# Fire Environment Committee Meeting

May 2-3, 2018

Ocean Isle Beach

**Welcome and Introductions**

**Review/Discussion of Minutes from November 2017 Meeting**

- Fire Weather Portal
  - Bug has been fixed that wasn't showing your bookmarked location
  - Cabe and John are still working on new breakpoints for Adjective Rating
- Smoke Management Plan
  - Requirement for retention of HYSPLIT met files
    - Those are large files that would be difficult to email, so now request only that people save their files locally
  - BlueSky model
    - Make 4 km grids available? Cabe emailed AirFire but haven't gotten a response from them
- Training
  - Current burn boss course not meeting the needs
    - Was going to be taught next week but was canceled due to lack of interest/qualified students
    - Still planning to review the course
  - RX-410: offer again as soon as feasible?
    - Won't happen this year; maybe 2019?
- Prescribed Fire Council
  - Will ask NWS at this meeting about include adverse wind profile year-round
- Minutes were approved as written

**New and Existing Tools in Air Quality Monitoring** (Elliot Tardif, NC DEQ)

- GOES-16 was the latest satellite launched for earth monitoring and imaging
  - Presented at high temporal and spatial resolutions
    - Updates every 5 minutes, so it provides near real-time imagery to assist in detection of smoke plumes
- GOES-16 data in real-time: http://rammb-slider.cira.colostate.edu/?sat=goes-16
  - In left-side menu, can change Se(c)tor to CONUS and then zoom in and pan to a specific area
  - Default imagery is useful for determining smoke plume locations, but other products are available too:
    - Natural Fire Color (CIRA)
      - Highlights heat signatures from prescribed burns and wildfires

        - May sometimes pick up artificial sources like steel mills
    - Fire Temperature (CIRA)
- College of DuPage's experimental viewer: http://weather.cod.edu/satrad/exper
    - Lightning Data
        - Click the Product Overlays button in the top left corner of the map
        - Data may not be archived yet
- Ozone Design Value Predictor (new tool from DEQ): http://www2.ncair.org/airaware/forecast/DesignValues/predictor_nc.php
    - Shows ground-level ozone values at all air quality monitoring sites statewide
        - Ozone measured in rolling 8-hour averages
        - Using average of the fourth-highest 8-hour values over a three-year period, can tell whether sites are exceeding the 70 ppb standard
- John Cook: Be careful assigning emissions values based on GOES data; other states have tried it with some difficulties
    - NWS Norman, OK working on a notification product based on this
- DEQ currently forecasts for regions (groups of counties) for ozone and PM2.5
    - Moving to a new capability to forecast for individual counties
        - For counties without a monitor, will use the closest one
- Hazard Mapping System Fire and Smoke Product: www.ospo.noaa.gov/Products/land/hms.html
    - Shows current burn locations and some smoke plumes/trajectories (from HYSPLIT?)
    - Not real-time; usually updates each morning
        - A similar product at airnow.gov updates at two-hour intervals

**State Climate Office Updates + Long Range Outlook** (Corey Davis, NC SCO)

- Fire Weather Portal updates since the November meeting
    - Added some new RAWS stations in other states
        - Are incident RAWS included in the Portal? Share an example with Corey if you know of one.
    - Added current and historical US Drought Monitor overlays
    - Added DENSCA Index
        - Developed by Denver Ingram and Kevin Scasny at SACC
        - Combines FM100, FM1000, BI percentile, ERC percentile, and min RH (weighted by a factor of 3) to give a fire danger value ranging from 0 (high danger) to 100 (no problem)
        - Preliminary analysis suggests that DENSCA < 38 is associated with increased fire activity
        - Available for Past and Current Conditions + on meteograms
        - Please evaluate and share feedback
    - Added a Readiness Plan Assistant Tool to show decision level values for FDRAs based on ERC and FM100
        - Tool isn't linked from the FWIP; ask Corey or Cabe if you need the link
        - FDRAs don't have tables for summer; may need to adjust this?

