

"Drought Impacts and Vulnerability in South Carolina"

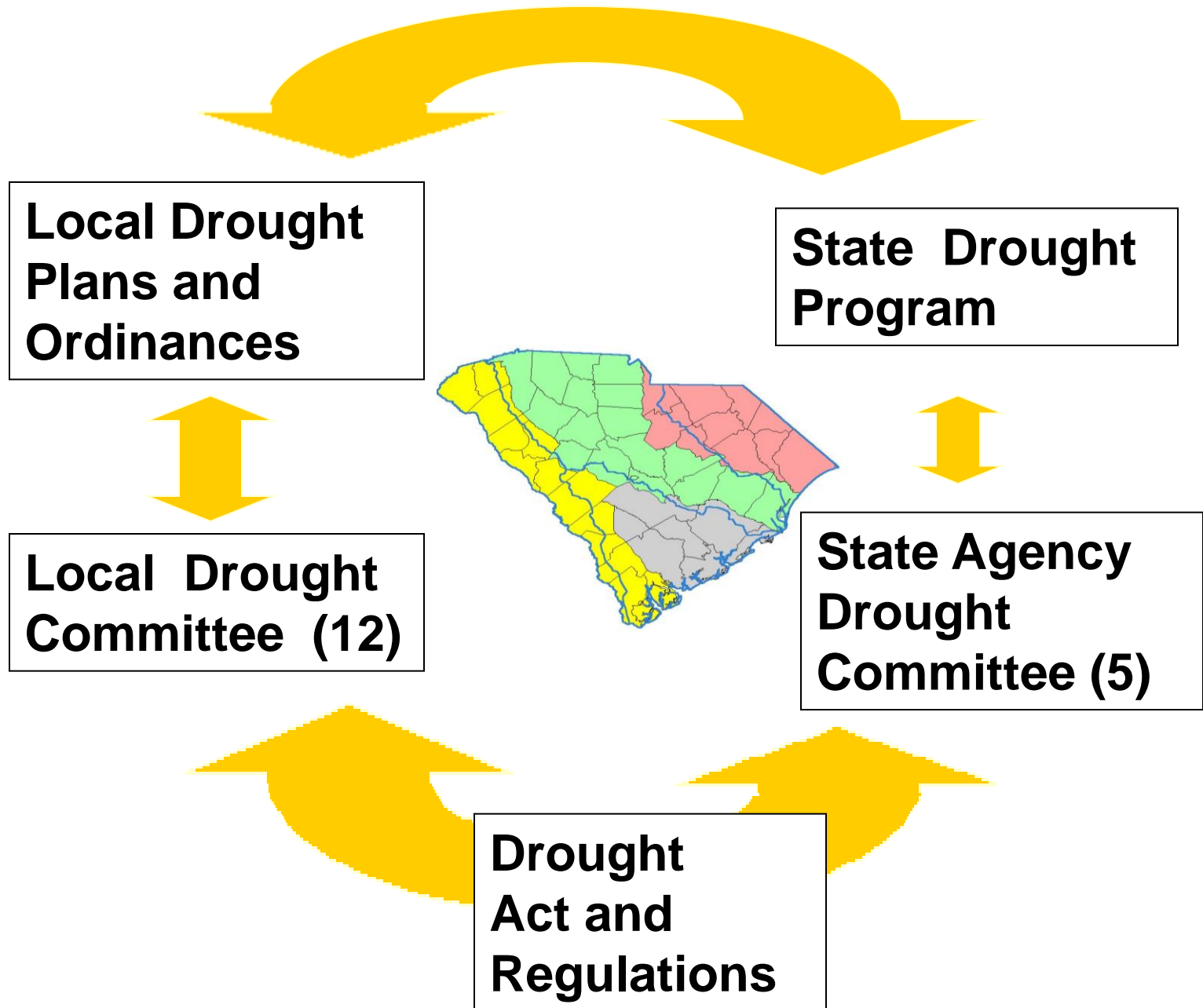
Hope Mizzell

State Climatologist

SC Department of Natural Resources



South Carolina's Hydro-Logical Cycle



