

Update on the MAG 2017 Eight-Hour Ozone Moderate Area Plan for the Maricopa Nonattainment Area

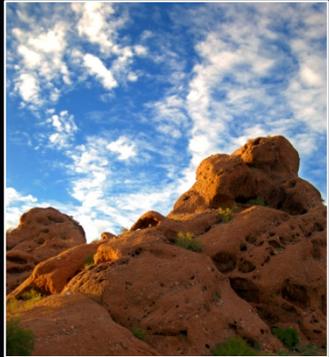


MAG Air Quality Technical Advisory Committee
August 25, 2016

ENVIRONMENTAL PROGRAMS

Moderate Area Requirements

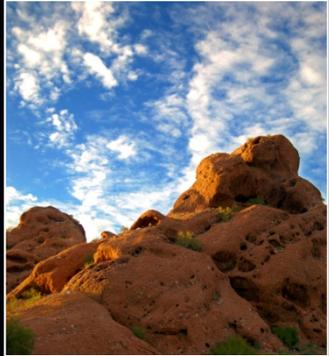
- Moderate Area Plan due January 1, 2017
- Plan is required to demonstrate at least a 15 percent Reasonable Further Progress (RFP) reduction in anthropogenic volatile organic compound emissions over a six year period (2012-2017) in the nonattainment area
- Attainment date is July 20, 2018
- Since the attainment date is in the middle of the summer ozone season, the plan is required to demonstrate attainment in the prior 2017 ozone season
- Region will need three years of clean data at the monitors in 2017 to meet the standard (2015-2017 monitoring data)



Moderate Area Requirements (continued)

ENVIRONMENTAL PROGRAMS

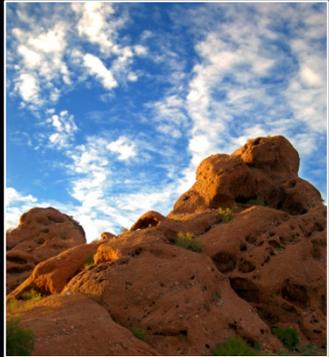
- Reasonably available control technology (RACT)
- Reasonably available control measures (RACM)
- New source review
- Emissions inventories
- Contingency measures
- Motor Vehicle Emissions Budgets
- Motor vehicle inspection and maintenance program
- Emissions offset requirement for major industries (1.15 to 1)



Reasonably Available Control Technology (RACT)

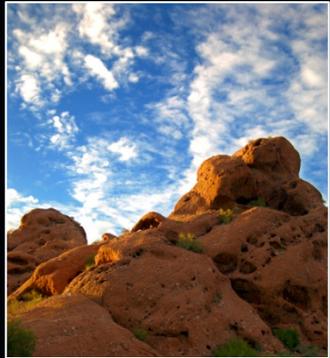
ENVIRONMENTAL PROGRAMS

- Clean Air Act Section 182(b)(2) requires Moderate Areas to implement reasonably available control technology (RACT)
- RACT for Moderate Areas applies to stationary sources of VOC and NOx
 - All major sources of VOC or NOx (100 tons per year)
 - Stationary sources of VOC and NOx for which EPA has issued Control Techniques Guidelines (CTG) or Alternative Control Techniques (ACT)
- Maricopa County Air Quality Department and Pinal County Air Quality Control District are in the process of reviewing and revising their stationary source VOC and NOx rules to meet RACT requirements
- RACT submittals are due to EPA by January 1, 2017 and will be submitted separately to EPA by Maricopa and Pinal County when complete



Reasonably Available Control Measures (RACM) Analysis

ENVIRONMENTAL PROGRAMS



- CAA Section 172(c)(1) and 40 CFR Section 51.1112(c) require the Moderate Area Plan to include provisions that demonstrate all Reasonably Available Control Measures (RACM), including RACT, have been adopted to meet Reasonable Further Progress (RFP) requirements and to demonstrate attainment as expeditiously as practicable
- A state must also demonstrate that there are no additional measures that are reasonably available that will advance the attainment date by at least one year or contribute to RFP
- EPA guidance requires that states should consider “all available measures, including those being implemented in other areas, and that a state must adopt measures for an area only if those measures are economically and technologically feasible and will advance the attainment date or are necessary for RFP”

