Urban Area Air Quality Planning
Phoenix-Mesa Ozone Case Study

WESTAR Planning Committee Meeting

December 2024

ADEQ Arizona Department of Environmental Quality

Clean Air, Safe Water, Healthy Land for Everyone

Presentation Outline

- Urban Area Planning Requirements
- Maricopa County 2015 ozone National Ambient Air Quality Standard (NAAQS) case study
- Voluntary control measures

Elements of a nonattainment area SIP

- Monitoring Data
- Emissions Inventory:
  - Point, Area, Mobile (Onroad & Nonroad), Natural/biogenic
- Modeling
- Control Strategies
- Compliance & enforcement authorities
- Administrative Requirement
- Additional Requirements based on Classification (next slide)

CAA Title I, Part D, Subpart 2 - Ozone

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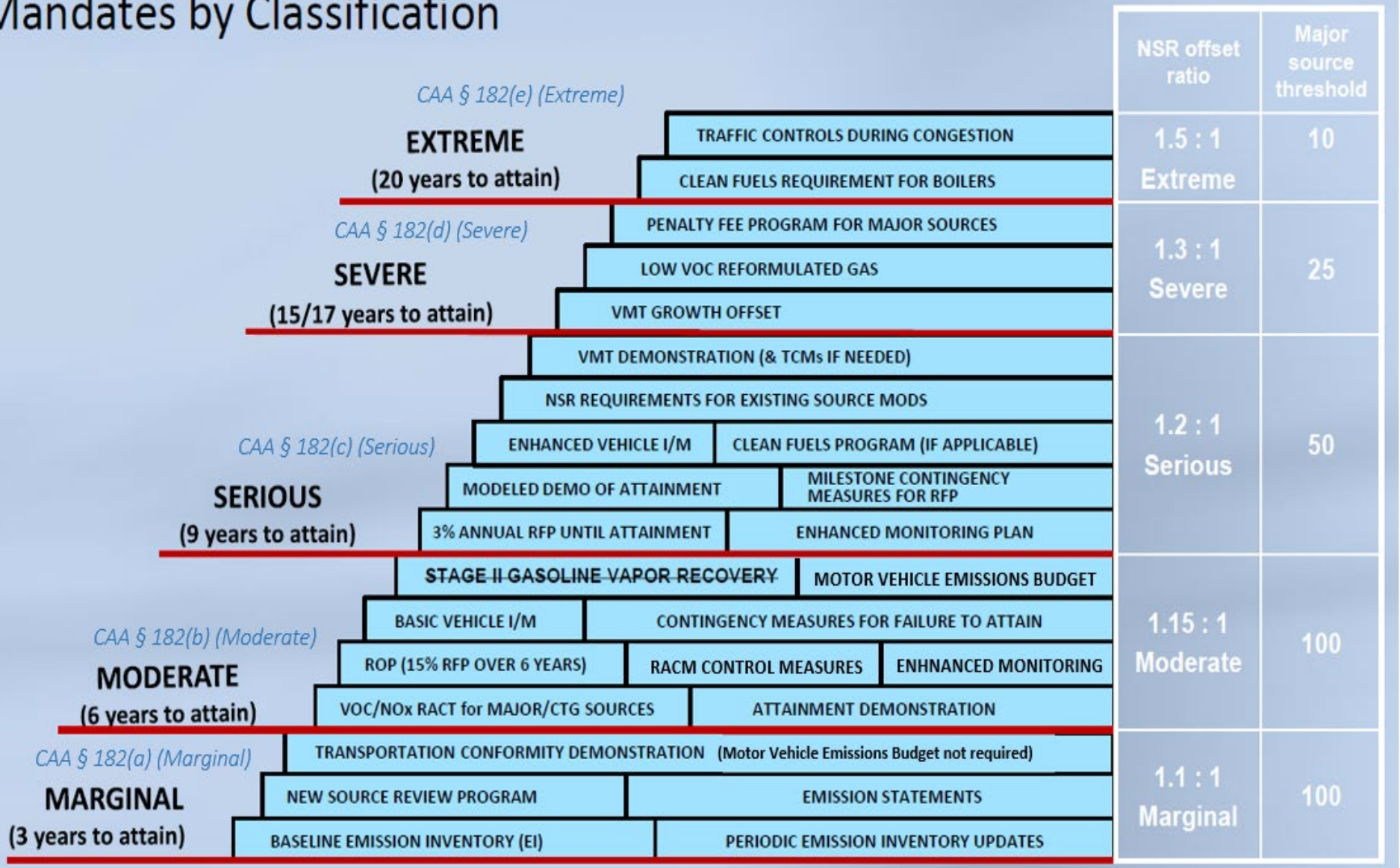
Overview of CAA Ozone Nonattainment Area Planning & Control Mandates by Classification



