

# **Drought Management in North Carolina**

**Southeastern Lakes Management Conference  
Managing Extremes: Watersheds and Climate Disruptions**

**May 5, 2010**

**Tom Fransen  
Division of Water Resources**

# Drought of 1998-2002

## Towns desperate for water

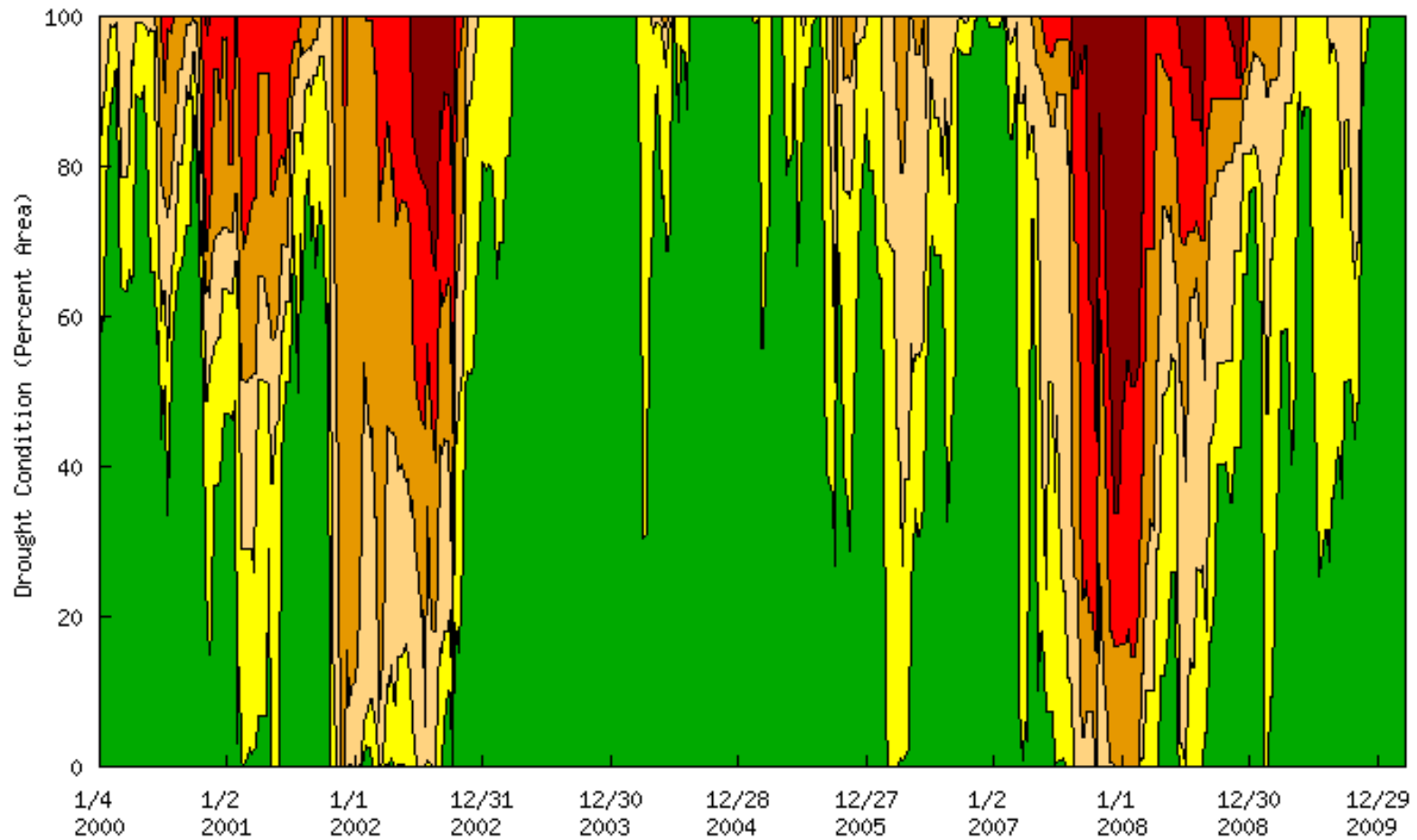


Above, Clint Beem, a Shelby Firefighter, monitors a jury-rigged system that draws water from the City of Kings Mountain through the Cleveland County water system to Shelby. Using the fire truck as a pumping station, 370 gallons per minute are processed.



