

Statewide Seasonal Fire Danger Assessment – June 2023 Update

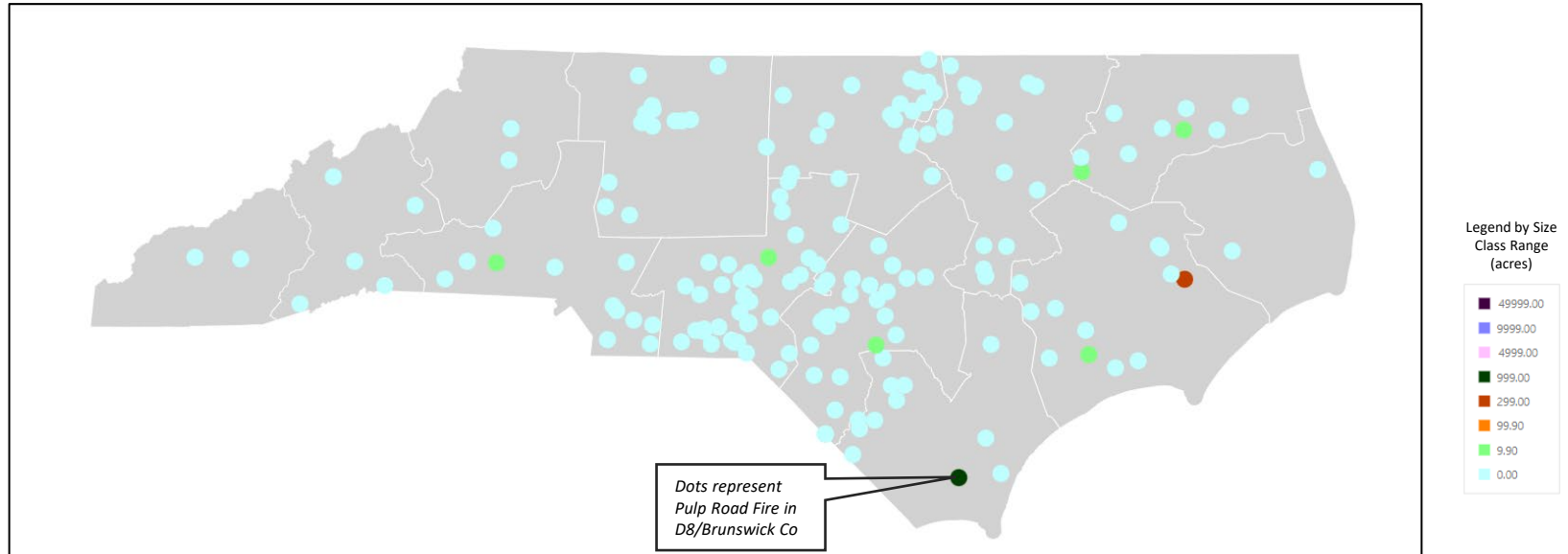
Created by: Jamie Dunbar
Fire Environment Staff Forester
NC Forest Service

Month to Date Incident Activity

fiResponse Incident Location Map (for general context)

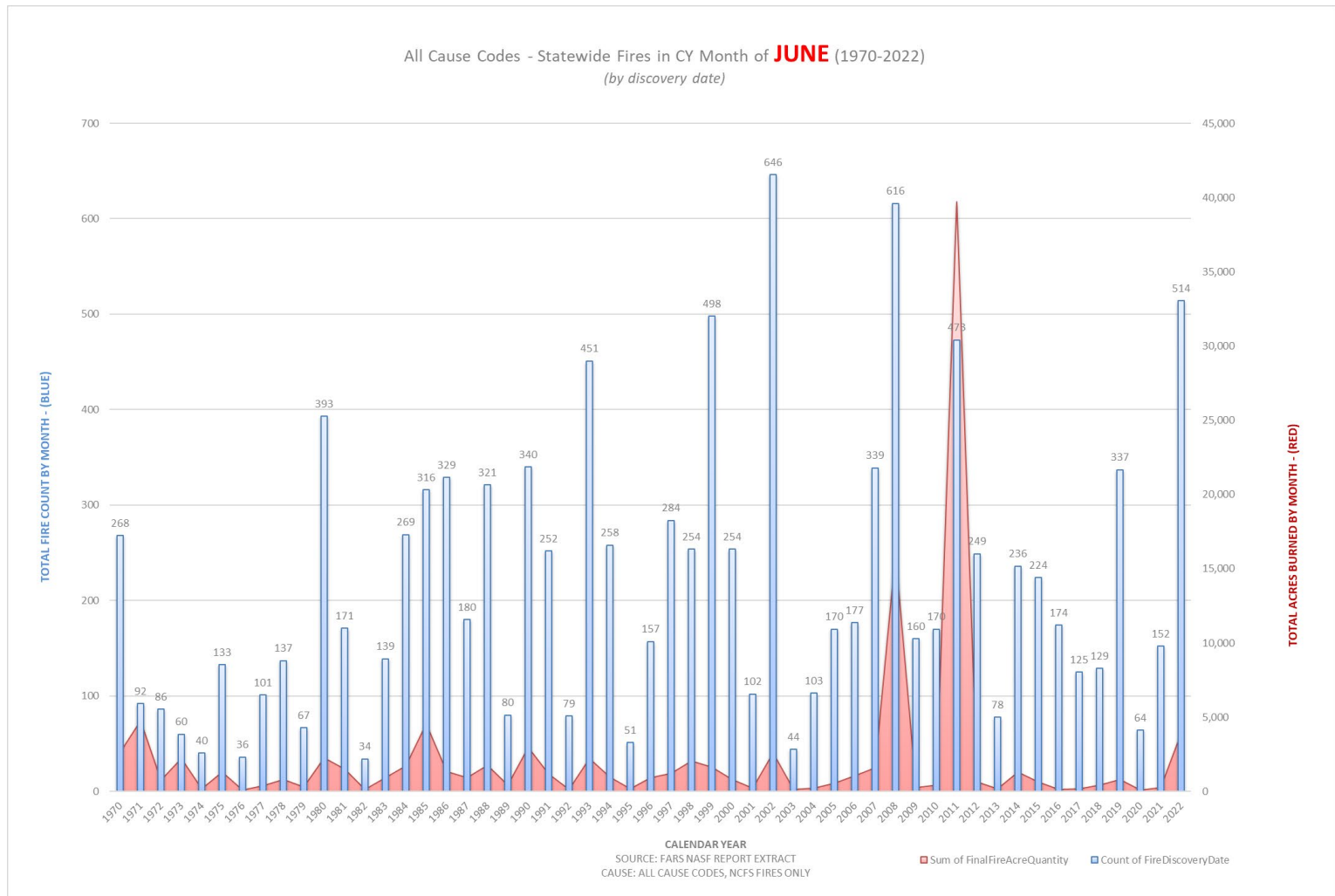
Date Range: 6/1 – 6/16, 2023

Report: Business Intelligence Module, Response Trends Map



NCFS – By Region				
Monthly <u>Fire</u> Activity (Does Not Include Federal Ownerships)				
Data Source:	Signal 14 Regional Activity Summary Report (Signal 14 is a snapshot in time)			
Date Range:	6/1 – 6/14, 2023			
Area	Wildfire Count	Wildfire Acres	RX Count	RX Acres
R1	32	115	11	2,932
R2	83	184	14	2,624
R3	12	17	0	0

