



Can Satellite Data Drive Public Policy for Fine Particulate Pollution?

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Disclaimer: The scientific results and conclusions, as well as any views or opinions expressed herein, are those of the author(s) and do not necessarily reflect those of NOAA or the Department of Commerce.

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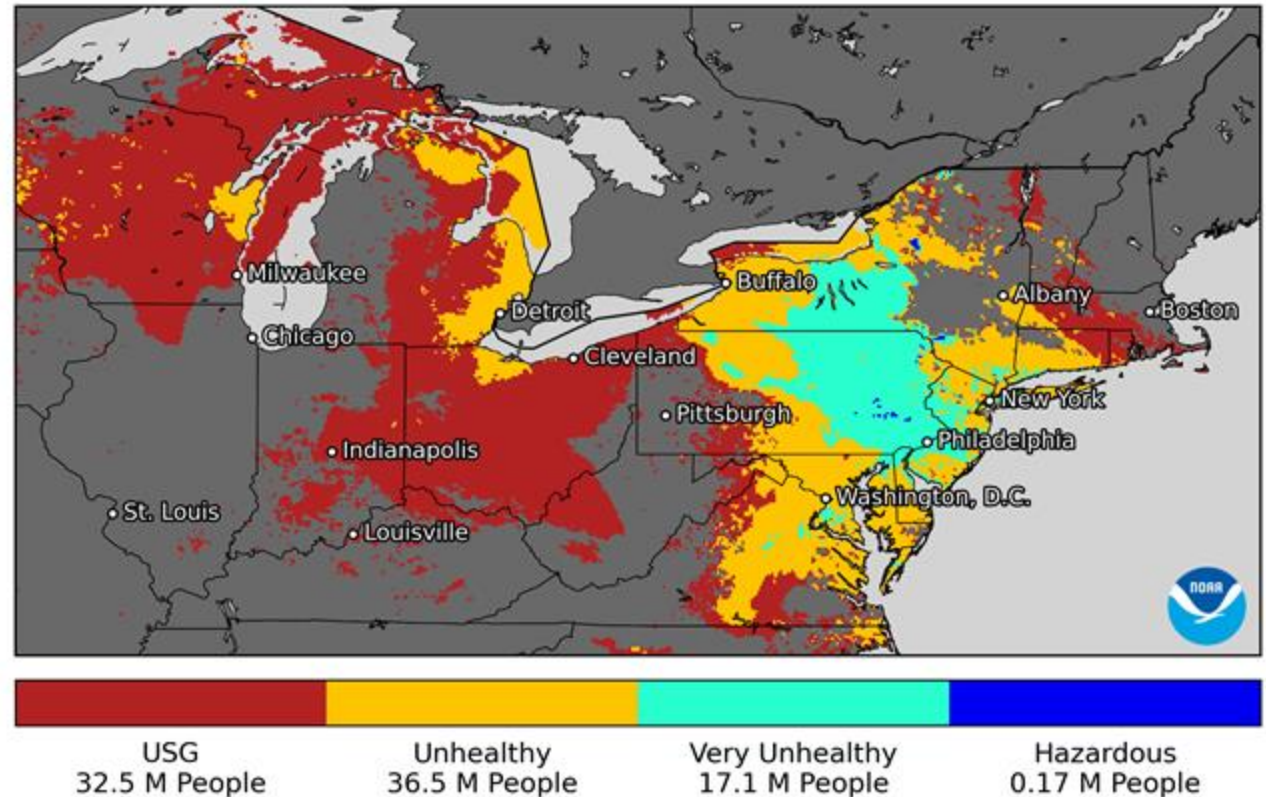
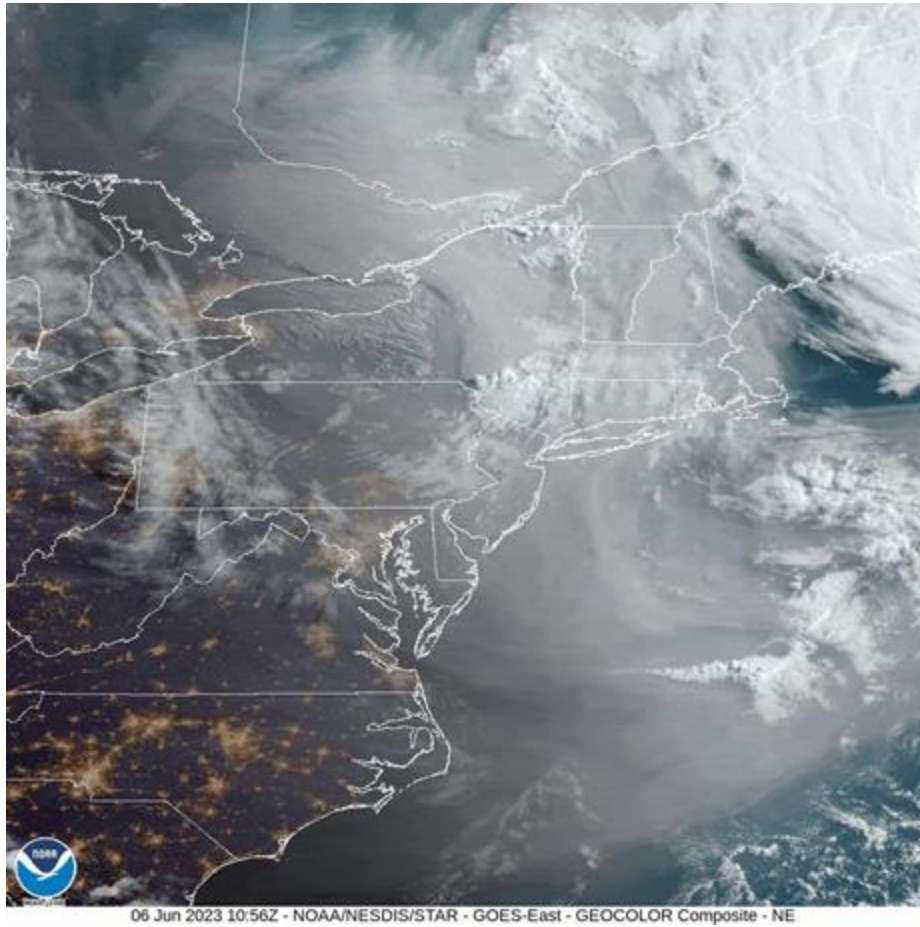
Fine particulate pollution in the US is decreasing...

