NC Fire Environment Committee: 2023 Spring Meeting

In-person at the State Climate Office and virtual via Teams
May 30-31, 2023

Welcome and Introduction (Jamie Dunbar)

- Have 17 people attending in person and 4 joining virtually

Review/Discussion of Minutes from May 2022 Meeting (Jamie Dunbar)

- NCSU now has a signed MOU in place that puts them on the FEC (and they were included on the list of representatives from Cabe in May 2022)
- Note: Gary Curcio has "retired retired" now so Laurel Kays may take his place as representative from NC Prescribed Fire Council
- Background: NC Wildlife Resources Commission upgraded to Windows 10, which was incompatible with the old version of FEPS, which is why Bill Jackson worked on a new SmokeTools interface and corresponding videos
- RT-300 was held in Chattanooga last summer; Thomas and Carmella attended and recommend sending burn bosses and agency administrators since the information is very relevant
- Engine academy is set for next year at Haw River
- Reminder that DENSCA (including 7-day forecasts) is available in the Fire Weather Portal and may be a useful resource to identify days with higher fire potential
- SMP: should we set "rules of the road" for multi-day burns (lasting through the night) in the Mountains?
- Farm Bill is currently in the fourth edition of language to change escaped burns from simple negligence to gross negligence; will likely be approved in the next Farm Bill (unless that language is stripped out)
- Minutes are approved

State Climate Office Updates (Corey Davis)

- Seasonal Weather Review and Outlook
    - Generally warm over the past 6 months, especially in January (8th-warmest) and February (2nd-warmest)
    - Mixture of wet and dry conditions, with dry weather in Feb/Mar and wet in April
        - Prevailing weather patterns have alternated between cold fronts from the west that left eastern areas drier, and lows moving up the coastline
    - This past winter was the 3rd in a row with a La Niña pattern
        - New research suggests that Australian bush fires in 2019-20 may have helped sustain that prolonged La Niña event
        - It was warmer and drier overall in NC with little to no snowfall
        - With such a warm February, the spring fire season started early and was fairly active, especially in eastern NC
    - Since the winter, La Niña has faded and warmer water is building in the Pacific, which could be the first signs of a developing El Niño
    - Current summer outlook shows increased chances of warm and wet weather

        - Justification includes forecast model consensus, recent trends, and an eastward shift in the southwestern monsoon moisture
    - El Niño could impact the Atlantic hurricane season, potentially reducing activity due to increases in upper-level winds and wind shear
        - Other factors could increase activity, including warm water in the Atlantic and an expected active west African monsoon this year
        - NOAA's outlook calls for a 40% chance of near-normal tropical activity
    - If El Niño develops, it could affect our weather next winter, likely making us wetter than normal
- Fire Weather Intelligence Portal Updates
    - 5 of the top 8 months in terms of Portal page views have happened since October 2022
    - Recent additions/updates include:
        - Days Since 0.10" or 0.25" of Precipitation
        - Reorganized soil temperature/moisture point layers, including the addition of Plant Available Water (upon request by Rob Lipford)
            - Note that detailed soil characteristics (wilting point, porosity, field capacity) are available for ECONet stations by clicking on them
        - Fire grids calculated using the National Blend of Models have been recently updated (including mixing height, burning category, ADI, etc.)
        - A Weekly Outlook tool is now available that summarizes 7-day weather and NFDRS forecasts by Fire Danger Rating Area
        - Bald Head Island ECONet station was recently relocated to the north side of the island
    - Coming soon: NASA SPoRT-LIS soil moisture data and related layers, including green vegetation fraction
    - Reminder: weekly drought updates and monthly outlooks are available on our email listserv; ask Corey (cndavis@ncsu.edu) if you'd like to join
- New Tools and Needs

Flash Drought Tools and Conference (Jamie Dunbar and Corey Davis)

