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Division of Water Resources
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To: Representative Pricey Harrison, Co-Chair
Representative Pryor Gibson, Co-Chair
Senator Bob Atwater, Co-Chair
Senator Dan Clodfelter, Co-Chair
Environmental Review Commission

From: Tom Reeder

Re: State Water Supply Plan Annual Report

Date: September 2, 2010

In accordance with GS 143-355(n), the annual report on the implementation of the State Water Supply Plan is submitted for your review. This report is received annually by the Environmental Review Commission and Gov Ops.

Thank you for your support of the State Water Supply Plan and the Division of Water Resources.

TR/km

Enclosures

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Department of Environment and Natural Resources
Division of Water Resources

STATUS REPORT TO THE GENERAL ASSEMBLY ON WATER SUPPLY PLANNING SEPTEMBER 1, 2009 THROUGH AUGUST 31, 2010

Assuring a sustainable water supply for the citizens of North Carolina is the primary mission of the Division of Water Resources (DWR or the Division). To carry out this responsibility, the Division administers several monitoring, planning and regulatory programs.

In partnership with the United States Geological Survey, the Division monitors the availability of water across the state through a network of monitoring wells and stream gages. DWR monitors water withdrawals based on data reported under mandatory registration and reporting programs. Additional information is received from annual water use reporting by withdrawers required to register their withdrawals and systems required to submit a local water supply plan as well as special data requests during drought conditions. Beginning in 2009, DWR also began receiving summaries of an annual survey of agricultural water users conducted by the Department of Agriculture and Consumer Services.

The Division administers the local water supply planning program, which was established after serious droughts in the 1980s disrupted local water supplies. DWR assists community water systems with the preparation of their local water supply plans. The information contained in these local plans, combined with data from other sources, provides the water use summary for the North Carolina Water Supply Plan. The Division is in the process of preparing long-term water resources plans for each of our seventeen major river basins in partnership with local governments, water users and other stakeholders.

The Division monitors and regulates water withdrawals associated with the transfer of surface water between designated river basins and water use in designated capacity use areas. As staff to the Environmental Management Commission, DWR processes applications for interbasin transfers of surface water and makes recommendations to the Commission. DWR conducts evaluations of resource conditions, oversees rule development and issues water withdrawal permits in designated capacity use areas. In addition, DWR chairs the Drought Management Advisory Council, manages drought response activities and is the lead for the Department of Environment and Natural Resources for the relicensing of hydroelectric projects. All of these activities affect and are affected by water supply planning issues.

Monitoring Water Resources

The Division maintains ground water and surface water monitoring networks directly and in partnership with federal agencies. The data from these networks provide essential information on the conditions of water resources throughout the state. North Carolina cooperates with the United States Geological Survey to maintain stream gage sites with near-real time data

collection capabilities. The Division also maintains an extensive network of ground water monitoring wells. Data from these wells are collected by DWR personnel quarterly. Over two-thirds of these wells have data recorders that collect daily water level data. Much of the ground water monitoring and data collection focuses on improving the understanding of the complex aquifer structures in the Coastal Plain.

The ongoing support of the General Assembly has allowed the Division to continue improving the data on aquifer conditions in the Coastal Plain by expanding the monitoring well network. Since 1998, DWR has added 151 wells at 39 monitoring stations in the Coastal Plain. The monitoring well network provides vital data for the management of the Central Coastal Plain Capacity Use Area. The Division will continue to expand the monitoring well network statewide as funds permit to improve data for ground water management. Data on ground water conditions are available on the Division's web site under the link for Ground Water Data.

The Division has joined with the State Climate Office at NC State University, the US Army Corps of Engineers, the US Geological Survey and other data collection agencies to develop a uniform database to store and disseminate water resources data. The product of this effort, the "Water Resources Information, Storage, Analysis, and Retrieval System" (WRISARS), is available on the Division's website at www.ncwater.org .

