



GEORGIA
DEPARTMENT OF NATURAL RESOURCES

ENVIRONMENTAL PROTECTION DIVISION

Georgia's PM_{2.5} Designation Recommendations and Exceptional Events Demos

Jim Boylan
Chief, Air Protection Branch

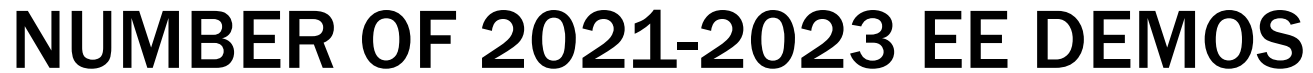
AAPCA 2025 Spring Meeting
Phoenix, AZ
May 1, 2025





EXCEPTIONAL EVENTS

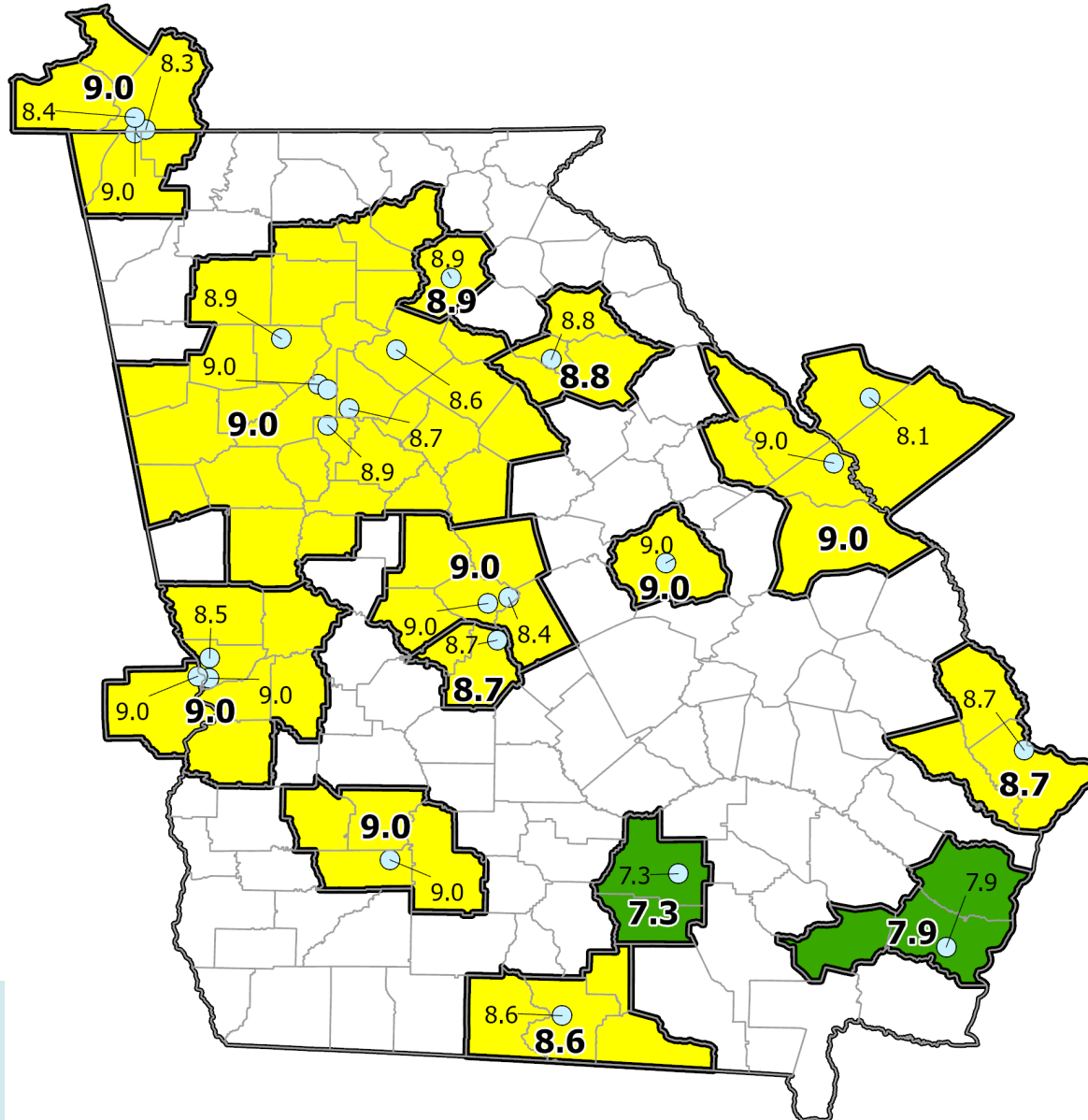
- **Exceptional Events are unusual or naturally occurring events that can affect air quality but are not reasonably controllable.**
- **When EPA concurs with an Exceptional Event, that data can be excluded from the design value used for comparison to the NAAQS.**
- **PM_{2.5} exceedances caused by wildfires, prescribed fires, and holiday fireworks are eligible for exclusion under the Exceptional Events Rule.**

[illegible]

EE Demos in GA ➔ 129
EE Demos in AL ➔ 22
Total EE Demos ➔ 151

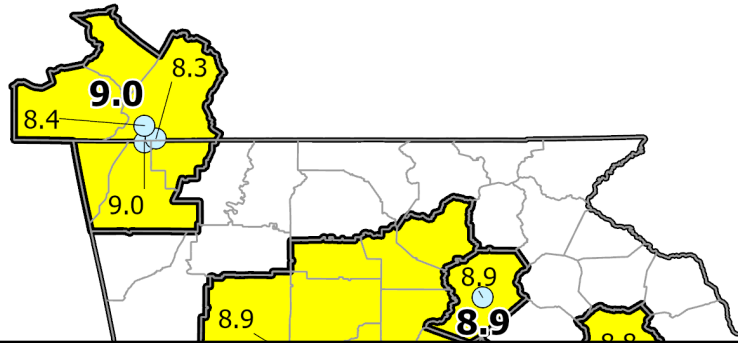


EE ADJUSTED 2021-2023 DESIGN VALUES

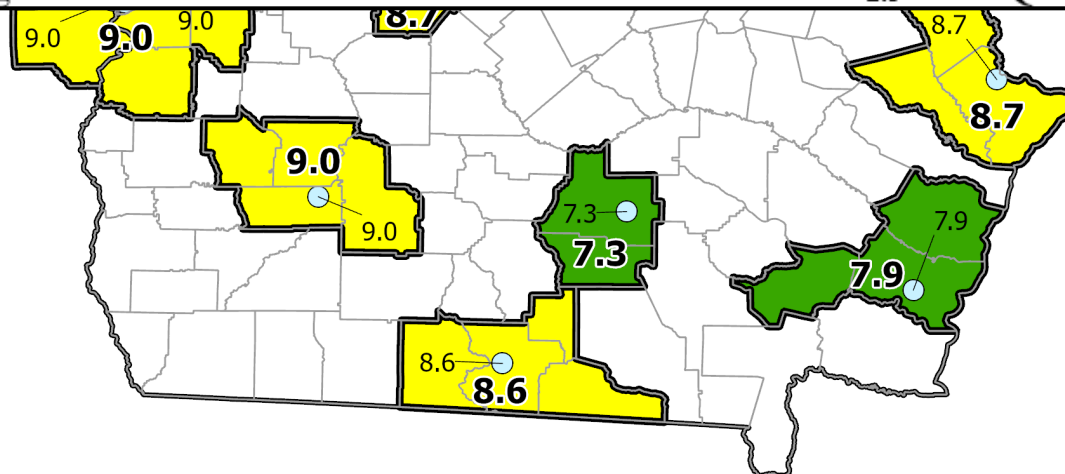




EE ADJUSTED 2021-2023 DESIGN VALUES



In accordance with U.S. EPA's memorandum "Initial Area Designations for the 2024 Revised Primary Annual Fine Particle National Ambient Air Quality Standard" (dated February 7, 2024), the Georgia Environmental Protection Division (EPD) recommends that all counties in the State of Georgia be designated as "attainment/unclassifiable" as shown in Appendix B. Georgia's recommendations are based on 2021-2023 PM_{2.5} design values calculated using certified monitoring data and account for exceptional event demonstrations submitted to EPA on February 7, 2025. Details on the rationale and justification used to support the Georgia designation recommendations are provided in the technical analysis document entitled "Georgia's Designation Recommendations for the 2024 Annual PM_{2.5} NAAQS."





