



GEORGIA
DEPARTMENT OF NATURAL RESOURCES

ENVIRONMENTAL PROTECTION DIVISION

Final Report for PM_{2.5} Exceedances in Georgia during 2021

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1. Introduction

The current annual and 24-hour PM_{2.5} National Ambient Air Quality Standards (NAAQS) are 12 µg/m³ and 35 µg/m³, respectively. Federal Reference Method (FRM) monitors collect PM_{2.5} samples for 24 hours on filters while Federal Equivalent Method (FEM) monitors measures hourly PM_{2.5} concentrations continuously. An exceedance of the PM_{2.5} NAAQS occurs when the measured 24-hour PM_{2.5} concentration is equal to or greater than 35.5 µg/m³.

Since 2016, the Data and Modeling Unit (DMU) has developed an initial exceedance report for each PM_{2.5} exceedance day.¹ These reports are completed within three business days of the exceedance and include a preliminary analysis of the air quality, meteorological, and emission data to aid in determining the cause of the PM_{2.5} exceedance. For the initial reports, DMU focuses on 24-hour PM_{2.5} NAAQS exceedances identified at FEM monitors because measurements at FRM monitors are not immediately available. FRM measurements are available several months after their sample collection because samples need to be transferred and analyzed in the laboratory. For sites with both FRM and FEM monitors, FEM measurements² can be replaced with FRM measurements for the purpose of design value calculations if the FRM monitor is designated as the “primary” monitor at the site. PM_{2.5} design values (DVs) are the 3-year average NAAQS metrics that are compared to the NAAQS levels to determine when a monitoring site meets or does not meet the NAAQS.

This final PM_{2.5} exceedance report will summarize PM_{2.5} exceedances throughout Georgia in 2021. This report consists of three parts: (1) final 24-hour PM_{2.5} concentrations for the days with the highest concentrations up to the 98th percentile at each monitor including the comparison with what was reported in the initial reports, (2) annual 98th percentile concentrations and design values at each PM_{2.5} monitor, and (3) a summary of the findings. Non-regulatory FEM monitors are not included in this report since they are not comparable to the NAAQS for regulatory purposes and do not have official PM_{2.5} design values. Figure 1 shows the locations of FRM, FEM, and speciation monitors across Georgia in 2021.

2. 24-hour PM_{2.5} NAAQS Exceedances in 2021

In the following subsections, final daily PM_{2.5} concentrations are reported for each monitor up to the 98th percentile value. The number of reported days varies depending on the number of creditable³ samples as shown in Table 1. Each subsection also contains a discussion of any changes from the initially reported exceedance concentrations to the final exceedance concentrations along with a short description of the cause of the exceedances.

¹ Georgia DNR employees may download all initial PM_{2.5} exceedance reports for 2021 at [Initial PM_{2.5} Exceedance Reports during 2021](#). The general public may obtain a copy of these reports by sending an e-mail to askEPD@gaepd.org and requesting the initial PM_{2.5} exceedance reports during 2021 from the Air Protection Branch.

² An FEM monitor can be a primary monitor or a “QA” monitor. An FEM QA monitor is used as a collocated quality assurance monitor to meet network design criteria in 40 CFR 58 Appendix D.

³ Creditable samples are daily values in the combined site record that are given credit for data completeness. The number of creditable samples for a given year also governs which value in the sorted series of daily values represents the 98th percentile for that year. Creditable samples include daily values collected on scheduled sampling days and valid make-up samples taken for missed or invalidated samples on scheduled sampling days.

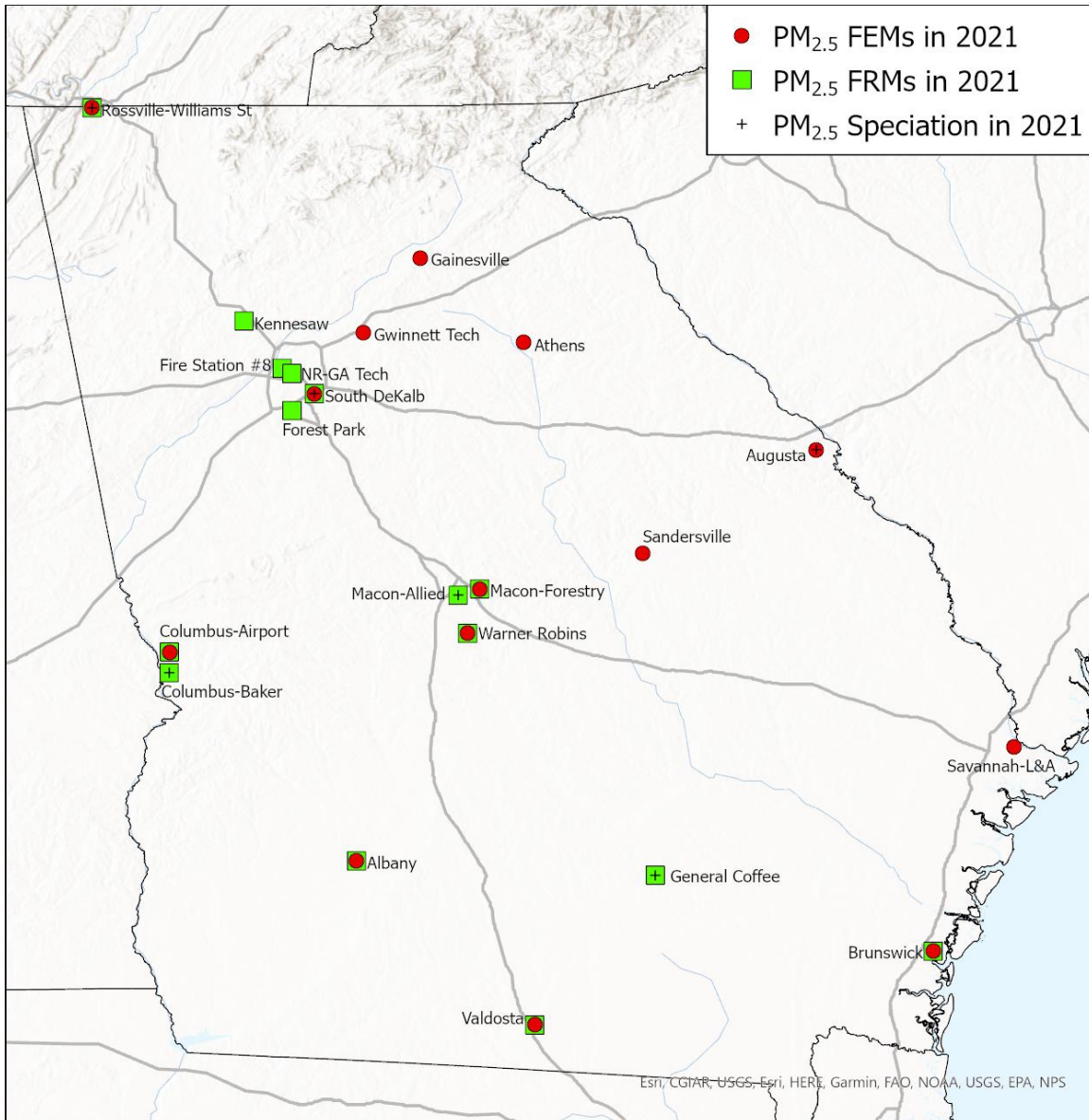


Figure 1. Locations of PM_{2.5} FRM, FEM, and speciation monitors across Georgia in 2021.