## Drought Status for North Carolina

(1/4/2000 -- 3/23/2010)



NCDWR

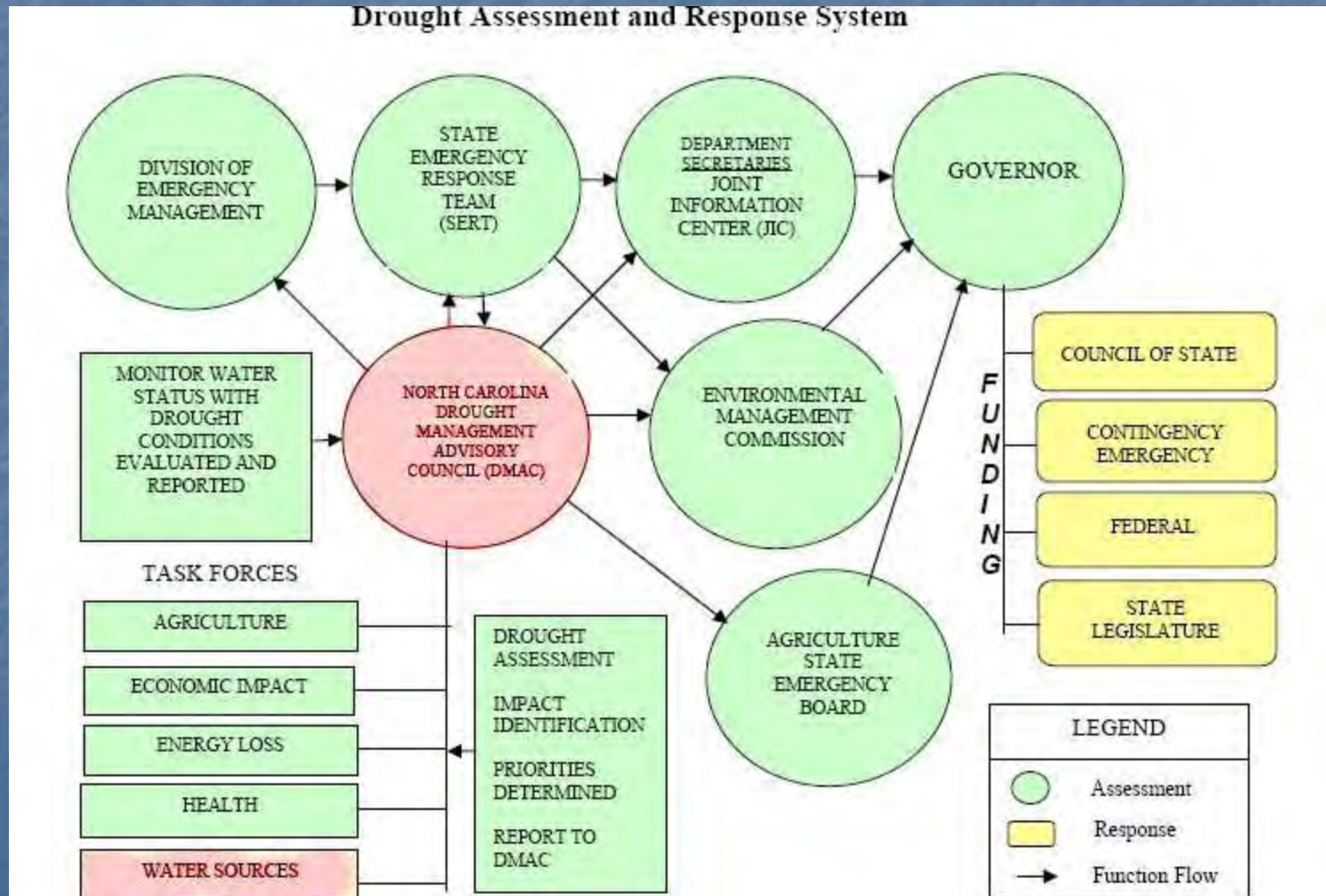
Exceptional Drought
  Extreme Drought
  Severe Drought  
 Moderate Drought
  Abnormally Dry
  Normal

[http://www.ncwater.org/Drought\\_Monitoring/dmhistory/](http://www.ncwater.org/Drought_Monitoring/dmhistory/)  
 Animated Map - <http://www.ncdrought.org/archive/index.php>

