

2025 PM2.5 and SO2 Year in Review

Bureau of Air Quality
August 2026





Pennsylvania
Department of
Environmental Protection

Agenda

- Fine Particulate Matter (PM_{2.5}) Designation Process
- 2025 PM_{2.5} and Sulfur Dioxide (SO₂) Year in Review
 - A Review of the Meteorology
 - PM_{2.5} Concentration Data
 - SO₂ Concentration Data
- Other 2025 Criteria Pollutants
- Next Steps



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PM2.5 Designation Process

PM2.5 Designation Process

- On February 7, 2024, EPA signed the final rule for a new PM2.5 National Ambient Air Quality Standard (NAAQS), revising the primary annual standard to 9.0 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) and retaining the primary 24-hour standard to 35 $\mu\text{g}/\text{m}^3$.
- EPA finalized 2023 PM2.5 design values (DV) in August 2024. DEP used these 2023 PM2.5 DV for its designation purposes.
- In its plan, DEP used five factors (air quality data, emissions data, meteorology data, geography/topography data and jurisdictional boundary data) to define its proposed PM2.5 nonattainment areas.
- The result: DEP proposed four areas in the Commonwealth for nonattainment area designation.
- DEP went out for public comment on its recommended PM2.5 designation from December 21, 2024 until January 28, 2025.

PM2.5 Designation Process

Facts about the public comment period:

- DEP extended the public comment period due to a submitted request by the public.
- In total, DEP received 24 public comments.
- Public comments were submitted from Pennsylvania citizens in addition to various public interest organizations.
- DEP submitted its designation recommendations to the Environmental Protection Agency (EPA) Region 3 in April 2025.



Map of Pennsylvania showing county-level COVID-19 case rates per 100,000 people. The map is color-coded by rate: red for high rates (above 9.0), orange for medium rates (7.0-9.0), and green for low rates (below 7.0). Blue dots indicate specific data points for each county. The map shows a clear trend of higher case rates in the eastern and southern parts of the state, particularly in the Philadelphia and Pittsburgh areas.

County	Case Rate (per 100,000)
Allegeny	9.2
Armstrong	8.3
Beaver	8.9
Butler	8.1
Centre	7.6
Clearfield	7.9
Clinton	7.3
Crawford	7.1*
Cumberland	7.9
Dauphin	9.8
Delaware	9.3
Franklin	8.7
Fulton	8.8
Harrisburg	8.4
Huntingdon	7.9
Juniata	8.4
Lancaster	9.5
Lebanon	8.4
Lehigh	8.3
Lycoming	5.6*
Mercer	7.0*
Monroe	8.5
Montgomery	8.1
Northampton	8.4*
Perry	7.9
Pike	8.3
Potter	6.4*
Schuylkill	8.4
Snyder	8.4
Susquehanna	5.9*
Tioga	5.7*
Union	7.5
Washington	7.1*
Wayne	7.5
Westmoreland	10.0
York	9.3

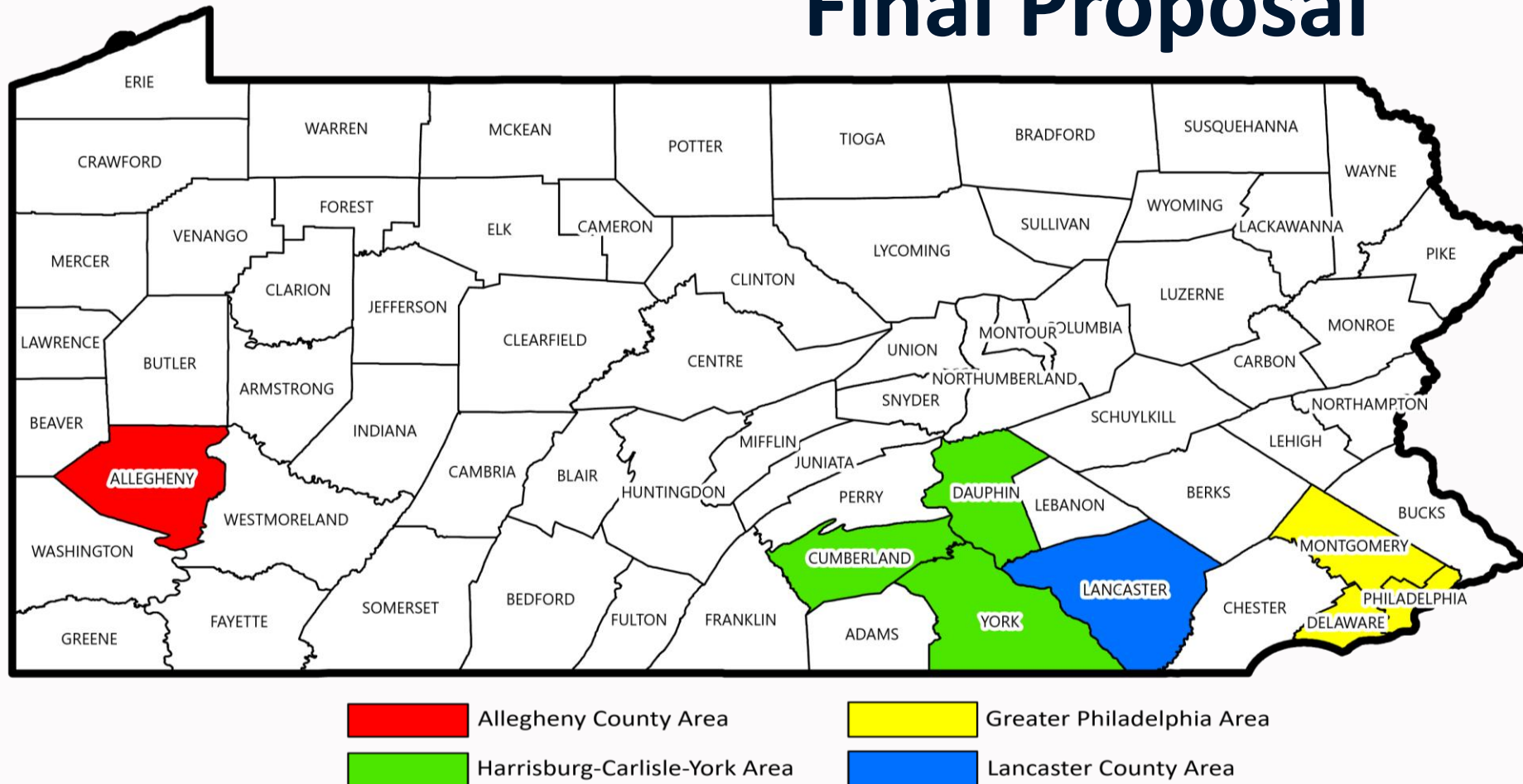
Asterisk (*) appearing behind the design value means the data is incomplete during 3-year period.



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PM2.5 Designation Process

Final Proposal



PM2.5 Designation Process

Where EPA stands:

- EPA did not issue proposed modifications to DEP's designation recommendations by October 9, 2025, 120-day letter.
- In November 2025, EPA requested that the D.C. Circuit vacate the 2024 PM2.5 standard.
- EPA did not finalize 2024 PM2.5 area designations by February 6, 2026.
- Litigation regarding the 2024 annual PM2.5 standard is ongoing.



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2025 PM_{2.5} Year in Review



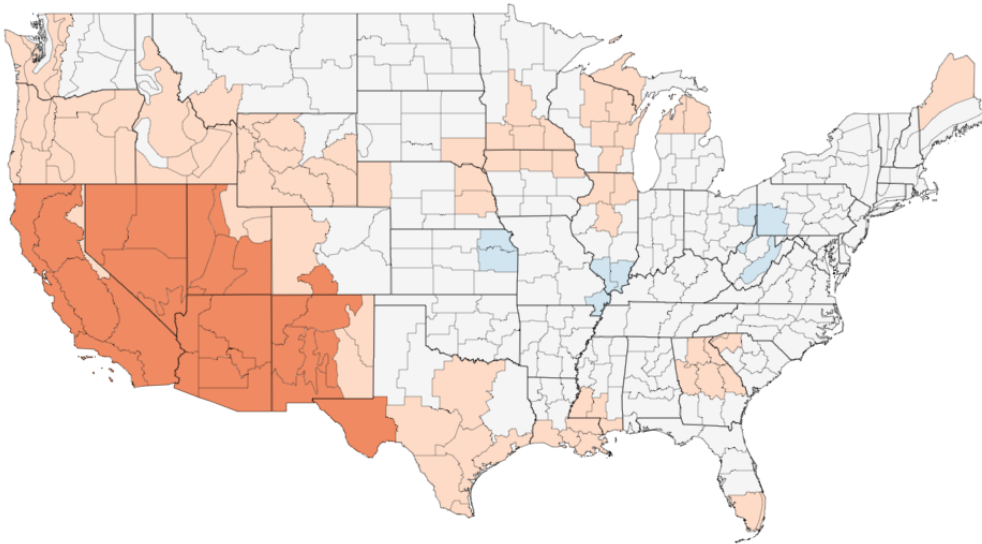
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Meteorology – Winter 2025

Temperature

Divisional Maximum Temperature Rank (131 years)

December 2024 - February 2025



Coldest ◀ Much Below Below Average Near Average Above Average Much Above ▶ Warmest

Contiguous U.S.

Temp: 44.70°F

Average: 42.70°F

Departure: 2.00°F

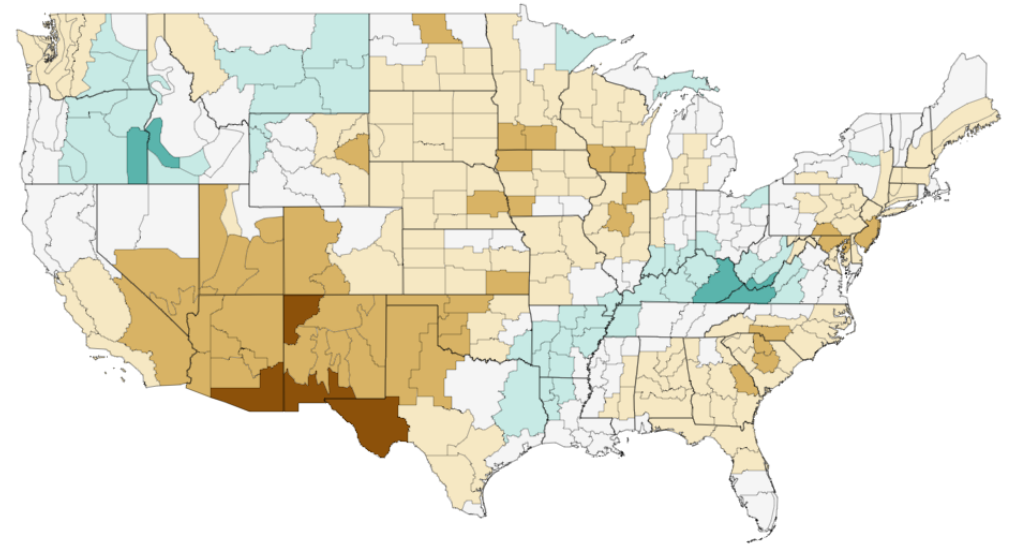
Rank: 25th Warmest



Precipitation

Divisional Precipitation Rank (131 years)

December 2024 - February 2025



Lowest ◀ Much Below Below Average Near Average Above Average Much Above ▶ Highest

Contiguous U.S.

Precip: 5.92"

Average: 6.79"

Departure: -0.87"

% of Avg: 87.2%

Rank: 22nd Lowest

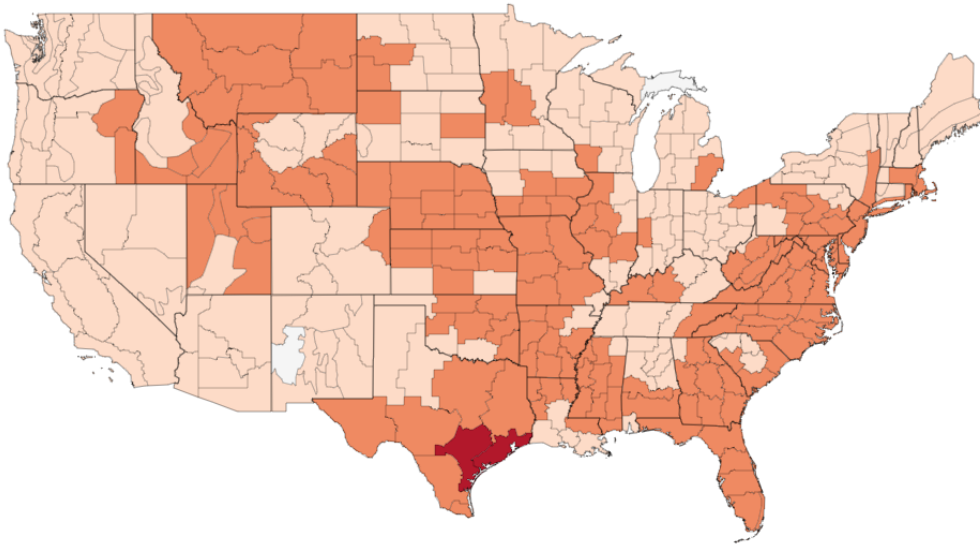


Meteorology – Spring 2025

Temperature

Divisional Maximum Temperature Rank (131 years)

March - May 2025



Coldest ◀ Much Below Below Average Near Average Above Average Much Above ▶ Warmest

Contiguous U.S.