- NAAQS PM_{2.5} standard that US counties cannot exceed:
 - **Annual average:** 12 $\mu\text{g m}^{-3}$
 - **24-hour 98th percentile** over 3 years: 35 $\mu\text{g m}^{-3}$
- Most of the US, except some counties in California is in attainment!!!



https://www3.epa.gov/airquality/greenbook/mappm25_2012.html

Exceptional events like transported smoke from Canadian fires of summer 2023 can undo years of progress...



<https://www.nesdis.noaa.gov/news/noaa-satellites-tracked-historic-levels-of-harmful-smoke-impacting-millions-the-eastern-us>

Smoke leads to exceedance of health standard

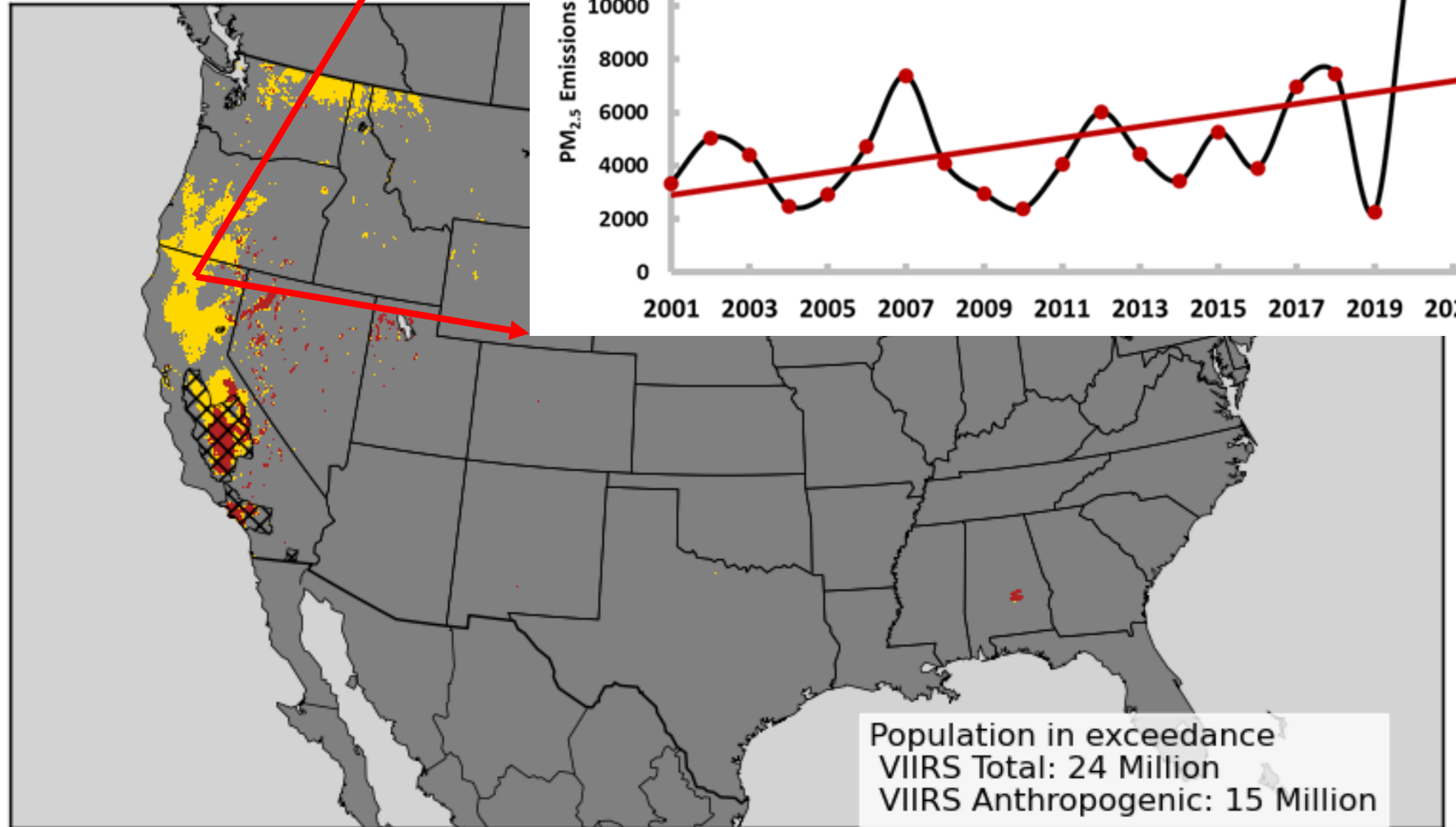
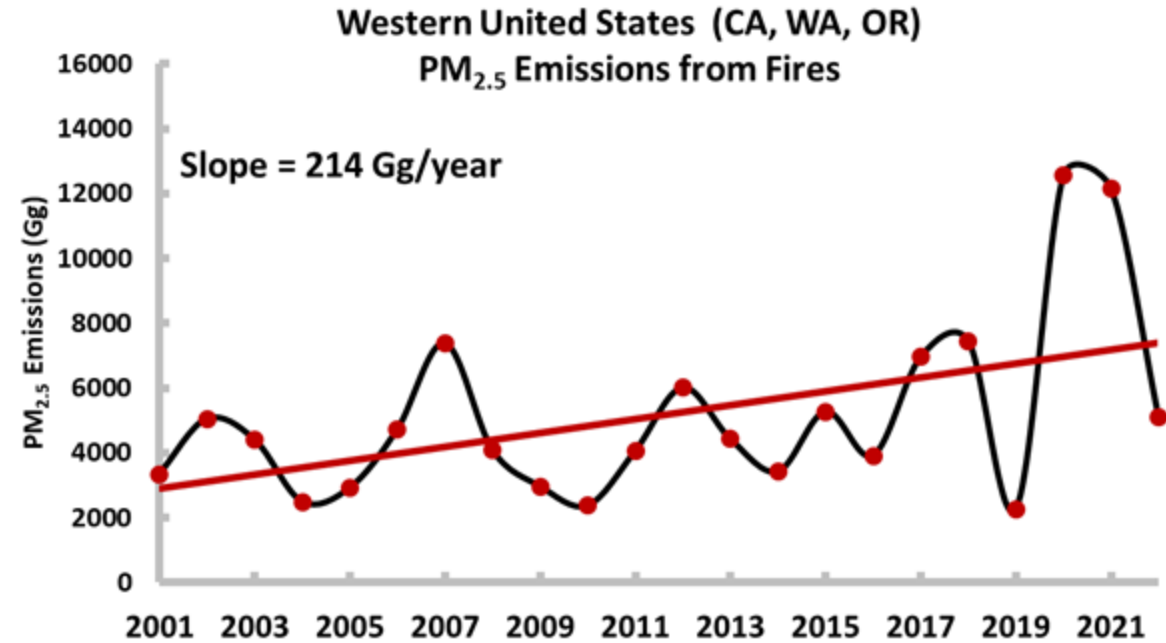
Regions in exceedance of