Monitoring Water Use

For about two decades North Carolina has required registration of large surface water and ground water withdrawals. An agricultural user must register its water use if the sum of its withdrawals is 1,000,000 or more gallons on any day. A non-agricultural user must register water use if the sum of its withdrawals is 100,000 or more gallons on any day. Registrations must be updated every five years. Local government water systems and large community water systems (defined to mean systems that regularly serve 1,000 or more service connections or 3,000 or more individuals) meet the registration requirement by submitting a local water supply plan.

Rules governing water use during droughts, which became effective in 2007, require anyone who must register a water withdrawal to also submit an annual water use report. In addition to the water use data submitted directly to DWR, the Division also receives summaries by river basin and by county of water use by agricultural operations reported to the NC Department of Agriculture and Consumer Services (NCDA&CS). Session Law 2008-143 established the requirement for the Department of Agriculture to conduct an annual water use survey of agricultural operations that withdraw 10,000 gallons or more of water per day.

Local Water Supply Planning

After the serious droughts in the 1980s, the General Assembly enacted legislation to require water supply planning at the state and local level. The intent of the Act was to assure the availability of adequate supplies of good quality water to protect public health and to support economic growth. Water supply planning requirements can be found in N.C. General Statutes

§143-355(l) and (m). G.S. 143-355(l) requires units of local government that supply or plan to supply water to the public and other large community water systems to develop local water supply plans. These local plans describe current water use and future water needs and identify the water system's expected future sources of water. The plans provide valuable information about how much water communities are using and how much they anticipate needing in the future.

Passage of Session Law 2008-143 expanded DWR's plan review responsibility to include plan approval and also established approval criteria. Approved plans are to be adopted by the water system's local governing board and must be updated at least every five years. DENR developed approval criteria for these plans in consultation with representatives of local government water systems. Session Law 2010-150 added the additional requirement that a local plan must be revised when a water system's "foreseeable future water needs" reaches 80 percent of its available supply or when its seasonal demand exceeds 90 percent. The Division is currently developing a methodology to identify systems that meet these criteria and guidelines to assist water systems in complying with these requirements. Information contained in the local plans supports local, regional and statewide water supply planning and is available on the Division's web site at www.ncwater.org .

The number of water systems that are required to prepare a local plan changes over time as water systems grow or merge. Currently, DWR expects to receive 547 local water supply plans. As of the end of July 2010, 504 systems have submitted revisions to their plans and reported water use during 2009. Nineteen additional water systems continue to work on updates in the online local water supply plan submission program. These updates will be submitted to the Division as soon as they are complete.

North Carolina Water Supply Planning

The General Assembly mandated development of a North Carolina Water Supply Plan (State Plan) at the same time that it acted to require preparation of local water supply plans. The local water supply plans were intended in part to provide information necessary for an evaluation of potential water supply conflicts in the State Plan. As mandated by law, the State Plan summarizes information contained in the local water supply plans. The first version of the State Plan was based on information from local plans submitted in 1992 and 1997 and 1999 water withdrawal registrations. The first State Plan summarized water use by major river basin and identified areas of concern where water availability or conflicts between users could limit the ability to meet water demands. The analysis of potential limitations on the ability of water systems to satisfy expected demand was based primarily on the staff's understanding of expected population growth and general water availability. The 2001 N.C. Water Supply Plan is available on the Division's web site at www.ncwater.org.

In the process of developing the State Plan, the Division's staff identified a need for more specific water availability information to inform the analysis. To this end, the Division began work on computer-based hydrologic models that could simulate historical water resource conditions and characterize natural variations in water availability. It is particularly important to identify when and where water demand may exceed available water resources because of

drought. Low flow conditions limit the amount of water available to assimilate pollution and limit a water system's ability to satisfy water demands without producing irreversible ecological impacts.

Prior to this effort, simplified models had been developed to analyze operating decisions and their potential effects on river flows. The analysis required for the N.C. Water Supply Plan required a more detailed computer model. The General Assembly provided financial support for the development of the Division's first basinwide hydrologic model to analyze the potential effects of increasing water supply allocations from B. Everett Jordan Reservoir. The Cape Fear River Basin Hydrologic Model proved to be a useful tool to describe potential impacts of various management options for the members of the Environmental Management Commission, the Division staff and other stakeholders.