# §143-355.1

## Drought Management Advisory Council Appendix 3 to Annex B – Drought Assessment and Response Plan

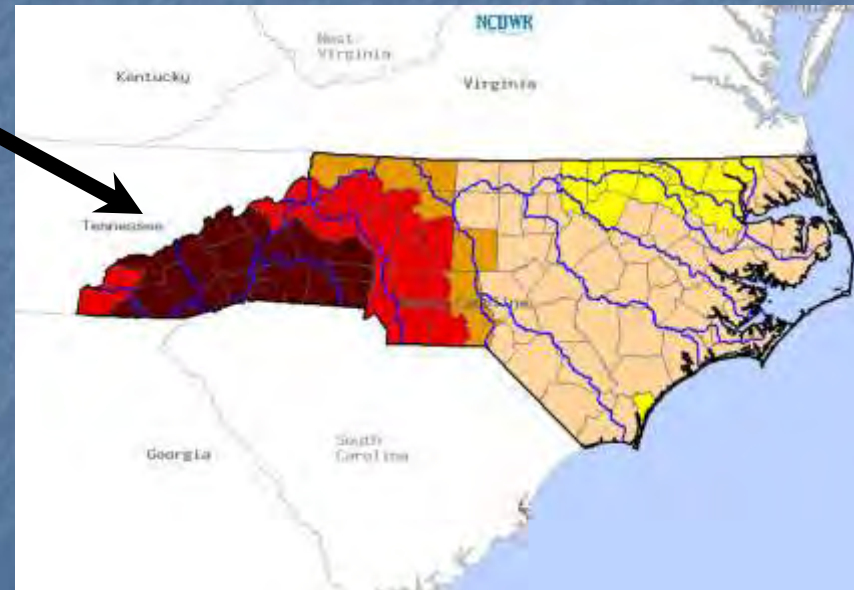
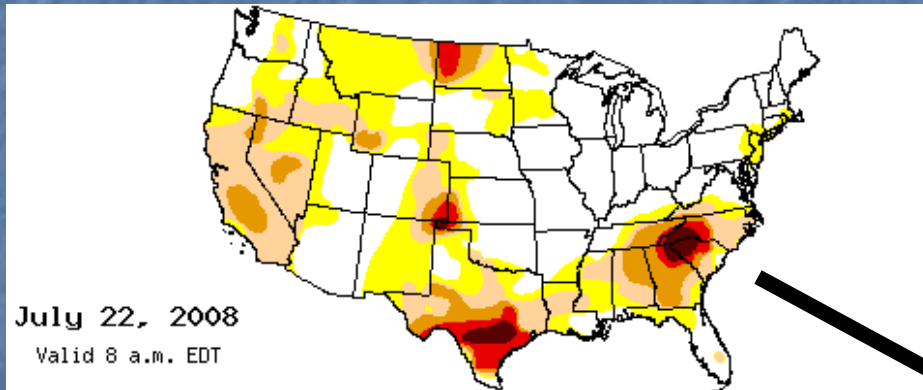
Drought Assessment and Response System



# 2008 Drought Bill Overview

- **HB 2499 ratified by NCGA on July 18.**
- **Contains new initiatives for drought response:**
  - **Registration & reporting**
  - **DENR approval of WSRP**
  - **Mandatory implementation of WSRP tiers**
  - **Enhanced enforcement measures**
  - **Water efficiency standards**
  - **Other provisions**

# 2008 Drought Bill Drought Designations



**County designation = highest designation for 25% or more of county land area.**

# **Water Shortage Response Plans (WSRP)**

- **DENR approval of water shortage response plan.**
- **Plans must contain:**
  - **Tiered levels of conservation based on severity.**
  - **Each tier results in more stringent conservation.**
  - **Other requirements in 15A NCAC 02E .0600.**
  - **Does not meter/regulate private drinking wells.**

# Implementation of More Stringent Measures

- **DENR may req. implementation of more stringent conservation measures based on written findings.**
- **Severe / Extreme / Exceptional Drought**
  - **System has not implemented any measures in WSRP**
  - **Measures needed to minimize impacts on health & env.**
- **Extreme / Exceptional Drought**
  - **System has implemented WSRP**
  - **After 30 days additional measures needed to minimize impacts on health, safety, and environment.**

# NC Drought Management Advisory Council Technical Drought Advisory Team

**NORTH CAROLINA Drought Management Advisory Council**

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**Hot Topics:** [North Carolina Drought Workshop - Drought Tools for Agriculture](#)

**US Drought Monitor of NORTH CAROLINA**

March 23, 2010  
Valid 8 a.m. EDT

**Drought Classifications**

- D0 - Abnormally Dry
- D1 - Moderate Drought
- D2 - Severe Drought
- D3 - Extreme Drought
- D4 - Exceptional Drought

**Legend:**

- County Boundaries
- Major River Basins ([View Map](#))
- A - Agricultural (crops, pastures, grasslands)
- H - Hydrological (water)

[Hi-Resolution Image](#) | [Print Version](#) | [Animation](#)

The U.S. Drought Monitor focuses on broad scale conditions. Information provided for North Carolina is relative to the information provided from all other states and the North Carolina Drought Management Advisory Council. Local conditions may vary.

No drought advisories are currently issued in North Carolina.

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**Counties Under Current Advisory**

No drought advisories are currently issued in North Carolina.

**DIVISION OF WATER RESOURCES**

**DROUGHT** ... a period of abnormally dry weather sufficiently prolonged from the lack of rainfall to cause a hydrologic imbalance.

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**2008 Drought Bill Signed Into Law**

On July 31, 2008, Governor Easley signed House Bill 2408, commonly known as the 2008 Drought Bill, into law as Session Law (SL) 2008-143. Part of the provisions in SL 2008-143 became effective immediately upon the governor's signature. The water system data tool was one of the important provisions of the new law. [Click to check out a summary of the new law.](#)

[2008 Drought Bill](#) | [Summary](#)

Public Water Supply Systems can log in below to report water use observations, status and weekly water use.