PM_{2.5} Satellite vs.
IMPROVE
Data processed: 9 years

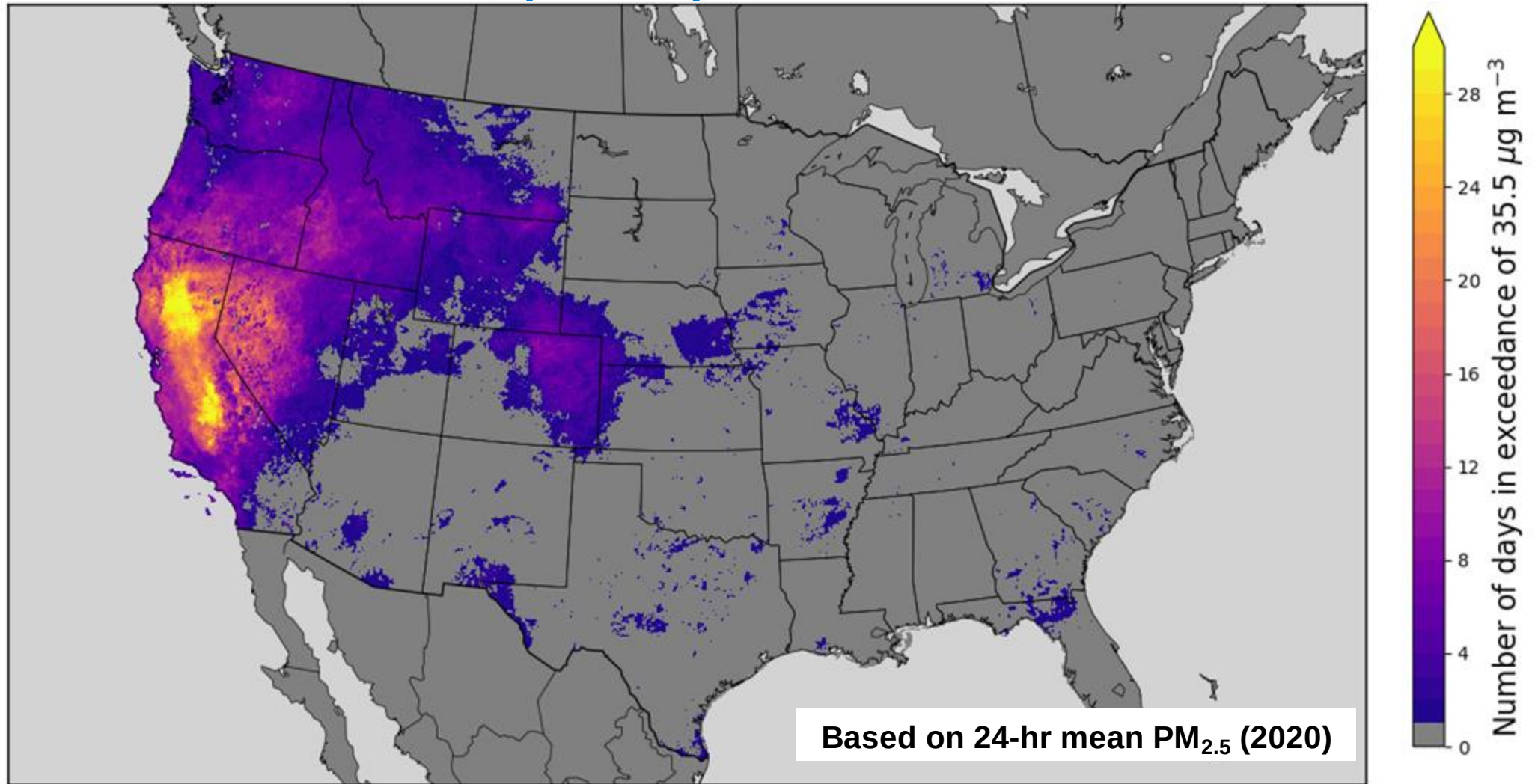
R² = 0.52

MBE = 2.8 µg/m³

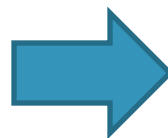
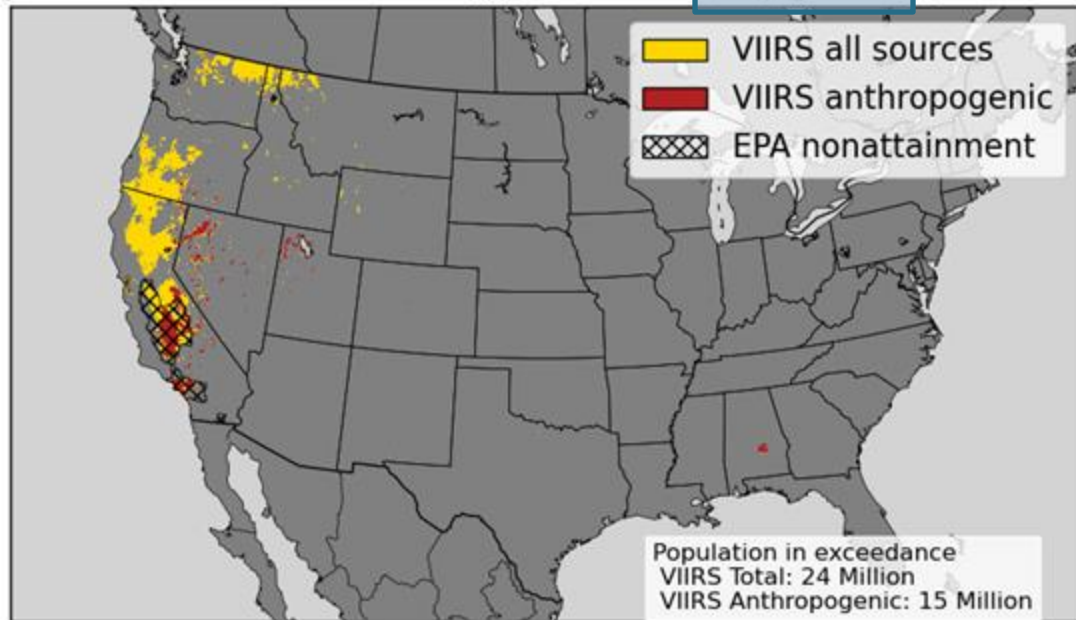
RMSE = 5.37 µg/m³