Changes made to data reporting and drought preparedness requirements since development of the first Cape Fear River Basin Hydrologic model, provided additional water use information that improved later river basin hydrologic models. As noted above, large water withdrawers must now annually report water withdrawals to the Division. The annual reports provide valuable information on how water use varies from year to year because of varying weather conditions. Also, local water supply plans must now include a water shortage response plan describing how and when the water system will impose water use restrictions during droughts. The information in these plans can be used to improve how the hydrologic models simulate changes in water demand when water sources are limited.

During the time period covered by this report, the Division has continued to work on development and refinement of river basin hydrologic models as follows:

Cape Fear River Basin: DWR staff has met with water withdrawers and other stakeholders in the Cape Fear River Basin in preparation for a review and possible revision of the allocations of water supply storage in B. Everett Jordan Reservoir. The Cape Fear River Basin Hydrologic Model will be revised to integrate new data and hydrologic conditions experienced in the basin since 2004. The revised model will be used to analyze water supply options for the Triangle Region to support long term water supply planning.

Neuse River Basin: The Division also finalized the Neuse River Basin Hydrologic Model, which simulates potential changes to river flows that may occur if water withdrawals increase as projected in local water supply plans for communities in the Neuse basin.

Roanoke River Basin: The Division has been working on an update of the Roanoke River Basin Hydrologic Model in conjunction with the Kerr Lake Regional Water System's request for approval to increase their existing transfers of surface water out of the Roanoke River Basin.

Tar-Pamlico River Basin: In July, the Division met with interested parties in the Tar-Pamlico River Basin to initiate the process of developing a hydrologic model for the Tar River.

Broad River Basin: Later this year, the Division will begin work on a model for the Broad River Basin. The Broad River Basin in North Carolina comprises the headwaters of a much larger river system in South Carolina. South Carolina's Department of Health and Environmental Control has expressed an interest in working with the Division on the development of the basin model and subsequent river basin water resources plan.

The Division of Water Resources began using hydrologic models in combination with water withdrawal data to provide a more reliable analysis of potential water supply conflicts for revisions to the N.C. Water Supply Plan. Session Law 2010-143, passed in July 2010, supports the Division's approach by mandating development of river basin hydrologic models. The legislation identifies the information that must be included in each model and the questions that the models should be designed to answer. The legislation also requires that the Environmental Management Commission review and approve the hydrologic models.

A major component that must be included in any comprehensive river basin model is still missing from the current models. To date, there is insufficient data and analysis to identify the flow required to protect the ecological integrity of aquatic resources. During the last year, DWR has worked with the Wildlife Resource Commission and other stakeholders to explore possible approaches to this problem. A summary of work to date and information related to identification of ecological flows is available at the "Ecological Flows" link on the Division's web site at www.ncwater.org . Session Law 2010-143 provided further support for the concept of building an ecological flow component into river basin hydrologic models.

The legislation requires the Department of Environment and Natural Resources to "identify the flow necessary to maintain ecological integrity" in the various river basins, and establishes a Science Advisory Board to assist in this effort. The board will be composed of representatives of water related state agencies and representatives of other sectors of the State's economy who have "expertise in aquatic ecology and habitat." The board will review the data and information that the Department uses to "characterize the ecology in the different river basins and identify the flow necessary to maintain ecological integrity." Creation of the advisory board will facilitate a comprehensive review of relevant information and the development of recommendations that will receive enthusiastic support from the water using community.

DWR has begun discussions with the Environmental Management Commission to establish the criteria that will have to be satisfied to receive approval for future hydrologic models. The Division expects to solicit nominations to the Science Advisory Board on ecological flows in August; an initial meeting of the Board will be planned for October or November of 2010.

Planning for Future Water Needs

To further the goal of assuring the availability of adequate supplies of water, the Division of Water Resources is developing a river basin water resources plan for each of the major river basins in the state. River basin water resources plans will support management of our river basins and will provide reliable, quantitative tools to plan for sustainable water use and support objective management and regulatory decisions.