Reasonably Available Control Measures (RACM) Analysis Results

ENVIRONMENTAL PROGRAMS



- Over time, the Maricopa nonattainment area has adopted and implemented 93 existing federal, state and local ozone control measures which have been approved by EPA in prior regional air quality plans or in separate EPA action
- For the RACM analysis, MAG worked closely with the Maricopa County Air Quality Department to evaluate the 93 existing measures by comparing the existing measures to measures listed in EPA's Menu of Control Measures and to NO_x and VOC rules in place in the Sacramento Metropolitan nonattainment area
- Sacramento Metropolitan nonattainment area rules were chosen for comparison primarily because EPA had recently approved Sacramento's 2013 RACM analysis as part of a SIP revision to meet the 1997 ozone standard

Reasonably Available Control Measures (RACM) Analysis

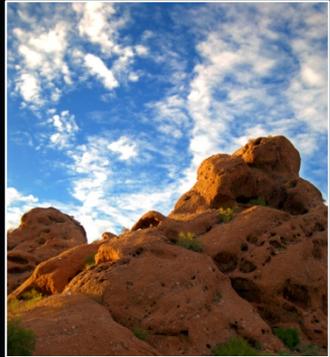
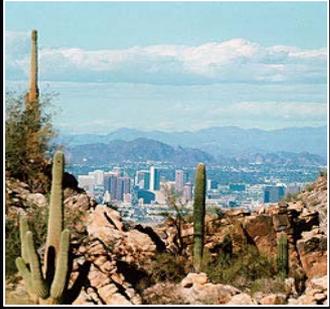
ENVIRONMENTAL PROGRAMS



- Since attainment modeling indicates that the 93 existing measures are sufficient to demonstrate attainment as expeditiously as practicable and meet RFP requirements, the RACM analysis finds that no additional or strengthened measures are necessary for inclusion and adoption in the MAG 2017 Moderate Area Plan
- Additionally, no additional or strengthened RACM are available to meet a one-year advancement of the attainment date (July 20, 2017), as any new or strengthened measure would have needed to be implemented by April 1, 2016, the beginning of the last full ozone season prior to July 20, 2017
- It is infeasible to have any new measure implemented by April 1, 2016, as this date precedes submittal and adoption of the Moderate Area Plan (due January 1, 2017) and also precedes the June 3, 2016 effective date of the final EPA rule reclassifying the Maricopa area to a Moderate nonattainment area

Modeling Attainment Demonstration General Approach

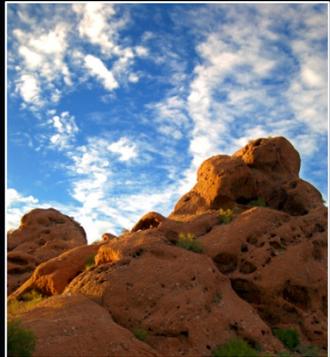
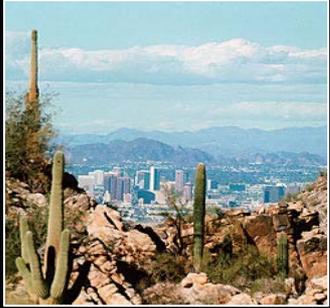
ENVIRONMENTAL PROGRAMS



- Since the attainment date is in the middle of the 2018 summer ozone season, the plan is required to demonstrate and model attainment in the prior 2017 ozone season
- The Moderate Area Plan relies on the continuing emission reduction benefits of the 93 existing ozone control measures to demonstrate attainment in 2017 in the Maricopa eight-hour ozone nonattainment area
- Photochemical ozone modeling was performed for the entire ozone season episode period of May 1 - September 30, 2011 (153 days)
- Attainment modeling was performed with baseline year emissions (2011) and attainment year emissions (2017)