- Remembering the flash drought from fall 2019 (Corey)
    - After August 2019, parts of southeastern NC were in drought but the western part of the state had been wetter than normal over the summer
    - Hurricane Dorian hit in early September and alleviated coastal drought conditions
    - By the second week of September, much of the state entered a hot and dry weather pattern associated with high pressure over the southeastern US
    - By the end of September, much of the Mountains and Piedmont were classified in Moderate to Severe Drought
    - Outlooks from the time offered a few clues about warmer and drier weather, but nothing that would have sounded the alarm over a fast-emerging drought
        - Recall that CPC outlooks only show the *probability* of above/below-normal conditions – *not* the intensity of those conditions

    - Takeaways from that event include how both hot *and* dry weather are often needed in tandem for rapid drought emergence, and the value of on-the-ground impact reports in validating our typical drought indicators
    - Each event is different in terms of its setup and impacts, based on when and where it develops and even antecedent moisture conditions
- Notes from the National Flash Drought Workshop in Boulder in early May 2023 (Jamie)
    - From the forestry perspective, an extra week or two of front-end lead time would help prepare for these types of event
    - Process of defining flash drought is difficult, and our typical drought monitoring (like the US Drought Monitor) can be slower to respond to and display these sorts of events
    - Flash drought has implications to wildfire, prescribed fire, tree survival (soil moisture)
    - Several useful tools are available for monitoring potential flash drought:
        - Climate Engine (using Google Earth)
        - CPC week-2 hazard outlooks now include rapid onset drought
        - Risk of Rapid Drought Intensification (experimental tool)
        - Updated US Drought Portal includes some nice-looking graphics

DAQ Updates and Notes (Bradley McLamb, NC DAQ)

- EPA Proposed Revisions to PM2.5 Standards
    - On January 5, EPA proposed to revised the level of the primary annual PM2.5 standard from 12.0 microg/m3 to a level from 9 to 10 microg/m3 – but have requested comment on revising as low as 8.0 and as high as 11.0
        - Would retain the primary 24-hour PM2.5 standard at 35 microg/m3, but requesting common on revising the level as low as 25 microg/m3
        - PM10 standards would not be affected
    - Annual design values across NC have been below 12.0 (the current standard) for 10+ years, and most monitors are below the proposed range (9-10) in almost all years, but there would be more concern if the standard was lowered to 8.0; 4 monitors would have exceeded that from 2020-2022
    - EPA is also proposing to revise the AQI to improve public communications about the risks from PM2.5 exposures (mainly at the Code Red and above level), and changes to the monitoring network to enhance protection of air quality in communities overburdened by air pollution
    - After a new NAAQS is implemented, it would take 2 years to designate areas of attainment or nonattainment, and after 3 years, states would need to submit an implementation plan under the Clean Air Act within the next 18 months
    - In the case of nonattainment, a request surrounding an exceptional naturally occurring event (like a large wildfire) can be submitted
- DAQ Forecasting Perspective of Great Lake Fire
    - Smoke became apparent on satellite imagery around noon on Friday, April 21
        - DAQ issued a Code Orange forecast for Jones and Craven counties

