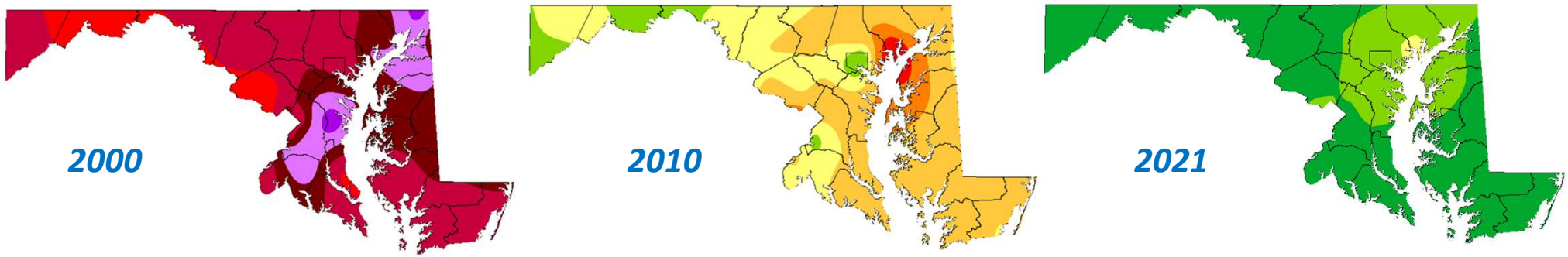
Maryland
Department of
the Environment

Air Quality Progress and Community Partnerships

Maryland's Shrinking Ozone Problem

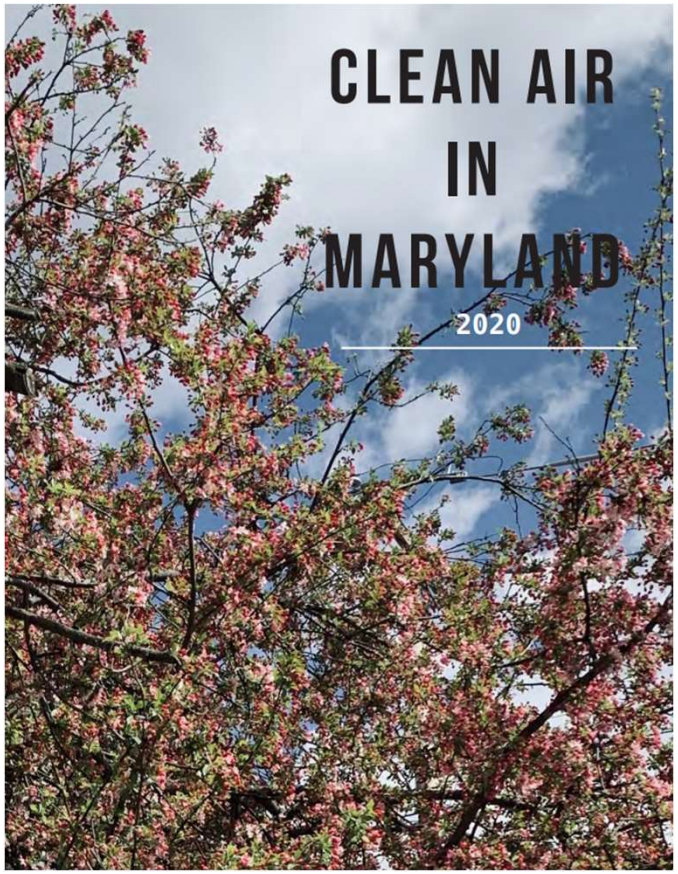


Air Quality Control Advisory Council – March 14, 2022

George S. (Tad) Aburn, Director, Air and Radiation Administration
Megan Ulrich, Senior Policy Advisor, Air and Radiation Administration

Overview of Presentation

- Background
- Clean Air and Climate Change Progress
- 2022 Priorities
- Environmental Justice and Community Partnerships
- Questions/Discussion