Data submitted to DWR through the water supply planning program, the water withdrawal registration program, capacity use area reporting requirements and annual water use reporting provide critical information for the river basin planning program.

River basin water resources plans provide a basin analysis of estimated future water supply withdrawals using a computer-based hydrologic model that simulates water flow in a basin. The hydrologic model provides a tool to analyze the effects of future water withdrawals and wastewater discharges over the range of river flow variability that occurred in the historical record. By projecting water needs to 2050 and evaluating these future demands with respect to known flow variability, DWR is able to identify areas where supplies may not be adequate to meet projected demands as well as when and where water use conflicts may develop. The river basin water resources plans and associated hydrologic models will provide the Division, local governments and other water users a reliable, quantitative framework within which to plan for sustainable and cost-effective water sources to meet future needs.

The first of these plans was the Cape Fear River Basin Water Supply Plan developed in 2002 as a tool for the analysis of allocations of water supply storage in B. Everett Jordan Reservoir. The prototype hydrologic model was updated with the technical and financial support of water users in the basin that recognized the value of the model as a water supply planning tool. A draft of an updated Cape Fear River Basin Water Supply Plan based on the updated model and water demand projections was developed. A summary of the modeling results is available on the Division's web site under the link for "Cape Fear River Basin Model". Before the updated plan was finalized, the Division received a request to initiate a new review of allocations and options for water supply storage in Jordan Lake reservoir from a group of Triangle communities. To support this effort the Cape Fear model will be updated again, thanks to funding from the General Assembly, by extending the historical flow record and integrating drought response plans.

In July 2010, the Division released the Neuse River Basin Water Resources Plan showcasing a revised format intended to be the prototype for future basin plans. Water demand projections for 20 years and 40 years in the future were analyzed using the newly finished Neuse River Basin Hydrologic Model. The model includes a seventy-six year record of hydrologic conditions that includes high-flow and low-flow conditions including several significant droughts and the drought of record for the basin. The Neuse River Water Resources Plan is available for review on the Division's web page at www.ncwater.org

As noted in previous reports, models were constructed for the Catawba and Yadkin river basins in conjunction with the relicensing of the hydropower projects on these rivers. The Division worked closely with the utility companies and other interested parties in these basins to estimate long-term water supply needs that were then included in the modeling of proposed

management options for the future. These analyses formed the basis of settlement agreements included with the hydropower license applications submitted to the Federal Energy Regulatory Commission (FERC). The Catawba River Basin Water Supply Plan was based on this relicensing work and can be found on the Division's web site. The water supply components of the modeling will be reviewed when FERC issues new licenses for the hydropower projects and finalizes the management schemes that will apply for the next several decades.

DENR's divisions of Water Resources and Water Quality are working together to coordinate basin planning efforts. The Division of Water Quality has been developing basinwide water quality plans since the early 1990s. These plans provide valuable information on current water quality conditions and the areas that require additional management efforts to protect the water quality of our surface water resources. DWR's river basin water resources plans evaluate different aspects of surface water resources by indentifying possible changes to stream flow conditions in the future as the population grows and water withdrawals increase. Staff members of both divisions are exploring ways to combine the information from both sets of plans to improve overall water resource management. A coordinated document discussing the relationships of the findings in the Neuse River Basinwide Water Quality Plan and the Neuse River Basin Water Resources Plan will be available later this year.

Planning for Water Shortages

After the 1998-2002 drought, the General Assembly enacted new requirements for water shortage response planning. Session Law 2002-167 requires water systems to describe in the local water supply plan how the water system "will respond to drought and other water shortage emergencies and continue to meet essential public water supply needs during the emergency." In 2007, the Environmental Management Commission adopted rules providing guidance on what should be included in these water shortage response plans. Session Law 2008-143 strengthened the requirement for water shortage response plans and gave the Department authority to approve or disapprove the plans. If a plan fails to include the required elements and is disapproved, the submitting water system is required to implement default water conservation measures set out in 15A NCAC 02E .0600 during extreme and exceptional drought conditions until an approvable plan is submitted.