Table 1. Annual number of creditable samples and the nth maximum 24-hour average value corresponding to the 98th percentile (Source: Table 1 of Appendix N to 40 CFR 50).

Annual number of creditable samples	the n th maximum 24-hour average value corresponding to the 98th percentile
1 to 50	1
51 to 100	2
101 to 150	3
151 to 200	4
201 to 250	5
251 to 300	6
301 to 350	7
351 to 366	8

Table 2. Number of creditable samples and the nth maximum 24-hour average value corresponding to the 98th percentile at each PM_{2.5} monitoring site in 2021.

Site Name	AQS	Annual number of creditable samples	the n th maximum 24-hour average value corresponding to the 98 th percentile
Albany	13-095-0007	352	8
Athens	13-059-0002	356	8
Augusta*	13-245-0091	311	7
Brunswick	13-127-0006	166	4
Columbus-Airport	13-215-0008	146	3
Columbus-Baker*	13-215-0012	99	2
Fire Station #8	13-121-0039	115	3
Forest Park	13-063-0091	121	3
Gainesville	13-139-0003	365	8
General Coffee*	13-069-0002	117	3
Gwinnett Tech	13-135-0002	324	7
Kennesaw	13-067-0003	121	3
Macon-Allied*	13-021-0007	118	3
Macon-Forestry	13-021-0012	363	8
NR-GA Tech	13-121-0056	121	3
Rossville-Williams St*	13-295-0004	226	5
Sandersville	13-303-0001	365	8
Savannah-L&A	13-051-1002	352	8
South DeKalb*	13-089-0002	357	8
Valdosta	13-185-0003	358	8
Warner Robins	13-153-0001	359	8

* These sites have co-located PM_{2.5} speciation monitors.

2.1. Albany (AQS ID: 13-095-0007)

At the Albany monitor in 2021, three exceedances were initially reported and confirmed based on FEM measurements. On April 7, 2021, another exceedance was initially reported ($38 \mu\text{g}/\text{m}^3$). However, the FRM measurement for the same day was $28.4 \mu\text{g}/\text{m}^3$ that is smaller than the 98th value, $30.3 \mu\text{g}/\text{m}^3$, in 2021

Table 3. Daily PM_{2.5} concentrations up to the 98th percentile value at the Albany monitor (AQS ID: 13-095-0007) in 2021.

Date	Rank	Final PM _{2.5} Concentration ($\mu\text{g}/\text{m}^3$)	Data Source for Final Concentration	FEM Initial Exceedance Report Value ($\mu\text{g}/\text{m}^3$)	Cause of Exceedances
20210312	1	48.6	FEM	49	Prescribed Fires
20210313	2	43.0	FEM	43	Prescribed Fires
20210406	3	39.2	FEM	39	Prescribed Fires
20210403	4	34.8	FEM	N/A	No exceedance documented
20210307	5	33.7	FEM	N/A	No exceedance documented
20210420	6	33.4	FEM	N/A	No exceedance documented
20210324	7	33.4	FEM	N/A	No exceedance documented
20210204	8	30.3	FEM	N/A	No exceedance documented

2.2. Athens (AQS ID: 13-059-0002)

At the Athens monitor in 2021, one exceedance was initially reported and confirmed based on FEM measurements.

Table 4. Daily PM_{2.5} concentrations up to the 98th percentile value at the Athens monitor (AQS ID: 13-059-0002) in 2021.

Date	Rank	Final PM _{2.5} Concentration ($\mu\text{g}/\text{m}^3$)	Data Source for Final Concentration	FEM Initial Exceedance Report Value ($\mu\text{g}/\text{m}^3$)	Cause of Exceedances
20210309	1	38.1	FEM Primary	38	Prescribed Fires
20210310	2	35.4	FEM Primary	N/A	No exceedance documented
20211205	3	33.1	FEM Primary	N/A	No exceedance documented
20211108	4	31.5	FEM Primary	N/A	No exceedance documented
20210407	5	27.8	FEM Primary	N/A	No exceedance documented
20210312	6	26.5	FEM Primary	N/A	No exceedance documented
20210408	7	25.0	FEM Primary	N/A	No exceedance documented
20211110	8	24.7	FEM Primary	N/A	No exceedance documented

2.3. Augusta (AQS ID: 13-245-0091)

At the Augusta monitor in 2021, seven exceedances were initially reported and confirmed based on FEM measurements. The PM_{2.5} speciation data (Figure 2) shows high organic carbon concentrations (19.4 µg/m³) and high elemental carbon concentrations (3.0 µg/m³) which supports the conclusion that prescribed fires were the cause of the exceedance on February 27, 2021.

Table 5. Daily PM_{2.5} concentrations up to the 98th percentile value at the Augusta monitor (AQS ID: 13-245-0091) in 2021.