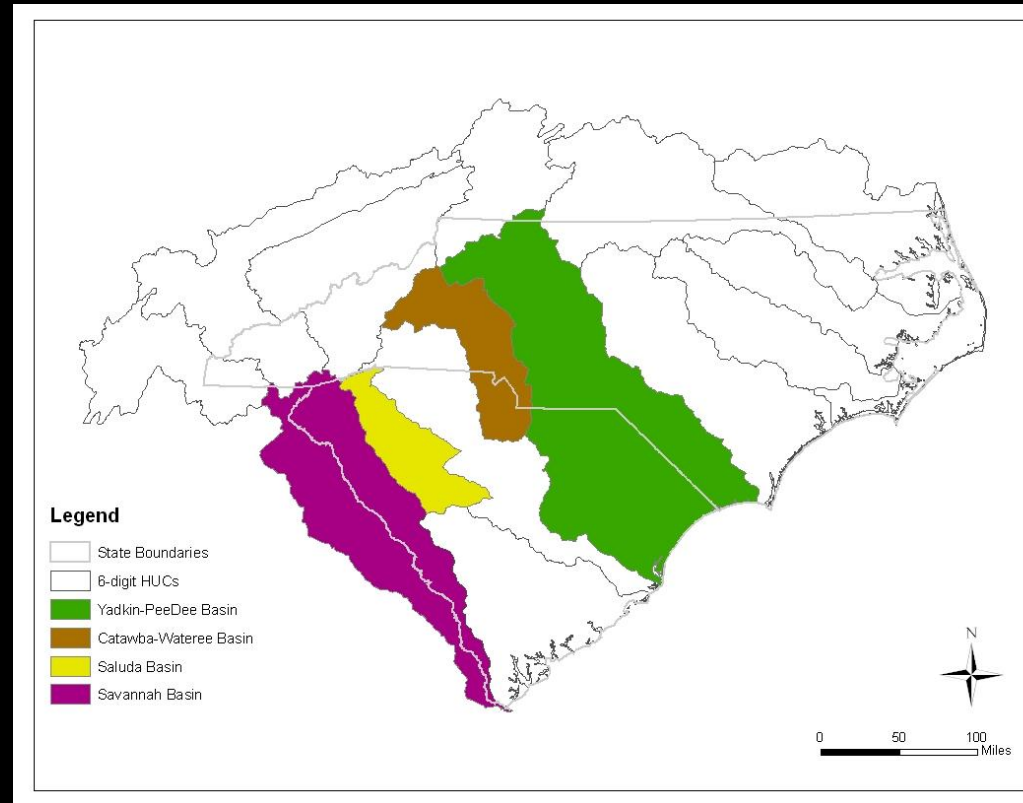
South Carolina Water Issues

3 States Sharing the Resource

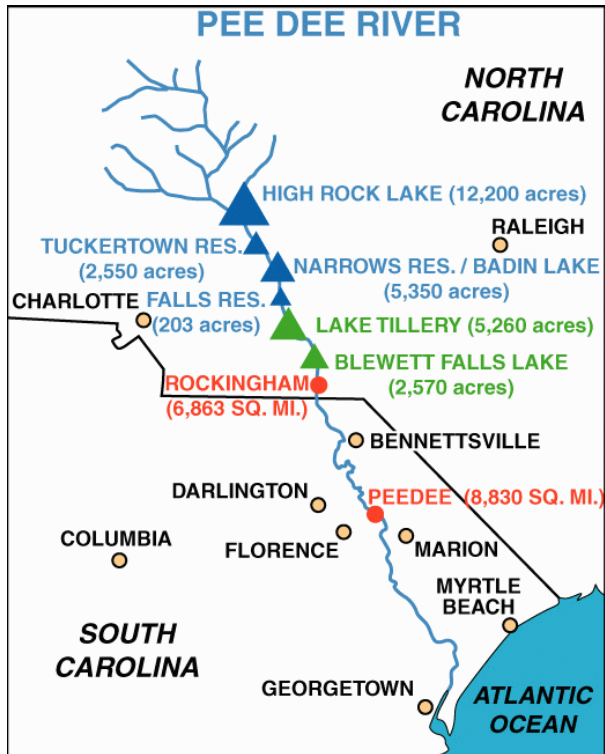
U.S. Army Corps of Engineers (Savannah)