Distribution of All Fires for month of JUNE from 1970 - 2022



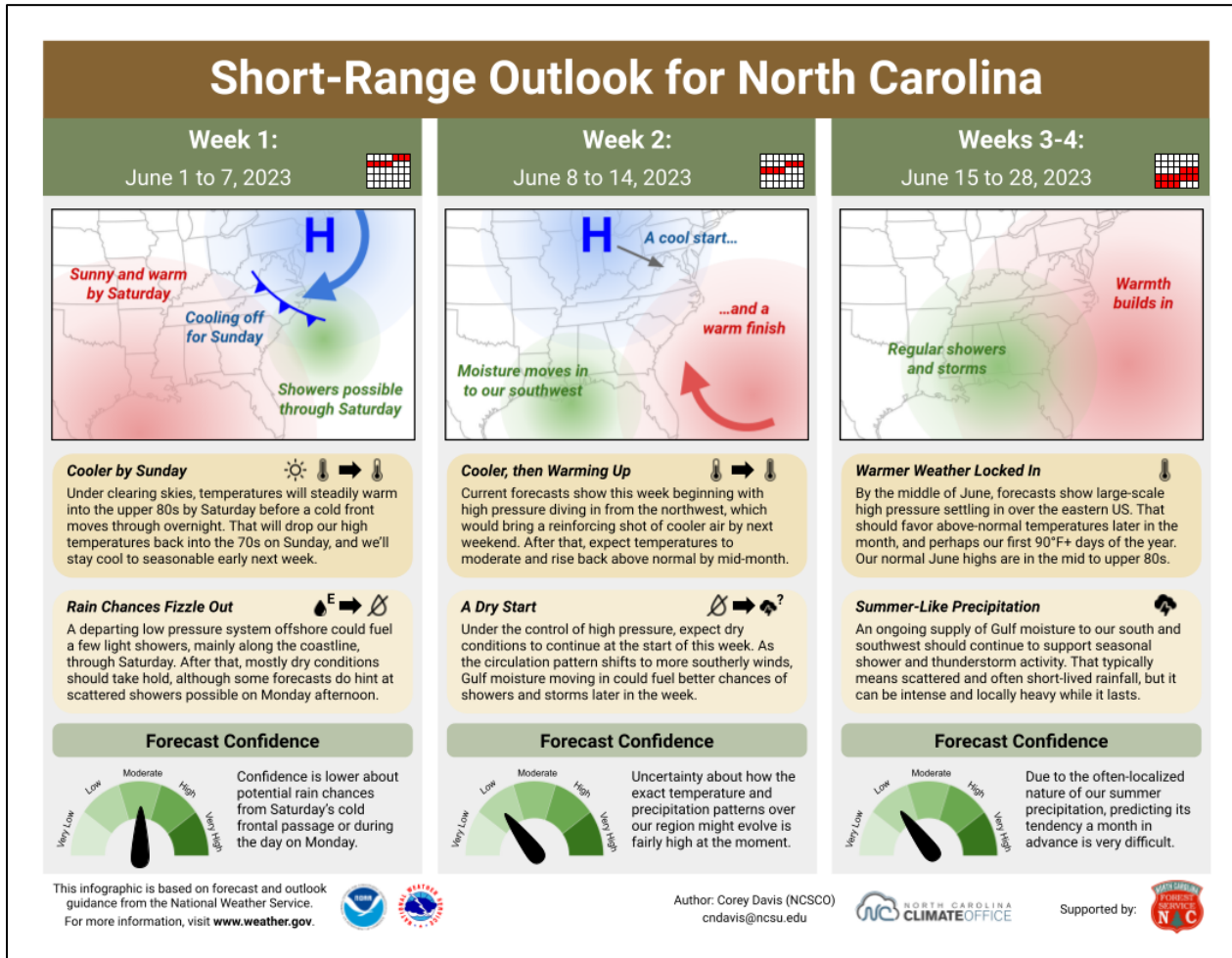
Cause: All Cause Codes, Statewide, NCF5 Reported Fires Only

Fire Environment Slides

Summary on Last Slide

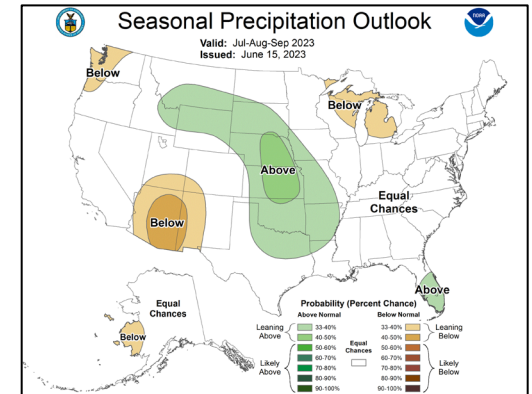
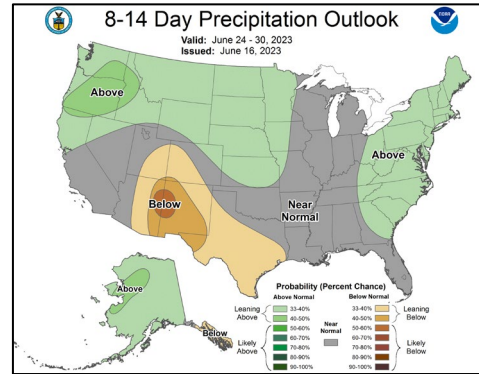
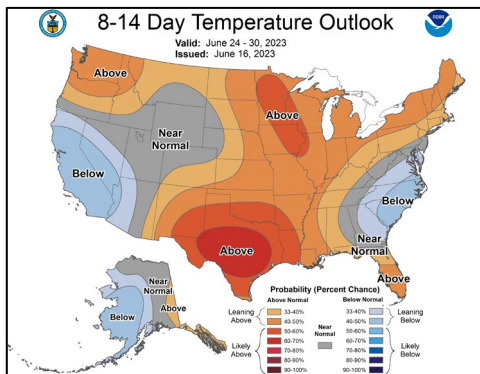
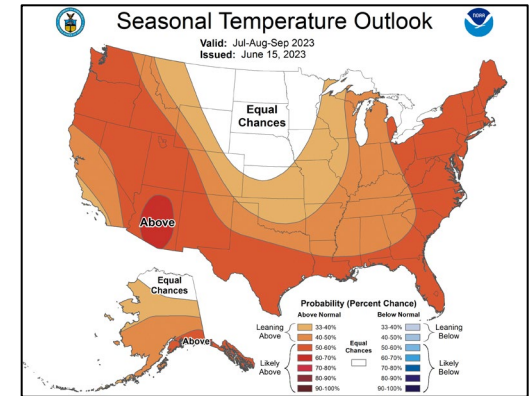
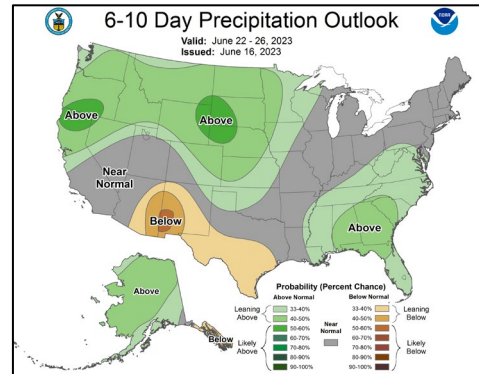
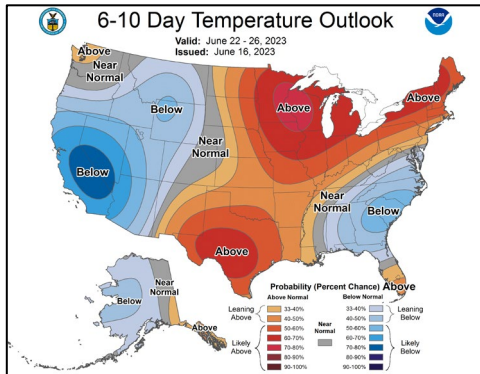
State Climate Office: Short-Range Monthly Outlook for NC

Released 6/1/23 & Location: <https://climate.ncsu.edu/fire/outlooks/>

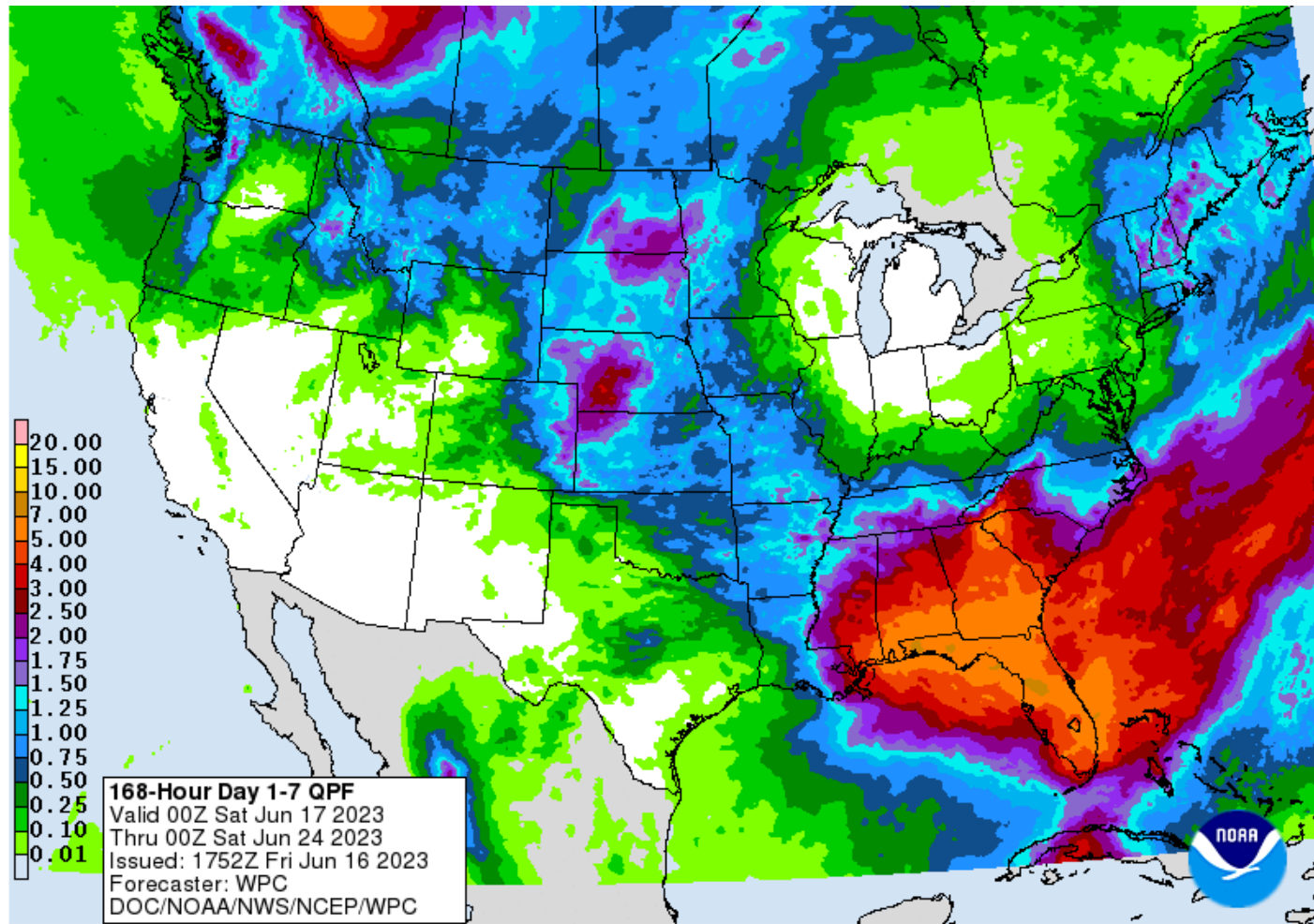


Temp & Precip Outlook

6-10 Day, 8-14 Day & Seasonal (July/Aug/Sept)



