

North Carolina
Drought Management Advisory Council

Annual Activities Report - 2009

Oct. 1, 2008 to Dec. 30, 2009

North Carolina Division of Water Resources
Department of Environment and Natural Resources

North Carolina Drought Management Advisory Council; Annual Report – 2009

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Introduction

This is Annual Report #5 of the North Carolina Drought Management Advisory Council on the implementation of North Carolina General Statute 143-355.1, which created the council in 2003. The General Assembly amended the statute in 2004 adding a new section requiring an annual report: “(g) (2003-387, s. 2; 2004-195, s. 2.5)” The council shall report on the implementation of this section to DENR’s secretary, the governor, and the Environmental Review Commission no later than Oct. 1 of each year was added. The report shall include a review of drought advisories issued by the council and any recommendations to improve coordination among local, state and federal agencies, public water systems and water users to improve the management and mitigation of the harmful effects of drought.

Drought Management Advisory Council

The Drought Monitoring Council was an interagency coordination and information exchange body created in 1992. The council did a credible job of monitoring and coordinating drought responses in 2002 and increased public awareness of its functions and effectiveness. The General Assembly recognized the Drought Monitoring Council’s leadership and performance by giving it an official statutory base and by changing its name to Drought Management Advisory Council (DMAC), reflecting the broader role of the council, which goes beyond monitoring drought conditions.

North Carolina General Statute 143.355.1., ratified July 17, 2003, assigned the DMAC an important new role, the need for which became evident in 2002. A number of local governments indicated that it would be helpful to have official, objective drought status advisories, to give them a reliable basis for their management responses. The new statute assigned that role to the DMAC and specifies the drought advisories to be based on technical data and crafted to fit varying conditions in different parts of the state. This process avoids the problems that some states have experienced in declaring drought warnings statewide, when conditions did not warrant it in all parts of the state.

Section 1 of this act also makes drought response provisions mandatory in local government water supply plans and extends this planning responsibility to all community water systems that serve 1,000 or more connections or 3,000 or more individuals.

The intent of the statute was for the DMAC to continue with essentially the same membership and functions that the Drought Monitoring Council previously exercised, but with new statutory authority and a new responsibility for providing a system of drought advisories when needed. Most importantly, the operation of the DMAC continues the same role as the Drought Monitoring Council did in support of the North Carolina Emergency Operations Plan.

Drought Legislation, Section 16 of Session Law 2008-143

An act to improve drought preparedness and response in North Carolina as recommended by the Environmental Review Commission was signed into law on July 31, 2008. Section 16 of SL 2008-143 called for minor changes in the law (2003) establishing the Drought Management Advisory Council. The law now requires that appointees to the council have expertise in water resource evaluation and management related to drought and drought impacts. It removes language that previously allowed DENR to expand the membership of the council. DENR can invite representatives of other organizations, including water systems regulated by the N.C. Utilities Commission, to “participate in the work of the Council.” The DMAC will provide consistent and accurate information on drought conditions in the state to the U.S. Drought Monitor, the Environmental Management Commission, the secretary of the Department of Environment and Natural Resources, the Environmental Review Commission and the public.

In the matter of DMAC issuing drought classification and response actions by county, SL 2008-143 requires that if the U.S. Drought Monitor of North Carolina shows more than one drought designation in a county, the drought classification for the county is the highest drought designation that applies to

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at least 25 percent of the land area of the county. Drought response actions are based on the drought classification for each county within a drought area that is listed each Thursday on the DMAC Web site, www.ncdrought.org.

The law states that the council may recommend to the Secretary of DENR a drought designation for a county that is different from the designation based on the U.S. Drought Monitor of North Carolina if the depiction of drought does not accurately reflect localized conditions. In recommending a drought designation that differs from the U.S. Drought Monitor designation, the council will consider stream flows, ground water levels, the amount of water stored in reservoirs, weather forecasts, the time of year and other factors relevant to determining the location and severity of drought conditions.

Worst Drought in North Carolina Since 1895

The drought in 2007 was the worst for North Carolina since record keeping began in North Carolina in 1895. In 2007, conditions in the state went from no drought to record drought in less than one year.

The year 2007 was recorded by the National Weather Service as the driest year in more than 100 years in North Carolina. Records were set in many areas for number of days of low humidity and number of days with temperatures above 90 F.

Forest landowners and many residents in wildfire-prone areas were impacted by the drought. The lack of rainfall left pine straw and other vegetation dry and fueled far more wildfires than we typically average. As a result, local firefighters and the N.C. Division of Forest Resources fought 30 percent more wildfires than North Carolina's 5,000 wildfires-a-year average. The 7,200 wildfires in 2007 burned more acreage than had burned in any year during the last two decades.