Temp: 66.70°F

Average: 63.10°F

Departure: 3.60°F

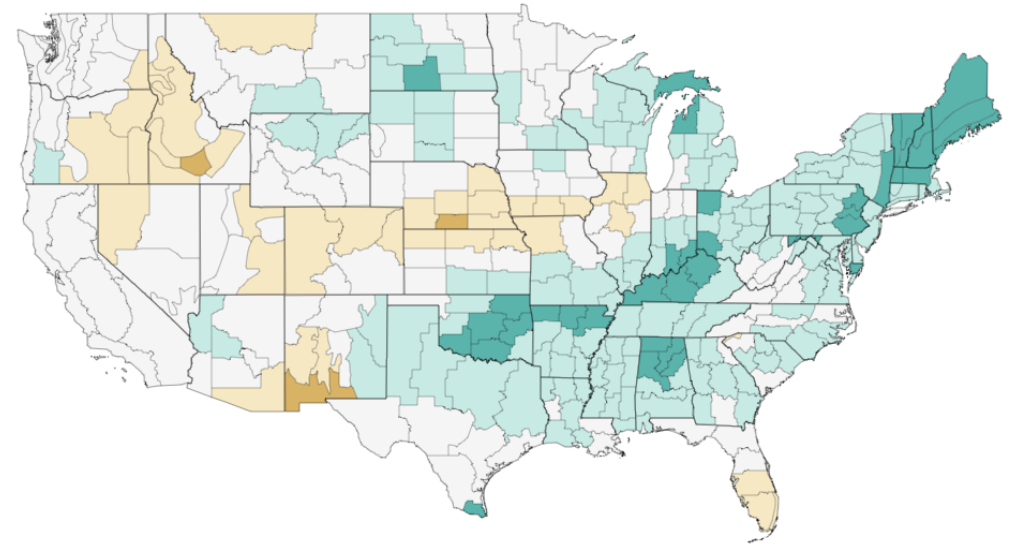
Rank: 4th Warmest



Precipitation

Divisional Precipitation Rank (131 years)

March - May 2025



Lowest ◀ Much Below Below Average Near Average Above Average Much Above ▶ Highest

Contiguous U.S.

Precip: 8.96"

Average: 7.93"

Departure: 1.03"

% of Avg: 112.9%

Rank: 24th Highest





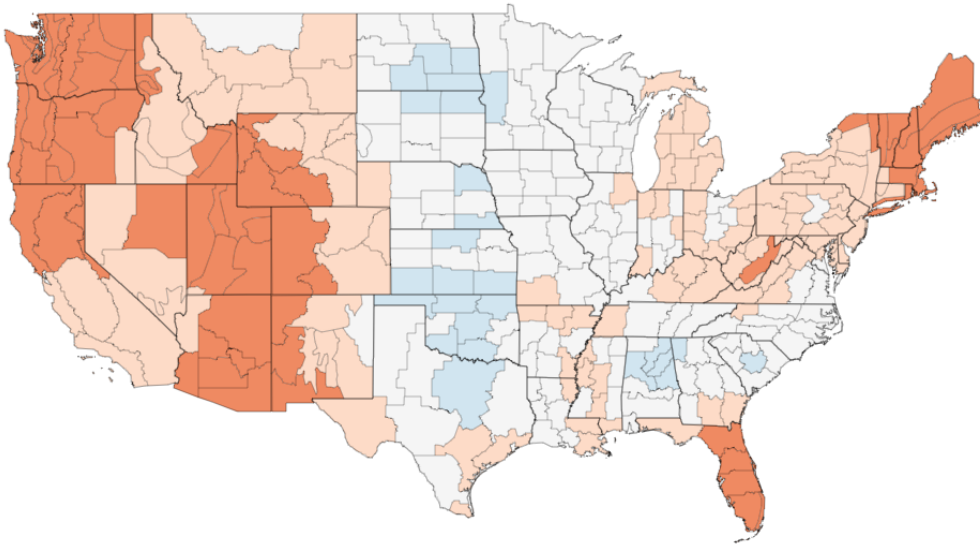
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Meteorology – Summer 2025

Temperature

Divisional Maximum Temperature Rank (131 years)

June - August 2025



Coldest ◀ Much Below Below Average Near Average Above Average Much Above ▶ Warmest

Contiguous U.S.

Temp: 85.80°F

Average: 84.30°F

Departure: 1.40°F

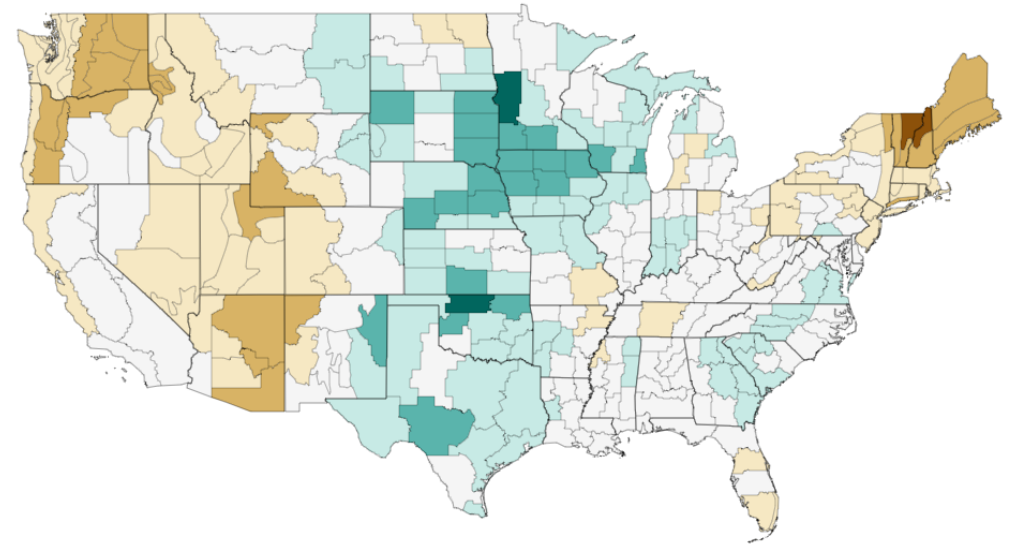
Rank: 21st Warmest



Precipitation

Divisional Precipitation Rank (131 years)

June - August 2025



Lowest ◀ Much Below Below Average Near Average Above Average Much Above ▶ Highest

Contiguous U.S.

Precip: 8.71"

Average: 8.32"

Departure: 0.39"

% of Avg: 104.7%

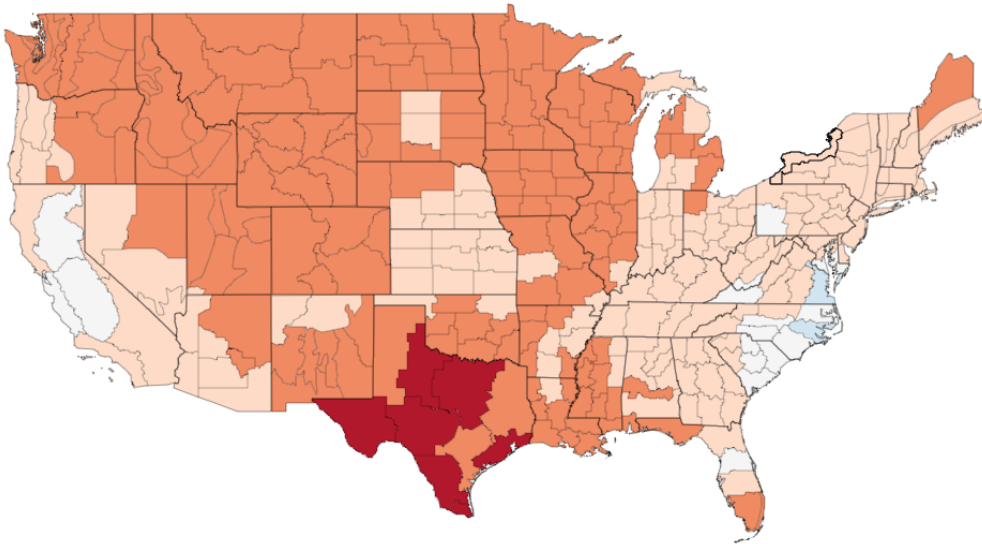
Rank: 44th Highest



Meteorology – Fall 2025

Temperature

Divisional Maximum Temperature Rank (131 years) September - November 2025



Coldest ◀ Much Below Below Average Near Average Above Average Much Above ▶ Warmest

Contiguous U.S.

Temp: 69.30°F

Average: 65.80°F

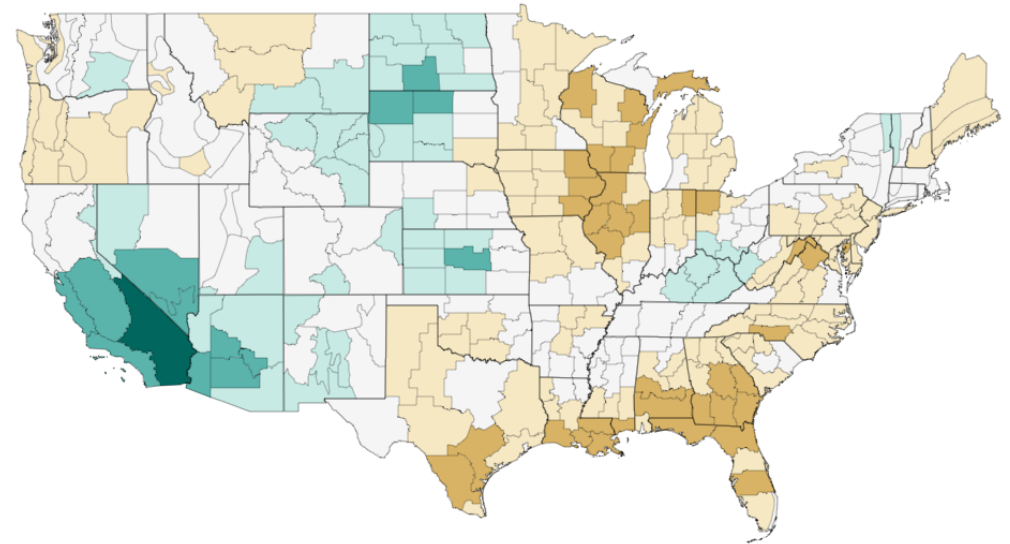
Departure: 3.50°F

Rank: 5th Warmest



Precipitation

Divisional Precipitation Rank (131 years) September - November 2025



Lowest ◀ Much Below Below Average Near Average Above Average Much Above ▶ Highest

Contiguous U.S.

Precip: 6.00"

Average: 6.88"

Departure: -0.88"

% of Avg: 87.2%

Rank: 27th Lowest*





2025 PM2.5 Monitoring Summary

- PM2.5 monitoring season – Year-round
- Overview of the 2025 DV for the 24-hour and annual PM2.5 NAAQS continuous monitors:
 - 2025 24-hour DV calculation – 98th percentile value from 2023, 2024, and 2025 averaged over a 3-year period.
 - 2025 annual DV calculation – Annual average calculated from quarterly (January – March, and so on) averages. Annual average for 2023, 2024, and 2025 averaged over a 3-year period.