Modeling Attainment Demonstration

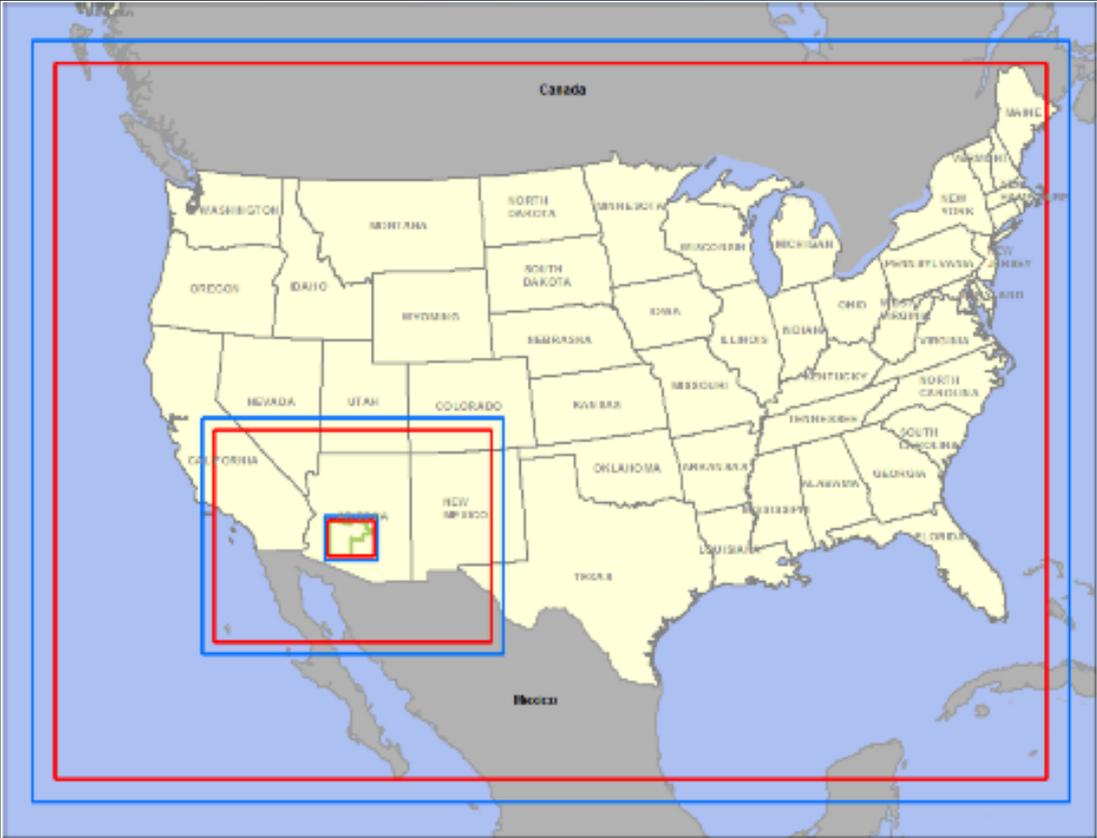
ENVIRONMENTAL
PROGRAMS



- The modeling protocol was finalized in December 2015 after review by EPA and the Air Quality Planning Team (ADEQ, ADOT, MAG and MCAQD)
- Models used in the attainment demonstration include:
 - Comprehensive Air Quality Model with Extensions (CAMx)
 - Weather Research and Forecasting (WRF)
 - Motor Vehicle Emission Simulator (MOVES2014a)
 - Emissions and Dispersion Modeling System (EDMS)
 - Model of Emissions of Gases and Aerosols from Nature (MEGAN)
 - Sparse Matrix Operator Kernel Emissions (SMOKE)
 - Model for Ozone and Related Chemical Tracers (MOZART)