DWR developed protocols for the review of water shortage response plans in consultation with representatives of local government and water utilities. As of the end of July, 551 plans have been submitted to DWR. To date DWR has notified 348 systems that their plans meet the minimum criteria established. The effectiveness of the resulting water shortage response plans has yet to be tested.

Water resources are evaluated weekly by the NC Drought Management Advisory Council. The technical committee of the council regularly monitors drought conditions and consults weekly with the authors of the US Drought Monitor to ensure that the weekly drought status accurately portrays conditions in North Carolina. The results of these evaluations are available at the NC Drought Management Advisory Council's link on the Division's web site at www.ncwater.org .

Hydropower Facility Relicensing

The Federal Energy Regulatory Commission (FERC) licenses non-federal hydroelectric generation projects on navigable waterways. Several existing hydroelectric projects in North Carolina have license applications currently pending before the Commission: Duke Energy's Catawba-Wateree Hydro Project and Nantahala Area Projects; Alcoa Power Generating Inc.'s Yadkin Project; and Progress Energy Carolinas, Inc.'s Yadkin-Pee Dee River Project. The FERC has not issued new licenses for these projects and still has the applications under review. In some cases, a final decision on relicensing has been affected by legal challenges. Since the old licenses have expired, these projects are operating under annual licenses that extend the conditions in the old licenses on a year to year basis. When and if the new licenses are issued, the ecological flows and recreational opportunities included in the negotiated settlement agreements will be implemented.

Regulation

Central Coastal Plain Capacity Use Area

The Water Use Act of 1967 provides a mechanism for regulating water withdrawals in areas where water use must be coordinated to protect the availability of water. The law allows the Environmental Management Commission to designate a capacity use area if water use has grown to the extent that competing uses must be managed or the ability of the water resource to replenish itself is threatened.

To date, the EMC has designated only one capacity use area in the state; rules creating the Central Coastal Plain Capacity Use Area (CCPCUA) became effective August 1, 2002. The rules, which were designed to gradually reduce ground water withdrawals from the endangered Black Creek and Upper Cape Fear aquifers, affect fifteen designated counties in the Central Coastal Plain. The rules encourage development of alternative sustainable sources of water and regulate ground water withdrawals through a permitting system. Anyone withdrawing more than 100,000 gallons a day of ground water must apply for and receive a permit from the Division of Water Resources. Currently, there are 221 active permits for ground water withdrawals in the CCPCUA. In addition there are 63 registered water withdrawers that withdraw 10,000 gallons or more in a day. The Division continually monitors conditions in the affected aquifers and regularly updates the Environmental Management Commission. Public water supply systems in the Central Coastal Plain have made significant progress toward meeting reduction goals through development of regional water authorities and other water sharing arrangements. Steps taken to reduce withdrawals from the depleted aquifers have already shown measurable benefits.

In September 2008, the Neuse Regional Water and Sewer Authority began providing water to member communities from a new surface water treatment plant on the Neuse River. The new facility made it possible for several communities that had previously relied on groundwater to switch to a surface water source. Start up of the new facility has produced demonstrable improvements in regional ground water levels. DWR monitoring indicates that ground water

levels have already risen by up to 25 feet in some areas. These improvements reinforce the premise of the capacity use area rules: reducing ground water withdrawals will allow the aquifers to recover. Additional information on the Central Coastal Plain Capacity Use Area and the associated rules are available on the Division's website at www.ncwater.org.

Interbasin Transfer of Surface Water

Many communities in North Carolina are located on or near the high ground that creates the boundaries between river basins. Other communities are located in the headwaters of river basins where the limited water supply has proven to be inadequate as the economy and population of the state has grown. In these situations, municipal water systems may need to move water between river basins. Carefully regulated interbasin transfers can be the most practical, economical and environmentally sound way to provide water and sewer service to the residents of some communities and to support economic growth.

In 2007, the General Assembly made significant changes to the laws regulating surface water transfers. Session Law 2007-518 expanded public notice requirements for proposed interbasin transfers and specified additional criteria to be considered by the Environmental Management Commission in deciding whether to grant an interbasin transfer certificate. The changes became effective on August 31, 2007 except that the General Assembly set a January 1, 2011 effective date for proposed interbasin transfers in the Central Coastal Plain Capacity Use Area. .