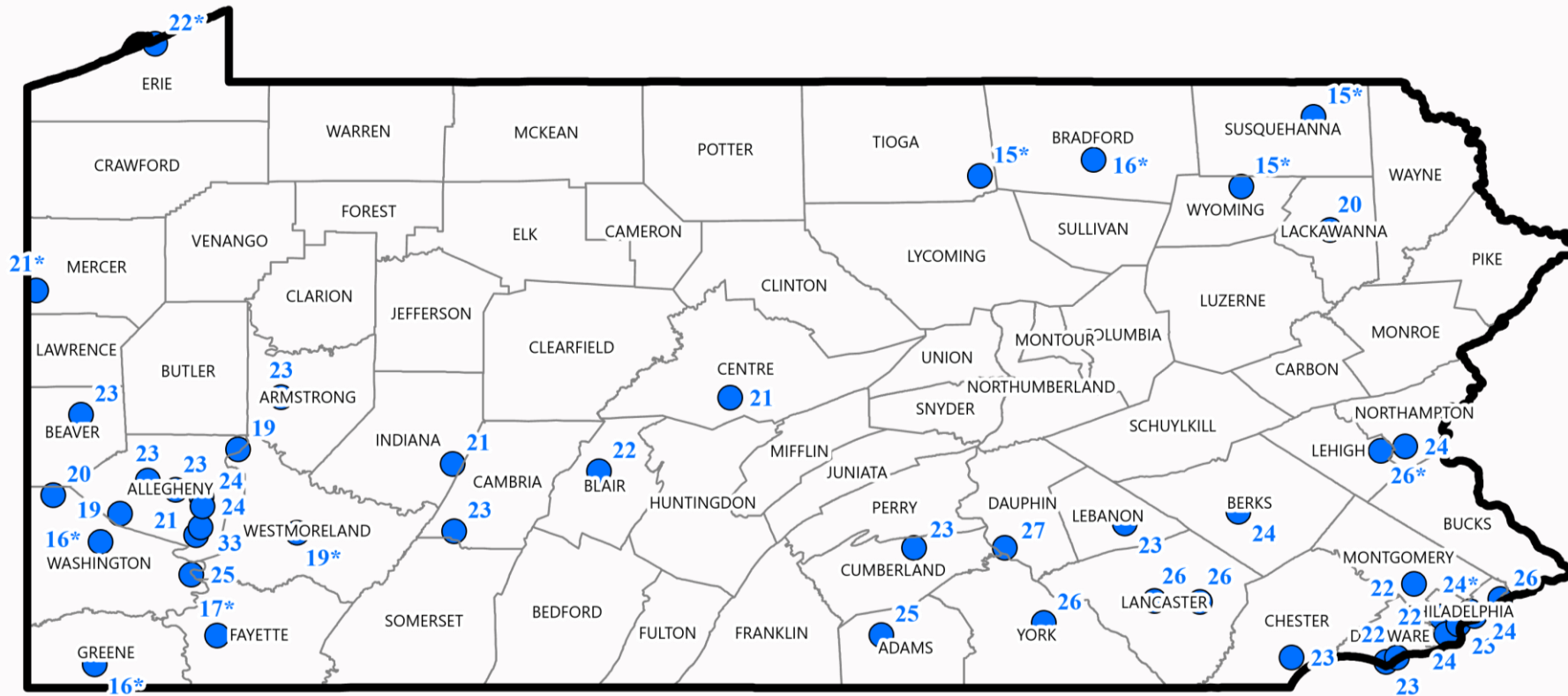
Number of 24-Hour PM_{2.5} Exceedances

Number of PM_{2.5} exceedance days and total number of exceedances per year within Pennsylvania's PM_{2.5} monitoring network (~54 total monitors):

- 2023: 28 days | 230 total exceedances
 - Abnormal year – smoke influence
- 2024: 6 days | 9 total exceedances
- 2025: 11 days | 29 total exceedances



2023 24-Hour PM2.5 Design Values



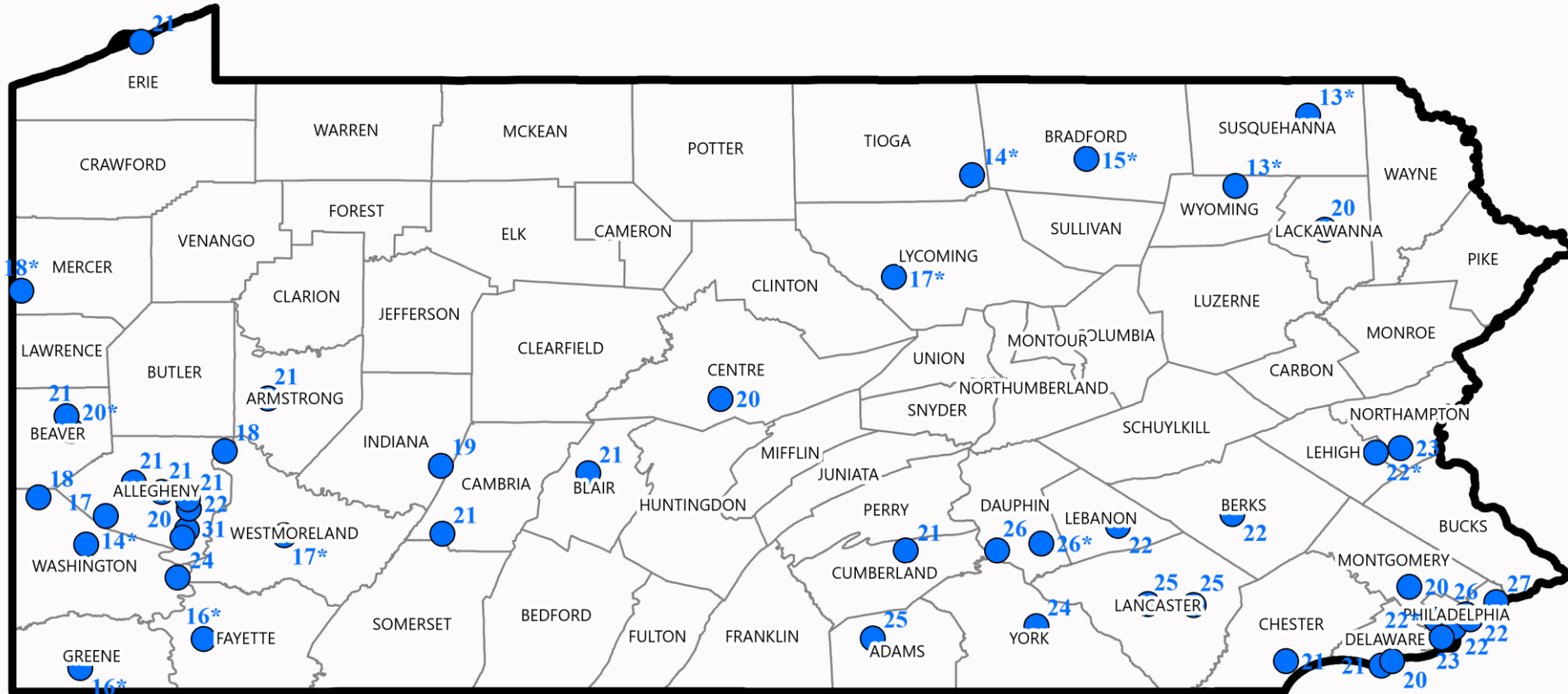
Appearing in Red – 2023 24-Hour PM_{2.5} design value above 35 µg/m³ (2006 PM_{2.5} Standard)

Appearing in Blue – 2023 24-Hour PM_{2.5} design value at or below 35 µg/m³ (2006 PM_{2.5} Standard)

Asterisk (*) appearing behind the design value means the data is incomplete during 3-year period.



2024 24-Hour PM2.5 Design Values



Appearing in Red – 2024 24-Hour PM_{2.5} design value above 35 µg/m³ (2006 PM_{2.5} Standard)

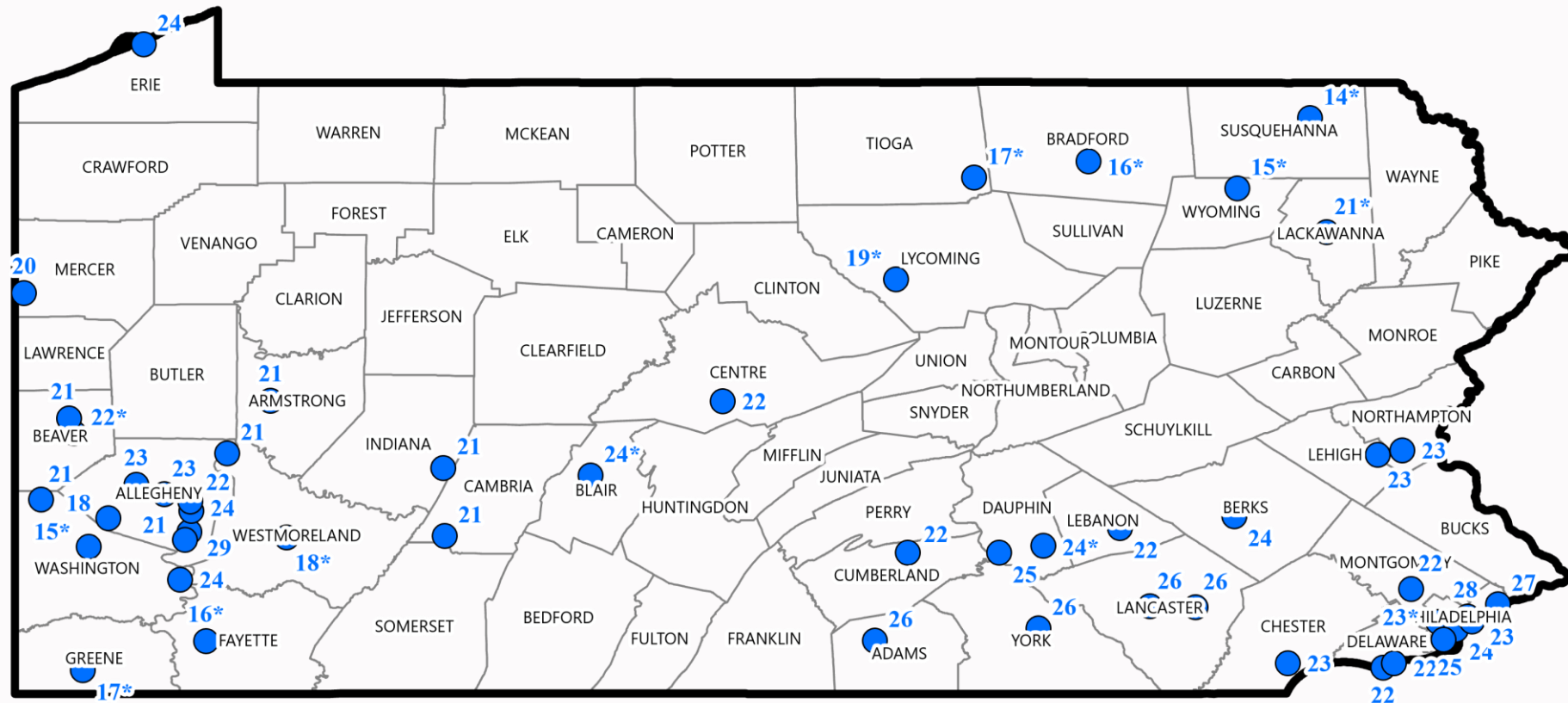
Appearing in Blue – 2024 24-Hour PM_{2.5} design value at or below 35 µg/m³ (2006 PM_{2.5} Standard)

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2025 24-Hour PM_{2.5} Design Values



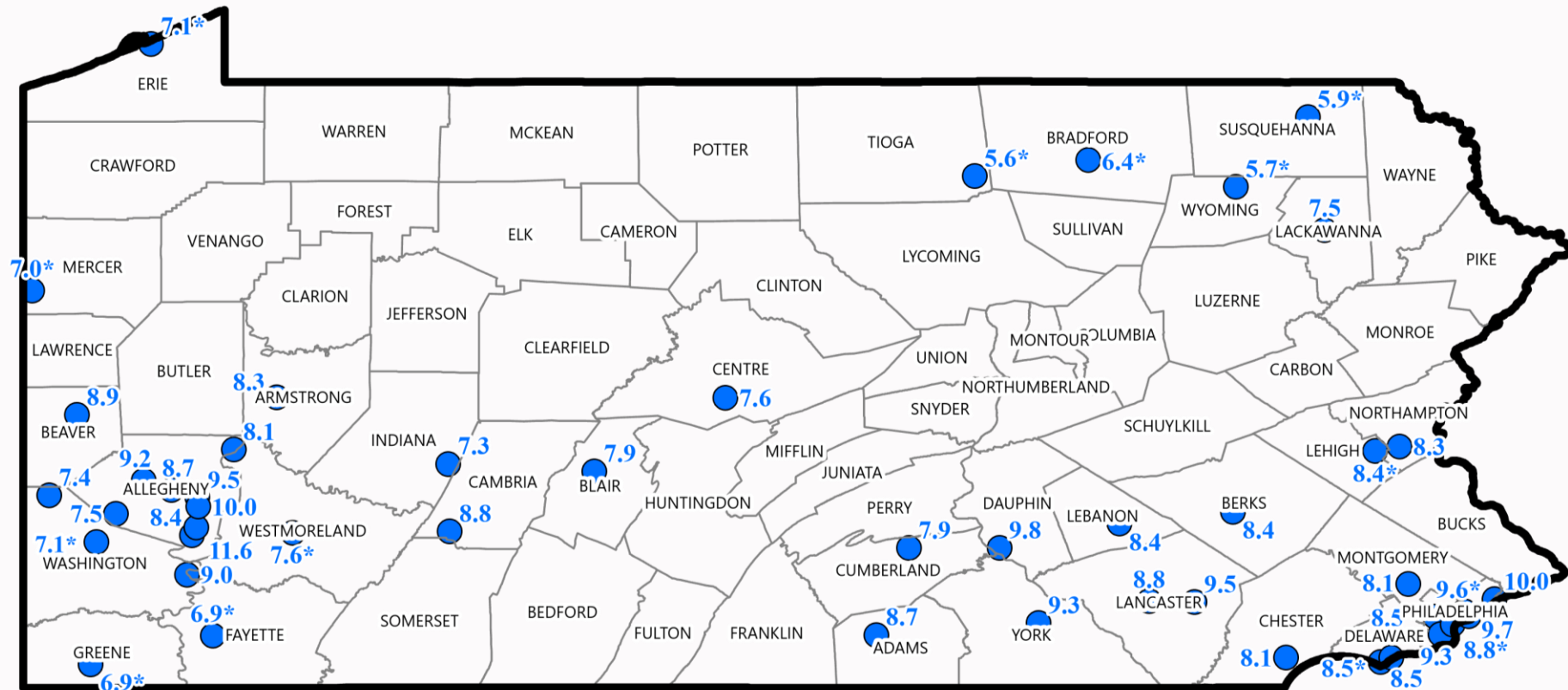
Appearing in Red – 2025 24-Hour PM_{2.5} design value above 35 µg/m³ (2006 PM_{2.5} Standard)