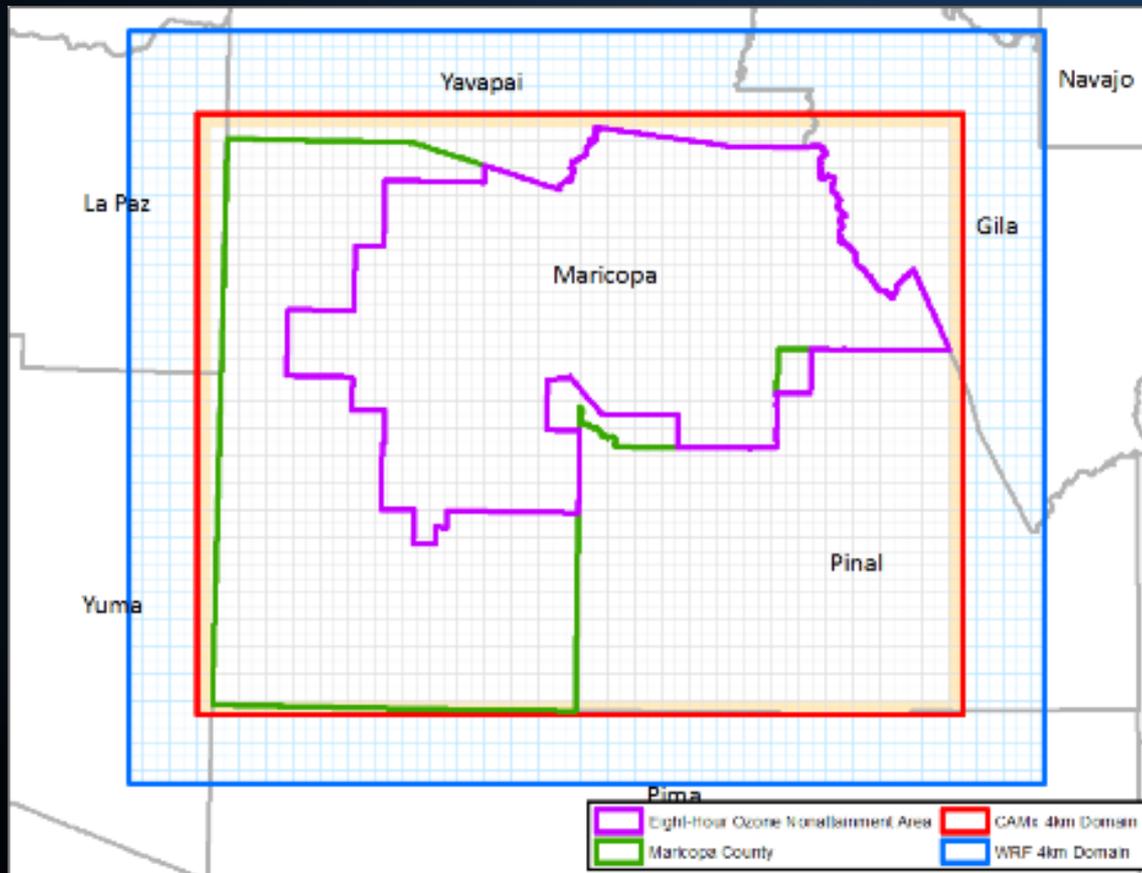
Modeling Domains

ENVIRONMENTAL
PROGRAMS



Inner Modeling Domain

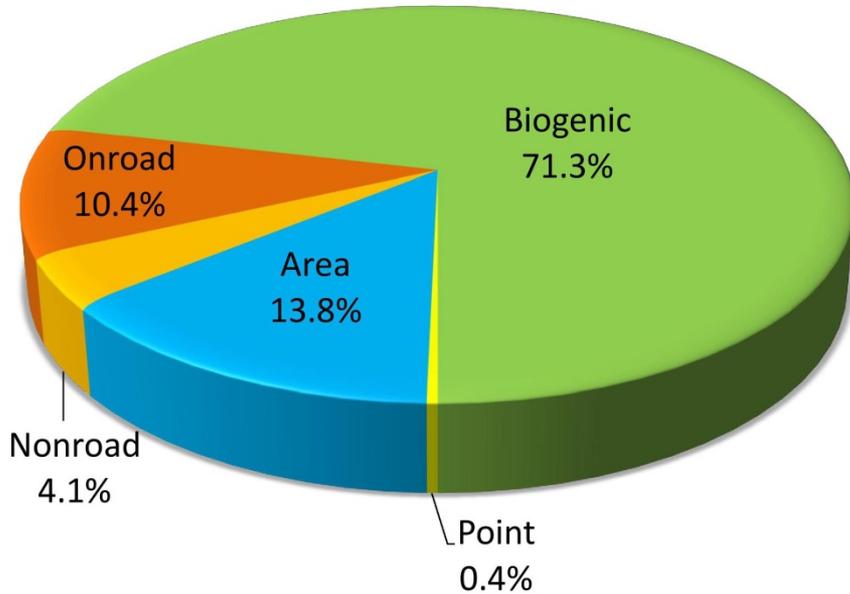
ENVIRONMENTAL
PROGRAMS



Ozone Season Average Daily 2011 and 2017 VOC Emissions in the Maricopa Nonattainment Area