Session Law 2010-155 again changed the effective date of the 2007 requirements for some applicants. For proposed interbasin transfers intended to supplement ground water supplies in the Central Coastal Plain Capacity Use Area, the effective date was delayed to January 1, 2013. The 2010 legislation also created a new classification of "isolated river basin" and made the 2007 requirements effective July 1 2020 for proposed transfers of surface water into those basins.

For purposes of the interbasin transfer laws, the river basin boundaries are defined in G.S. 143-215.22G and delineated on an associated map. Session Law 2008-198 extended the basin lines for interstate river basins into neighboring states for the purposes of implementing the notice requirements set out in G.S. 143-215.22L. Details of the interbasin transfer program and the statutory requirements are available at the Interbasin Transfer link on the Divisions web site at www.ncwater.org .

While many communities move water between river basins, only four Interbasin Transfer Certificates have been issued under G.S. 143-215.22I and the precursor legislation. Charlotte Mecklenburg Utilities has a certificate to transfer up to 33 million gallons per day from the Catawba River to the Rocky River Basin. Cary, Apex, Morrisville, and Wake County jointly hold a certificate to transfer up to 24 million gallons per day from the Haw River Basin to the Neuse River Basin. The Piedmont Triad Regional Water Authority has permission to transfer up to 30.5 million gallons per day from the Deep River to the Haw River and Yadkin River Basins. The Cities of Concord and Kannapolis received permission to transfer up to 10 million gallons per day from the Catawba River Basin and 10 million gallons per day from the

Yadkin River Basin into the Rocky River Basin. (This 2007 decision by the EMC was appealed under the Administrative Procedures Act; an out-of-court settlement in May 2010 resolved the legal challenge.)

Pending Interbasin Transfer Requests

The **Greenville Utilities Commission** is working with several neighboring communities to develop a regional surface water source to replace ground water withdrawals from the regulated aquifers in the Central Coastal Plain Capacity Use Area. Sharing surface water to reduce ground water withdrawals will require an IBT certificate. As provided in Session Law 2007-518, the decision on whether to issue this IBT certificate will be made under the procedures and standards set out in G.S. 143-215.22I that were in effect on July 1, 2007.
The Greenville Utility Commission has submitted its petition to transfer a total of 12.3 million gallons per day from the Tar River Basin to the Contentnea Creek and Neuse River Basins to provide drinking water for the Farmville, Winterville and Greene County water systems. A public hearing was held on November 5, 2009 and comments were accepted until January 19, 2010. The Hearing Officers' Report is being developed and is expected to ready for presentation to the Environmental Management Commission by the end of the year.

The **Kerr Lake Regional Water System** has indicated it intends to submit a petition requesting an increase in its existing interbasin transfer of 10 million gallons per day. The regional water system will request an increase to 24 million gallons per day. The system proposes to transfer water withdrawn from Kerr Lake on the Roanoke River to public water systems in the Tar, Neuse and Fishing Creek River Basins. DWR expects to receive a Draft Environmental Impact Statement for this proposed transfer increase by the end of 2010.

Brunswick County has submitted a notice of intent to apply for an expansion of its grandfathered interbasin transfer. The County currently receives surface water from the Cape Fear River through the Lower Cape Fear Water and Sewer Authority and provides treated water to customers in the Cape Fear, Waccamaw and Shallotte River Basins. A Draft Environmental Impact Statement is under development to support a request for an increase in the grandfathered transfer amount of 10.44 million gallons per day to 19.29 million gallons per day.

The completion of the **Neuse Regional Water and Sewer Authority** facilities on the Neuse River and the switch from ground water to surface water by member communities will require the Authority to apply for an interbasin transfer certificate. The delayed effective date for application of the 2007 interbasin transfer requirements to applicants responding to the Central Coastal Plain Capacity Use Area rules may allow the Authority to proceed under the rules that were in place prior to July 1, 2007.