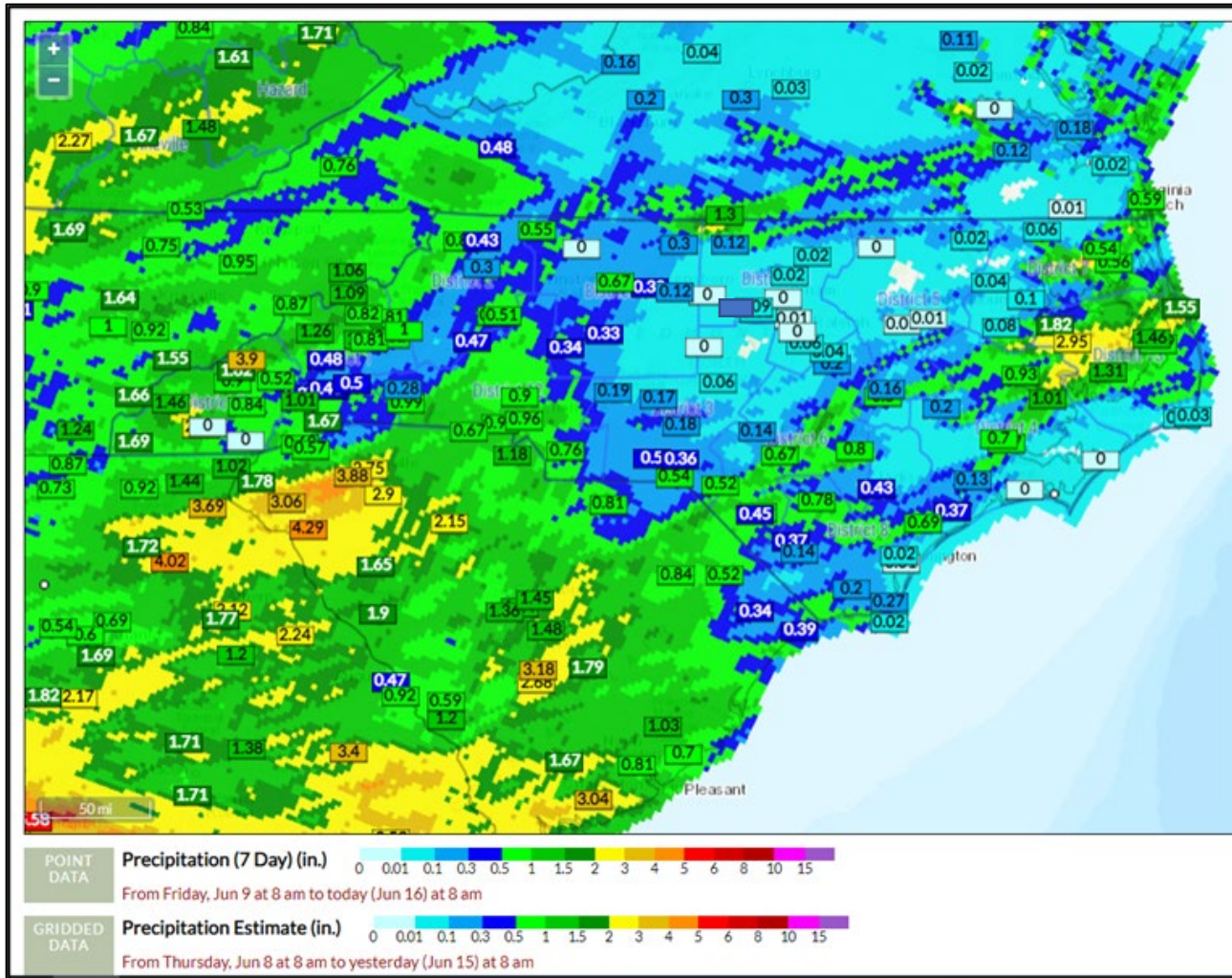
Quantitative Precipitation Forecast, 7-Day



(Potential for higher totals to shift south)

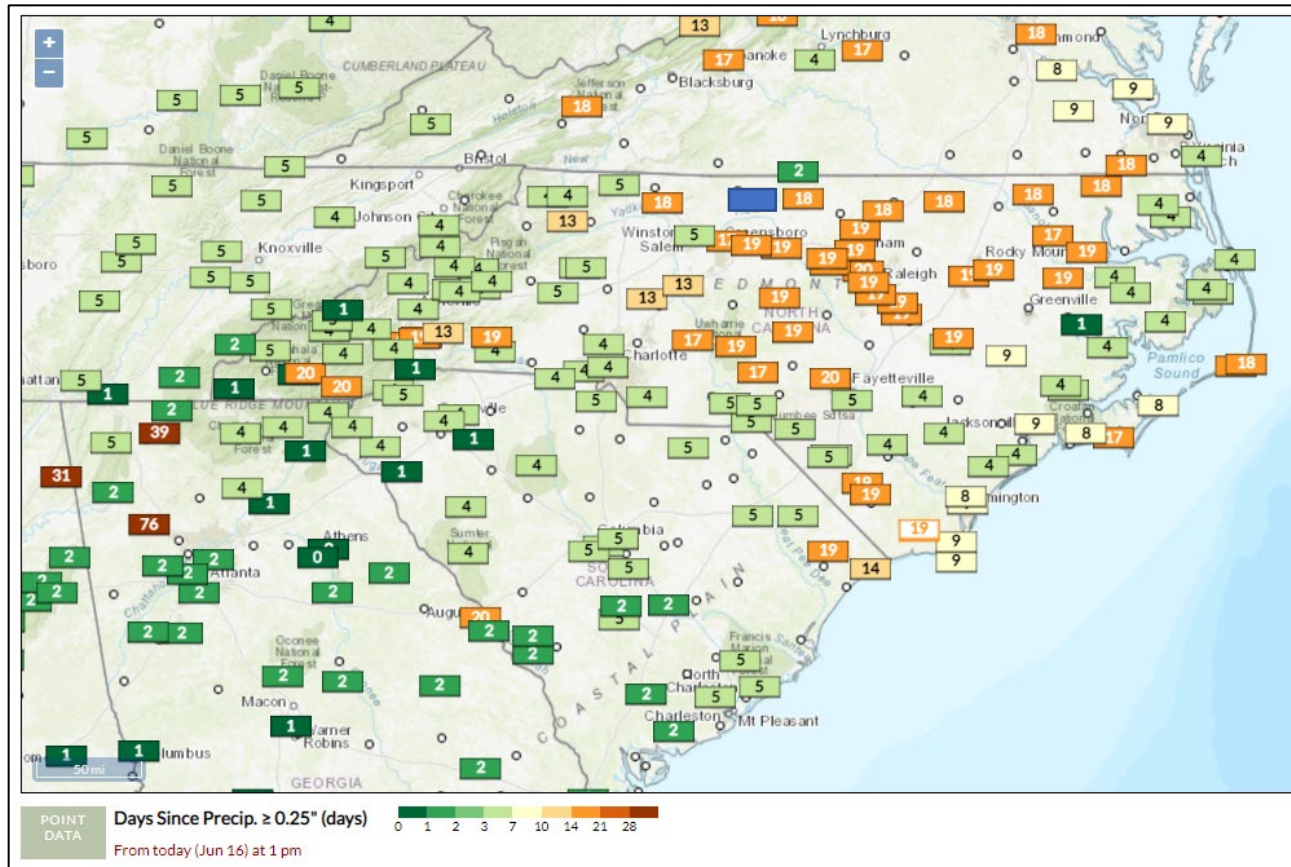
7 Day Precipitation Totals

FWIP (Point accumulation ending at 0800 on 6/16, Grid ending 0800 6/15)



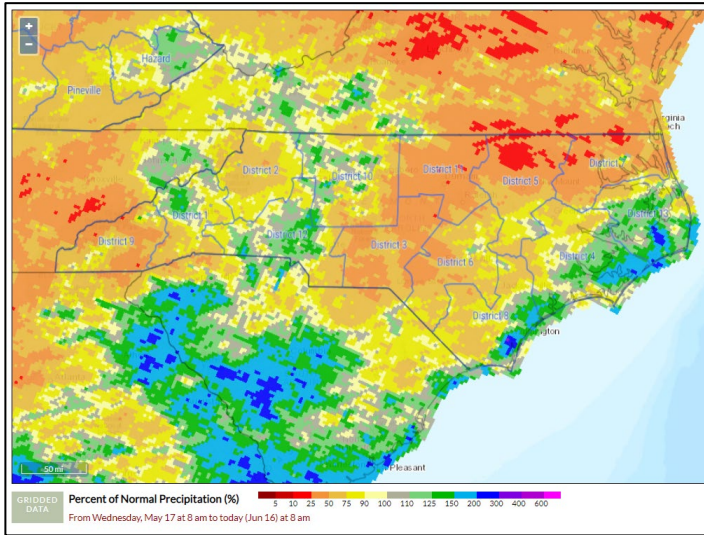
Days Since Precip $\geq 0.25''$

FWIP (Point calculation ending at 1300 on 6/16)