The N.C. Dept of Agriculture and Consumers Services, or NCDA, worked to help producers with drought-related issues during the fall of 2007 through the year 2008. Many livestock farmers took advantage the NCDA Hay Relief effort that helped get much-needed forage to livestock operations in the western part of the state. As 2008 came around, NCDA efforts focused on what farmers could do to minimize their water usage. NCDA staff worked in cooperation with the Rural Center and the soil and water conservation districts to help farmers clean out ponds, dig new wells and conserve more water in livestock operations. Staff is also a part of the many legislative activities surrounding water usage and drought management. The USDA in partnership with NCDA is now conducting a water usage survey to calculate the water usage by agriculture in the state.

Soil moisture was not a grave problem during the planting season of 2008. However, the lack of rains throughout the spring and summer months stunted or prohibited crop growth in some areas. Some areas had record low yields while some other areas seemed to make it through the drought because of isolated showers which doused fields at the right times of the growing season.

At one point, as many as 30 cities and towns were forced to confront the realization that they may run out of water or have to ration water. Many of those were within 100 days of running out of water.

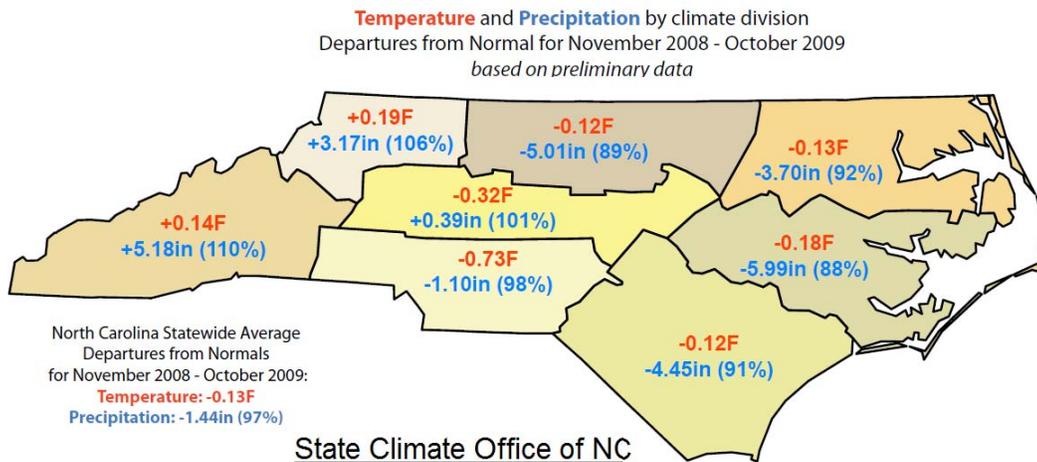
In Siler City, officials had to ship in water supplies by truck. Rocky Mount sought and received the state's permission to extend a pipeline to Wilson to keep from running out of water.

In many ways, it was fortunate that in North Carolina we had confronted a serious drought before – just five years earlier. In 1998-2002, we experienced what we thought was the drought to end all droughts. A report *The Drought of 1998-2002 in North Carolina – Precipitation and Hydrologic Conditions* was prepared and released by the U.S. Geological Survey in 2005. More details on how the state coped with the 2007-08 droughts can be found in the Annual Report (#4) for the DMAC released in the fall of 2008.

Drought Overview 2008-2009

1. As is typical for most years in North Carolina, climate patterns between November 2008 and October 2009 included extremes in wet and dry patterns. Extreme drought conditions lingered in southwestern North Carolina in late 2008, and moderated in western counties during the early winter. However, dry conditions in January and February brought drought impacts to central and eastern counties. A wet period in March and April brought relief to central and eastern North Carolina, while wet conditions in western North Carolina in May and June ended the lingering drought conditions there. However, July and August were again dry in central and eastern North Carolina. September and October was wet in western North Carolina, but dry in central parts of the state. By the end of October, moderate drought was again widespread in central North Carolina. Many areas experienced record-breaking rainfall in December. As a whole, the year was wet in western North Carolina, and dry in central and eastern North Carolina. Figure 1 is a climate summary for the period November 2008 – December 2009.