Types of Air Quality Models

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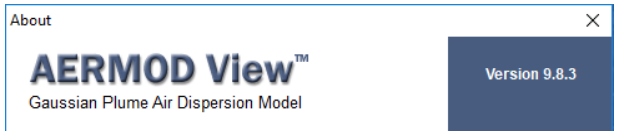
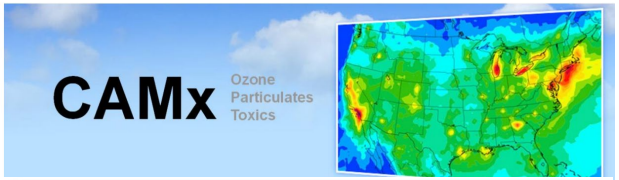
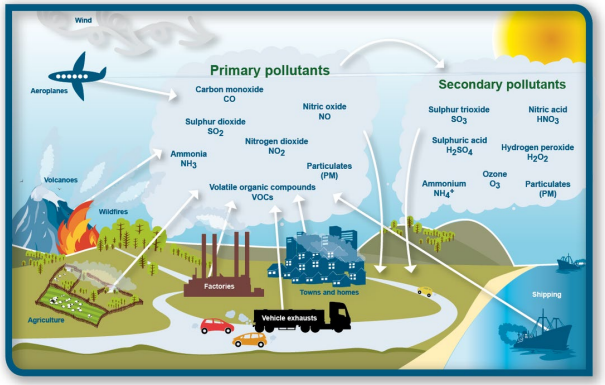
Dispersion Models



Source: https://lakepowellchronicle.com/article/three-sisters-totally-silent

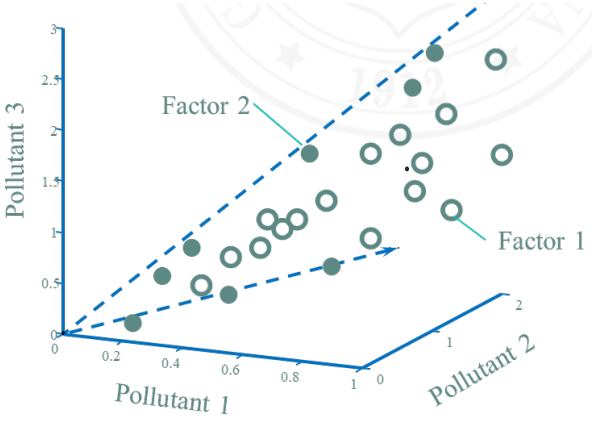
Photochemical Models





Source: https://www.mrgscience.com/ess-topic-63-photochemical-smog.html

Receptor Models



Visual mathematical simulation of how air pollutants disperse in the ambient atmosphere by using emission, meteorological and topography data.

AERMOD, CALPUFF

Large-scale (regional to continental) three-dimensional models that simulate the emissions transport, chemistry, and removal of chemical species in the atmosphere.

CAMx, CMAQ

Mathematical and statistical procedures for identifying and quantifying the sources of pollutants at an air monitor (receptor) location.

HYSPLIT, PSCF,PMF

Motor Vehicle Emissions Budget (MVEB)