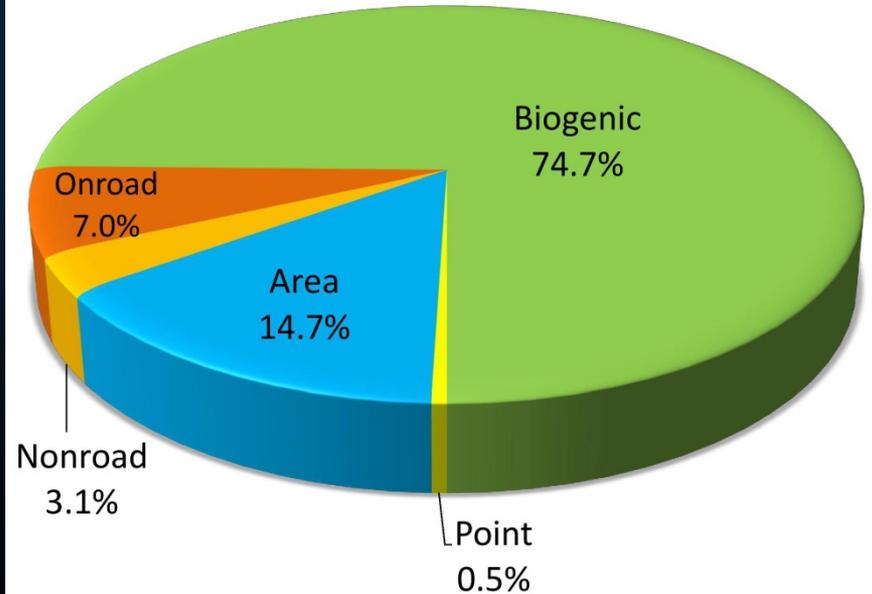
2011 Ozone Season Daily VOC Emissions

Eight-Hour Ozone Nonattainment Area Total : 683.30 metric tons/day



2017 Ozone Season Daily VOC Emissions

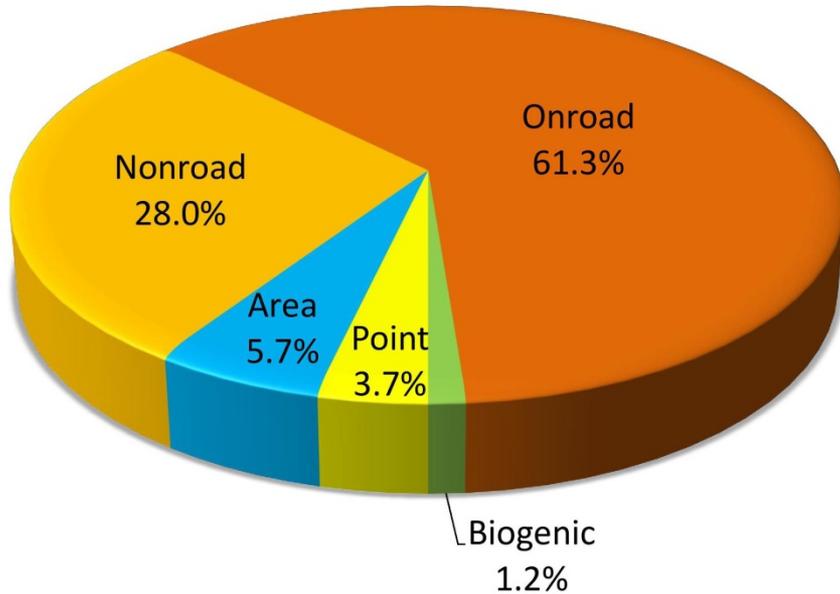
Eight-Hour Ozone Nonattainment Area Total : 652.80 metric tons/day