[LOGIN](#)

**Current County Advisories as of March 23, 2010**

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Published by the [NC Drought Management Advisory Council](#) every Thursday.

Click on a county for county drought information or click on [drought](#) information when loaded.

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NC DMAC - <http://www.ncdrought.org/>

NC DWR - <http://www.ncwater.org/drought/>





# Water Sources Task Force

[http://www.ncwater.org/Drought\\_Monitoring/wstaskforce.php](http://www.ncwater.org/Drought_Monitoring/wstaskforce.php)

North Carolina Department of Environment and Natural Resources

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## Division of Water Resources

### County/River Basin Public Water Systems Summary

[DWR Home](#) > [drought](#)

Date:

County Summary  Basin Summary

County:

County	Current Advisory	Emergency Water Restrictions	Mandatory Water Restrictions	Voluntary Water Restrictions	Not Restricted	Tier 1	Tier 2	Affected Population	Current Weekly Water Use (% Change from last week)
ALAMANCE	None			Alamance (Drought) Burlington () Elon College (Drought) Graham (Drought) Green Level (Drought) Haw River (Drought) Mebane (Drought) Ossipee SD (Drought) Swepsonville (Drought)				96,706	Burlington 11,344,000 (-0.61%) Graham Mebane
ALEXANDER	None			Energy United WC/Alexander Co WC (Drought) TAYLORSVILLE, TOWN OF (Drought)	Alexander County WDs		Energy United WC/Alexander Co WC	24,181	TAYLORSVILLE, TOWN OF
ALLEGHANY	None			SPARTA, TOWN OF (Drought)				1,824	
				Aspen County (Drought)					

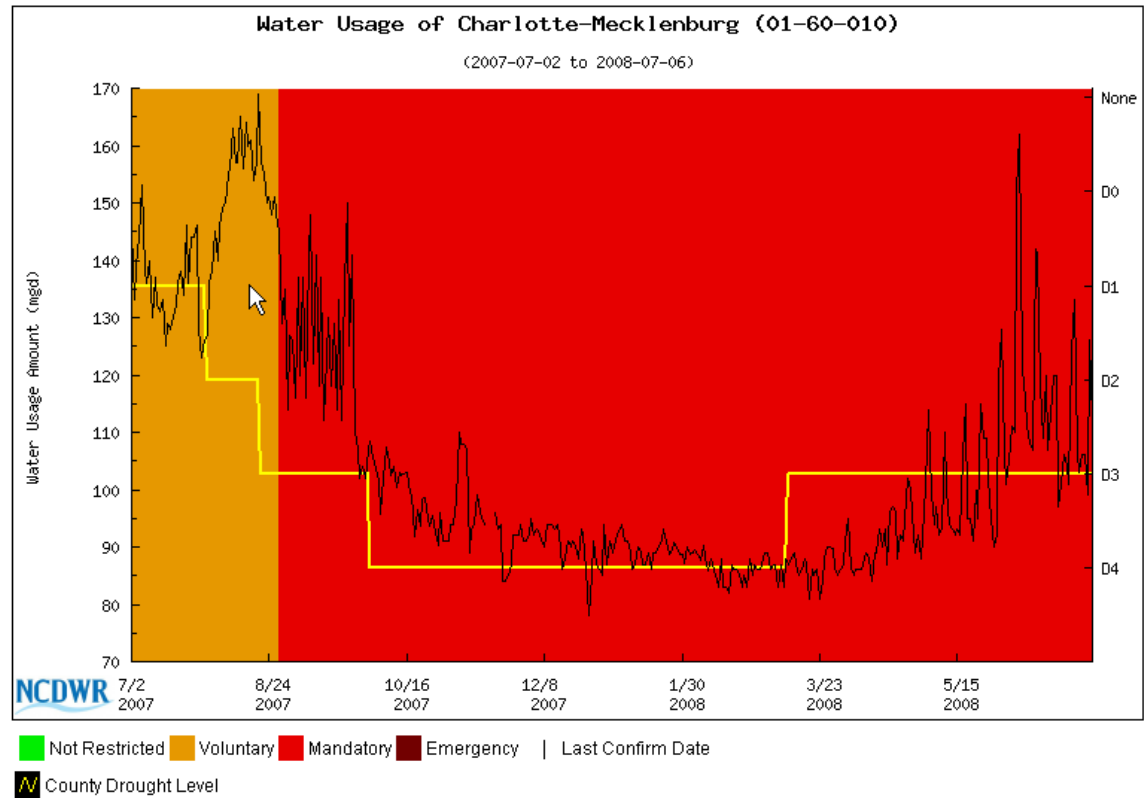
<http://www.ncwater.org/drought/summary.php>