BREAKDOWN OF EE DEMOS

Monitor Location	Canadian Wildfires	Prescribed Fires	Holiday Fireworks
Rossville	4		
Atlanta	2		
Augusta	8	29	3
Sandersville	16	47	
Macon	5	6	
Columbus	2	7	
<i>Phenix City, AL</i>	<i>1</i>	<i>20</i>	<i>1</i>
TOTAL	38	109	4



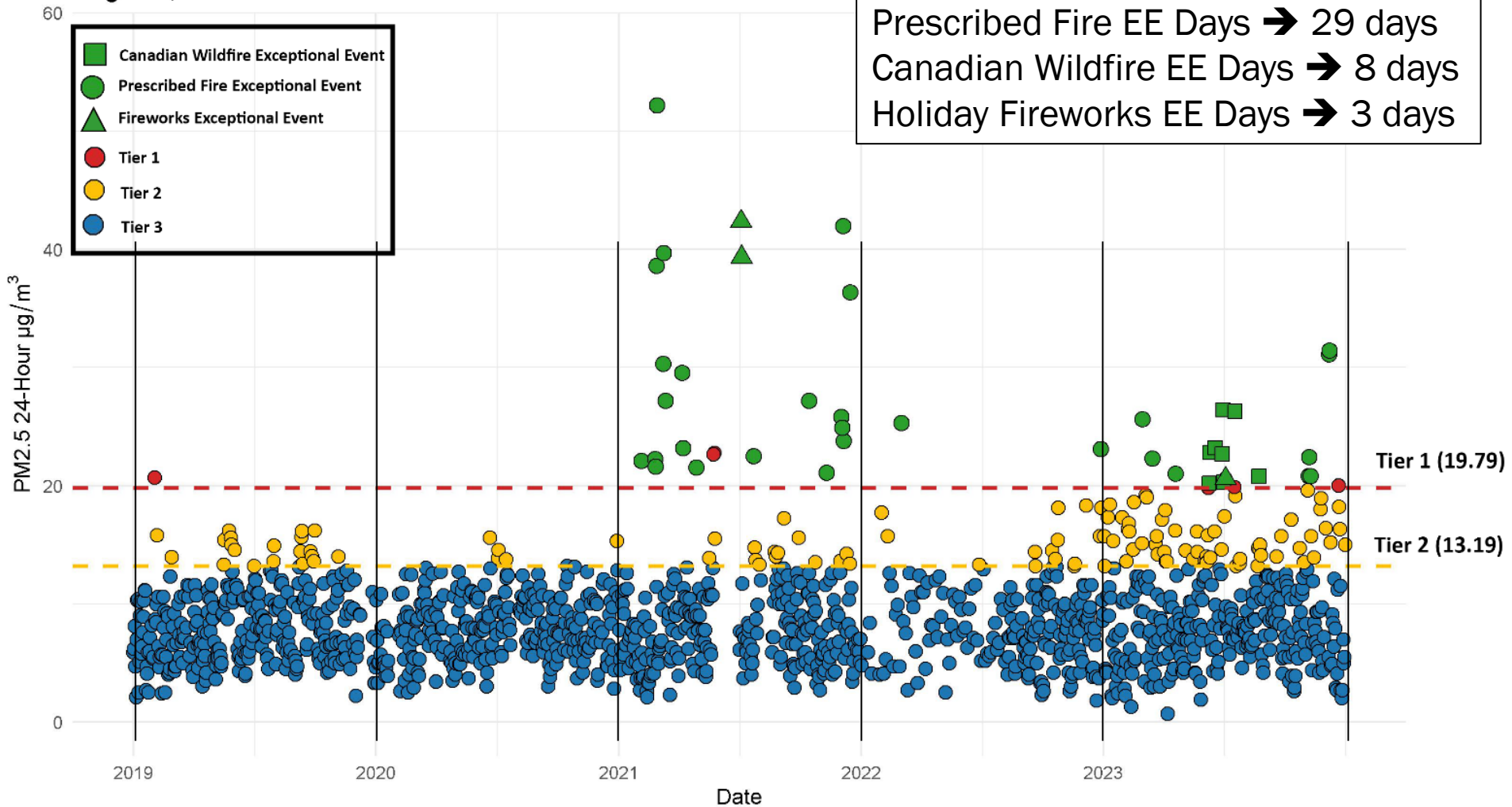
BREAKDOWN OF EE DEMOS

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TOTAL	38	109	4



AUGUSTA - 40 EXCEPTIONAL EVENTS

Augusta, 2019-2023





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ENVIRONMENTAL PROTECTION DIVISION

**Prescribed Fire
Exceptional Event Demonstration
for Exceedances of the
2024 Annual PM_{2.5} NAAQS
at Augusta, GA in 2021-2023**

Prepared by:
Air Protection Branch
Environmental Protection Division

February 7, 2025



EXCEPTIONAL EVENTS ELEMENTS

- **Conceptual Model of the Event**
- **Public Notification and Public Education**
- **Clear Causal Relationship**
 - Comparison to historical data
 - Ambient measurements, modeling, etc.
- **Human Activity Unlikely to Recur**
 - Natural vs. actual fire return interval
- **Not Reasonably Controllable/Preventable**
 - GA's Certified Smoke Management Program (SMP)
 - GA's State Wildlife Action Plan (SWAP)
- **Public Comment Process**