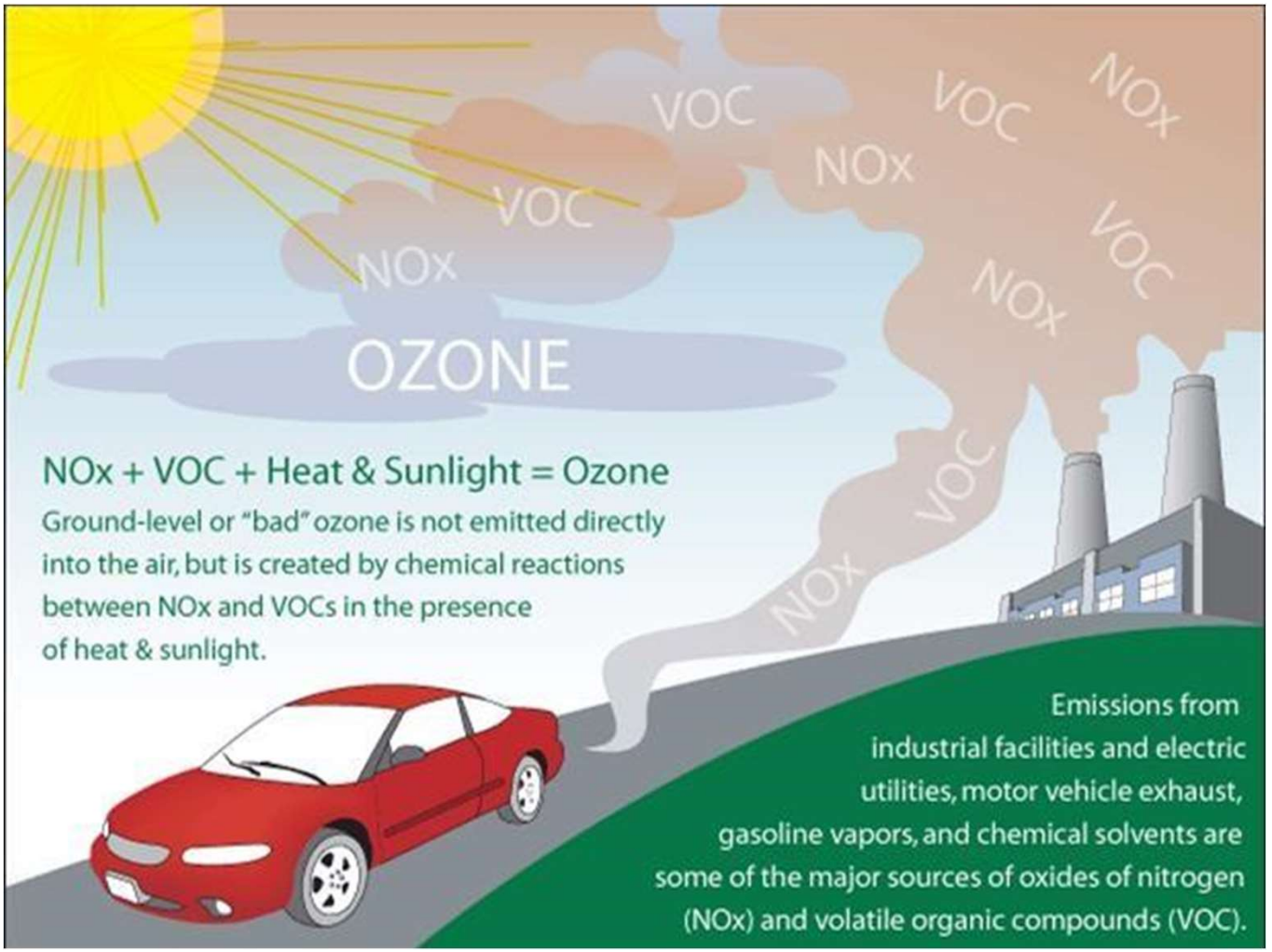


https://mde.maryland.gov/programs/Air/Pages/index.aspx


AIR QUALITY BASICS

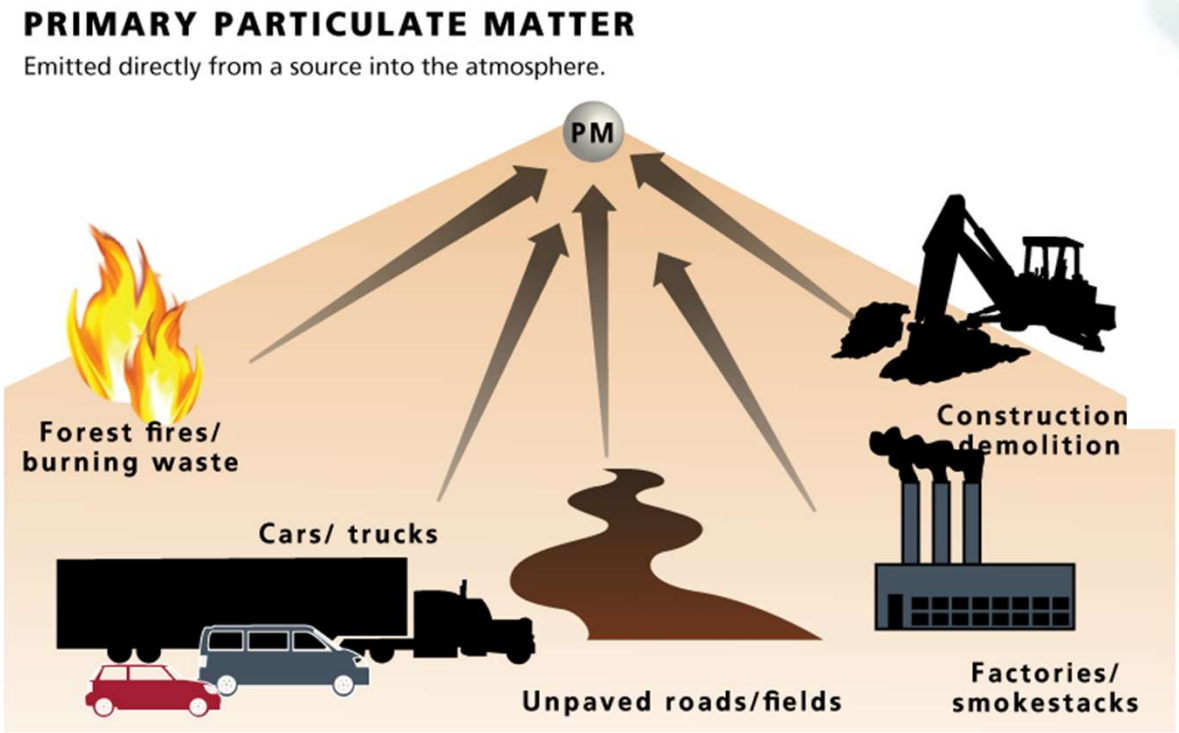
Ground-Level Ozone

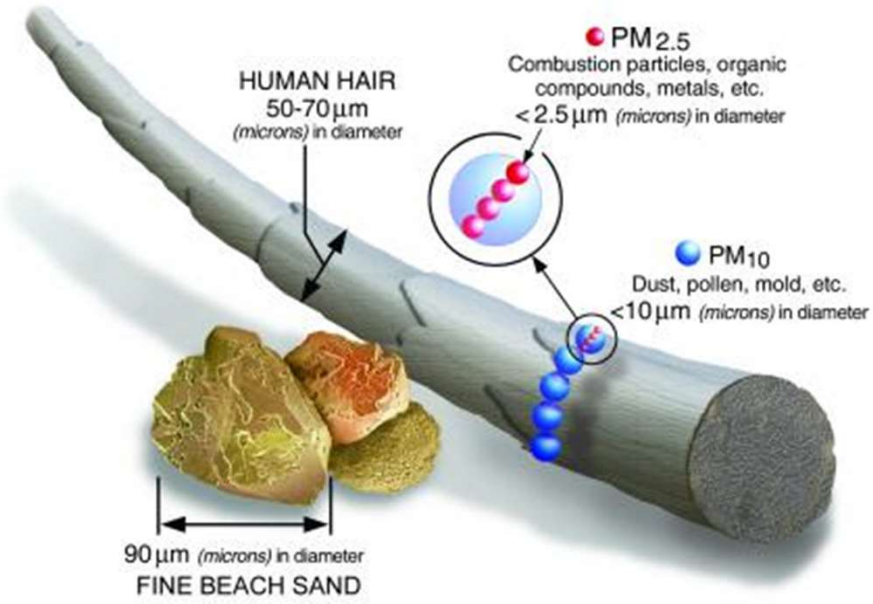
- The most pervasive air pollutant in Maryland and many other parts of the country…



Particulate Matter

- For the past 10 years, fine particle levels have met the federal air quality standards. Typically, particle levels are higher in urban areas



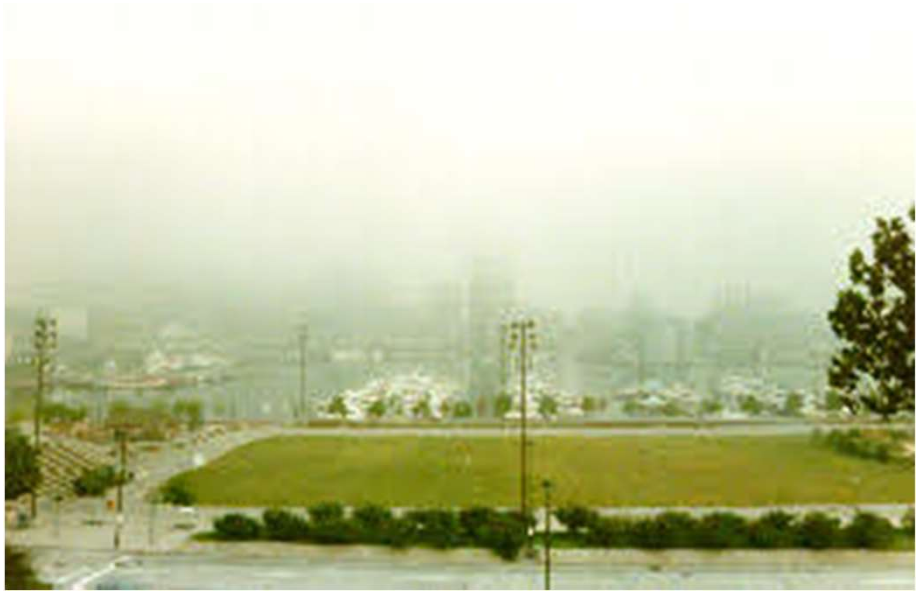


The Ugly…

- Significant air quality events, such as those occurring in Denora, PA in 1948, New York City in 1953, 1963 and 1966 as well as many others throughout the nation, prompted the federal government to enact the Clean Air Act (CAA)

The Bad…

- Up until 2010, Maryland continued to experience numerous bad air quality events with ground-level ozone and particulate matter levels in the unhealthy range
  - 2005 MIT PM Study - Maryland identified as the riskiest place to breathe the air east of the Mississippi
  - 2008 - EPA designates the Baltimore area as the worst ozone area outside of California and Texas



The Good…

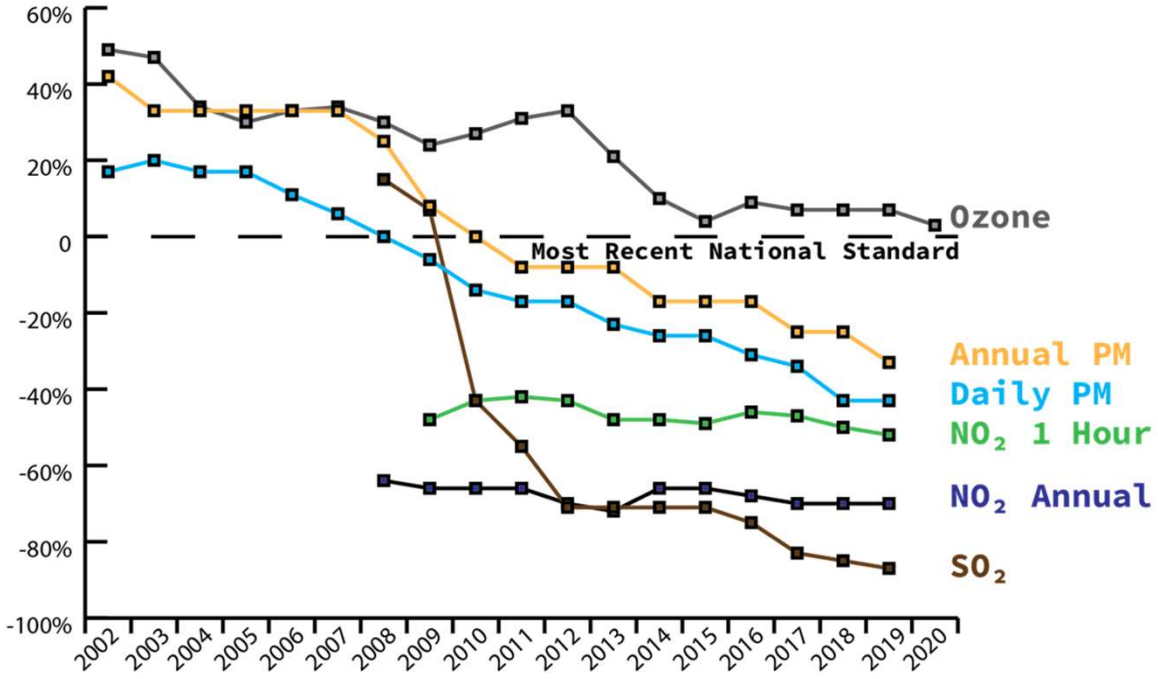
- In recent years, Maryland has achieved the federal fine particle standard, as well as the 2008 ozone standard, and is moving towards achieving the more stringent 2015 ozone standard. In 2020, Maryland recorded the fewest number of bad ozone days ever recorded in a year


