systems that instituted water use restrictions during 1998.

Rainfall in January 1999 temporarily eased drought problems for most areas. Greensboro's reservoirs recovered during January, however, Asheville's reservoirs did not recover until mid-1999. Below normal rainfall resumed in February and continued through the summer of 1999 for most of the state. Below normal rainfall and record high temperatures during the summer stressed many water systems to their limits, resulting in over 40 water systems calling for water use restrictions during 1999, also shown in Figure 4-4.

In September 1999, hurricanes Floyd and Dennis eliminated drought conditions in eastern and central North Carolina, but drought conditions west of the Piedmont persisted for the remainder of 1999 and continued into 2000, preventing the normal winter replenishment of streams, reservoirs, and ground water levels. By the end of August 2000, numerous systems in the western Piedmont were beginning to experience water supply problems as streamflows and lake levels continued to decline,

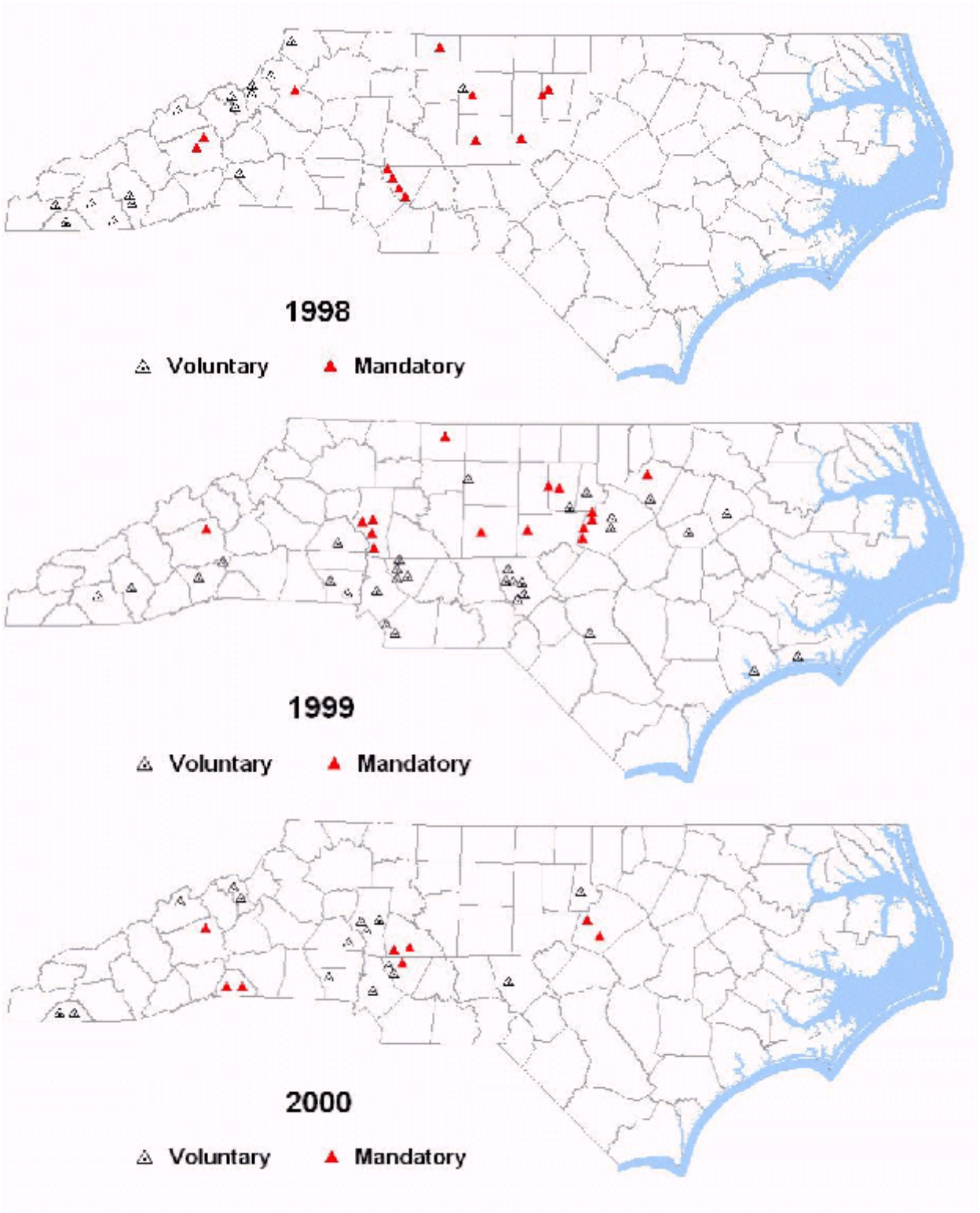

Figure 4-4. Water System Conservation during 1998-2000 Drought

prompting water conservation for some systems (also shown in Figure 4-4). However, conditions improved markedly during September due to extended periods of wetter, cooler weather. This wet period was then followed by over a month of extremely dry weather, with much of the state receiving no measurable rainfall for the entire month of October, again causing serious water supply concerns for numerous water sytems. Since October 2000, conditions have slightly improved for most systems, however, as of December 2000 several systems remain under voluntary or mandatory water use restrictions. More normal rainfall is expected for early 2001, which should further ease drought conditions and begin to allow water supplies to recover.

Both Asheville and Greensboro will be better able to cope with drought in the future because of additional water supplies. Asheville's Mills River intake and water plant came on-line in November 1999, providing Asheville with at least 5 MGD of additional supply. Greensboro has completed a connection with Reidsville that could supply an additional 8 MGD. In addition, the Piedmont Triad Water Authority, of which Greensboro is a member, is nearing final approval and construction of Randleman Lake, a major regional water supply.

4.4.2 Local Drought Response

Because water supply systems in North Carolina are so numerous and diverse, the best place to address water shortages and drought response is at the local level. To provide guidance to local systems, the Division of Water Resources has developed a "Water Shortage Response Handbook" for public water supply systems in North Carolina. The handbook emphasizes the need for local officials and the local community to develop a program to deal with a drought or other water shortage. Most importantly, the handbook describes how a community can implement a multi-level drought response program. Having a water shortage response plan, including a drought ordinance, allows a community to respond to water shortages early and hopefully avoid the need for extreme measures later on.

4.4.3 State Drought Response