    - By early afternoon on April 21, a large smoke plume had expanded to cover much of eastern NC, with reports of ash falling in New Bern and visibility of 3 miles
        - DAQ forecasts them showed Code Purple over Craven and Jones counties, and widespread code red in eastern NC
    - Hourly PM2.5 concentrations as far north as VA were reading in the Code Red range on Friday evening
    - On Saturday morning, Greenville monitor showed hourly PM2.5 concentrations in the Code Red range, so a Code Red to Code Purple forecast remained
    - Rain ahead of a cold front began to fall on Saturday evening, with about half an inch in total, and smoke was not visible on Sunday
    - Key takeaways:
        - Forecasters at NC DAQ collaborated internally and externally to get consistent messaging out to the public
        - No large areas of smoke or air quality impacts have been observed since Saturday, April 22
- Air Quality Portal Exploration
    - Main dashboard includes county-based air quality and weather forecasts
    - Ambient Information Reporter tool includes weather station and air quality monitor observations
        - Can view the current daily average for pollutants like PM2.5, which aligns with what DAQ is actually forecasting for
            - Even if values spike for one hour, it's useful to compare against the daily average since it's likely not that high
    - Ozone Design Value Predictor tool shows the predicted attainment status of air quality monitors based on their past history and the critical (4th-highest) value so far this year
        - Currently working on adding PM2.5 to this tool, and those design values should be available within the next year
    - DAQ's NC Air Quality Blog highlights significant air quality events, including the high-ozone event in early April (before the Great Lake Fire) and other topics of interest (like ozone climatology)
- Updates from Smoke Summit held March 20-22 in Newton, GA
    - Airsheds in our region are often saturated with smoke from other states, and that can impact our own prescribed burning opportunities
    - Other southern states have more tightly regulated land clearing burn permitting
    - EPA shared exceptional events guidance, and has committed to putting on a webinar about the process, if needed

NFDRSv4 (Jamie Dunbar)

- Misc. NFDRSv4 Notes
    - Per the FDOP (now signed by everyone), NC uses Nelson fuel models X (brush) and Z (slash; only in the Sandhills)
        - X is very flashy since dead fuel loading includes only 1- and 10-hour fuels

- Nelson Fuel Moistures/Fire Danger vs. Fosberg/Fire Behavior
    - The previous (Rothermel) fuel models estimated 1- and 10-hour fuel moisture using the Fosberg model
    - Nelson fuel model produces a more dynamic estimate that better reflects changes in precipitation, humidity, and sunshine
    - These two models can produce very different values, with the Nelson model frequently higher than Fosberg (especially in 1-hour and 10-hour fuel moistures)
    - RAWS stations have a “10-hour” electronic fuel stick, but that data does not correlate exactly with the Fosberg calculated 10-hour fuel moistures
    - What’s the best way to determine 1-hour and 10-hour fuel moisture?
        - Rules of thumb values from the old system (Fosberg) are not compatible with Nelson System
        - Consider the Fireline Handbook Appendix B, (using a Kestrel), manual 10–hour fuel sticks, or FDFMT in BEHAVE
        - Parallels can be derived from looking at percentiles from FFP and comparing Fosberg vs. Nelson (like Keith and John created)
        - Region 2 was seeing burn plans come in using Fosberg and was writing the Nelson fuel moistures and correlation on the plans
        - Nelson values represent fire *danger* (reflective of the general conditions over an extended area, affecting an initiating fire), and does not correspond with fire *behavior (deals with an existing fire in a given time and space)*
            - Also, the Portal is only showing the 1 pm value (from yesterday, today, or forecasted) and the actual numbers can vary throughout the day
        - National Parks has taken fine dead fuel moistures out of their burn plans
        - Could temperature and relative humidity alone be more useful to consult? If RH is below a certain level, the fine dead fuel moisture will likely be too low to burn as well
        - We could potentially calculate the Fosberg fine dead fuel moisture using temperature and relative humidity (using lookup tables including time of year and elevation) and show it in the Portal – both from hourly weather station observations and high-resolution gridded data
            - Jamie and Corey will work on this
        - Let’s also rethink the information needed in burn plans, including whether to remove fine dead fuel moisture entirely, or to agree on either Nelson or Fosberg
            - FEC moves to form a subcommittee to develop and recommend changes to the official burn plan, and submit recommendations to Aaron Gay (so that these changes can be reflected in NCFS’s certified burner course)
            - Note that other challenges in burn plans include measuring eye-level winds compared to the 20-foot winds noted in the plans, and no mention of gusts