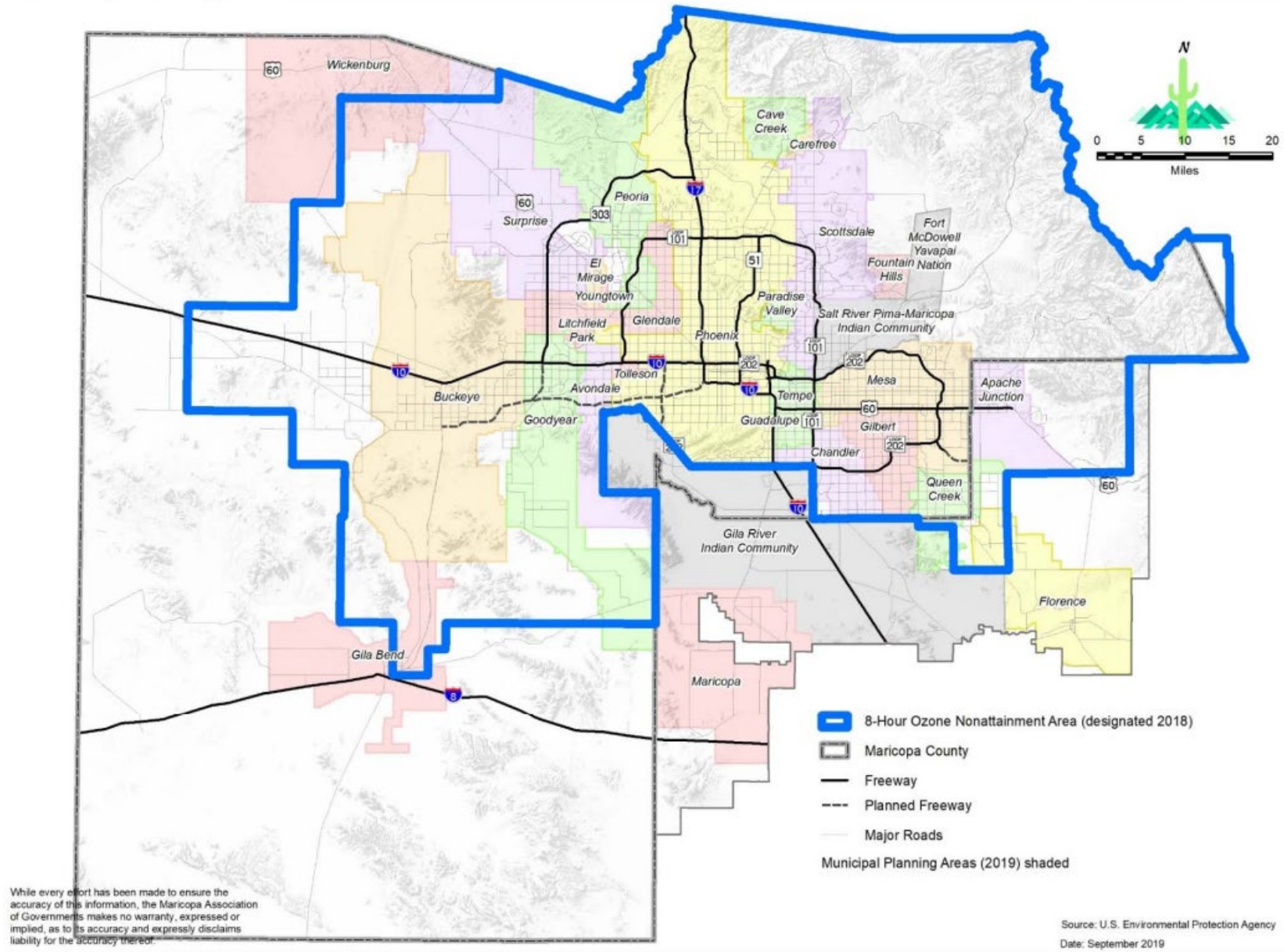
- Inputs to on-road emissions inventory include: number and type of vehicles, age of vehicles, rate of fleet turn over, seasonal temperatures, VMT, and transportation network
- MVEB functions regulatory limit for on-road mobile source emissions
- Must be found adequate or approved by EPA
- Conformity is demonstrated using the MVEB
  - Project emissions for transportation plans/transit improvement program must be at or below the MVEB

Transportation Conformity (PM, Ozone, CO)

- CAA Section § 176(c) requires federal projects conform to a state's SIP in nonattainment & maintenance areas.
  - Generally applies to Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) funded projects
- 40 CFR § 51.390 and 40 CFR Part 93, Subpart A

Phoenix-Mesa Nonattainment Area (NAA)