2021 - CLEAN AIR HIGHLIGHTS
PROGRESS CONTINUES

Clean Air Highlights

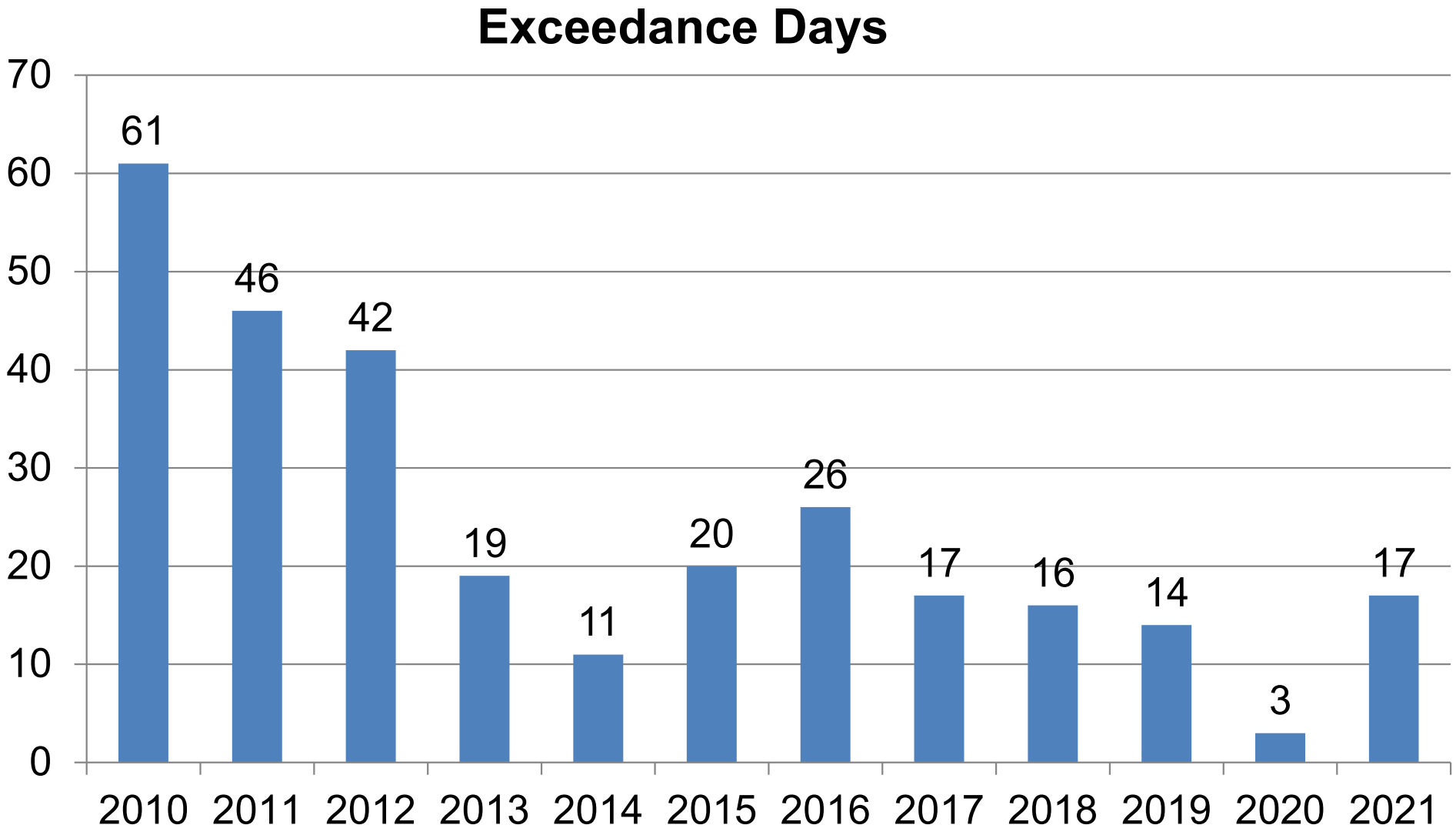
- For nearly 30 years, Maryland's air quality has dramatically improved

- Air quality policies and regulations have lowered levels of six common pollutants — particles, ozone, lead, carbon monoxide, nitrogen dioxide, and sulfur dioxide



- ↓Nitrogen Dioxide (NO_2) Annual 16% (2008-2019)
- ↓Nitrogen Dioxide (NO_2) 1-Hour 8% (2009-2019)
- ↓Ozone (O_3) 28% (2002-2020)
- ↓Particles ($PM_{2.5}$) Annual 53% (2002-2019)
- ↓Particles ($PM_{2.5}$) 24-Hour 51% (2002-2019)
- ↓Sulfur Dioxide (SO_2) 1-Hour 88% (2008-2019)

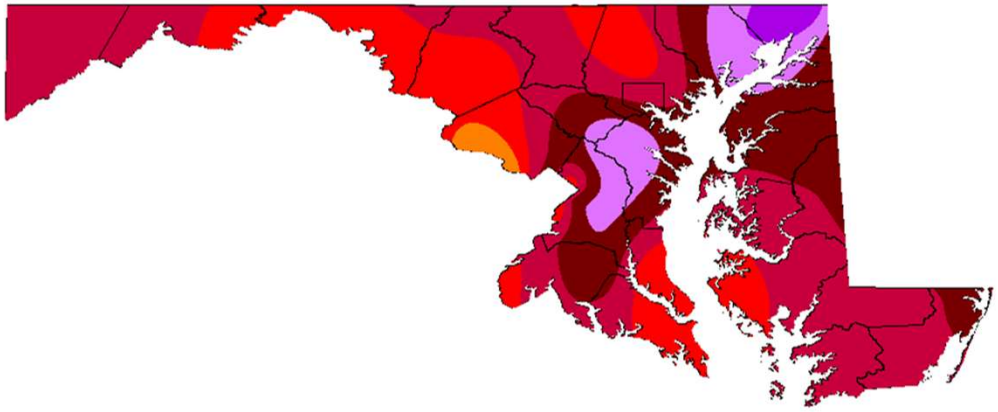
Maryland Bad Ozone Days



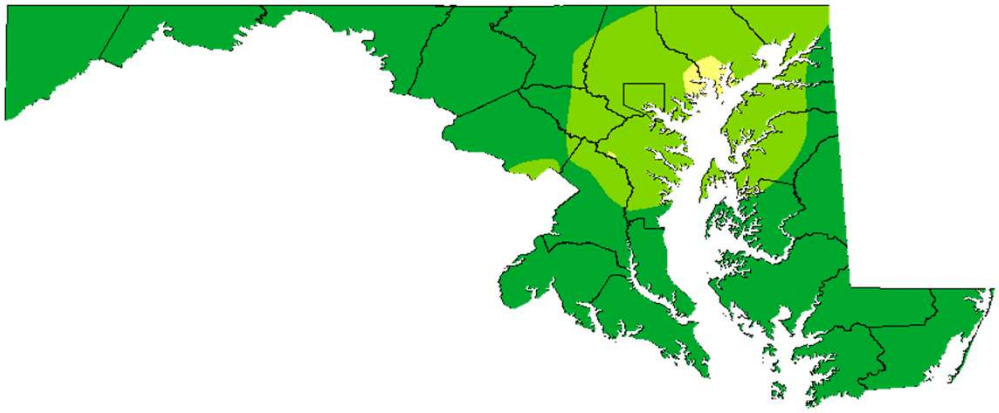
Note: 2021 data is considered preliminary