Date	Rank	Final PM _{2.5} Concentration (µg/m ³)	Data Source for Final Concentration	FEM Initial Exceedance Report Value (µg/m ³)	Cause of Exceedances
20210228	1	53.4	FEM	53	Prescribed Fires
20211205	2	43.6	FEM	44	Prescribed Fires
20210704	3	43.5	FEM	44	Local Fireworks
20210310	4	41.2	FEM	41	Prescribed Fires
20210705	5	40.3	FEM	40	Local Fireworks
20210227	6	40.1	FEM	40	Prescribed Fires
20211216	7	38.2	FEM	38	Prescribed Fires

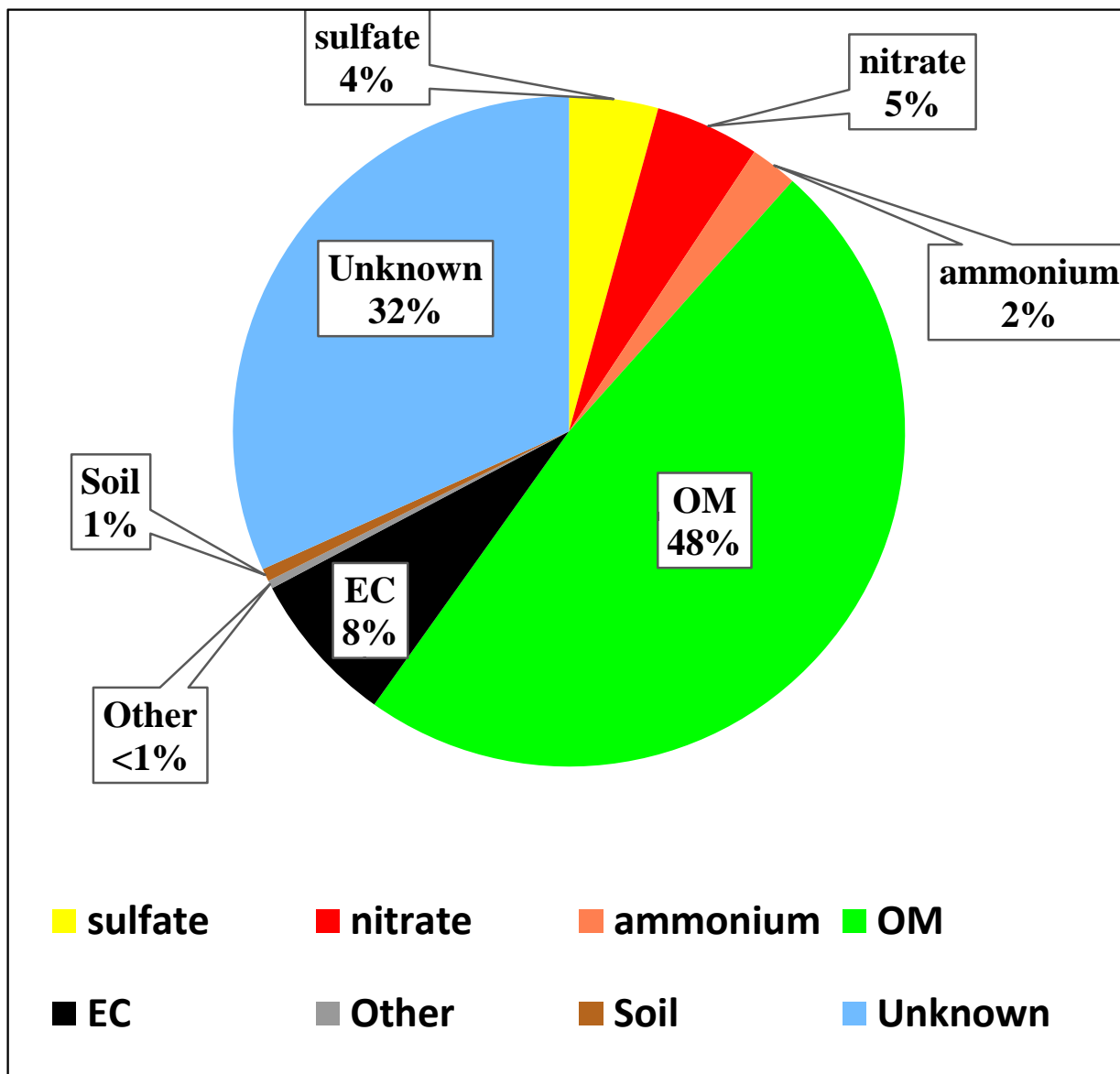


Figure 2. Percentages of PM_{2.5} constituents in the measured PM_{2.5} concentration (40.1 μg/m³) at the Augusta monitor on February 27, 2021. Details about the definitions of “Other” and “Unknown” are in Appendix A.

2.4. Brunswick (AQS ID: 13-127-0006)

At the Brunswick monitor in 2021, no exceedances were reported based on FEM and FRM measurements.

Table 6. Daily PM_{2.5} concentrations up to the 98th percentile value at the Brunswick monitor (AQS ID: 13-127-0006) in 2021.

Date	Rank	Final PM _{2.5} Concentration (µg/m ³)	Data Source for Final Concentration	FEM Initial Exceedance Report Value (µg/m ³)	Cause of Exceedances
20211205	1	24.7	FEM	N/A	No exceedance documented
20211204	2	20.8	FEM	N/A	No exceedance documented
20211201	3	18.4	FEM	N/A	No exceedance documented
20210826	4	17.7	FRM	N/A	No exceedance documented

2.5. Columbus-Airport (AQS ID: 13-215-0008)

At the Columbus-Airport monitor in 2021, one exceedance was initially reported based on non-regulatory FEM measurements and confirmed based on FRM measurements.

Table 7. Daily PM_{2.5} concentrations at the Columbus-Airport monitor (AQS ID: 13-215-0008) in 2021.

Date	Rank	Final PM _{2.5} Concentration (µg/m ³)	Data Source for Final Concentration	FEM Initial Exceedance Report Value (µg/m ³)	Cause of Exceedances
20210308	1	42.1	FRM	40*	Prescribed Fires
20210314	2	30.3	FRM	N/A	No exceedance documented
20211201	3	27.1	FEM	N/A	No exceedance documented

* The initial exceedance value, 40 µg/m³, was reported with non-regulatory FEM measurements.

2.6. Columbus-Baker (AQS ID: 13-215-0012)

At the Columbus-Baker monitor in 2021, no exceedance was initially reported due to the absence of FEM measurements. Later, one exceedance was confirmed based on FRM measurements. For the exceedance on March 8, 2021 at the Columbus-Baker monitor, no initial report was developed due to the absence of FEM measurement. However, the exceedance was likely due to prescribed fires as elevated PM_{2.5} concentrations were measured at the Columbus-Airport monitor.

Table 8. Daily PM_{2.5} concentrations up to the 98th percentile value at the Columbus-Baker monitor (AQS ID: 13-215-0012) in 2021.

Date	Rank	Final PM _{2.5} Concentration (µg/m ³)	Data Source for Final Concentration	FEM Initial Exceedance Report Value (µg/m ³)	Cause of Exceedances
20210308	1	60.7	FRM	No FEM	Prescribed Fires
20210314	2	35.1	FRM	No FEM	No exceedance documented

2.7. Fire Station #8 (AQS ID: 13-121-0039)

At the Fire Station #8 monitor in 2021, no exceedances were reported based on FRM measurements.

Table 9. Daily PM_{2.5} concentrations at the Fire Station #8 monitor (AQS ID: 13-121-0039) in 2021.