A State Drought Response Plan has been adopted by North Carolina agencies to provide a systematic means of assessing and responding to the impact of drought on water supply and agriculture. The assessment system calls for representatives from state and federal agencies to form task forces that use a broad range of data sources to evaluate and assess water availability and drought impacts and distribute the information to water system managers. The response system deals with unmet water supply needs across the state. When necessary, recommendations are made to seek legislative or federal assistance.

The Drought Monitoring Council (DMC) is a working group of various federal and state agencies with expertise in the areas of water resources, climatology, agriculture, public health, and emergency management. The DMC, chaired by the Water Supply Planning Section, Division of Water Resources, oversees North Carolina's response to water shortage situations. The DMC routinely monitors climatological and other drought related information, including precipitation, streamflows, ground water levels, soil moisture, reservoir levels, water supply and demand, and other drought data.

During an extended drought, the DMC keeps the State Emergency Response Team apprised of any unmet water needs, identifies and recommends ways to meet those needs, ensures inter-agency coordination, identifies potential drought mitigation measures, and determines when to deactivate as problems subside.

4.5 Growth in Headwaters

Much of North Carolina's growth is occurring along the Piedmont Urban Crescent, the Interstate 40 and Interstate 85 corridors stretching from Raleigh to Charlotte. Part of this crescent is also located in the headwaters of the Cape Fear and Neuse River basins, particularly Guilford, Alamance, Orange, and Durham Counties.

Headwaters are the upper reaches of a river basin comprised of smaller streams that later merge downstream to form the main rivers in a basin, such as the Cape Fear or Neuse River. These smaller streams may offer plenty of water under normal rainfall conditions, but their yields can be quite low during dry periods.

As communities in these headwater areas continue to grow, developing additional water sources that supply sufficient amounts of water, are economically feasible, and have acceptable environmental impacts will be challenging. Two new reservoir projects–one currently under constructions and one in the final approval stage–will be crucial for the long-term water supply needs for this area.

Hillsborough's new reservoir, completed in November 2000, will provide much needed future water supply for that community. Additional withdrawals from the Eno River are not allowed under the voluntary capacity use agreement that restricts Hillsborough's current withdrawals from the river.

The Piedmont Triad Regional Water Authority's Randleman Reservoir project is still awaiting final approval from the U.S. Army Corps of Engineers. This 48 million gallon per day regional water supply project on the Deep River will provide water for the long-term needs of Greensboro, High Point, Jamestown, Archdale, Randleman, and Randolph County. The Piedmont Triad Regional Water Authority has been pursuing this project since 1986. The Final Environmental Impact Statement (EIS) for the Randleman Reservoir was released on December 11, 2000. Following a 30-day public comment period, a Record of Decision will be prepared, concluding the EIS process. A final decision on the Federal 404 Permit for the project could be rendered by the Corps of Engineers as early as February 2001.