County Summary Tab - <http://www.ncwater.org/drought/>

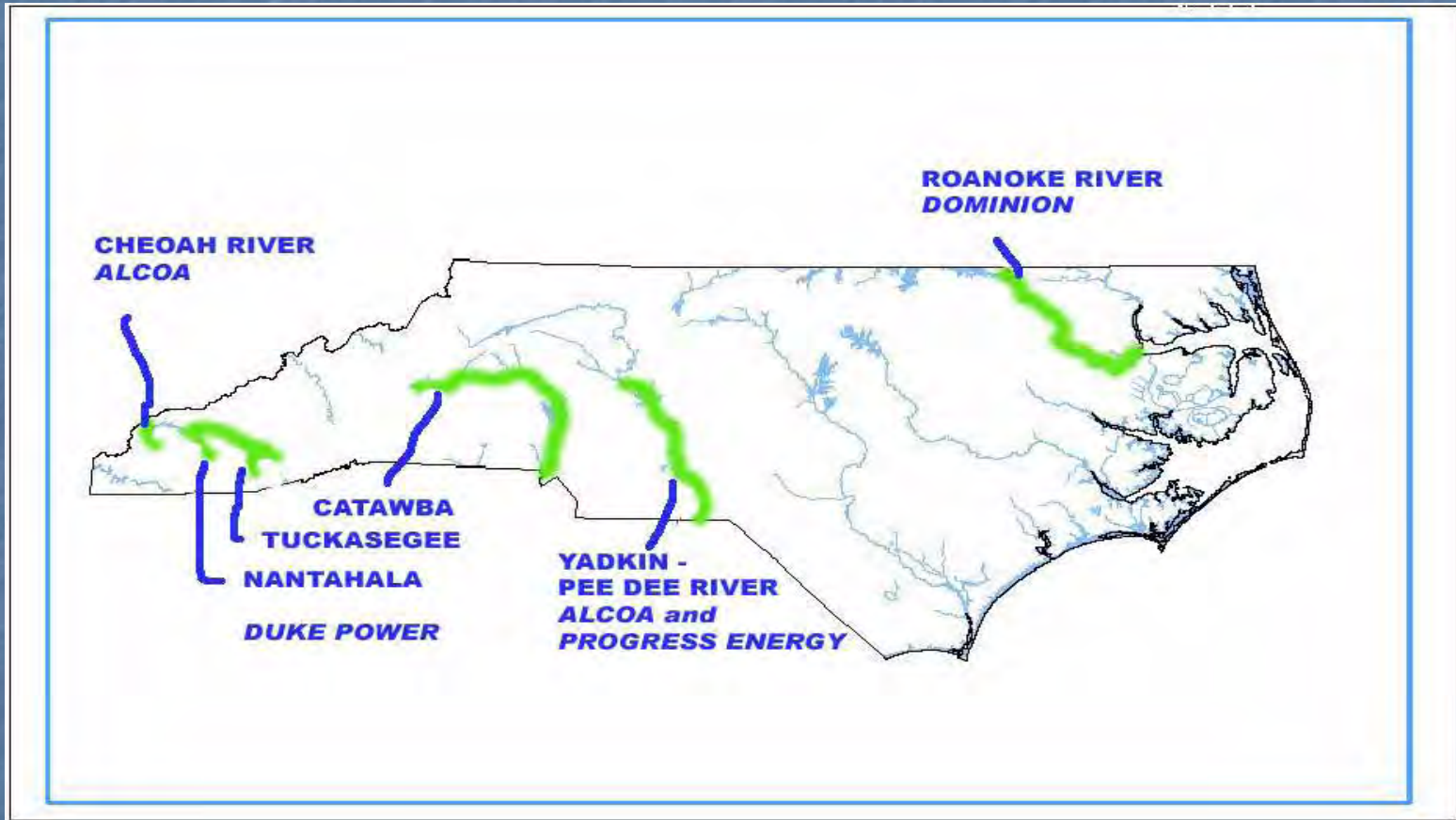
# Water Use Reporting – Weekly Water Use

Start Week: 2007-07-02 End Week: 2008-06-30

Date	Water Use (gpd)	System Status	Tier	County Drought Level
2007-07-02	145,000,000	Y		D0 - Abnormally
2007-07-03	133,000,000	Y		D1 - Moderate
2007-07-04	139,000,000	Y		D1 - Moderate
2007-07-05	144,000,000	Y		D1 - Moderate
2007-07-06	153,000,000	Y		D1 - Moderate
2007-07-07	138,000,000	Y		D1 - Moderate
2007-07-08	136,000,000	Y		D1 - Moderate
2007-07-09	140,000,000	Y		D1 - Moderate
2007-07-10	130,000,000	Y		D1 - Moderate
2007-07-11	137,000,000	Y		D1 - Moderate
2007-07-12	132,000,000	Y		D1 - Moderate
2007-07-13	131,000,000	Y		D1 - Moderate
2007-07-14	133,000,000	Y		D1 - Moderate
2007-07-15	125,000,000	Y		D1 - Moderate
2007-07-16	129,000,000	Y		D1 - Moderate
2007-07-17	128,000,000	Y		D1 - Moderate
2007-07-18	130,000,000	Y		D1 - Moderate
2007-07-19	132,000,000	Y		D1 - Moderate
2007-07-20	136,000,000	Y		D1 - Moderate
2007-07-21	138,000,000	Y		D1 - Moderate
2007-07-22	134,000,000	Y		D1 - Moderate
2007-07-23	146,000,000	Y		D1 - Moderate
2007-07-24	136,000,000	Y		D1 - Moderate