Appearing in Blue – 2025 24-Hour PM_{2.5} design value at or below 35 µg/m³ (2006 PM_{2.5} Standard)

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2023 Annual PM2.5 Design Values



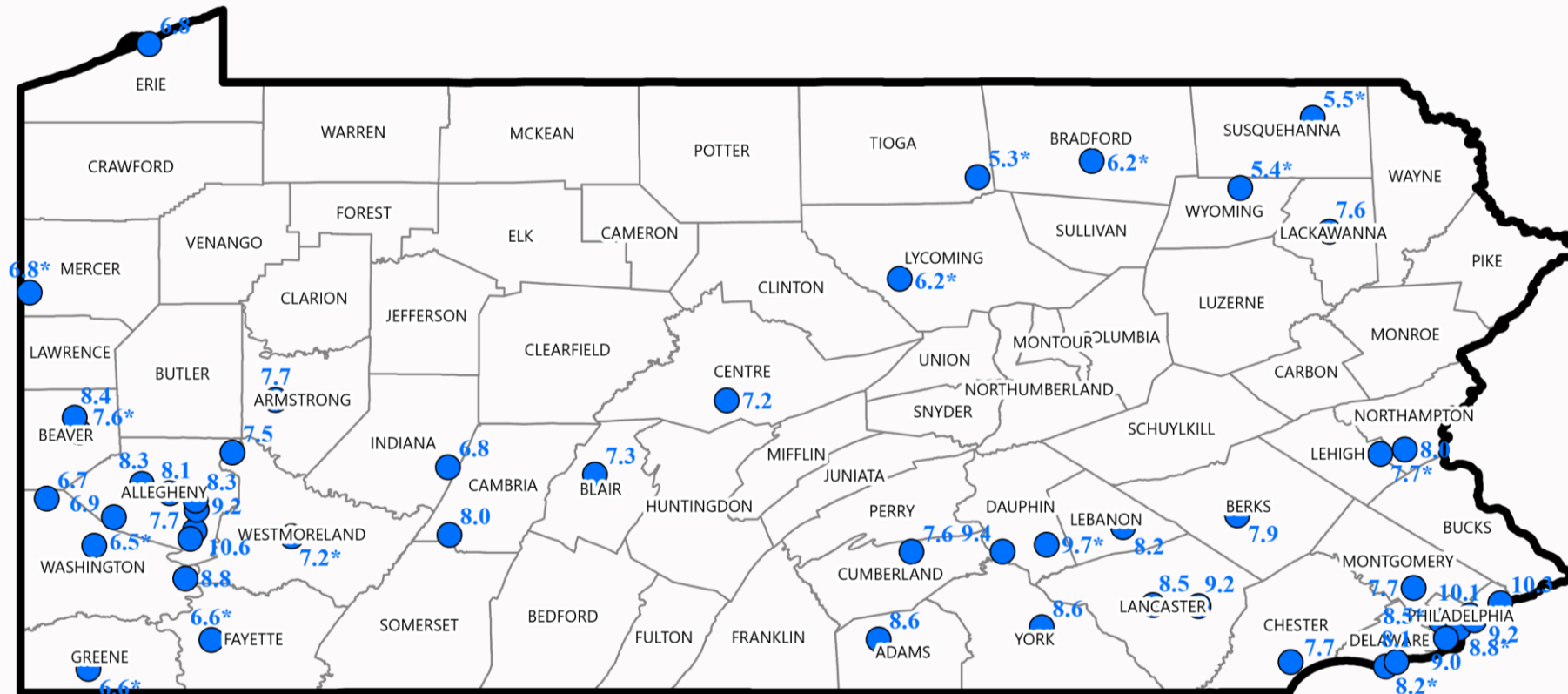
Appearing in Red – 2023 annual PM_{2.5} design value above 12.0 µg/m³ (2012 PM_{2.5} Standard)

Appearing in Blue – 2023 annual PM_{2.5} design value at or below 12.0 µg/m³ (2012 PM_{2.5} Standard)

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2024 Annual PM2.5 Design Values



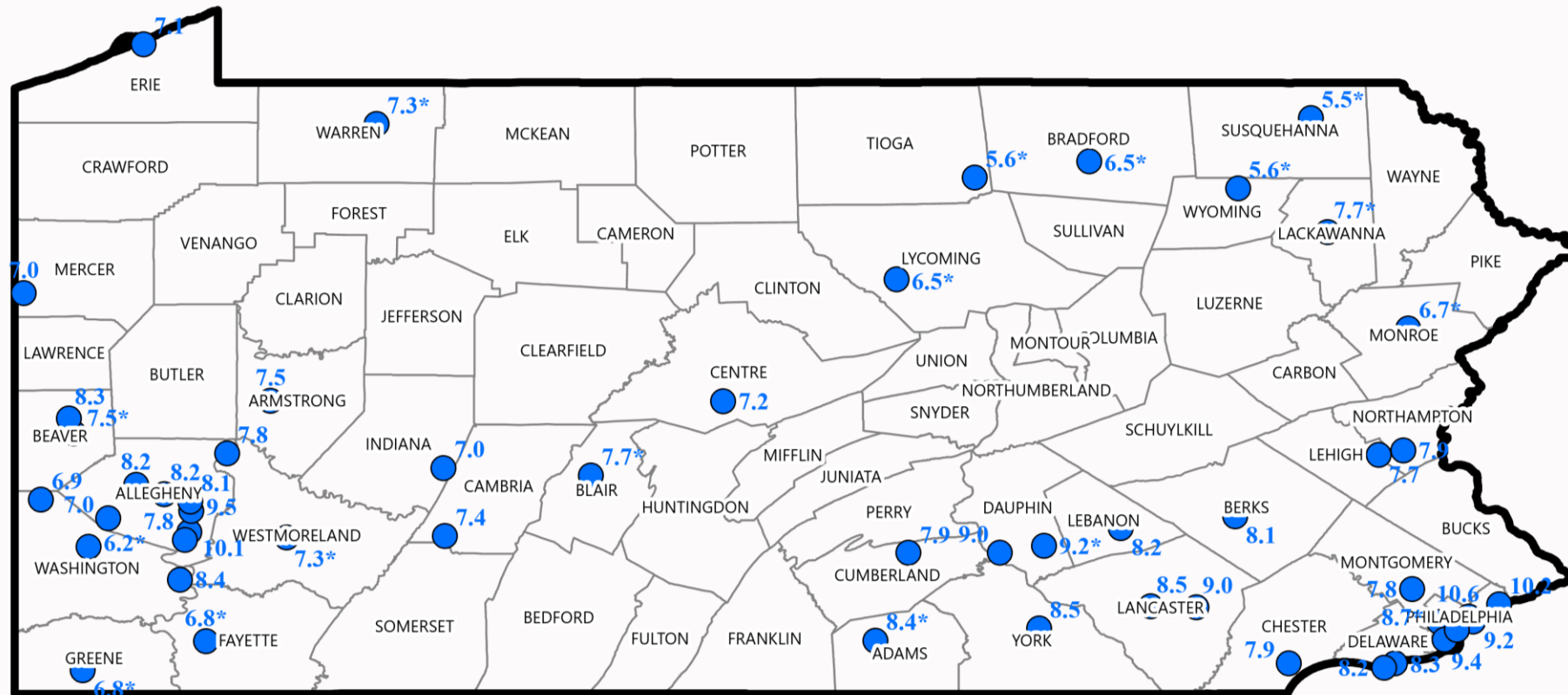
Appearing in Red – 2024 annual PM_{2.5} design value above 12.0 µg/m³ (2012 PM_{2.5} Standard)

Appearing in Blue – 2024 annual PM_{2.5} design value at or below 12.0 µg/m³ (2012 PM_{2.5} Standard)

Asterisk (*) appearing behind the design value means the data is incomplete during 3-year period.



2025 Annual PM2.5 Design Values



Appearing in Red – 2025 annual PM_{2.5} design value above 12.0 µg/m³ (2012 PM_{2.5} Standard)

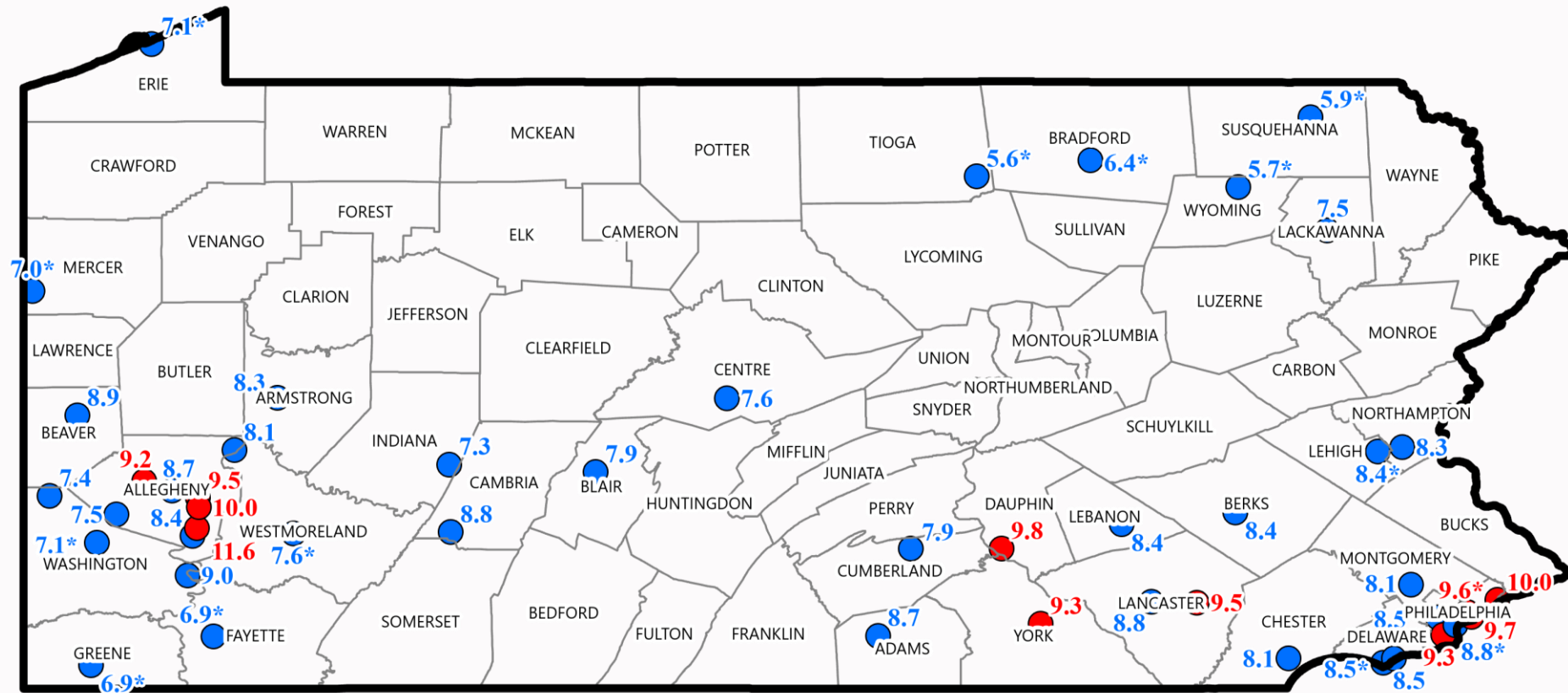
Appearing in Blue – 2025 annual PM_{2.5} design value at or below 12.0 µg/m³ (2012 PM_{2.5} Standard)

Asterisk (*) appearing behind the design value means the data is incomplete during 3-year period.