Another area of concern along the Urban Crescent has been the Cabarrus County portion of the Rocky River Basin. Several water systems in the area, including Kannapolis and Concord, have been especially impacted by the drought. Reservoirs in this area have been unable to refill for the past three years due to limited rainfall and low streamflows.

Besides the Piedmont Urban Crescent, headwater situations in some mountain river basins are also presenting challenges to local water systems. For example, Blowing Rock (which straddles the headwaters of three different river basins) is pursuing additional water sources to supplement its limited existing surface water supplies.

Efficient use of both the existing and new water supplies will be critical to communities in these headwaters. Water reuse should be part of the overall water management strategy for communities where irrigation and industrial use comprises a significant portion of their water use. Regional cooperation will also be important for successful water supply management in areas where some systems may have surplus water supply. An example of this cooperation is the recent agreement between Greensboro and Reidsville, whereby Greensboro will purchase surplus water from Reidsville.

Based on experience, developing additional water supplies in these high-growth headwater areas will be a challenging and lengthy process, so communities need to plan accordingly.

4.6 Eno River Voluntary Capacity Use Area

The Eno River originates in northern Orange County at the confluence of the East and West Forks. From its headwaters, the river flows in a southerly direction through Hillsborough, and then east into Durham County. Approximately eight miles northeast of the City of Durham, the Eno River and the Flat River combine to form the Neuse River. Major tributaries include the East and West Forks, Seven Mile Creek, McGowan Creek, and the Little River.

Three water supply reservoirs–Lake Orange (Orange County), Corporation Lake (Orange-Alamance Water System), and Lake Ben Johnson (Hillsborough)–have been constructed on the East Fork and the Eno River. Historically, the Eno River has been a water supply for various water systems, including Hillsborough, Durham, Orange-Alamance Water System, and the Orange Water and Sewer Authority. Currently, only Hillsborough, Orange-Alamance Water System, and Piedmont Minerals withdraw water from the Eno River.

4.6.1 History of Problem

Increasing development and use of the river led to a situation of no flow below Lake Ben Johnson during dry periods. During the 1980's, there were periods lasting several weeks when the Eno River was completely dewatered, bringing complaints from riverside property owners, patrons of the Eno State Park, and environmental groups.

Concerned with the worsening situation, Orange County Commissioners asked the state to consider a Capacity Use Area designation under the Water Use Act of 1967. In response to the request, the Division of Water Resources conducted a capacity use investigation.

In its Eno River Capacity Use Investigation published in1987, the division recommended designating the Eno River watershed above the confluence with the Little River as a Capacity Use Area. In an effort to avoid regulation, the three main water users, Hillsborough, Orange-Alamance Water System, and Piedmont Minerals, Inc., agreed to a voluntary Capacity Use Agreement to be monitored by the Division of Water Resources. This agreement sets tiered withdrawal limits based on storage remaining in Lake Orange for each participant whenever the average daily flow drops below 10 cubic feet per second (cfs) for seven consecutive days.

4.6.2 Status of Agreement

While the voluntary capacity use agreement has functioned well and flows in the Eno River have greatly improved, additional water supplies in the basin are needed for future growth. In order to meet demands during low flow periods, both Hillsborough and Orange-Alamance Water System have needed to purchase water from sources outside of the Eno River basin.

Hillsborough's new water supply reservoir on the West Fork of the Eno is a significant water supply development that will improve the water supply situation for the area. This reservoir, which was completed and began filling in November 2000, will increase Hillsborough's available water supply by 1.8 million gallons per day (MGD) initially and by 3.0 MGD when Phase II of the project is completed around 2005. In addition, the reservoir will improve flow conditions in the river system by increasing minimum instream flow targets by at least 1.0 cfs downstream at the Eno River gage in Hillsborough. Hillsborough is also planning to expand its existing Eno River intake to provide the capacity necessary to withdraw the additional yield provided by the new West Fork reservoir.

Orange-Alamance needs to secure additional water supplies to meet existing and future demands, particularly during low-flow periods. In 1995, Orange-Alamance added a 0.2-MGD well to serve as a supplemental supply during low flow periods. During the summer of 1999, an extended low flow period coupled with the temporary loss of an interconnection with the Graham-Mebane Water System prompted Orange-Alamance to install a second well in late 2000, which will provide an additional 0.115 MGD of supply. Despite these increases in Orange-Alamance's water supply, additional water supplies are still needed.