- Created new static image maps of several Portal parameters (KBDI, FM100, ERC, Adjective Rating, Adjective Rating averaged by FDRA, readiness plan decision levels)
    - Eventually will want to put the Adjective Rating by FDRA on the public-facing NCFS site, but first, John and Cabe need to set new breakpoints for all NC stations
    - Some of these will be displayed on the SACC site as well
- To-do list/wish list (based on suggestions at past meetings and discussions)
    - Coming soon: CPC temperature and precip. outlooks
    - Coming soon: WPC precipitation forecasts for the next 7 days
    - Still investigating real-time fine dead fuel moisture as a replacement/supplement for 1-hour FM, which is only updated once per day
    - Hope to add NASA's satellite-based soil moisture and Green Vegetation Fraction data; also SMAP?
        - Corey has been in contact with someone at NASA and is waiting to hear back about getting access to those grids
    - Meteogram enhancements including historical max/min/avg values for additional NFDRS parameters + an option to download meteogram data as a spreadsheet
    - New forecast datasets
        - Smoke and fire grids for vent rate, stability class, ADI, and LVORI from all NWS WFOs in NC
            - Jim Merrell is coordinating this before he retires in 4 months
            - Jake Wimberley at NWS GSP has offered to share his scripts
        - Smoke and fire grids also in development at the SCO based on the WRF model
            - Hope to have beta versions ready this summer
            - Eventually will be calculated over 3 different grids of varying resolution: Carolinas, southeast US, and CONUS
        - FWF text products displayed as a shapefile
            - Comment: These may not be very useful since they're only for a county/zone instead of a point
            - Use PWFs instead? GSP may be producing AWFs at higher resolution.
        - Extracting weather data from NDFD to calculate future fire danger, including a forecasted DENSCA
            - Current publicly available NDFD files are at 3-hour intervals, which would make calculating precipitation duration more difficult
                - NWS will investigate getting hourly (instead of 3-hourly) NDFD grids along with fire/smoke products
            - Suggestion: Check with Matt Jolly or SACC about calculating BI/ERC/FM forecast values based on NDFD
    - Additional suggestions

- Link the Portal with the NCFS database of planned burns to show those burns each day (lat/lon and expected tonnage)
    - Would help districts coordinate to know what's burning next door
    - Will need an NCID to get access to their database (could be grabbed as a spreadsheet/csv file)
    - South Carolina Forestry Commission has some tools for showing current wildfire locations and burning permits: https://www.state.sc.us/forest/fire.htm
        - Includes county, lat/lon, burn type, and acreage

- Organic soil moisture monitoring
    - CISA is funding 3 monitoring stations in NC
    - Goal is to monitor conditions for a few years then compare with other datasets (SMAP?) to find a good proxy for organic soil moisture and smoldering potential
    - Last year, the 3 target sites were identified by the FEC
        - Pocosin Lakes NWR site was installed in March
            - Data so far shows a significant response of 5 cm and 10 cm soil moisture to rainfall and lack of rainfall/warm weather
            - 10 cm values have been consistently lower than 5 cm; could be roots sapping moisture from that level, or evaporation as surface moisture trickles down?
        - Green Swamp site visit was completed last month; a site was selected along the northern boundary
            - Will need to clear some brush along the 50-100 foot path to the station location
            - Waiting for NCSU approval of language in the research permit application
        - Dismal Swamp site visit was also completed last month; proposed site is in a maintenance area behind the visitor's center, on the fringe between the grass and woods
            - Thomas Crate said the soils there should be at least 3 feet deep
    - TNC is interested in having a second station at Pocosin Lakes funded by US F&WS on a drained plot about a mile SE of the first station
        - Site visit was completed last August
        - Waiting on NCSU approval of the contract
    - Hope to complete the 3 remaining installations this spring
    - OSM data will be added to the Portal
        - Could include an option to show individual sensors as well as the level averages (average all three sensors at 5 cm, 10 cm, etc.)
    - Also a cheaper RAWS-type monitoring option that could include fewer sensors/levels
        - John Cook is interested and has funding for 2 soil moisture stations near Dare Bomb Range
- Long-range outlook
    - La Nina was in place last winter, and it was warm and dry as expected, but much colder in January and snowier overall

