

The Benefits of Uniform Compliance with National Air Quality Standards

Daniel M. Sullivan Alan Krupnick

Resources for the Future
VALUABLES Consortium

July 17, 2018
HAQAST Meeting

Motivation

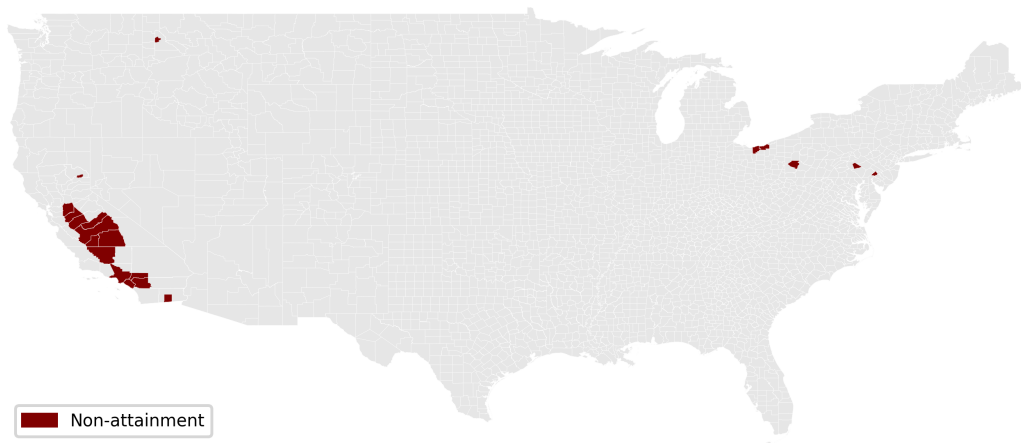
1. 37% of U.S. lives in county with no $\text{PM}_{2.5}$ monitor.
2. Monitor sample may not be representative of population.

⇒ Use satellite data (Dalhousie) to fill the gaps.

We then calculate the potential benefits of more uniform compliance with CAA.

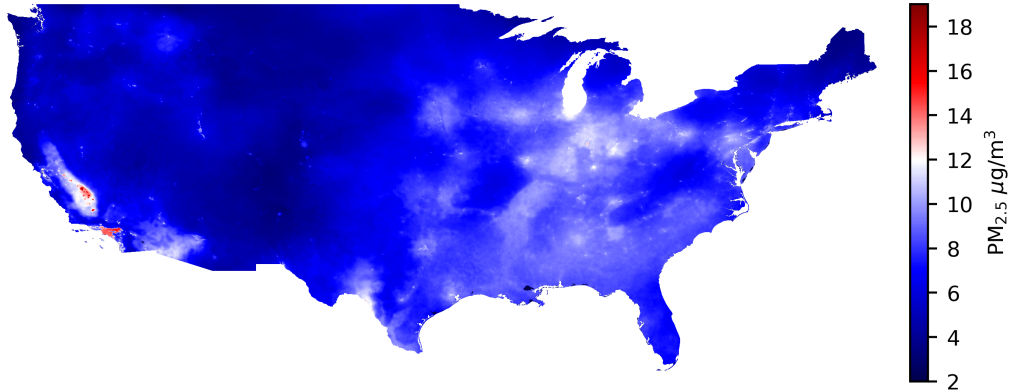
Not many areas are non-attainment

PM_{2.5} Non-attainment, annual standard, 2015



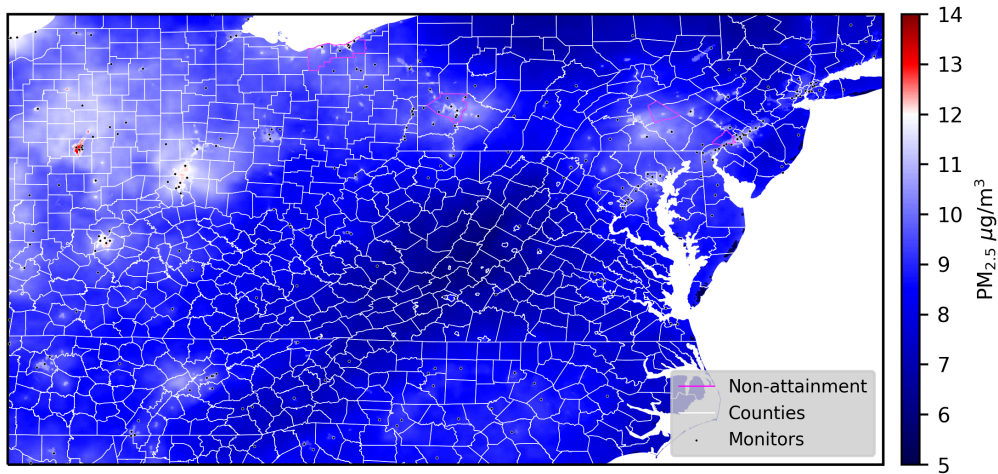
Satellites show many areas close to NAAQS cutoff