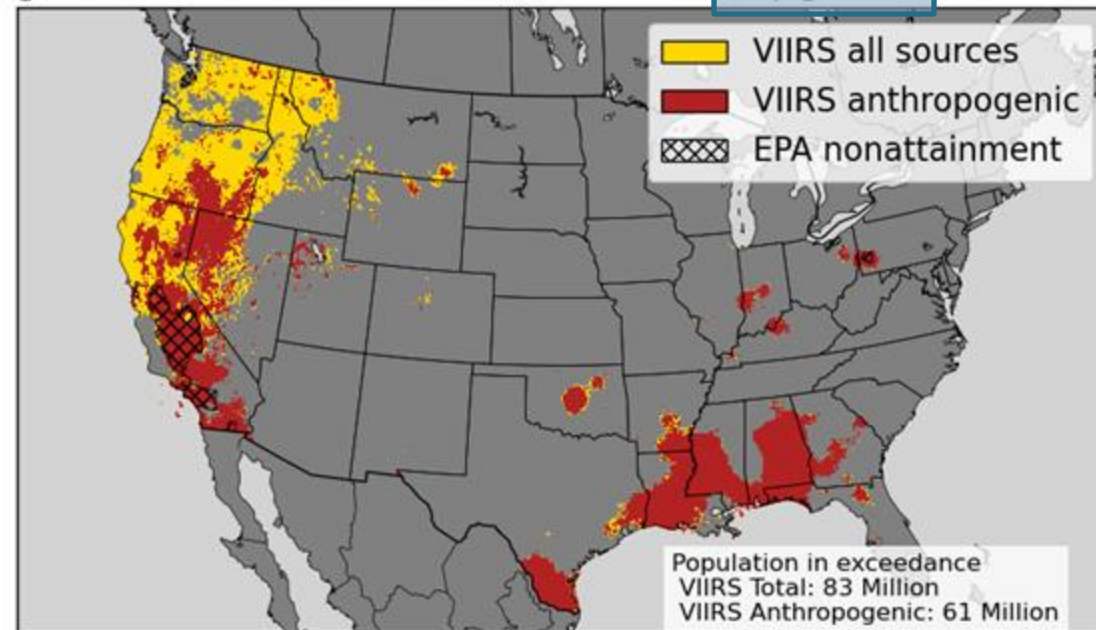
Satellite data are already informing daily air quality alerts



Regions in exceedance of PM_{2.5} standard [$12 \mu\text{g m}^{-3}$] (2018-2020)

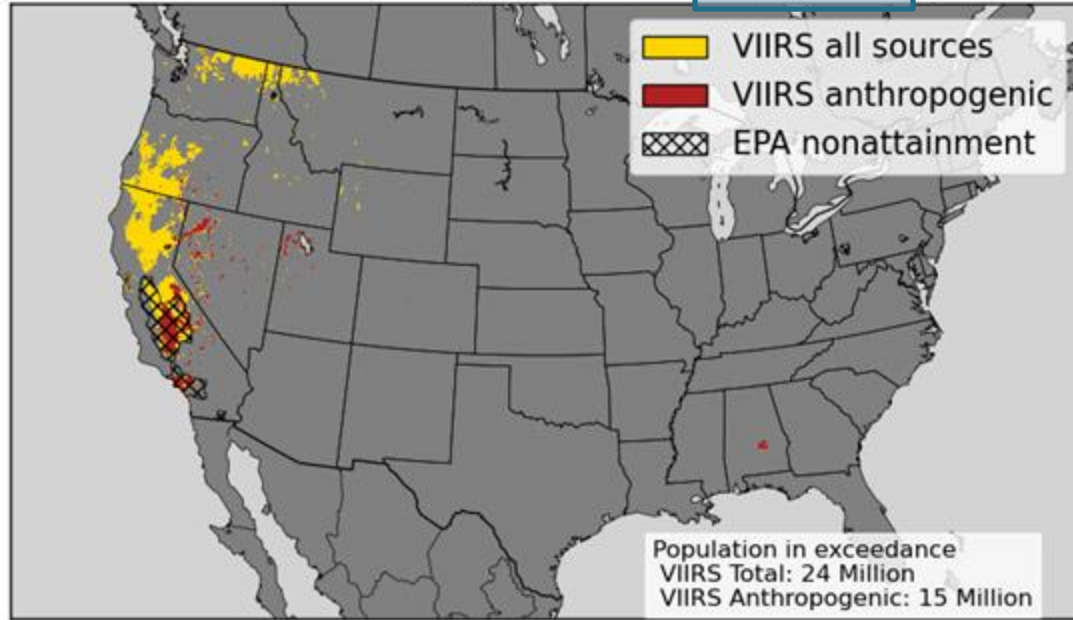


Regions in exceedance of PM_{2.5} standard [$9 \mu\text{g m}^{-3}$] (2018-2020)