- NC came out of drought this winter, which was also unexpected given the outlook of dry weather
- Now going from La Nina to ENSO neutral conditions
    - Forecasts show a possible weak El Nino this fall, but they showed the same thing last year and it didn't happen
        - Typical of the summertime predictability barrier for ENSO
- CPC's summer outlook shows warmer than normal weather along the east coast with possible above-normal precipitation in the Northeast and Mid-Atlantic
    - However, that forecast was made a few weeks ago, and since then, several of the models or model ensembles have backed off on that wet summer forecast
- In mid-April, NCSU's forecast team released their tropical outlook
    - Expecting above-normal numbers of storms (14 to 18) and hurricanes (7 to 11)
    - Based on sea surface temperatures, weather patterns, and other factors
    - Last year, Atlantic SSTs were warm off Africa and in the Gulf, so lots of storms formed there
        - The Bermuda High was set up east of Bermuda, so few storms passed close to the east coast
    - Currently, Atlantic SSTs are warm in the central Atlantic and Caribbean and cool off the African and Gulf coasts
        - Similar past year was 1999; more storms formed closer to land and the Bermuda High steered several (Dennis, Floyd) into NC
    - Current forecasts show a more westerly Bermuda High this summer/fall, which could keep storms away from NC (and bring us warmer weather), *but* that forecast can and probably will change
- Motion passed to add the State Climate Office as a permanent member of the FEC

**Smoke Management Plan Review and Revisions** (Cabe Speary, NCFS)

- Last fall, the Prescribed Fire Council technical committee offered suggestions to the SMP
    - Changed some dates and total acreage burned over that historical date range
    - "Non-industrial lands" changed to "state and private lands"
    - Burning Category table was updated
        - Vent rates from 0-14,760 now classified as stagnant (no burning allowed)
        - Burning Category 1 (some burning allowed) now corresponds to 14,760 to 33,499
        - New Suggestion: Change bullet point 3 under the Burning Category table (open vs. understory) so it matches the maximum allowable tonnage table (Table 2)
        - Pete S.: Don't like the fuel size classes (1-hr, 10-hr, etc.) included because understory burns often include live fuels and open/site prep burns include a variety of dead fuel sizes
            - It may be confusing to calculate fuel loading and translate to the maximum allowable tonnage chart

- Some landowners haven't gone through the training to know differences between size classes
- Recommendation: Change classification from Open vs. Understory to basic fuel models (Grass/Shrub/Timber vs. Slash), and add that note/clarification beneath the table

- ADM Certification
  - Two levels of proposed certification: basic and advanced
    - Separates VSmoke from PC HYSPLIT since many people weren't completing the ADM course after needing to do a model run
    - Basic certification requires completing the NC Certified Burner course, NCFS Prescribed Burn School, or have certification from another state
      - Hold basic training during Certified Burner course
        - For 2 to 4 hours after the exam?
        - Webinar-based?
      - Includes performing a model run for a low-complexity smoke management burn
      - Model run and results need to be evaluated by an advanced atmospheric dispersion modeler; if acceptable, evaluator will send a copy of the required documentation and completed burn plan + certification form to the Fire Environment Forester
  - Recommendation: Put a hold on adding this basic certification to the SMP until evaluating needs in each region
    - Have people contact their local ops office if they need a run?
    - Should catch up everyone internally before offering it to the public
      - Hold a standalone ADM school for NCFS?
    - Can still introduce the concept of ADM in the prescribed burn school
    - Re-evaluate this at the PFC Annual Meeting and/or at the next FEC Meeting
  - To get BlueSky implemented, need to get the color code changed and add in visibility as an output

**Training Needs and Opportunities**

- National Wildfire Training website (https://nationalfiretraining.nwcg.gov) includes a listing of past and current courses being offered
  - S490 (Advanced Fire Behavior) being offered in Atlanta next March 11-15
    - Last taught in NC last January
  - S273 (Single Engine Airtanker Manager) being offered in Chapel Hill next March 18-22
  - Cabe attending RAWS training in GA later in May.
- Fire academies still on the schedule
  - May 21-25 in Kinston (includes S215, S231)
  - June 18-22 in Kinston (S230, S270, L280)

    - October 8-12 in Kinston (TBD; probably S215, Firewise)
    - Note: Kinston facility won't have barracks and meals after July 1
    - S211 offered June 25-29 in Crossnore
    - Canceled S290 and S390 last fall. Both have a backlog of people needing.
    - Decisions about non-NCFS nominees for S390 will be made in June
    - S390 may also be offered in June in Maryland
- EPA holding a workshop in Durham on June 25-26: "Stakeholder Views Related to Non-Regulatory Performance Targets for Low-Cost Sensors that Measure PM2.5 and Ozone in the United States"
    - Could be a way to crowdsource PM2.5 and ozone data
    - Need to give manufacturers a sense of targets that the public and researchers are interested in
- S130 and S190 being held in the Smokies this summer, and at NC State in June
- Training officer Aaron's contact: aaron.gay@ncagr.gov
- Southern Blue Ridge meeting coming up May 15-17 in Pickens, SC
    - Fire Learning Network has 8 project areas called landscapes in the southern Blue Ridge that share information about burns
    - Looking at improved communications and how landowner attitudes may have changed over time
    - Long-term forest outlooks after 2016 fires
    - NWS from Atlanta and Columbia will be there
    - Registration is closed but Margit may be able to squeeze people in
- Advanced NFDRS will be held in March 2019 in Tucson
    - Would like to have at least 2 NCFS folks there who have already taken S-491
- Prescribed Fire Council annual meeting is on August 2-3 in Asheboro
    - Tour of the NC Zoo on Thursday (Aug. 2)
    - Tour of an unmanaged stand on Friday

