NC STATE UNIVERSITY

Using the Fire Weather Intelligence Portal and Assessing Current Drought Resources

Corey Davis

PFC Meeting

August 2, 2018

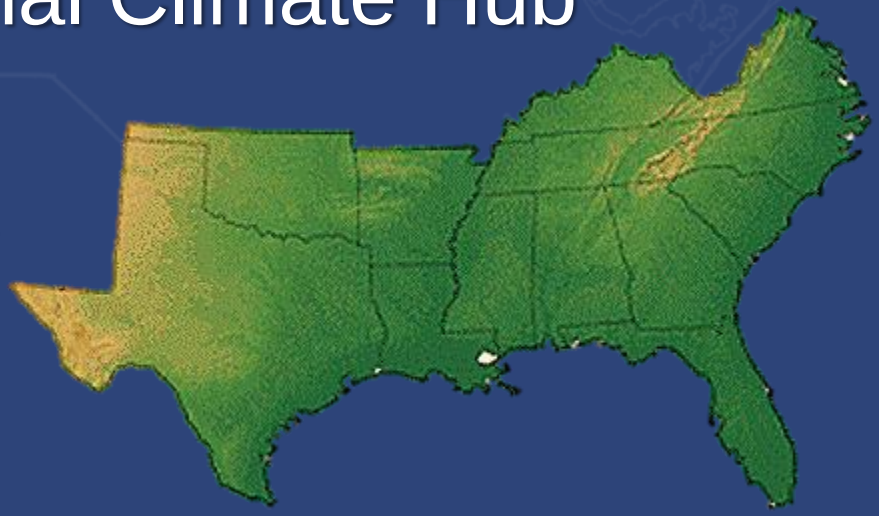
NORTH CAROLINA CLIMATE OFFICE

Presentation Topics

- "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

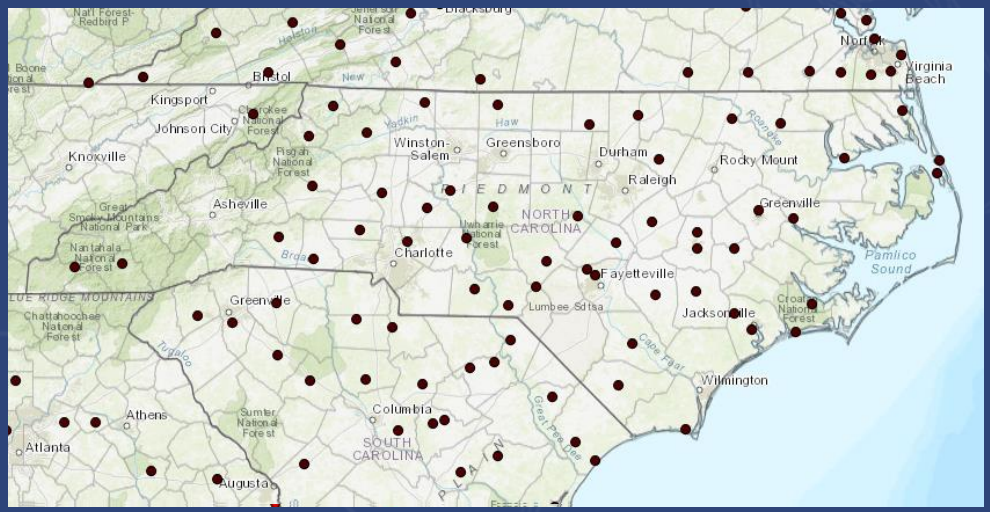


Time Period Coverage

- 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)

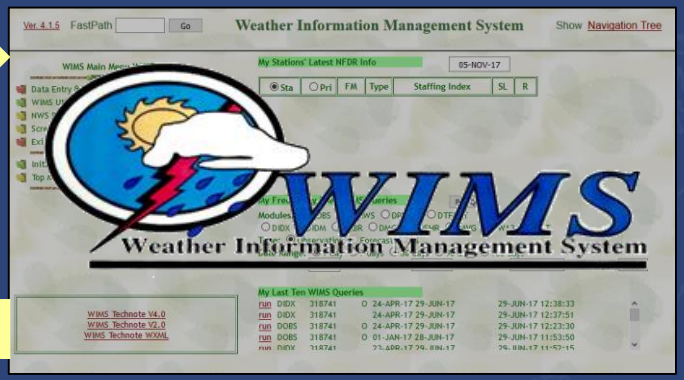


- Point data available since 2002, or since each station started reporting

NFDRS Data

Weather Observations

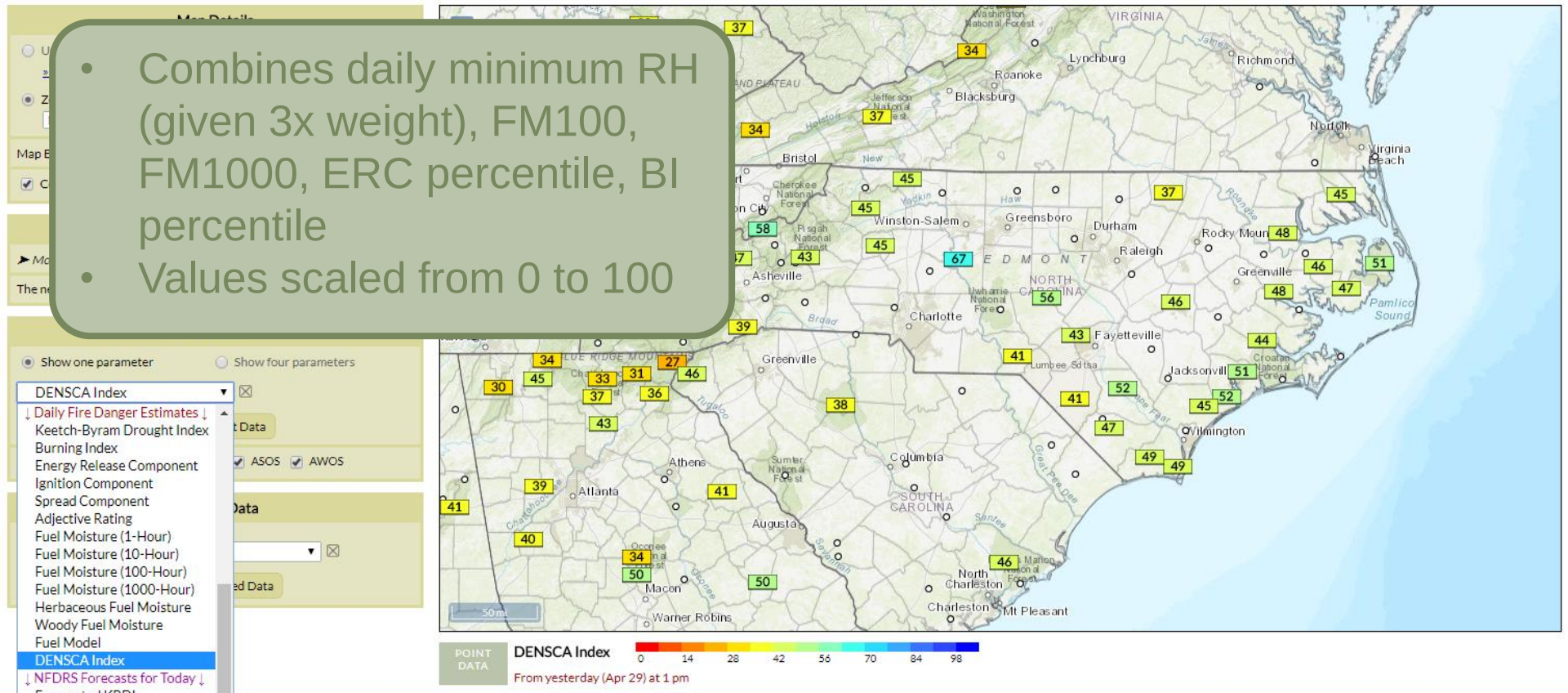
Calculated NFDRS Output



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

DENSCA Index

- Combines daily minimum RH (given 3x weight), FM100, FM1000, ERC percentile, BI percentile
- Values scaled from 0 to 100