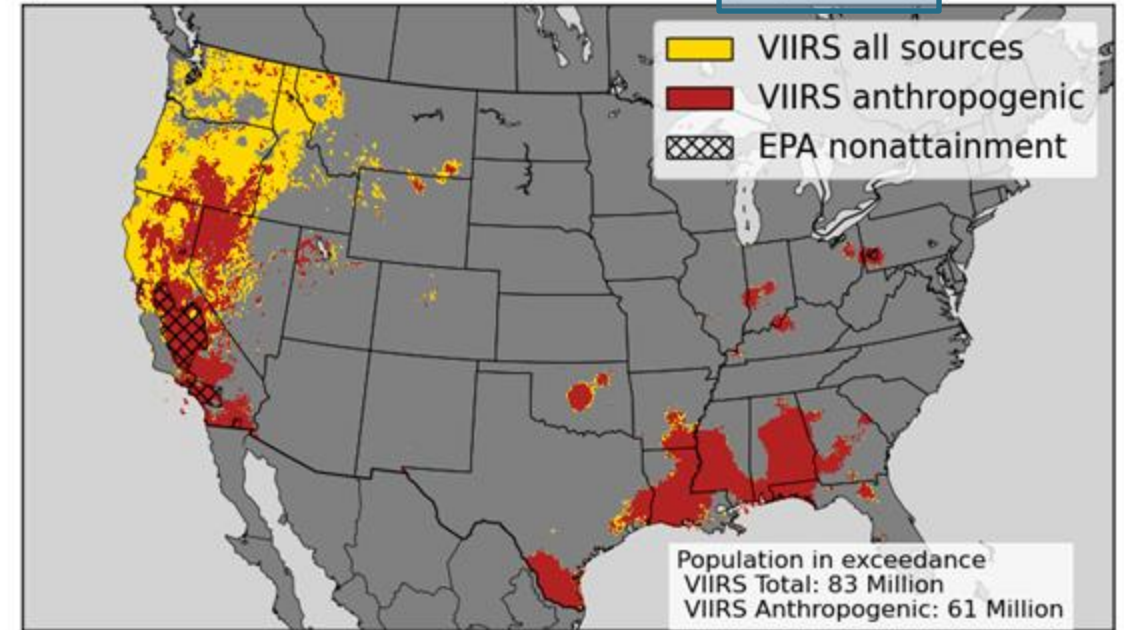


New EPA
rulemaking has
important
implications

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