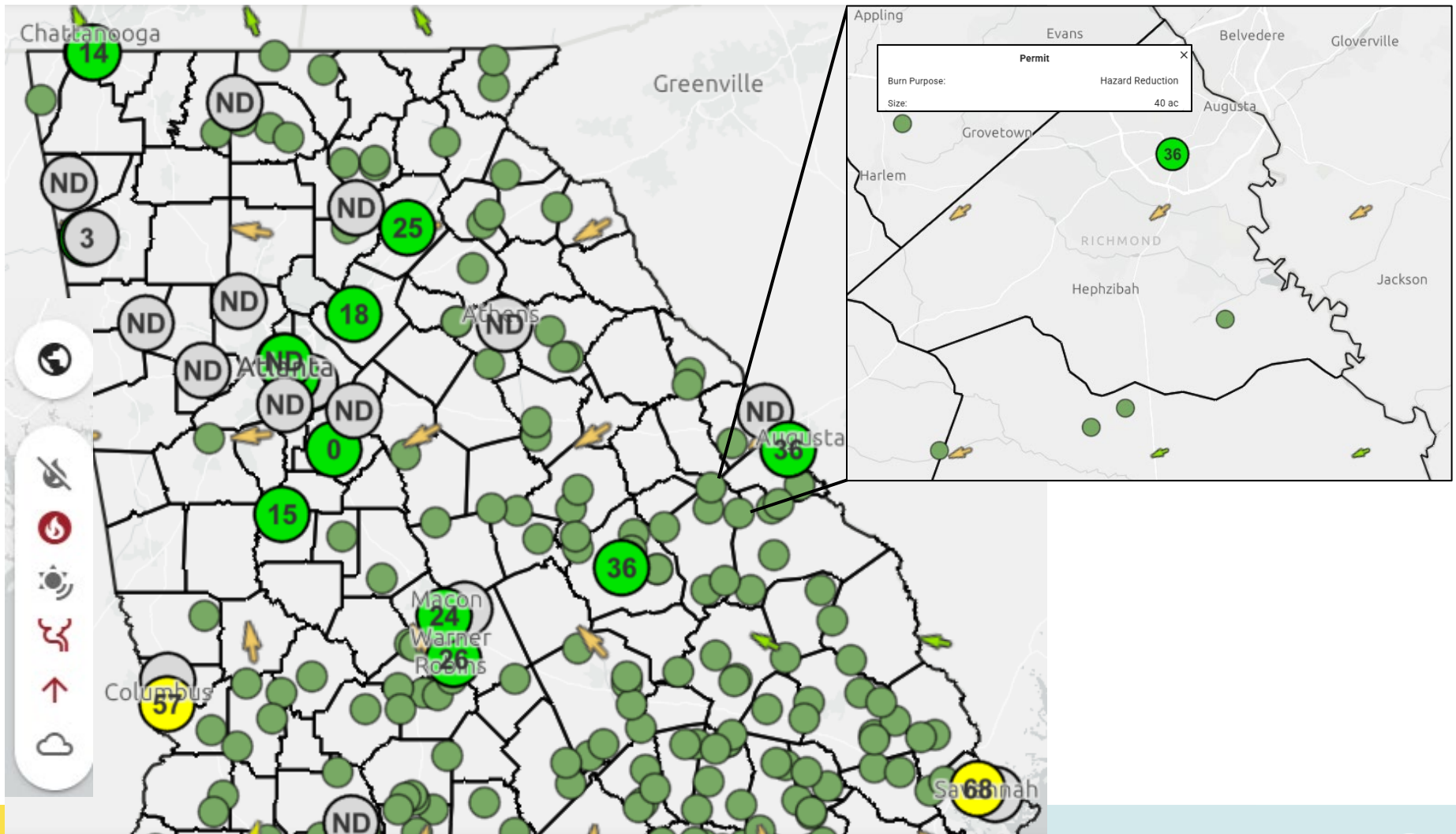


PUBLIC NOTIFICATION

- The Georgia Forestry Commission (GFC) has a public website with an interactive wildfire and burn permit map that contains the current Air Quality Index (AQI) at all monitors in Georgia with the option to add the following layers:
 - (1) burn restrictions, (2) daily burn permits, (3) PM_{2.5}, (4) NOAA HMS smoke plumes, (5) wind vectors, and (6) smoke forecast.
- The public can zoom in to see if smoke may impact their location.



GFC PUBLIC WEBSITE





PUBLIC EDUCATION

- The Georgia EPD website has a link to the GFC interactive burn permit map.
- Also, the EPD website has links to:
 - EPA's AirNow Fire and Smoke Map,
 - EPA's AirNow When Smoke is in the Air,
 - EPA's AirNow Prepare for Fire Season,
 - EPA's Smoke-Ready Toolbox for Wildfires, and
 - Georgia DNR Wildlife Resource Division - Prescribed Fire Information.



AUGUSTA – MARCH 3, 2022

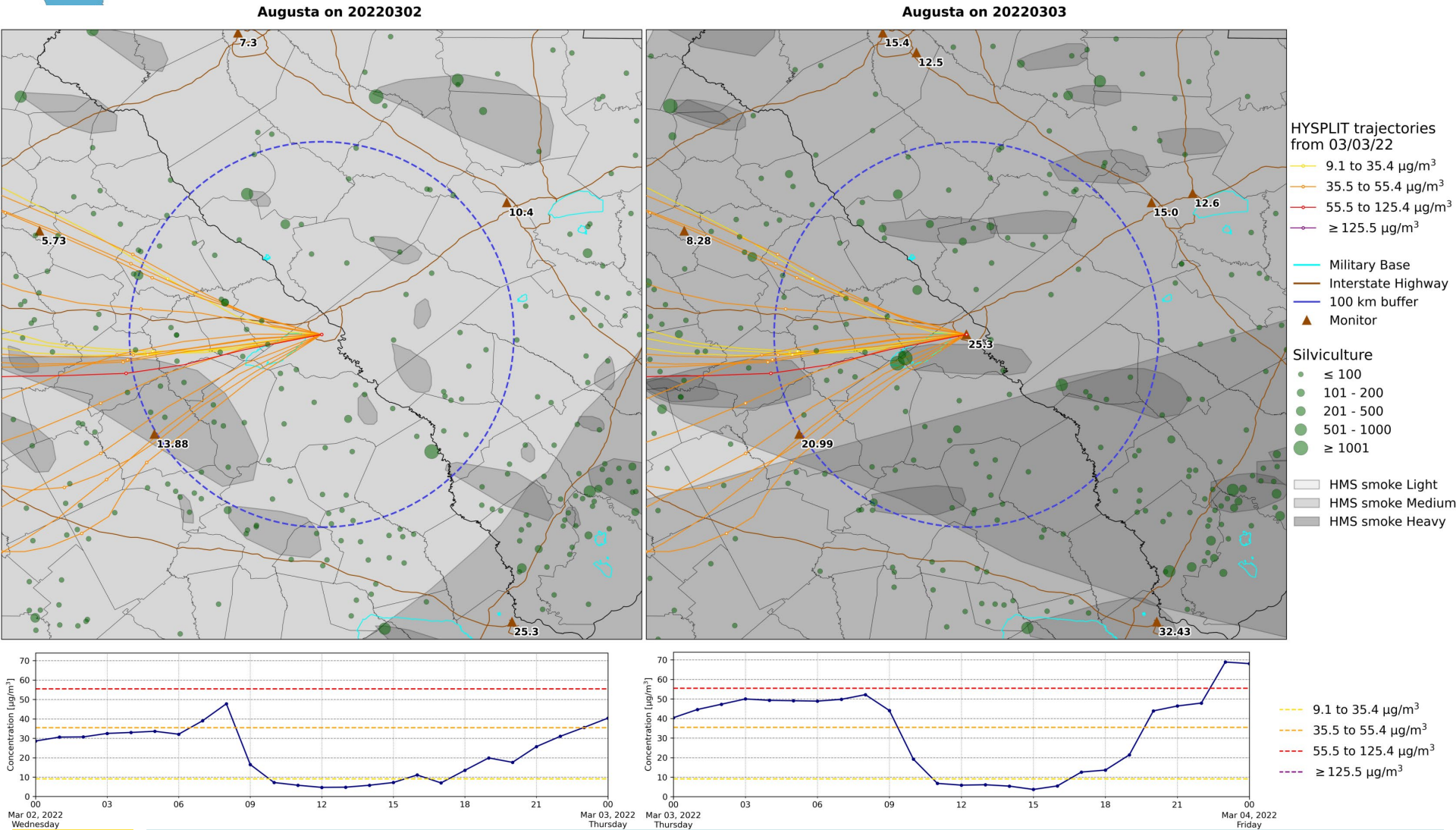


Figure 20A. The top left map contains burn permits issued, HMS smoke plumes, and 24-hour $\text{PM}_{2.5}$ concentrations at the Augusta $\text{PM}_{2.5}$ monitor on March 2, 2022. The top right map contains the same information for March 3, 2022. Both maps contain HYSPLIT back trajectories (released at 100 m, 24-hour duration) from the Augusta $\text{PM}_{2.5}$ monitor on March 3, 2022. HYSPLIT markers are spaced in 3-hour intervals. In the time series plots, the blue solid line shows hourly observations from the FEM monitor. The dashed lines correspond to the AQI breakpoints for $\text{PM}_{2.5}$ concentrations.