# Another Drought Response Driver FERC Relicensing in NC



# Low Inflow Protocol Indicators for the Catawba-Wateree Basin

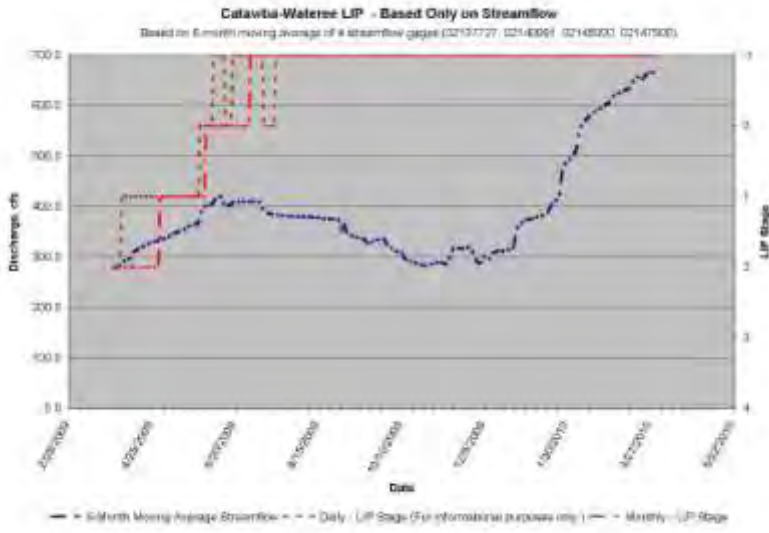
Catawba-Wateree Low Inflow Protocol (LIP) Trigger Status

	Reservoir Storage as a % of Target	% of 6-Month Long Term Avg Streamflow	3-Month Avg of U.S. Drought Monitor	Groundwater Level
Normal	100%	85%	0	
LIP Stage 0	96.8 (up 6.6%) 90%	78%	1	
LIP Stage 1	75%	65%	2	
LIP Stage 2	57%	55%	3	Langtree
LIP Stage 3	56% on 12/12/07 42%	51.3 (up 6.4%)	3.33 (up 1)	Linville
LIP Stage 4		30% on 1/31/07	4.0 on 12/07/07	Glen Alpine

Here 9/12/08

→ = Trigger data point on 9/12/08 (30-day change)

- - - → = Lowest trigger data point reached since LIP implemented in August 2006



# How to get to the data.

North Carolina Department of Environmental and Natural Resources  
**Division of Water Resources**  
 Water Resources Information, Storage, Analysis, and Retrieval System (WRISARS)  
 DWR Home • Home Data Retrieval Site

The diagram illustrates the water cycle with five interconnected components: Weather (top), Stream Flow (left), Reservoir (right), Water Use (bottom right), and Ground Water (bottom left). Arrows indicate the flow of water between these components, showing a continuous cycle.

Note: Products that use current conditions, recent history, may contain estimates and (unless data and therefore are likely to change). For example, many rainfall observations include 1-hour estimates for missing values. Also for some streams, flow statistics may have been computed from reported and unreported flows. This can lead to inaccurate depictions of flow conditions. This site represents a collaborative effort between the NC Division of Water Resources and the NC State Climate Office, the US Army Corps of Engineers, the NC DWR Ground Water Management Division, and the US Geological Survey (USGS). If you have any questions or comments, please contact us at [wrisars@deq.state.nc.us](mailto:wrisars@deq.state.nc.us)

**State Climate Office of North Carolina**  
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**NC CRONOS Database**

**NC Climate Retrieval and Observations Network Of The Southeast Database**

The NC CRONOS/ECOLet Database, developed by the State Climate Office of North Carolina, enables the public to quickly and easily retrieve archived observations from **22,960** (11,371 actual) weather sites and **14,456** water sites in and around North Carolina. To retrieve "page" observations, click here.

Not sure what you're looking for? Click here to download an Excel spreadsheet listing all weather stations in the CRONOS database, as well as which parameters they measure.

**WEATHER**

Surface weather observations, such as temperature, dewpoint, rainfall, etc. Use the search box below to drill the map to cross stations.