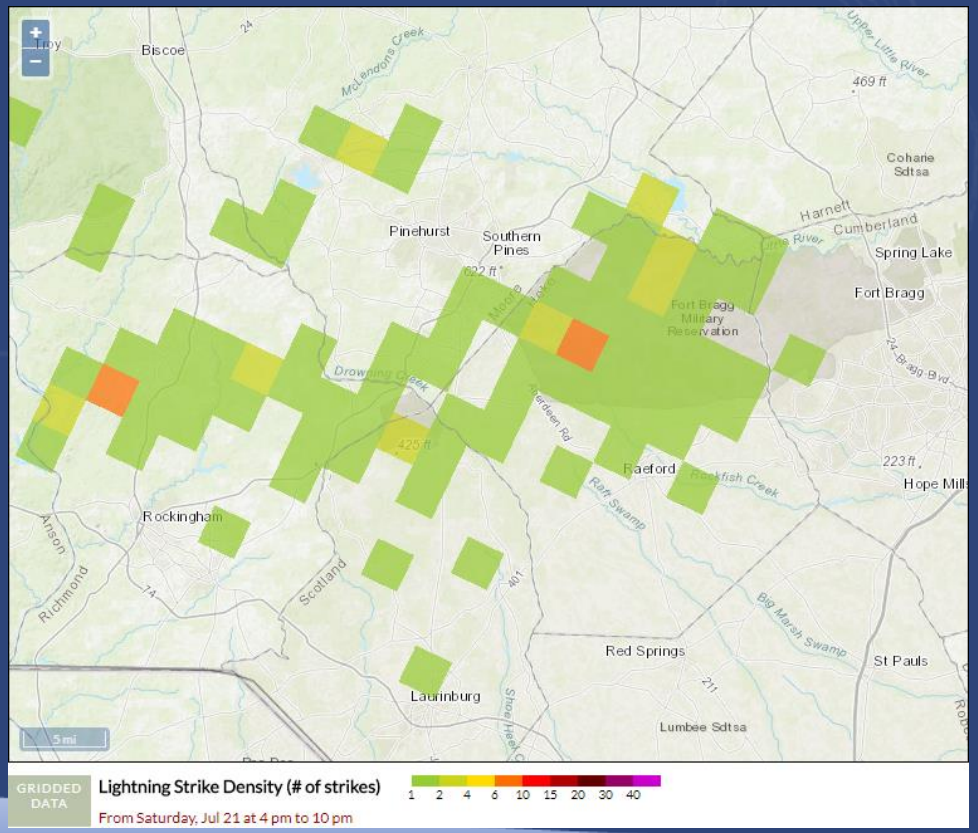


Gridded Datasets

- 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

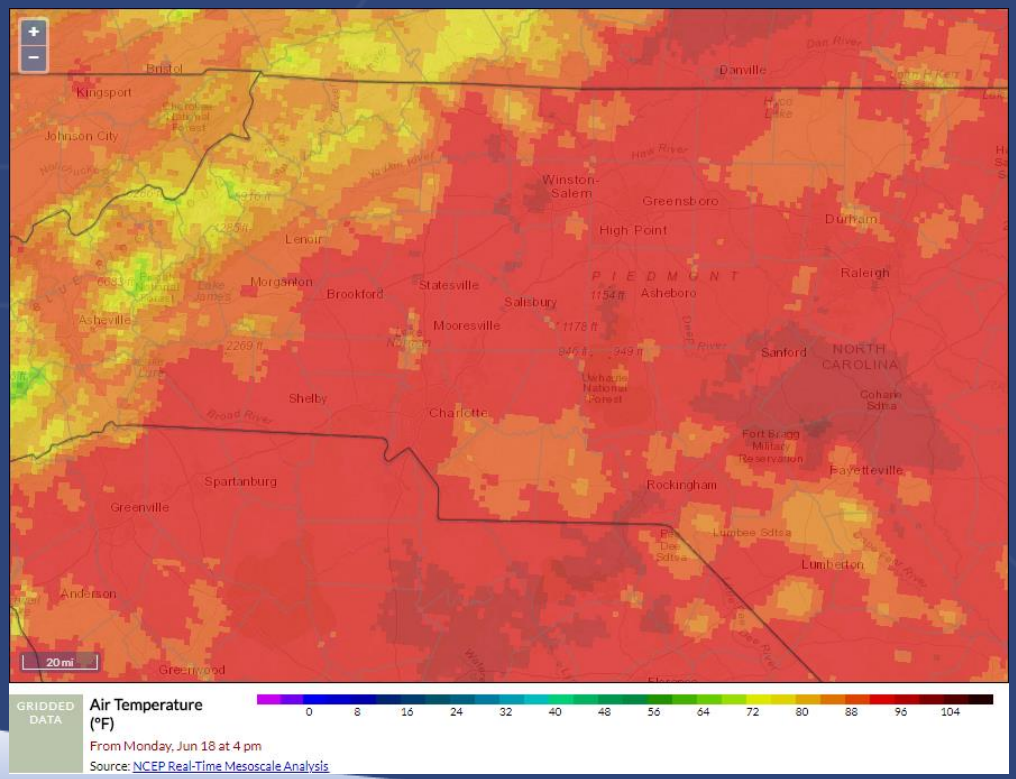
Lightning Strike Density

- 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

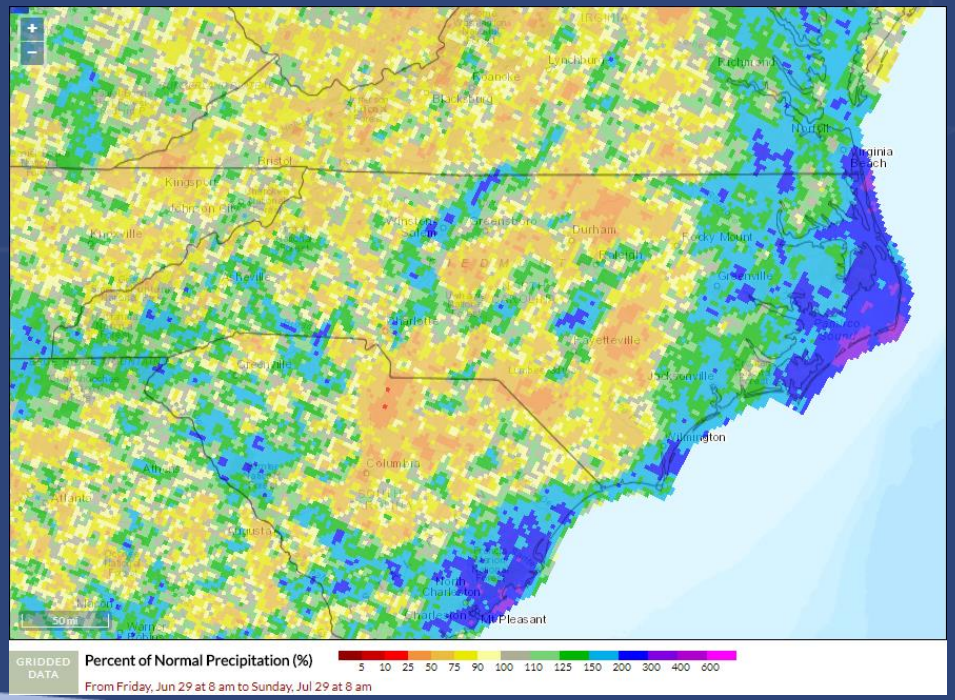
- Hourly surface weather conditions from NWS