Date	Rank	Final PM _{2.5} Concentration (µg/m ³)	Data Source for Final Concentration	FEM Initial Exceedance Report Value (µg/m ³)	Cause of Exceedances
20210802	1	20.3	FRM	No FEM	No exceedance documented
20210311	2	19.1	FRM	No FEM	No exceedance documented
20210407	3	18.6	FRM	No FEM	No exceedance documented

2.8. Forest Park (AQS ID: 13-063-0091)

At the Forest Park monitor in 2021, no exceedances were reported based on FRM measurements.

Table 10. Daily PM_{2.5} concentrations up to the 98th percentile value at the Forest Park monitor (AQS ID: 13-063-0091) in 2021.

Date	Rank	Final PM _{2.5} Concentration (µg/m ³)	Data Source for Final Concentration	FEM Initial Exceedance Report Value (µg/m ³)	Cause of Exceedances
20210802	1	21.7	FRM	No FEM	No exceedance documented
20210407	2	20.6	FRM	No FEM	No exceedance documented
20210724	3	19.4	FRM	No FEM	No exceedance documented

2.9. Gainesville (AQS ID: 13-139-0003)

At the Gainesville monitor in 2021, no exceedances were reported based on FEM measurements.

Table 11. Daily PM_{2.5} concentrations up to the 98th percentile value at the Gainesville monitor (AQS ID: 13-139-0003) in 2021.

Date	Rank	Final PM _{2.5} Concentration (µg/m ³)	Data Source for Final Concentration	FEM Initial Exceedance Report Value (µg/m ³)	Cause of Exceedances
20210407	1	26.4	FEM	N/A	No exceedance documented
20210310	2	25.1	FEM	N/A	No exceedance documented
20211205	3	23.5	FEM	N/A	No exceedance documented
20210309	4	23.4	FEM	N/A	No exceedance documented
20210724	5	22.6	FEM	N/A	No exceedance documented
20210408	6	22.1	FEM	N/A	No exceedance documented
20210725	7	21.0	FEM	N/A	No exceedance documented
20210723	8	20.8	FEM	N/A	No exceedance documented

2.10. General Coffee (AQS ID: 13-069-0002)

At the General Coffee monitor in 2021, no exceedances were reported based on FRM measurements.

Table 12. Daily PM_{2.5} concentrations up to the 98th percentile value at the General Coffee monitor (AQS ID: 13-069-0002) in 2021.

Date	Rank	Final PM _{2.5} Concentration (µg/m ³)	Data Source for Final Concentration	FEM Initial Exceedance Report Value (µg/m ³)	Cause of Exceedances
20210314	1	18.6	FRM	No FEM	No exceedance documented
20210227	2	16.1	FRM	No FEM	No exceedance documented
20210724	3	15.2	FRM	No FEM	No exceedance documented

2.11. Gwinnett Tech (AQS ID: 13-135-0002)

At the Gwinnett Tech monitor in 2021, one exceedance was initially reported and confirmed based on FEM measurements.

Table 13. Daily PM_{2.5} concentrations up to the 98th percentile value at the Gwinnett Tech monitor (AQS ID: 13-135-0002) in 2021.

Date	Rank	Final PM _{2.5} Concentration (µg/m ³)	Data Source for Final Concentration	FEM Initial Exceedance Report Value (µg/m ³)	Cause of Exceedances
20210705	1	38.3	FEM	38	Local Fireworks
20211205	2	32.5	FEM	N/A	No exceedance documented
20210407	3	28.3	FEM	N/A	No exceedance documented
20210310	4	26.7	FEM	N/A	No exceedance documented
20211204	5	23.8	FEM	N/A	No exceedance documented
20211117	6	22.7	FEM	N/A	No exceedance documented
20210312	7	22.5	FEM	N/A	No exceedance documented

2.12. Kennesaw (AQS ID: 13-067-0003)

At the Kennesaw monitor in 2021, no exceedances were reported based on FRM measurements.

Table 14. Daily PM_{2.5} concentrations up to the 98th percentile value at the Kennesaw monitor (AQS ID: 13-067-0003) in 2021.

Date	Rank	Final PM _{2.5} Concentration (µg/m ³)	Data Source for Final Concentration	FEM Initial Exceedance Report Value (µg/m ³)	Cause of Exceedances
20210802	1	22.7	FRM	No FEM	No exceedance documented
20210407	2	19.7	FRM	No FEM	No exceedance documented
20210724	3	19.7	FRM	No FEM	No exceedance documented

2.13. Macon-Allied (AQS ID: 13-021-0007)

At the Macon-Allied monitor in 2021, no exceedances were reported based on FRM measurements.

Table 15. Daily PM_{2.5} concentrations up to the 98th percentile value at the Macon-Allied monitor (AQS ID: 13-021-0007) in 2021.

Date	Rank	Final PM _{2.5} Concentration (µg/m ³)	Data Source for Final Concentration	FEM Initial Exceedance Report Value (µg/m ³)	Cause of Exceedances
20210407	1	28.3	FRM	No FEM	No exceedance documented
20211203	2	24.6	FRM	No FEM	No exceedance documented
20210309	3	24.0	FRM	No FEM	No exceedance documented

2.14. Macon-Forestry (AQS ID: 13-021-0012)

At the Macon-Forestry monitor in 2021, one exceedance was initially reported and confirmed based on FEM measurements.

Table 16. Daily PM_{2.5} concentrations up to the 98th percentile value at the Macon-Forestry monitor (AQS ID: 13-021-0012) in 2021.

Date	Rank	Final PM _{2.5} Concentration (µg/m ³)	Data Source for Final Concentration	FEM Initial Exceedance Report Value (µg/m ³)	Cause of Exceedances
20210308	1	47.7	FEM	48	Prescribed Fires
20210313	2	31.5	FEM	N/A	No exceedance documented
20210407	3	30.8	FEM	N/A	No exceedance documented
20210314	4	26.6	FEM	N/A	No exceedance documented
20210408	5	26.2	FEM	N/A	No exceedance documented
20210120	6	24.9	FEM	N/A	No exceedance documented
20210406	7	24.2	FEM	N/A	No exceedance documented
20211205	8	24.0	FEM	N/A	No exceedance documented

2.15. NR-GA Tech (AQS ID: 13-121-0056)

At the NR-GA Tech monitor in 2021, no exceedances were reported based on FRM measurements.

Table 17. Daily PM_{2.5} concentrations up to the 98th percentile value at the NR-GA Tech monitor (AQS ID: 13-121-0056) in 2021.