The Shrinking Ozone Problem

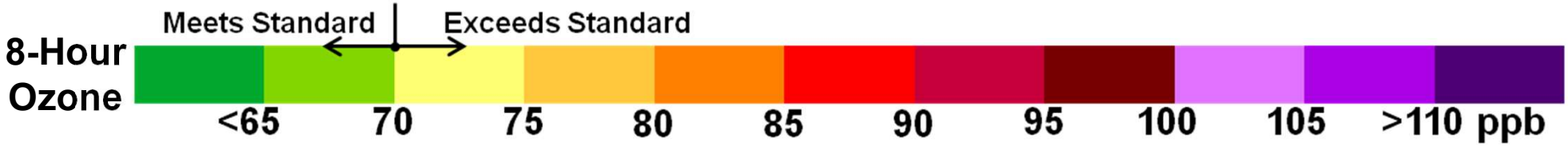
1998



2021



Lower Ozone Levels and Significant Spatial Risk Reduction



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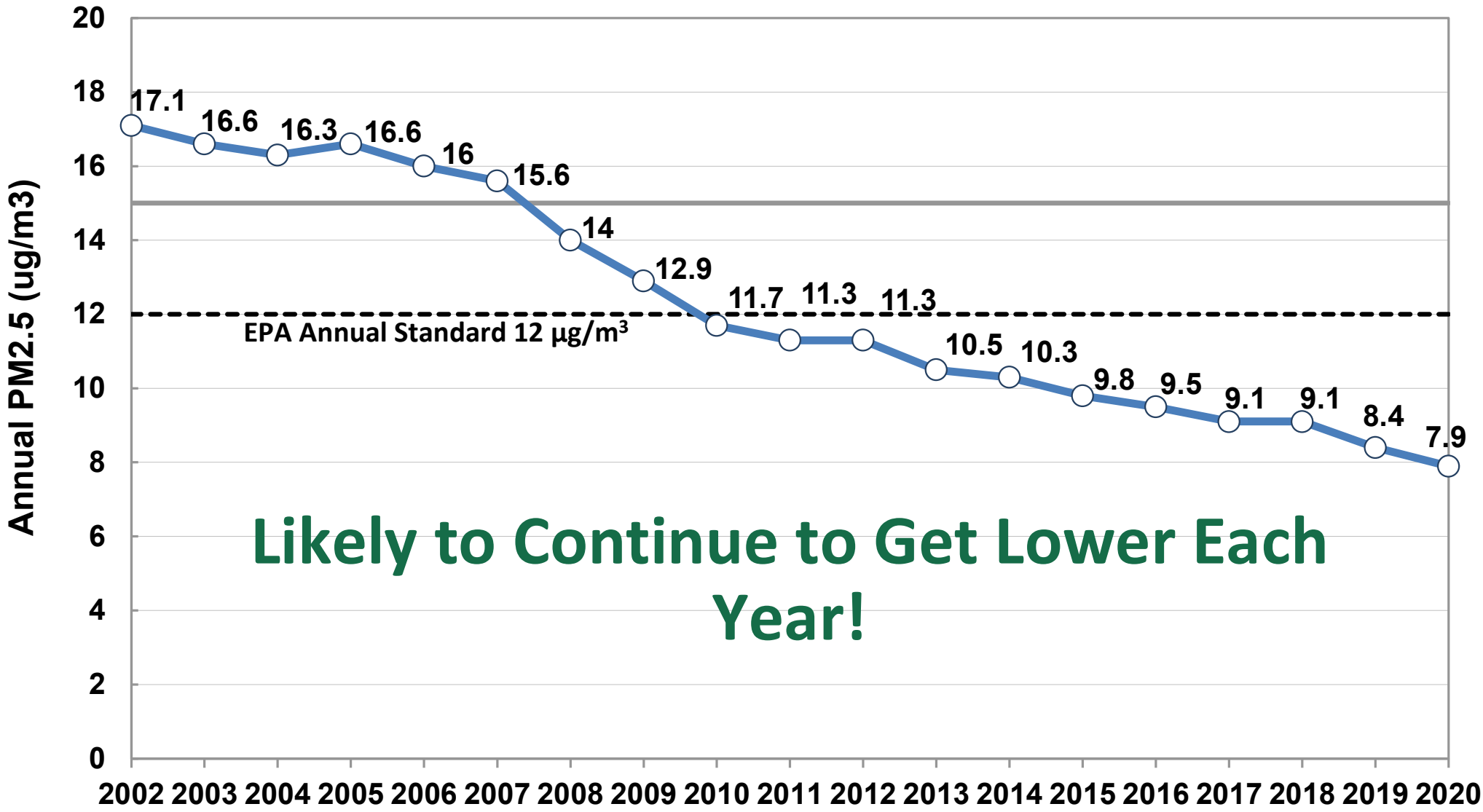
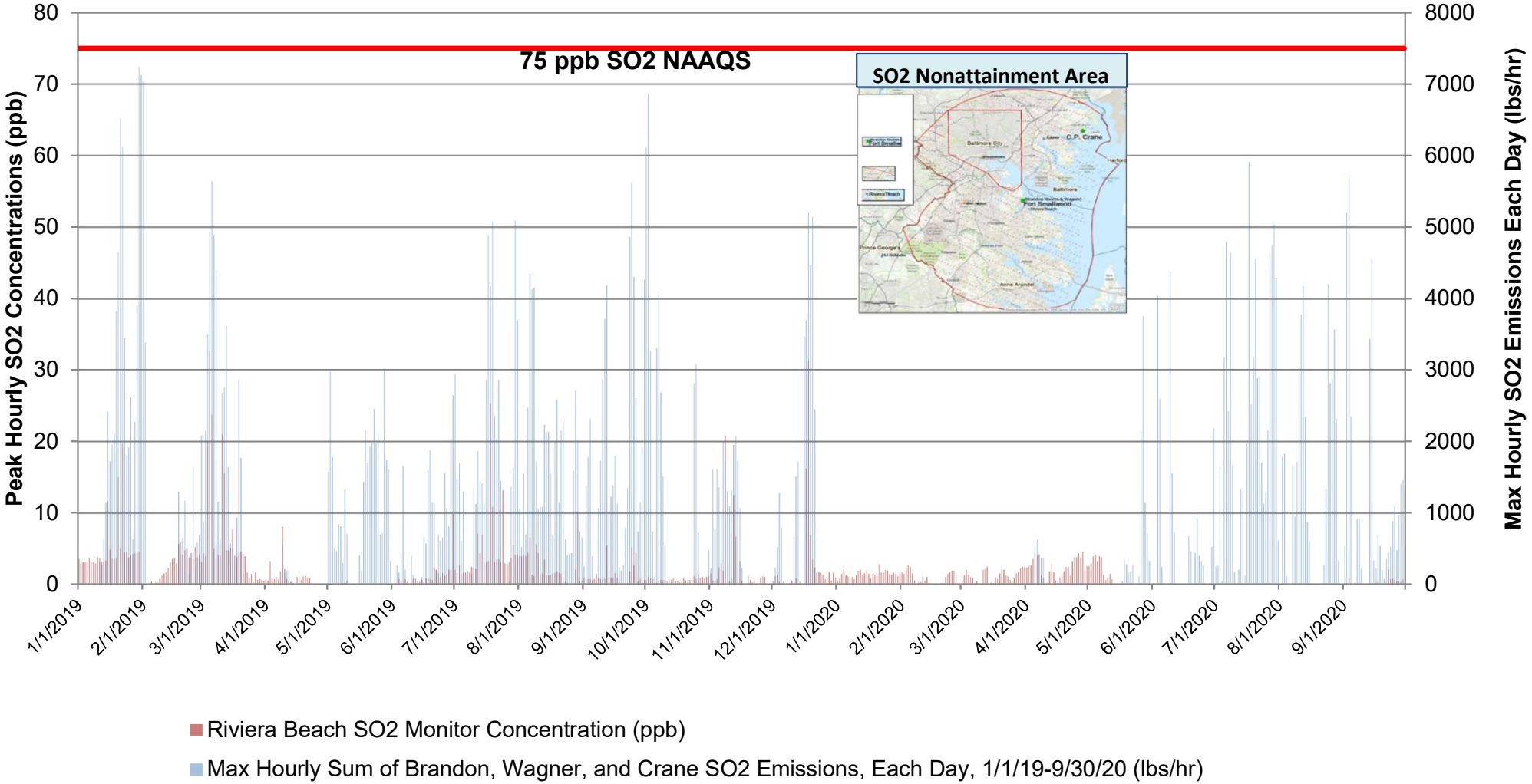
Fine Particle Air Pollution
Lower Levels Across the State