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

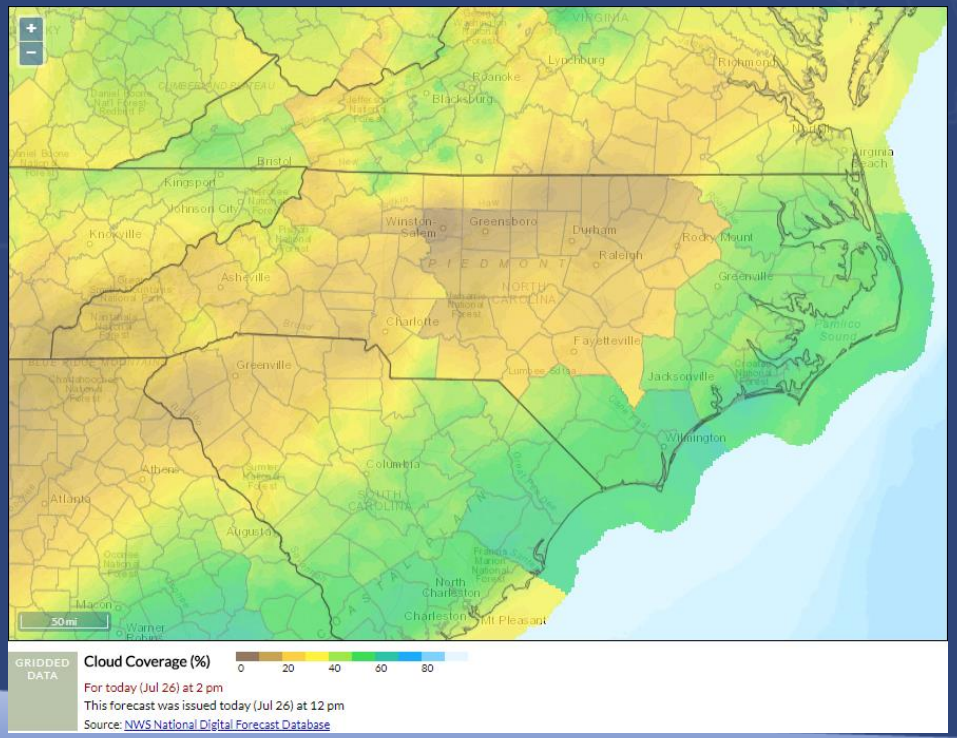
Gridded Precipitation Products

- 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



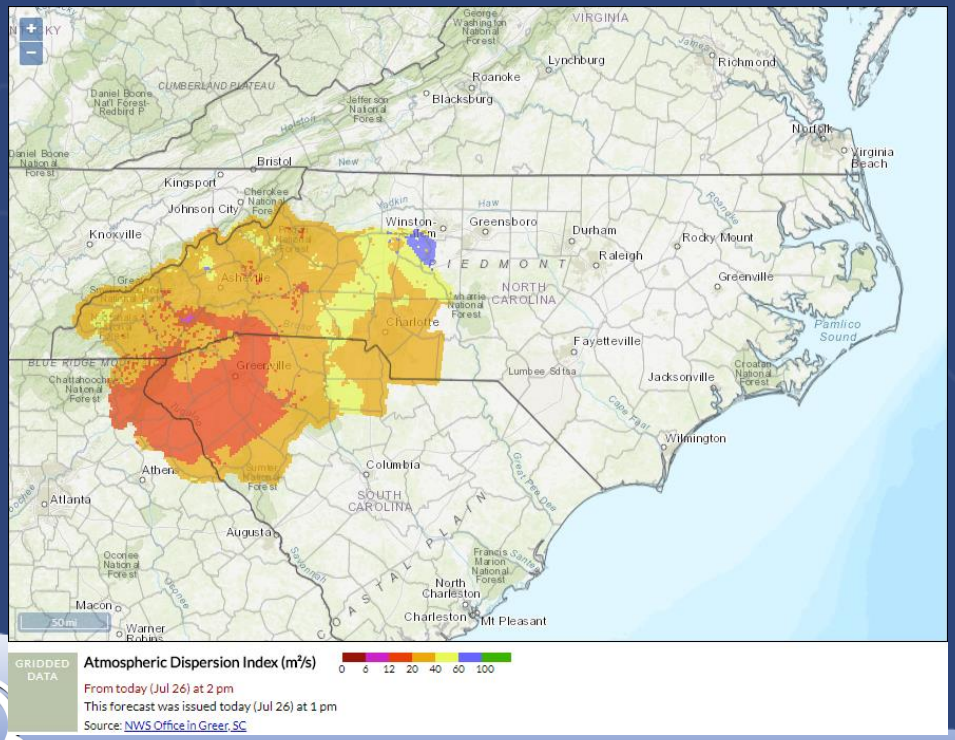
National Digital Forecast Database

- 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

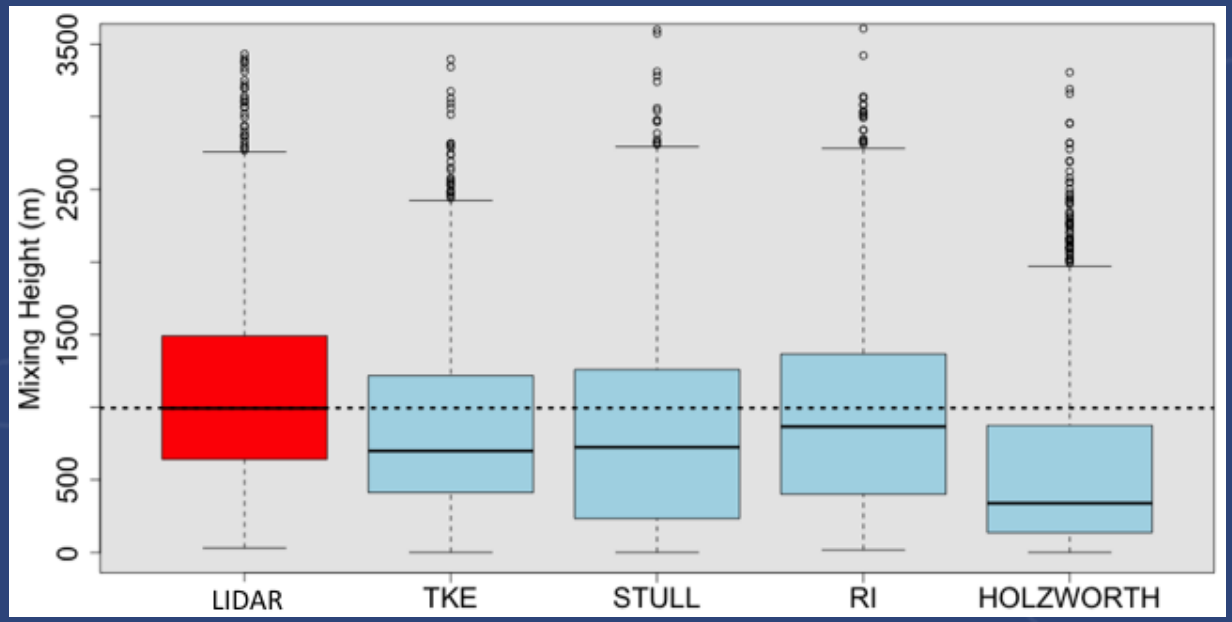


- Ventilation rate, stability class, ADI, LVORI
- MRH has also started sharing their grids; other NC WFOs soon