Date	Rank	Final PM _{2.5} Concentration (µg/m ³)	Data Source for Final Concentration	FEM Initial Exceedance Report Value (µg/m ³)	Cause of Exceedances
20210227	1	21.4	FRM	No FEM	No exceedance documented
20210724	2	20.5	FRM	No FEM	No exceedance documented
20210802	3	20.2	FRM	No FEM	No exceedance documented

2.16. Rossville Williams St (AQS ID: 13-295-0004)

At the Rossville Williams St monitor in 2021, one exceedance was initially reported and confirmed based on FEM measurements.

Table 18. Daily PM_{2.5} concentrations up to the 98th percentile value at the Rossville Williams St monitor (AQS ID: 13-295-0004) in 2021.

Date	Rank	Final PM _{2.5} Concentration (µg/m ³)	Data Source for Final Concentration	FEM Initial Exceedance Report Value (µg/m ³)	Cause of Exceedances
20211204	1	39.3	FEM	39	Prescribed Fires
20210723	2	30.9	FEM	N/A	No exceedance documented
20211205	3	30.6	FEM	N/A	No exceedance documented
20210722	4	30.5	FEM	N/A	No exceedance documented
20211117	5	28.0	FEM	N/A	No exceedance documented

2.17. Sandersville (AQS ID: 13-303-0001)

At the Sandersville monitor in 2021, three exceedances were initially reported and confirmed based on FEM measurements.

Table 19. Daily PM_{2.5} concentrations up to the 98th percentile value at the Sandersville monitor (AQS ID: 13-303-0001) in 2021.

Date	Rank	Final PM _{2.5} Concentration (µg/m ³)	Data Source for Final Concentration	FEM Initial Exceedance Report Value (µg/m ³)	Cause of Exceedances
20210407	1	39.6	FEM	40	Prescribed Fires
20210408	2	36.5	FEM	37	Prescribed Fires
20210313	3	35.7	FEM	36	Prescribed Fires
20210406	4	28.3	FEM	N/A	No exceedance documented
20210314	5	27.6	FEM	N/A	No exceedance documented
20210226	6	27.4	FEM	N/A	No exceedance documented
20211109	7	25.9	FEM	N/A	No exceedance documented
20210420	8	25.8	FEM	N/A	No exceedance documented

2.18. Savannah-L&A (AQS ID: 13-051-1002)

At the Savannah-L&A monitor in 2021, no exceedances were reported based on FEM measurements.

Table 20. Daily PM_{2.5} concentrations up to the 98th percentile value at the Savannah-L&A monitor (AQS ID: 13-051-1002) in 2021.

Date	Rank	Final PM _{2.5} Concentration (µg/m ³)	Data Source for Final Concentration	FEM Initial Exceedance Report Value (µg/m ³)	Cause of Exceedances
20211130	1	32.6	FEM	N/A	No exceedance documented
20211202	2	24.4	FEM	N/A	No exceedance documented
20211201	3	24.3	FEM	N/A	No exceedance documented
20211204	4	23.3	FEM	N/A	No exceedance documented
20211129	5	22.9	FEM	N/A	No exceedance documented
20210705	6	22.5	FEM	N/A	No exceedance documented
20211110	7	22.5	FEM	N/A	No exceedance documented
20211205	8	22.0	FEM	N/A	No exceedance documented

2.19. South DeKalb (AQS ID: 13-089-0002)

At the South DeKalb monitor in 2021, no exceedances were reported based on FEM measurements.

Table 21. Daily PM_{2.5} concentrations up to the 98th percentile value at the South DeKalb monitor (AQS ID: 13-089-0002) in 2021.

Date	Rank	Final PM _{2.5} Concentration (µg/m ³)	Data Source for Final Concentration	FEM Initial Exceedance Report Value (µg/m ³)	Cause of Exceedances
20210705	1	34.1	FEM	N/A	No exceedance documented
20211205	2	34.0	FEM	N/A	No exceedance documented
20210312	3	32.9	FEM	N/A	No exceedance documented
20210309	4	26.3	FEM	N/A	No exceedance documented
20210310	5	25.8	FEM	N/A	No exceedance documented
20211204	6	24.2	FEM	N/A	No exceedance documented
20210704	7	23.1	FEM	N/A	No exceedance documented
20211110	8	22.0	FEM	N/A	No exceedance documented

2.20. Valdosta (AQS ID: 13-185-0003)

At the Valdosta monitor in 2021, no exceedances were reported based on FEM measurements.

Table 22. Daily PM_{2.5} Concentrations at the Valdosta monitor (AQS ID: 13-185-0003) in 2021

Date	Rank	Final PM _{2.5} Concentration (µg/m ³)	Data Source for Final Concentration	FEM Initial Exceedance Report Value (µg/m ³)	Cause of Exceedances
20210204	1	28.0	FEM	N/A	No exceedance documented
20210313	2	22.7	FEM	N/A	No exceedance documented
20211204	3	21.2	FEM	N/A	No exceedance documented
20210223	4	20.4	FEM	N/A	No exceedance documented
20211201	5	19.6	FEM	N/A	No exceedance documented
20210120	6	19.2	FEM	N/A	No exceedance documented
20210406	7	18.4	FEM	N/A	No exceedance documented
20211116	8	17.5	FEM	N/A	No exceedance documented

2.21. Warner Robins (AQS ID: 13-153-0001)

At the Warner Robins monitor in 2021, three exceedances were reported initially. Two exceedances out of these three exceedances were confirmed based on FEM measurements. One exceedance on March 14, 2021 was identified as a non-exceedance with FRM measurements. On April 7, 2021, another exceedance was initially reported ($36 \mu\text{g}/\text{m}^3$). However, the FRM measurement was $25.6 \mu\text{g}/\text{m}^3$, which is smaller than the 98th value ($25.93 \mu\text{g}/\text{m}^3$) in 2021.