FERC Hydropower Relicensing

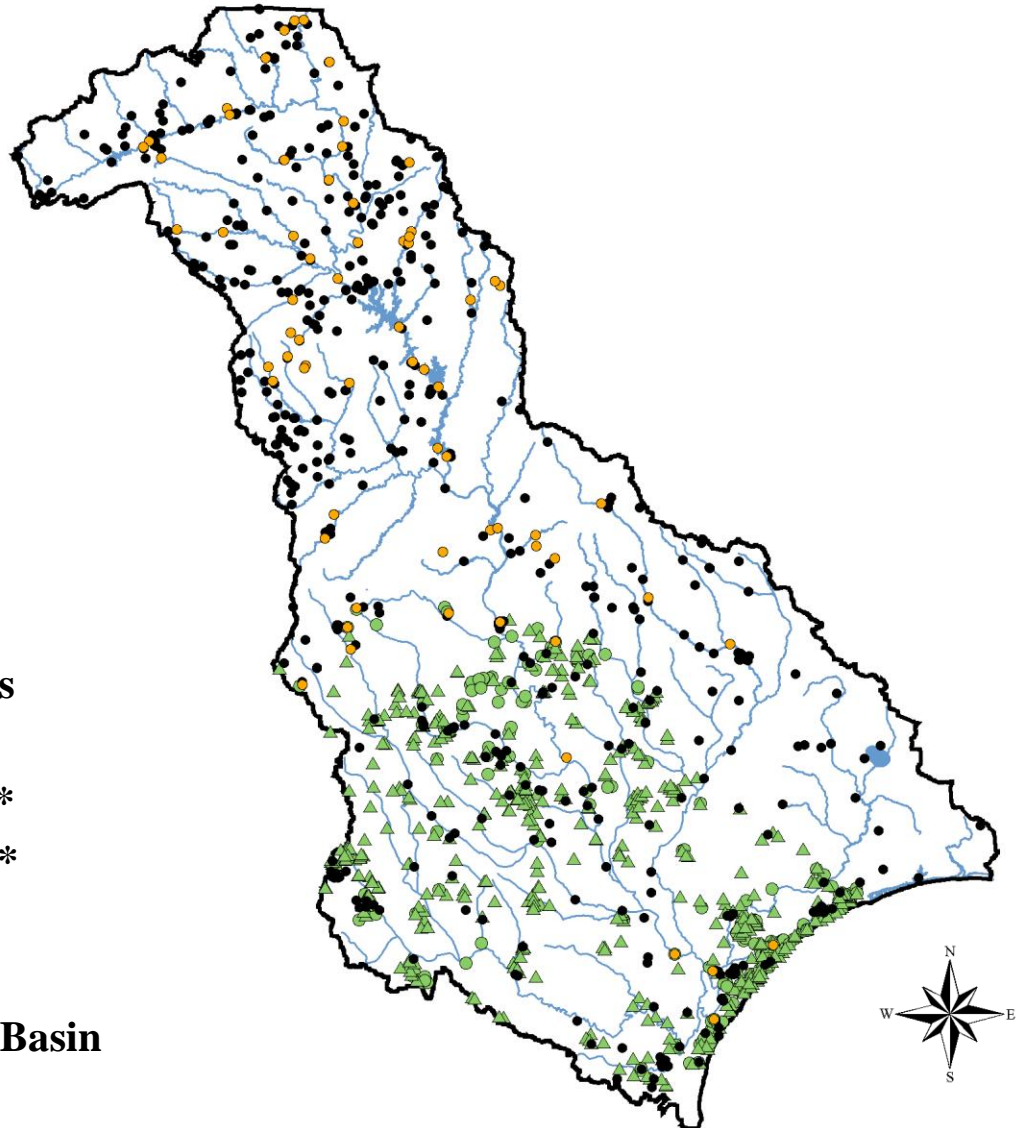
- Alcoa and Progress Energy (Yadkin-Pee Dee)
- Duke Energy (Catawba- Wateree)
- SCE&G (Saluda)