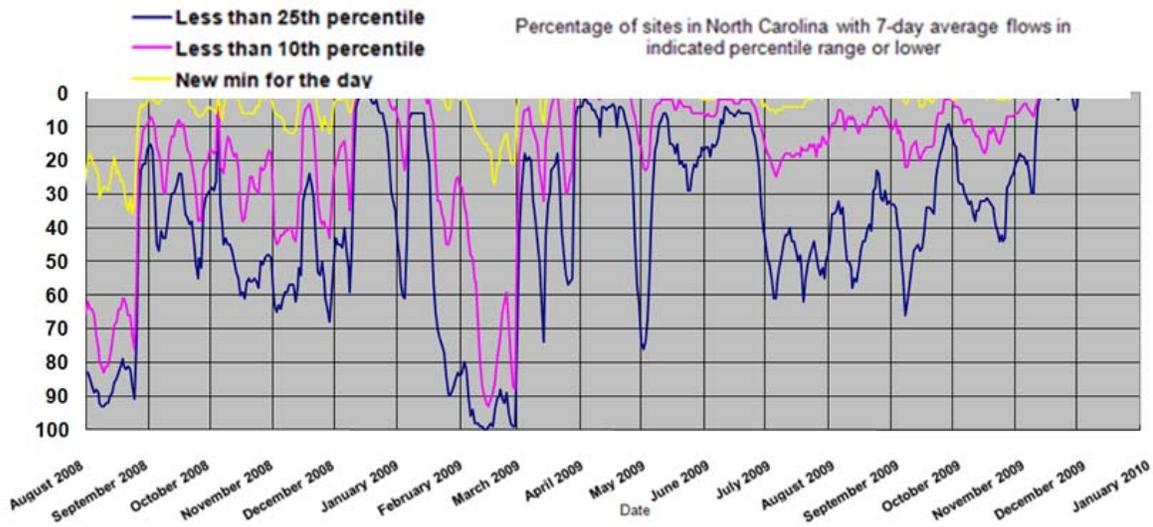
Figure 1 Climate summary for the period Nov. 2008 – Dec. 2009



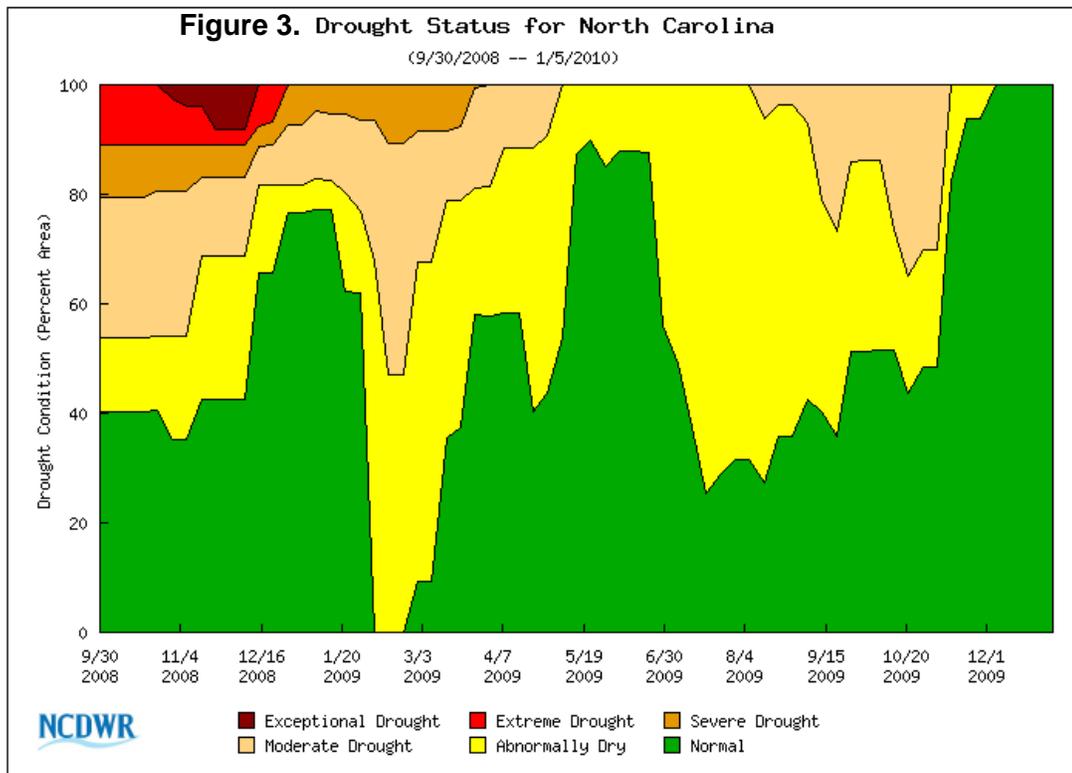
2. Water resources conditions in the fall of 2008, were below-normal in western Piedmont and Blue Ridge with higher conditions in the remaining parts of the state following tropical rainfalls in the late summer season. However, dryness began to set in across the central and eastern parts of the state such that by end of February, streamflows were below normal across most of North Carolina. Increases in streamflows were noted across central and eastern sections during spring 2009 as well parts of western North Carolina, especially during the late spring. While normal-to-above-normal conditions continued to expand across parts of western North Carolina during the summer, below-normal streamflow conditions again became more widespread across the central and eastern sections, particularly during the late summer and early fall of 2009. During the last months of 2009, more frequent and widespread rainfalls have helped to improve streamflow conditions across all of the state to normal and above-normal ranges.