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

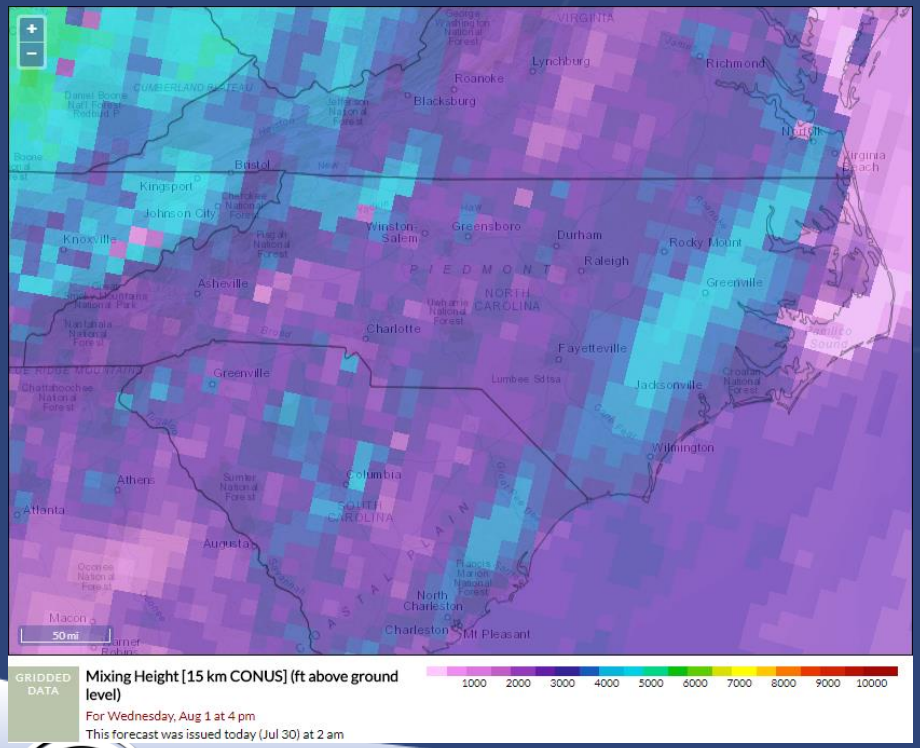


From Fearon et al., 2015

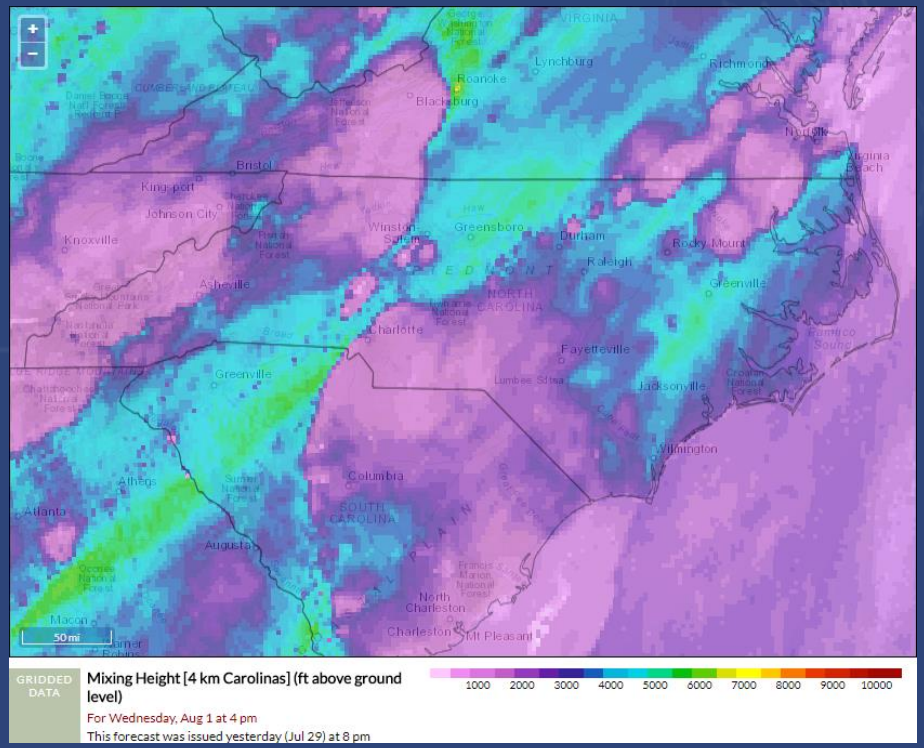
TKE – most robust method
Stull – most operationally feasible
RI – surrogate for dominant TKE terms
Holzworth – not recommended