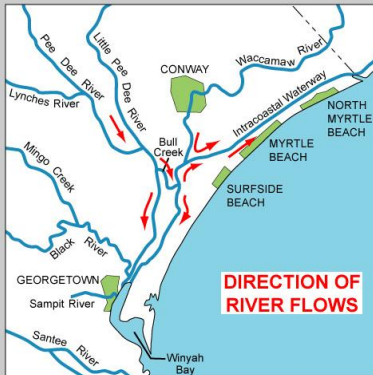
Yadkin-Pee Dee Basin



- Surface Water Intakes
- Dischargers
- Surface Water Users *
- ▲ Ground Water Users *
- Streams
- Lakes
- ▭ Yadkin-Pee Dee River Basin



Yadkin-Pee Dee Basin



RELEASE (CFS)	STORAGE DEPLETION TIME	JULY						
		1	2	3	4	5	6	
1500	93 DAYS	7	8	9	10	11	12	13
1200	107 DAYS	14	15	16	17	18	19	20
900	133 DAYS	21	22	23	24	25	26	27
		28	29	30	31			
AUGUST		1	2	3	SEPTEMBER			
		4	5	6	7	8	9	10
		11	12	13	14	15	16	17
		18	19	20	21	22	23	24
		25	26	27	28	29	30	31
OCTOBER		1	2	3	4	5	NOVEMBER	
		6	7	8	9	10	11	12
		13	14	15	16	17	18	19
		20	21	22	23	24	25	26
		27	28	29	30	31		
							1	2
							3	4
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							19	20
							21	22
							23	24
							25	26
							27	28
							29	30

Emergency Agreement



Economic Impact of Reduced Pee Dee River Water Flow on the Pee Dee Region of SC

**Jeffrey Pompe, Francis Marion University
Prepared for Pee Dee Coalition**

46,264 manufacturing jobs in 9 Pee Dee counties

Leading tourist destination

(Grand Strand)

**Myrtle Beach and Georgetown
impacted by saltwater intrusion**



Summer 2002 Impacts

Manufacturing firms and utilities

\$4.9 million in capital costs

\$629,000 in monthly costs



Economic Impact of Reduced Pee Dee River Water Flow on the Pee Dee Region of SC

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Future Impacts

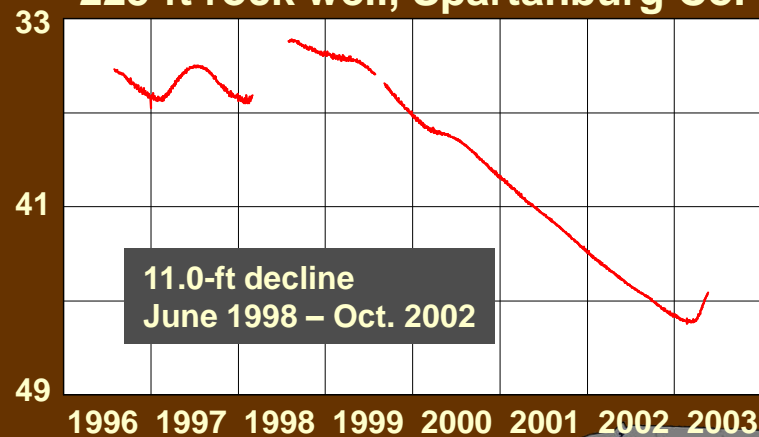
Manufactures and public water suppliers

- \$103.7 million in one time costs**
- \$372,000 in monthly costs**
- Public water suppliers decrease production by 25% and lose \$425,000 in revues per month**

Tourism

Adverse publicity on reduced water supply discourages tourists similar to bad publicity created by hurricanes

225-ft rock well, Spartanburg Co.