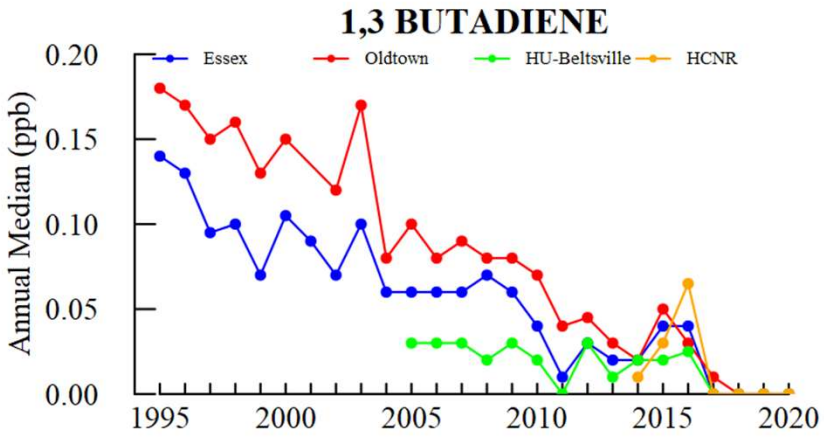
Likely to Continue to Get Lower Each Year!

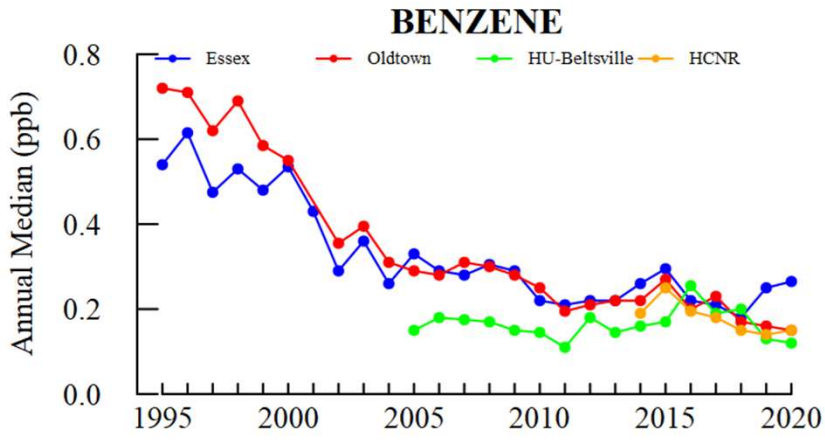
SO2 Air Pollution Levels Well Below Standards

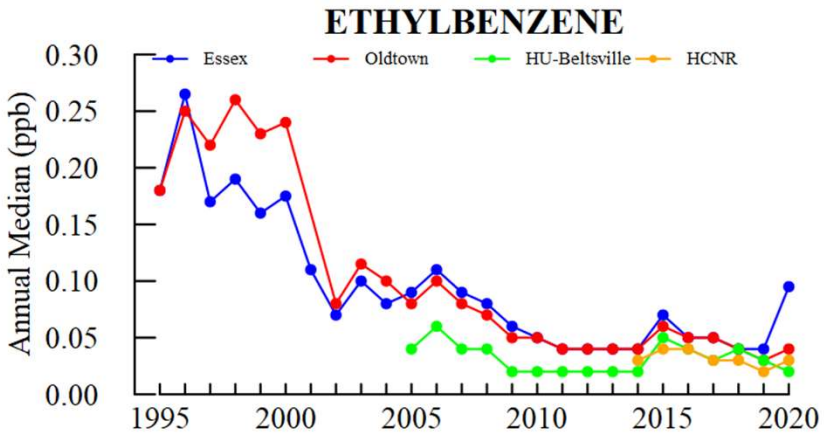
Peak Daily Riviera Beach Monitor SO2 Concentrations &
Maximum Hourly Sum of Brandon, Wagner, & Crane SO2 Emissions
Each Day, 1/1/19 – 9/30/20

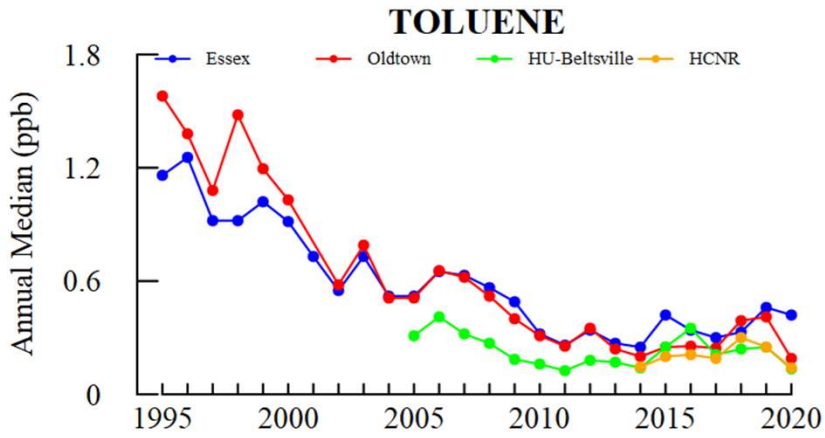


Air Toxics Have Been Reduced Significantly









- Air toxics are those known to cause cancer and other serious health impacts
- Over the last 25 years, Maryland has generally cut concentrations of air toxics by 50%

What Has Driven the Progress?

- Maryland has adopted hundreds of emission control programs to reduce air pollution
  - A few of the higher profile efforts are listed below
- Stationary (smokestack sources):
  - The Maryland Healthy Air Act, The Regional Greenhouse Gas Initiative (RGGI), Maryland's 2015 NOx Regulations … many more
- Mobile sources:
  - The 2007 Clean Cars Program, Federal Tier 2 and 3 tailpipe standards, numerous diesel emission reduction efforts … many more
- Potential future emission reduction efforts:
  - Federal action to reduce ozone being transported into Maryland, Zero Emission Medium and Heavy-Duty Trucks … many more