Ozone Season Average Daily 2011 and 2017 NOx Emissions in the Maricopa Nonattainment Area

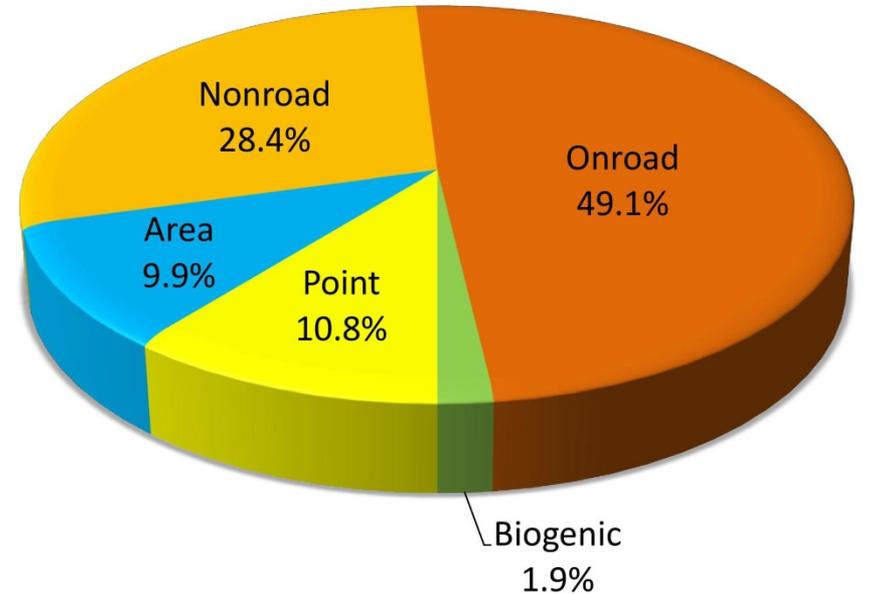
2011 Ozone Season Daily NOx Emissions

Eight-Hour Ozone Nonattainment Area Total : 191.08 metric tons/day



2017 Ozone Season Daily NOx Emissions

Eight-Hour Ozone Nonattainment Area Total : 127.66 metric tons/day



Existing Measures Used for Numeric Credit in the Attainment Demonstration

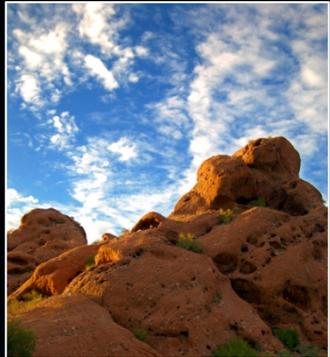
ENVIRONMENTAL PROGRAMS



- **Summer Fuel Reformulation: California Phase 2 and Federal Phase II Reformulated Gasoline with 7 psi from May 1 through September 30**
- **Phased-In Emission Test Cutpoints**
- **One-Time Waiver from Vehicle Emissions Test**
- **Tougher Enforcement of Vehicle Registration and Emissions Test Compliance**
- **Expansion of Area A Boundaries**
- **Gross Polluter Option for I/M Program Waivers**
- **Coordinated Traffic Signal Systems**
- **Develop Intelligent Transportation Systems**
- **Federal Tier 2 and Tier 3 Motor Vehicle Emissions and Fuel Standards**
- **Federal Phase 1 and 2 Light-Duty and Phase 1 Heavy-Duty Greenhouse Gas Rules**
- **Federal Nonroad Equipment Standards**
- **Federal Portable Fuel Container Rules**