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2023 Annual PM_{2.5} Design Values



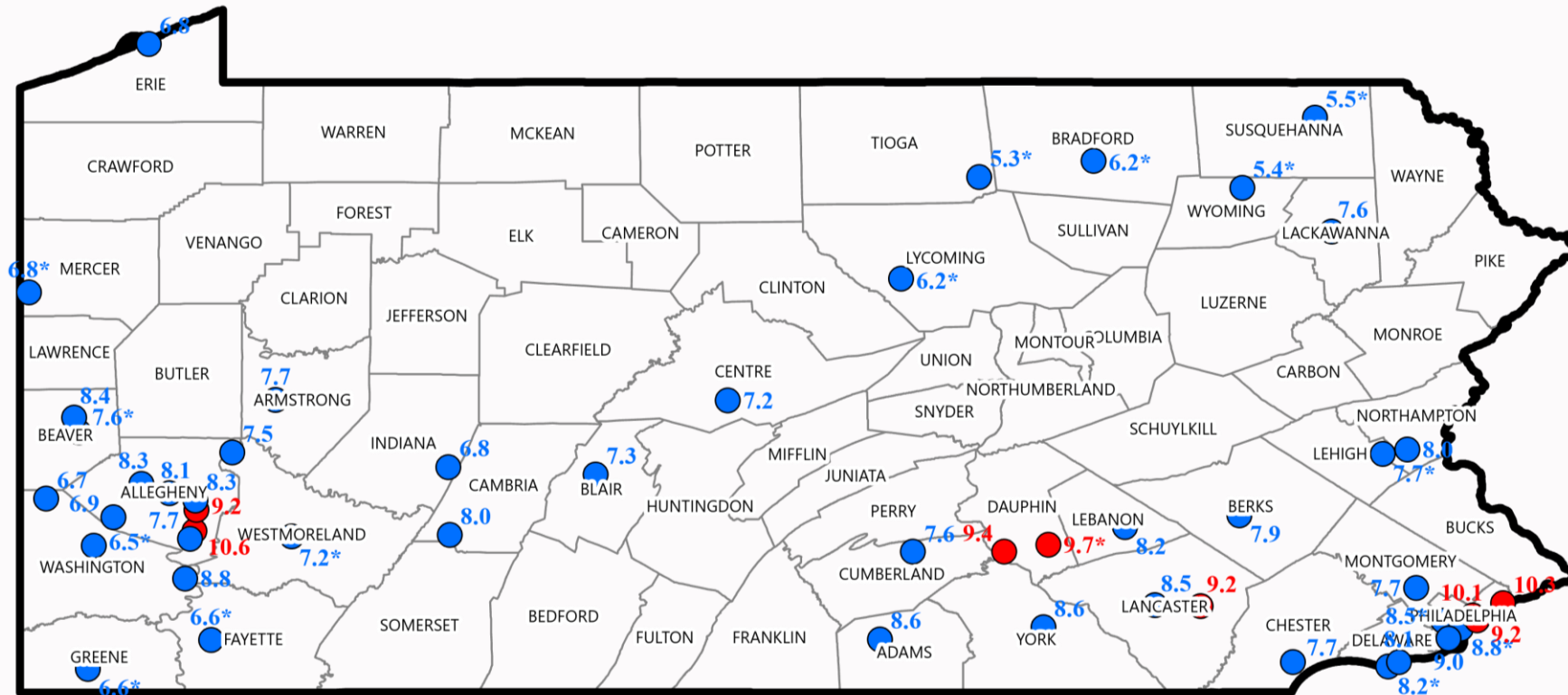
Appearing in Red – 2023 annual PM_{2.5} design value above 9.0 µg/m³ (2024 PM_{2.5} Standard)

Appearing in Blue – 2023 annual PM_{2.5} design value at or below 9.0 µg/m³ (2024 PM_{2.5} Standard)

Asterisk (*) appearing behind the design value means the data is incomplete during 3-year period.



2024 Annual PM2.5 Design Values



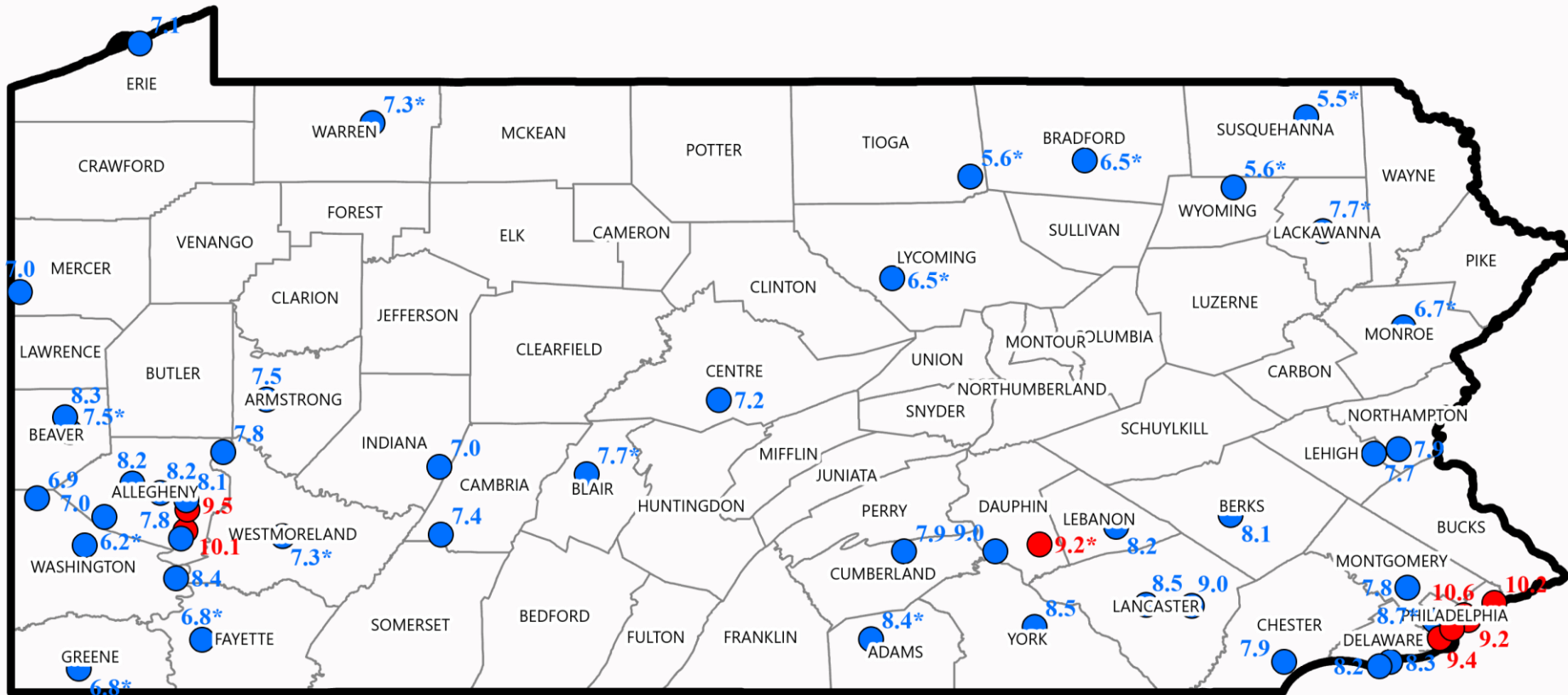
Appearing in Red – 2024 annual PM2.5 design value above 9.0 µg/m³ (2024 PM2.5 Standard)

Appearing in Blue – 2024 annual PM_{2.5} design value at or below 9.0 µg/m³ (2024 PM_{2.5} Standard)

Asterisk (*) appearing behind the design value means the data is incomplete during 3-year period.



2025 Annual PM2.5 Design Values



Appearing in Red – 2025 annual PM2.5 design value above 9.0 µg/m³ (2024 PM2.5 Standard)

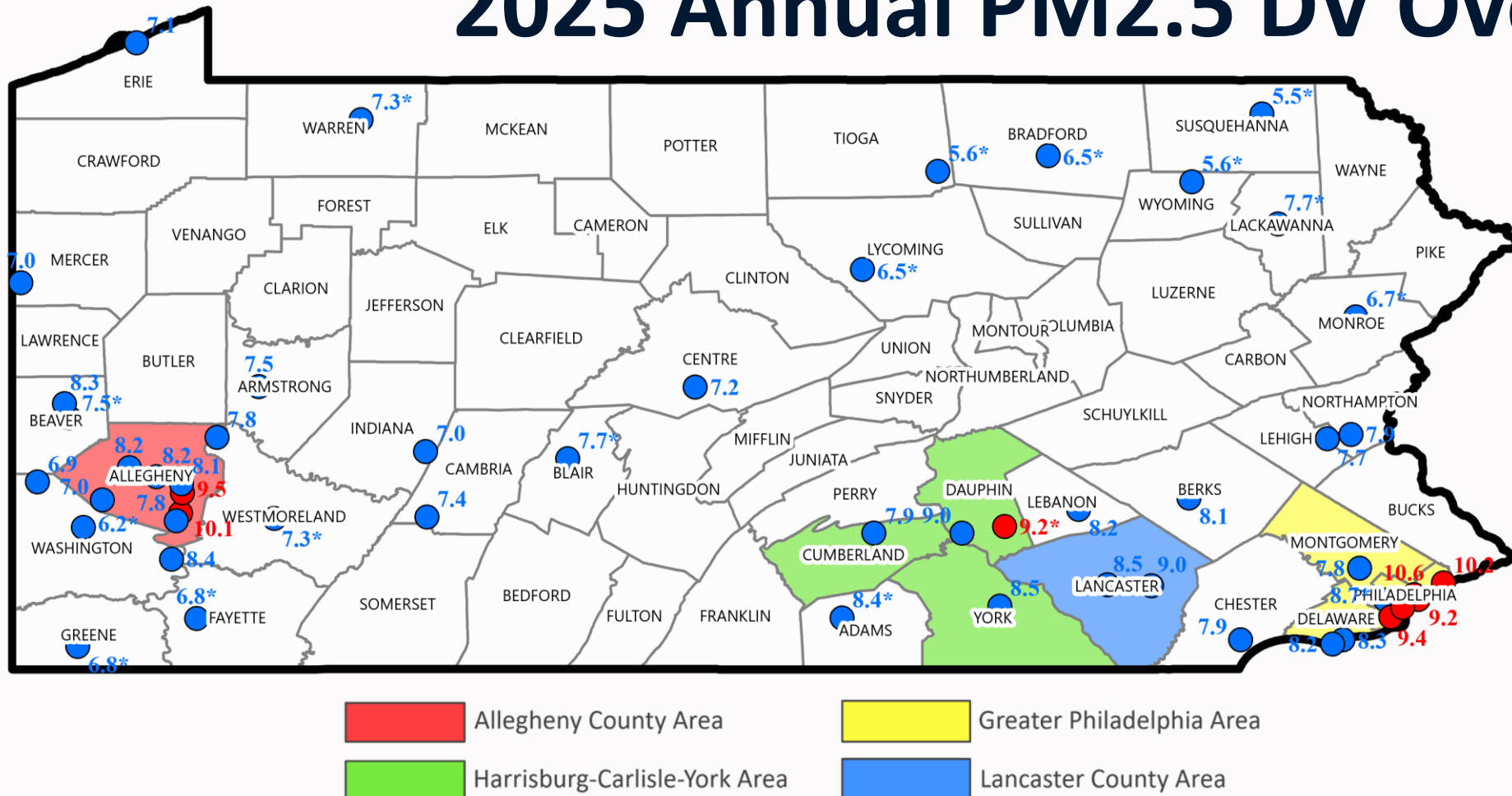
Appearing in Blue – 2025 annual PM_{2.5} design value at or below 9.0 µg/m³ (2024 PM_{2.5} Standard)

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PM2.5 Designation Proposal and 2025 Annual PM2.5 DV Overlay



New PM2.5 Sites Added 2025

To assist with increasing the AQI reporting and improving coverage in forecasting, DEP has established PM2.5 monitoring as follows:

- Warren Overlook (Warren County), Start Date 7/23/2025
- Swiftwater (Monroe County), Start Date 7/30/2025



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2025 SO₂ Year in Review

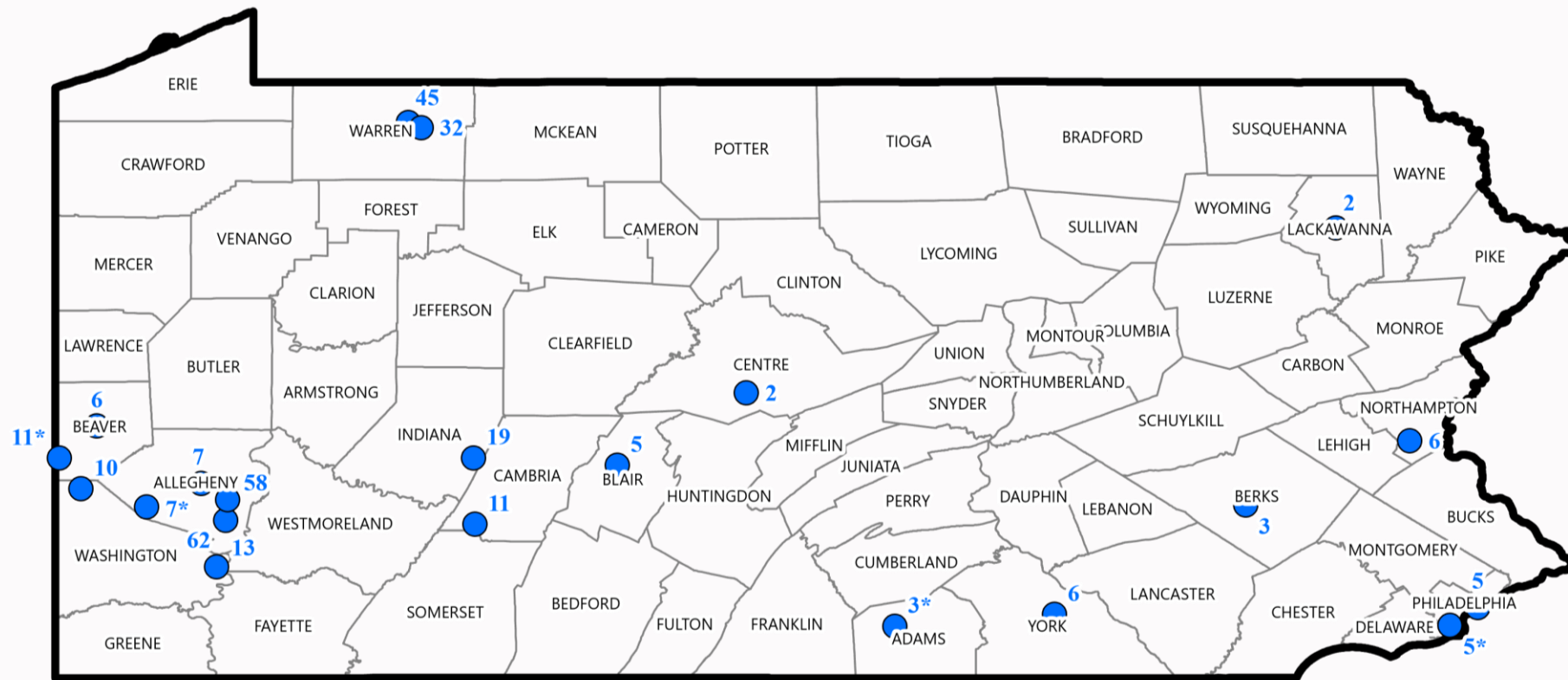
2025 SO₂ Monitoring Summary

- SO₂ monitoring season – Year-round
- 1-hour standard (2010) – 75 ppb
- Overview of the 2025 DV for the 1-hour NAAQS continuous monitors:
 - 2025 1-hour DV calculation – annual 99th percentile value of 1-hour daily maximum concentrations from 2023, 2024, and 2025, averaged over a 3-year period.