Figure 1: Eight-Hour Ozone Nonattainment Area and Municipal Planning Areas

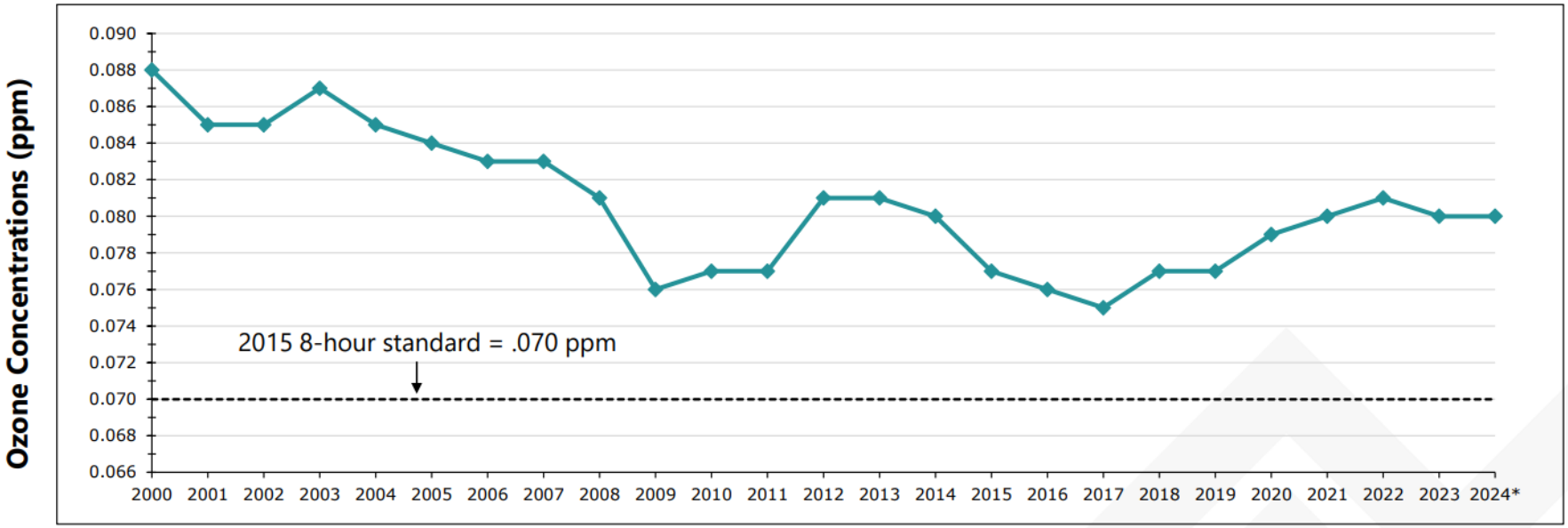


While every effort has been made to ensure the accuracy of this information, the Maricopa Association of Governments makes no warranty, expressed or implied, as to its accuracy and expressly disclaims liability for the accuracy thereof.

Source: U.S. Environmental Protection Agency
Date: September 2019

Ozone Trends in the Maricopa NAA

Highest 3-Year Average of the 4th Highest 8-Hour Ozone Concentration in the Maricopa Nonattainment Area



* Based on preliminary data through August 19, 2024.
Sources: Environmental Protection Agency Air Quality System; Ozone Design Values Reports; and AirNow.

Emissions inventory

Table 1.7–3. Annual and season-day emissions from all sources in the 2015 8-hour ozone NAA (including emission reduction credits).

	Annual emissions (tons/yr)			Season-day emissions (lbs/day)		
Source category	VOC	NOx	CO	VOC	NOx	CO
Point	1,345.1	2,682.6	1,529.7	8,626	24,277	12,896
Nonpoint (area)	37,412.7	5,203.4	18,049.8	209,885	32,880	144,659
Nonroad mobile	7,995.3	16,896.7	110,028.8	63,661	112,100	944,672
Onroad mobile	17,982.4	26,129.9	194,001.4	112,746	140,154	1,203,419
Biogenic	95,311.6	484.4	11,916.8	1,283,539	5,896	163,704
Total, all source categories:	**160,047.1**	**51,397.0**	**335,526.5**	**1,678,457**	**315,307**	**2,469,351**

Urban Area Planning in Arizona

- Jurisdictional considerations
  - Planning authority (A.R.S. § 49-406)
    - In Arizona, Metropolitan Planning Organizations are certified by the Arizona Governor to have primary planning responsibility for various nonattainment/maintenance SIP revisions
  - Permitting authority (A.R.S. § 49-402)
  - Rulemaking authority
    - State/County authority
- Memorandum of Agreement
  - Helps clarify the planning/permitting roles and responsibilities