DAY 2

**Comparing the NWS Results for the Lavdas ADI and NC Ventilation Index** (Bill Jackson, NC PFC)

- Ventilation Index is a product of the mixing height and transport wind speed
    - Is the basis for Burning Category
- Lavdas Atmospheric Dispersion Index also includes stability class
- State Climate Office wrote a script to extract NWS fire weather forecast archived data for 2009 to 2014 for the 7 WFOs forecasting for NC
    - For each day, forecasts for morning, afternoon, and any updates
    - Up to 63 forecasted variables available (each file/WFO includes a subset of those)
    - Bill wrote a program to process each NWS FWF file
        - Produced one Excel file for each WFO containing "today's" results
            - Contains date, season, transport wind speed, mixing height, ventilation index, ADI value, and ADI category (calculated based on original Lavdas paper)

- Results
    - Category 1 days had the largest range in ADI categories
        - Most frequent with Fair ADI – those days may have atmospheric stagnations if low wind speed
    - Category 2 days most frequent with Generally Good ADI
        - Some instances Cat 2 days in higher ADI categories if the atmosphere was moderately unstable
    - Category 3 days most frequent with Generally Good or Good ADI
        - Lavdas says Generally Good ADI has good dispersion of smoke
    - Category 4 days most frequent with Good or Very Good ADI
        - Lavdas says Good ADI typically has good burning weather conditions
    - Category 5 days most frequent with Very Good ADI
        - Lavdas says Very Good ADI may indirectly bring hazardous burning conditions because the atmosphere can be very unstable
    - General agreement among all WFOs except for Morristown because mixing height is determined above mean sea level
        - Seems to shift everything down 1 category; not as many Very Good ADI days there
- Why don't some states (AL, FL, GA) use Burning Category and use ADI instead?
    - Bill: They were possibly working with the Macon lab, which had peer-reviewed literature surrounding ADI to support its usage
    - It would take a large amount of education to switch other states like NC to ADI only. Bill does not recommend at this time.
    - In Arkansas, used a series of VSmoke runs to help set tonnage restrictions for each Burning Category

**Using Stull Methodology to Calculate Mixing Heights** (Josh Weiss, NWS ILM)

- Background
    - Mixing height forecasting is difficult with little to no verification
    - Values vary among models, and different NWS WFOs use different methodologies
    - Uncertainty about best practices (which method is best?)
    - Mixing heights are important
        - They help determine many other FWF parameters (inversion, transport wind, vent rate, ADI, LVORI, potential temperature)
        - Impact transportation (super fog)
- NWCG told NWS HQ in October 2014 that they wanted a more consistent mixing height forecast
    - NWS formed a team with 9 members (2 from each region) using research by Matt Fearon to establish a national mixing height method
        - Research compared different methods (incl. Holzworth, Stull, Bulk Richardson, TKE) and determined which was the most accurate using NASA's CALIPSO satellite, which uses aerosol backscattering to determine an accurate mixing height
            - Holzworth (most frequently used) was the worst