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**Canadian Wildfire
Exceptional Event Demonstration
for Exceedances of the
2024 Annual PM_{2.5} NAAQS
at Augusta, GA in 2023**

Prepared by:
Air Protection Branch
Environmental Protection Division

February 7, 2025



HYSPLIT BACK-TRAJECTORIES

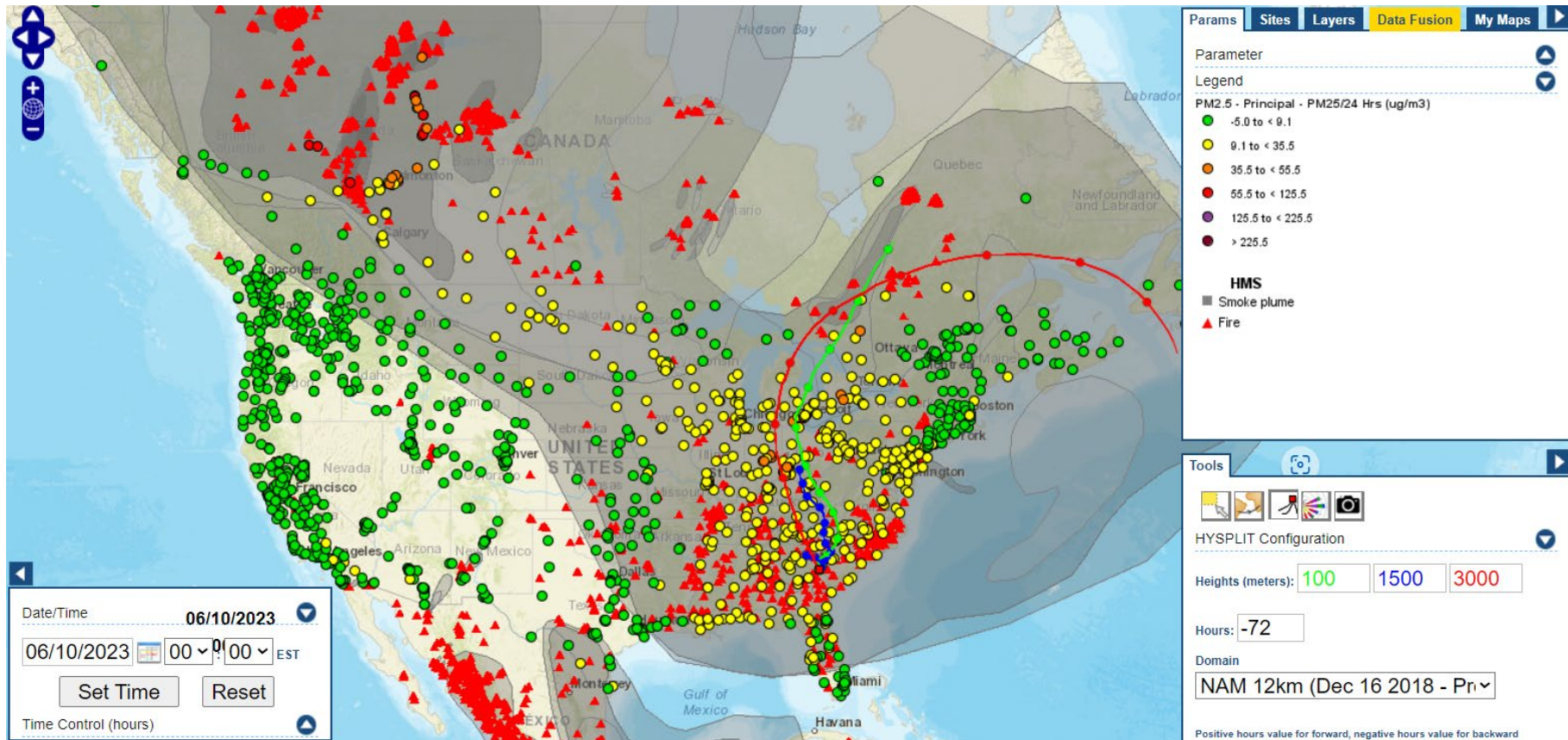


Figure C2. Map of HMS smoke plumes (grey polygons) and fires (red triangles), daily PM_{2.5} concentrations (circles), and HYSPLIT back-trajectories of release heights at 100 m (green lines), 1500 m (blue lines), and 3000 m (red lines) for 0 AM EST on June 10, 2023.



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**Holiday Fireworks
Exceptional Event Demonstration
for Exceedances of the
2024 Annual PM_{2.5} NAAQS
at Augusta, GA in 2021-2023**