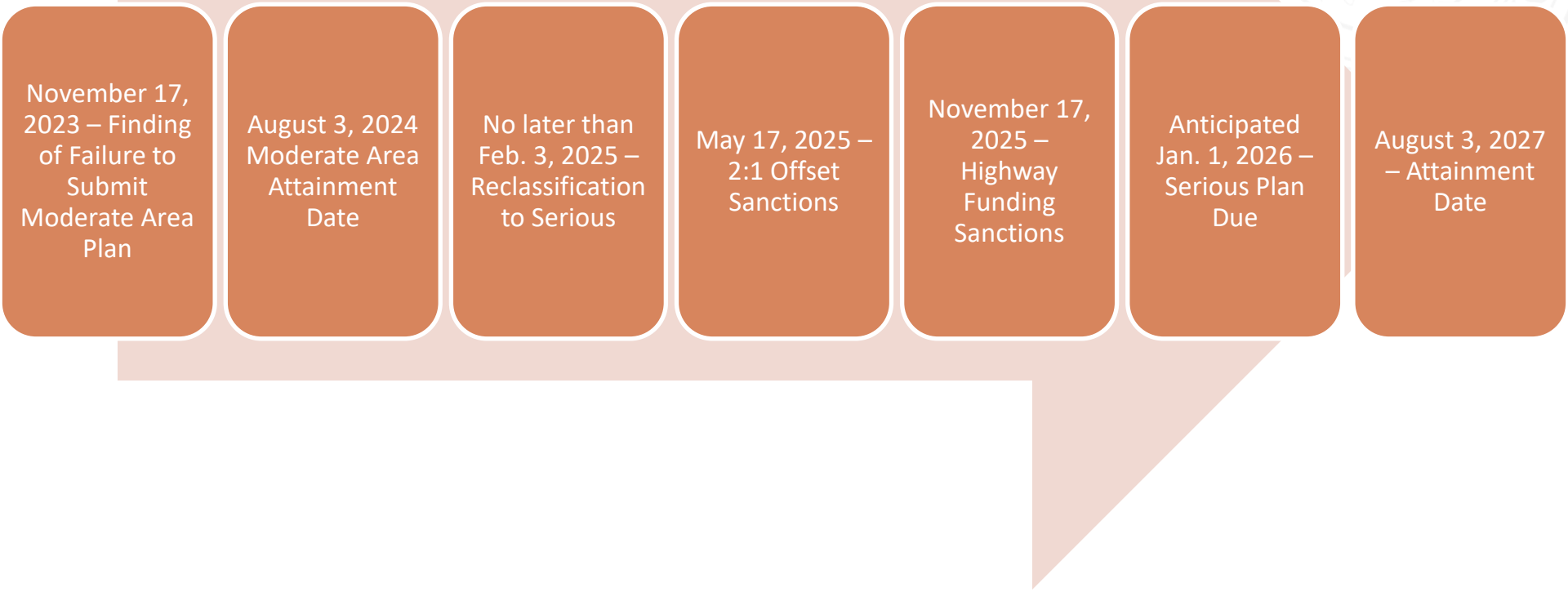
Urban Air Planning in Arizona

- October 7, 2022, EPA finalized reclassification of Maricopa nonattainment area for the 2015 ozone NAAQS from marginal to moderate with an August 3, 2024 attainment date
  - 2021-2023 data indicates the area will not attain the standard
  - Design value is currently at 80 parts per billion (PPB)
- Within 6 months (Feb 3. 2025) (CAA § 182(b)(2), EPA is require to reclassify the area to serious by finding of failure to attain. The new attainment date will be August 3, 2027 (using 2024-2026 data)
- EPA has discretion to set Serious Area plan due date but no later than Jan. 1, 2026 to allow for one full ozone season ahead of the attainment date for controls to be in place
    - For the moderate area it is really focused on VOC reductions from base year for 2017 to moderate year of 2023.
  - Clean Fuels Program (Carb Phase 2 and CBG program)
  - 3% reduction in emissions (VOC or NOx)
  - Enhanced Vehicle Inspection and Maintenance program
  - Contingency measures
  - Vehicle Miles Traveled Demonstration
    - Have to show in attainment modeling that VMT is accurate. If not accurate, additional TCMs would need to be applies

Urban Air Planning in Arizona (continued)

- Revision and completion of base year (2017) and attainment year (2026) emissions inventories
- Photochemical modeling
  - Investigate sensitivity to NOx/VOC reductions
  - Estimate emissions reductions needed for attainment
  - Estimate source contributions (local/interstate/international sources)
  - Evaluate the need for a CAA § 179B international emissions demonstration
- Continue to evaluate need for additional control measures
  - Composting/architectural coating
- Efforts to understand the ozone science in the MAG region
  - Ensure control measures will achieve the needed ozone reductions
- Need from EPA to investigate regional ozone challenges and science, including wildfires and international transport
- Next Steps for MAG
  - Finalize 2017, 2023, and 2026 ozone season emissions inventories
  - Develop modeling

Timeline


November 17, 2023 – Finding of Failure to Submit Moderate Area Plan
August 3, 2024 Moderate Area Attainment Date
No later than Feb. 3, 2025 – Reclassification to Serious
May 17, 2025 – 2:1 Offset Sanctions
November 17, 2025 – Highway Funding Sanctions
Anticipated Jan. 1, 2026 – Serious Plan Due
August 3, 2027 – Attainment Date

Next Steps

- Turn off sanction clocks by submitting a Moderate Area Plan to be submitted prior to the first sanctions clock runs (May 17, 2025)
- Develop approvable serious area plan for submittal to EPA by Jan. 1, 2026
- Continued engagement with EPA to address regional ozone challenges
  - Need for new science as reductions in local man-made precursor emissions have not resulted in equivalent reductions in ozone concentrations
  - Regulatory relief related to wildfires and international transport

Moderate Area Requirements to be Met

- RACT demonstration (ADEQ, MCAQD, and PCAQCD) will submit separate RACT SIP revisions.
- Basic I/M program
  - Has an existing enhanced vehicle I/m program.
    - Performance modeling to show it meets EPA's requirements
- NNSR
- RFP/Rate of Progress – 15% reduction in VOC reductions from base year (2017) to the milestone year (2023).
  - Manmade NOx (tons/day)

