

Greater Pittsburgh
Northwest RAMP Report
January 27th – February
2nd, 2020

- Due to sensor failure, no O₃ data are available for Bradford Woods this week

Air Quality Monitoring Network

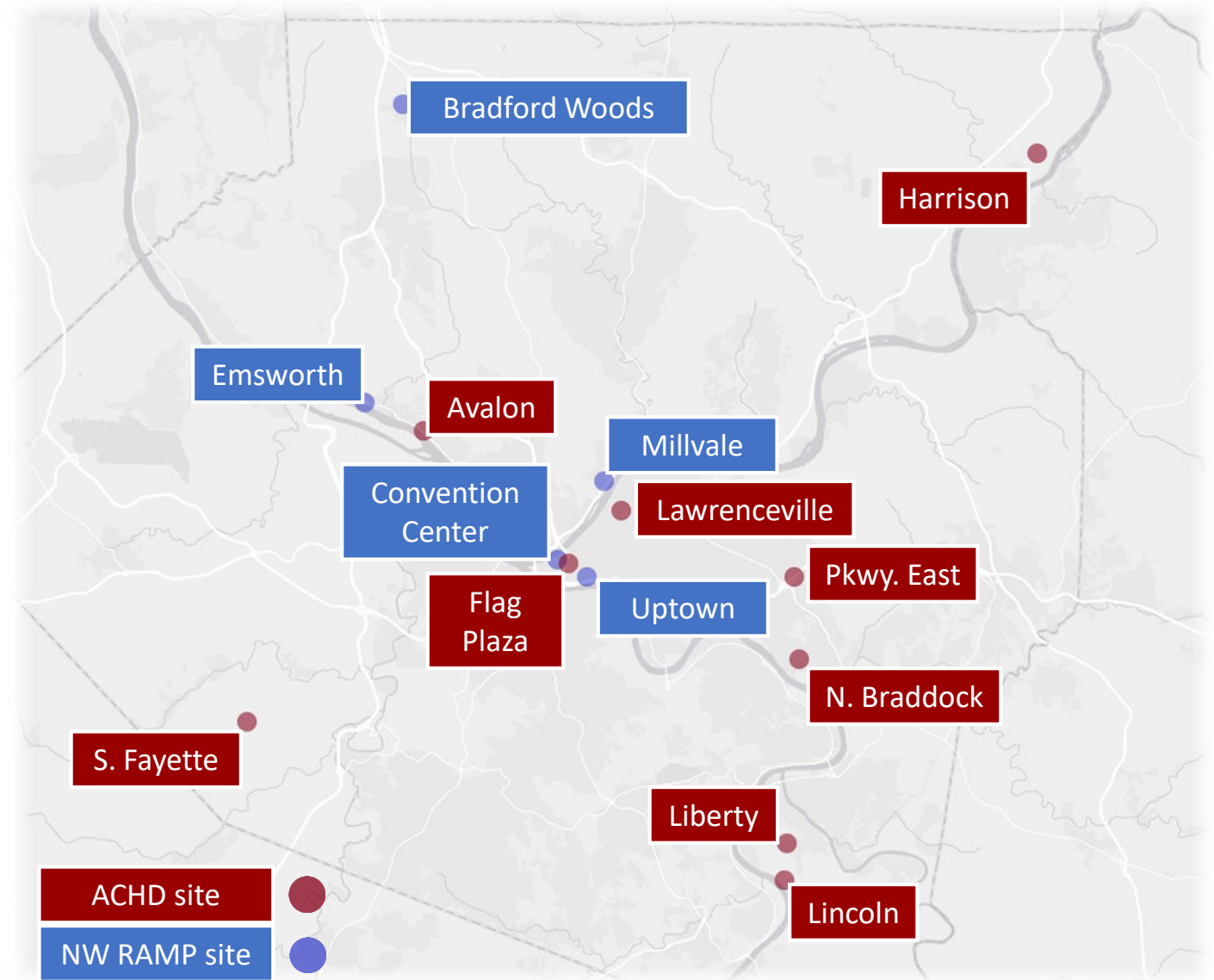
To ensure compliance with NAAQS, the Allegheny County Health Department (ACHD) maintains a network of highly precise (but very expensive) instruments measuring EPA-regulated pollutants (e.g. PM_{2.5})

While not as precise, our RAMP monitors allow us to measure some of these pollutants at many more locations.

