



December 6, 2016
Nat Wilson & Mark Durway

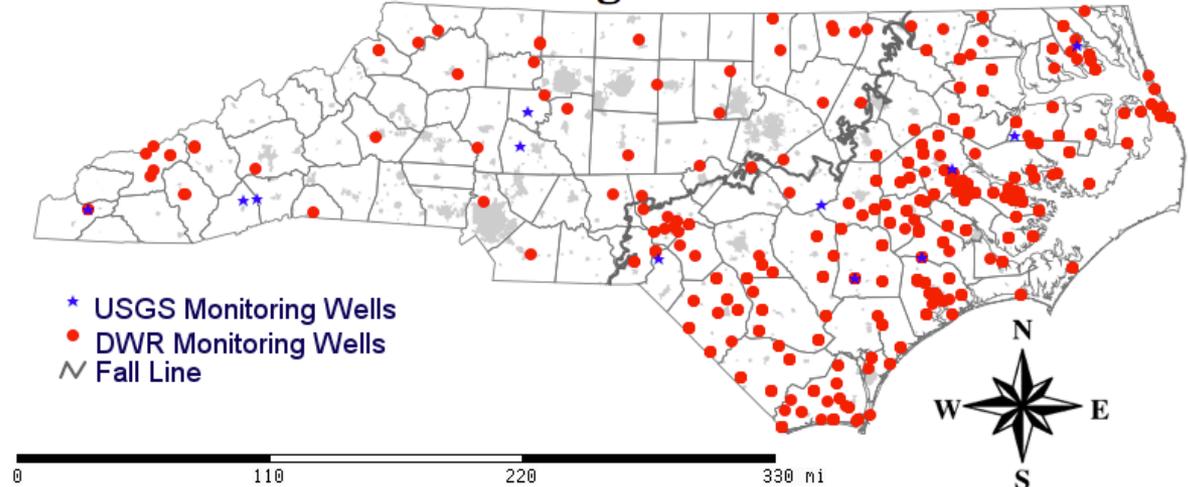
Data Provider Update – North Carolina



Overview of Monitoring Network

- 650 wells at 224 sites
- North Carolina has crystalline basement rock at depth with overlying sedimentary units in the coastal plain which thicken from a feather edge at the fall line to over 10,000 feet under Cape Hatteras
- Coastal plain well stations typically have wells tapping each of the major aquifers (up to 10 wells at a site)
- West of the fall line well stations are usually one well in the basement rock or in the surficial aquifer

North Carolina Division of Water Resources Monitoring Well Network



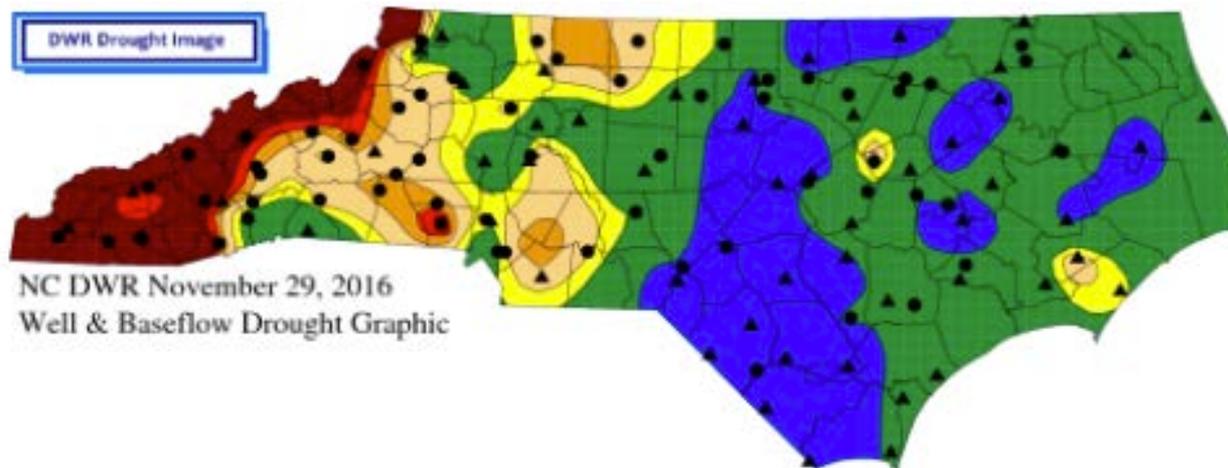
Network Goals

- Map the aquifers
 - Freshwater-saltwater interface
 - Aquifer extent
 - Hydraulic properties
- Track drought conditions
- Monitor overuse areas
- Gather background ground water quality data