2017	2023	2026
147.2	89.5	78.5

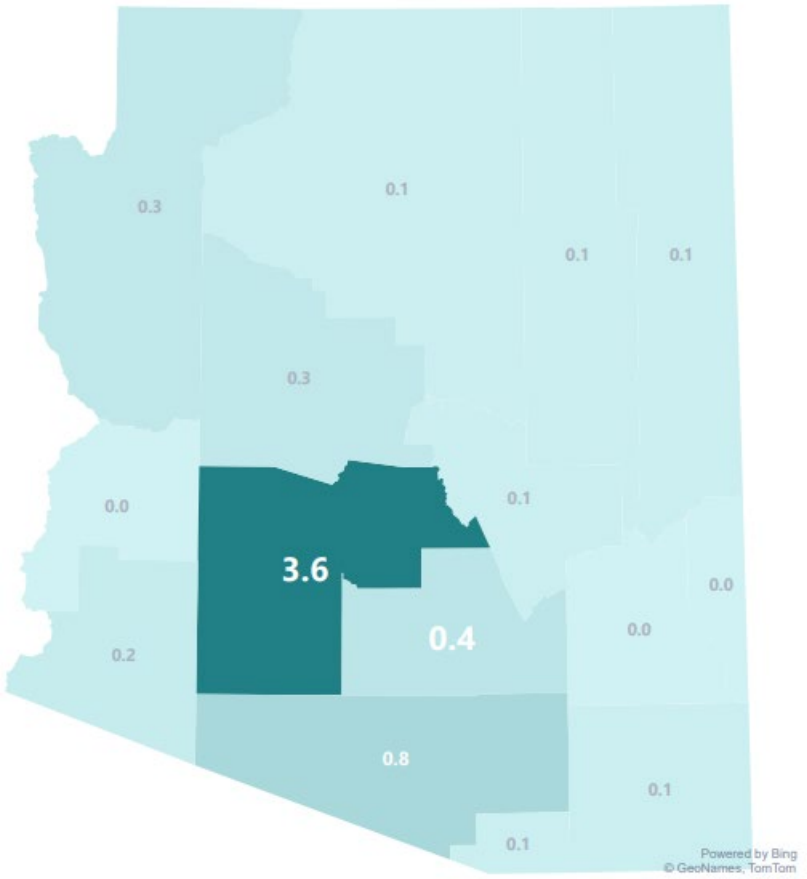
  - Manmade VOC (tons/day)

2017	2023	2026
167.8	159.7	156.0

- Contingency measures (*Bahr v. U.S. EPA*, 836 F.3 1218 (2016)).
  - Maricopa County Air Quality Department's rules as contingency measures (VOC limits on architectural coatings and commercial composting)

VIN numbers to improve MOVES inputs

- Classification of vehicle registration is an input for the MOVES model. MAG contracted with ERG to decode and classify VIN information into MOVES input.
  - Developed scripts in Python to decrypt NHTSA VIN decoder, and classifies decoded VIN data to MOVES input
- ADOT data did not contain enough raw data to create MOVES input.
- Source type classification (NHTSA Body class, GVWR, Owner type)
- Fuel type classification