The ACHD monitoring network as well as the northwest portion of the CMU RAMP network are shown to the right.

Further information on the ACHD network can be found at:

<http://www.achd.net/air/index.php>

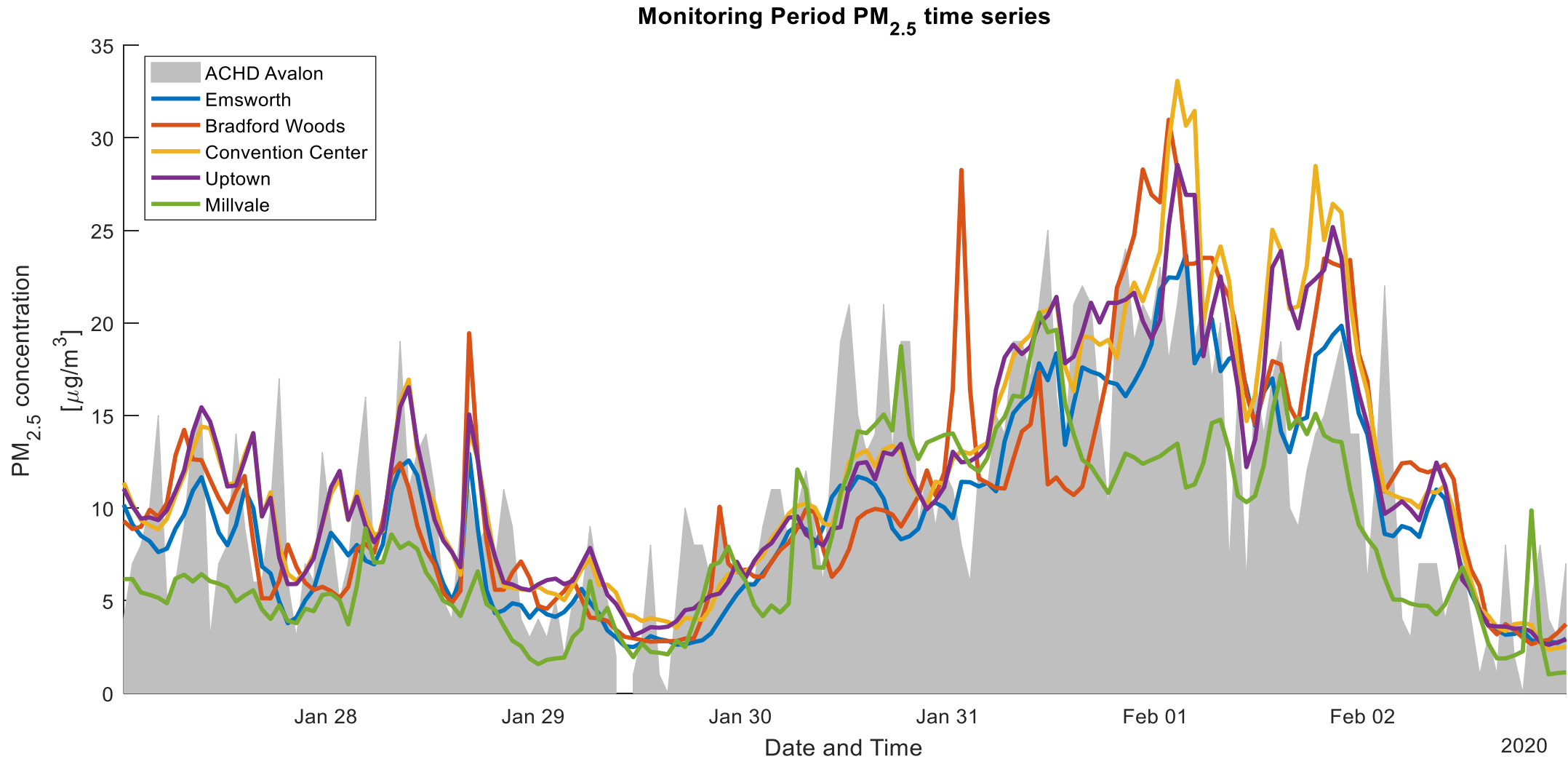


What is PM_{2.5}?