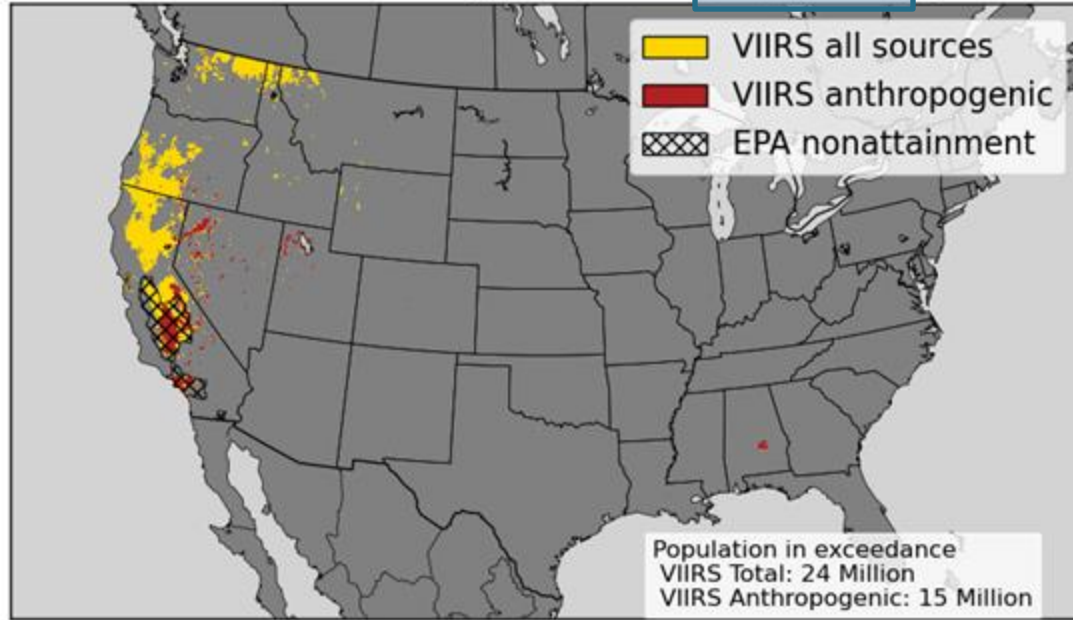


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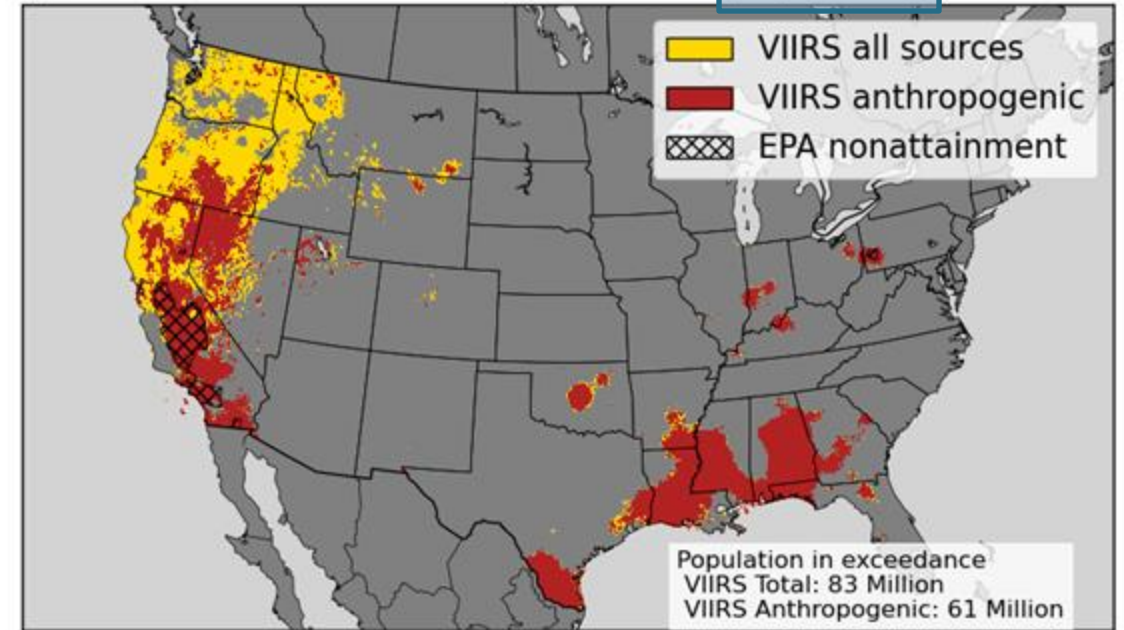
The Plus