How We Use Network Data

- The data is available on-line through a series of web pages which allow review of well construction, time-series plots of water levels, downloading of water levels, links to other types of data (e.g. geophysical logs or hydrogeological framework)
- All data is also available through a map interface which is a more natural way to access and juxtapose several layers of geographic data
- Combine water levels and estimated baseflows to help us illustrate drought – a picture of natural storage conditions
- Capacity use area permit application reviews



D4	D3	D2	D1	D0
Exceptional	Extreme	Severe	Moderate	Abnormally Dry
< 2	2 - 5	5 - 10	10 - 20	20 - 30

Normal	Wet
30 - 70	> 70



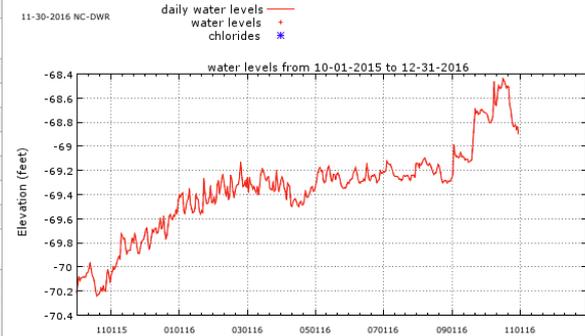
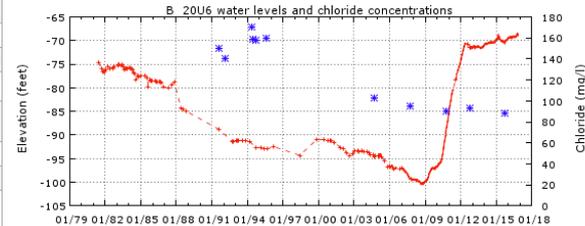
Trans-Boundary Issues

- Heavy ground water withdrawals in both Virginia and South Carolina affect water levels in NC aquifers
- The Central Coastal Plain Capacity Use Area (15 counties) regulate ground water withdrawals and require phased reductions in use

Field	Data
County	Hertford
Quad	B 20U6
Name	Como
Latitude	36.507222
Longitude	-77.005833
Location Accuracy	GPS
Netname (link to USGS data)	NC-155
USGS ID	363026077001906
Aquifer	Lower Cape Fear
Land Surface NED elevation = 71.02 feet	67.98
Date Constructed	06/09/1981
Measuring Point (feet above land surface)	2.93
Depth	575.00
Diameter	4.00
Yield	15.00
Exists?	y
Recorder Box?	y
Top of Screen	560.00
Bottom of Screen	570.00
Water Temperature (degrees F)	61.6
Number of Water Levels (date * feet below land surface * elevation)	3.715 ** 999.99 feet below land surface value indicates dry well
06/09/1981 to 10/31/2016	-222.22 feet above land surface value indicates a flowing well
Number of Chlorides (date * chlorppm * spcond_uS/cm * salin_ppt * pH * comments)	12
06/09/1981 to 09/14/2015	** -1 values equal no data ** a negative number other than -1 equals below detection limit of abs(number)

DWR Monitoring Database Detail for B 20U6

[Show Map](#) -- [Monthly Statistics Plot](#) -- [Site Map](#) -- [Station Levels](#)