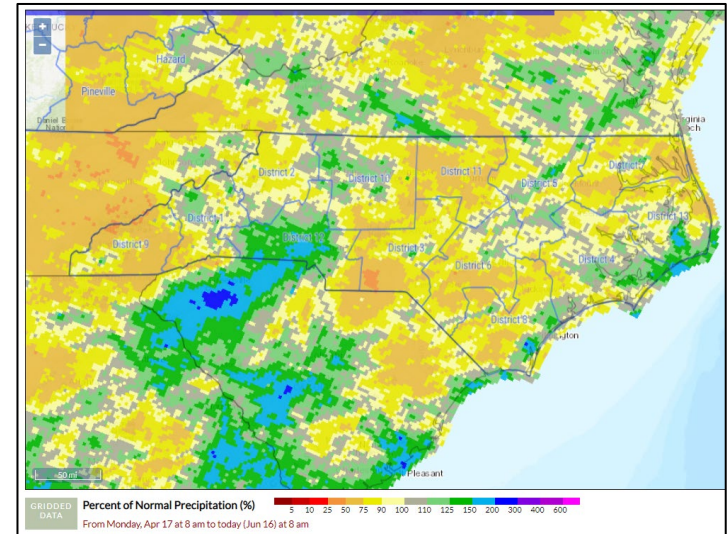


Percent of Normal Precip, FWIP (Ending 0800 6/16)

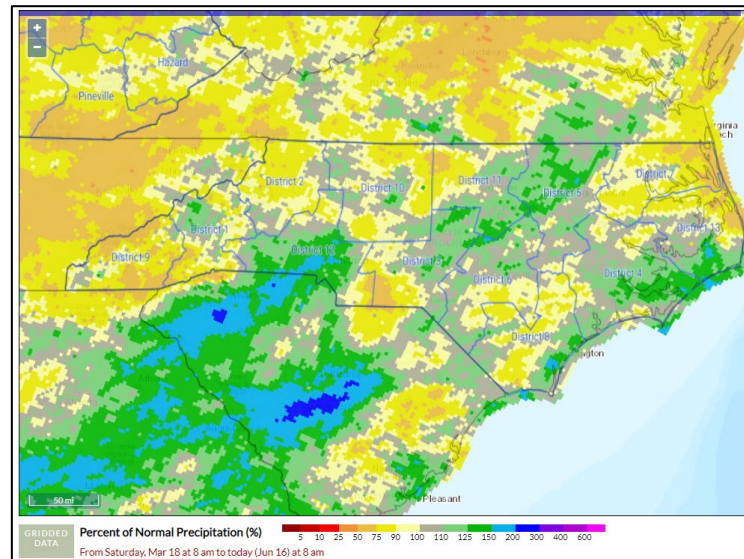
30-Day % of Normal



60-Day % of Normal

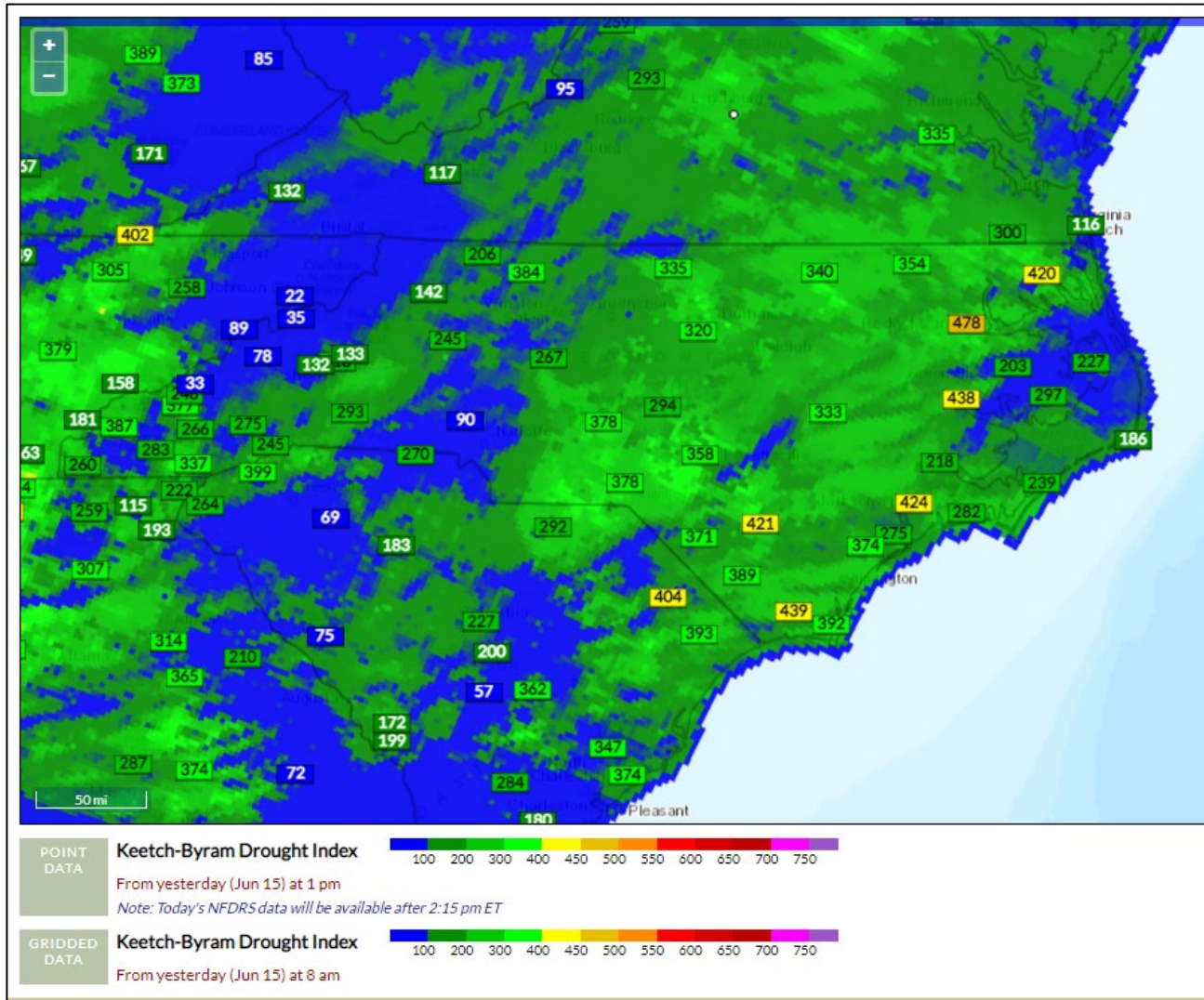


90-Day % of Normal



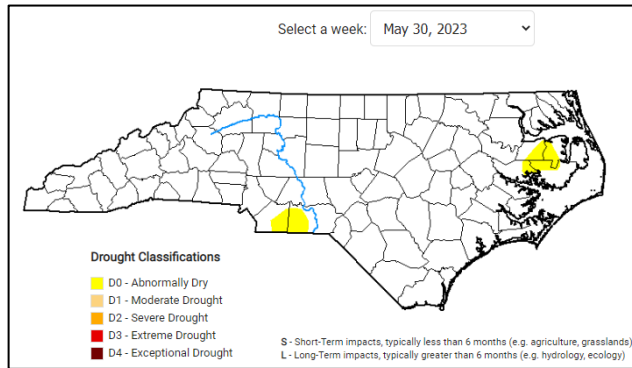
KBDI - Gridded & Station Points

FWIP (Point calculation from 1300 on 6/15, Grid ending 0800 6/15)

