

# Using the Fire Weather Intelligence Portal and Assessing Current Drought Resources

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PFC Meeting  
August 2, 2018

# Presentation Topics

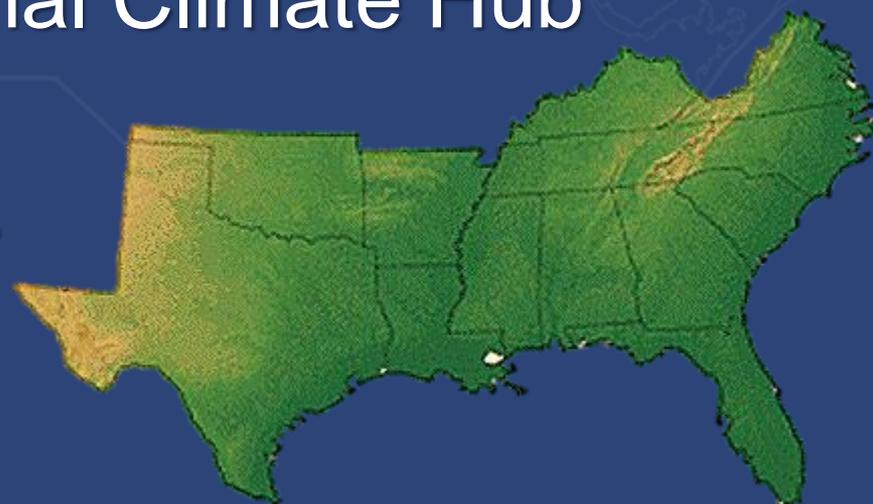
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- “Portal for Pros”
  - Where FWIP data comes from
  - How to effectively use the Portal
- Drought resource discussion
  - Updates on upcoming FWIP datasets
  - Your turn to provide feedback



# Portal Background

- Developed beginning in 2011 with support from NC Forest Service
- Expanded in 2017 with support from Southeast Regional Climate Hub
  - Covers 13 states
  - Faster load times
  - Mobile friendly



# Time Period Coverage

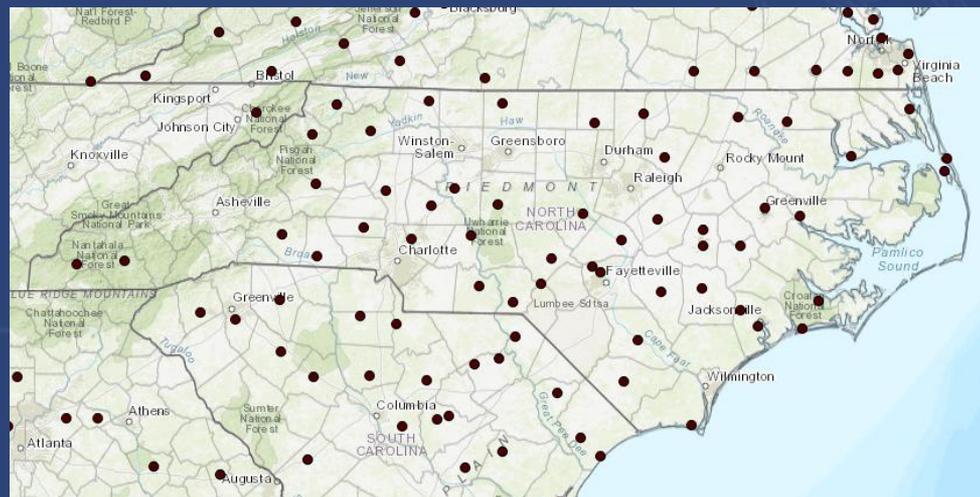
- Past Conditions
  - Since 2002 (or station start date) for most point parameters
- Current Conditions
  - From the past 1-2 hours (hourly) or 0-1 days (NFDRS)
- Forecast Conditions
  - Mostly short-term forecasts (up to 72 hrs)



# Weather Observations

- Collected from 4 networks:

- RAWS (47)
- ECONet (41)
- ASOS (18)
- AWOS (50)



- Point data available since 2002, or since each station started reporting



# NFDRS Data

Weather  
Observations

Calculated  
NFDRS Output

ID	Type	Date	Time	
DIR	DIDX	318741	0 24-APR-17 29-JUN-17	29-JUN-17 12:38:33
DIR	DIDX	318741	24-APR-17 29-JUN-17	29-JUN-17 12:37:51
DIR	DOBS	318741	0 24-APR-17 29-JUN-17	29-JUN-17 12:22:30
DIR	DOBS	318741	01-JAN-17 28-JUN-17	29-JUN-17 11:52:50
DIR	DIRX	318741	75-APR-17 76-88-17	76-88-17 11:52:15

- NFDRS obs retrieved from WIMS daily
- Includes tomorrow's forecasts from NWS
- Only shows in the Portal for manually edited (type "O") stations/observations