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2024 1-Hour SO₂ Design Values



Appearing in Red – 2024 1-Hour SO₂ design value above 75 ppb (2010 SO₂ Standard)

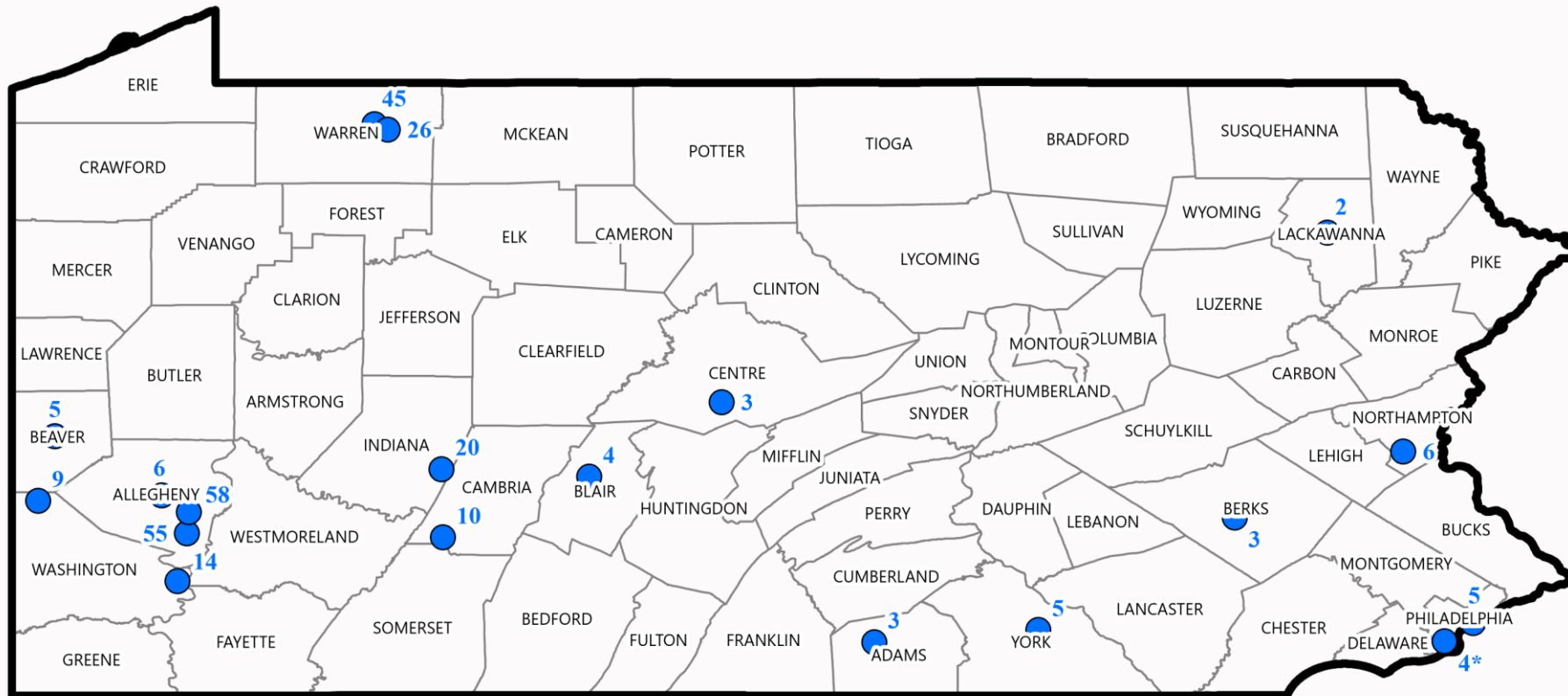
Appearing in Blue – 2024 1-Hour SO₂ design value at or below 75 ppb (2010 SO₂ Standard)

Asterisk (*) appearing behind the design value means the data is incomplete during 3-year period.



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2025 1-Hour SO₂ Design Values



Appearing in Red – 2024 1-Hour SO₂ design value above 75 ppb (2010 SO₂ Standard)

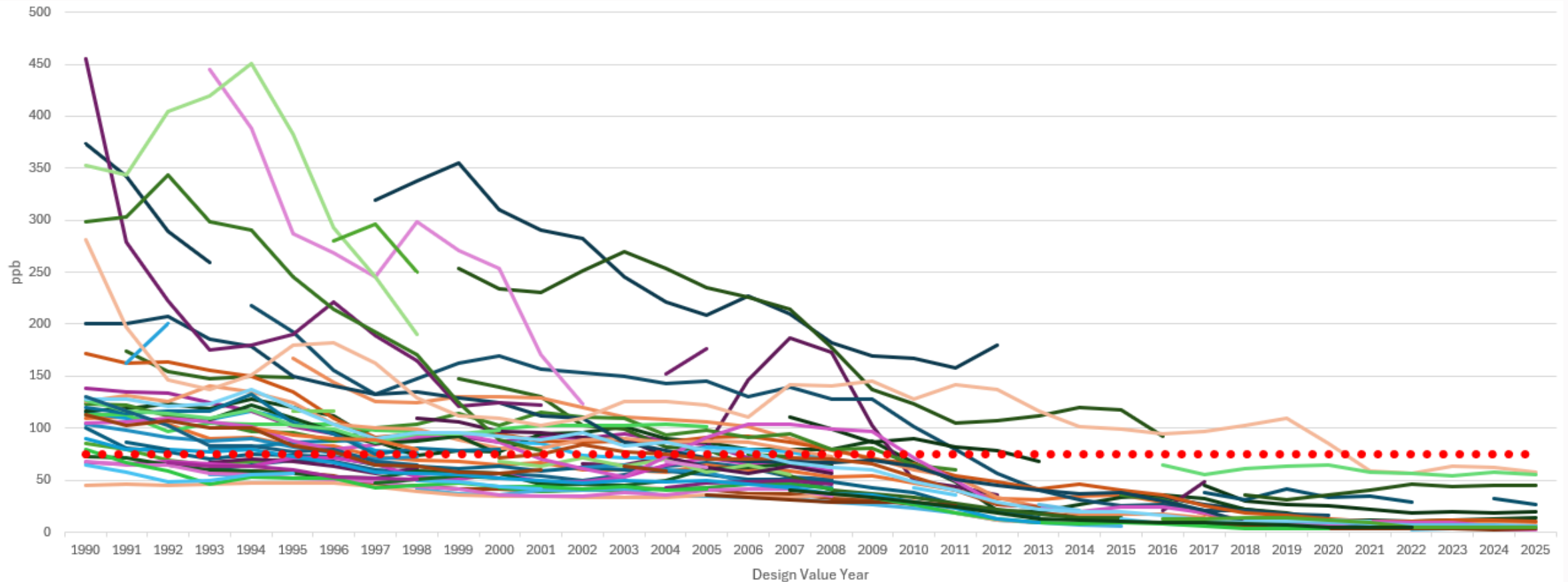
Appearing in Blue – 2024 1-Hour SO₂ design value at or below 75 ppb (2010 SO₂ Standard)

Asterisk (*) appearing behind the design value means the data is incomplete during 3-year period.



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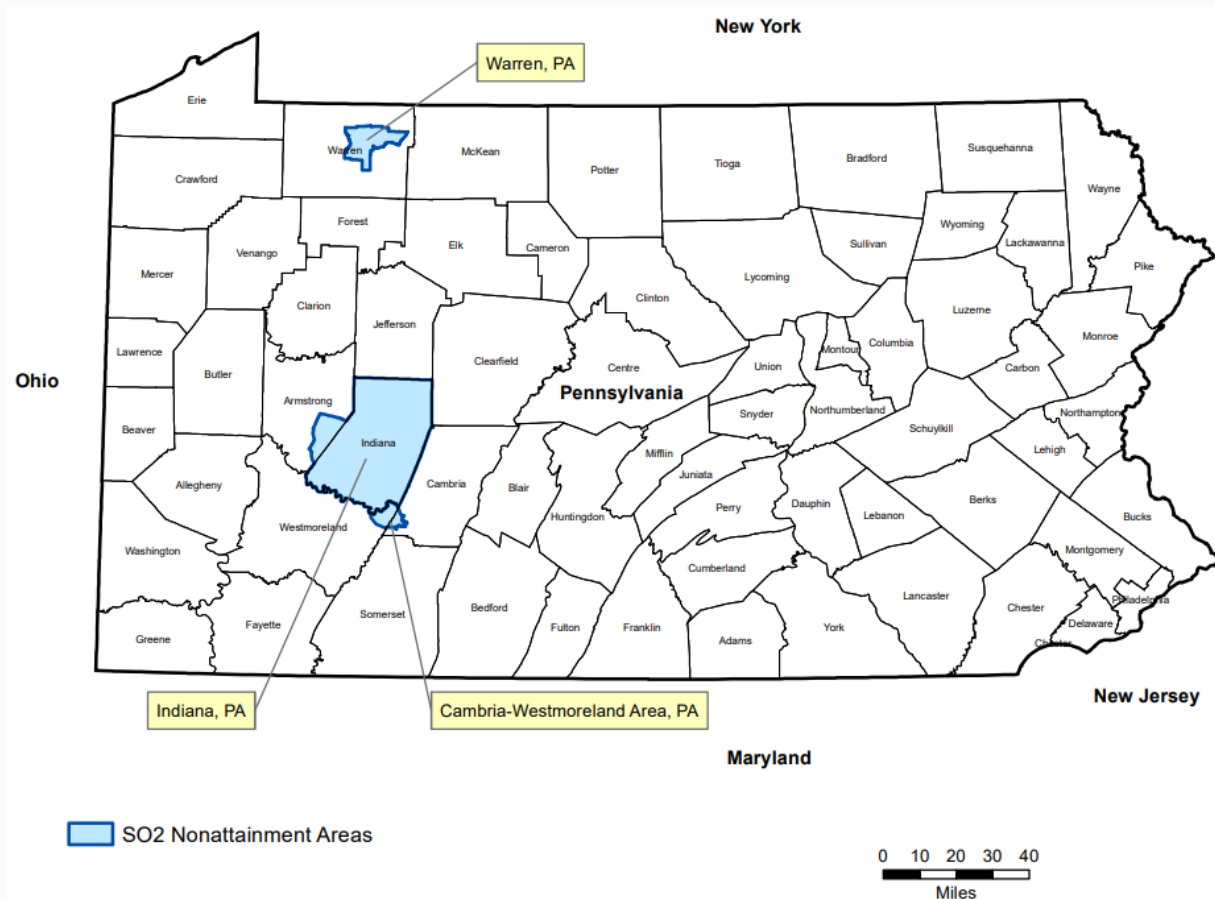
1990 – 2025 Valid PA SO₂ DV 2010 NAAQS (75 ppb)





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PA SO₂ Nonattainment Areas



Current PA SO₂ nonattainment areas are limited to:

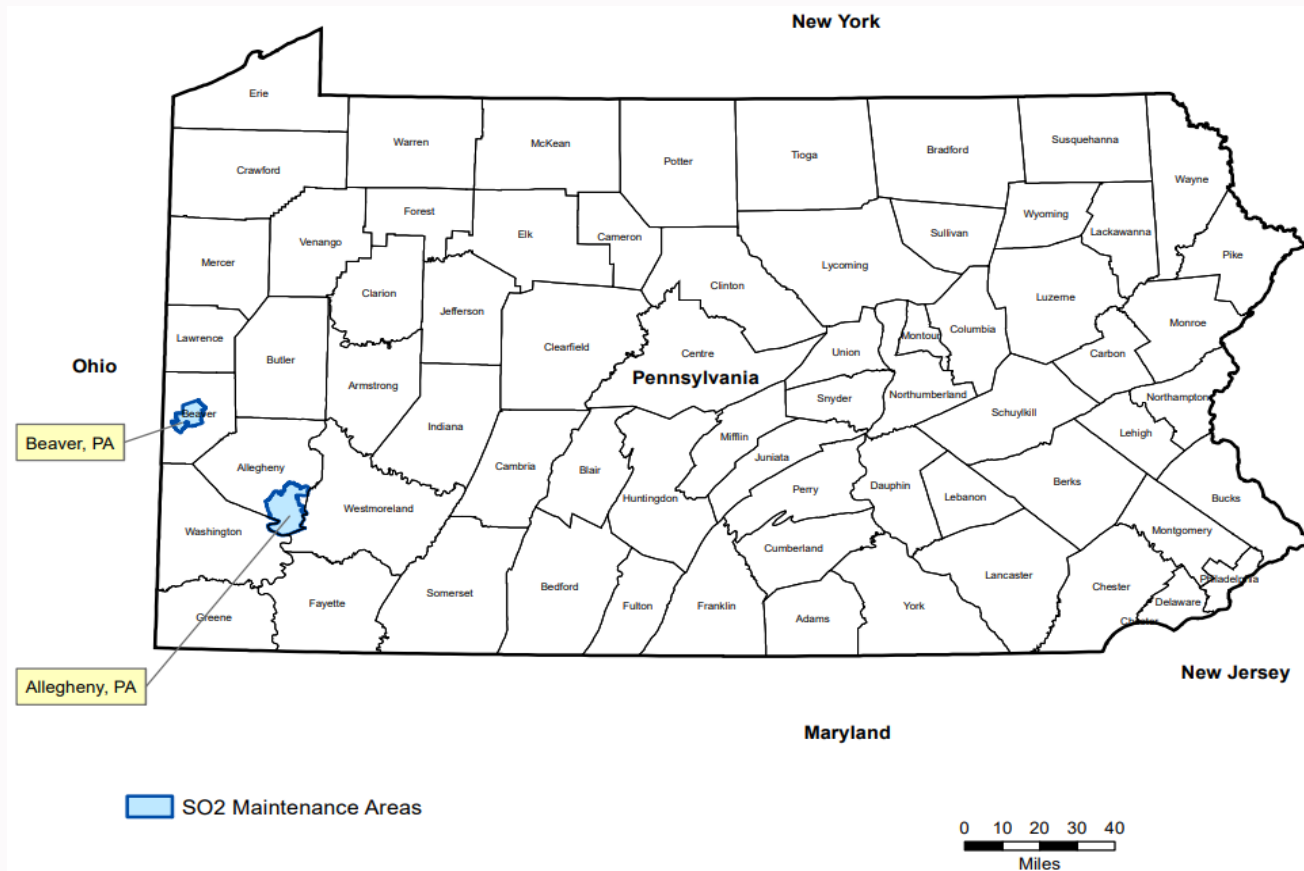
- Warren
- Indiana
- Cambria-Westmoreland

https://www3.epa.gov/airquality/greenbook/paso2_2010.html



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PA SO₂ Maintenance Areas



- Beaver County was redesignated to attainment/maintenance in 2025.
- Allegheny County remains a maintenance area.

https://www3.epa.gov/airquality/greenbook/paso2_2010m.html



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Other 2025 Criteria Pollutants



A map of Pennsylvania showing county boundaries and names. Temperature data points are marked with blue dots and numbers. The numbers are in blue or red, and some are followed by an asterisk. Weather icons (cloud, sun, moon) are also present near some temperature points.

County	Location	Temperature	Notes
Erie	Erie	62*	Blue
Warren	Warren	57*	Blue, with cloud icon
McKean	McKean	62	Blue
Potter	Potter	63	Blue
Tioga	Tioga	61	Blue
Susquehanna	Susquehanna	61	Blue
Wayne	Wayne	65	Blue
Lackawanna	Lackawanna	61	Blue
Pike	Pike	64	Blue, with moon icon
Monroe	Monroe	66	Blue
Northampton	Northampton	66	Blue
Lehigh	Lehigh	67	Blue
Bucks	Bucks	68	Blue
Montgomery	Montgomery	65	Blue
Philadelphia	Philadelphia	73	Red
Delaware	Delaware	69	Blue
Chester	Chester	67	Blue
York	York	67	Blue
Adams	Adams	66	Blue
Franklin	Franklin	63	Blue
Fulton	Fulton	67	Blue
Bedford	Bedford	65	Blue
Somerset	Somerset	65	Blue
Westmoreland	Westmoreland	62	Blue
Fayette	Fayette	66	Blue
Greene	Greene	64*	Blue
Washington	Washington	65	Blue
Allegheny	Allegheny	64*	Blue
Beaver	Beaver	67	Blue
Lawrence	Lawrence	59*	Blue
Butler	Butler	66	Blue
Armstrong	Armstrong	66	Blue
Indiana	Indiana	65*	Blue
Cambria	Cambria	63	Blue
Blair	Blair	65*	Blue
Huntingdon	Huntingdon	65	Blue
Mifflin	Mifflin	67	Blue
Juniata	Juniata	67	Blue
Perry	Perry	64*	Blue
Cumberland	Cumberland	63	Blue
Dauphin	Dauphin	67	Blue
Lebanon	Lebanon	67	Blue
Berks	Berks	69	Blue
Schuylkill	Schuylkill	66	Blue
Carbon	Carbon	66	Blue
Northumberland	Northumberland	66	Blue
Snyder	Snyder	66	Blue
Union	Union	66	Blue
Lycoming	Lycoming	66	Blue
Sullivan	Sullivan	61	Blue
Wyoming	Wyoming	65	Blue
Forest	Forest	62	Blue
Elk	Elk	62	Blue
Cameron	Cameron	62	Blue
Clinton	Clinton	67	Blue
Centre	Centre	65	Blue
Clearfield	Clearfield	65	Blue
Jefferson	Jefferson	67	Blue
Clarion	Clarion	67	Blue
Venango	Venango	66	Blue
Crawford	Crawford	66	Blue

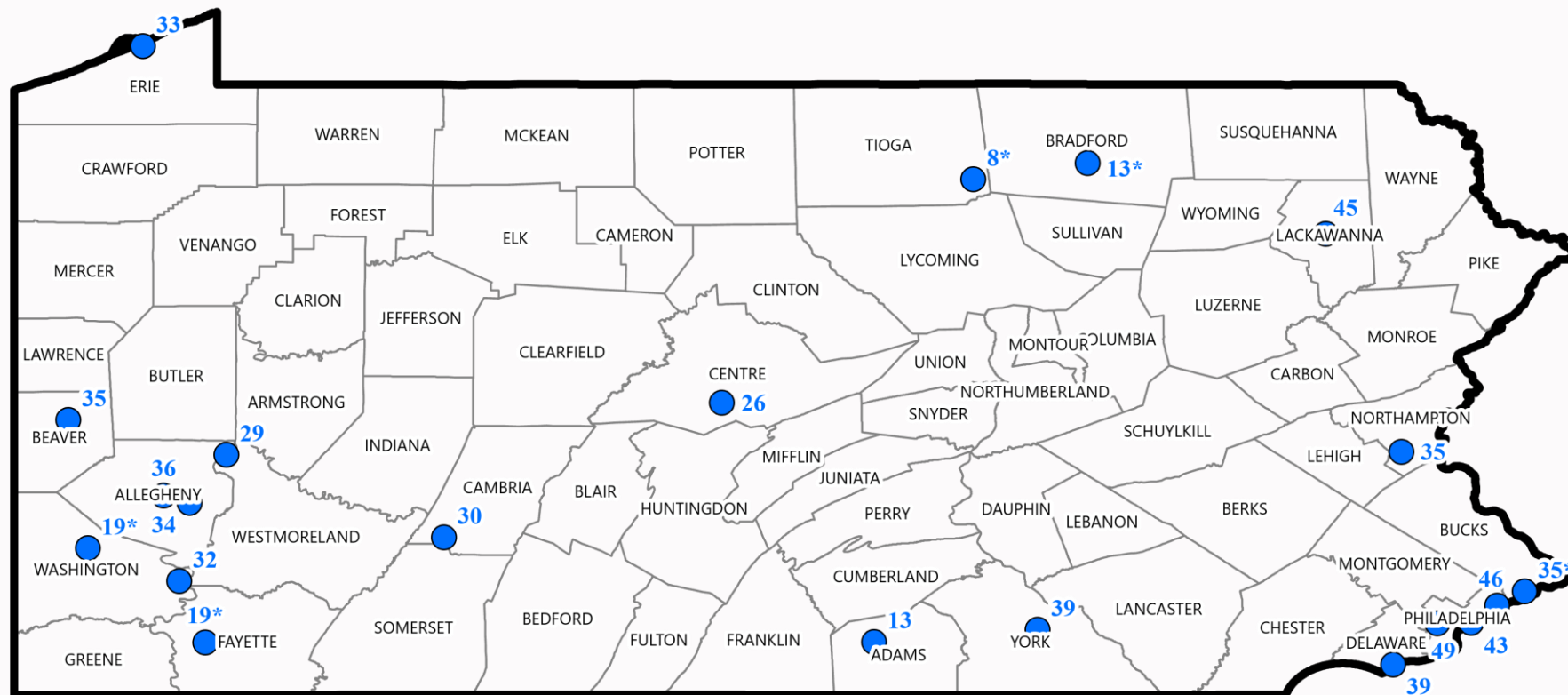
Appearing in Blue – 2025 8-Hour O3 design value at or below 70 ppb (2015 O3 Standard)

Asterisk (*) appearing behind the design value means the data is incomplete during 3-year period.



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2025 1-Hour NO₂ Design Values



Appearing in Red – 2025 1-Hour NO₂ design value above 100 ppb (2010 NO₂ Standard)

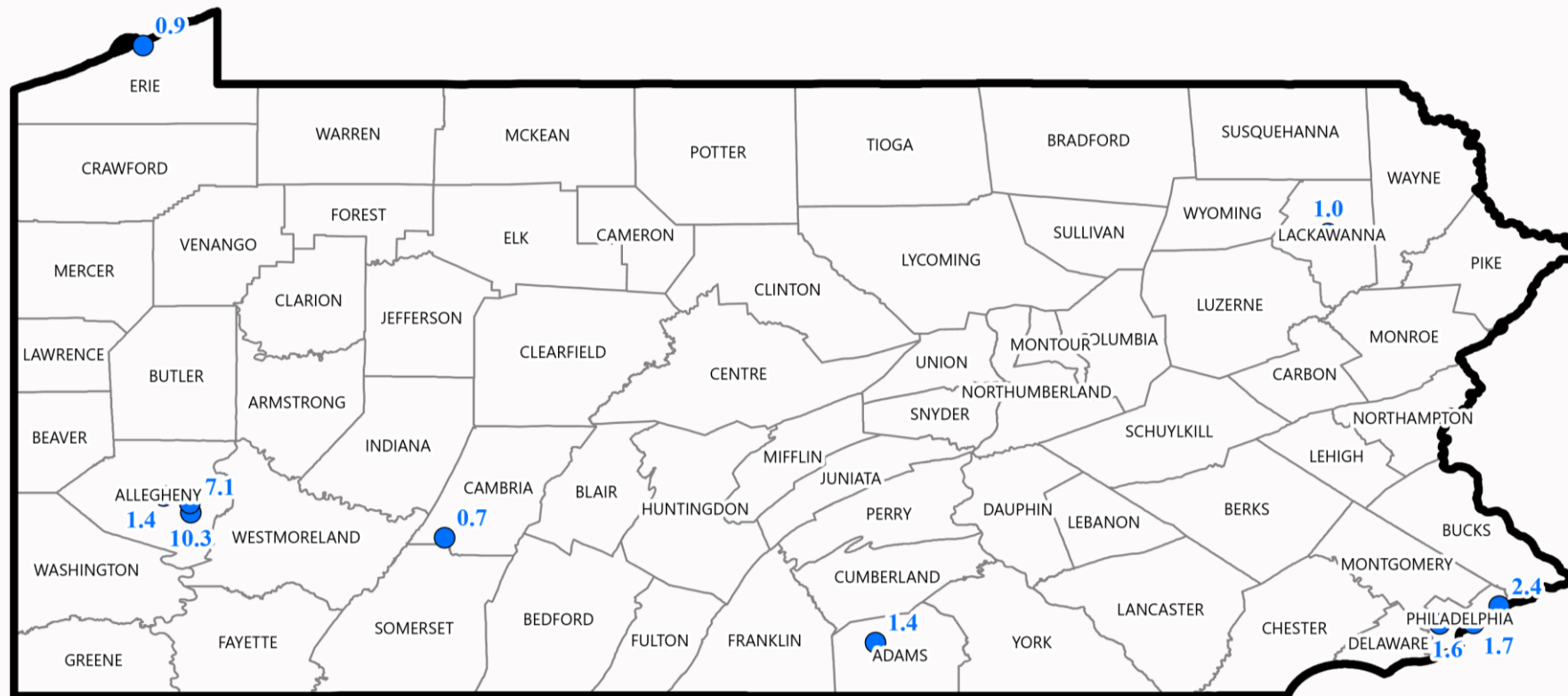
Appearing in Blue – 2025 1-Hour NO₂ design value at or below 100 ppb (2010 NO₂ Standard)

Asterisk (*) appearing behind the design value means the data is incomplete during 3-year period.