- Improved air quality for many millions and better health outcomes

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New EPA rulemaking has important implications

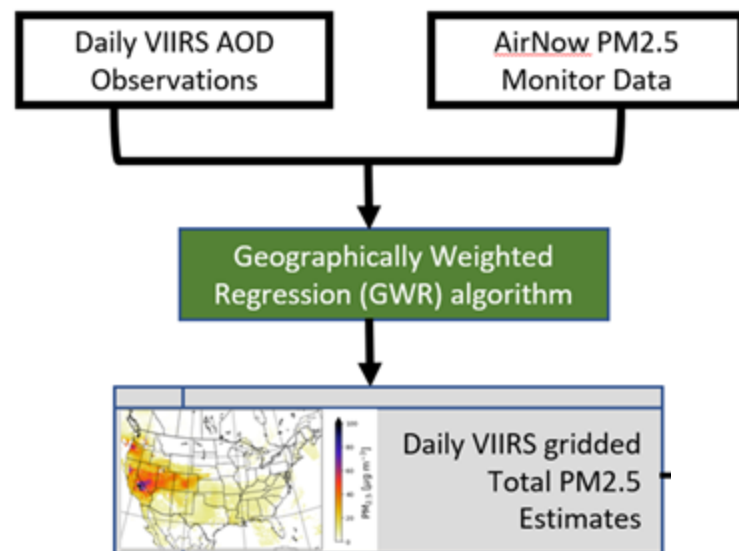
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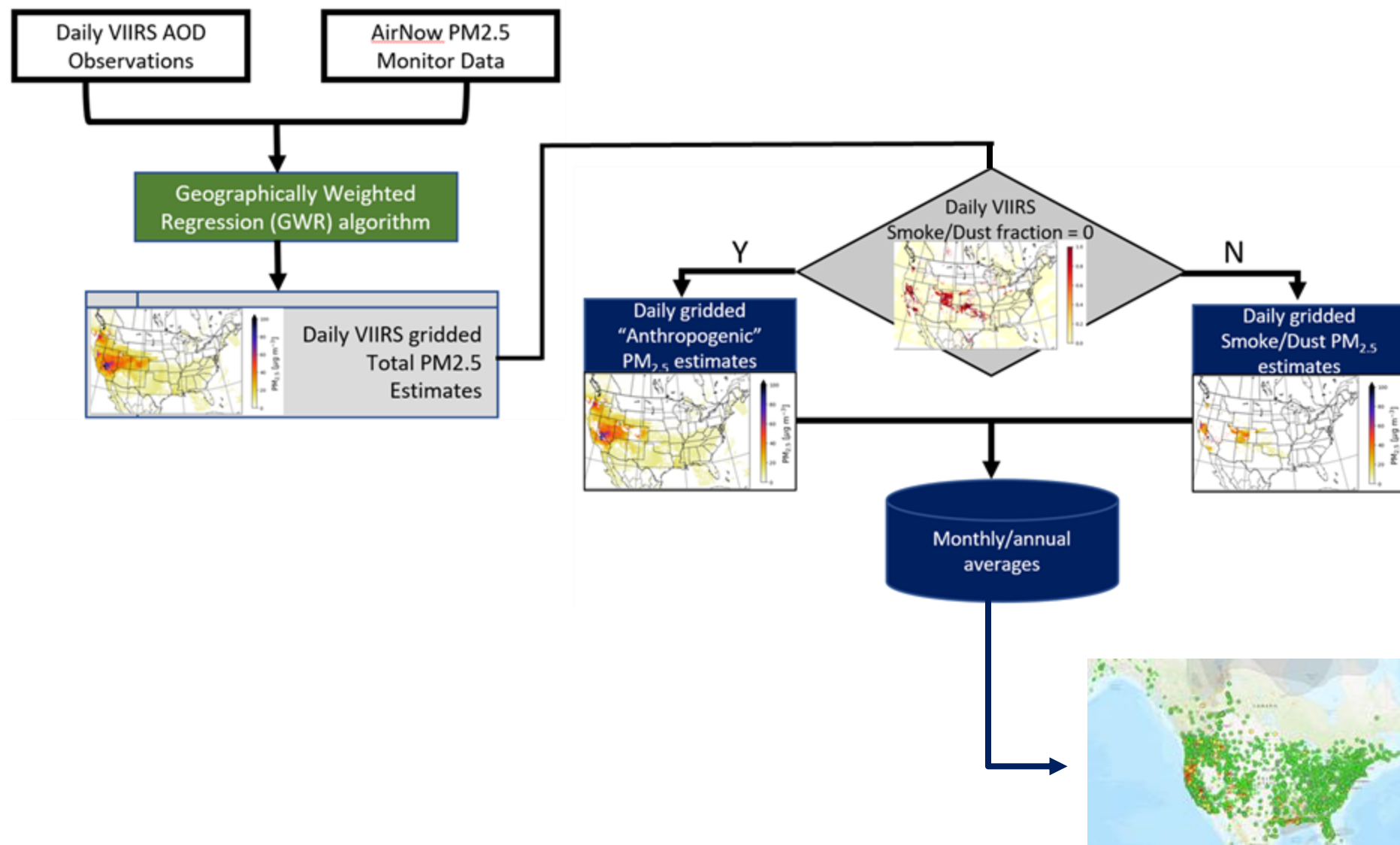
The Downside