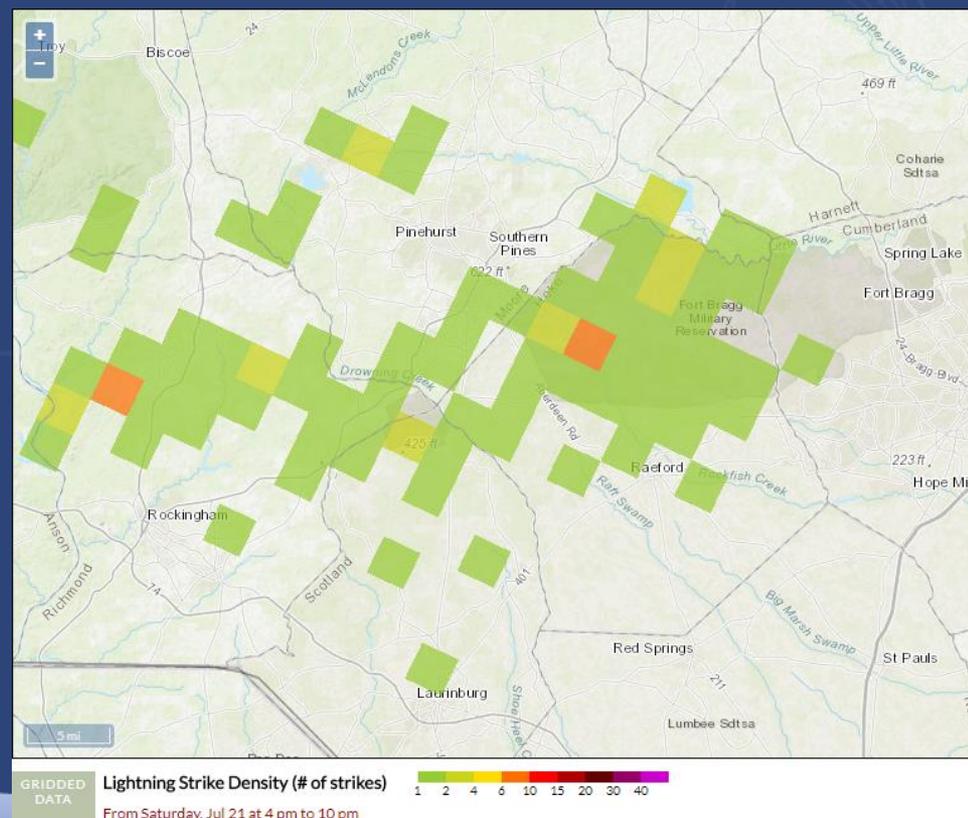
# Gridded Datasets

- Active Fire Perimeters
- Watches and Warnings
- Lightning Strike Density
- Radar and Satellite
- Precipitation & Drought
- High-Resolution Weather Analysis
- National Digital Forecast Database
- NWS GSP Fire Grids
- CPC & WPC Outlooks
- SCO WRF Mixing Height



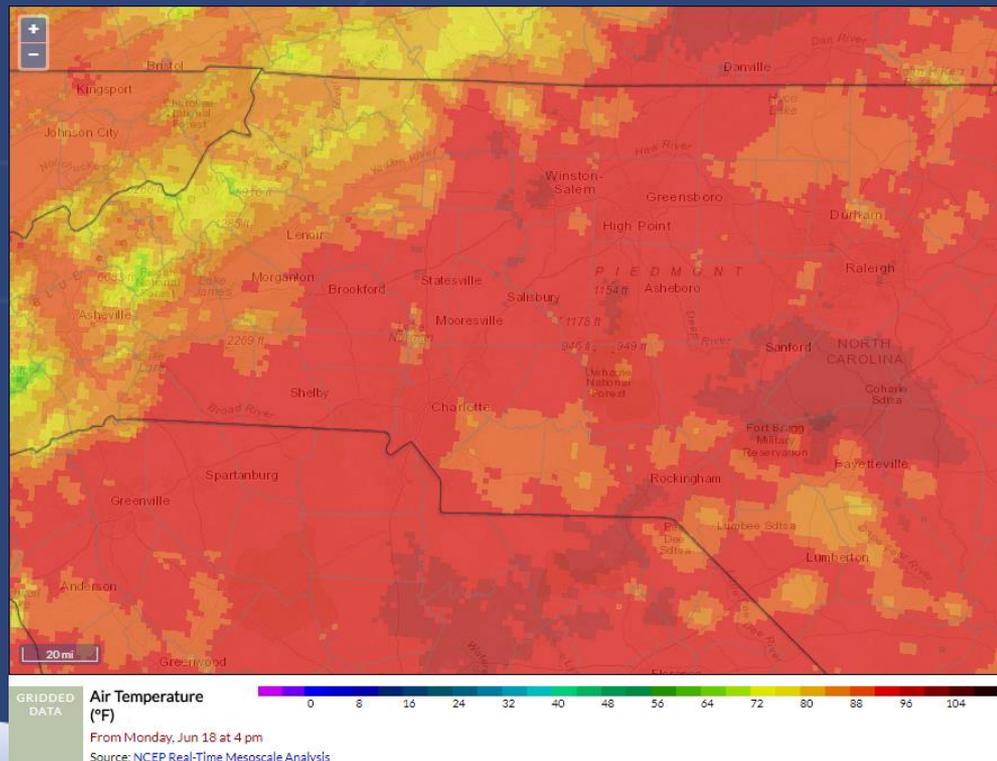
# Lightning Strike Density

- Data from US Precision Lightning Network
  - Estimated 95% or better ground stroke detection efficiency
- Aggregated on a ~5 km grid
- Available since Oct. 2010



# Real-Time Mesoscale Analysis

- Hourly surface weather conditions from NWS

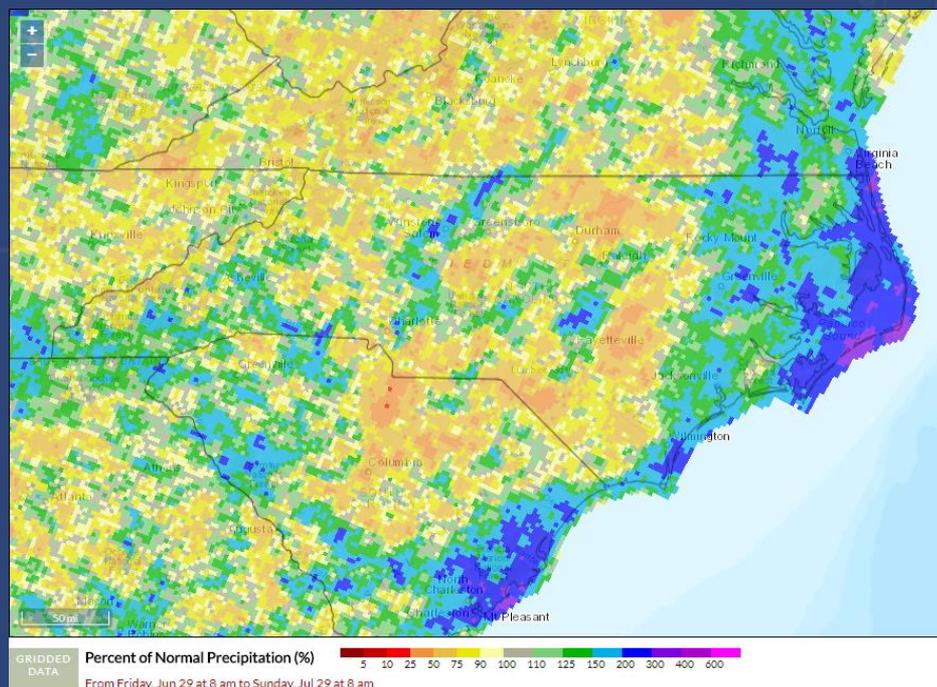


- Interpolates station and satellite-derived obs to a 2.5 km CONUS grid
- Air temp., dew pt., wind speed available since May 2013