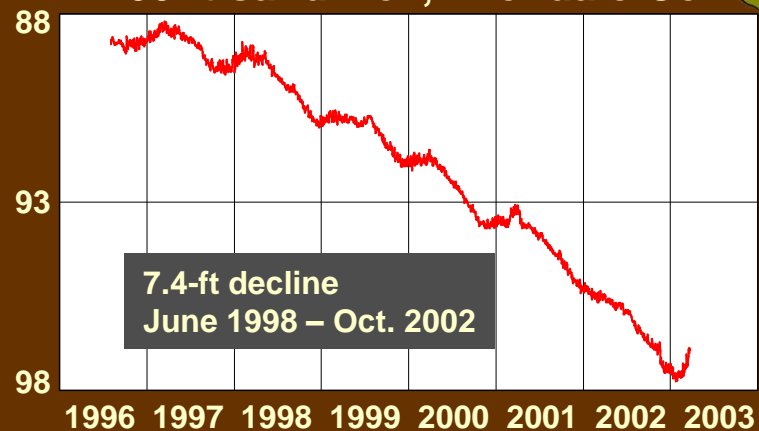


115-ft sand well, Marlboro Co.



Groundwater conditions in the State during the drought

1400-ft sand well, Allendale Co.



190-ft limestone well, Hampton Co.



Record Drought 1998-2002

Drought Impacts on Drinking Water/Fire Protection



- 1000+ Dry Wells – no financial assistance available
- 30 Water Systems with mandatory restrictions
- Reduced water availability for fire protection

Drought Impacts on Agriculture



- 5 consecutive years declared agricultural disaster
- Herd reductions for cattle

SC Drought Impacts on Forestry



Root Rot in pines:	\$	1,900,000
Southern Pine Beetle:	\$	264,867,725
Forest Growth:	\$	1,000,000,000
Seedling Survival:	\$	7,200,000
Nursery		
Irrigation	\$	47,208
Seedling Loss	\$	41,000
Increased Culls	\$	57,310
Reduction in Sales	\$	2,690,000
Fire Protection:		
Detection	\$	500,000
Timber Damage	\$	5,000,000
Property Damage	\$	4,000,000
Fire Dept	\$	25,230,000

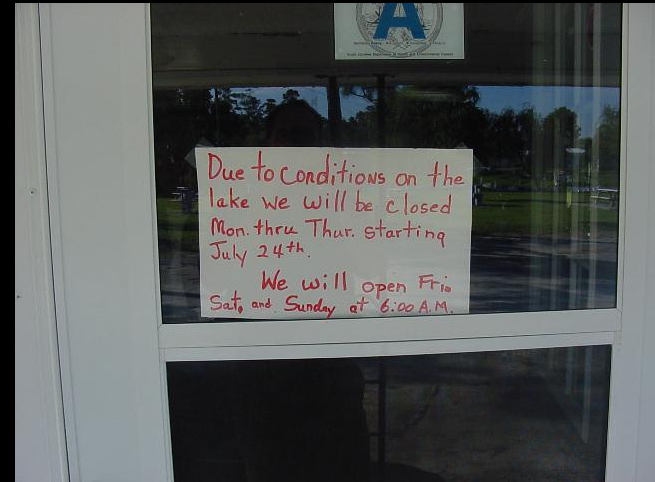
Total Forestry Drought Economic Impact to date: \$1,311,533,243

*Does not include impact on paper mills operating in SC and Forest Industry seedling nurseries (SC Forestry Commission)



Drought Impacts on Tourism

- Closed businesses /Reduced staff
- Ripple effect through economy
- Not recognized by SBA
- Increased aquatic weeds \$300,000/lake to control



Drought Impacts on Industry and Power Generation

- \$7.5 million for 13 Non-utility Hydropower plants
- \$500,000 / Industry



Regional Drought Monitor for the Carolinas



USC-
CISA



Dynamic Drought Index for Basins in NC and SC - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Links »