SCO WRF Mixing Height

15 km run

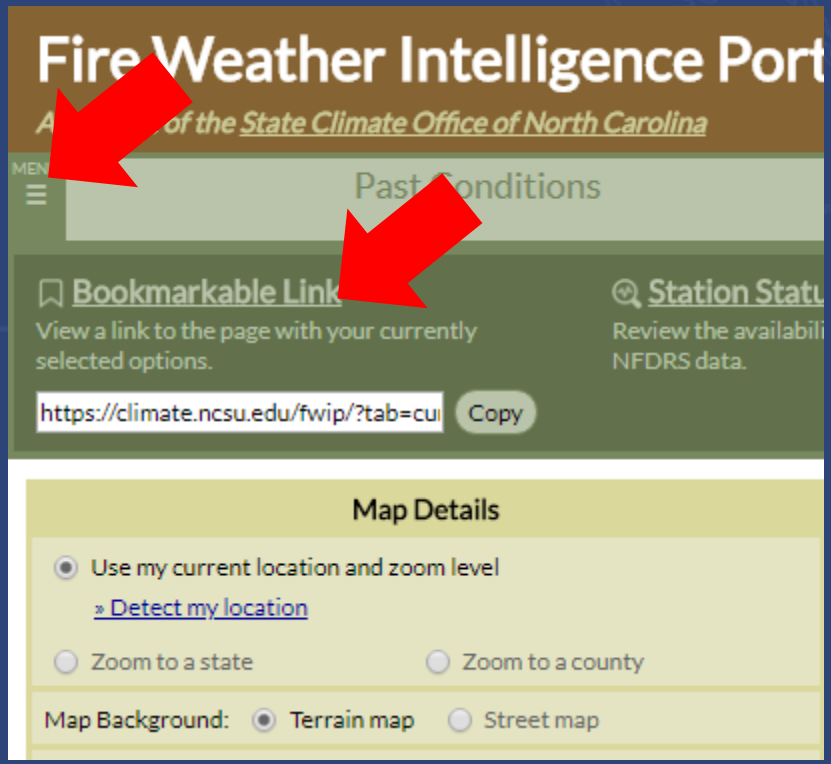


4 km run



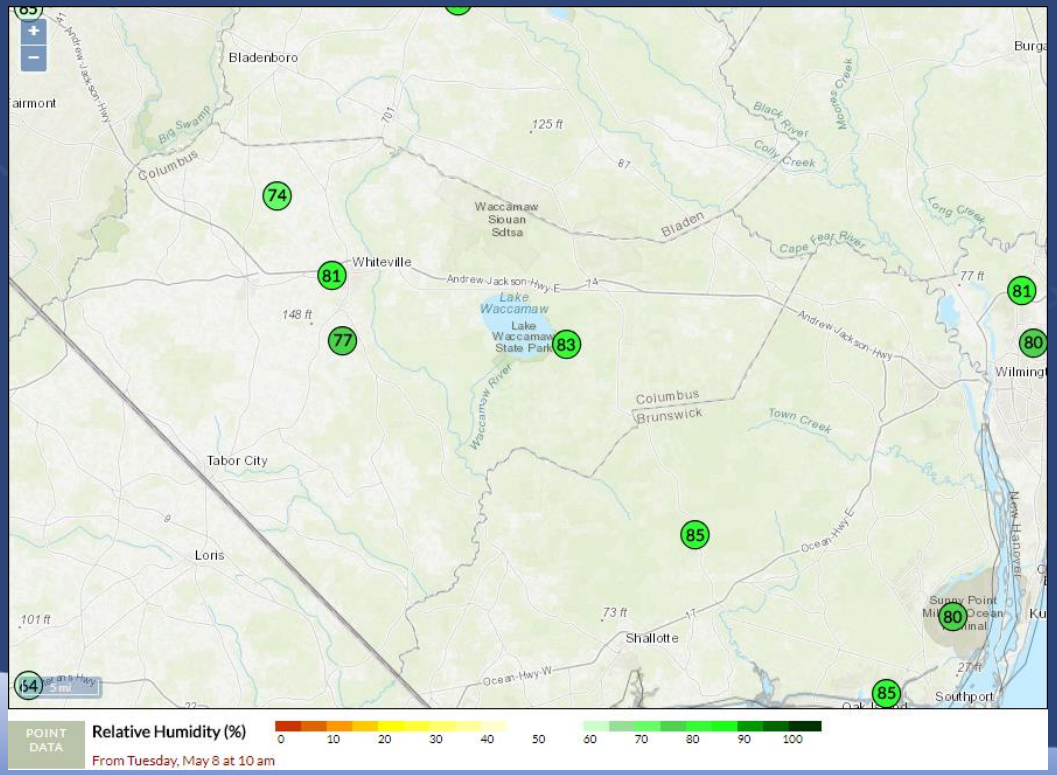
Portal Strengths

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



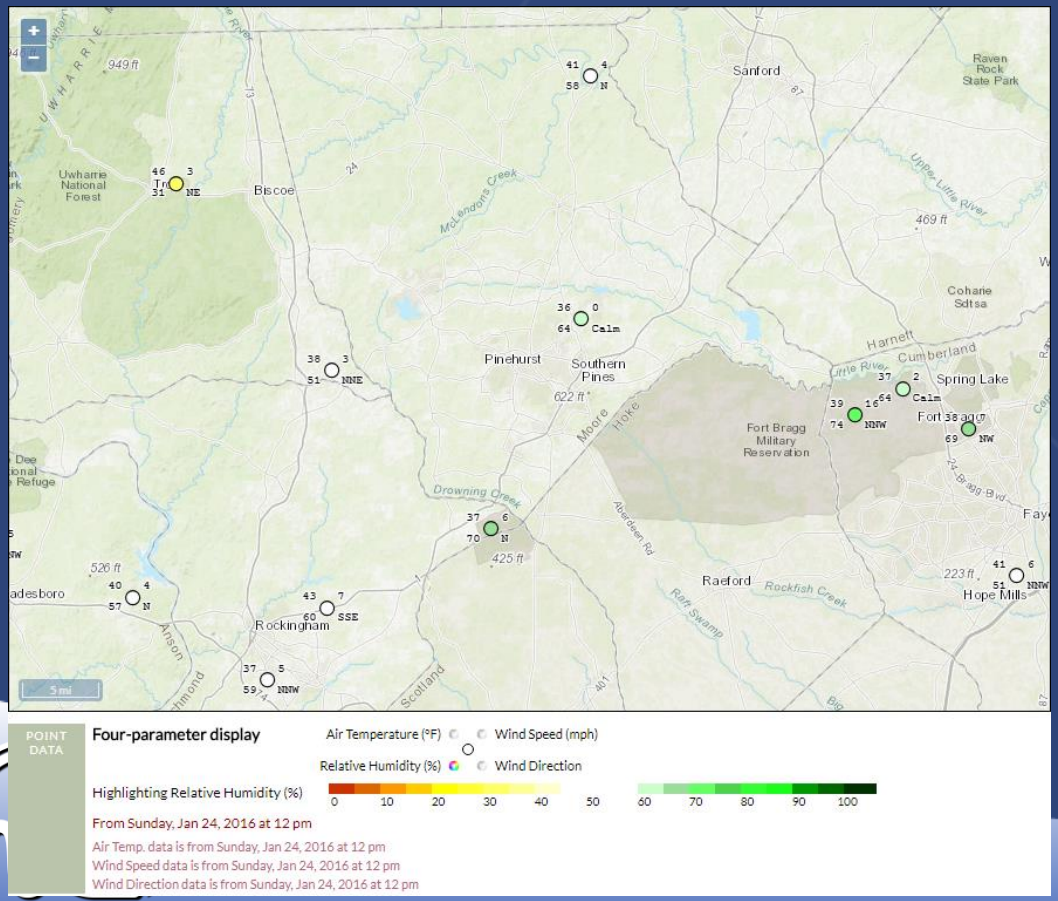
Portal Example Usage