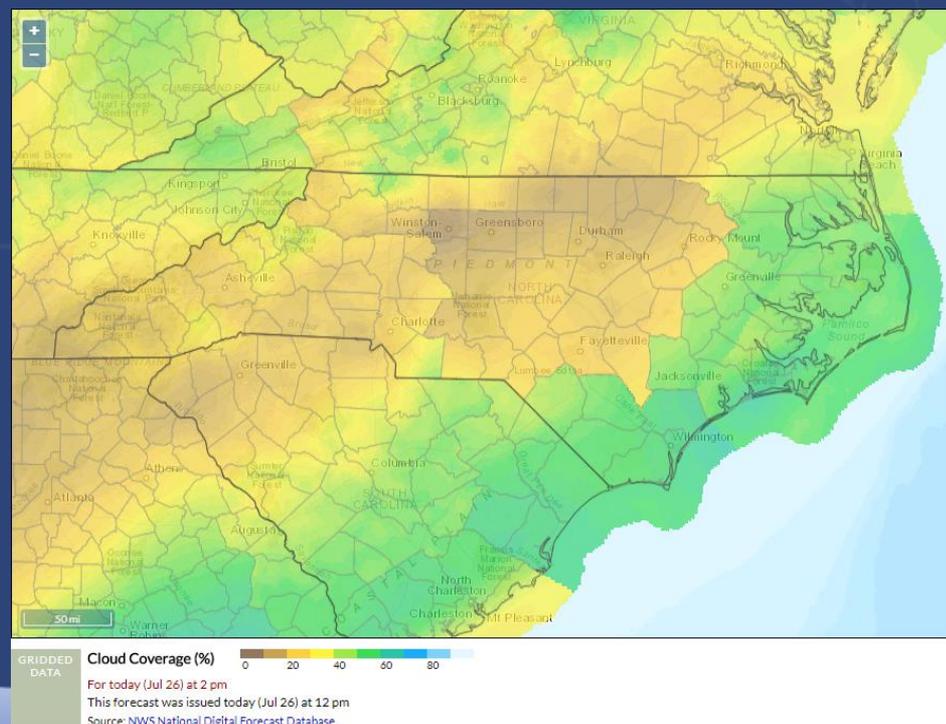
# Gridded Precipitation Products

- Based on the NWS AHPS dataset
  - Radar-based, gauge-calibrated precipitation
- Use PRISM normals to calculate % of normal, SPI
- Files update once per day before noon



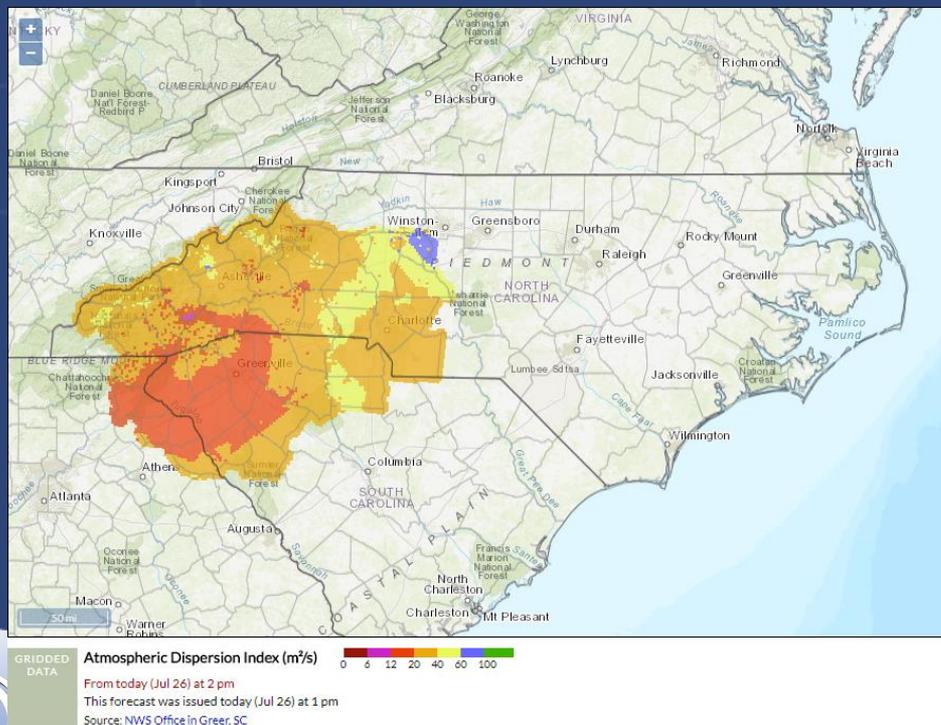
# National Digital Forecast Database

- Forecasts created by NWS offices (often using a model blend), patched into a national dataset
- Available up to 72 hours out
- Air temp., dew pt., rel. hum., wind speed, cloud coverage



# NWS Fire Weather Products

- Fire grids from NWS GSP are shared on NWS Eastern Region server



- Ventilation rate, stability class, ADI, LVORI
- MRH has also started sharing their grids; other NC WFOs soon

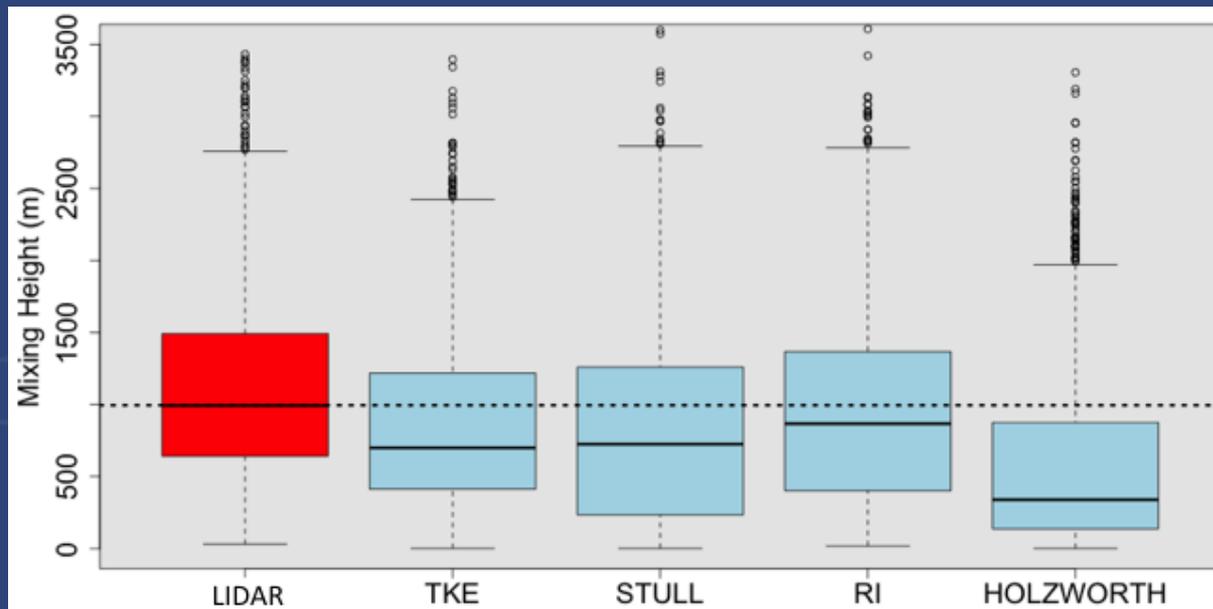


# SCO WRF Mixing Height

- Weather, Research, and Forecasting Model
- Two separate model runs:
  - 4 km over the Carolinas (00 and 12 GMT)
  - 15 km over CONUS (06 and 18 GMT)
- Forecasts available 72 hours out
- Uses turbulent kinetic energy
  - “TKE is a combined representation of buoyancy, wind shear, advection, and other gradients and perturbation terms” (Fearon et al., 2015)