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2025 1-Hour CO Design Values



Appearing in Red – 2025 1-Hour CO design value above 35 ppm (1971 CO Standard)

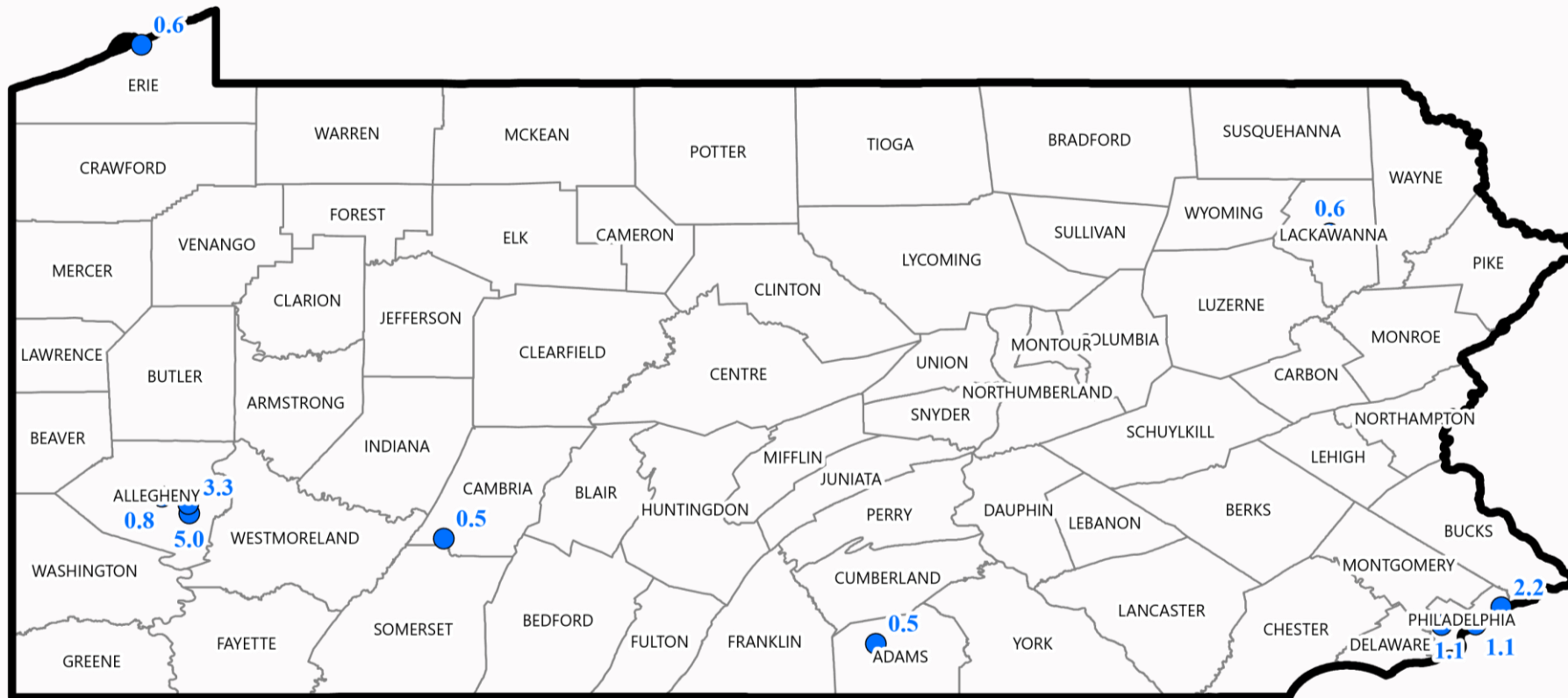
Appearing in Blue – 2025 1-Hour CO design value at or below 35 ppm (1971 CO Standard)

Asterisk (*) appearing behind the design value means the data is incomplete during 3-year period.



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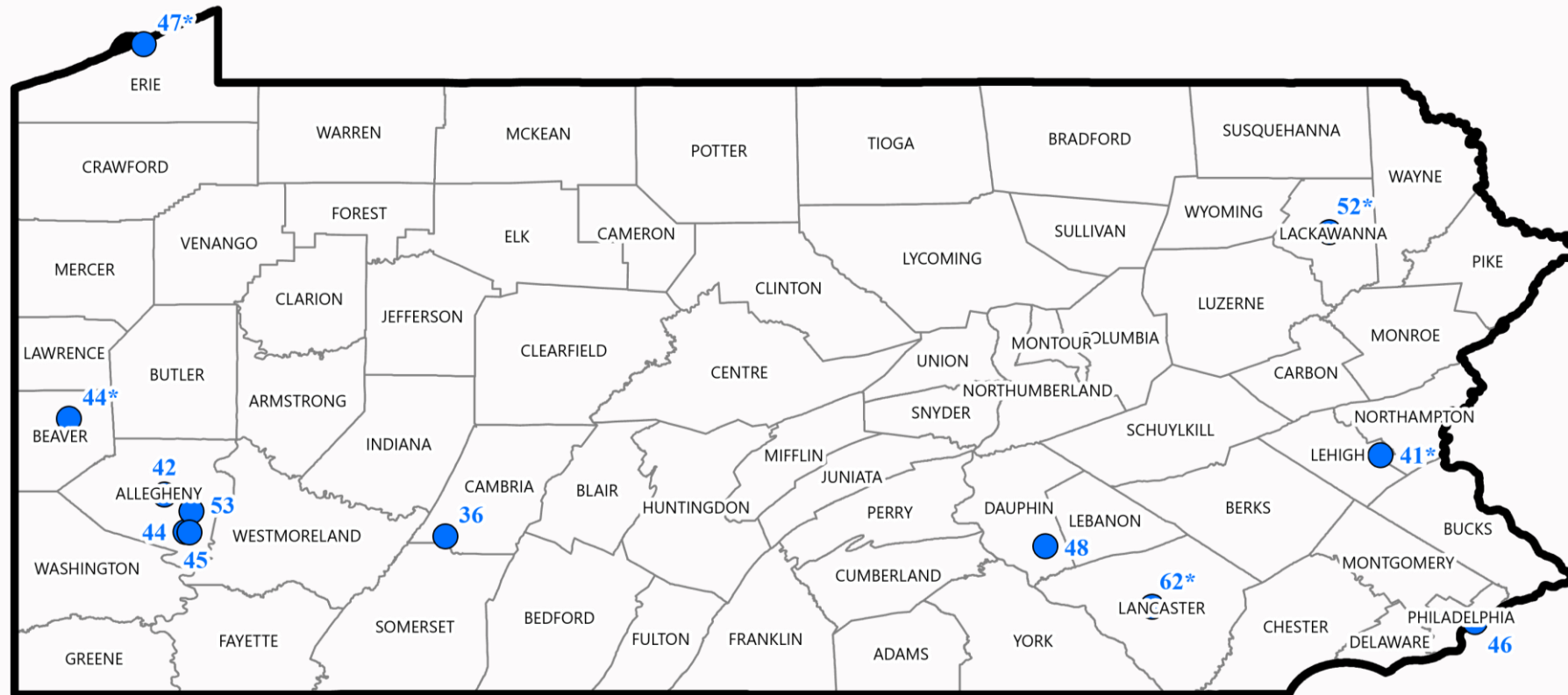
2025 8-Hour CO Design Values





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2025 24-Hour PM10 Design Values



Appearing in Red – 2025 24-Hour PM10 design value above 150 ug/m3 (1999 PM10 Standard)

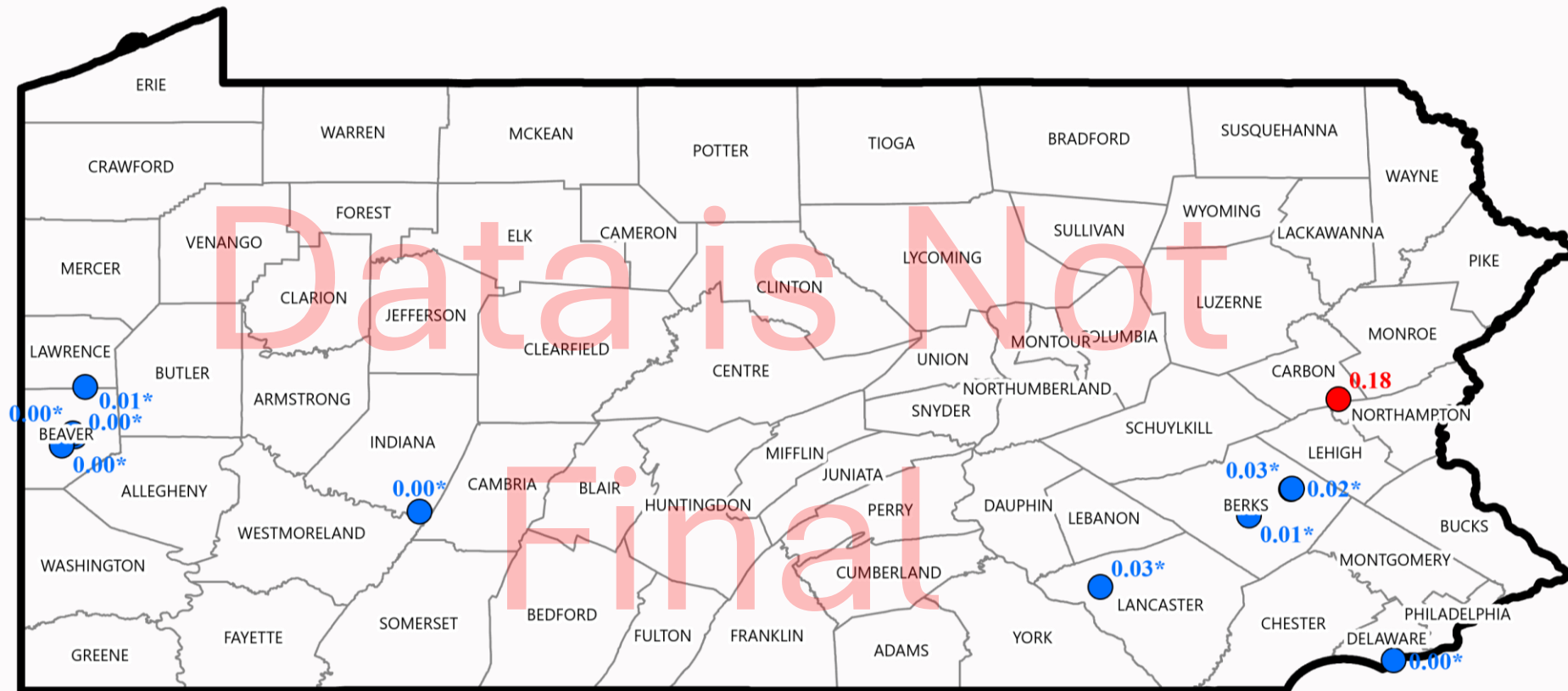
Appearing in Blue – 2025 24-Hour PM10 design value at or below 150 ug/m3 (1999 PM10 Standard)

Asterisk (*) appearing behind the design value means the data is incomplete during 3-year period.



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2025 3-Month Rolling Lead (Pb) DV



Appearing in Red – 2025 3-month rolling Pb design value above $0.15 \mu\text{g}/\text{m}^3$ (2009 Pb Standard)

Appearing in Blue – 2025 3-month rolling Pb design value at or below $0.15 \mu\text{g}/\text{m}^3$ (2009 Pb Standard)

Asterisk (*) appearing behind the design value means the data is incomplete during 3-year period.



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Next Steps



Next Steps

- DEP certified all ambient 2025 criteria air monitoring data, except for lead (Pb).
- We await decisions at the federal level about our PM_{2.5} recommended designations and our PM_{2.5} exceptional event analysis.
- If current PM_{2.5} annual NAAQS stays at 9.0 µg/m³, we will reevaluate the need for additional exceptional event analyses (that may now be “regulatory significant”) with respect to the June 2023 wildfire event.



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Get In Touch

Melissa Jativa
Bureau of Air Quality
400 Waterfront Drive
Pittsburgh, PA 15222

...

412-442-4303 / mjativa@pa.gov

Hallie Weiss
Bureau of Air Quality
2 East Main Street
Norristown, PA 19401

...

484-250-5026 / haweiss@pa.gov

The Department of Environmental Protection's mission is to protect Pennsylvania's air, land and water resources and to provide for the health and safety of its residents and visitors, consistent with the rights and duties established under the Environmental Rights Amendment (Article 1, Section 27 of the Pennsylvania Constitution).



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Get In Touch

Bryan Oshinski
Central Office / Bureau of Air Quality
400 Market Street
Harrisburg, PA 17105

...

717.783.8949 / boshinski@pa.gov

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