Search by station ID, name, county, and/or city:

**Division of Water Resources – <http://www.ncwater.org/wrisars/>**  
**State Climate Office - <http://www.nc-climate.ncsu.edu/cronos>**

# 2007-08 Drought Fontana Lake (Sept 9-10, 2007)



**This is why we need data outside NC.**

# Drought Map Server

NC Drought Status Map - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://mapserver.ncwater.org/DM/frames\_dhtml.html?layer=basins&layer=nc&zoomsize=2&map=%2Ffags%2Fwww%2Fhdocs%2FDM

Google

Layers Legend

Only show NC  Yes  No

Drought Status Layers: U.S. Drought Monitor

Calculation Methods: Default

USDM  USGS Query Percentiles

7-day Average Streamflow Percentiles (10/6/2008)

Unregulated Streamflow  Other Streamfl

Drought Wells  Other Wells

Label

Water Conservation Status (Drought)  All

Water Use Amount Change Query Water Use

Based on Last Month Average

Catawba-Wataree Basin

IBT Basins

Basins

2-Digit HUCs

4-Digit HUCs

6-Digit HUCs

8-Digit HUCs

Hydrography

State Boundary of NC

NC Geographic Regions

NC DENR Regions

Climate Divisions/NC Agricultural Districts

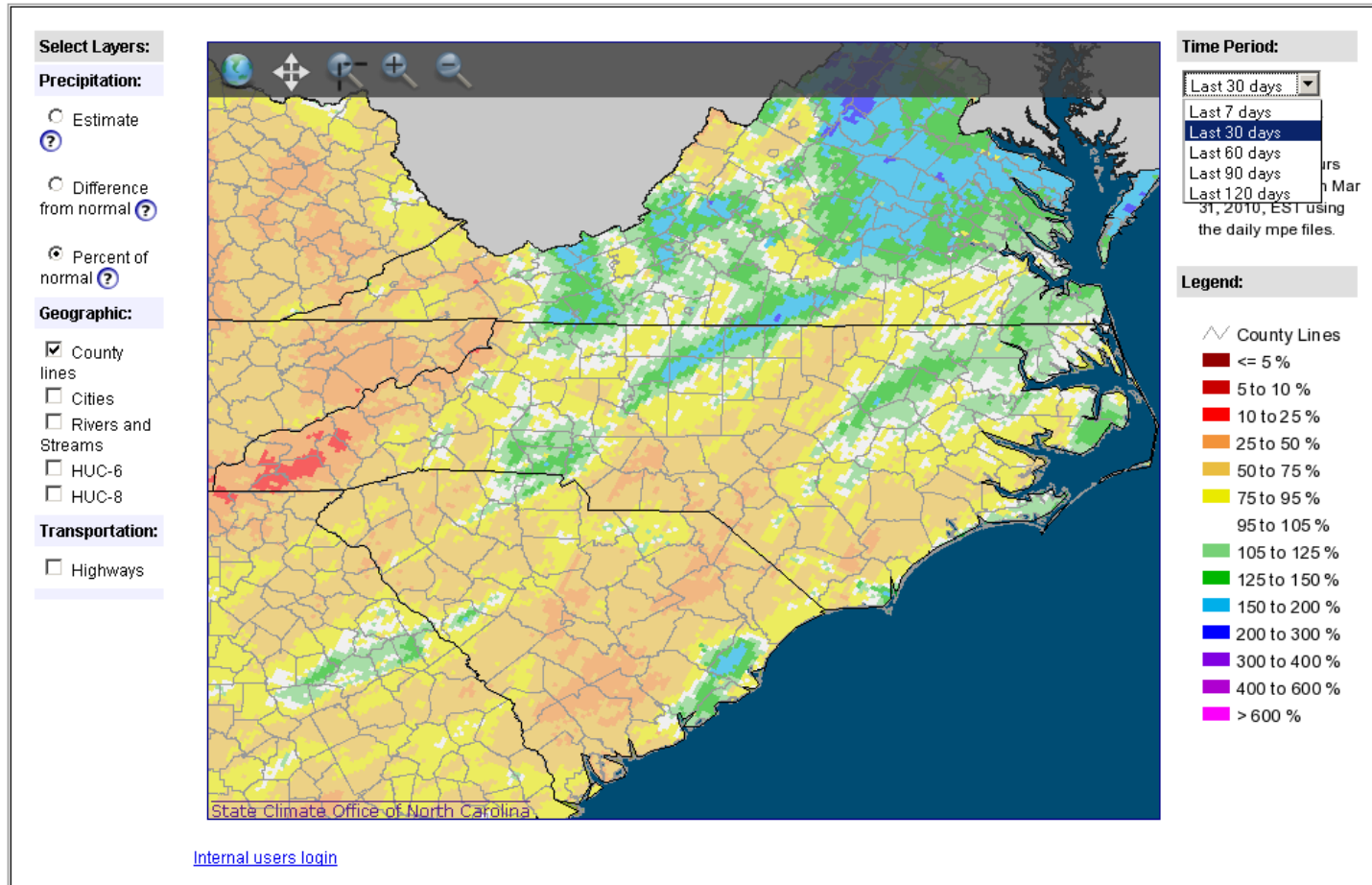
Counties

<http://mapserver.ncwater.org/DM/>

# SCO Precipitation Estimates

## State Climate Office of North Carolina Multi-sensor Precipitation Estimates (MPE)

There are possible errors associated with these radar-based precipitation estimates. This product is in beta.