- PM_{2.5} is particulate matter (such as smoke, soot, and dust) in the atmosphere that has a diameter of 2.5 micrometers (about 1/30th the width of a human hair) or smaller, allowing them to enter your lungs and bloodstream^[1]
- PM_{2.5} has been linked to cardiovascular disease and lung disease^[2]
- The National Ambient Air Quality Standards (NAAQS) are set by the Environmental Protection Agency (EPA) and regulate what concentrations of PM_{2.5} are acceptable.^[3] PM_{2.5} is measured in micrograms per meter cubed ($\mu\text{g}/\text{m}^3$). The standards are as follows:
 - Annual average (over 3 years) of PM_{2.5} should not exceed $12\mu\text{g}/\text{m}^3$
 - 24 hour average (98th percentile over 3 years) should not exceed $35\mu\text{g}/\text{m}^3$
- For more information, visit <https://www.epa.gov/pm-pollution/particulate-matter-pm-basics>



PM_{2.5} Concentration Over the Past Week



Pictured above as colored lines are the PM_{2.5} readings for the northwest portion of the RAMP network averaged hourly. Also shown are the ACHD Avalon PM_{2.5} readings (recorded hourly)

How Did the RAMP Sites Compare to ACHD Avalon?

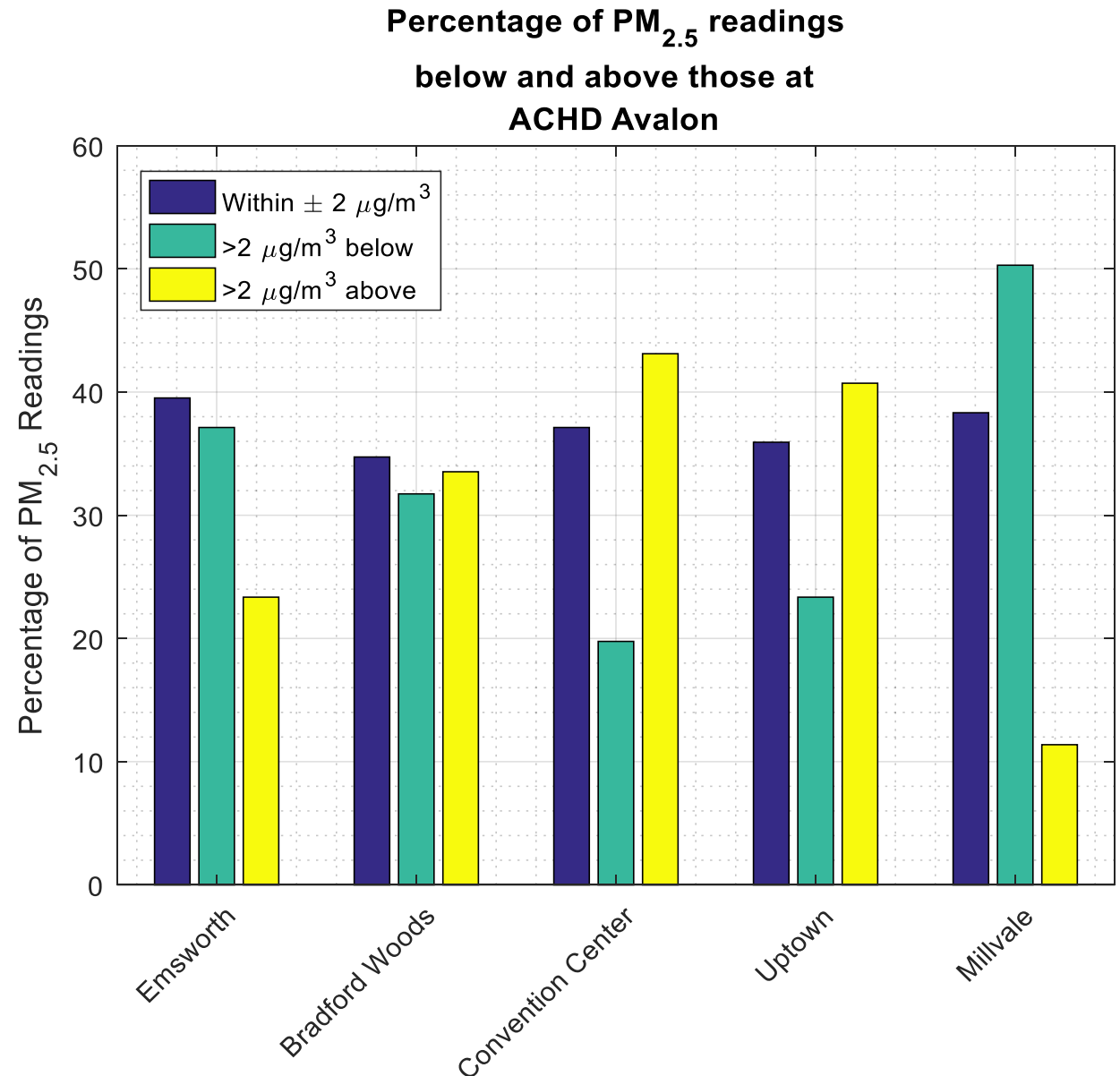
Shown right is a plot of how well the PM_{2.5} readings at northwest RAMP sites matched up with the nearby ACHD Avalon.