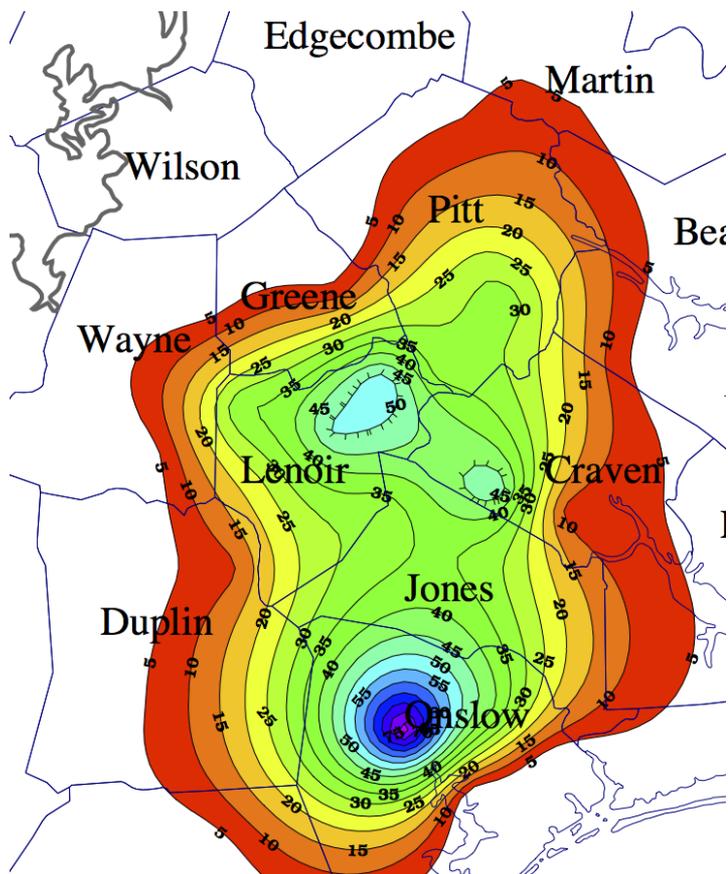
slope: +1.04 feet/year over this date range

Start Date: End Date:

Hover over or click start and end date fields to change date range.



Using Data to Help Manage



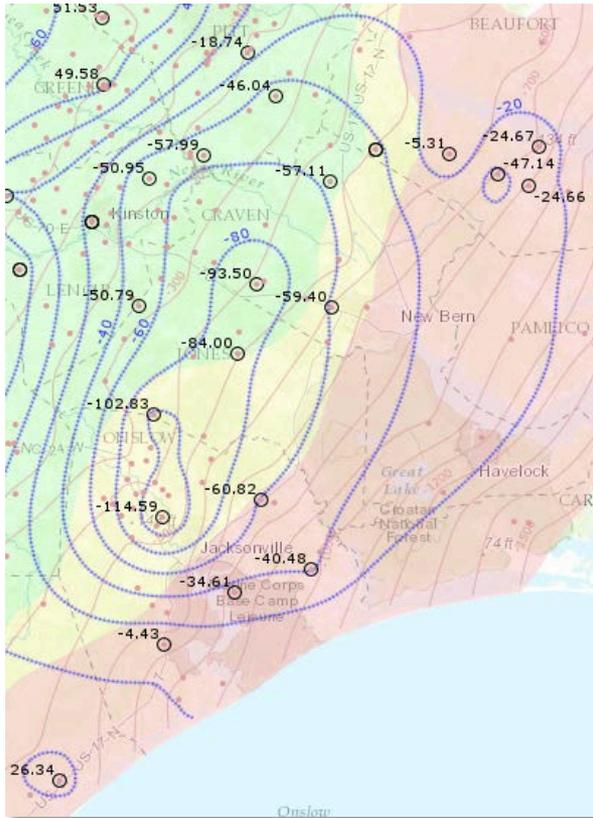
- Central Coastal Plain Capacity Use Area (CCPCUA)
- Black Creek Aquifer is part of the Northern Atlantic Coastal Plain aquifer system and is a principal aquifer in this management area
- Current potentiometric surface map of ground water levels is subtracted from historical surface to show water level recovery
- Since November 2007 there has been up to 80 feet of recovery as water providers have added alternative water sources to their systems and reduced their reliance on the Black Creek aquifer
- How effective have the CCPCUA rules been to improve the sustainability of the Black Creek aquifer?