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



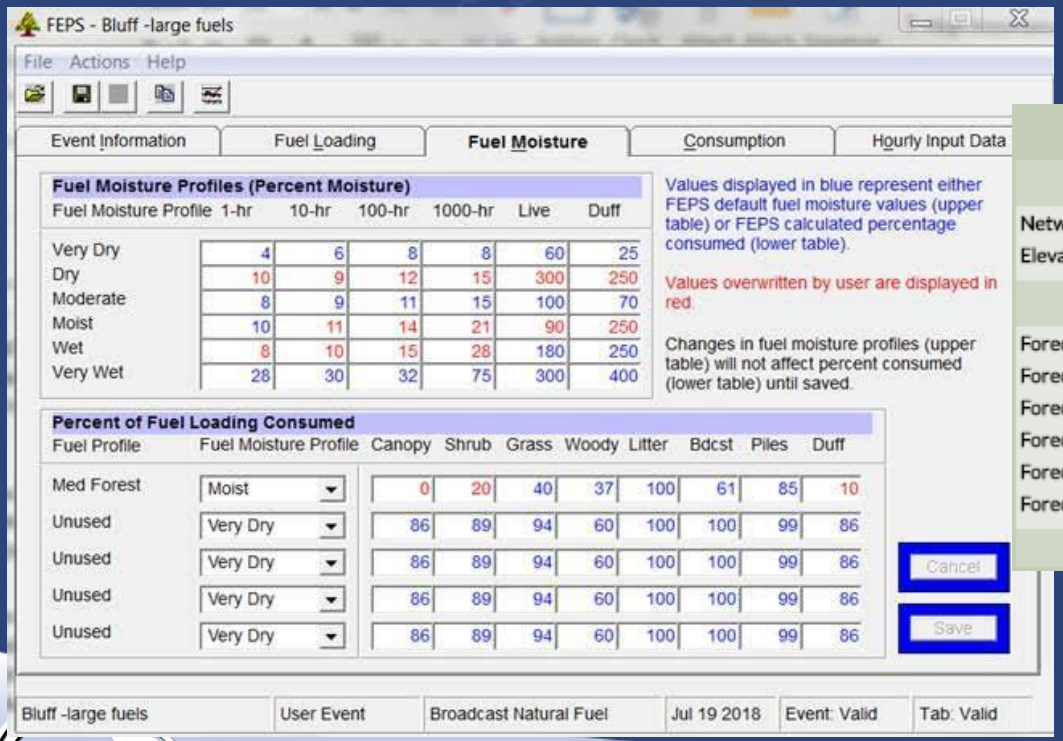
Portal Example Usage

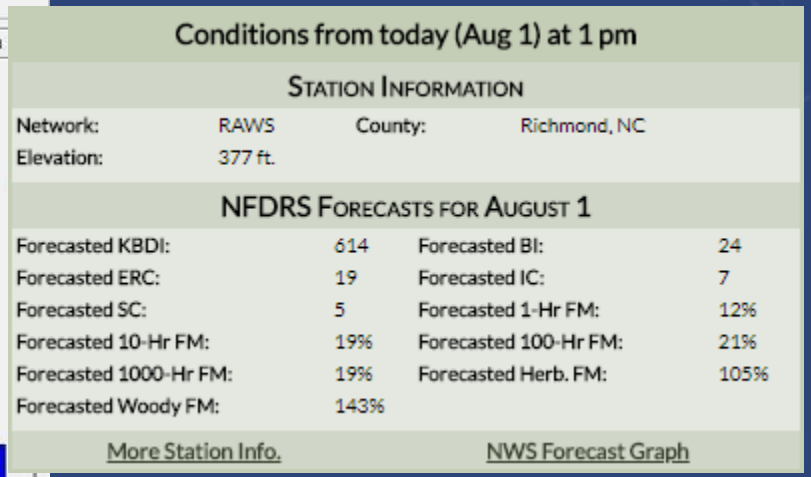
- Verifying weather factors in fire severity



Portal Example Usage

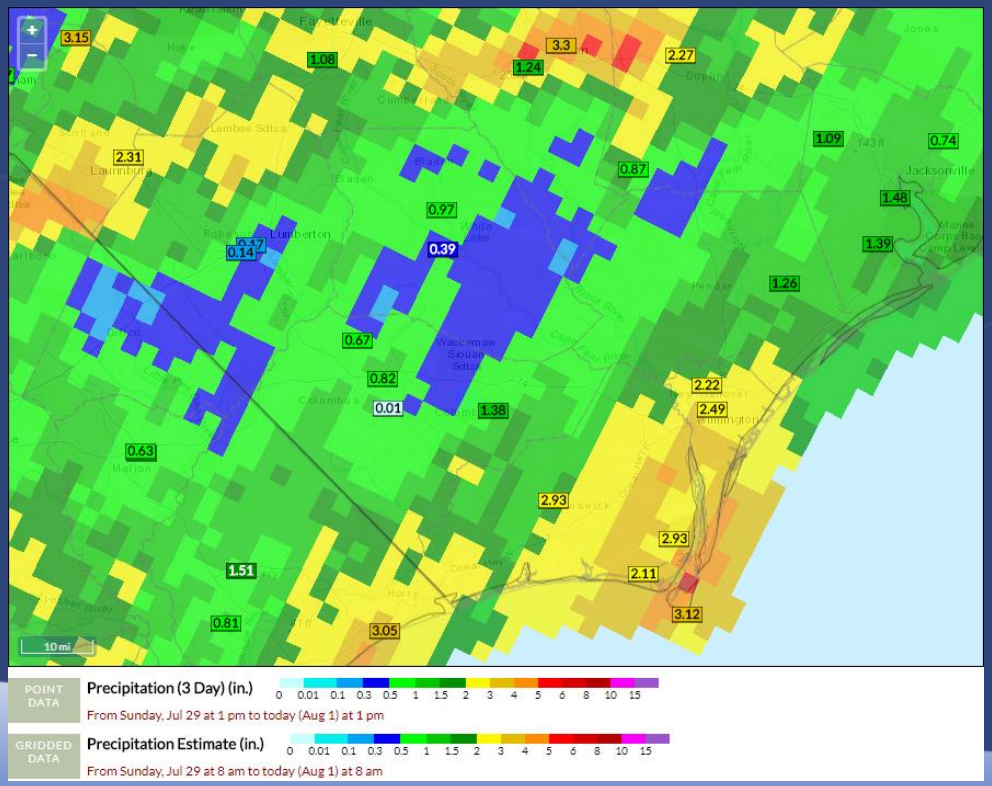
- Filling in FEPS files for smoke modeling