# Mixing Height Methodologies



From Fearon et al., 2015

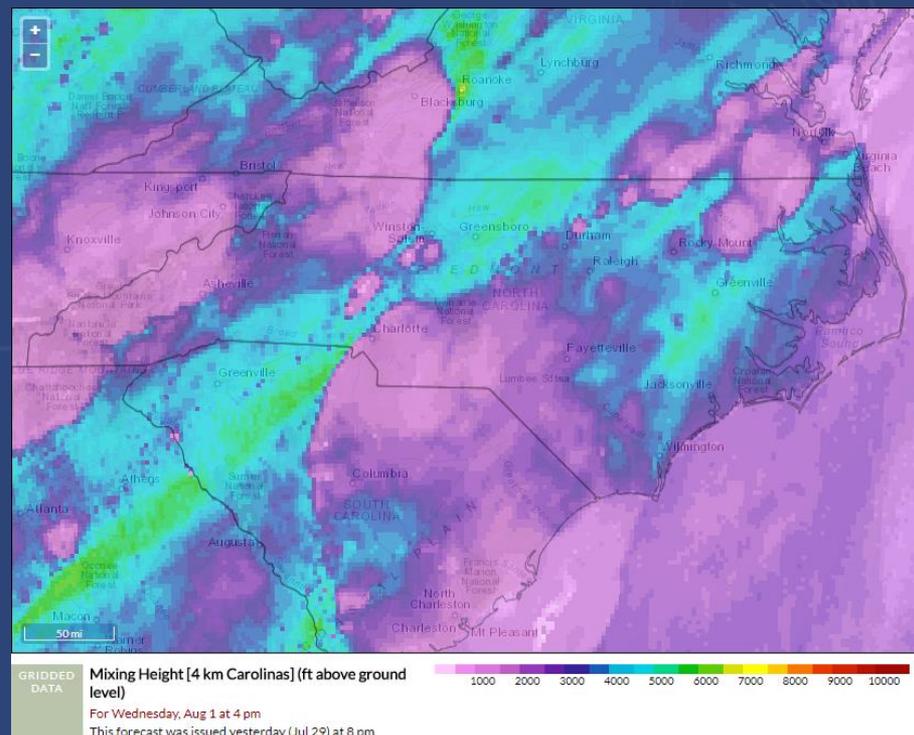
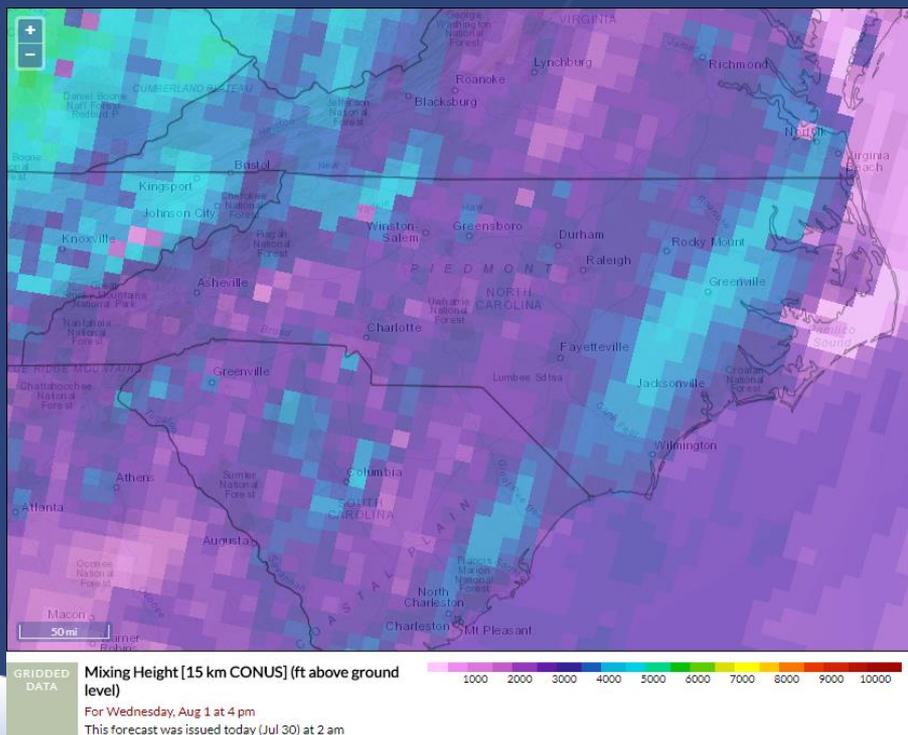
TKE – most robust method  
 Stull – most operationally feasible  
 RI – surrogate for dominant TKE terms  
 Holzworth – not recommended



# SCO WRF Mixing Height

15 km run

4 km run



# Portal Strengths

- Emphasizes ground-truth surface observations
  - Additional networks, parameters
- Ideal for routine monitoring
  - Easy to access the same view each time you check

**Fire Weather Intelligence Port**  
State Climate Office of North Carolina

**Past Conditions**

**Bookmarkable Link**  
View a link to the page with your currently selected options.  
<https://climate.ncsu.edu/fwip/?tab=cu> **Copy**

**Map Details**

Use my current location and zoom level  
» [Detect my location](#)