Shown in the plot are RAMP readings that are:

- **Within** $\pm 2 \mu\text{g}/\text{m}^3$ of ACHD Avalon
- $> 2 \mu\text{g}/\text{m}^3$ **below** ACHD Avalon
- $> 2 \mu\text{g}/\text{m}^3$ **above** ACHD Avalon

- In the past week, the NW RAMP sites west of downtown Pittsburgh read close to Avalon.
- The sites close to the city center read higher than Avalon.
- Millvale, however, was most likely to read lower.

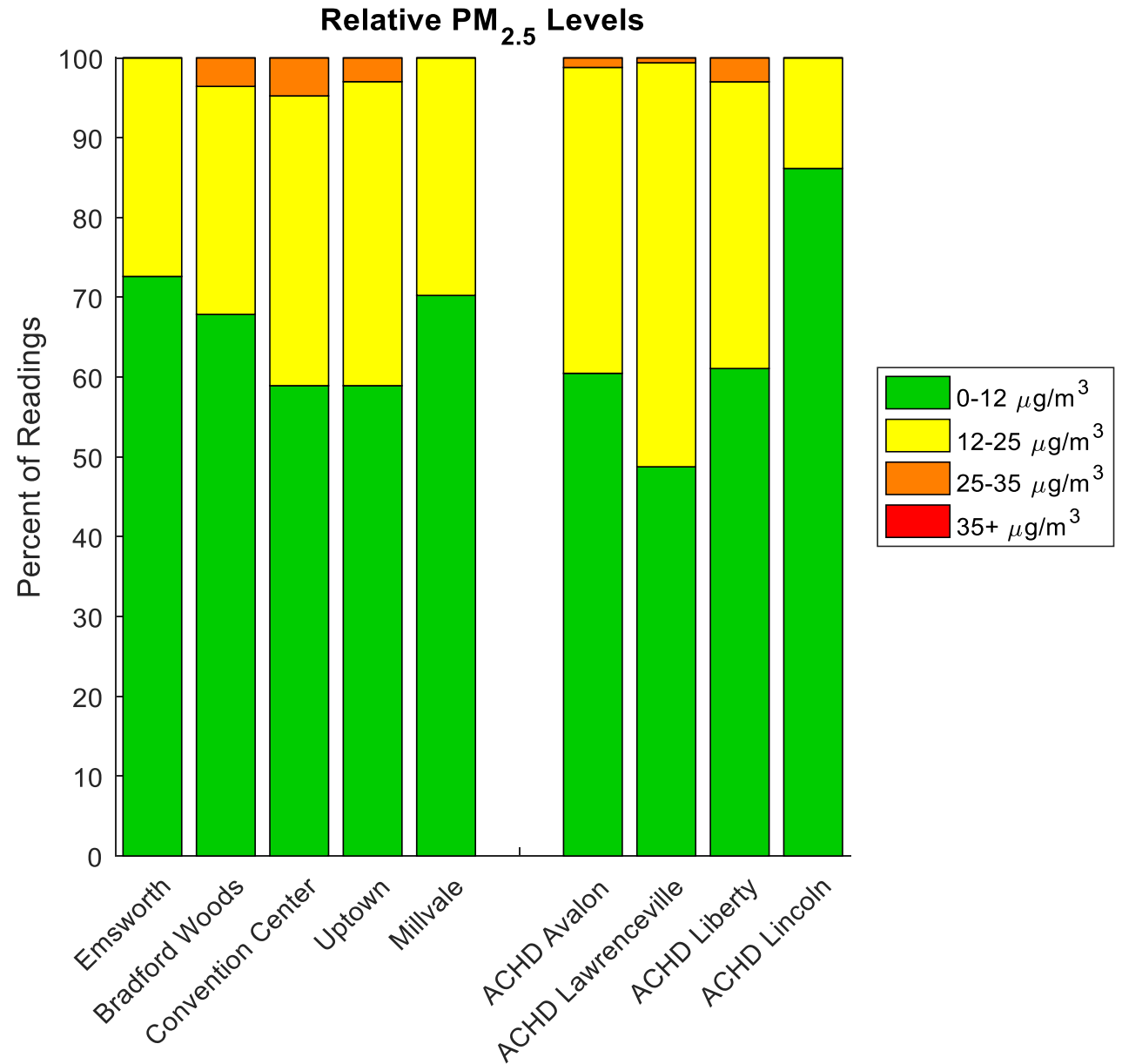
- The NW RAMP most likely to read higher PM_{2.5} levels than the Avalon monitor was at the Convention Center.
- The RAMP most likely to read lower was Millvale.
- The site at Emsworth read close to ACHD Avalon most frequently.