Figure 2, is a graph showing the percentage of USGS WaterWatch streamgages in North Carolina (<http://waterwatch.usgs.gov/?m=real&r=nc&w=real%2Cmap>) that are below normal (25th percentile) since August 2008.

Figure 2. Percentage of Streamgages in North Carolina with below Normal 7-day Average Flow



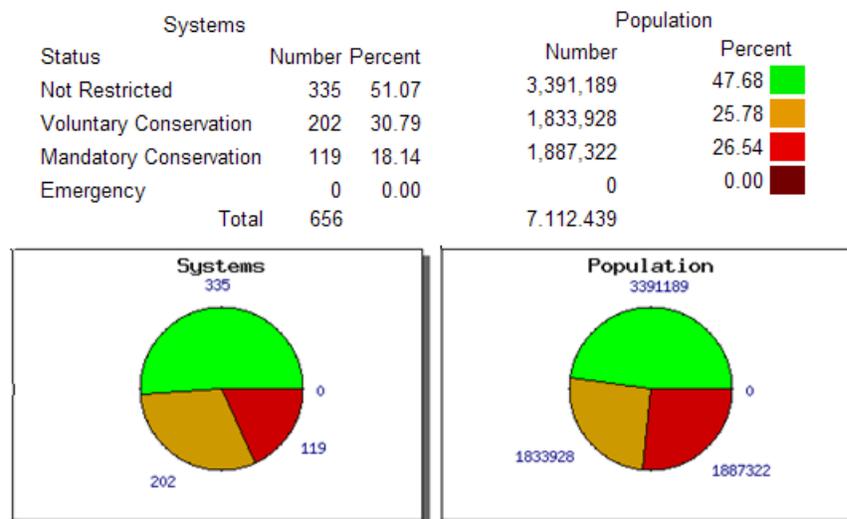
3. Groundwater conditions this year (2009) varied within the state by region and season as indicated by the 21 USGS observation wells displayed on N.C. Climate Response Network (<http://groundwaterwatch.usgs.gov/StateMapsNet.asp?ncd=crn&sc=37>). Until early-to-mid fall 2009, below normal water levels were most widespread in the French Broad River basin and Coastal Plain region. Water levels depicted in the normal ranges (albeit, lower ranges of normal) were more common this year than previous years (particularly during the warmer months) at many of the Piedmont wells depicted on the N.C. Climate Response Network.
4. For the first time in more than two years, none of North Carolina was experiencing drought conditions in May 2009. Fifty three counties on opposite ends of the state remained abnormally dry, which means an area could return to drought without adequate rainfall. Nevertheless, many North Carolina community water systems left voluntary and mandatory water restrictions in place. Statewide 3.94 million people, or 55 percent of the people that receive water from systems the N.C. Division of Water Resources tracks, are under mandatory or voluntary water use restrictions.
5. Drought conditions reemerged in parts of North Carolina for the first time since early May. A lack of rainfall thrust seven central counties in the state from abnormally dry into moderate drought.
6. For the first time in nearly three years, no county in the Tar Heel State was experiencing drought or abnormally dry conditions according to the U.S. Drought Monitor map released on Dec 10, 2009. The last time North Carolina experienced normal conditions was Jan. 30, 2007.
7. Figure 3 is a display of the drought conditions in North Carolina for the period Sept 30, 2008 – Jan 5, 2010.



8. DWR and PWSS maintain a Web site, [Water Conservation Level Status](#), for more than 600 (Figure 4) tracked public water systems statewide. This online, real-time database provides a consistent way to document and track impacts of drought related causes on public water supply systems.

If you're interested to see if your community has enacted water conservation measures, go to: http://www.ncwater.org/Drought_Monitoring/reporting/displaystate.php

Figure 4. Water Conservation level status, Statewide
Statewide summary data for tracked water systems



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9. Drought conditions in the mountains and abnormally dry conditions in parts of the Piedmont and Coastal Plain regions that occurred during 2008 and early 2009 had no impact on agriculture. By the end of 2009, the state was free from all drought classifications, thanks to timely rains during the year and precipitation received from Tropical Storm Ida in November. Growing conditions throughout the year were very favorable for much of the state leading to record yields for a few crops. The state finished off the year with above normal precipitation and below normal temperatures for most of December, delaying soybeans and cotton harvests.