ADDRESSING CLIMATE CHANGE

MARYLAND'S EFFORTS

Greenhouse Gas Reduction Efforts

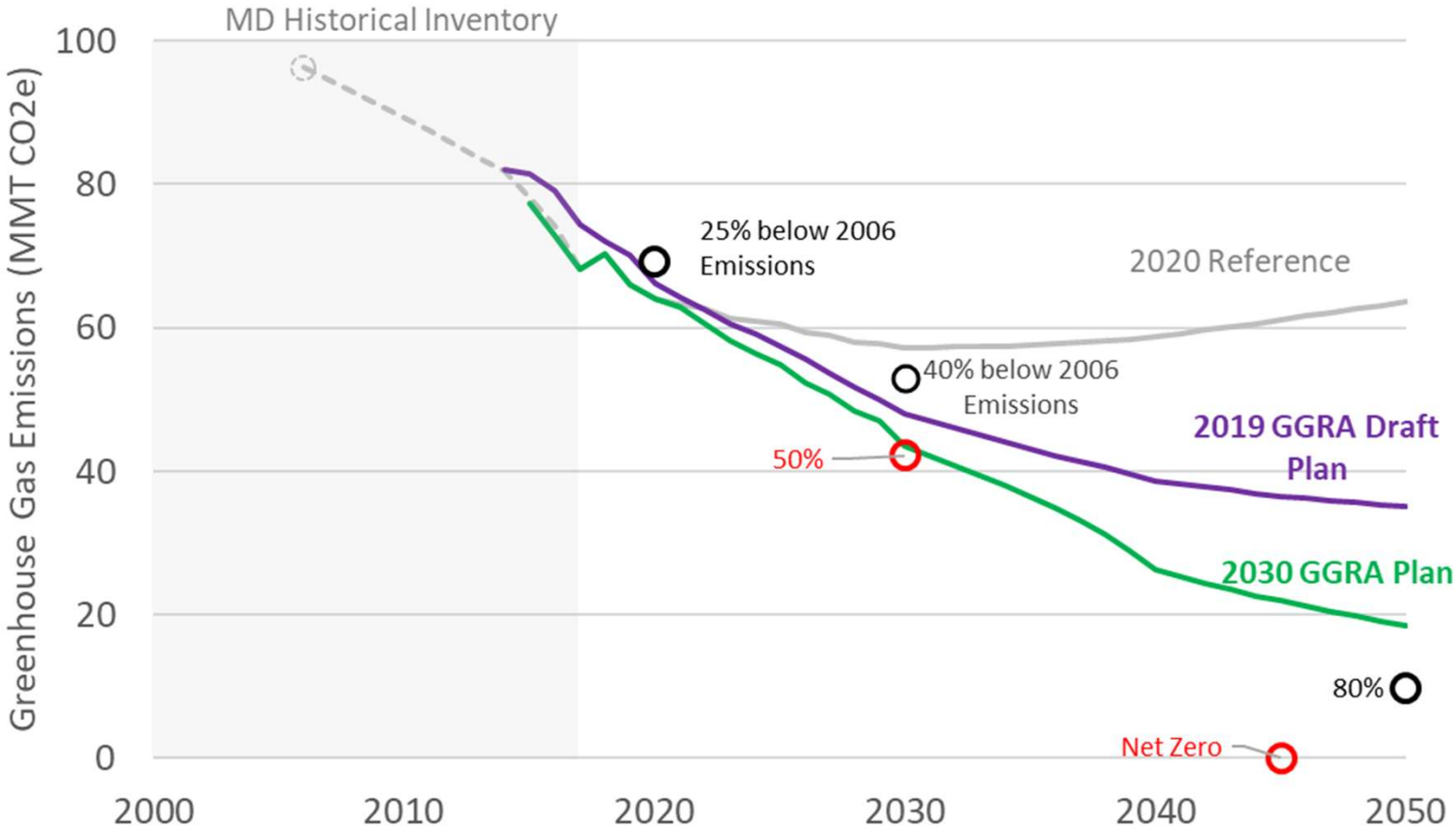
- One year ago, MDE released Maryland's latest climate plan, called the 2030 Greenhouse Gas Reduction Act (or GGRA) Plan

- The Plan identifies measures that, if fully implemented, would put Maryland on a path to reduce net GHG emissions at least 50% by 2030 with supportive federal actions

- MDE's 2030 Plan reduces emissions substantially more than required by the existing law which calls for a 40% reduction while positively impacting the state’s economy and creating jobs

The 2030 GGRA Plan

The GHG reduction pathway in the 2030 GGRA Plan (show in green) indicates that a 50% reduction by 2030 is attainable, with supportive federal actions



Maryland greenhouse gas emissions, accounting for sequestration. Projections from Draft Plan and 2030 GGRA Plan

GGRA Plan - Economic Impacts

The GGRA Plan achieves the 2030 goal with significant benefit to the state's economy

MD impact relative to Reference Case	Through 2030	Through 2050
Average job impact*	+ 6,186	+ 6,823
GDP Impact**	+ $ 5.3 billion	+ $ 14.7 billion
Personal Income Impact**	+ $ 4.5 billion	+ $ 16.1 billion
Public Health Benefit (Avoided Mortality)**	+ $ 0.9 to $ 2.1 billion	+ $ 7.5 to $ 17 billion
Climate Change Benefit**	+ $ 3.12 billion	+ $ 27.9 billion

* Average number of job-years created or sustained each year.
** 2018 Dollars, Cumulative, Net Present Value using 3% discount rate.
Climate benefit evaluated using Federal Social Cost of Carbon (2015 Update)

2022 PRIORITIES

A Rapid-Fire Snapshot of 2022 Policy Priorities

Climate Change

- The GGRA Plan builds upon the 50% RPS goal and sets a goal to achieve 100% clean electricity generation by 2040 by both building clean energy and capping emissions from fossil energy

- As the electricity supply decarbonizes, the Plan outlines a way to electrify transport and buildings to efficiently run on clean electricity

- The GGRA Plan aims to have around 30% of new cars purchased in 2025 be EVs. That number should exceed 60% by 2030

A Rapid-Fire Snapshot of 2022 Policy Priorities

Climate Change

- The GGRA Plan aims to replace fossil fuel heating systems in buildings with efficient electric heat pumps that are powered by increasingly clean and renewable electricity

- The GGRA has measures to reduce methane leakage from the natural gas system, as well as potential updated regulation on landfills to reduce leaks

- The plan includes several programs aimed at sequestering carbon in our natural and working lands

A Rapid-Fire Snapshot of 2022 Policy Priorities

GGRA 2030/2050 Plan

- We still have sensitivity analysis to do: exploring upcoming Federal action once we have a clearer picture of incoming administration's plan

- The Buildings Plan (MWG) and Medium/Heavy Duty ZEV Action Plan (Agencies, ZEEVIC, & Multistate ZEV Task Force)

- Mid-course GGRA progress report due in 2022

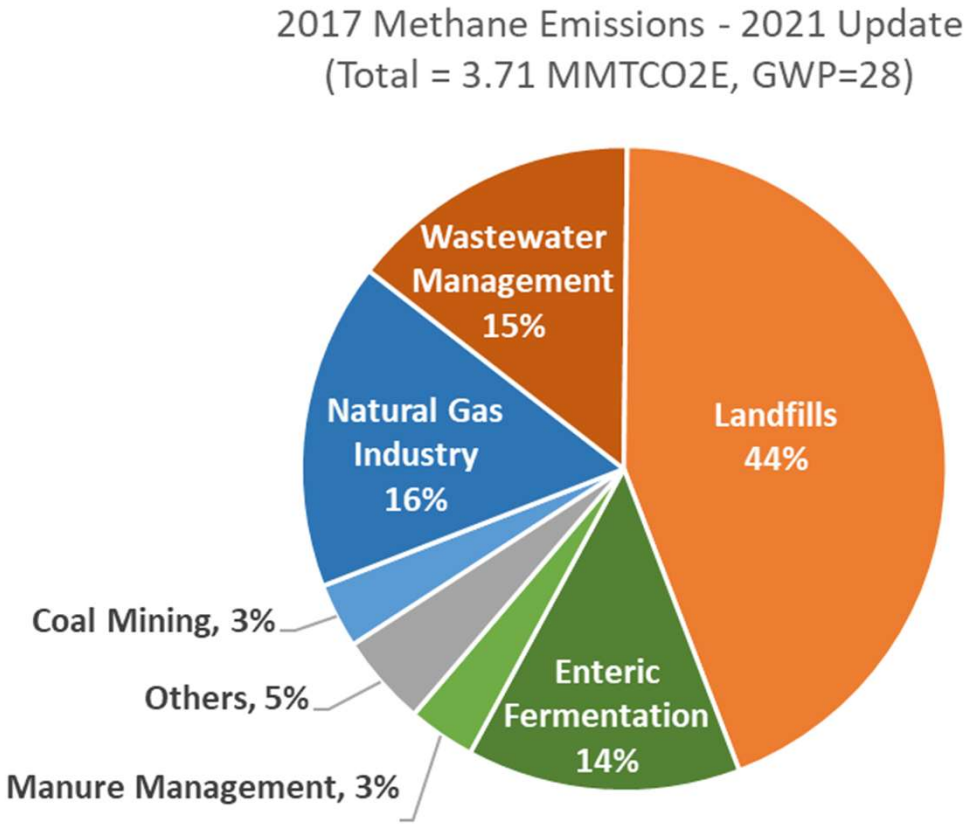
A Rapid-Fire Snapshot of 2022 Policy Priorities

Climate Change Continued

- Legislation
  - During 2022 Session, multiple bills have been introduced in both the Maryland Senate and House related to climate change
- Climate Commission
  - Commission and four working groups will continue to meet. We do not expect a let up on the demanding pace
- Short-lived climate pollutants (SLCP)
  - Two regulations complete – HFC prohibitions and methane control at Natural Gas Compressor Stations
  - Drafting a regulation for methane control at landfills
    - This will be a future high profile action item for AQCAC

Why the Focus on Leaking Methane from Landfills?