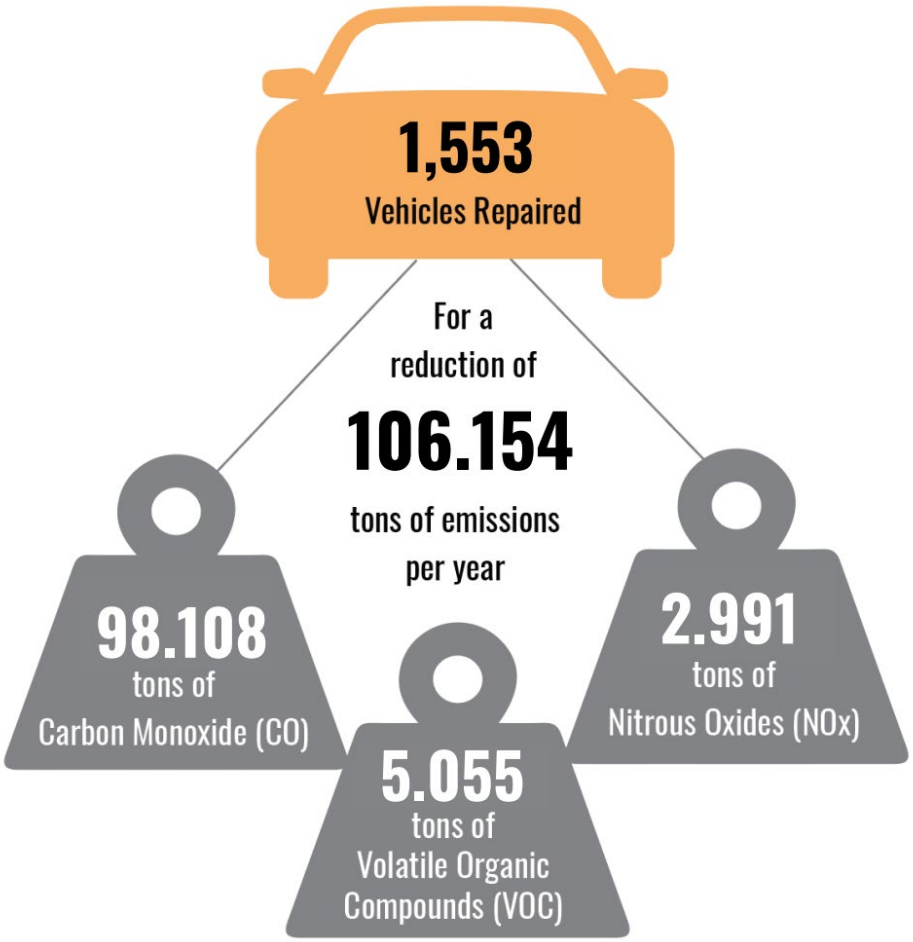


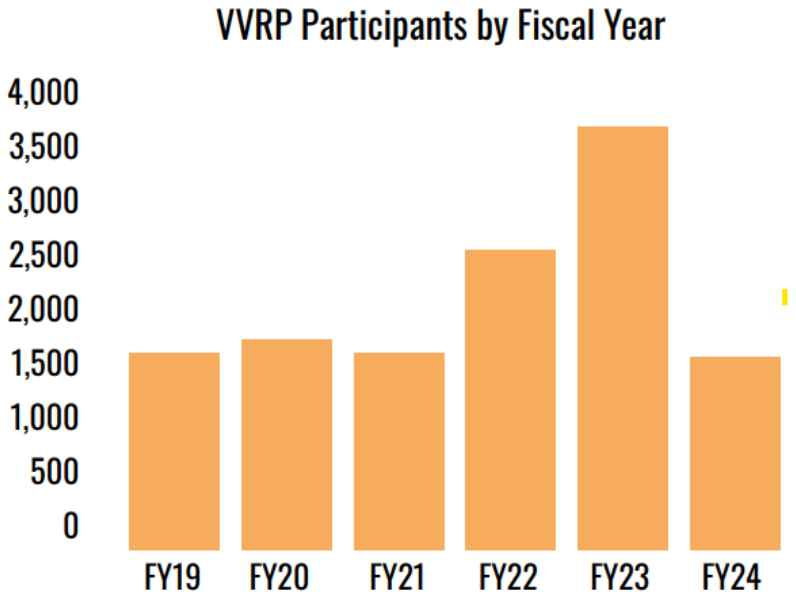
ADEQ Voluntary Programs

Program	Pollutant Impact	Description
Lawn and Garden Program	Decrease Ozone & PM10	Vouchers for commercial and residential users to purchase lower emitting lawn and garden equipment.
Idle Reduction Program	Decrease Ozone & PM2.5	A statewide program for school districts to build and sustain an idle reduction program (first phase).
Electric Vehicle Project	Decrease Ozone	Partnered with car manufacturers to provide rebates for the purchase of new electric vehicles.
Dust Stabilization Project	Decrease PM10	Stabilized more than 150 acre along 1-10 in Pinal County to reduce hazards of windblown.
ADEQ Telework Project	Decrease Ozone	Reducing the number of work commutes by ADEQ employees and reduce the number of ozone exceedance days over time.
DERA	Decrease Ozone and PM2.5	Provide funding for vehicles to replace, repower, or retrofit older higher emitting diesel engines with newer diesels or newer vehicles that use alternative fuels.
Flag Program	None	Educational materials and colored flags that notify local communities about local air quality conditions.
Air Arizona Mobile App	None	A new air quality mobile app with hourly forecasts (Phoenix, Tucson, Yuma, Nogales, Globe/Miami, Hayden/Winkelman.
Targeted Public Outreach	Decrease Ozone & PM10	Increase public information on air quality through programs and projects and make it easier for public to make better choices that improve air quality.

Voluntary Vehicle Repair Program – FY24

FISCAL YEAR 2024 RESULTS





- For context, the pollution reductions from the program are equivalent to removing approximately 1,508 vehicles from the road.

Voluntary Vehicle Repair Program

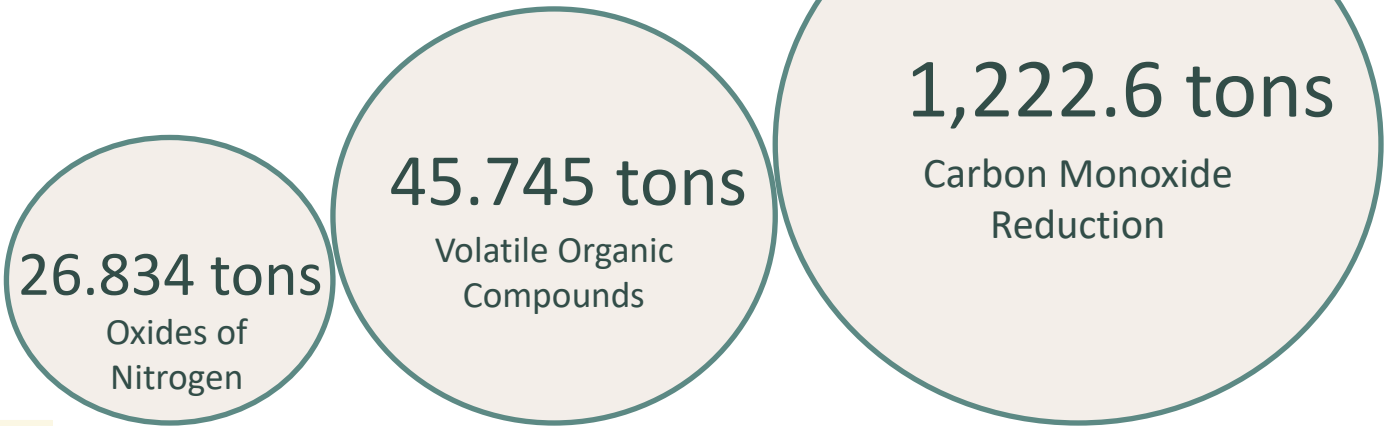
Goal: Reduce air pollution emitted by older vehicles that have failed their vehicle emissions inspection.