            - Depending on the changes to the Farm Bill (and based on concerns from utility companies for telephone poles being burned by escaped fires) there may be other changes needed to the burn plans
            - Might be worth bringing in a landowner like Jesse Wimberley to make sure the new state burn plan is usable
- QA of Weather and Fire Data for 9 FDRA Databases
    - Jamie is working with Kelly Cagle on updating the data with fires through 2022
    - FDOP breakpoints are being reviewed to include additional weather/fire information
    - Each southern state is reviewing and adjusting interagency FDOPs
        - Cabe has contracted to assist other states
    - The FEMS portal is not live yet
    - When download weather data from WIMS (via PLST), it won't include solar radiation, but the COGNOS tool does include that

2020 Smoke Management Plan Review (Jamie Dunbar)

- Recent Updates
    - Last week, DAQ and NCDA reviewed the 2017 SMP document
    - DAQ, State Parks, TNC, NC Wildlife, and potentially other cooperators would like to access the fiResponse system and the situational viewer
    - Remember to follow up on prescribed burn entries and close out burns
    - Jamie is still updating contact information on various documents, websites, and YouTube videos
- Current ADM Process
    - For low complexity certification, can view a VSmoke-Web training video, then notify Fire Environment Forester, and complete burn plans/VSmoke-Web run/quiz
        - Lack of communication about this being available
    - For moderate to high complexity certification, process is covered on pages 10-11 of SMP; includes completing the ADM training course, perform runs for at least 3 burns evaluated by a certified ADMer, and certification form shared with Fire Environment Forester
        - Update step 2 to have the trainee contact the Fire Environment Forester, and he can connect them with a certified ADMer
            - Means we need to maintain a list of certified ADMers/mentors
        - Trainees interested in the course could contact Jamie, and they work with David Greathouse or others to organize small training courses at a district-level
- BlueSky Playground Inclusion Discussion and Review (John Cook)
    - BlueSky combines existing tools and modeling options, including pulling in or customizing fuel details (similar to FEPS), fuel moisture, consumption, burn timing, and directly running VSmoke or Hysplit to view a smoke plume (now

displayed in terms of AQI colors, and also including visibility), and able to export as a KMZ or PDF document
    - RX-410 currently teaches how to use the BlueSky Playground (but recommends using VSmoke when writing a burn plan)
    - John has been using this exclusively for at least a year, and also finds it easier to review others' runs on BlueSky
    - We move to recommend to the management team to accept BlueSky as another tool in the SMP, in addition to PC Hysplit for moderate to high complexity burns
        - Kevin Harvell: Historically, the management team has accepted the FEC's recommendations
        - What would someone need to submit from BlueSky as part of a burn plan? Just a run ID or a link to the run?
- Review of SMP Document
    - Need to add/update hyperlinks, names, and processes
        - Note: Add NC State to the document
    - How to incorporate edits/changes to models and easily changed material – via an appendix?
        - How quickly are new ADM products coming online? Do we need to review those once per year and update the appendix?
    - Under VIS guidance, could more clearly word how to determine the 16,000-acre airshed – as a simple circle
    - Modify moderate to high complexity instructions since it still refers to the training course
        - Keep current PC Hysplit smoke modeling instructions mostly as is, but change from mandatory training course to the pod-based system using Bill Jackson's materials
        - Also add in guidance for ADM using BlueSky
            - Consensus to only require 1 run using BlueSky, instead of 3
        - Current ADM-certified modelers will be grandfathered in for using BlueSky
        - Create a tutorial for BlueSky, or link to one that's already available, as training material
        - Should we remove the endorsements (for VSmoke vs. PC Hysplit) for each certified burner?
        - Make sure Aaron updates the certified burner course to cover the BlueSky option
    - DAQ can provide a one-pager about climatological tendencies for higher ambient pollutant levels
    - In the definitions, include language about mitigating Smoke Sensitive Areas that makes smoke acceptable there
    - Need to update the VIS worksheet Appendix 2
    - Appendix 3 - ADM certification checkoff sheet will need to be updated to account for BlueSky (maybe add a checkbox for which program is being used)
    - Update the District 1 phone number