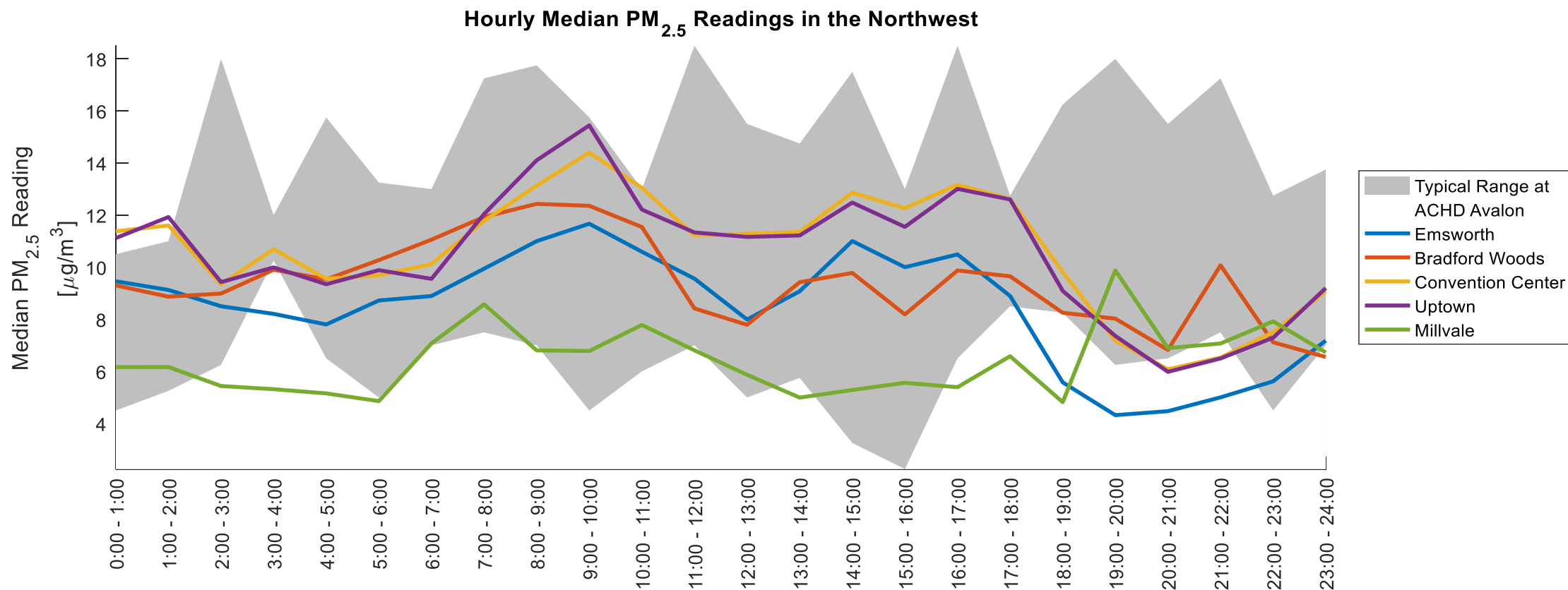
How Did the Site Readings Compare?