- Scramble to meet the new standard
- Where can the reductions come from? Energy, industry, and transport sectors have already cut the primary emissions down. Most PM_{2.5} now is secondary aerosol. Efforts are needed to understand the gains from NO_x and VOC reductions on secondary aerosol
- There is this fear that if the new standard becomes the law, states may issue fewer permits for prescribed burns. Less prescribed burns “now” means more uncontrolled “wildfires” in the future

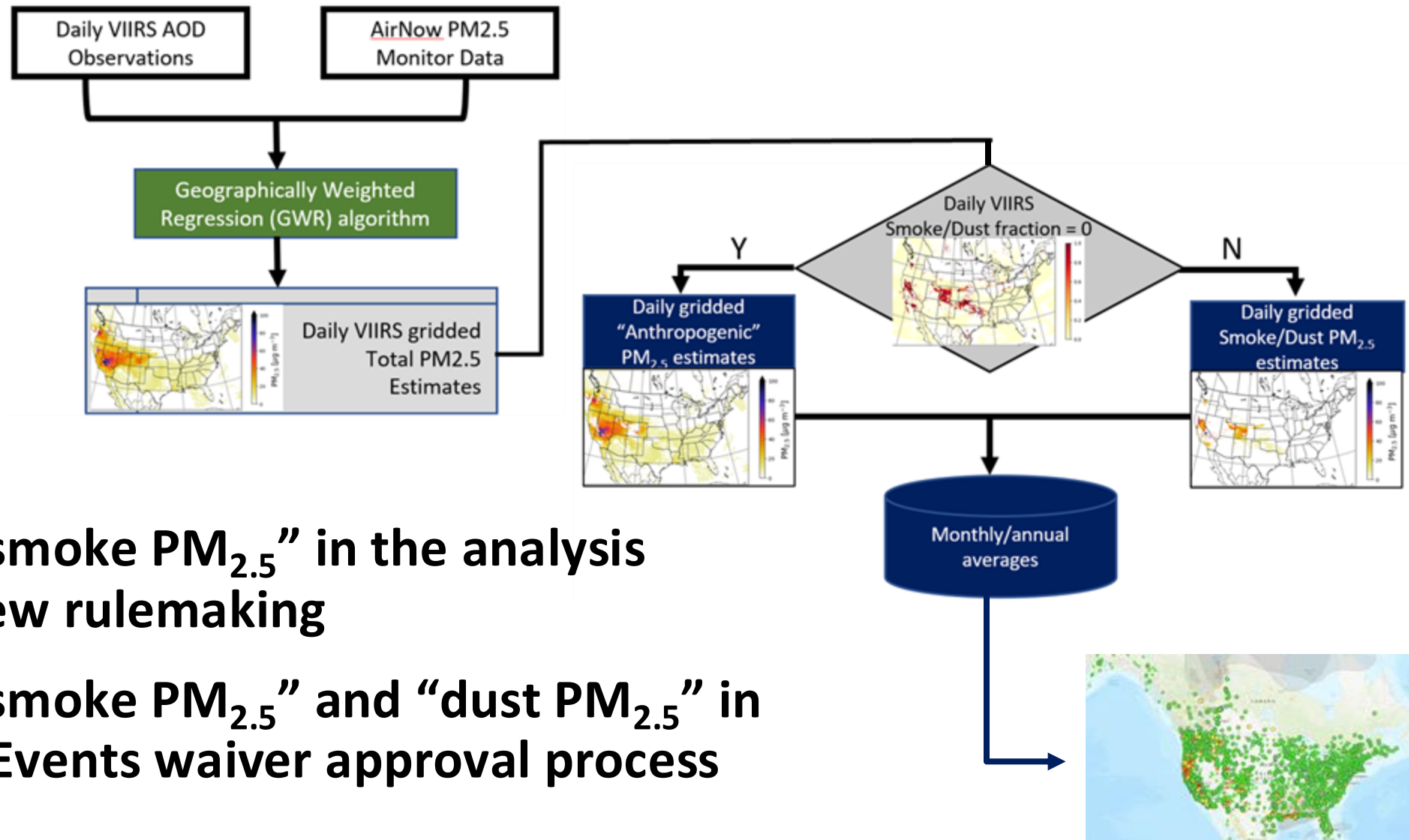
Quantitative Smokescreen Tool



Quantitative Smokescreen Tool



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- Use NOAA “smoke PM_{2.5}” in the analysis leading to new rulemaking
- Use NOAA “smoke PM_{2.5}” and “dust PM_{2.5}” in Exceptional Events waiver approval process