DYNAMIC DROUGHT INDEX FOR BASINS IN NORTH AND SOUTH CAROLINA

| HOME | START | DROUGHT INDEX | HELP | CONTACT US |

Start: Display Type and Weights

Select display type: ☒ Map ☐ Graph ☐ Table

For raw values of single drought index, select "Raw value" and one of enter weights (%) for each drought index (must sum to 100). (NOTE: For percentile blend, 100% weekly streamflow percentile, raw 1-month SPI, a

Palmer Drought Severity Index (PDSI)
Palmer Hydrological Drought Index (PHDI)
Palmer Z Index
1-month Standardized Precipitation Index
3-month Standardized Precipitation Index
6-month Standardized Precipitation Index
9-month Standardized Precipitation Index
12-month Standardized Precipitation Index
24-month Standardized Precipitation Index
1-month Precipitation
3-month Precipitation
6-month Precipitation
12-month Precipitation
24-month Precipitation
60-month Precipitation

Dynamic Drought Index for Basins in NC and SC - Microsoft Internet Explorer

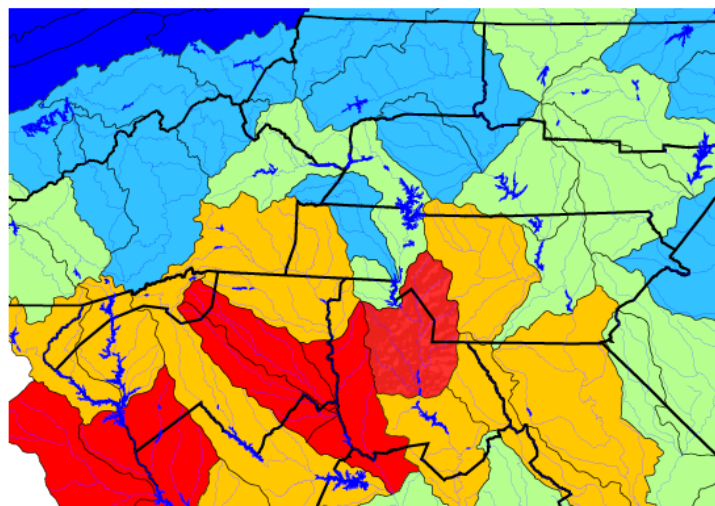
File Edit View Favorites Tools Help

Show Inputs Station List Create Graph Create Table

Blend Percentile Map for May 2004

Notice: Selected features show aggregated values

Status: Click to select or deselect feature(s)



Info

Blend index value	7.16	
Region	03	South Atlantic-Gulf Region
Subregion	0305	Edisto-Santee
Accounting unit	030501	Santee
Cataloging unit	03050103	Lower Catawba, North Carolina, South Carolina.



X: 516,686m Y: 3,894,164m

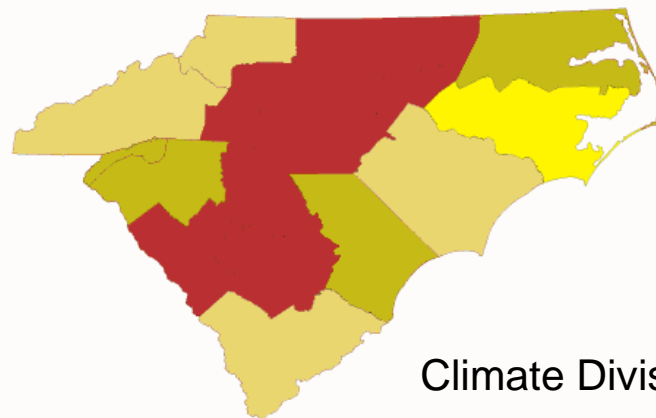
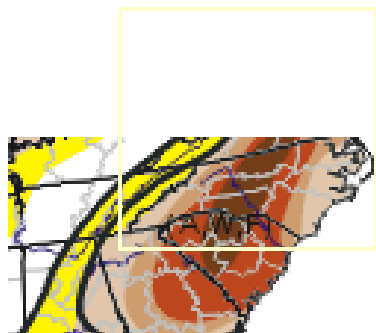
- M B S Layer
- ☐ USGS Stream Gages
 - ☐ NWS Weather Stations
 - ☐ States
 - ☐ Drought Management Areas
 - ☐ Climate Divisions
 - ☐ Counties
 - ☐ 2-Digit HUC Areas
 - ☐ 4-Digit HUC Areas
 - ☐ 6-Digit HUC Areas
 - ☐ Catawba-Watersee Basin
 - ☐ 8-Digit HUC Areas
 - ☒ Hydrology
 - ☒ Shaded Relief