- Methane is a super potent greenhouse gas
  - 28 times the warming impact of CO_2 over 100 years
  - 80 times over methane's 20-year lifetime in the atmosphere
- Early action is critical
- Landfills are the largest methane emission source in the MDE inventory
- Research and other new analyses indicate that real world methane emissions from landfills may be significantly larger than originally estimated with strong daily variations that may cause significant mis-quantification
  - New research on landfill and methane emissions is being planned
  - MDE is currently evaluating these differences



Other States And Organizations Working on Similar Regulations

- California (effective 2010) and Oregon (effective 2021) have adopted regulations to reduce methane gas emissions from landfills
- The US Climate Alliance (USCA) a partnership between states to address climate change and reduce greenhouse gas emissions is also working on this issue
  - USCA has formed a working group to discuss and share regulatory approaches for addressing this issue
- MDE is looking at the regulatory approaches taken in other states and will be using this information in the rulemaking process

Addressing Methane Emissions from Landfills

- Two basic drivers:
  - The new federal New Source Performance Standards (NSPS) and Emission Guidelines (EG) for Municipal Solid Waste landfills
  - The need for additional requirements to minimize leaking methane emissions as part of the State's climate change efforts
- MDE is working on a regulation that will build on the new federal NSPS/EG requirements
- The regulation will include additional requirements that go beyond the federal standards to minimize methane emissions
- MDE held two stakeholder meetings in September 2020 and June 2021
  - Comments from stakeholders focused on adopting stringent requirements for MSW landfills, climate change, and waste diversion
- Next stakeholder meeting – Spring 2022

Rapid-Fire Priorities (Continued)

- Mobile
  - Medium & Heavy Duty ZEV MOU a very high priority
  - The Transportation and Climate Initiative (TCI) also a high priority
  - Analyses and expansion of regional program still ongoing
  - Electric vehicles (EVs) are also another very high priority
    - Will continue to come to AQCAC for reg changes when California makes changes
  - California and Clean Air Act Section 177
  - Potential regs for and advanced clean truck program, a heavy duty diesel NOx program and an updated California car program are all at a point for consideration under 177
  - EPA is moving to harmonize the federal program with the California program

Rapid-Fire Priorities (Continued)

- Environmental Justice
  - Hyper-local air monitoring projects … Now four efforts that are either up and running or soon to be up and running. Baltimore, Cheverly, St. Mary's County and DC area
  - Reinvigorated MDE-wide process for environmental justice is now being implemented
  - Community partnerships - MDE Air Program had initiated partnerships with nine communities … now being blended with MDE-wide effort
  - Permits and compliance
- Maryland's Port and Peak Day Partnerships
  - Port partnership very strong, MDE, MDOT, MEA, the Port and over 15 different communities. Over $15 Million investment into clean air and very large reductions in NOx, greenhouse gases, PM, air toxics and diesel particulate. More reductions on the way
  - MDE's peak day partnership effort is in its 5th year. Extra effort and reductions on worst ozone days from about 40 stationary NOx sources

Rapid-Fire Priorities (continued)

- Ozone
  - Transport
    - Section 184C (PA power plants that don't always run their controls), Cross State Air Pollution Rule (CSAPR) Update for 2015 standard, strengthened RACT in PA and Good Neighbor SIPs are all in the works right now
  - Municipal Waste Combustors
    - Permit conditions and tougher regulations are in the works
  - Aftermarket Catalysts
    - Still moving on MDE regulation, but federal action is also a possibility
- Sulfur Dioxide (SO2)
  - All areas in Maryland (3) now meeting the standard
  - Working to wrap-up attainment demo process for all 3 areas

Diesel Emission Reduction Efforts The Future

- Community Projects funded with VW funds
  - Turner Station
    - Marshall's Trash Truck
  - Curtis Bay
    - Diesel yard truck
- VW Projects in and around the North Point area
  - Port projects
    - Repower tugs and purchase trucks and handling equipment
    - NOx reduced by 406 tons, $2.97 M investment
  - Private Sector projects
    - Repower tugs and purchase diesel buses, locomotive switchers, electric cranes
    - NOx reduced by 1,876 tons, $22.3 M investment
- Other VW Projects
    - Purchase new electric and alternative fuel school buses, trash trucks, transit buses
    - NOx reduced by 1,307 tons, $133.7 M investment

Environmental Justice and Community Engagement

Environmental Justice Initiatives

- Environmental Justice is a very high priority at MDE
  - Department wide effort to reinvigorate the state's EJ Commission
  - MDE-wide initiatives on outreach, compliance, permits and mapping
- Air Program Initiatives
  - Partnership effort with over 9 communities to work together to reduce environmental risk
    - So far, two of these efforts have resulted in diesel cleanup projects selected by the community (Turner Station and Curtis Bay)
  - Port Partnership also includes collaboration with over 15 communities and has driven huge investment into diesel clean up in and around the Port. By 2025 over $35 Million will have been invested to reduce air pollution around the Port
  - Several exiting efforts involving community-based, hyper-local air monitoring/sensor networks

The Port Partnership

- A great example of a partnership between government and communities
- Government partners: the Port, the MD Department of the Environment, the MD Department of Transportation and the MD Energy Administration
- Community partners: Turner Station, St. Helena, Greater Baybrook, North Point, Fort Howard and maybe 10 other communities
- Diesel reduction has been a major focus, but the partnership includes other media and other issues
- Through 2020, about $15 Million investment into clean air and climate change … over 4,000 tons of NOx emissions eliminated … significant reductions in GHG and toxic emissions … continued collaboration with communities

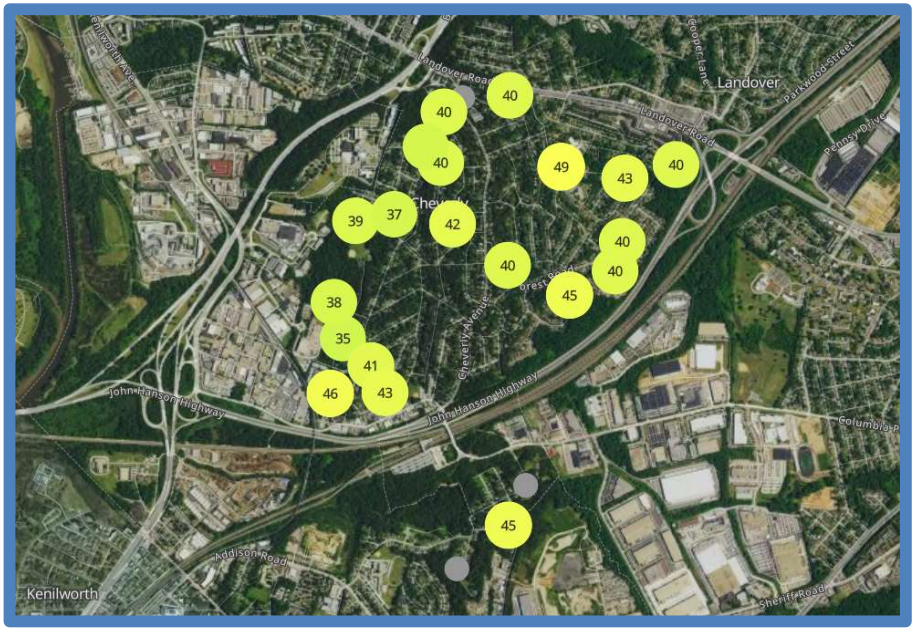
New Partnership Opportunities

- The Federal Government has announced an unprecedented amount of new funding for community-based projects, citizen science, ports, climate change and more
  - Maryland is perfectly positioned to take advantage of these grant opportunities
    - Community-based projects
    - Port projects
    - Private sector projects
- Opportunities in many areas of interest to the Communities
  - Diesel clean-up and electrification
  - Strengthened partnerships with communities
  - Citizen science
  - Hyper-local air monitoring/sensor networks
  - Many more opportunities