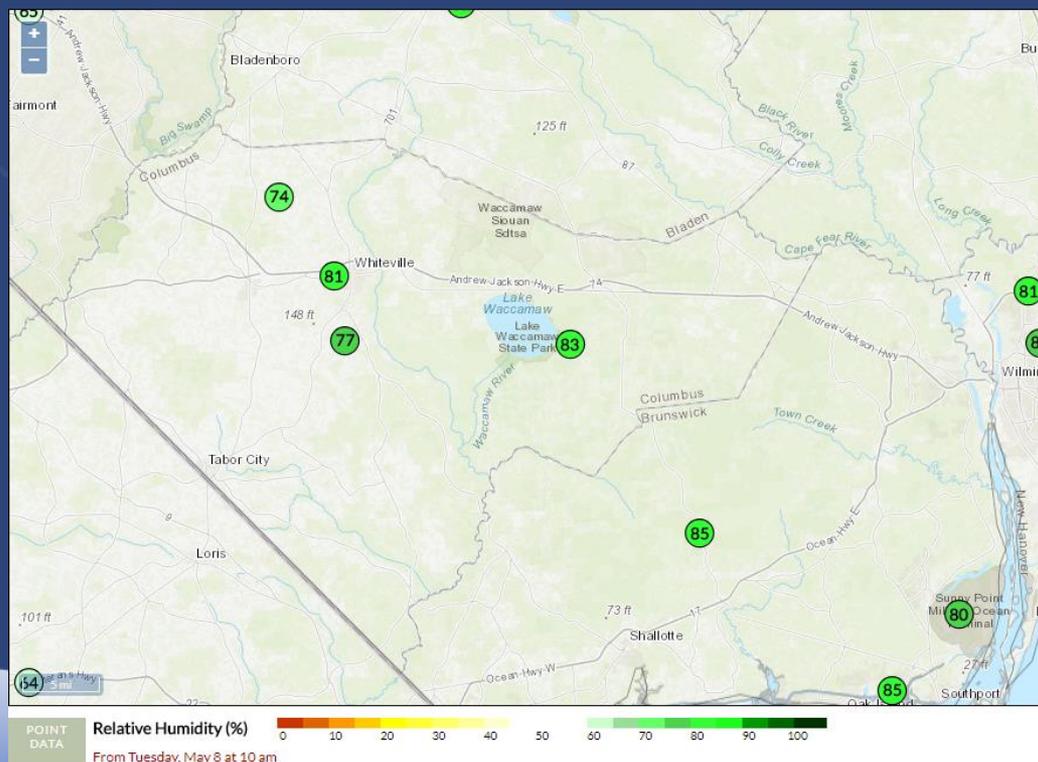
Zoom to a state  Zoom to a county

**Map Background:**  Terrain map  Street map



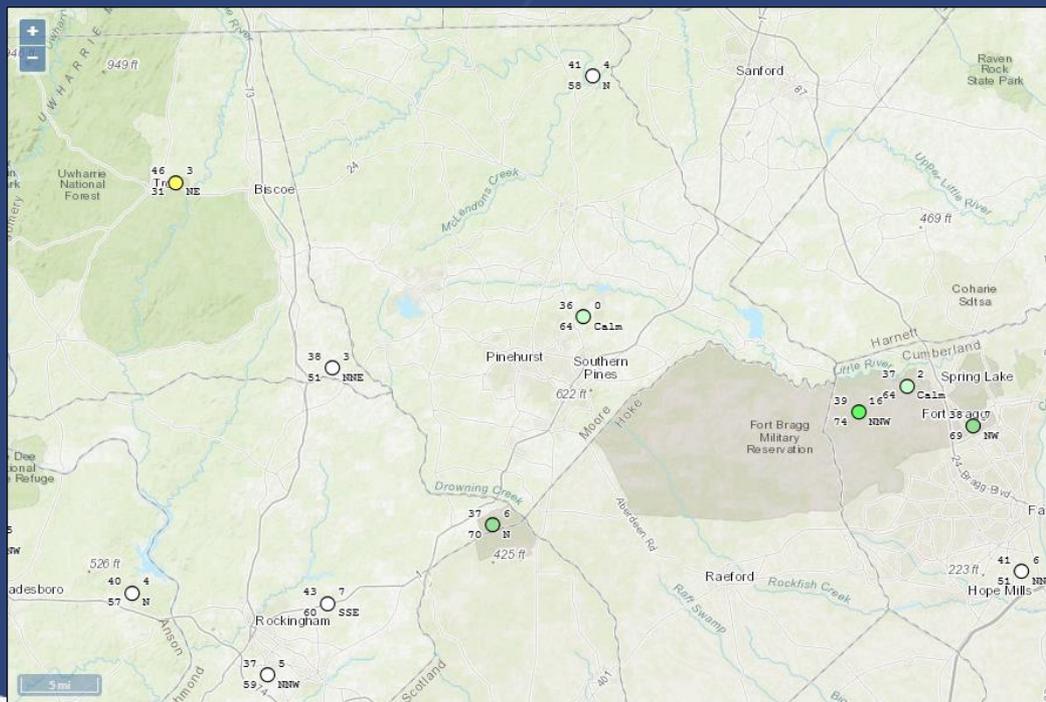
# Portal Example Usage

- Checking on-the-ground conditions before and during a prescribed burn



# Portal Example Usage

- Verifying weather factors in fire severity



**POINT DATA** Four-parameter display

- Air Temperature (°F)
- Relative Humidity (%)
- Wind Speed (mph)
- Wind Direction

Highlighting Relative Humidity (%)

From Sunday, Jan 24, 2016 at 12 pm  
 Air Temp. data is from Sunday, Jan 24, 2016 at 12 pm  
 Wind Speed data is from Sunday, Jan 24, 2016 at 12 pm  
 Wind Direction data is from Sunday, Jan 24, 2016 at 12 pm



# Portal Example Usage

- Filling in FEPS files for smoke modeling

FEPS - Bluff -large fuels

File Actions Help

Event Information Fuel Loading Fuel Moisture Consumption Hourly Input Data

**Fuel Moisture Profiles (Percent Moisture)**

Fuel Moisture Profile	1-hr	10-hr	100-hr	1000-hr	Live	Duff
Very Dry	4	6	8	8	60	25
Dry	10	9	12	15	300	250
Moderate	8	9	11	15	100	70
Moist	10	11	14	21	90	250
Wet	8	10	15	28	180	250
Very Wet	28	30	32	75	300	400

Values displayed in blue represent either FEPS default fuel moisture values (upper table) or FEPS calculated percentage consumed (lower table).  
 Values overwritten by user are displayed in red.  
 Changes in fuel moisture profiles (upper table) will not affect percent consumed (lower table) until saved.

**Percent of Fuel Loading Consumed**

Fuel Profile	Fuel Moisture Profile	Canopy	Shrub	Grass	Woody	Litter	Bdcst	Piles	Duff
Med Forest	Moist	0	20	40	37	100	61	85	10
Unused	Very Dry	86	89	94	60	100	100	99	86
Unused	Very Dry	86	89	94	60	100	100	99	86
Unused	Very Dry	86	89	94	60	100	100	99	86
Unused	Very Dry	86	89	94	60	100	100	99	86

Bluff -large fuels User Event Broadcast Natural Fuel Jul 19 2018 Event: Valid Tab: Valid

Conditions from today (Aug 1) at 1 pm

**STATION INFORMATION**

Network: RAWS County: Richmond, NC  
 Elevation: 377 ft.