- Hosting VSmoke Web on an NC Site
    - Dan Chan from Georgia Forestry Commission created a backup copy after the main site went down, but there wouldn't be a problem with NC making our own copy
        - Could the Prescribed Fire Council or another group host it?
        - More to come on this topic from Dunbar

NWS Updates and Discussion (Jimmy Taeger)

- The 2023 Annual Operating Plan (AOP) has been updated with some minor changes, including a few local office staffing and responsibility changes
- New IDSS Forecast Points webpage is available (renamed from the Fire Weather Dashboard) as a way to get local point forecasts, including customizable weekly weather summaries and hourly forecast table and graphics
    - Note: this does not replace a spot forecast
- Fire Weather Snooper tool (in development) lets you see and sort observation sites by weather variable, and highlight sites with increased fire danger or red flag criteria
    - Can customize this page with only select stations in the URL (as weather.gov/lox/snooper?wfo=rah&stns=XXXX,YYYY,ZZZZ)
- Hysplit dispersion runs are available upon request, now using BlueSky 4 to estimate PM2.5 emissions
    - Includes particle positions/cross-sections and time of arrival maps for plumes
    - Limited in terms of options for adjusting tonnages and fuel details

Training Needs and Opportunities (Jamie Dunbar)

- 90%+ of state-level trainings are advertised to cooperators
- Interagency instructors are welcome and needed for all classes
    - State Parks has been helping with L-280 and S-219 Lead
- WTREX in February was very successful
- S-290 will be held in Crossnore from Feb 12 to 16, 2024
    - 13 interagency nominations seated in 2023
    - Once per year in NC
    - Online S-290 as a backup
- S-390 using a new format (using the Wildland Fire Learning Portal) in Crossnore from June 12-16, 2023
    - Once per year in NC
    - Interagency cadre
    - 24 students including 2 from TNC, 1 from USFS, 1 from State Parks, and 3 from NWS
- S-490 usually offered in alternating years – nothing announced for future dates yet
- S-491 was held using a pod format in February 2023 – nothing announced for future dates yet
- NCFS Prescribed Burn Boss School coming up in June 2024
    - Agency-specific but do accept some cooperators
- Certified Burner course – hybrid course was held May 22-24, again on Oct 23-25

    - 64 completed the class
    - Two virtual half days and one small group field day

Agency/Program Updates (All)

- NC Wildlife Resources
    - 270 burns for 23,000 acres for the year
    - Using a burn dashboard (integrated with enterprise software) to update polygon-based burns every morning and evening, and it has been very successful
- State Parks
    - Piedmont and Mountain burns have mostly wrapped up, and transitioning to the Sandhills and Coastal Plain
    - Megan Johnson at NCSU just did her PhD defense on a smoke acceptance study in NC, including a survey of park users about smoke that found they're generally okay with smoke (especially from prescribed fire), while the public is less acceptable of wildfire smoke
    - Prescribed Fire Council has contracted UNCW for a fire needs assessment; should be released June 1
        - Includes fire data from different cooperators (not NCFS) that shows we have more prescribed fire needs in the state
    - Switching from 3 regions to 5 districts
    - 60 new positions in the governor's budget, and expanding their land base
    - Appropriated 2 fire positions in the last budget cycle
- National Park Service
    - Typical burning season, about 500 acres in NC, including at Moore's Creek battlefield and in Pisgah along the Blue Ridge Parkway
    - Got funding under infrastructure law to create new positions, including a new fuels specialist (Trevor Wallace) and a fuels crew (4 positions filled, 3 still to fill)
    - Hired a new FMO (Brian Tonihka from BIA) to fill a vacancy over the past ~18 months
- US Fish & Wildlife Service
    - Slow start to burning but caught up; 14,000 acres burned before Last Resort fire started
    - Let the water out from Last Resort on May 8
    - Big Burn Area Response (BAR) project
    - Last year, added a new engine captain and a wildfire apprentice position last year, also have a wildfire apprentice position closing June 1 at Alligator River and wildfire specialist at Pungo
    - Adding lots of new fire breaks (18 miles at Pocosin) and a new one at Alligator River near Manns Harbor
- The Nature Conservancy
    - Mountains:
        - Adam Warwick is continuing to hire 25 individuals to support burning across the Southern Blue Ridge