Table 23. Daily PM_{2.5} concentrations up to the 98th percentile value at the Warner Robins monitor (AQS ID: 13-153-0001) in 2021

Date	Rank	Final PM _{2.5} Concentration ($\mu\text{g}/\text{m}^3$)	Data Source for Final Concentration	FEM Initial Exceedance Report Value ($\mu\text{g}/\text{m}^3$)	Cause of Exceedances
20210313	1	37.9	FEM	38	Prescribed Fires
20210307	2	36.5	FEM	37	Prescribed Fires
20210314	3	29.3	FRM	40	Initial exceedance refuted by FRM data
20210408	4	29.0	FEM	N/A	No exceedance documented
20210312	5	28.3	FEM	N/A	No exceedance documented
20210315	6	27.6	FEM	N/A	No exceedance documented
20210226	7	26.2	FEM	N/A	No exceedance documented
20211205	8	25.9	FEM	N/A	No exceedance documented

3. Annual 98th Percentile Concentrations and Design Values

The annual 98th percentile daily PM_{2.5} concentrations for 2012-2021 are shown in Figure and Table 24. The PM_{2.5} design value is calculated by averaging the annual 98th percentile daily PM_{2.5} concentrations for three consecutive years at each monitoring site. For example, the 2021 design value at Albany (24 µg/m³) was calculated by adding the 2019 98th percentile daily PM_{2.5} concentrations (19.8 µg/m³), 2020 98th percentile daily PM_{2.5} concentrations (22.4 µg/m³), and 2021 98th percentile daily PM_{2.5} concentrations (30.3 µg/m³), then dividing by three. The 24-hour PM_{2.5} design values for 2012-2021 are shown in Figure and Table 25. All design values are below the 24-hour PM_{2.5} NAAQS level (35 µg/m³). The highest 2021 24-hour design value (28 µg/m³) is in Augusta (13-245-0091).

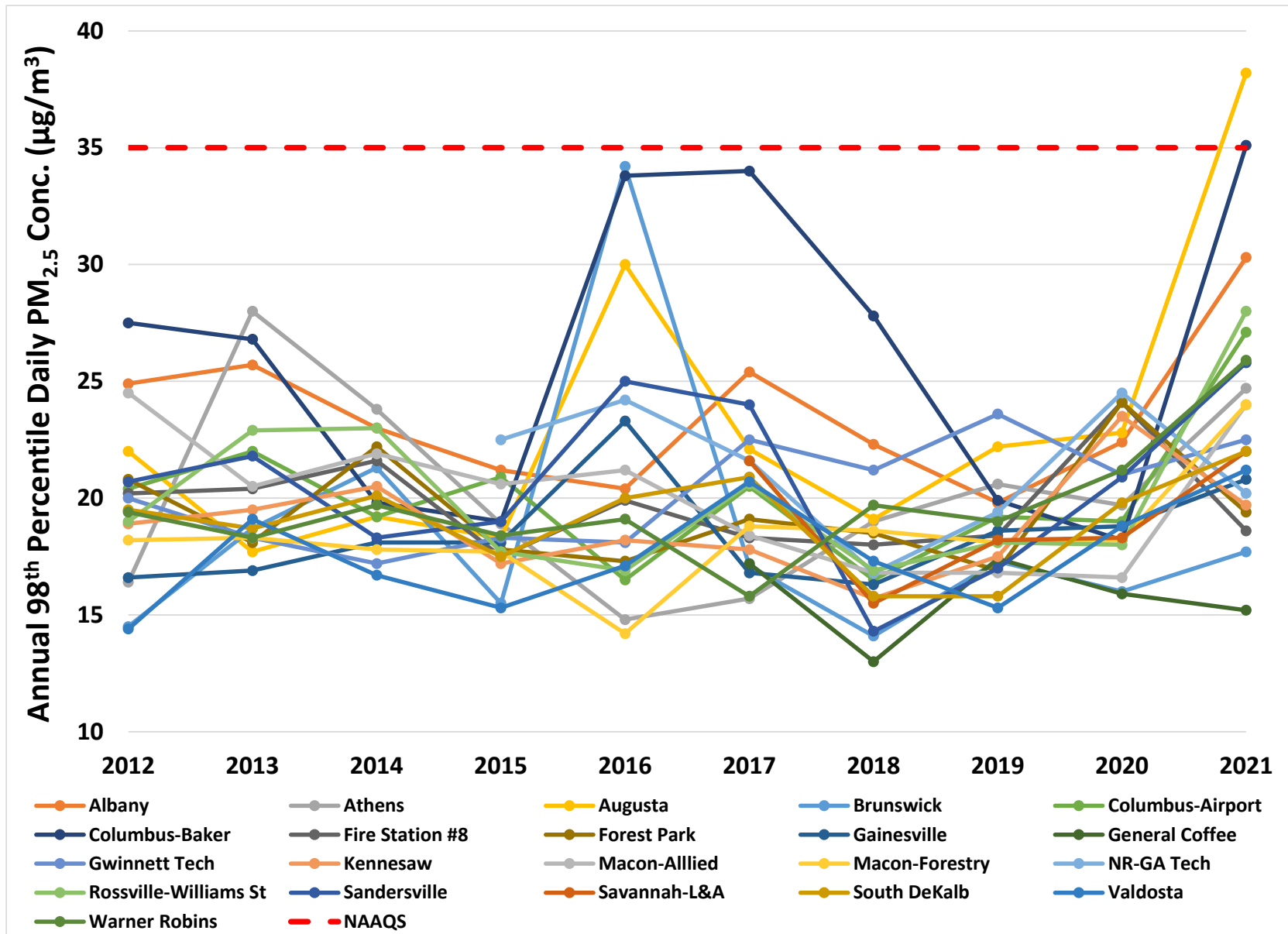


Figure 3. Trend of annual 98th percentile daily PM_{2.5} concentrations in Georgia for 2012-2021.

Table 24. Annual 98th percentile daily PM_{2.5} concentrations in Georgia for 2012-2021