**NFDRS FORECASTS FOR AUGUST 1**

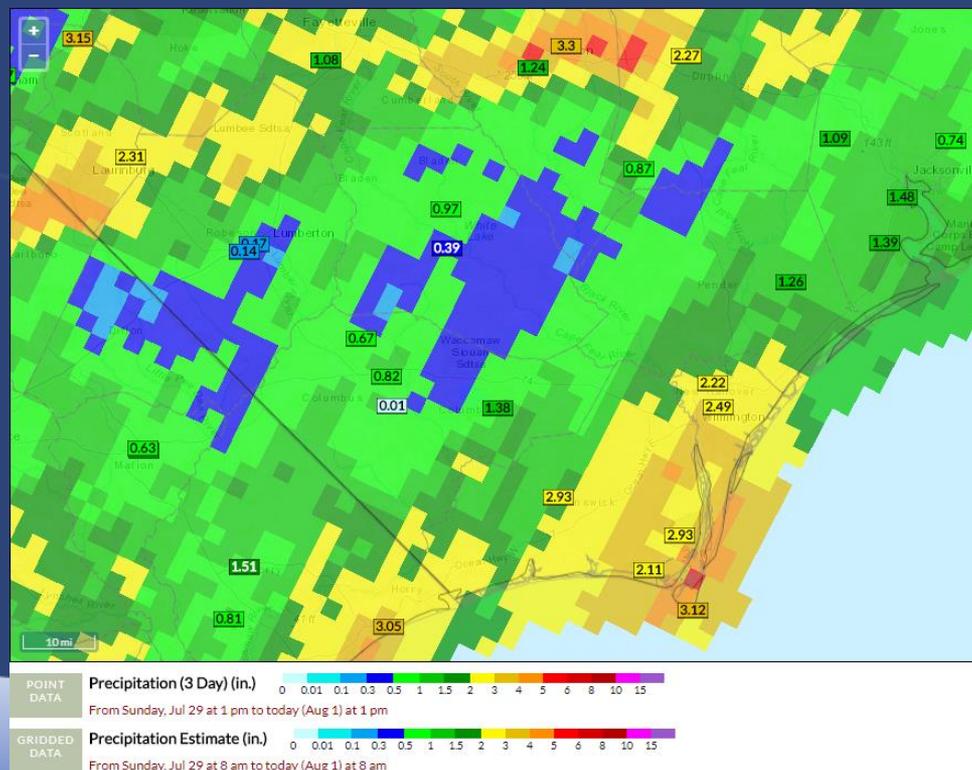
Forecasted KBDI:	614	Forecasted BI:	24
Forecasted ERC:	19	Forecasted IC:	7
Forecasted SC:	5	Forecasted 1-Hr FM:	12%
Forecasted 10-Hr FM:	19%	Forecasted 100-Hr FM:	21%
Forecasted 1000-Hr FM:	19%	Forecasted Herb. FM:	105%
Forecasted Woody FM:	143%		

[More Station Info.](#) [NWS Forecast Graph](#)



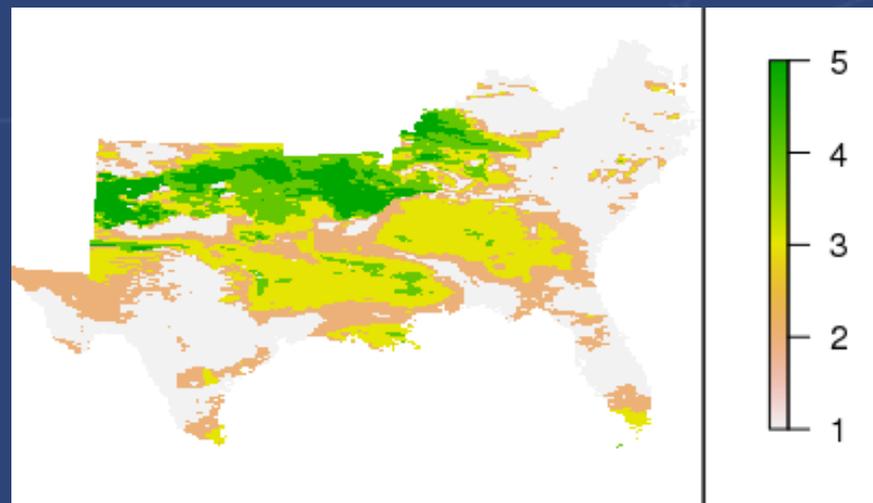
# Portal Example Usage

- Routine daily monitoring of environmental moisture conditions



# Portal Limitations

- Lacking some forecast information and parameters
  - Vent rate, Burning Category, stability class, ADI, and LVORI from SCO WRF are in development
- Plan to add retrieval of gridded values on click
  - And meteograms for forecast data



Example Burning Category data calculated from SCO WRF model



# Additional Information

- Online documentation is available

**Fire Weather Intelligence Portal**  
*A product of the State Climate Office of North Carolina*

SUPPORTED BY: NC STATE UNIVERSITY FOREST SERVICE NC SERCH

MENU

Past Conditions Current Conditions Forecast Conditions  
Reloading in 3:26

[Bookmarkable Link](#)  
View a link to the page with your currently selected options.

[Station Status Page](#)  
Review the availability of weather station obs and NFDRS data.

[About the Portal](#)  
An overview of the Portal's features and functionality.

[NC State Climate Office Website](#)  
Find additional weather and climate information.

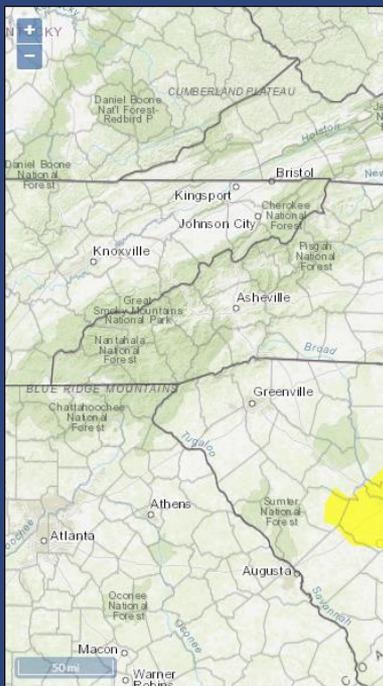
Close [X]

- Contact Corey Davis:
  - [cndavis@ncsu.edu](mailto:cndavis@ncsu.edu)
  - 919-513-1390