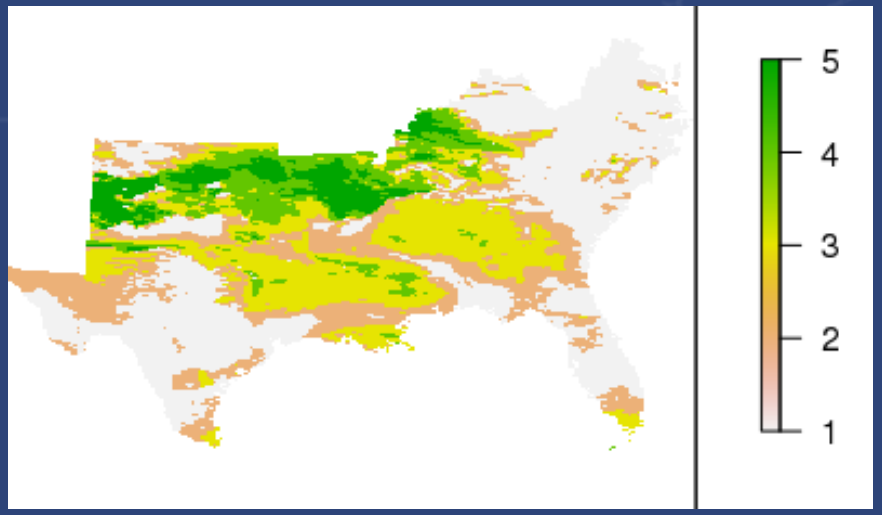
Portal Example Usage

- Routine daily monitoring of environmental moisture conditions



Portal Limitations

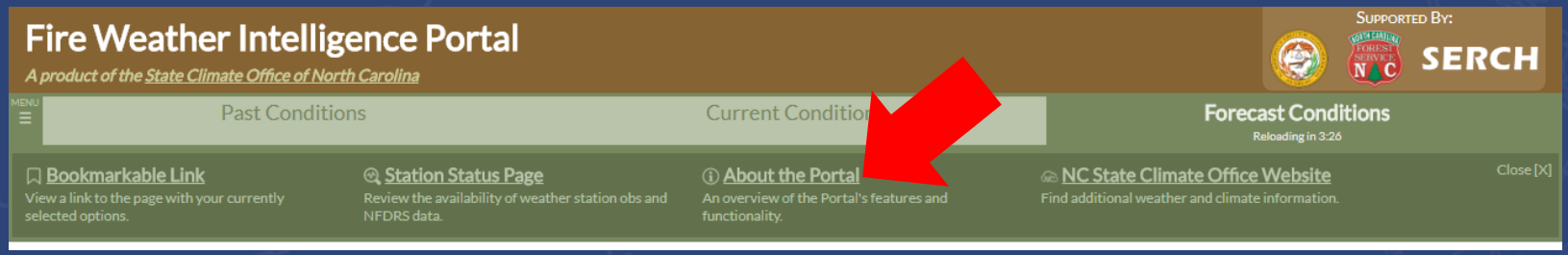
- Lacking some forecast information and parameters
  - Vent rate, Burning Category, stability class, ADI, and LVORI from SCO WRF are in development
- Plan to add retrieval of gridded values on click
  - And meteograms for forecast data



Example Burning Category data calculated from SCO WRF model

Additional Information

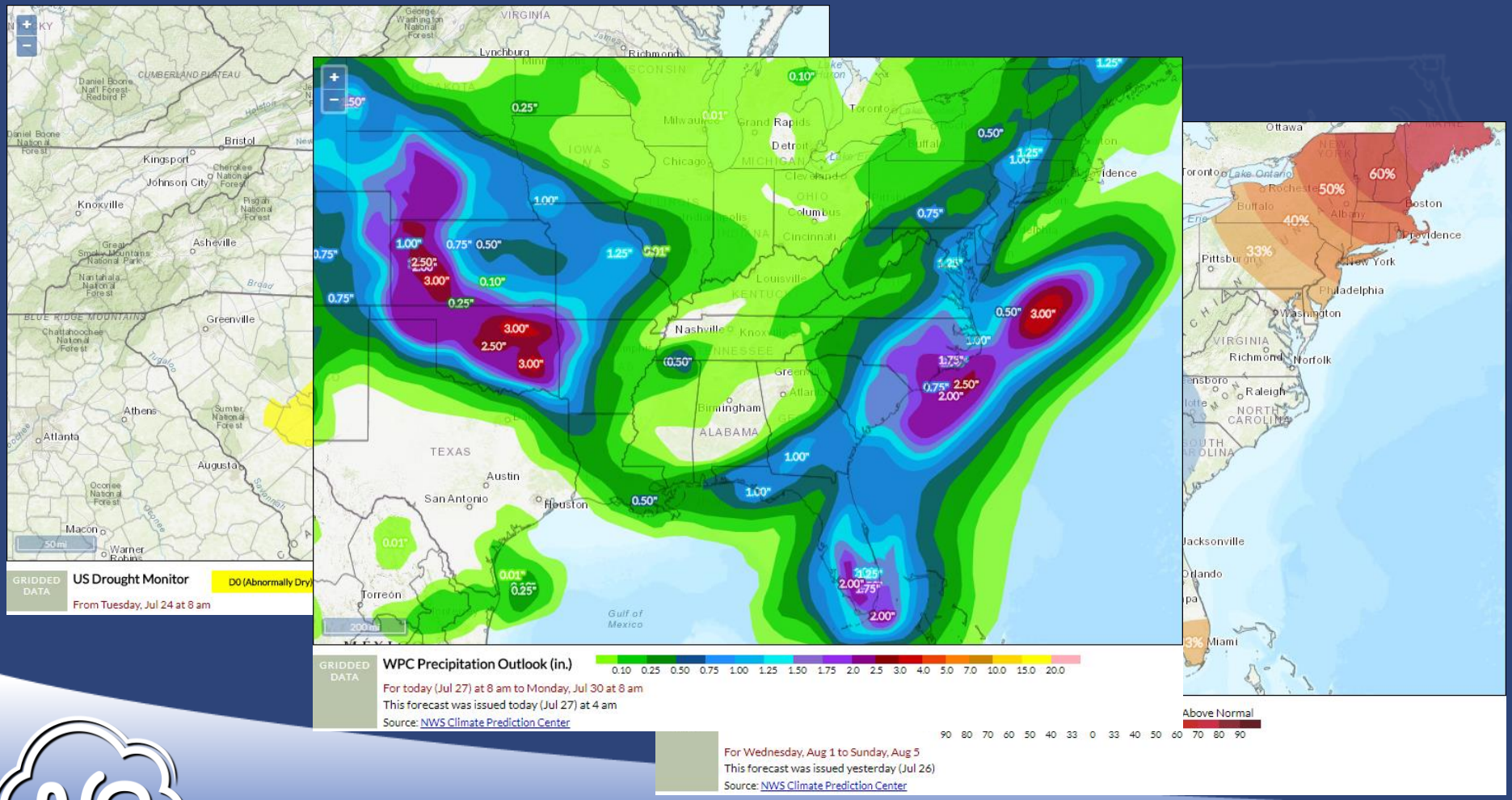
- Online documentation is available



- Contact Corey Davis:
  - cndavis@ncsu.edu
  - 919-513-1390

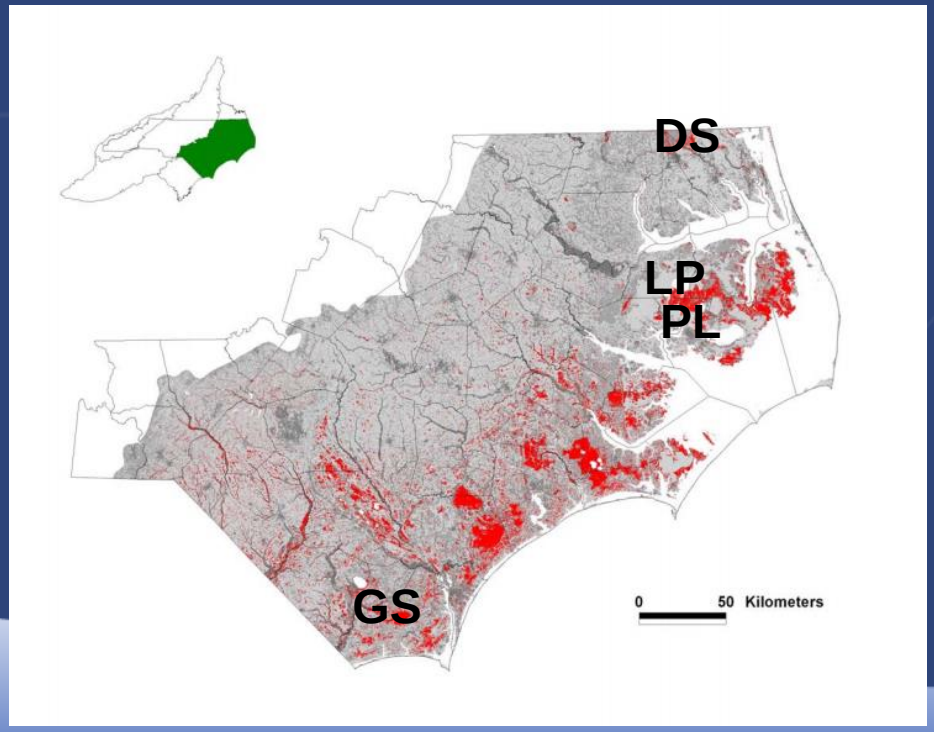
Upcoming Additions to the Portal and Drought Resource Engagement