Legend 8-Digit HUC Areas

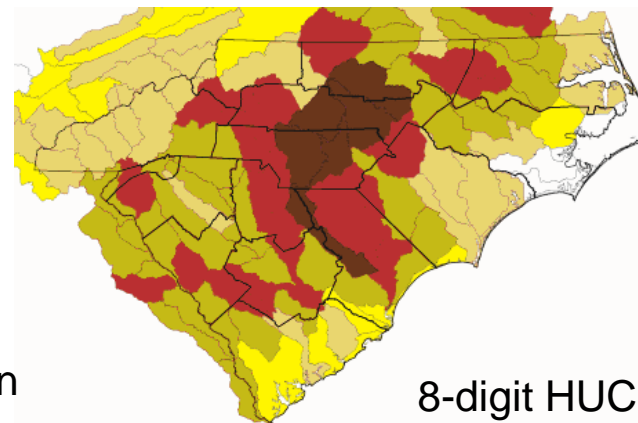
0.16 to 11.88
11.88 to 21.14
21.14 to 40.78
40.78 to 64.22
64.22 to 98.18
No Data

Comparison: spatial variability

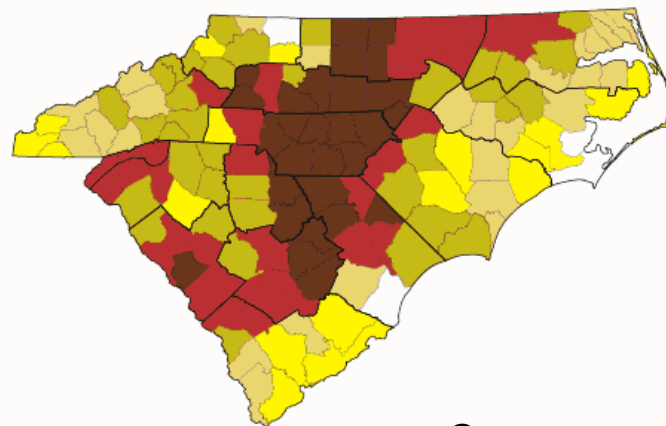
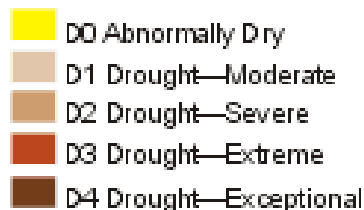
July 2002



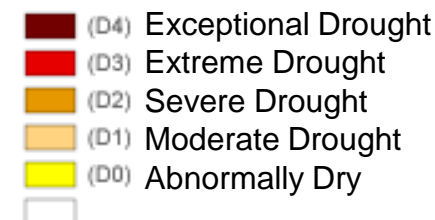
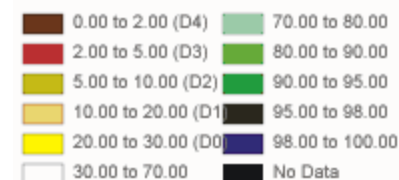
Climate Division



8-digit HUC



County



Why is NIDIS Important to SC?

- **Improve monitoring and detection**
- **Improve drought forecasting and prediction**
- **Increase research in collaboration with stakeholders**
- **Decision-support tools such as Internet portal**
- **Comprehensive view of drought mitigation**
- **Assist states and local water users as they revise and develop drought plans**



Thank you!

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<http://www.dnr.sc.gov/climate/sco>