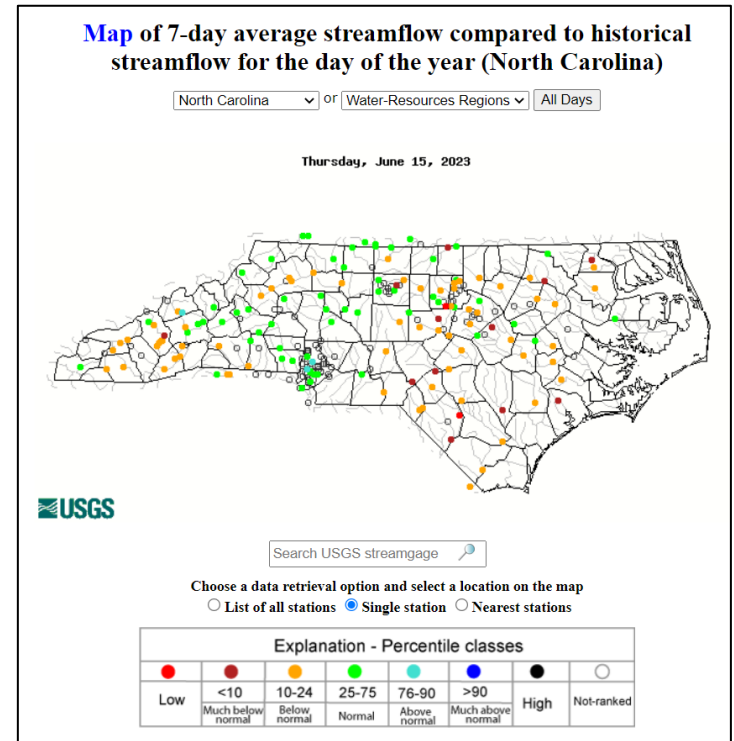
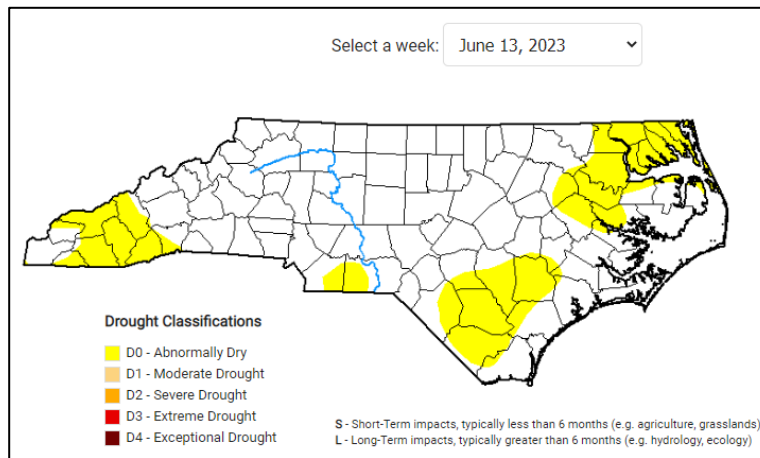


Drought Situation

Two Weeks Ago:



Current Week:

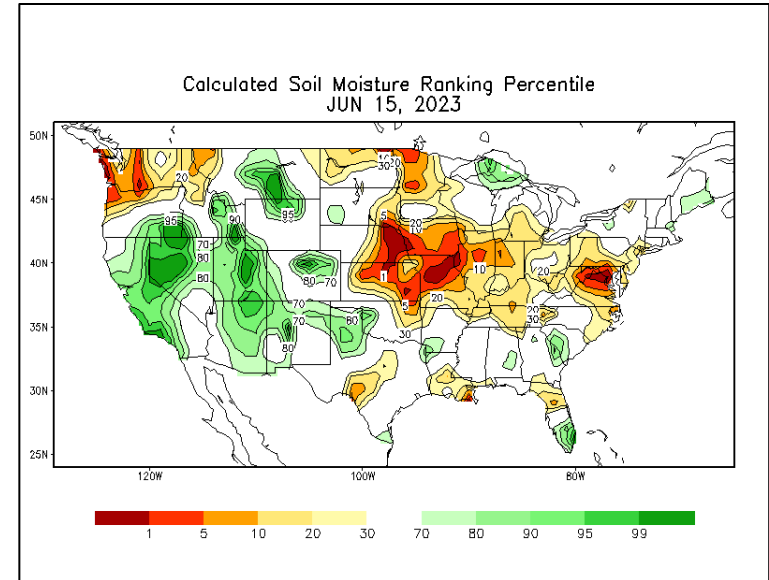
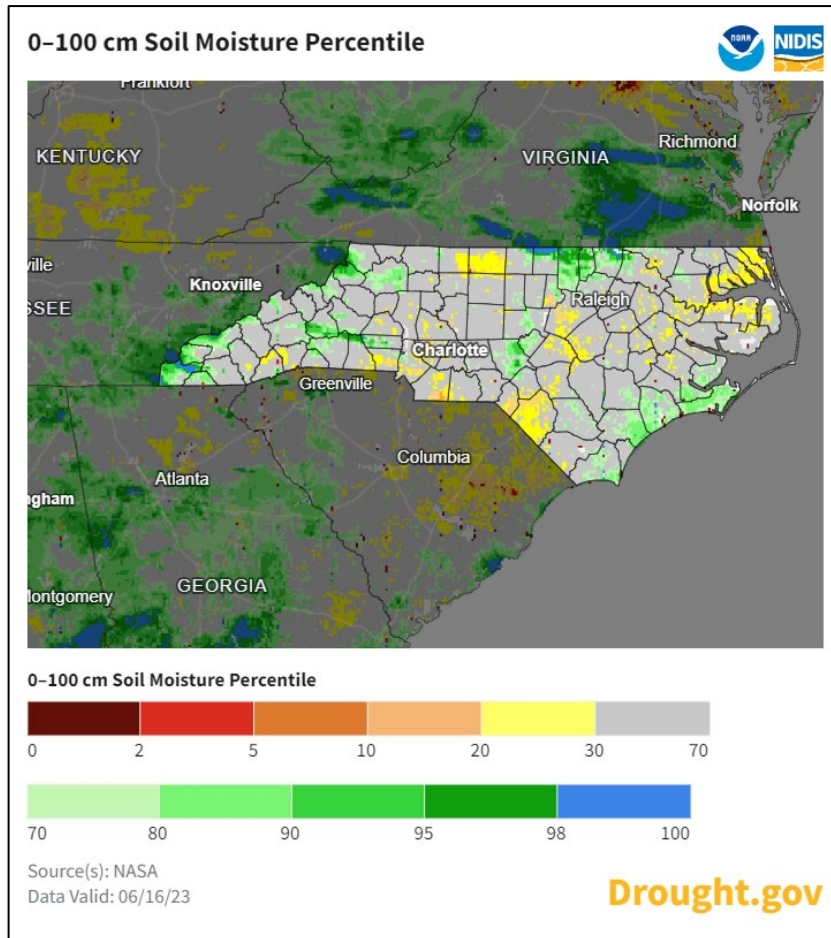


- “D0” Abnormally Dry Designation now for ~25% of State
- Decline in stream flows over much of state indicative of summer pattern of thunderstorms within watersheds.

Modeled Relative Soil Dryness

National CPC Product: 6/15/23

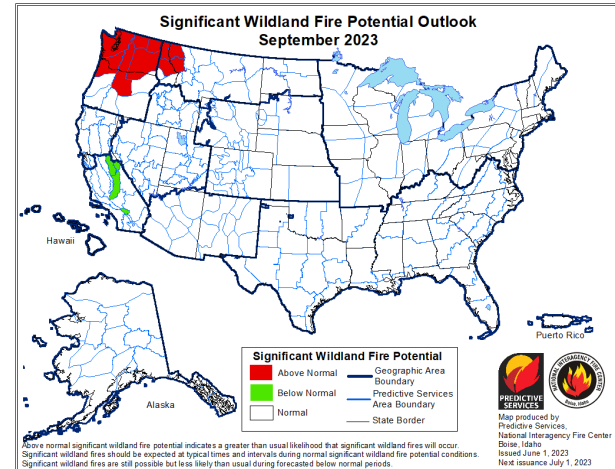
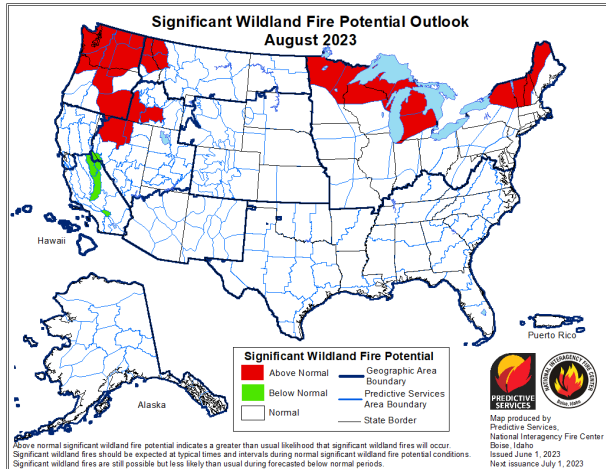
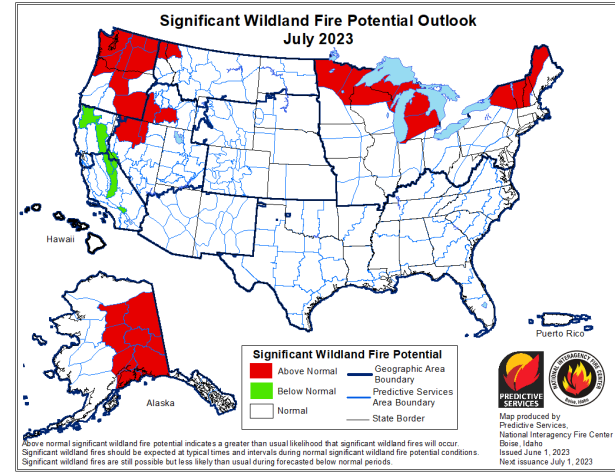
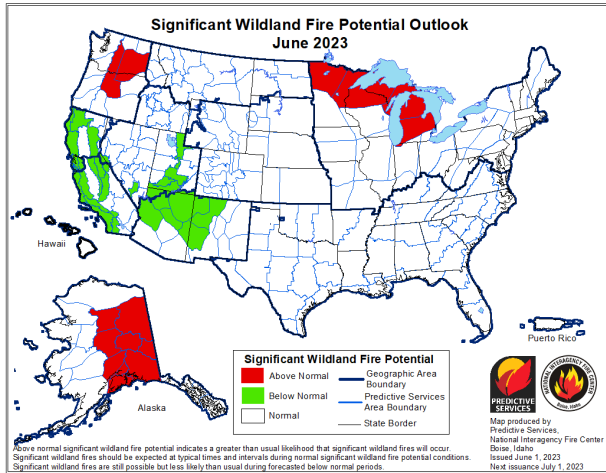
0-100 cm Depth (6/16/23)



- SPoRT is currently down due to disk failure.
- Note pockets of dryness throughout state.
- Hit-and-Miss nature of rainfall events apparent (left).