The bar graph represents the fraction of hours when the PM_{2.5} concentration is in a certain range:

- **low** (0-12 $\mu\text{g}/\text{m}^3$)
 - **moderate** (12-25 $\mu\text{g}/\text{m}^3$)
 - **elevated** (25-35 $\mu\text{g}/\text{m}^3$)
 - **high** (more than 35 $\mu\text{g}/\text{m}^3$)
- In the past week, all NW RAMPs read more “low” concentrations than ACHD – Lawrenceville.
 - However, the RAMPs at the Convention Center and Uptown have recorded fewer “low” concentrations than the rest of ACHD stations.
 - These sites, as well as Bradford Woods, also recorded more “elevated” concentrations than any of the ACHD sites.
 - The most polluted NW RAMP site in the past week in terms of PM_{2.5} was the Convention Center.
 - The cleanest was Emsworth.



What's the Daily Pollution Profile in the Northwest?



Shown above are the median values for each site per hour of the day. ACHD Avalon figure represents the typical range at that site every hour (25th to 75th percentile)

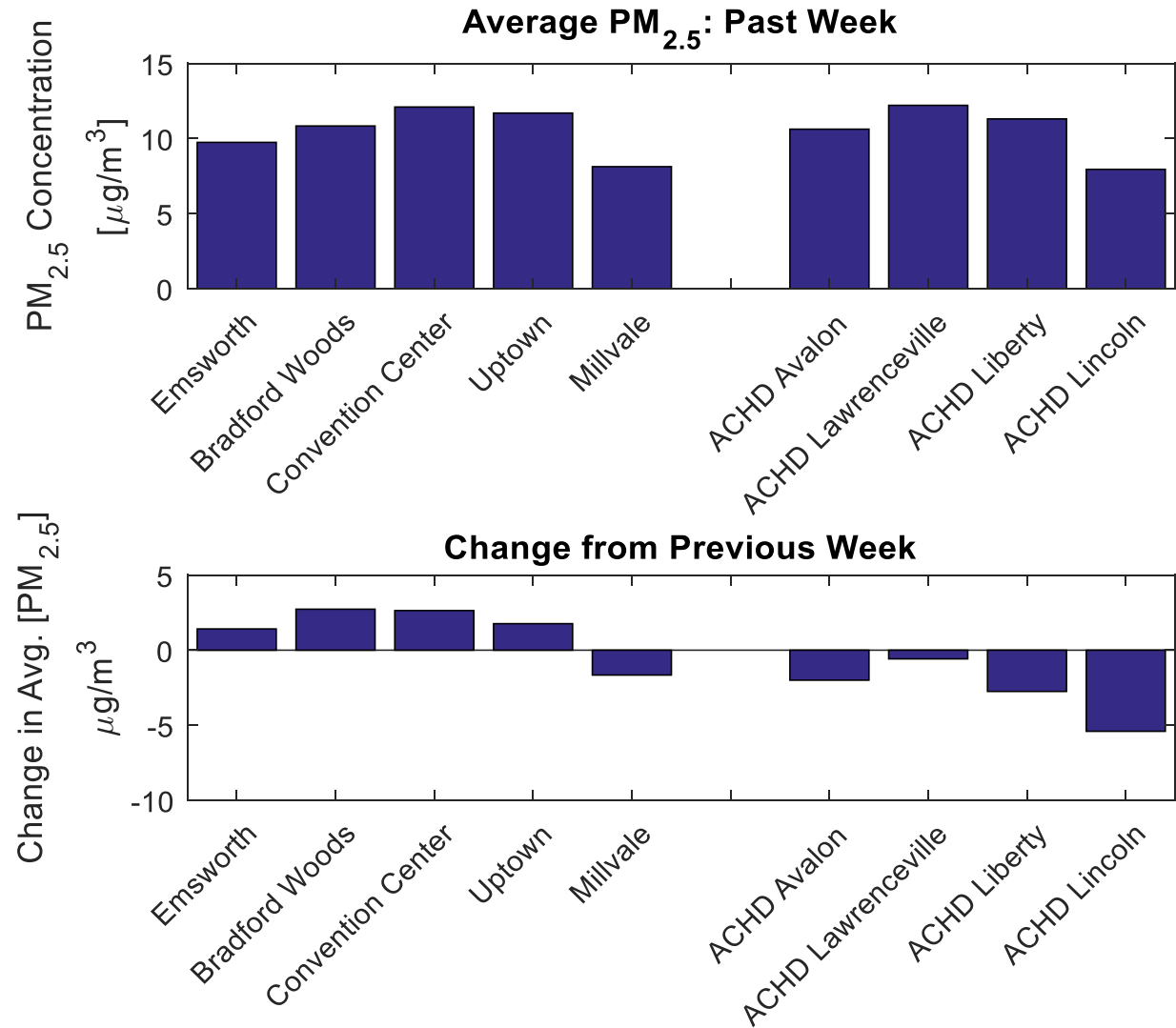
- NW RAMPs tended to read higher around the morning and evening rush hours (7 – 11 AM and 2 – 6 PM).
- They tended to read lower in the evening (7 – 11 PM)
- The RAMP in Millvale did not reflect this trend, however.
- ACHD Avalon did not see a strong daily pattern over the past week.