Existing Measures Used for Numeric Credit in the Attainment Demonstration

ENVIRONMENTAL PROGRAMS



- The emissions reduction benefits of the measures that impact onroad and nonroad mobile sources have been aggregated as reflected in emission results from the EPA MOVES2014a model
- The aggregate 2017 emission reduction benefits of the measures for onroad mobile sources is 25.3 metric tons/day of VOC and 54.5 metric tons/day of NO_x
- The aggregate 2017 emission reduction benefits of the measures for nonroad mobile sources is 7.6 metric tons/day of VOC and 17.3 metric tons/day of NO_x
- The 2017 emission reduction benefits of the portable fuel container rules is 6.2 metric tons/day of VOC

Modeling Attainment Demonstration Results

ENVIRONMENTAL
PROGRAMS



- The future peak design value (2017) must be less than 75.9 ppb (0.0759 ppm) to demonstrate attainment
- The future design value is calculated by multiplying the baseline design value (2011) by Relative Response Factor (RRF)
- The baseline design value is calculated base on a five-year weighted average of three design values for 2009-2011, 2010-2012, and 2011-2013
- Relative Response Factor (RRF) is the ratio of the future year (2017) ozone prediction to the baseline year (2011) ozone prediction at each monitoring site

Modeling Attainment Demonstration Results

ENVIRONMENTAL PROGRAMS



- **Attainment of the 2008 ozone standard is demonstrated through CAMx photochemical modeling in 2017 at all monitoring sites within the nonattainment area**
 - CAMx modeling at the ozone monitoring sites predicts a 2017 peak design value of 75.6 ppb (0.0756 ppm) at the North Phoenix monitoring site
- **Attainment of the 2008 ozone standard is also demonstrated through CAMx photochemical modeling in unmonitored areas throughout the nonattainment area and the 4km modeling domain**
 - CAMx modeling in the unmonitored areas predicts a maximum 2017 design value of 75.5 ppb (0.0755 ppm), located in a grid cell northwest of the Supersite monitor

Weight of Evidence and Supplemental Analyses

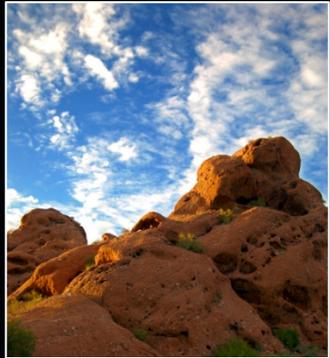
ENVIRONMENTAL
PROGRAMS



- EPA modeling guidance requires supplemental analyses, such as a weight of evidence (WOE) analysis, that demonstrates attainment can be reached in the future (2017) with some margin of safety, especially when the projected future design values are close to the ozone standard
- MAG performed several supplemental analyses and contracted with RAMBOLL ENVIRON to provide a weight of evidence analysis that supports the photochemical modeling results predicting attainment of the 2008 ozone standard in 2017
- Supplemental analyses include items such as ambient ozone and precursor emissions trends, absolute model forecasts, VOC- and NOx-limited area analyses, zero-out emissions analysis, decoupled direct method analysis, source apportionment, and background ozone analyses

Summary of Weight of Evidence and Supplemental Analyses

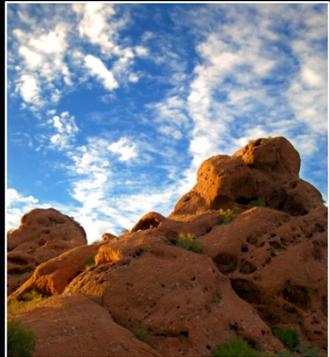
ENVIRONMENTAL PROGRAMS



- EPA rulemaking modeling for the Cross-State Air Pollution Rule (CSAPR) suggest that the Maricopa nonattainment area would be in attainment in 2017
- NO_x emissions controls are the best mechanism for decreasing ozone levels by 2017 and beyond. NO_x emissions and ambient trends have continued to decline
- If anthropogenic VOC emissions are increased up to 15% beyond what was modeled, or anthropogenic NO_x emissions are increased up to 5% beyond what was modeled, the model still predicts attainment in 2017
- Back trajectories and source apportionment analyses suggest significant contributions to elevated ozone in the nonattainment area from background ozone
- Ambient NO_x and VOC concentrations show an aggressive and persistent downward trend since 2000
- Using preliminary 2016 monitoring data through August 22, 2016, only one of the 20 nonattainment area monitors (Pinnacle Peak) has a preliminary 2014-2016 ozone design value (0.076 ppm) that is over the 2008 ozone standard