Prepared by:
Air Protection Branch
Environmental Protection Division

February 7, 2025



NEARBY FIREWORKS

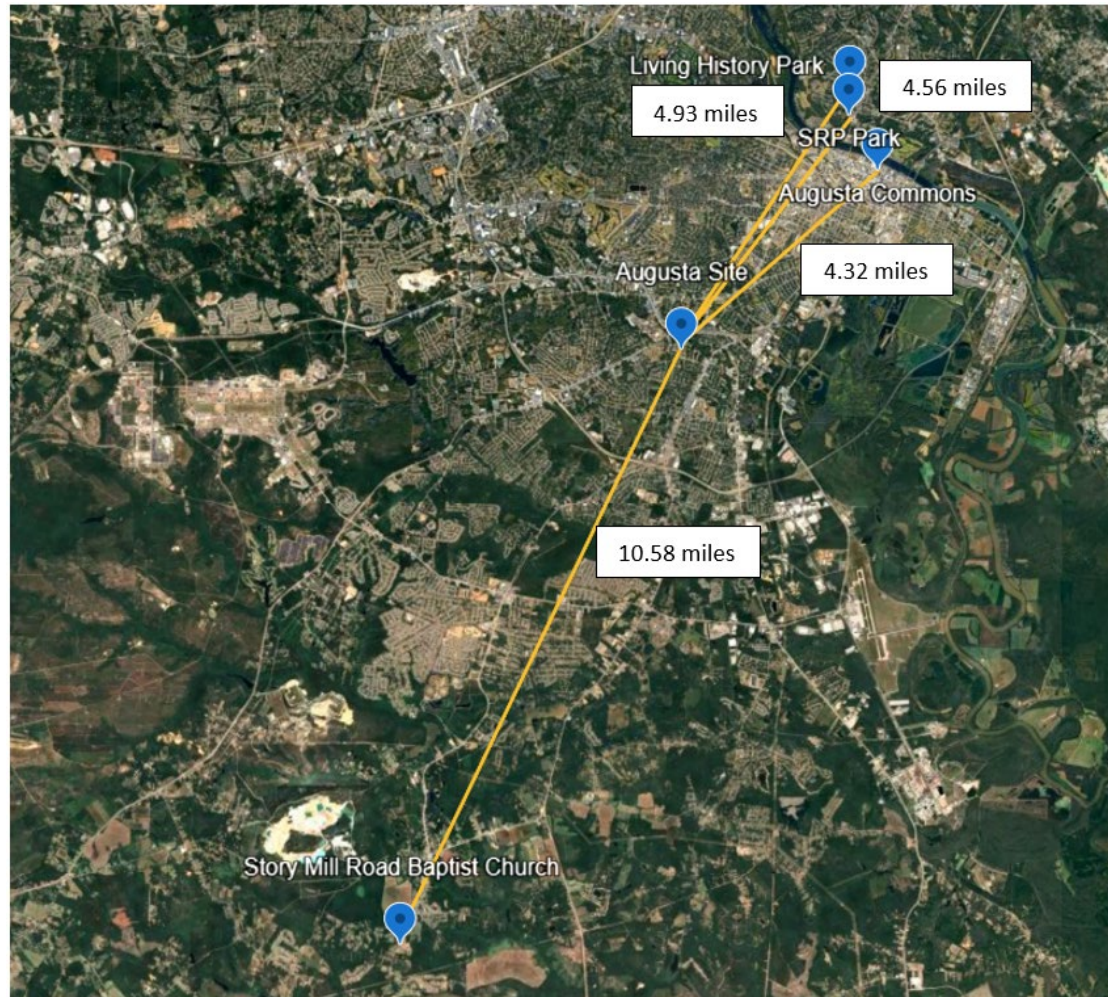


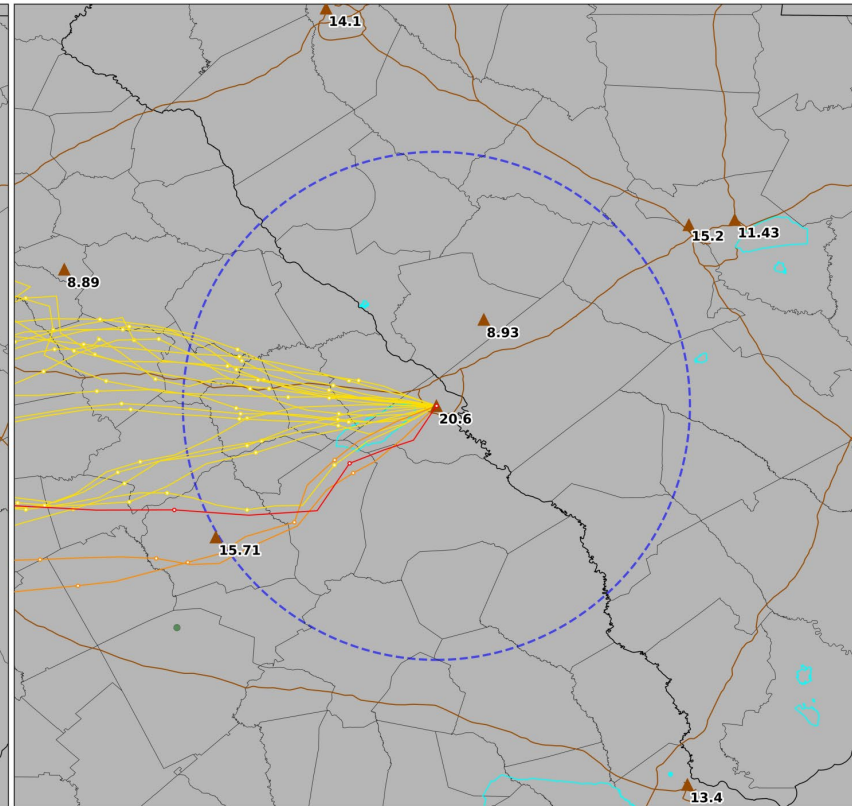
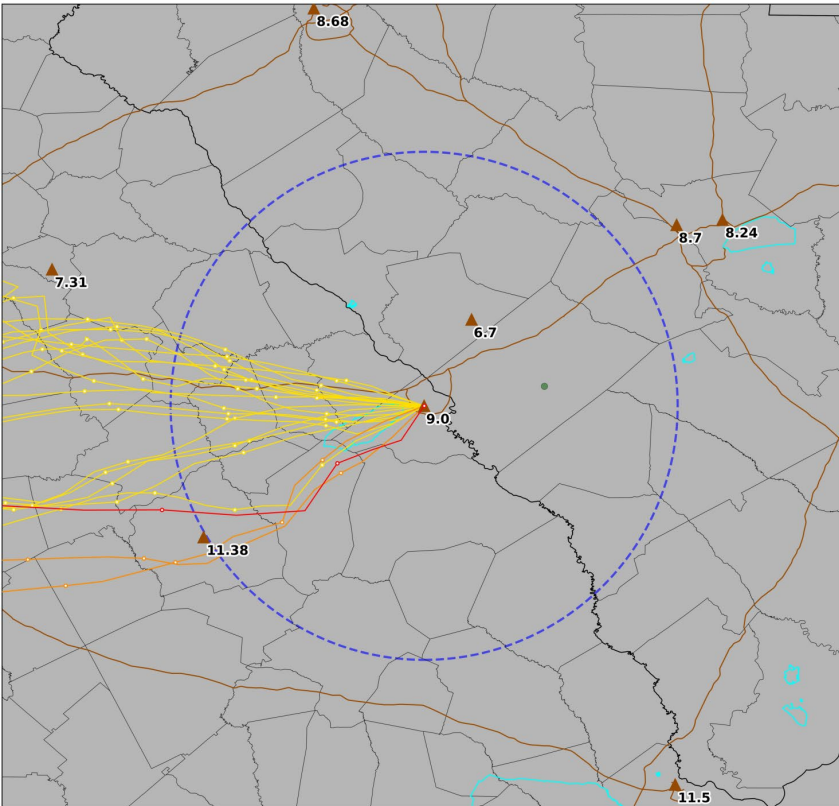
Figure 6. Locations of nearby fireworks and distances from the Augusta site.



HYSPLIT BACK-TRAJECTORIES

Augusta on 20230703

Augusta on 20230704



HYSPLIT trajectories
from 07/04/23

- 9.1 to 35.4 $\mu\text{g}/\text{m}^3$
- 35.5 to 55.4 $\mu\text{g}/\text{m}^3$
- 55.5 to 125.4 $\mu\text{g}/\text{m}^3$
- $\geq 125.5 \mu\text{g}/\text{m}^3$

Military Base
Interstate Highway
100 km buffer
Monitor

Silviculture

- ≤ 100
- 101 - 200
- 201 - 500
- 501 - 1000
- ≥ 1001

HMS smoke Light
HMS smoke Medium
HMS smoke Heavy

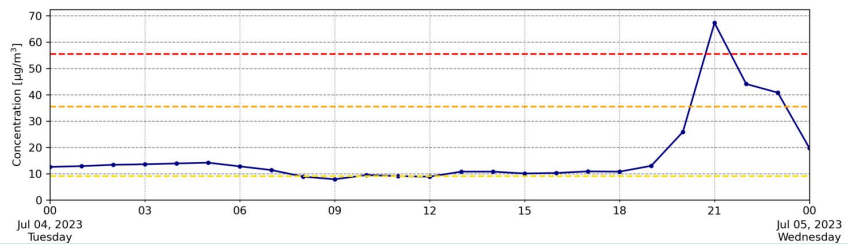
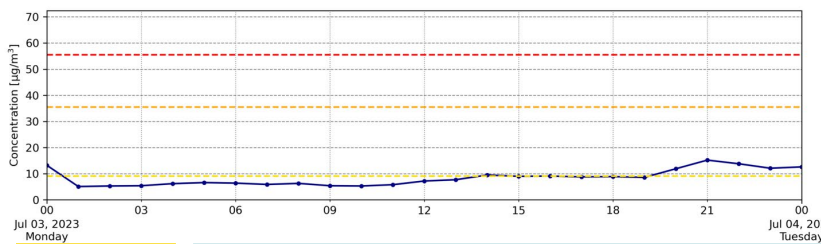


Figure 3. The top left map contains HMS smoke plumes and $\text{PM}_{2.5}$ concentrations at the Augusta $\text{PM}_{2.5}$ monitor on July 03, 2023. The top right map contains HMS smoke plumes and $\text{PM}_{2.5}$ concentrations on July 04, 2023. Both maps contain HYSPLIT back trajectories (released at 100 m, 24-hour duration) from the Augusta $\text{PM}_{2.5}$ monitor on July 04, 2023. HYSPLIT markers are spaced in 3-hour intervals. In the time series plots, the blue solid line shows hourly observations from the FEM monitor. The dashed lines correspond to the AQI breakpoints for $\text{PM}_{2.5}$ concentrations.