How Did PM_{2.5} Readings Change?

Average Weekly Readings of NW RAMP and ACHD Networks:

	NW RAMPs	ACHD sites
This week	10.5 µg/m ³	10.5 µg/m ³
Last week	9.1 µg/m ³	13.2 µg/m ³
Change	+1.4 µg/m ³	-2.7 µg/m ³
	15% increase	20% drop

- This week, both the RAMPs and ACHD networks recorded the same weekly average.
- The RAMPs in and near downtown Pittsburgh recorded a similar weekly average to the nearby ACHD – Lawrenceville.
- The rest fell between the measurements at ACHD Avalon and ACHD Lincoln.
- However, the RAMPs saw a net increase in weekly average, while the ACHD network saw a network-wide drop, particularly in the Mon Valley.



Note: Last week – week of 2020-01-20
This week – week of 2020-01-27

Other Pollutants: Ozone

Ozone (O₃), measured in parts per billion (ppb), can be beneficial when it is high in the atmosphere, but breathing in Ozone at ground level can have many harmful effects, such as causing coughing and chest pain, damaging throat and lung tissues, and exacerbating other health problems like asthma and bronchitis^[1]

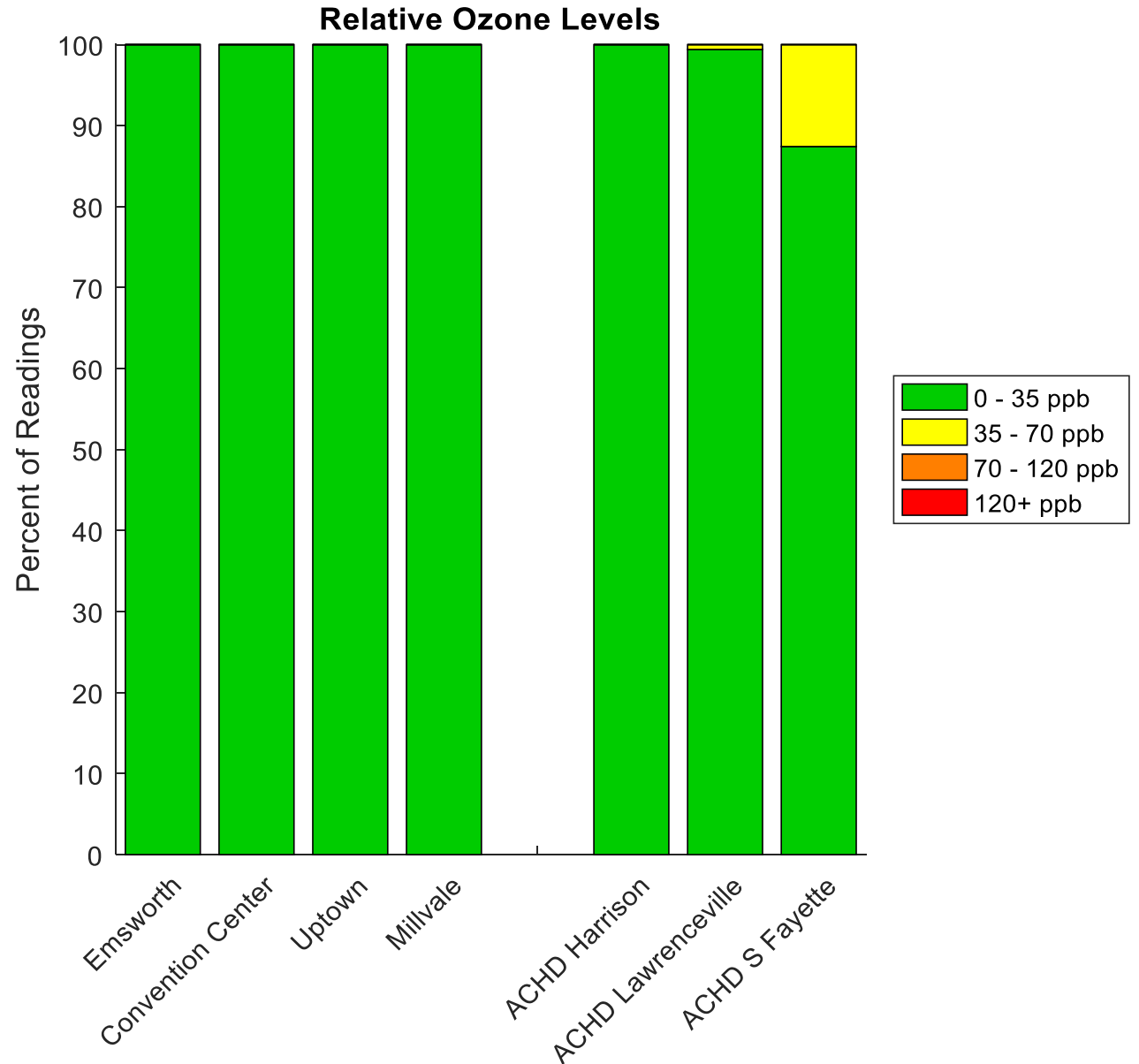
The NAAQS for O₃ are^[3]

- O₃ should not exceed 120 ppb in one hour
- O₃ should not exceed 70 ppb over eight hours