Program Highlights

- Provides financial assistance to motorists for emissions reduction related repairs
- Mandated by A.R.S. § 49-474.03(G)
- Partnership between ADEQ, Maricopa County, and Pima County

Results: From FY2019 to FY2024, the program has repaired 12,874 high emitting passenger vehicles

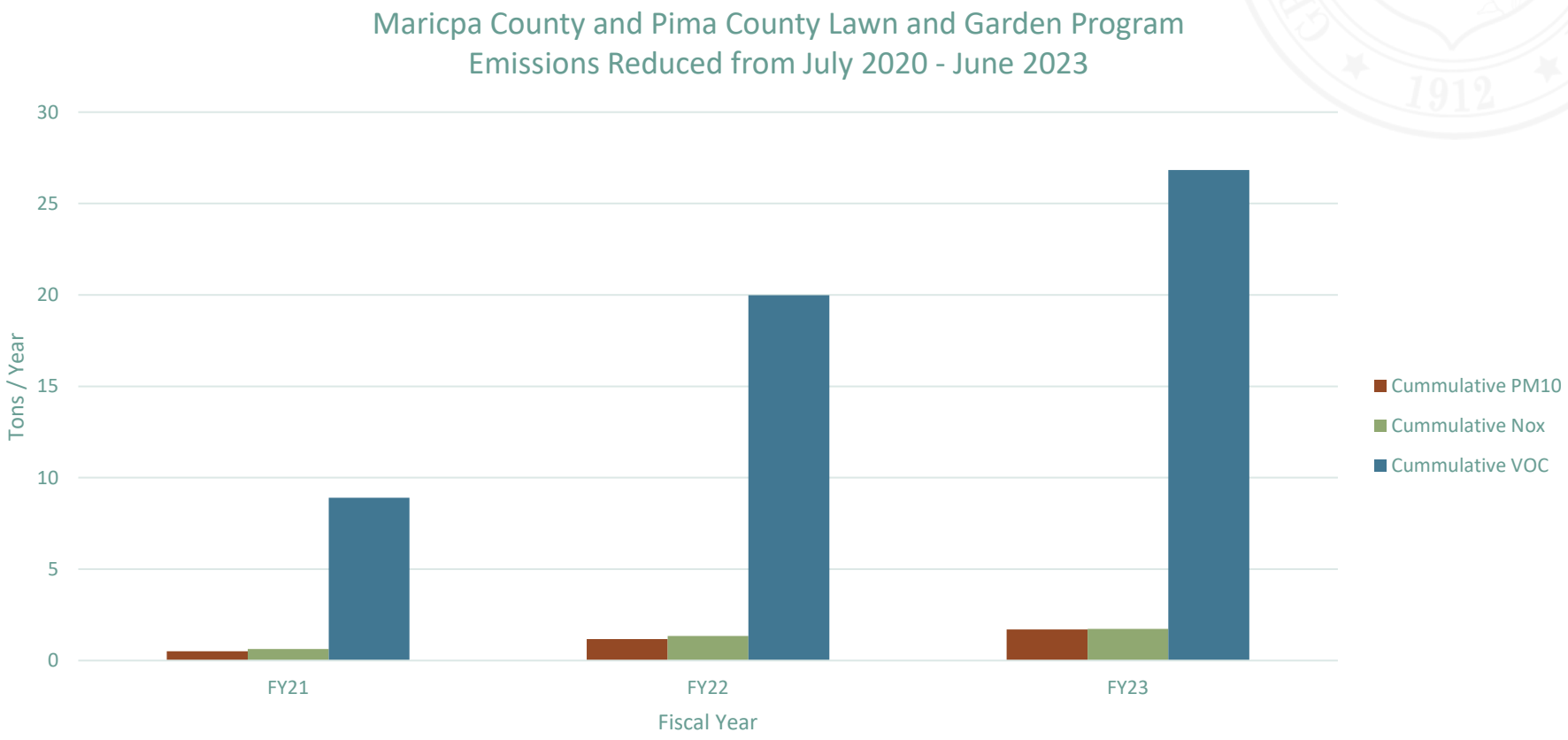
Total Program Emissions Reductions from FY19 to FY24



Source: VOLUNTARY VEHICLE REPAIR PROGRAM | Fiscal Year 2019 Annual Report

Lawn & Garden Program (A.R.S. § 49-457.01)

This program provides residents of Maricopa and Pima Counties the opportunity to trade in their gasoline-powered lawn and garden requirement for a voucher of up to $150 toward the purchase of an electric alternative.



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