                - Statistically insignificant differences between Stull, TKE, RI
                    - Richardson Number is similar to/incorporated into TKE
            - Paper recommended TKE; it had the least variability and was closest to the LIDAR control
                - However, a very fine grid scale is needed with no feasible way to operationally diagnose the accuracy (can't compare to observed TKE values)
            - Stull was recommended because it is most operationally feasible/easy to diagnose
                - Key difference from Holzworth: Holzworth uses dry adiabatic lapse rates but Stull incorporates moisture (virtual potential temperature)
                - In NC, Stull typically predicts a higher mixing height than Holzworth
                    - Sometimes, especially on days with lots of moisture present, NWS RAH's modified virtual potential temperature approach over-predicts mixing heights by 20 to 25%
- Status of Stull implementation
    - WFO ILM has virtual potential temperature plotted in AWIPS
    - WFO MSO, FFC, SLC have been testing a Stull smartTool that puts model output into the graphical forecast editor
        - Initial version was scrapped due to some errors
        - A new version has been developed
            - Uses the NBM (National Blend of Models) instead of NAM only
            - Now in testing throughout FY18 to compare Holzworth with Stull
            - Adjustments will be made as needed, and in early FY19, will make Stull mixing height grids available as experimental to partners on the FWF? Or somewhere else?
            - A long comment and evaluation period (at least 1 year) will follow (for education, comparison, and policy changes)
            - Initially, it will be up to each WFO to adopt Stull
            - Will there be a need to adjust VIS or other tables? V-smoke runs?
            - Eventually plan to have it nationally operational
                - Mixing height grids could be created at the national center and sent down to individual offices
                    - That could be an issue if those grids don't account for local factors (e.g., terrain, thin barrier islands) that each WFO might know better
                    - Also, the NBM doesn't perform well in situations like extreme heat or frontal passages with different timings
    - Until implementation is complete, continue to give feedback to your local WFO if their forecasted mixing heights are correct (or incorrect)
        - They can keep a record of that and adjust their forecasts
        - NWS RAH issued 95 spot forecasts last year; only got feedback about 7
    - May need an internal team/lead in NC to help with evaluating the different methods

        - Could compare different forecast values from the FWFs + SCO WRF model (uses TKE)
        - Possibly use some spare balloons and radiosondes (currently located in Kinston) to verify mixing height forecasts
            - Could be a graduate student project? See JFSP funding opportunity

**Agency Updates**

- Region 2
    - Fully staffed now
    - Lots of forester vacancies at the district level
    - Not as much prescribed burning as preferred over the past year due to weather
    - Several large fires due to high winds/low RH
        - Including a 339 acre fire in Chatham County at Shearon Harris
    - Increased SEAT use
    - Short 3 county rangers and about a dozen ACRs
    - D11 is getting more involved doing small burns (2-3 acres) at local parks and plots, including Duke Gardens, Chapel Hill Library, Hemlock Bluffs
- Management team
    - Greg Smith from D1 accepted a position in Region 3
    - Joe Gilroy moved to Division of Aviation
    - Discussed proposed changes to SMP in early April; discussed concerns about holding back implementing basic vs. advanced certifications
- National Weather Service
    - AOP signatory form will go out this week
    - GSP is now doing 3-hourly values for stability class, ADI, and LVORI in their PFWs
        - Current PFWs from other offices just show a max value at 6-hour increments
        - Recommend leaving PFWs as-is for other offices
    - Jim Merrell will coordinate with GSP and other NC WFOs to get smoke and fire product grids to the FWIP
    - Heard some concerns/confusion about issuing enhanced fire danger statements (SPSs) further in advance than desired
        - Those will now always be issued in a 24-hour window
    - Have had some recent hires at various offices
- Region 1
    - D7 has names in a slot for every job except district ranger, but have 3 to 5 people out with medical issues
    - Fully staffed at the region level
    - Slower burning/fire season than usual
    - D4 has fallen behind the curve on burning in some areas (especially along the urban interface) due to many wet years + new, inexperienced people coming in
        - Need to catch people up on ADM

    - Recommendation: FEC should produce some TechNotes about growing season burning
        - Research has been done but it needs to be collected in one place
        - Discuss parameters including fire danger (e.g., specific FMs)
        - Discuss outcomes/benefits of growing season burning
        - Margit could draft something with help from NC Wildlife
        - Mark Megalos could offer some forestry expertise?
- Region 3
    - Poor burning conditions last fire season; regular rainfall
        - Minimal prescribed burning opportunities
    - Region level is fully staffed
    - Small fire last weekend on USFS property  Deer Park
    - D12 did a 120-acre burn about 1.5 miles from CLT airport
    - Older single-engine air tanker (SEAT) fleet couldn't fly at ground levels of 2,000 feet or above; recently brought in a newer SEAT fleet that can access those elevations
- The Nature Conservancy
    - Good burn season: 41 burns over 2,700 acres
    - Sharing crews with Wildlife Resources and federal acres: an additional 96 burns of 37,000 acres
- NC Parks Service
    - Mountain region biologist Marshall Ellis just retired
    - Created 2 new positions (restoration forester and full-time permanent fire position) now in review with state HR
    - Updated MOU going to NCFS management team for review
        - Targets better communication between Parks and NCFS/county level
    - New MOA with NCFS in the works, including aviation access, equipment time, and contract burning
    - Burned over 21 different park units and 5,400 acres so far with additional growing season burns planned
    - Building 7 brush trucks
    - Adding a second burn crew in D6/Harnett County at Raven Rock State Park?
        - Could be online within the next year or two
        - Existing burn crews are available to anyone based on MOUs with various agencies
- NC Wildlife
    - Fully staffed for the first time in 8 to 9 months
    - Renewed MOU for the next 5 years with NCFS signed about a month ago
    - Successful burn season in the Sandhills and southern Coastal Plain; more recent burns in the northern Piedmont
- US Fish and Wildlife Service
    - Good on manpower at the moment
    - Took delivery of some new equipment to replace an old Geo-Boy
    - Lots of experience available on their crews
    - Not as many dry days with a northeasterly wind to burn, and typically not many growing season burning opportunities there
    - Some planned burning at Pea Island this fall