Reasonable Further Progress – 15% Rate of Progress Plan

ENVIRONMENTAL PROGRAMS

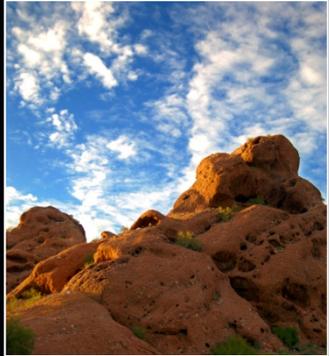


- Clean Air Act Section 182(b)(1) requires the Moderate Area Plan to include a Rate of Progress (ROP) Plan that demonstrates a 15% reduction in anthropogenic VOC emissions over a 6-year period (2012-2017) across the entire nonattainment area
- 2011 baseline anthropogenic VOC emissions = 195.78 metric tons/day
- 2017 target to meet the 15% ROP = 166.41 metric tons/day (195.78 x 100%-15%)
- 2017 actual anthropogenic VOC emissions = 165.28 metric tons/day
- The 15% ROP Plan is met within the nonattainment area, as 2017 anthropogenic VOC emissions are 15.6% less than 2011 baseline emissions

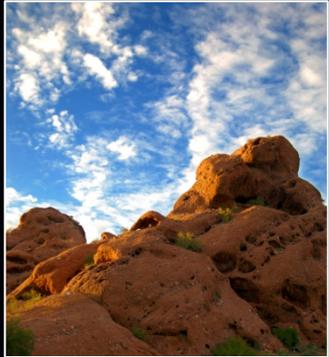
ENVIRONMENTAL PROGRAMS

Motor Vehicle Emissions Budgets

- Onroad mobile emissions from the modeling attainment demonstration establish the transportation conformity motor vehicle emissions budgets for the attainment year of 2017
- For VOC emissions the 2017 budget is 45.7 metric tons/day
- For NOx emissions the 2017 budget is 62.7 metric tons/day



ENVIRONMENTAL PROGRAMS



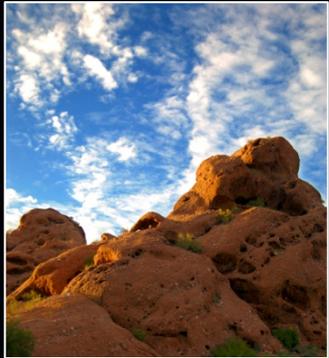
Contingency Measures

- Section 172(c)(9) of the Clean Air Act requires the Moderate Area Plan to include contingency measures that can be implemented without further rulemaking action should the area fail to attain the standard by the attainment date
- EPA requires that contingency measures represent one-year's worth of progress, amounting to reductions of 3 percent of the 2011 baseline NOx or VOC emissions
- The existing measures quantified in the attainment demonstration provide continued emission reduction benefits beyond the attainment date into the contingency year of 2018 that can be used to meet the contingency measure requirements
- The combined NOx and VOC emission reduction benefits of the quantified existing measures amount to a 3.86% reduction from baseline 2011 emissions in 2018, meeting the 3 percent target

Moderate Area Plan Schedule

ENVIRONMENTAL PROGRAMS

- **September 2016 – Draft plan available for public review**
- **October 2016 – Public hearing**
- **October 27, 2016 - MAG Air Quality Technical Advisory Committee recommendation**
- **November 9, 2016 - MAG Management Committee recommendation**
- **December 7, 2016 - MAG Regional Council adoption**
- **Submit adopted plan to ADEQ and EPA by January 1, 2017**





**MARICOPA
ASSOCIATION of
GOVERNMENTS**



**For more information
Contact:
Matt Poppen
(602) 254-6300**

mpoppen@azmag.gov