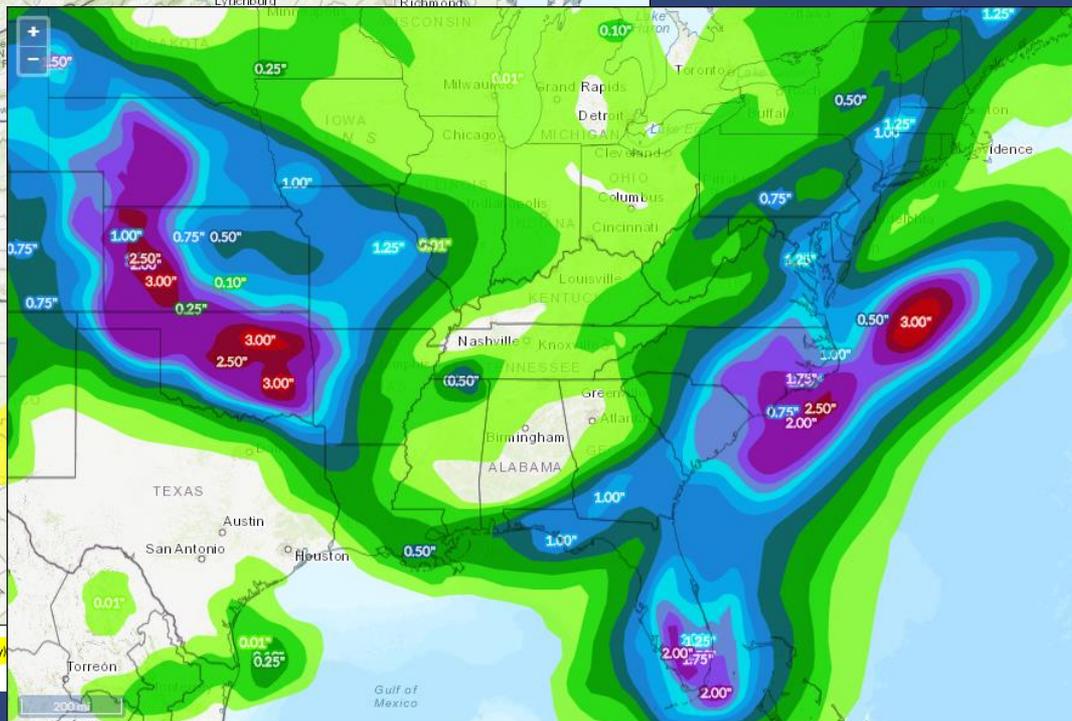


# Upcoming Additions to the Portal and Drought Resource Engagement

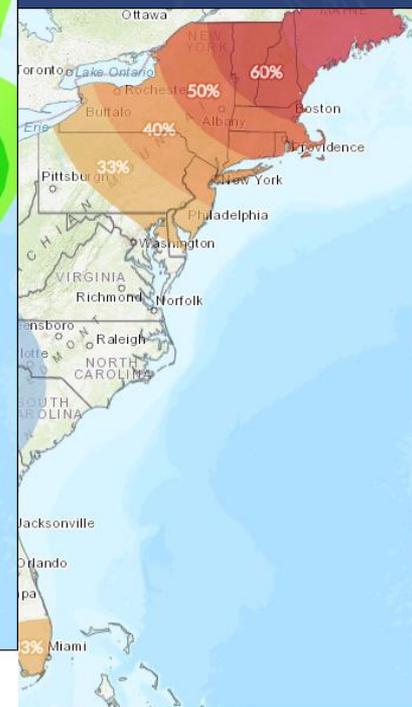
# Recently Added Products



GRIDDED DATA **US Drought Monitor** D0 (Abnormally Dry)  
From Tuesday, Jul 24 at 8 am



GRIDDED DATA **WPC Precipitation Outlook (in.)**  
For today (Jul 27) at 8 am to Monday, Jul 30 at 8 am  
This forecast was issued today (Jul 27) at 4 am  
Source: [NWS Climate Prediction Center](#)



Above Normal

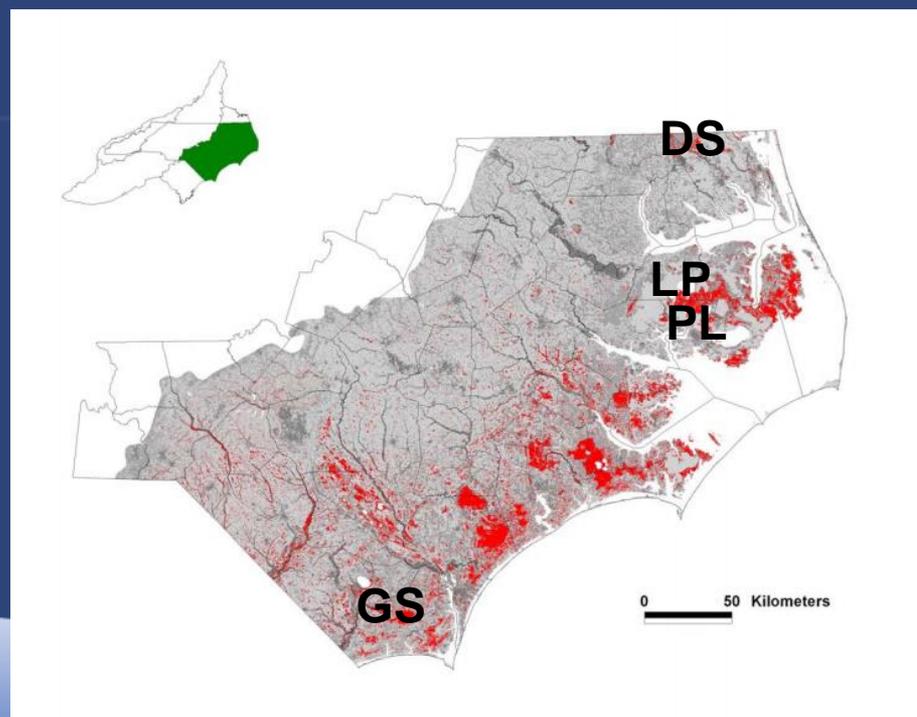
For Wednesday, Aug 1 to Sunday, Aug 5  
This forecast was issued yesterday (Jul 26)  
Source: [NWS Climate Prediction Center](#)