Site Name	AQS ID	County	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Albany	13-095-0007	Dougherty	24.9*	25.7	23.0	21.2	20.4	25.4	22.3	19.8	22.4	30.3
Athens	13-059-0002	Clarke	16.4	28.0	23.8	18.9	14.8	15.7	19.0	20.6	19.7	24.7
Augusta	13-245-0091	Richmond	22.0	17.7	19.2	18.3	30.0	22.1	19.1	22.2	22.8	38.2
Brunswick	13-127-0006	Glynn	14.5*	18.7*	21.3*	15.5	34.2	17.1	14.1	17.3	16.0	17.7
Columbus-Airport	13-215-0008	Muscogee	20.4	22.0	19.2	20.9	16.5	20.5	16.5	19.2	19.0	27.1
Columbus-Baker**	13-215-0012	Muscogee	27.5	26.8	19.8	19.0	33.8	34.0	27.8	19.9	18.2*	35.1*
Fire Station 8	13-121-0039	Fulton	20.2	20.4	21.6	17.5	19.9	18.3	18.0	18.4	24.1	18.6
Forest Park	13-063-0091	Clayton	20.8	18.1	22.2	17.8	17.3	19.1	18.5	16.9	24.1	19.4
Gainesville	13-139-0003	Hall	16.6	16.9	18.1	18.1	23.3	16.8	16.3*	18.6	18.8	20.8
General Coffee	13-069-0002	Coffee						17.2*	13.0	17.4	15.9	15.2
Gwinnett Tech	13-135-0002	Gwinnett	20.0	18.3	17.2	18.3	18.1	22.5	21.2	23.6	21.0	22.5*
Kennesaw	13-067-0003	Cobb	18.9	19.5	20.5	17.2	18.2	17.8	15.7	17.5	23.5	19.7
Macon-Allied	13-021-0007	Bibb	24.5	20.5	21.9	20.6	21.2	18.4	16.8	16.8	16.6	24.0
Macon- Forestry	13-021-0012	Bibb	18.2	18.3	17.8	17.7	14.2	18.8	18.6	18.1	18.2	24.0
NR-GA Tech	13-121-0056	Fulton				22.5	24.2	21.6	16.8	19.4	24.5	20.2
Rossville William St.**	13-295-0004	Walker	19.0	22.9	23.0	17.7	16.9	20.6	16.9	18.1	18.0*	28.0*
Sandersville	13-303-0001	Washington	20.7	21.8	18.3	19.0	25.0	24.0	14.3	17.0	20.9	25.8
Savannah-L&A	13-051-1002	Chatham						21.6*	15.5*	18.2*	18.3	22.0
South DeKalb	13-089-0002	DeKalb	19.5	18.7	20.1	17.5	20.0	20.9	15.8	15.8	19.8	22.0
Valdosta	13-185-0003	Lowndes	14.4*	19.1	16.7	15.3	17.1	20.7	17.3	15.3	18.8	21.2
Warner Robins	13-153-0001	Houston	19.4	18.3	19.7	18.4	19.1	15.8	19.7	19.0	21.2	25.9

* Indicates that the data used to calculate the 98th percentile value did not meet the completeness requirement specified in 40 CFR Part 58.

** For Columbus-Baker, the data was combined with the previous site of Columbus-Cussetta. For Rossville Williams St., the data was combined with the previous site of Rossville.

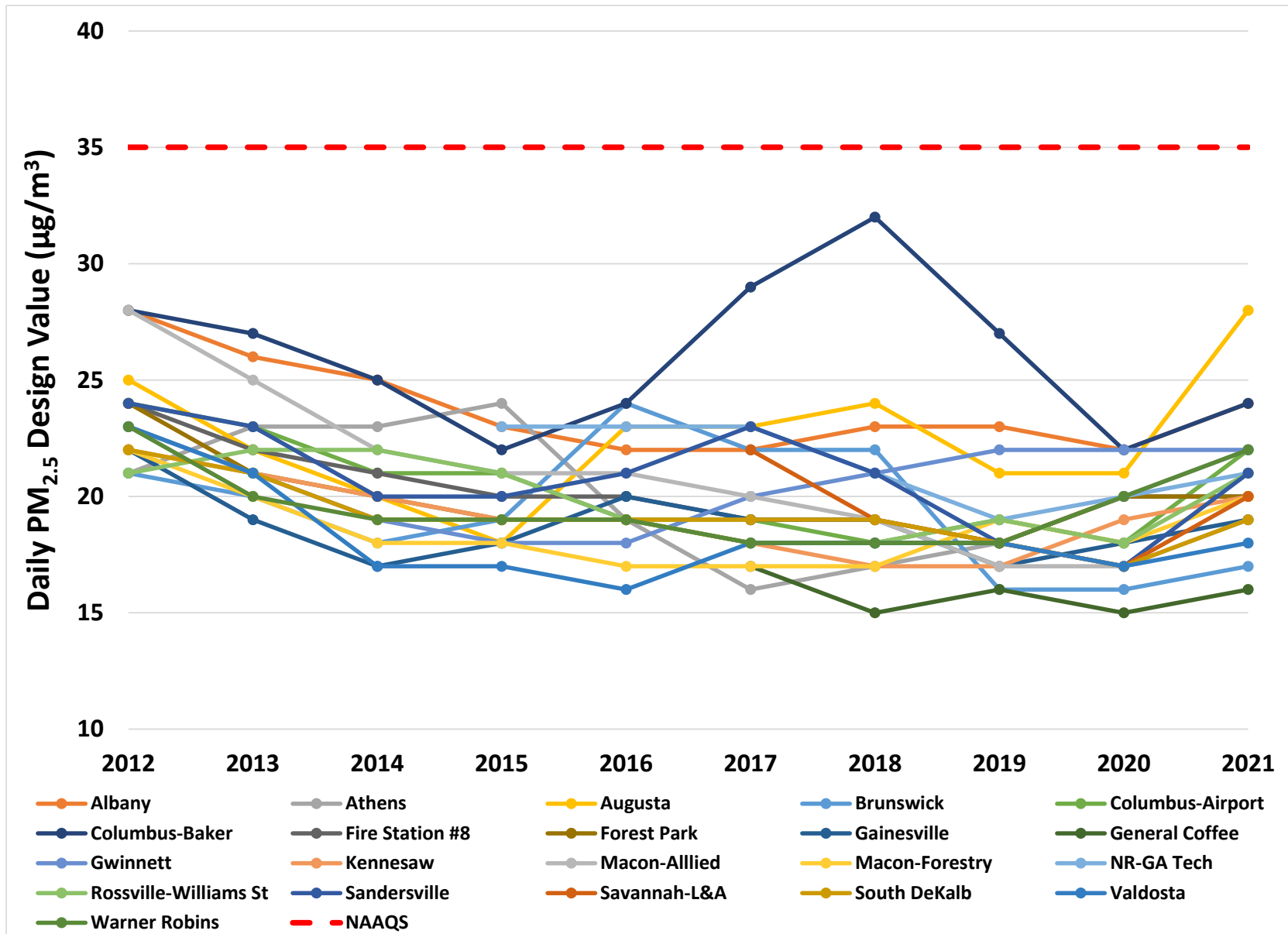


Figure 4. Trend of daily PM_{2.5} design values in Georgia for 2012-2021.

Table 25. Design values for the 24-hour PM_{2.5} NAAQS in Georgia for 2012-2021.