WIND ROSE

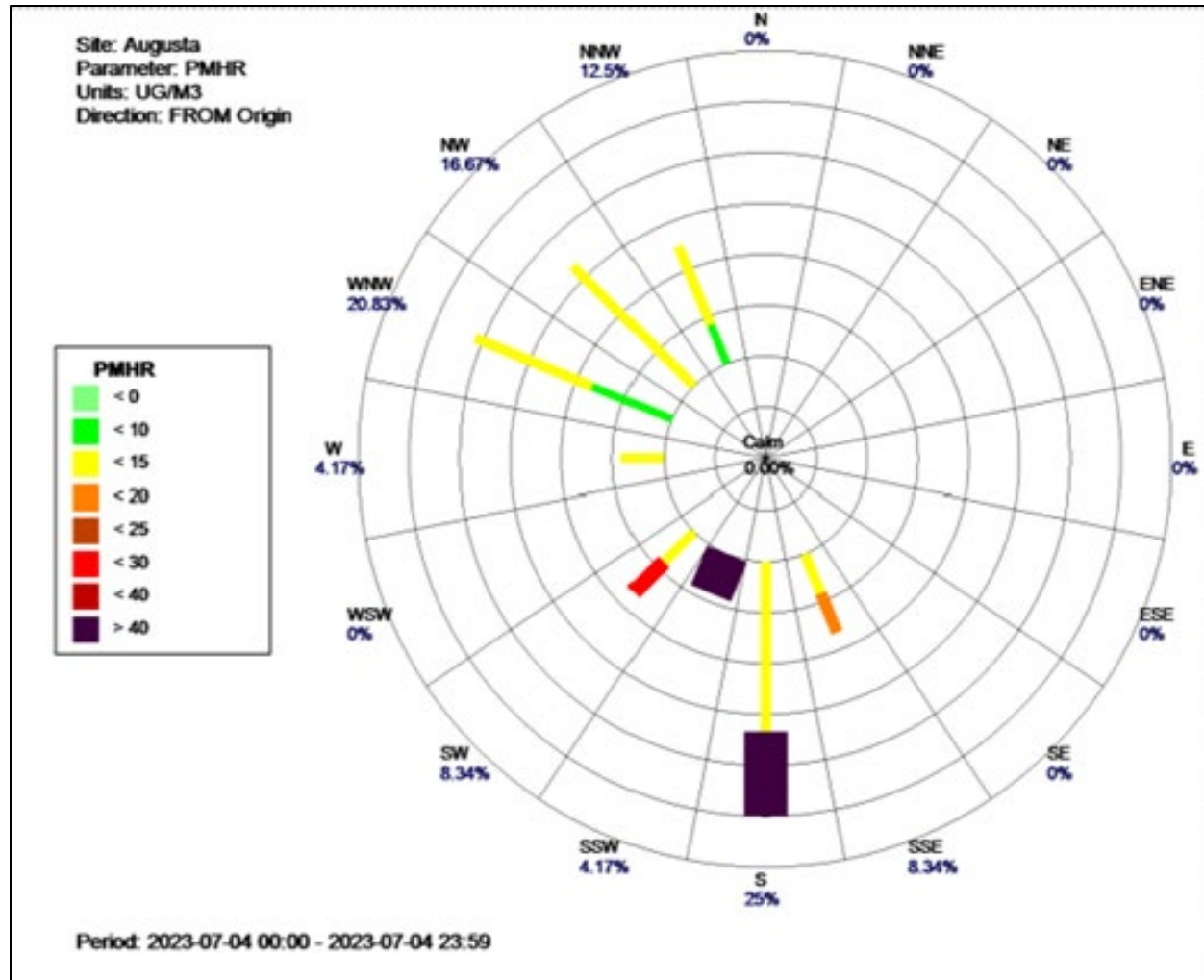
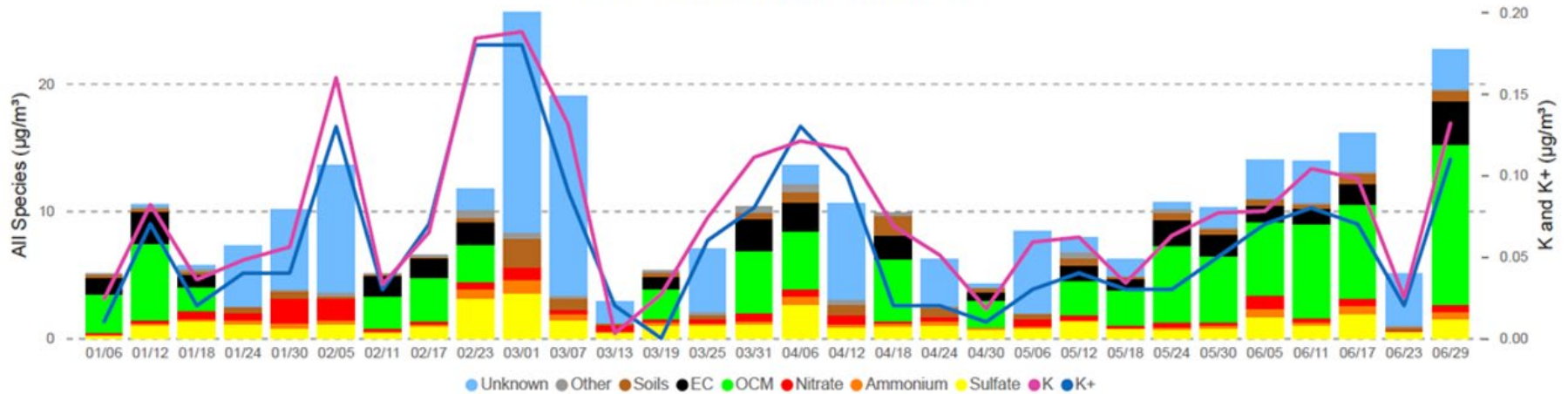


Figure 5. Windrose showing PM_{2.5} concentrations and wind direction at the Augusta site on July 4, 2023.



PM_{2.5} SPECIATION DATA

Augusta PM_{2.5} (µg/m³) - Jan-Jun 2023



Augusta PM_{2.5} (µg/m³) - Jul-Dec 2023

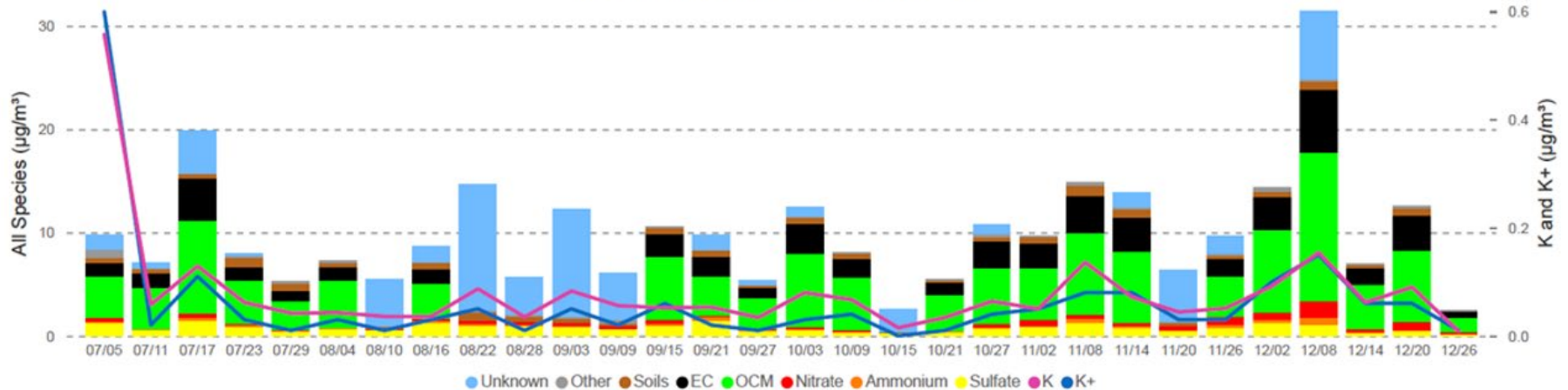


Figure 7. PM_{2.5} speciation data at the Augusta site in 2023.