Significant Wildland Fire Potential Outlook:

Updated 6/1/23 – Next Update on 7/1/23



A significant fire is one that requires resources from outside the district (other than aviation). IA potential is based more on shorter term weather factors. Just a few days of dry weather can increase IA activity considerably as we have seen this year.

ENSO Notes from the CPC (6/8/23 Update)

ENSO Alert System Status: **El Niño Advisory**

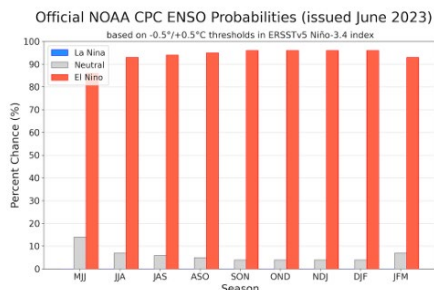
El Niño conditions are present and are expected to gradually strengthen into the Northern Hemisphere winter 2023-24.

ENSO, or El Niño Southern Oscillation, is a fluctuation in the sea surface temperature (SST) in the equatorial Pacific Ocean. Research has shown that even slight changes in the SST, particularly in area 3.4, can influence weather in North America. Generally, when SSTs are lower than normal, known as La Niña, NC has drier than normal conditions and can have more fire occurrence. However, La Niña also can lead to more tropical activity. El Niño, on the other hand, usually means wetter weather for NC, but less opportunity for tropical landfalls due to increased wind shear. In order to declare a La Niña, the departure from average SST must be at least -0.5°C (line shown in green) for 3 consecutive months. For El Niño, the departure must be at least 0.5°C above average for 3 consecutive months.

CPC Probabilistic ENSO Outlook

Updated: 8 June 2023

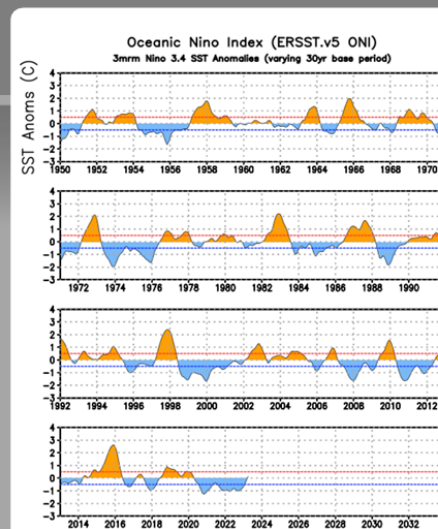
El Niño is favored through Northern Hemisphere winter 2023-24, with chances exceeding 90% for most of the period.



ONI ($^{\circ}\text{C}$): Evolution since 1950

The most recent ONI value (March - May 2023) is 0.1°C .

El Niño ↑
Neutral
La Niña ↓



Useful Daily Self-Briefing & Situational Awareness Links

Useful Daily Links:

Daily WIMS Observations and NFDRS Estimates

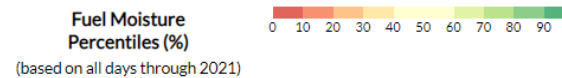
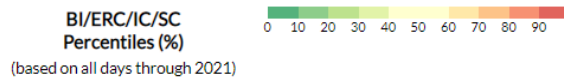
Averaged by FDRA SIG Group

This is available on the FWIP at: <https://products.climate.ncsu.edu/fwip/nfdrs.php?data=ob&state=NC>

- The averaged values are derived from the SIG Station Outputs for a particular FDRA
(SIG station names shown in bold on the live link above)
- You can toggle the percentiles on/off, displaying below the actual calculated values
these percentiles are based on analysis of "All Days" for entire calendar year range through 2021 for these stations

Daily Observations for 6/16/23

Averages by FDRA																		
FDRA	STATION_COUNT	NFDR_DATE	BI	ERC	IC	SC	KBDI	1HR	10HR	100HR	1000HR	HRB	WOODY	TEMP	RH	WIND	PRECIP	DUR
Southern Highlands	3	2023-06-16	39.27 65.9%	19.47 60.5%	3.47 51.9%	14.63 65.3%	280.00	14.06 50.9%	19.65 63.9%	18.80 46.0%	20.63 63.0%	180.60	153.67	77.3°F	52.3%	WNW 4.7 mph	0.25 in.	0.3
Central Mountains	3	2023-06-16	33.93 60.0%	18.47 53.6%	3.63 63.0%	10.57 59.7%	188.33	14.21 54.7%	19.67 65.7%	18.17 34.3%	21.17 68.1%	250.00	200.00	81.0°F	46.0%	ESE 3.3 mph	0.06 in.	1.7
Northern Highlands	2	2023-06-16	45.70 66.4%	22.20 68.1%	5.60 78.3%	17.65 64.3%	117.00	12.27 28.5%	18.19 49.9%	17.59 35.9%	21.88 80.1%	250.00	200.00	77.0°F	47.0%	SW 6.0 mph	0.00 in.	0.0
Blue Ridge Escarpment	3	2023-06-16	62.97 69.1%	34.60 74.0%	10.13 80.5%	21.87 65.7%	205.33	10.50 37.1%	16.42 38.9%	17.60 34.2%	18.09 20.5%	195.60	161.67	85.0°F	41.3%	NW 5.0 mph	0.00 in.	0.0
Western Piedmont	3	2023-06-16	60.70 63.2%	36.00 68.4%	8.50 74.5%	19.07 59.9%	239.33	11.00 43.9%	16.67 58.2%	16.99 33.5%	20.64 76.6%	150.10	131.00	88.7°F	39.3%	WNW 4.7 mph	0.03 in.	0.3
Sandhills	3	2023-06-16	39.53 60.2%	38.07 46.3%	7.40 44.7%	8.20 80.2%	338.67	12.01 56.8%	18.72 68.3%	17.57 40.5%	19.70 64.0%	112.27	110.67	90.7°F	37.3%	WNW 5.3 mph	0.00 in.	0.0
Eastern Piedmont	4	2023-06-16	59.15 30.3%	30.73 35.7%	7.20 48.1%	21.43 27.7%	273.75	11.99 51.1%	18.25 61.5%	16.90 22.6%	20.16 62.9%	144.15	132.75	86.8°F	47.3%	WNW 5.3 mph	0.00 in.	0.0
Southern Coastal	7	2023-06-16	32.44 25.4%	22.24 32.1%	3.27 29.1%	8.23 20.4%	385.00	13.48 56.4%	18.96 65.2%	18.23 30.4%	20.89 64.1%	245.86	200.00	86.9°F	57.4%	SW 4.4 mph	0.04 in.	0.4
Northern Coastal	4	2023-06-16	36.35 25.9%	27.33 39.1%	4.43 35.0%	8.48 17.9%	362.50	12.39 48.6%	17.43 56.1%	17.33 21.9%	20.82 70.2%	188.88	171.25	88.0°F	54.5%	SSW 4.8 mph	0.00 in.	0.0



Useful Daily Links:

Daily WIMS Forecast Observations and NFDRS Estimates

Averaged by FDRA SIG Group

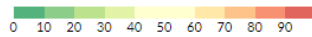
This is available on the FWIP at: <https://products.climate.ncsu.edu/fwip/nfdrs.php?data=fc>

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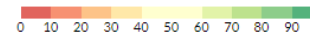
Daily Forecast for 6/16/23 (issued on 6/15)