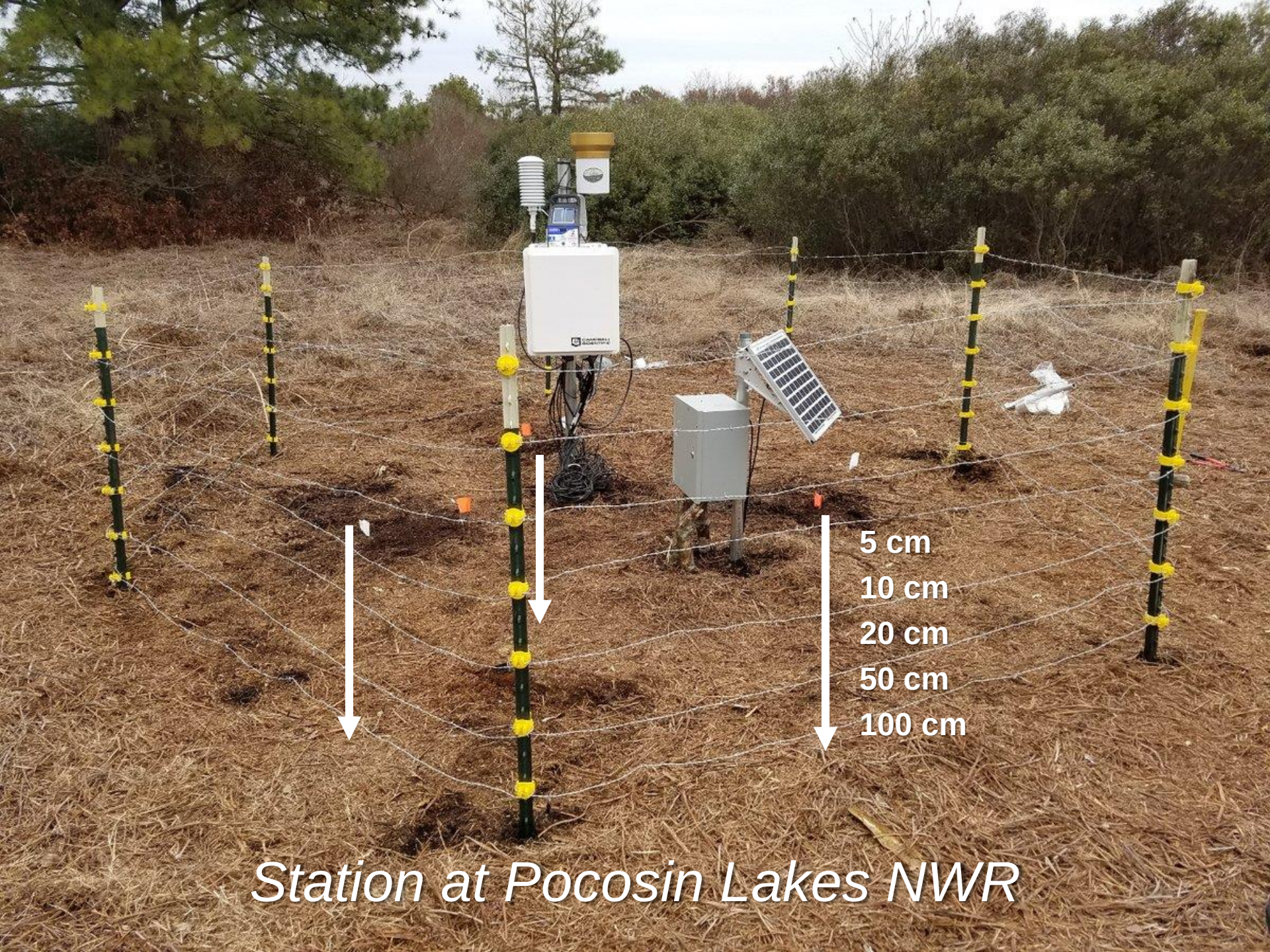
Recently Added Products



Upcoming Products

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





Station at Pocosin Lakes NWR

Using the Portal

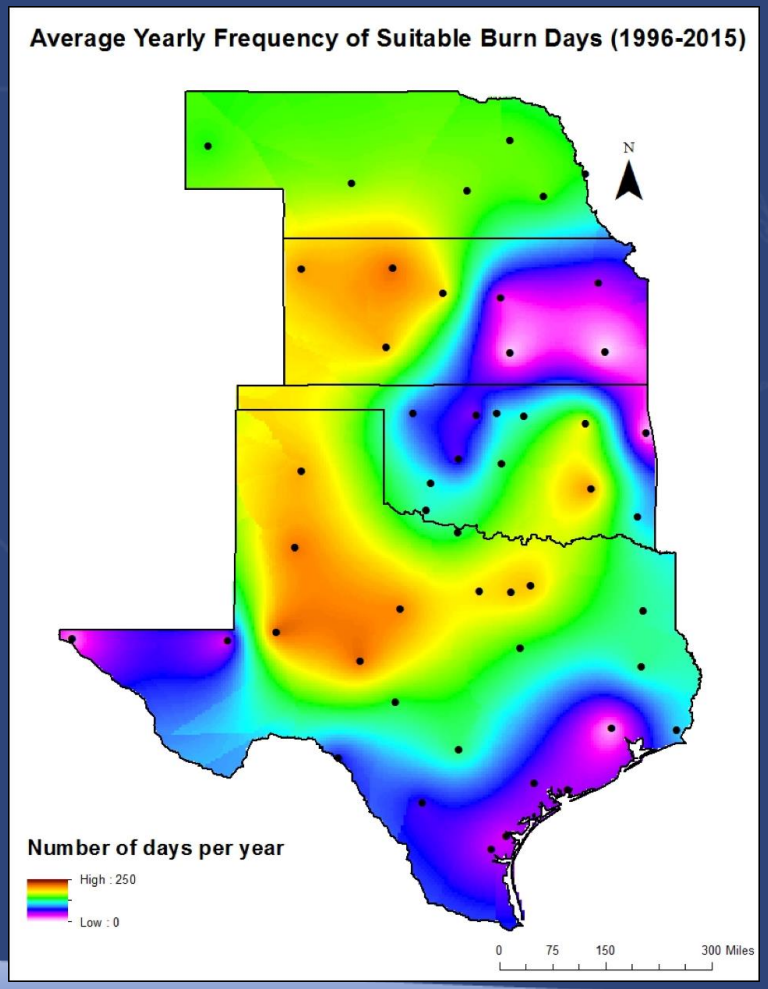
- How often do you use the Portal?
- Which region(s) do you usually view?
- Which datasets do you view most frequently?
- Do you use the Portal by itself or alongside other products?
- Which external products do you look at for environmental monitoring?

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

Corey Davis

cndavis@ncsu.edu

919-513-1390