PM_{2.5} Design Values, 2015



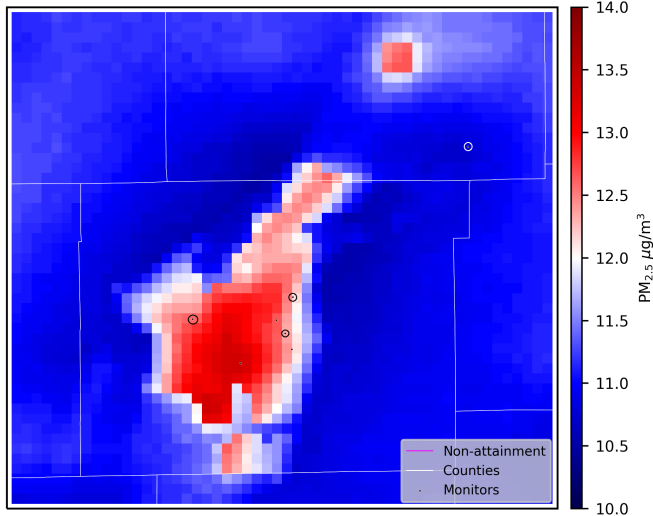
Monitors miss lots of pollution

PM_{2.5} Design Values and Attainment Status. 2015

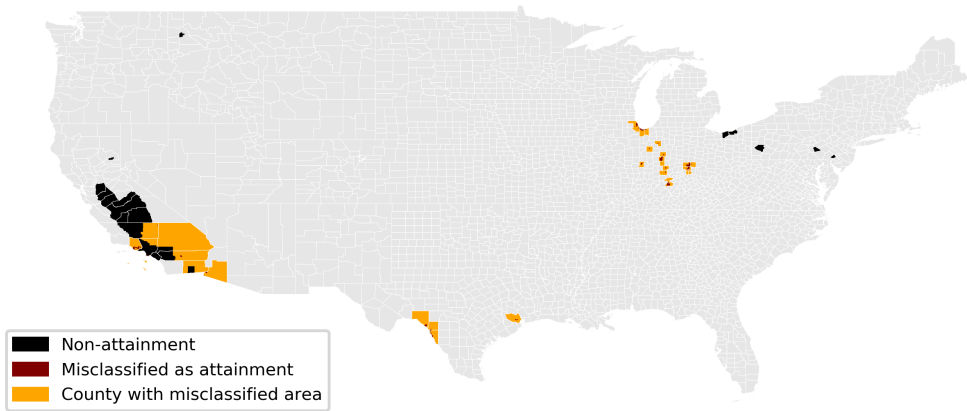


Indianapolis, IN

PM_{2.5} Design Values and Attainment Status. 2015

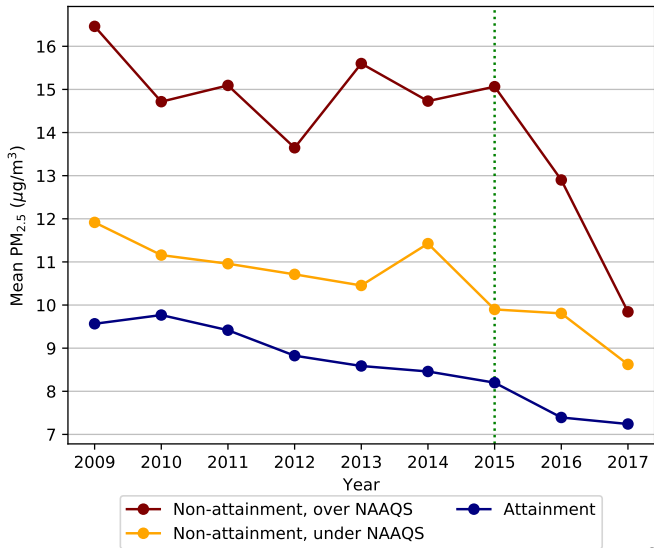


Mis-classified areas, annual standard, 2015



Regulators are very good at targeting monitors over NAAQS

PM_{2.5} averages at monitors

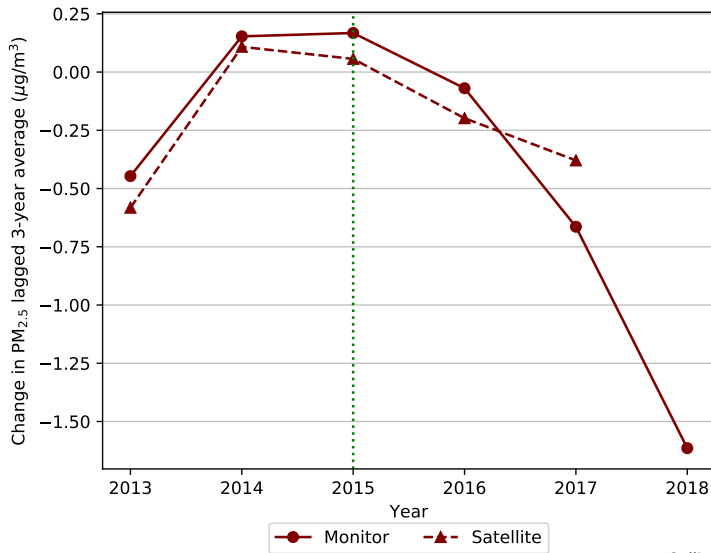


What if all areas over NAAQS were targeted like monitors?

- ▶ Monitors over NAAQS see $\sim 2 \mu\text{g}/\text{m}^3$ $\text{PM}_{2.5}$ reduction after non-attainment classification.
- ▶ If mis-classified areas were treated similarly
 - 3,321 fewer deaths (DR from Lepeule et al. 2012)
 - \$30 billion VSL annually for 2–5 years.
- ▶ What about non-attainment areas away from monitor?

Change in concentration for people over NAAQS

Monitors vs. satellites



Conclusion

- ▶ Millions of people likely mis-classified as “attainment”.
- ▶ Mortality costs at least \$30 billion.
- ▶ Suggests large potential role for satellite data in regulatory analyses.

sullivan@rff.org

VALUABLES convening session at 2018 AGU Fall Meeting:

PA048: Quantifying the Value of Earth Science Information by Identifying How it Changes Societal Outcomes <https://agu.confex.com/agu/fm18/prelim.cgi/Session/52133>

For more info, contact Bethany Mabee (mabee@rff.org), VALUABLES Community Manager