Averages by FDRA																		
FDRA	STATION_COUNT	NFDR_DATE	BI	ERC	IC	SC	KBDI	1HR	10HR	100HR	1000HR	HRB	WOODY	TEMP	RH	WIND	DUR1	DUR2
Southern Highlands	3	2023-06-16	56.67 72.6%	21.13 66.7%	5.20 71.8%	28.10 71.8%	293.33	13.88 50.9%	18.91 58.4%	18.35 31.0%	20.54 63.0%	180.53	152.67	78.3°F	50.7%	NW 9.7 mph	0.3	0.0
Central Mountains	3	2023-06-16	49.20 67.9%	20.70 62.5%	5.30 70.9%	21.03 66.7%	175.33	13.23 46.9%	18.60 59.7%	17.58 34.3%	21.12 68.1%	250.00	200.00	79.0°F	46.7%	NW 11.0 mph	0.0	0.0
Northern Highlands	2	2023-06-16	47.20 66.8%	17.95 58.7%	4.55 73.3%	22.15 66.6%	104.00	14.05 46.6%	19.67 63.1%	17.34 21.0%	21.80 80.1%	250.00	200.00	73.0°F	54.0%	NW 11.0 mph	0.0	0.0
Blue Ridge Escarpment	3	2023-06-16	64.13 69.3%	24.73 61.5%	6.90 67.2%	32.40 71.0%	189.33	13.02 55.0%	18.71 59.8%	16.80 23.3%	17.86 20.5%	196.33	163.33	80.7°F	44.7%	WNW 9.7 mph	0.0	0.0
Western Piedmont	3	2023-06-16	54.43 60.4%	26.37 54.3%	6.00 57.2%	20.73 62.0%	225.67	12.86 63.5%	18.24 65.2%	16.67 33.5%	20.55 76.6%	150.73	132.00	86.3°F	43.7%	W 6.0 mph	0.0	0.0
Sandhills	3	2023-06-16	38.97 57.3%	35.57 42.6%	6.50 44.7%	8.60 86.5%	326.33	12.81 64.7%	18.93 68.3%	17.52 40.5%	19.71 64.0%	111.70	111.67	87.0°F	45.7%	W 4.7 mph	0.0	0.0
Eastern Piedmont	4	2023-06-16	52.60 27.1%	27.13 31.1%	5.80 42.0%	18.53 24.8%	260.50	12.76 59.9%	18.41 61.5%	16.51 22.6%	20.15 62.9%	144.30	133.00	85.3°F	50.0%	W 5.0 mph	0.0	0.0
Southern Coastal	7	2023-06-16	36.20 29.4%	22.84 34.2%	3.90 36.4%	9.96 26.3%	373.57	13.10 56.4%	19.01 65.2%	18.08 30.4%	20.83 64.1%	245.86	200.00	85.7°F	55.3%	WSW 5.7 mph	0.0	0.0
Northern Coastal	4	2023-06-16	38.80 28.0%	23.78 34.6%	4.15 35.0%	11.10 23.3%	349.50	13.13 58.4%	17.88 63.0%	17.20 21.9%	20.80 70.2%	189.35	172.00	86.3°F	57.0%	WSW 6.5 mph	0.0	0.0

BI/ERC/IC/SC
Percentiles (%)
(based on all days through 2021)



Fuel Moisture
Percentiles (%)
(based on all days through 2021)



Useful Daily Links:

Weekly Outlook - FDRA General Fire Danger Forecast Matrix:

- Available on the FWIP within the “[Resources for NCFs](#)” page.
- The operation link is: <https://products.climate.ncsu.edu/fwip/outlook.php>
- The matrix updates daily - please review the tool notes below for more details.
- For the 9 FDRAs in North Carolina

Weekly Outlook

Fire Danger Rating Area

Select a state: North Carolina Select an FDRA: Southern Coastal

Southern Coastal FDRA - General Fire Danger Forecast

For planning purposes only; forecast is subject to change

Four or more **RED** blocks in a day signals the potential for a **Critical Fire Day**

DAY	FRI 16-Jun	SAT 17-Jun	SUN 18-Jun	MON 19-Jun	TUE 20-Jun	WED 21-Jun	THU 22-Jun
Avg. Max. Temp. (°F)	88	87	90	86	82	80	82
Avg. Min. Humidity (%)	52	37	41	49	67	72	69
Avg. 20' Wind Speed (mph)	6	6	4	8	9	14	9
Avg. Wind Direction*	WSW	WNW	SSE	SE	ENE	ENE	ENE
Avg. Probability of Precip. (%)	30	3	10	39	56	56	52
Days Since a Wetting Rain**	3.0	4.0	5.0				
Forecast ERC (Fuel Model X)	22.8	27.3	27.9	24.5	20.8	15.8	16.0
Forecast BI (Fuel Model X)	36.2	40.0	36.2	46.3	43.4	35.8	32.2
Forecast IC (Fuel Model X)	3.9	5.6	5.3	5.8	3.9	2.0	1.8
Forecast 100-Hr. FMC	18.1	17.8	17.5	17.4	17.6	18.2	18.5
Forecast 1000-Hr. FMC	20.8	20.6	20.4	20.2	20.0	20.0	19.9
KBDI	373.6						

Data Source:

- Weather forecasts come from the National Weather Service's [Global Forecast Database](#). The wind speed and direction, and probability of precipitation, are calculated as averages of the 1 am, 7 am, 1 pm, and 7 pm forecasts. The 20-foot wind speed is estimated from the 10-meter forecast using the log wind profile method.
- Days since a wetting rain is calculated using a combination of historical data (to determine the most recent wetting rain event) and forecasted precipitation amounts. These forecasted amounts are only available for the first three days of the forecast period.
- Fire danger forecasts for the next 7 days are issued by National Weather Service through WIMS. KBDI is only available on the first forecast day since the [NFDRS Forecast](#) product does not include precipitation amounts, which are used to adjust KBDI from day to day.

Values in the table above are averages from 7 stations in this FDRA:

- Finch's Station (317501)
- Beaufort (317201)
- New Bern (319005)
- Turnball Creek (319302)
- Hofmann Forest (319507)
- Whiteville (311701)
- Sunny Point (319803)

KEY	Low to Moderate Burning Conditions	Burning Conditions Can be High CAUTION	Burning Conditions Can be Critical WATCH/OUT
Avg. Max. Temp.	Less than 50°F	Between 50°F and 65°F	Greater than 65°F
Avg. Min. Humidity	Greater than 40%	Between 35% and 40%	Less than 35%
Avg. 20' Wind Speed	Less than 5 mph	Between 5 mph and 10 mph	Greater than 10 mph
Avg. Wind Direction*	Criticality of wind direction is highly dependent on burn operations and/or structures threatened.		
Days Since a Wetting Rain**	A wetting rain is defined as 0.10" or greater. This is an average of the FDRA stations noted above.		
Energy Release Comp.	Less than 36.4	Between 36.4 and 47.2	Greater than 47.2
Burning Index	Less than 68.3	Between 68.3 and 89.5	Greater than 89.5
Ignition Component	Less than 7.9	Between 7.9 and 12	Greater than 12
100-Hour Fuel Moisture	Greater than 18.2%	Between 17.3% and 18.2%	Less than 17.3%
1000-Hour Fuel Moisture	Greater than 19%	Between 18% and 19%	Less than 18%
KBDI	Less than 385	Between 385 and 486	Greater than 486

Other factors to consider when determining fire danger: sky conditions, precipitation amount, number of days since rain, and season.

Tool Summary:

The forecast matrix was created using **standard NFDRS and weather forecast data**:

- Weather conditions and NFDRS outputs are forecasted over the next 7 days by NWS for SIG stations in each FDRA.
- Weather variable ranges and breakpoints were defined by FDRA stakeholders and relate to Pocket Card notes.
- Maximum temperatures in the Critical range are color-coded with shades of red to help visually distinguish daily variations. The brightest red color corresponds to temperatures of 100°F or greater.

Fire danger forecast indices and component values are grouped into three categories based on historical percentiles, assessed using the FF+ All Days filter through 2021:

- Low to Moderate (0 to 74th percentile); shown in blue-green
- High (75th to 89th percentile); shown in yellow
- Very High to Extreme (90th+ percentile); shown in red and labeled as Critical

Dead fuel moisture forecast values are grouped into three categories based on historical percentiles, assessed using the FF+ All Days filter through 2021:

- Low to Moderate (26th to 100th percentile); shown in blue-green
- High (11th to 25th percentile); shown in yellow
- Very High to Extreme (0 to 10th percentile); shown in red and labeled as Critical