PUBLIC COMMENTS

- **Georgia EPD's Exceptional Event Demonstrations were posted for a 30-day public comment period on December 20, 2024.**
- **Four sets of comments were received.**
 - **Midwest Ozone Group (MOG)**
 - **Tall Timbers**
 - **Southern Environmental Law Center (SELC)**
 - **U.S. Environmental Protection Agency (EPA)**
- **Georgia EPD responded to all comments and submitted final versions of our Exceptional Event Demonstrations to EPA on February 7, 2025.**



MOG AND TALL TIMBERS COMMENTS

- Both groups provided comments in support of the proposed demonstrations.
- Georgia EPD appreciates the comments of support. These comments did not result in any changes to our final exceptional event demonstrations submitted to EPA on February 7, 2025.



SELC COMMENTS

- The prescribed fire EE demonstrations do not provide the necessary support for excluding the identified dates as exceptional events.
- Georgia EPD believes that sufficient evidence has been presented to support the approval of our exceptional event demonstrations.
- The Prescribed Fire EE demonstrations must clarify whether the site of all prescribed fires referenced in the demonstrations occurred on public lands or private property so they can be properly evaluated as potential exceptional events.
- Both are covered under the Georgia Smoke Management Plan and both are eligible for exceptional events approval by EPA.



SELC COMMENTS

- The Prescribed Fire EE Demonstrations lack information required by EPA guidance to support an exceptional event approval.
- Georgia EPD has included the most important information from the list (latitude/longitude, dates of burns, and total acres burned).
- Given the known limitations of HMS modeling, the EE demonstrations must provide additional, corroborating information.
- Georgia EPD agrees there may be some limitations with the HMS data in certain situations; however, the HMS data is still a strong piece of evidence in the determination of smoke impacts.



SELC COMMENTS

- Instead of submitting information regarding the actual fire cycle for each of the prescribed fire events, the EE demonstrations attempt to recreate a generic fire cycle for each county. The problems with this approach are numerous and obvious.
- Georgia EPD does not think it is reasonable to expect each demonstration to include actual, site-specific information regarding the frequency of prescribed fires at thousands of specific locations.
- Since information was not available on the actual prescribed fire interval for specific tracts of land, Georgia EPD calculated an average fire interval for each county.



SELC COMMENTS

- Georgia's Smoke Management Plan must be enhanced and improved to ensure compliance with the new PM_{2.5} standard.
- Georgia EPD feels confident that our 2008 certified Georgia SMP is adequate to control smoke emissions from prescribed fires and protect public health.
- At the same time, Georgia EPD is currently working with the GFC and DNR Wildlife Resources Division to possibly update Georgia's Smoke Management Plan to ensure continued compliance with the new annual PM_{2.5} standard.
- In addition, the Georgia Forestry Commission is looking at new approaches for restricting prescribed burning to reduce the number of PM_{2.5} exceedances.



EPA COMMENTS

- EPA was not able to reproduce the Tier 1 and Tier 2 thresholds with “R and I Fire Flags” excluded, as recommended by EPA’s PM_{2.5} Wildland Fire Exceptional Events Tiering Document.
- Georgia EPD chose to exclude “R and All I Flags”. Georgia EPD believes that the “R and All I Flags” option is the most appropriate for determining the tiers. The calculation of the 98th percentile value used to determine the tiering thresholds should exclude high PM_{2.5} concentrations caused by fire events as well as other possible types of exceptional events that are unrelated to fires (e.g., Saharan dust, fireworks, etc.). That way, we have a single tiering threshold that is applicable to all exceptional events at this site.

R and I Fire Flags
Only R Flags
R and All I Flags ✓



EPA COMMENTS

- Some dates should be Tier 2 (not Tier 1). Given that that these dates should be Tier 2 events, it is recommended that additional information be provided to support these days.
- Based on the previous discussion, Georgia EPD believes these are Tier 1 days. Either way, Georgia EPD has included at least three pieces of evidence (HYSPLIT, HMS smoke plumes, and PM_{2.5} time series plots) for all Tier 1 and Tier 2 events.



EPA COMMENTS

- Clearly indicated that the permitted silvicultural prescribed fires that occur on wildlands are the subject of the EE Demos. Also, add the definition of wildland.
- Add a broad description of how similarities among these events generally affected the concentrations at the monitoring site and the environmental conditions that contributed to the exceedance.
- Add discussion of any other actions taken to notify the public about the potential for elevated air quality impacts from large (greater than 1000 acres) prescribed fires.
- All have been addressed.



EPA COMMENTS

- Add discussion to explain that information on the actual prescribed fire return interval for specific tracts of land is not readily available, which is why the procedure described in this section was used.
- Briefly describing the fire-dependent ecosystems or species (e.g., long leaf pine, red-cockaded woodpecker, etc.) that are found in the counties where there is frequent prescribed burning, and that it is needed to maintain these fire-adapted ecosystems or species.
- Add additional information to the captions in Appendix A (Integrated Plots).
- All have been addressed.