Site Name	AQS ID	County	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Albany	13-095-0007	Dougherty	28*	26	25	23	22	22	23	23	22	24
Athens	13-059-0002	Clarke	21	23	23	24	19	16	17	18	20	22
Augusta	13-245-0091	Richmond	25*	22*	20	18	23	23	24	21	21	28
Brunswick	13-127-0006	Glynn	21*	20*	18*	19	24	22	22	16	16	17
Columbus-Airport	13-215-0008	Muscogee	24*	23*	21	21	19	19	18	19	18	22
Columbus-Baker**	13-215-0012	Muscogee	28*	27*	25	22	24	29	32	27	22*	24*
Fire Station 8	13-121-0039	Fulton	24*	22*	21*	20	20	19	19	18	20	20
Forest Park	13-063-0091	Clayton	24*	21*	20	19	19	18	18	18	20	20
Gainesville	13-139-0003	Hall	22	19	17	18	20	19	19	17	18	19
General Coffee	13-069-0002	Coffee						17*	15*	16*	15	16
Gwinnett Tech	13-135-0002	Gwinnett	23*	21	19	18	18	20	21	22	22	22
Kennesaw	13-067-0003	Cobb	22*	21	20	19	19	18	17	17	19	20
Macon-Allied	13-021-0007	Bibb	28	25	22	21	21	20	19	17	17	19
Macon-Forestry	13-021-0012	Bibb	22	20	18	18	17	17	17	19	18	20
NR-GA Tech	13-121-0056	Fulton				23*	23*	23	21	19	20	21
Rossville William St.**	13-295-0004	Walker	21	22	22	21	19	18	18	19	18*	21*
Sandersville	13-303-0001	Washington	24*	23	20	20	21	23	21	18	17	21
Savannah-L&A	13-051-1002	Chatham						22*	19*	18*	17	20
South DeKalb	13-089-0002	DeKalb	22	21	19	19	19	19	19	18	17	19
Valdosta	13-185-0003	Lowndes	23*	21*	17	17	16	18	18	18	17	18
Warner Robins	13-153-0001	Houston	23	20	19	19	19	18	18	18	20	22

* Indicates that the data used to calculate the design value did not meet the completeness requirement specified in 40 CFR Part 58.

** For Columbus-Baker, the data was combined with the previous site of Columbus-Cussetta. For Rossville Williams St., the data was combined with the previous site of Rossville.

4. Summary

In 2021, 21 monitors measured PM_{2.5} concentrations in Georgia. In total, 21 PM_{2.5} exceedances were reported at ten monitors.⁴ One exceedance was not initially reported due to the absence of FEM measurement. Table 26 contains a summary of the final PM_{2.5} exceedances in 2021. Of the 21 PM_{2.5} exceedances, 18 exceedances were due to prescribed fires and three exceedances were due to holiday fireworks. The 2021 annual 98th percentile daily PM_{2.5} concentrations are below 35.5 µg/m³ at all monitors, except Augusta (13-245-0091) which has a value of 38.2 µg/m³. The 2021 annual 98th percentile daily values are higher than the 2020 annual 98th percentile daily values at 16 monitors and the 2021 daily design values are higher than the 2020 daily design values at 18 monitors. However, all design values are still below the 24-hour PM_{2.5} NAAQS level (35 µg/m³). The highest 2021 24-hour design value (28 µg/m³) is in Augusta (13-245-0091).

Table 26. Summary of PM_{2.5} exceedances in 2021.

Date	Site Name	AQS ID	Final PM _{2.5} Concentration	Cause of Exceedances
20210227	Augusta	13-245-0091	40.1	Prescribed Fires
20210228	Augusta	13-245-0091	53.4	Prescribed Fires
20210307	Warner Robins	13-153-0001	36.5	Prescribed Fires
20210308	Columbus-Airport	13-215-0008	42.1	Prescribed Fires
20210308	Columbus-Baker	13-215-0012	60.7	Prescribed Fires
20210308	Macon-Forestry	13-021-0012	47.7	Prescribed Fires
20210309	Athens	13-059-0002	38.1	Prescribed Fires
20210310	Augusta	13-245-0091	41.2	Prescribed Fires
20210312	Albany	13-095-0007	48.6	Prescribed Fires
20210313	Albany	13-095-0007	43.0	Prescribed Fires
20210313	Sandersville	13-303-0001	35.7	Prescribed Fires
20210313	Warner Robins	13-153-0001	37.9	Prescribed Fires
20210406	Albany	13-095-0007	39.2	Prescribed Fires
20210407	Sandersville	13-303-0001	39.6	Prescribed Fires
20210408	Sandersville	13-303-0001	36.5	Prescribed Fires
20210704	Augusta	13-245-0091	43.5	Local Fireworks
20210705	Augusta	13-245-0091	40.3	Local Fireworks
20210705	Gwinnett Tech	13-135-0002	38.3	Local Fireworks
20211204	Rossville Williams St	13-295-0004	39.3	Prescribed Fires
20211205	Augusta	13-245-0091	43.6	Prescribed Fires
20211216	Augusta	13-245-0091	38.2	Prescribed Fires

⁴ At the Warner Robins monitor in 2021, three exceedances were reported initially. Two exceedances out of these three exceedances were confirmed based on FEM measurements. One exceedance on March 14, 2021 was identified as a non-exceedance with FRM measurements.

Appendix A. Definition of PM_{2.5} Species in this report.

PM _{2.5} Species	Details	AQS Parameter Code
sulfate	sulfate	88403
nitrate	nitrate	88306
ammonium	ammonium	88301
OM	1.4*organic carbon (OC PM _{2.5} LC TOR)	88320
EC	elemental carbon (EC PM _{2.5} LC TOR)	88321
soil	2.2*aluminum	88104
	2.49*silicon	88165
	1.63*calcium	88111
	2.42*iron	88126
	1.84*titanium	88161
Other	antimony PM _{2.5} LC	88102
	arsenic PM _{2.5} LC	88103
	barium PM _{2.5} LC	88107
	bromine PM _{2.5} LC	88109
	cadmium PM _{2.5} LC	88110
	chromium PM _{2.5} LC	88112
	cobalt PM _{2.5} LC	88113
	copper PM _{2.5} LC	88114
	chlorine PM _{2.5} LC	88115
	cerium PM _{2.5} LC	88117
	cesium PM _{2.5} LC	88118
	lead PM _{2.5} LC	88128
	indium PM _{2.5} LC	88131
	manganese PM _{2.5} LC	88132
	nickel PM _{2.5} LC	88136
	magnesium PM _{2.5} LC	88140
	phosphorus PM _{2.5} LC	88152
	selenium PM _{2.5} LC	88154
	tin PM _{2.5} LC	88160
	vanadium PM _{2.5} LC	88164
	silver PM _{2.5} LC	88166
	zinc PM _{2.5} LC	88167
	strontium PM _{2.5} LC	88168
rubidium PM _{2.5} LC	88176	
potassium PM _{2.5} LC	88180	
sodium PM _{2.5} LC	88184	
zirconium PM _{2.5} LC	88185	
Unknown	PM _{2.5} – (sulfate + nitrate + ammonium + OM + EC + soil + Other)	N/A