Ozone levels in the Greater Pittsburgh area in the past week have been well within EPA limits. The maximum hourly levels are outlined below:

	NW RAMPs	ACHD
Site w. max. O ₃ Level	Emsworth	S. Fayette
Max. O ₃ Level	30 ppb	39 ppb

No significantly high O₃ concentrations were recorded in the greater Pittsburgh area in the past week.



Additional Resources

- [1] EPA website: <https://www.epa.gov/criteria-air-pollutants>
- [2] Dockery, D. W., Pope III, C. A., Xu, X., Spengler, J. D., Ware, J. H., Fay, M. E., ... Speizer, F. E. (1993). The New England Journal of Medicine as published by New England Journal of Medicine. Downloaded from www.nejm.org on August 16, 2010. For personal use only. No other uses without permission. Copyright © 1993 Massachusetts Medical Society. All rights reser. *N Engl J Med*, 329(24), 1753–1759. <https://doi.org/10.1056/NEJM199410063311401>
- [3] EPA website: <https://www.epa.gov/criteria-air-pollutants/naaqs-table>
- [4] Allegheny County Health Department Air Quality Program; Draft Monitoring Plan for 2019. <http://www.achd.net/air/publiccomment2018/ANP2019draft.pdf>.

If you would like any additional information about anything presented in this report, please contact us:

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