USDA in partnership with NCDA released in 2009 the results of a survey of agriculture water usage in North Carolina in 2008. The water use information will be available to make wise decisions on drought management decisions and how they could affect the agriculture economy. The North Carolina 2008 Agriculture Water Use Report is available on the internet at:

<http://www.ncagr.gov/stats/release/WU2008.pdf>

10. Wildfire activity was below normal for every month during this time period except for July 2009. The N.C. Division of Forest Resources continued to work on the Evans Road Fire through the end of 2008 until the fire was announced controlled in early 2009. For the 2009 calendar, 3,219 fires burned 12,235 acres. The number of homes saved was 3,183 while 13 homes were lost to fire. There were 900 other structures saved such as outbuildings and sheds. However, 145 structures were lost to fire. Overall, wildfire activity was less than the 10-year average due to the wet conditions in 2009.

Drought Response Activities—Oct. 2008 to Dec. 2009

Council Meetings

The council, by law, is required to meet at least once in each calendar year in order to identify agency representatives that will maintain appropriate agency readiness and participation. The DMAC chairman called for the initial meeting of the council in 2009 on March 20 in Raleigh. Attendance included 54 representatives and associates of the DMAC. Only one meeting of the DMAC was held during this reporting period.

Items on the meeting agenda included drought assessment and forecast reports about the seasonal drought outlook and the impact of drought on streamflow and ground water levels, lake and reservoir levels, agriculture, forestry and public water systems and special reports about drought preparedness and response.

Press Releases

Press releases were sent out after each DMAC meeting. In addition, more than 20 news releases were issued concerning drought conditions and current drought advisories.

1. Drought conditions in North Carolina are updated weekly. A Technical Drought Advisory Team, a sub group of the DMAC, participates each Tuesday in an audio-video telecom to gather and feed information to the U. S. Drought Monitor author about local drought conditions in North Carolina. The team is a group of experts on climate, weather, geology, water supply, forestry and agriculture; that report each week the impact of rainfall on streams, groundwater, reservoirs, wildfire activity and crops that are valid at 8 a.m. Eastern Standard Time each Tuesday. Based on that discussion, the council makes a recommendation to the U.S. Drought Monitor about how the state's drought map should look that week. The U.S. Drought Monitor uses the state's recommendation when it releases the final drought map each Thursday. To see or download a copy of the drought map, go to the state's official drought Web site, www.ncdrought.org.

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2. At the river basin level, there are weekly conference calls to coordinate releases from reservoirs, hydroelectric power generation, etc. to conserve as much water as possible and to balance upstream and downstream needs. The U.S. Army Corps of Engineers and the utility companies, owners of the biggest reservoirs, are all working together in this effort.

The state Public Water Supply Section's regional offices and the Division of Water Resource staff continued to stay in touch with water systems identified in 2007 that were identified as Tier-1 systems not taking action to help alleviate drought. Systems remain at their highest tier-level until a resource is online (operating) that will provide an emergency water supply to minimize the system's vulnerability to drought. The following is a link that provides more detail about the Tier-1 systems:

www.ncwater.org/Drought_Monitoring/reporting/weekstatust123.php

Critical Local Government Drought Response Projects:

One of DENR's and DMAC's most critical, ongoing drought related activities in response to the 2007 drought, was to identify and help North Carolina communities most at-risk of "running out of water" during drought. The following is a list of the drought response projects where most practical short term projects are underway that could supply an expedient, supplemental water source to these "at-risk" communities.

Tier--1 Drought Response Project Updates

Bessemer City – Interconnection with Gastonia

Bessemer City decided that it had higher needs for other infrastructure funding and has not pursued an interconnection with the city of Gastonia. Due to this lack of progress on the interconnections, the special funding for this interconnection (\$100,000) that had been made available by the General Assembly has reverted to the General Fund and is no longer available. We are not aware of any current efforts by the city to renew discussions with the city of Gastonia on this interconnection.

Boone – New raw water intake on New River

The town of Boone is in the process of requesting a reclassification of the New River to WS IV for their water intake. This process will likely take two years. The USDA is currently going through the EA review process. The town's engineer is responding to USDA comments on the preliminary engineering report. The project design is approximately 35 percent complete. The engineer also indicated that the project construction could likely begin in approximately nine months if the reclassification issue is resolved.

Blowing Rock – Interconnect with Boone

Public Water Supply has approved plans and specifications and the low interest loan. USDA is in the approval process on behalf of Appalachian Regional Commission. The contract has been awarded and the engineers expect construction to be commenced in 2010.

Boone – ASU Interconnect

Interconnection completed in 2009.