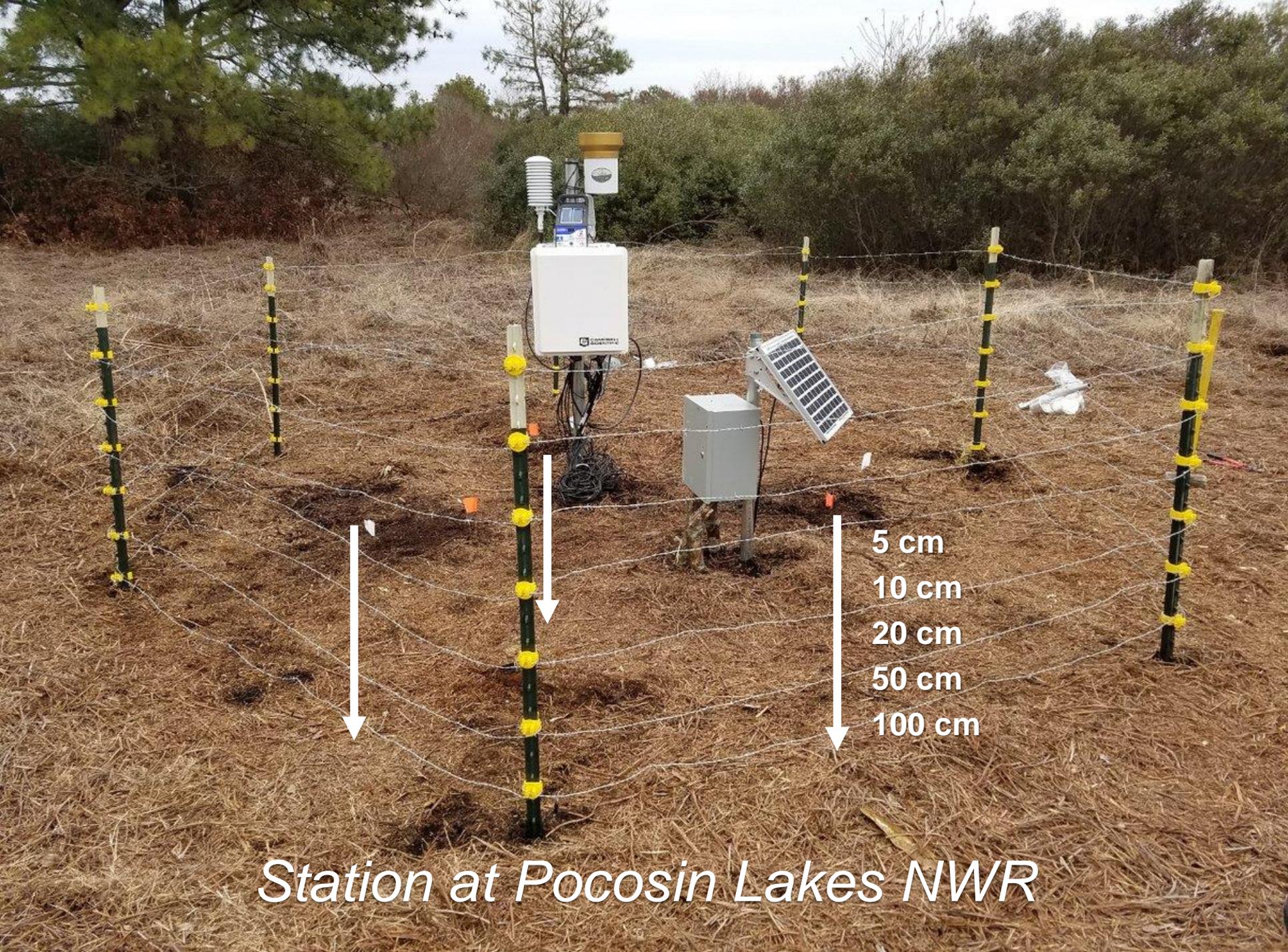
90 80 70 60 50 40 33 0 33 40 50 60 70 80 90



# Upcoming Products

- Real-time fine dead fuel moisture
- Organic soil moisture data





- 5 cm
- 10 cm
- 20 cm
- 50 cm
- 100 cm

*Station at Poccosin Lakes NWR*

# Using the Portal

- How often do you use the Portal?
- Which region(s) do you usually view?
- Which datasets do you view most frequently?
- Do you use the Portal by itself or alongside other products?
- Which external products do you look at for environmental monitoring?



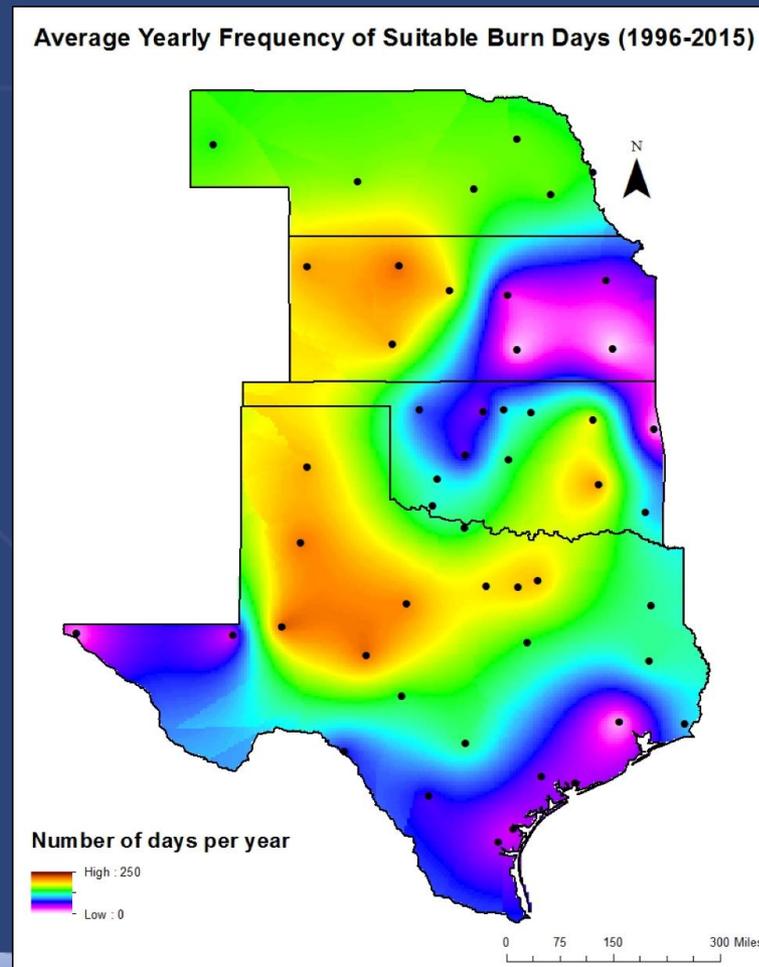
# Information Preferences

- How far in advance would you prefer to begin looking at forecast guidance?
  - 1-3 days? 1-2 weeks? Longer than that?
- How would you prefer to receive drought and fire risk information?
  - Actively from the Portal or other sites? Email or text message alerts for location(s) of interest? Social media?



# Other Questions & Discussion

- For prescribed burning purposes, is the Portal useful?
  - What would make it more useful?
- Would a prescribed burning climatology for NC be helpful?
- Other comments or ideas?



# Questions?

<https://climate.ncsu.edu/fwip>

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919-513-1390