Cheverly Maryland Effort

- Partnership between the Mayor and residents of Cheverly, MD; Dr. Sacoby Wilson, U of M Center for Community Engagement, Environmental Justice, and Health (CEEJH) and MDE
- Just outside of D.C. in Prince George's County … in an area with concerns over environmental justice
  - Numerous stationary sources and major highways around the Sherriff Road area in Cheverly … generally upwind of populated areas
- Community wide air monitoring/sensor network made up primarily of PurpleAir fine particle sensors now in place
  - Kudos to Dr. Wilson's team for driving this effort

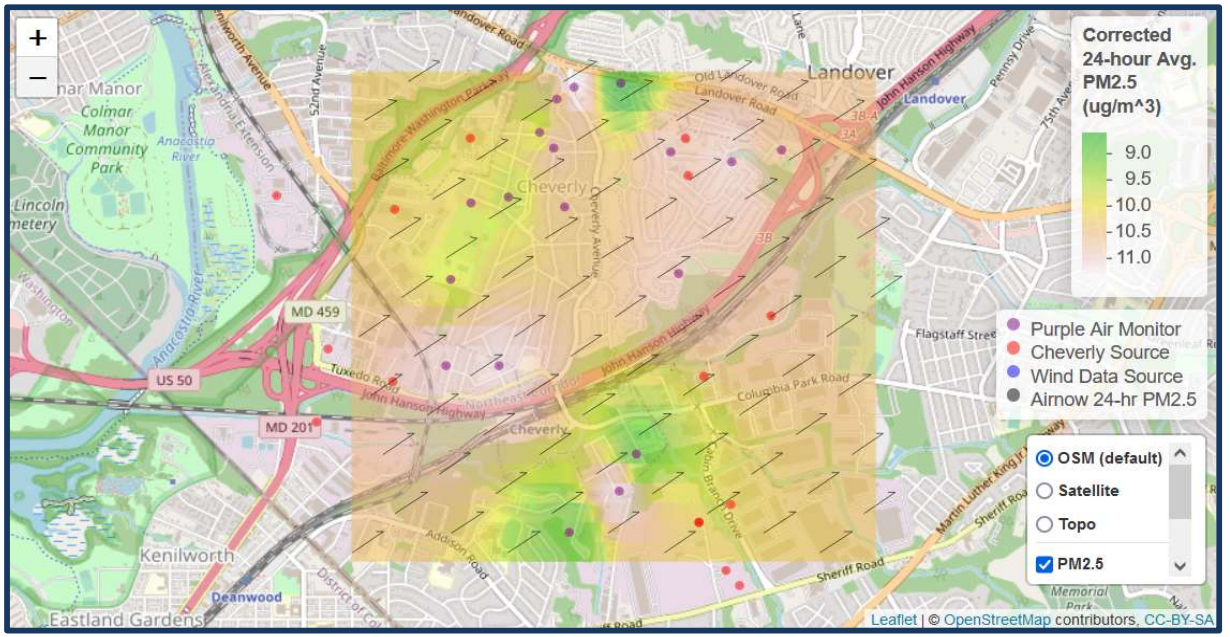
Sensors in Cheverly, Maryland



The MDE Targeted Inspection Initiative in Cheverly

- Intensive inspection effort in June and July of 2021
  - Several meetings with community
  - Uses sensor, wind and source data, citizen input and other information to target inspections
  - Area-wide surveillance and source specific inspections 3 or more days each week
  - Stationary and mobile sources
  - 28 days of inspections - many site visits – 3 NOVs
  - Web page summarizes daily activity and inspection reports
- Follow-up activities potentially include initiatives on fugitive dust and idle reduction
- Positive input from Mayor and residents

https://mde.maryland.gov/programs/Air/AirQualityCompliance/Pages/CheverlyTargetedInspectionInitiative.aspx

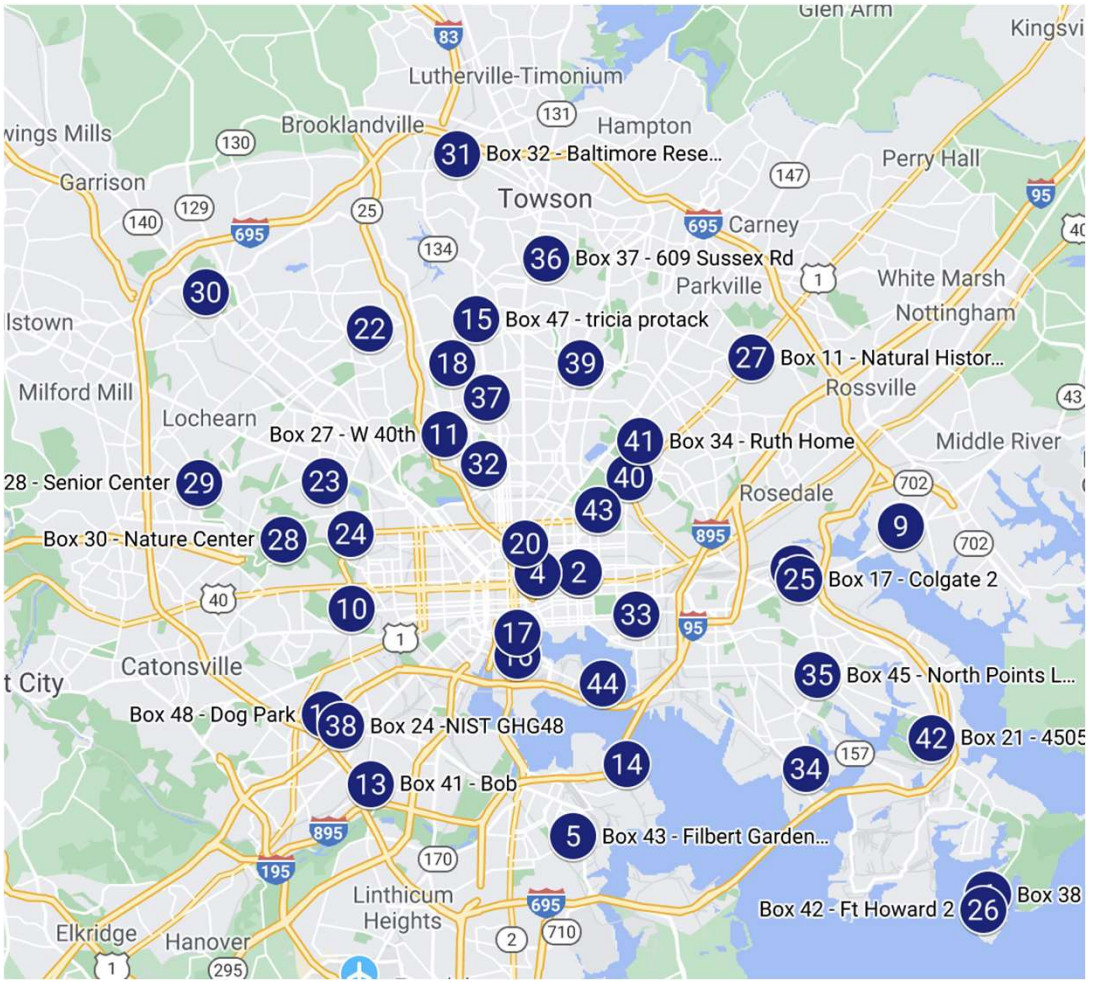


Using Sensor, Wind and Emission Source Data to Identify Hotspots and Target Inspections

Another Example of a Hyper-Local Monitoring Project

The Johns Hopkins/Yale "SEARCH" Project

- Lead by Johns Hopkins and Yale with MDE collaboration
- A project using a large network of low-cost air quality sensors to look at air pollution variability across the Baltimore area
- Data on fine particulate, nitrogen dioxide, greenhouse gases and more being collected
- Similar projects in Cheverly, St. Mary's County, PG County, Harford County and the DC area



SEARCH sensor map courtesy of Kirsten Koehler (JHU)

New Curtis Bay Partnership

- Significant effort on this partnership over the past two months
  - Very high priority because of the explosion at the CSX coal pier
- Effort will include:
  - A community driven partnership effort
  - Enhanced monitoring
  - New permit requirements
  - Targeted inspection and enforcement activities by MDE


QUESTIONS ... DISCUSSION