Hendersonville – New Water Intake on French Broad River

The city has received approval for \$500,000 from the rural center and received an extension of time for use of the funds. The city has applied for stimulus money (DWSRF), but was not approved in Round 1. The city is still hoping to receive funding through the U.S. Army Corps of Engineers (Water Resource Development Act, 2007 Reauthorization) in a 75/25 split, if they are

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not successful with acquiring DWSRF funding. The city feels like this project should qualify for this funding, but have seen no evidence of this happening to date.

The city is still hopeful that the new water intake in the French Broad River could be in place by the summer 2010, given that the current funding opportunities come to fruition.

King – Interconnection with Winston-Salem

The city has actively pursued an interconnection with the city of Winston-Salem, and the interconnection is under construction. This interconnection was made a reality largely due to the special funding for this interconnection (\$100,000) that had been made available by the General Assembly.

Lenoir – New Water Intake – Lake Rhodhiss

The city of Lenoir has received the authorization to construct from the state Public Water Supply Section. The Conveyance Permit Application has been submitted to Duke Energy for review. It is anticipated that it will take approximately one month to complete their review and another six months at the federal review level. The design engineer estimates that upon these approvals, the project completion will take approximately 20 months.

Marshall – New Wells and Water Line Replacements

All funding has been approved. The project design for Phase-1, water line improvements has been approved by Public Water Supply. Funding Notice to proceed with project in Jan 2010 with completion date set for April 2010.

Mars Hill – Interconnect with Weaverville

The town has received an authorization to construct. Contract was awarded on 2-Nov 2009 with construction starting in Dec 2009.

Robbinsville – New Wells

The town has secured the necessary funding to install two wells to supplement their existing surface water supplies. Unfortunately, they have not yet been able to secure an acceptable site. Their consultant is still working with the town and property owners to make a selection and to install test wells.

Tryon/Columbus/Saluda – Interconnections and System Upgrades

This project consist of 7.5 miles of 10-inch water lines; four booster pumps; four pressure reducing valves and a new water storage tank to be located on a 0.7-acre lot located off State Road 1122 that will connect the towns of Columbus, Saluda and Tryon. Construction for the key portion of this project, the new water main between Saluda and Tryon, began 14-Dec 2009 with end-date scheduled 31-Dec 2010.

Yadkinville – Interconnection with Davie County

The town was unable to reach an agreement with Davie County for an interconnection of their water systems. Due to this lack of progress on the interconnection, the special funding for this interconnection (\$100,000) that had been made available by the General Assembly has reverted the general fund and is no longer available. We are not aware of any current efforts by the town to renew discussions with Davie County on this interconnection.

Water Reclamation and Reuse Activities:

- DENR personnel developed an expedited permitting process in order to respond to the high level of interest from municipalities and industries in using reclaimed water for non-potable water uses. Additional information on the use of reclaimed water can be found on the Division of Water Quality's Web site at:
- <http://h2o.enr.state.nc.us/admin/pubinfo/ReclaimedWaterInfoOct07.htm>
- Session Law 2008-143 clearly states that "it is the public policy of the State that the reuse of treated wastewater or reclaimed water is critical" to meet water supply needs. This legislation also encourages the Environmental Management Commission to "encourage and promote" the use of reclaimed water as an alternative to surface water discharges. (SL 2008-143, Section 10) During droughts, the reduction in surface water discharges could exacerbate the impacts of water shortages by reducing the amount of water flow in the receiving streams. This legislation also added the stipulation that to be eligible for state water infrastructure funds applicants must evaluate "the extent to which future water needs of the water system can be met by reclaimed water." DENR personnel are engaged in rule revisions that will update the beneficial uses for reclaimed water that will be permitted in North Carolina.
- In order to facilitate and encourage the collection and reuse of rain water, DENR personnel are developing a policy that will provide stormwater control and treatment credit for the harvesting and reuse of rain water. This policy is expected to become effective in 2010.
- Session Law 2008-143 defined "gray water" as "wastewater removed from household wash basins, bathtubs and showers." It also requires the Commission of Health Services to develop rules to authorize the use of gray water during droughts.

Informational, Outreach, and Educational Activities:

- DENR staff produced and delivered a wide range of educational and water conservation materials for educators, children and adults. These materials were distributed to a broad audience statewide. <http://www.savewaternc.org/>
- North Carolina is known as a state rich in water. However, the 2007-08 drought – the worst since we started recording droughts in 1895 – and the drought of 1998 – 2002 have illuminated just how vulnerable water supplies in the state can be to drought.

DENR staff produced "The Water Connection – Water Resources, Drought and the Hydrologic Cycle in North Carolina" in the fall of 2009. State officials created the publication to explain how people can protect our state's water supplies, the relationship between surface and groundwater, and the impact drought has on North Carolina's most precious natural resource.