- National Park Service
    - Their zone covers 20 parks in a four-state region
    - Changing their zone name to “Appalachian-Piedmont-Coastal (APC) Zone”
    - 4 vacancies to fill
    - Slow burning season, but did do one burn in the Smokies on the NC side and one at Moores Creek near Wilmington
- Camp Lejeune
    - Have one position open now
    - 19 fires responded to for 3,600 acres
        - 2 fires covered 2,500 of those acres
    - Best prescribed burning season in a while: 24 burns for 8,022 acres
    - Working with Greg Hicks to update the cooperative fire agreement MOA to include the use of NCFS helicopters for aerial ignition
    - Should have 3 new dozers by next fire season
    - Mechanical and chemical vegetation management ongoing around ignition sources
- State Climate Office
    - Installed a new ECONet in Bahama in February
    - This winter, completed the university’s 5-year review process
        - Top recommendation was to name a permanent director, so expect a committee to be formed this summer or fall
- NCFS Fire
    - Fire staff is fully staffed at the moment
    - Aaron Gay is the new training officer
    - Justin Query has taken over as Fire Prevention Forester in Morganton
    - Stuart Scott is new assistant fire chief
    - Statewide fire activity: 3,257 fires over 9,012 acres
    - 231 prescribed burns for 15,827 acres (68.5 acres average per burn)
    - James Rogers is now full-time FEPP coordinator
    - Randy Kearney now volunteer fire department coordinator

**Fire Environment Project Updates** (Cabe Speary, NCFS)

- NFDRS2016
    - Updated timeline shows a rollout over the next 1 to 2 years
        - National trainers meeting this month to develop a curriculum to take to the geographical areas this fall
        - Will also try to create new decision points for the new fuel models during the week-long training in Atlanta
    - Get preliminary work done to update Fire Danger Operating Plan soon?
    - When will we stop updating WIMS? Not clear based on the timeline.
    - Will Advanced NFDRS be updated after the rollout? May change the format to put some material in S391 and shorten Advanced NFDRS into a week-long course.
        - Caleb: WIMS course was much more beneficial for running ops than S491

            - That course should be offered in NC to get new folks up to speed; US Parks Service is talking to Denver about offering it again
- Live fuel moisture measurement program
    - Getting good data from Dupont Recreational Area
        - Now taking measurements of mountain laurel and rhododendron every two weeks
    - Also set up at Rendezvous Mountain including Virginia pine, but not taking measurements as frequently
    - Goal is to take that program statewide, with maybe 3 sites per region
        - What are ~3 live fuels of concern in each region?
        - What are locations where we can take measurements that won't change drastically over time, e.g., not a timber harvest?
            - Prefer an area of at least 5 acres with personnel nearby who can take monthly measurements (or every 2 weeks during fire season)
- Smoke intrusion
    - D9 has had instances of significant smoke intrusion from South Carolina or areas to the east
    - One possible solution is integrating the NCFS database with the FWIP
    - Would be beneficial to know what's going on across political boundaries
    - Can check spot weather forecast monitoring page for burns in other states
    - How could we better communicate with/provide feedback to other states?
    - Could put out a press release noting location of the smoke releases (e.g., using GOES-16 imagery) to help address public concerns

**Action Items**

- Next meeting scheduled to be held in the Piedmont
    - Proposed location: Cliffs of the Neuse State Park near Goldsboro