        - They have had several returners and are starting to break up those returners to support multiple burns per day
    - Sandhills:
        - Erick Rietschier is the burn boss in the Sandhills; productive first year included support for a Certified Burner field day at Calloway Forest last week
        - Two key position changes this year: Assistant Land Steward and National Fish and Wildlife Foundation (NFWF) crew lead was extended to a year-round position
            - Will be hiring the year-round Assistant Land Steward soon, Single Resource Boss Qualified
        - Maintained their normal 2 crews for this year; getting harder and harder to hire seasonal burn crew members due to various reasons (extended seasons out west, permanent positions at lower levels out west, etc.)
    - Coastal Plain:
        - Nathan Burmester is our burn boss on the Coast and Zach West is starting to work on his RXB2
        - They had their normal configuration of 4 crews this year
        - Staff are gearing up for Fire in the Pines Festival in Wilmington this fall
    - Purchased an ignition drone and are working staff through training to utilize it on burns; hoping to have the program up and running for next burn season
    - WTREX:
        - Successful Women in Fire Prescribed Fire Training Exchange at Singletary Lake State Park
        - Two-week event where the group was broken down into 3 modules
        - Supported 6 days of burning, completed 19 burn units, supported 11 burn bosses for a total of 1419 acres
        - Participants and IMT members worked on RXB2, RXB3, FIRB, FEMO, ENGB, ENOP, CRWB, FFT1, LOFR, and TRSP
- Prescribed Fire Council
    - Annual meeting is Sep. 20-21 in Wilmington
    - Registration has not opened yet
- NC State
    - RT-130 was held in December, with 45 students
    - Included live fire simulations
- NC Forest Service
    - Region 3
        - Average fire season, with several of 80-100 acres
            - April 1 wild event included 93 fires in D9, D1, and D2
        - Below average year for prescribed burning; D9 and D1 burned about 500 acres, and ~70 burned in D2, mainly due to capacity and vacancies
            - Had one escaped burn at Dupont that burned an extra 40-50 acres, but the contingency plan worked as designed
    - BRIDGE Program

        - 5 short of full staffing among inmates
        - 3 positions down
        - Will have a Type 6 engine
    - Region 2
        - Good burn year (8,000 acres) considering how wet it was most of the time
        - Have a new Ember Alliance crew available in the Uwharrie, the Stevens area, and the Sandhills zone
        - Used the Conservation Corps crew a few times
        - Spotty wildfire activity this spring, but it picked up in the Sandhills in May with several 100+ acre fires
            - Ground fire in Scotland County
            - Fire in Hoke County near Fort Bragg burning in a swampy area with difficult access and a helicopter required
        - Dozers on order for Rockingham, Rocky Mount, and Fayetteville
        - Very few spare trucks at the moment due to mechanical issues; new ones were ordered last year
        - About 30 vacancies across the region
    - Region 1
        - Several dry spells with some large fires (Last Resort, Great Lakes)
            - Ground fire wasn't terrible but it was consistent
            - Big fires have been human-caused so far, but in lightning season now
        - 60 to 75% staffing at the moment; vacancies did affect the burn program
    - NCFS State-Level
        - About 100 vacancies statewide, and about ⅓ down on frontline firefighters
        - Piloting new qualifications for ACRs to require only a high school diploma
    - Central Office fire staff
        - RAWS maintenance agreement shifting to FTS since grant money can't be used to pay the federal government anymore
            - Similar maintenance level for 39 stations + 2 soil stations
            - Looks like they will take over beginning in July
            - Working on details now

Open Forum and Next Meeting (All)

- Jamie will email out any relevant updates between meetings
- Next meeting in the Coastal Plain in November; venue and dates TBD