History of Participation

- Participation began in 2009 with 31 wells
- NC DEQ added 85 wells in 2016
- Applied for, but did not receive, additional funding to support data collection

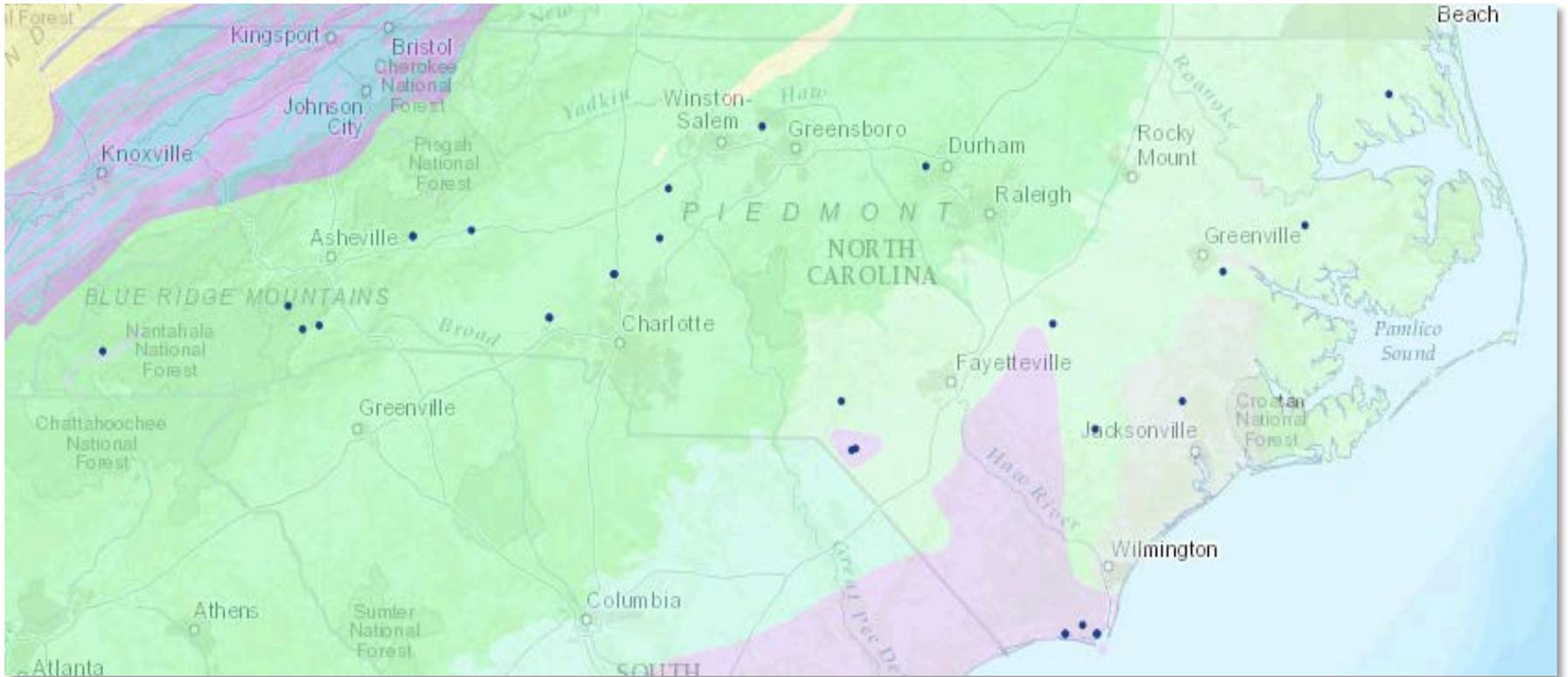


Site Selection and Classification Process

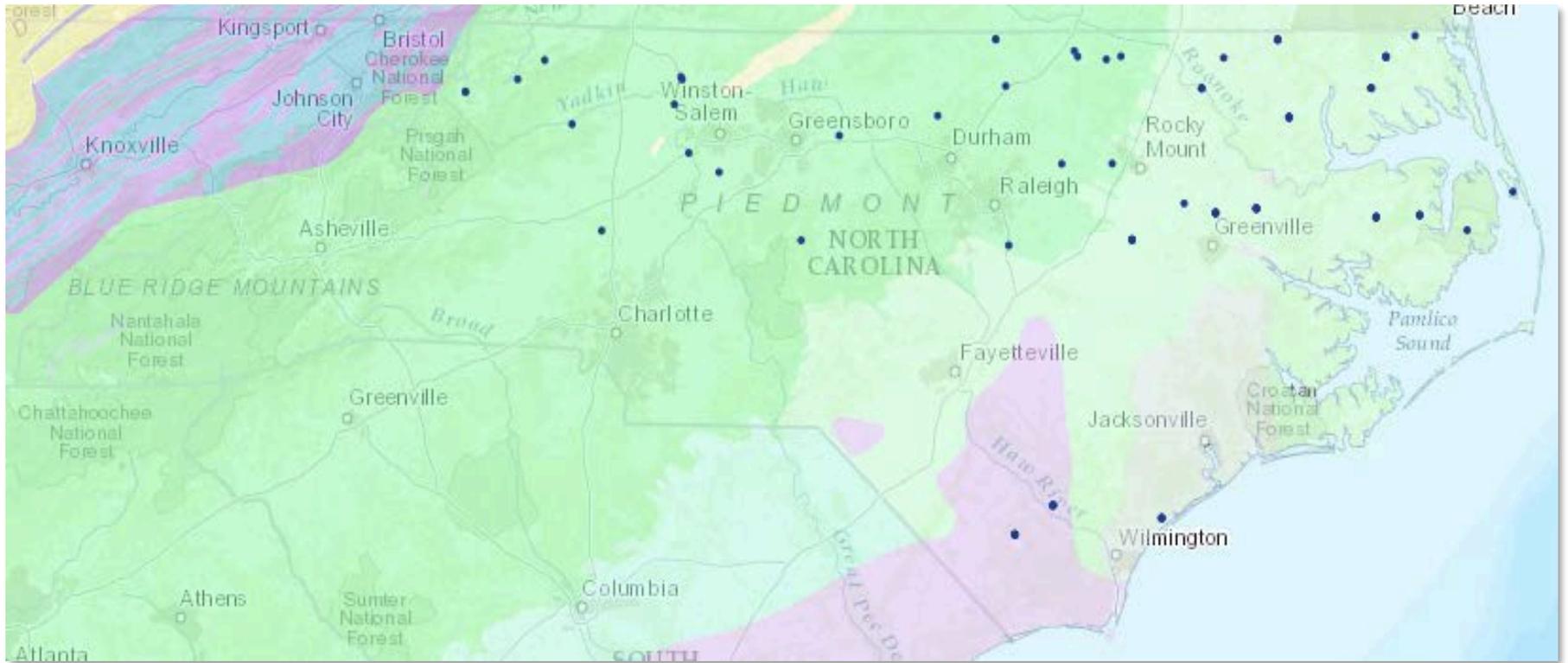


- Minimum of one well per county (100 counties in NC)
- Coastal Plain wells: monitor surficial and major confined aquifers (3 or more zones)
- Piedmont and Mountains: monitor surficial and regolith-bedrock aquifers (2 zones)
- Each well must have dedicated data recorder (Onset Computer HOBOS)
- Minimum 5 years of consistent quarterly monitoring data
- Either background conditions or suspected/documentated changes acceptable, provided other criteria were met