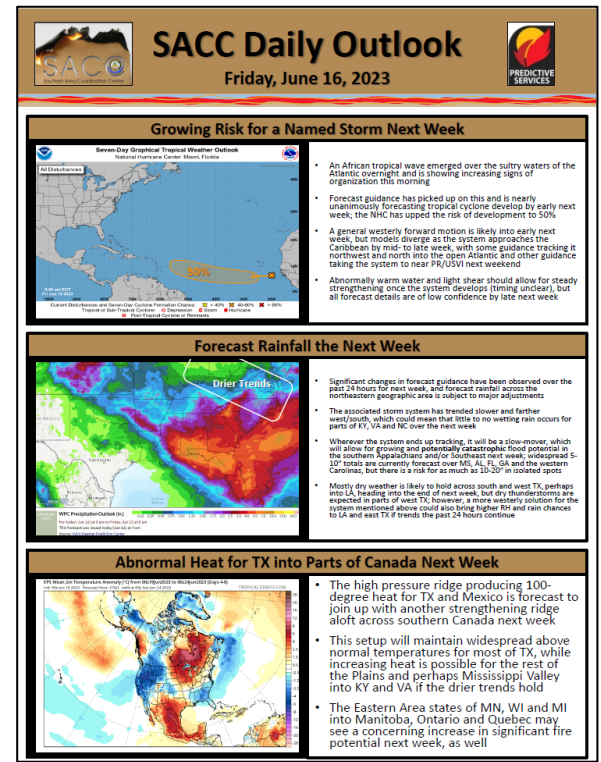
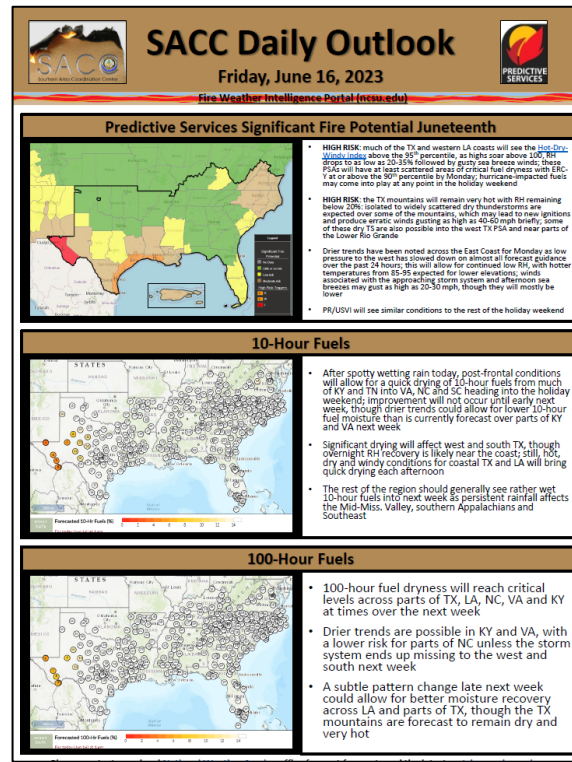
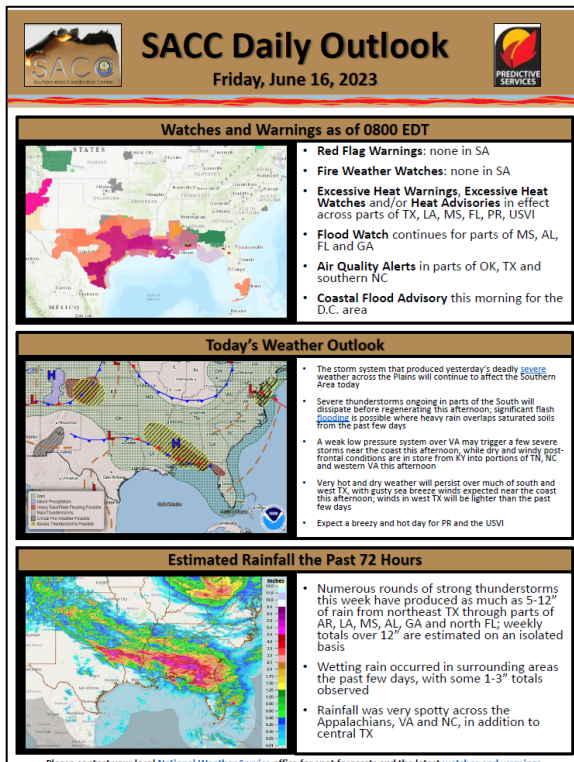
Other Notes:

- Read the key and notes for each FDRA, included on the outlook matrix page.
- Forecasts are variable and can change significantly over a forecast cycle and across the landscape.
- This is another tool for gaining better situational awareness, and should be used for general planning purposes only.
- The outlook matrix is refreshed when an FDRA is selected, using the most recent forecast data available at that time. The 7th day may drop off or display partial data prior to the afternoon/evening forecast update.
- Daily updates to NFDRS forecasts occur around **1530** daily, while general weather forecasts are updated around **1730** daily.

Useful Daily Links:

Southern Area Daily Outlook Page:

<https://gacc.nifc.gov/sacc/resources/predictive/sacc-daily-outlook.pdf>



Product is generally updated weekdays (three example images from 6/16 Outlook shown)

NC DAQ Air Quality Forecast - Next Three Days

The North Carolina Division of Air Quality issues forecasts for fine particulate matter year-round and ozone from March through October. Forecasts and discussions are updated each afternoon for the next three days, and are sometimes updated in the morning to reflect the latest ambient conditions.

View: The latest forecast discussion The **afternoon** forecast discussion from

This forecast was issued on **Friday, June 16, 2023 at 2:49 pm.** ✔ This forecast is currently valid.

Today's Air Quality Conditions

Ozone is rising into the Code Orange range near and downwind of Charlotte and an Air Quality Action Day is being issued for the remainder of today accordingly, and is climbing through Code Yellow range over the rest of the interior; Code Green conditions are being observed over the coast.

Fine particulate readings are holding in the Code Red range in Wilmington thus far this afternoon and closer to the Pulp Road fire in Brunswick County. The forecast will be left unchanged owing to the possibility of cleaner air building inland, in particular over New Hanover and Pender Counties, as the sea breeze increases this afternoon. Lower readings in the Code Green to lower Code Yellow range are being observed elsewhere around the state.

[↗](#) For a display of the most recent Air Quality Index (AQI) conditions throughout the day, visit the *Ambient Information Reporter (AIR)* tool.

General Forecast Discussion

A frontal boundary will move through the state tonight into tomorrow morning with isolated showers and thunderstorms, bringing dry air in from the north, and with it some areas of smoke from the wildfires in Canada. While fine particulate readings unto themselves aren't expected to build to the point of being unhealthy (Code Orange or worse), daily averages in the mid/upper Code Yellow range are expected over most of the state-- the exception being in southeastern North Carolina where ongoing impacts from the Pulp Road fire in Brunswick County may allow for fine particulate readings in the Code Red range in Brunswick County with possible Code Orange impacts in New Hanover County as winds shift out of the northwest in the wake of frontal passage. Air Quality Action Days have been issued for both counties accordingly.

On the ozone side of the forecast, the incoming areas of smoke may-- as we are seeing today-- serve as an enhancing agent for ground-level ozone formation, offsetting typically lower weekend emissions and allowing ozone to build into the Code Yellow range over most of the state under mostly sunny skies, with Code Orange conditions possible in and downwind of Charlotte and Air Quality Action Days have been issued for Mecklenburg, Union and Cabarrus counties to account for this concern.

Outlook

A difficult extended forecast is in the offing through Monday owing to high pressure settling overhead during this time, allowing for any areas of smoke that build in from the north tomorrow to remain in place Sunday and Monday, and with it concerns for elevated ozone and fine particulate values. Code Yellow air quality is being advertised for most of the state to account for this, but the forecast will be watched closely for any updates based on how observed air quality evolves during this time.

Pulp Road fire/southeastern North Carolina: Code Orange conditions are being advertised for portions of southeastern North Carolina both days depending on anticipated wind direction. Given the dynamic nature of this fire and fast-changing impacts on air quality, the forecast will also be watched closely for any updates.

Author: *Tardif* - NC Division of Air Quality

Extended Air Quality Outlook

The forecast Air Quality Index value for each pollutant represents the highest value expected within each county, so some areas and monitors may see lower values. We use the best information and techniques available to ensure the quality and accuracy of the forecasts we provide to the public. Note that ranges do *not* include the nine-county Triad region, which is covered by the Forsyth County Office of Environmental Assistance and Protection.

Forecast Day	AQI Range	Category Range
Friday (Jun 16)	77 to 160	Yellow to Red
Saturday (Jun 17) 🌧️	87 to 151	Yellow to Red
Sunday (Jun 18)	90 to 101	Yellow to Orange
Monday (Jun 19)	90 to 101	Yellow to Orange

Statewide Summary Notes

Current Activity:

- Spring 2023 has continued to see normal overall activity (in statewide occurrence context)
 - Pulp Road Fire (Green Swamp Preserve Area) is on-going in D8/Brunswick County with the NCFS Red Team (IMT2) to be dispatched at time of document creation.
(Fire is within pocosin type fuels/organic soil areas that limit trafficability with heavy fuel loading)
 - Four Month Outlook - Normal Activity continues to be favored **statewide** (see Significant WF Potential Outlook Slides)
-

Climate/Weather:

- ENSO Notes – have shifted into El Niño status, likely persisting into Winter
 - Related changes in the “weather” take time to show up as these types of patterns evolve (generally weeks+)
 - Hurricane Season began on June 1st – tropical cyclone development in the Atlantic is possible into the next week
 - Seeing the summer-like rainfall/thunderstorm pattern (generally poor distribution of rains with lightning)
 - Better chances of wetting rain next week with cooler conditions continuing, while trend for heavier amts shift south
 - Above normal temperatures are favored in the July – August time period
 - Equal chances for above or below precipitation is also noted for the same period due to forecast uncertainty
-

Fuels/Drought:

- Green conditions, shading & canopy wind interception has helped keep most of state in normal pattern of fire activity
- Fuels and Indices are generally trending near seasonal averages statewide (see FWIP)
- Browning road shoulder grasses (especially elevated roads) have been noted as consuming
- Periods of very low relative humidity (seasonally) have been somewhat moderated by cooler than normal conditions
- “Lightning Season” ignition risks, especially on areas of drying organic soils or deep organic duff
- ~25% of State now in “D0” Abnormally Dry Conditions
- Our active growing season, higher temps and increasing evaporative demands (VPD) can cause drought conditions to expand quickly, especially in localized areas that continue to miss rainfall events
- Note areas that have now exceeded 14 days since ≥ 0.25 ” rain (see earlier slide) along with decreasing dead fuel moistures (100-hr fuels)
- **If** significant & widespread drought intensification was to occur, overall initial attack activity and mop-up demands would likely increase (traditionally occurring in all R1 and most southern/eastern R2 districts if such a scenario developed)