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- o learn more about our water resources, DWR has made it easy to download a copy of “The Water Connection” from the state’s Division of Water Resources’ Web site,

www.ncwater.org.

- DENR staff continues to participate in a variety of drought-related symposiums, outreach events, conferences and forums that are too numerous to list here.
- DENR staff have provided numerous drought reports and updates to the news media, concerned citizens, the General Assembly and the Environmental Management Commission.
- The state Division of Pollution Prevention and Environmental Assistance (DPPEA) is working successfully to provide technical help to North Carolina organizations including industries, businesses and government agencies to identify ways to reduce and conserve water.
- DPPEA updated “Water Efficiency Manual for Commercial, Industrial and Institutional Facilities.”
- DPPEA “Fix a Leak Week” partnership with EPA focuses on “best of the best” local government approaches on water efficiency.

DMAC Web Site

The DMAC Web site, www.ncdrought.org, presents a picture of the U.S. Drought Monitor, or USDM, for North Carolina that is released on Thursday of each week. The drought conditions depicted are valid for 8 a.m. Eastern Daylight Time for the preceding Tuesday. North Carolina is fortunate because it has the DMAC to work closely with the U.S. Drought Monitor to adjust designations weekly to better reflect North Carolina's local conditions. The USDM is defined as the official drought map nationally and by law for the state of North Carolina.

The DMAC issues official drought advisories Thursday based on drought classification to provide all water users with a reliable basis for managing and calling for drought response actions in their region. The list of counties under drought advisories is updated and released each week (www.ncdrought.org) to reflect local drought classifications on the weekly U.S. Drought Monitor for North Carolina.

The DMAC Web site also has a number of tabs that link to available resources of drought information, some with real-time data about [current conditions](#), [news](#), the [DMAC](#), [drought contacts](#), [information](#) and [drought education](#), [drought monitor archives](#), and [water conservation tips](#).

The site now includes time lapse animation of the weekly USDM nationally and for North Carolina since January 2000 with the option to view drought classifications by statewide, county or river basin. This drought monitor history can be found at: www.ncdrought.org/archive/index.php.

Improving Coordination and Drought Depiction

Drought Indicator Wells -- Drought indicator wells are a network of wells that monitor the effects of droughts and other climate variability on groundwater levels in the aquifers (water table). The Division of Water Resources' goal is to increase the number and geographic distribution of drought indicator wells. DWR has 48 actively monitored wells in the network and a short-term goal of adding two wells to that network this fiscal year. The long-term goal is to have at least 60 drought indicator wells. This will allow a much more complete assessment of impending or actual drought conditions in each of the major river basins of the state.

http://www.ncwater.org/Data_and_Modeling/Ground_Water_Databases/Drought_Indicator_Wells/

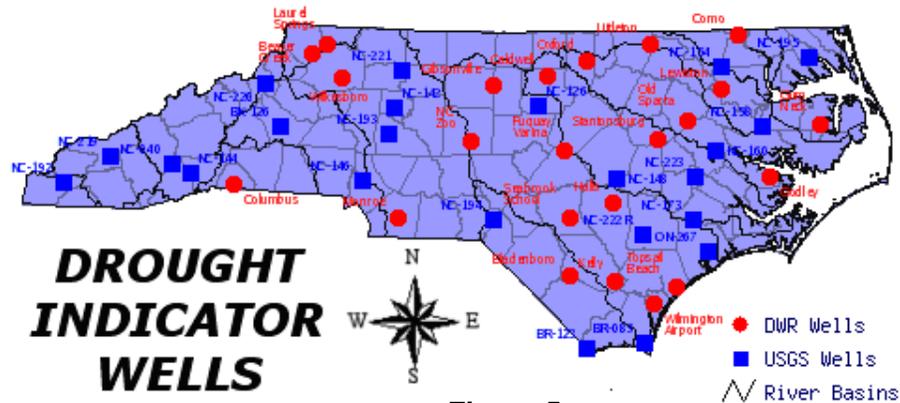


Figure 5

River Basin Drought Management Plans -- As part of the relicensing of hydropower projects in the Catawba-Wataree and Yadkin-Pee Dee river basins, procedures have been established and tested for adjusting operations during periods of low-inflow to conserve the limited water supply during the 2007 drought. The low-inflow protocol, or LIP, provides trigger points and procedures for how the projects will be operated as well as water withdrawal reduction measures and goals for other water users during periods of low-inflow.

Planning is underway with stakeholders in the Neuse River Basin to work with the state Division of Water Resources and others to fund and develop a drought management model for the basin. The Division of Water Resources is working with the U.S. Army Corps of Engineers and stakeholders on updating drought management plans on Falls and Jordan reservoirs.