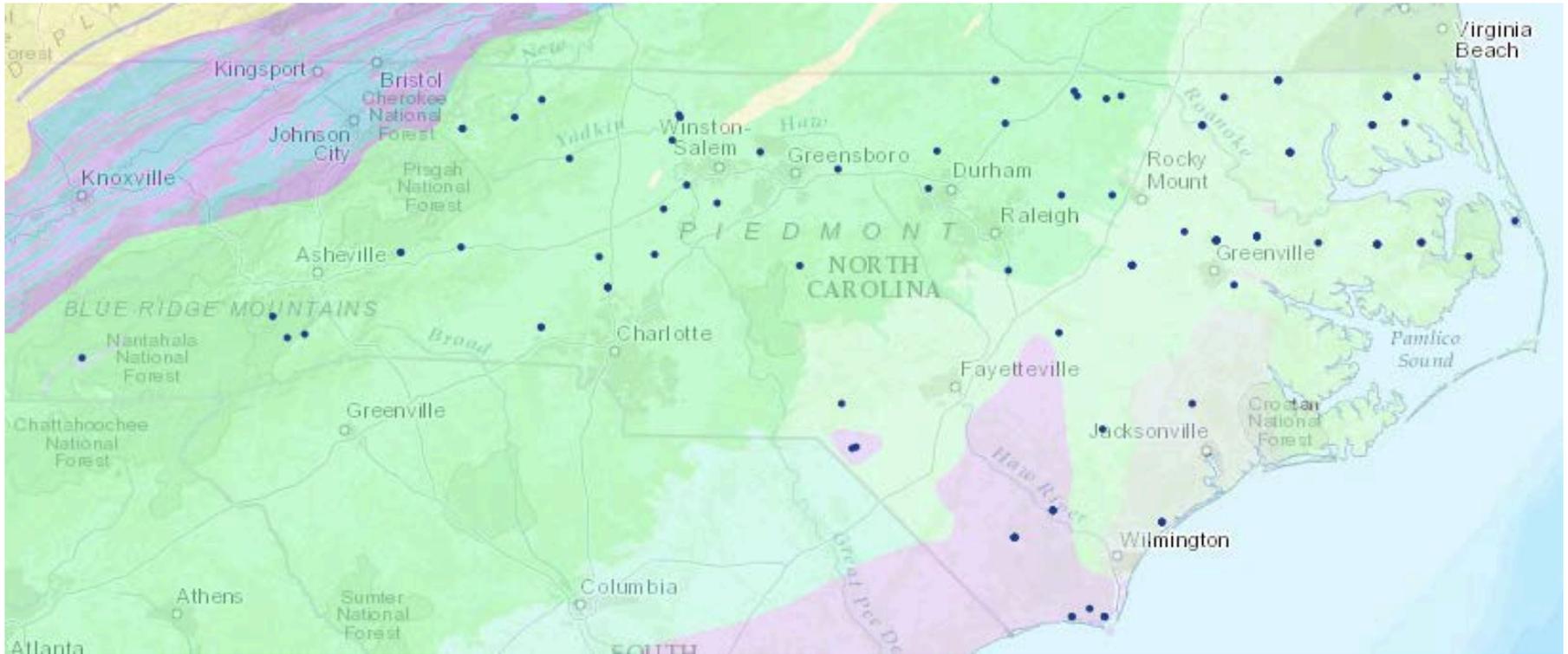
31 Original Wells (USGS, 2009-2010)



85 New Wells (NC DEQ, 2016)



116 Wells to Date

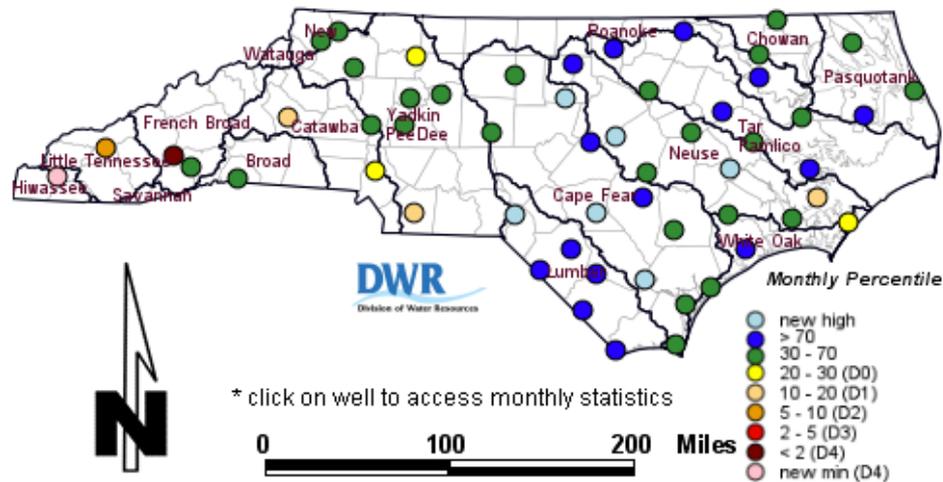


Differences in NC and NGWMN Data Collection

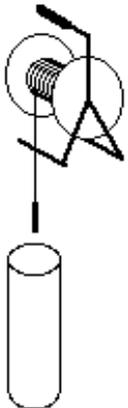
- NC exceeds quarterly monitoring expectation
- Continuous hourly monitoring on most wells
- Remote cell phone telemetry on 16 wells for drought monitoring