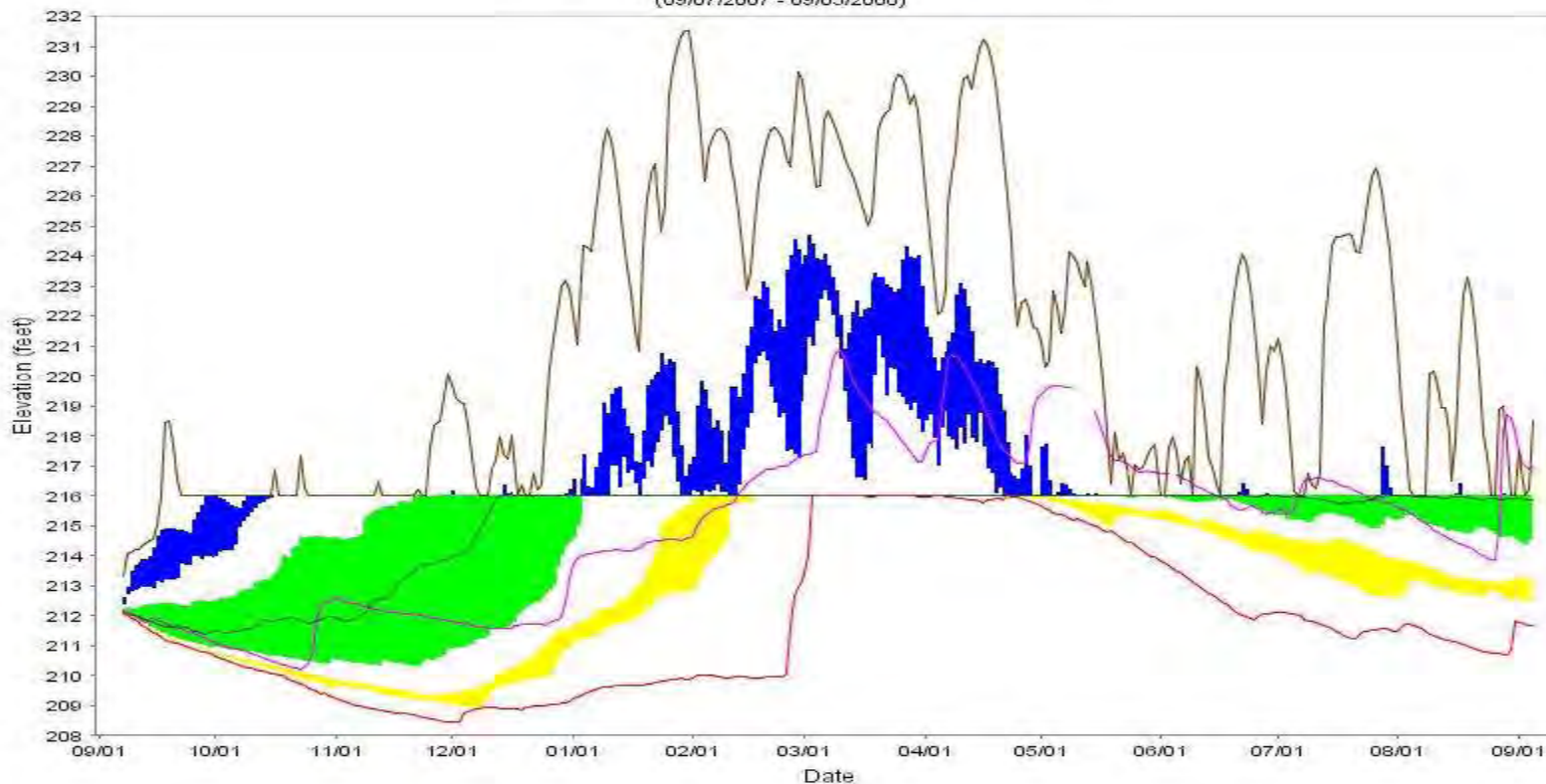
# River Basin Models

## Ensemble Forecasting

### Jordan 9/2007 Forecast

#### Jordan Lake Elevation Forecast

Compare Forecast To Actual Lake Elevations  
(09/07/2007 - 09/05/2008)



- Min — Median — Max — Actual Jordan Elevation
- YELLOW (LOWER) BAND = 5- TO 10-PERCENTILE
- GREEN (MIDDLE) BAND = 25- TO 75-PERCENTILE
- BLUE (UPPER) BAND = 90- TO 95-PERCENTILE

# Questions?

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[2008 Drought Bill](#) | [Summary](#)

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