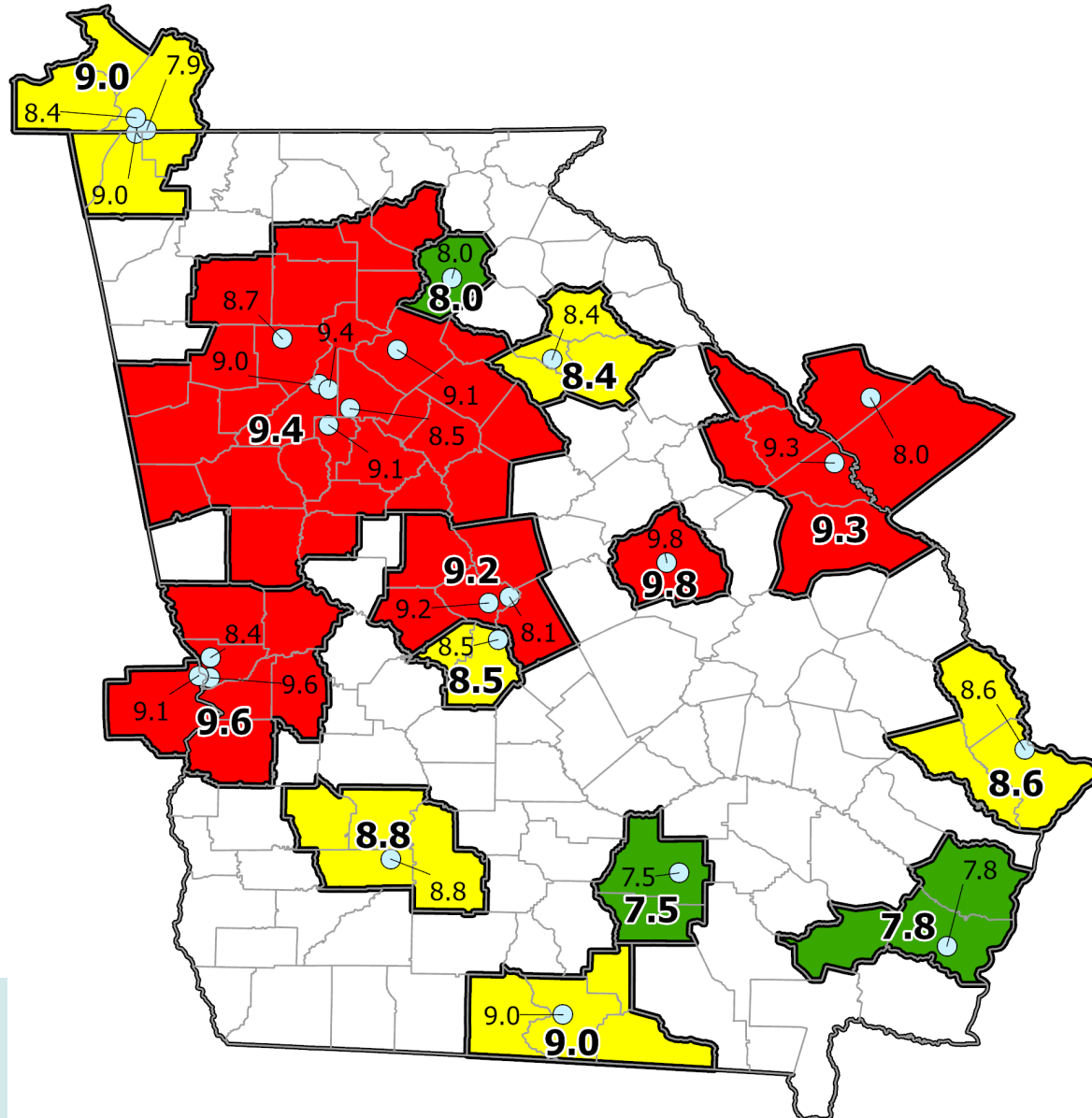


ROUND 2...

- **March 31, 2025** – Georgia EPD certified 2024 PM_{2.5} data.
- **April 1, 2025** – Started work on EE demos for 2024, as well as reevaluation of EE demos for 2022 and 2023.
- **September 30, 2025** – Initial notification and EE demonstration submittals due to EPA.
- **October 9, 2025** – EPA sends out 120-day letters for initial area designations.
- **February 6, 2026** – EPA promulgates final 2024 PM_{2.5} NAAQS area designations.

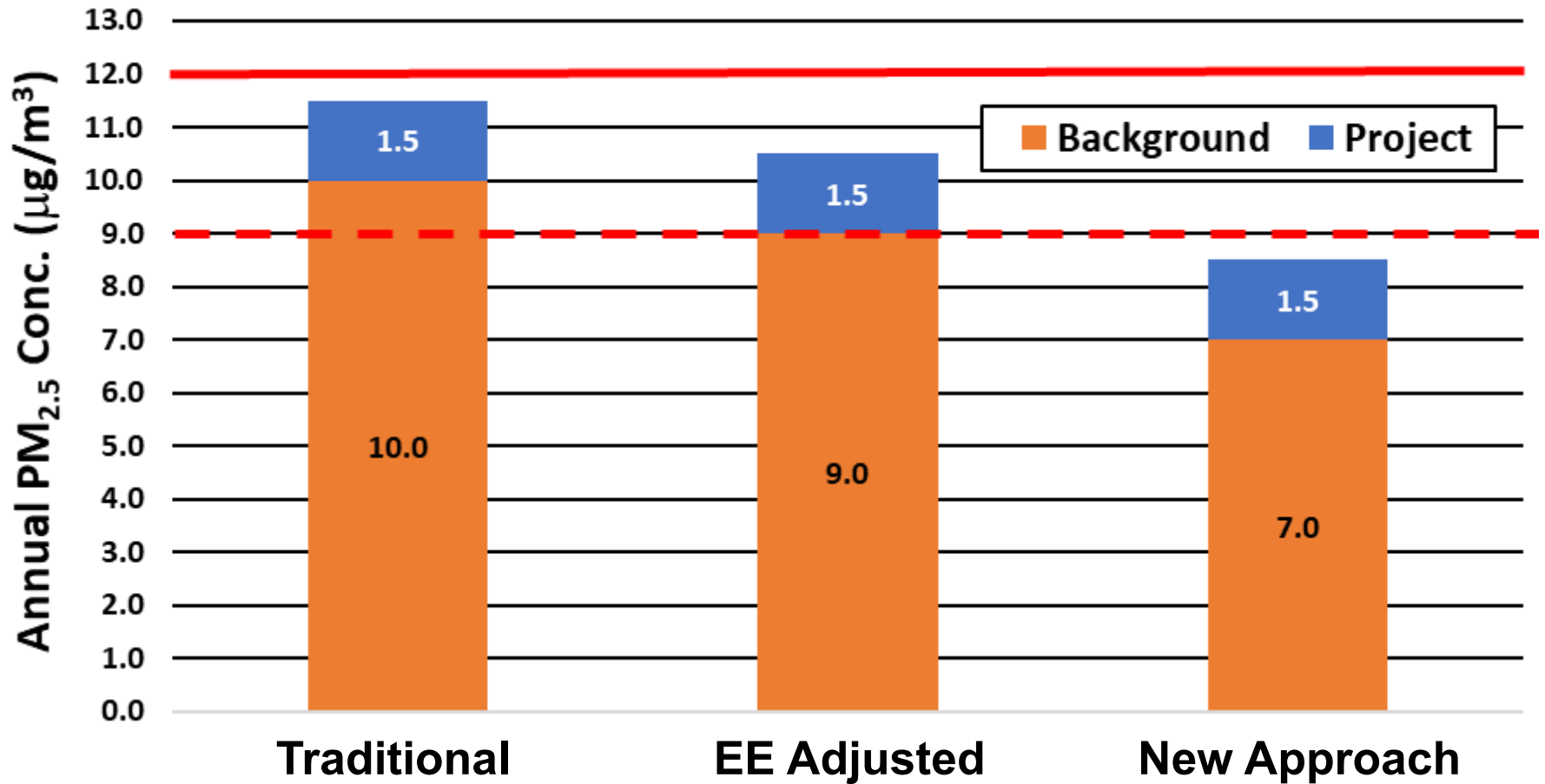


OFFICIAL 2022-2024 PM_{2.5} DESIGN VALUES





PSD BACKGROUND FOR PM_{2.5}





NEW PM_{2.5} BACKGROUND APPROACH

- **Total Impact = S1 + S2 + N + B (Background)**
 - S1 = Direct impacts for source project (AERMOD)
 - S2 = Secondary impacts from source project (MERPs)
 - N = Direct impacts from point sources near project (AERMOD)
- **B = Regional Background (B1) + Local Background (B2)**
- **B1 = M – AA – DPM – SPM – SAM**
 - M = Lowest PM_{2.5} monitor concentration in the state
 - AA = Atypical Activities near M (e.g., wildfires, prescribed fires)
 - DPM = Direct impacts from point sources near M (AERMOD)
 - SPM = Secondary impacts from point sources near M (MERPs)
 - SAM = Secondary impacts from area sources near M (MERPs)
- **B2 = SPP + SAP**
 - SPP = Secondary impacts from point sources near project (MERPs)
 - SAP = Secondary impacts from area sources near project (MERPs)

For more details, please contact Byeong Kim at Byeong.Kim@dnr.ga.gov.



GOLD STAR EE TEAM



- **TOP ROW:** Byeong Kim, Emily Kennedy, Terri Hamby, Winter Widdifield, Jaime Gore
- **BOTTOM ROW:** Jim Boylan, DeAnna Oser, Janet Aldredge, Zach Draper, Anna Aponte, Maggie Owen, Elisabeth Munsey, Asher Mouat
- **NOT PICTURED:** Xiangyu Jiang



CONTACT INFORMATION

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QUESTIONS