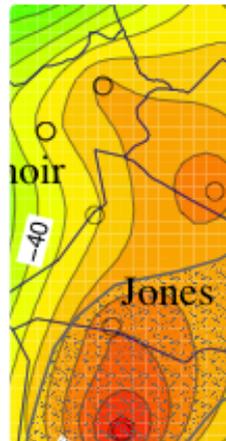
Other Available Data – www.ncwater.org



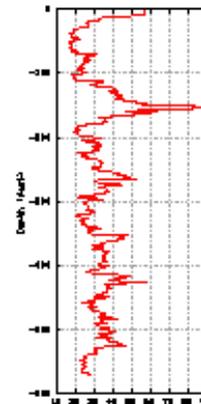
Ground Water Levels



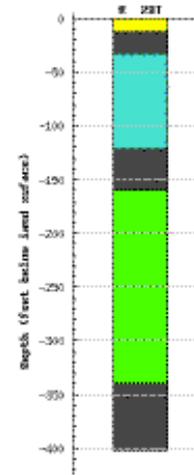
Potentiometric Surface Maps



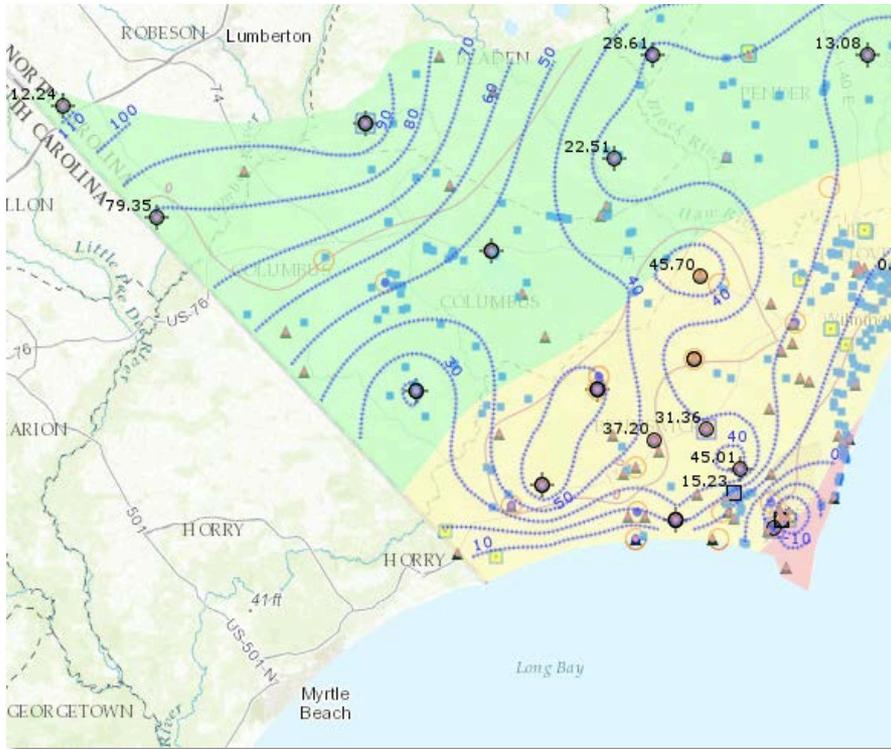
Geophysical Logs



Hydrogeology



Current NGWMN Projects to Enhance Network



With additional federal funding, we can enhance current operations including:

- new well installation
- rehabilitation of existing wells
- adding more wells to NGWMN registry

Contact Information

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www.ncwater.org/?page=357

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