Water Resources Information -- The N.C. Division of Water Resources continues to work with the N.C. State Climate Office, the U.S. Army Corps of Engineers, the N.C. Ground Water Management Section, the U.S. Geological Survey, and the Tennessee Valley Authority to improve and expand a water resources information, storage, analysis, and retrieval system (WRISARS). This program provides an archive of historical and near real-time data about hydrology (including stream flow, groundwater and reservoir data), weather and climate, and water use in North Carolina. Data products are now available for public use at <http://www.ncwater.org/wrisars/index.php> or drought products at <http://mapserver.ncwater.org/DM/>.

Precipitation Outlook; Feb -- Oct 2010

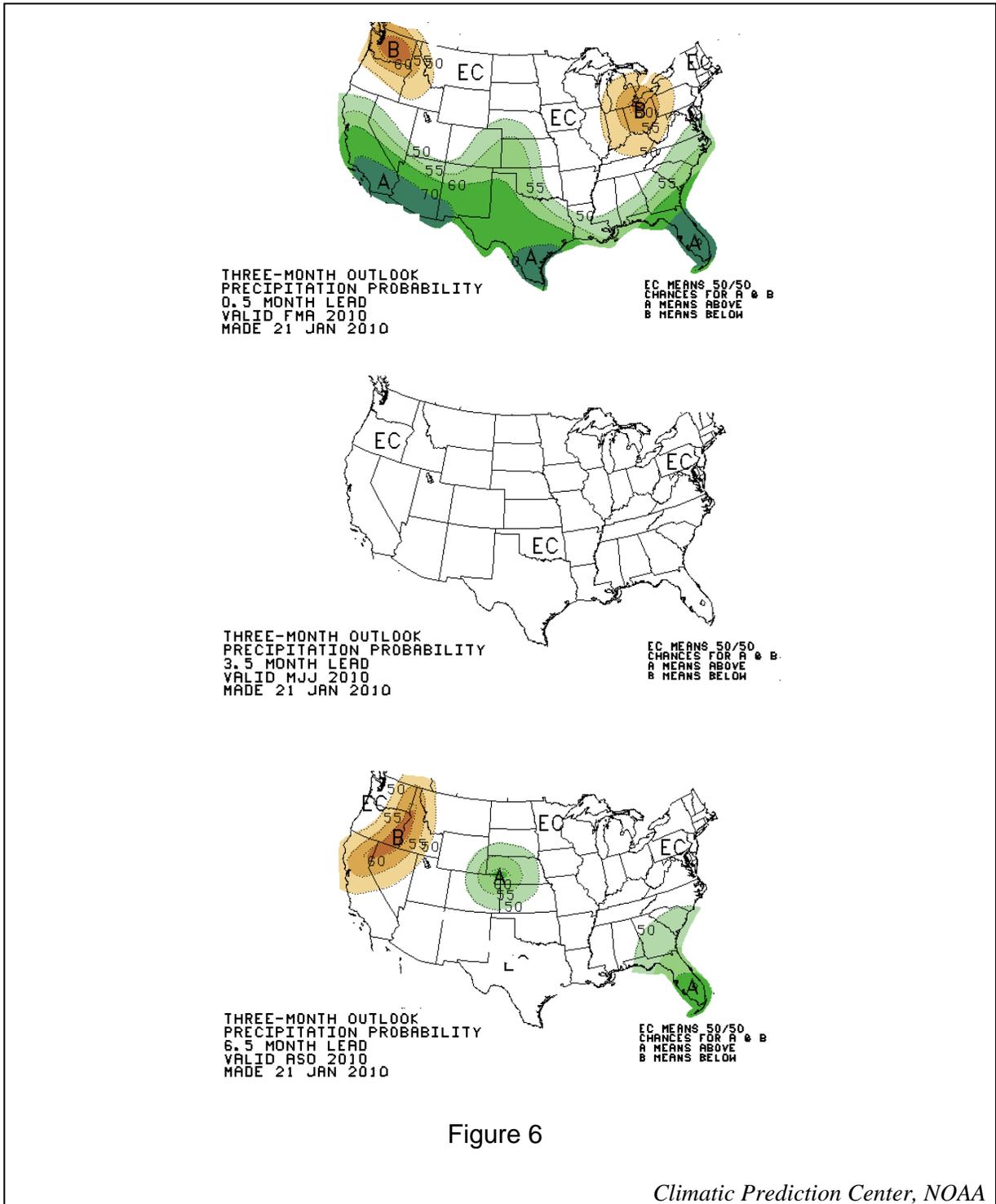


Figure 6

Climatic Prediction Center, NOAA