Pinal County PM_{10} Nonattainment Area SIP Overview

Pinal County Stakeholder Meeting

31 N Pinal St, Florence, AZ

9/1/2015

Introduction

The Pinal County PM_{10} Nonattainment Area was redesignated as nonattainment for the 1987 24-hour PM_{10} National Ambient Air Quality Standard (NAAQS) by the U.S. Environmental Protection Agency (EPA) on July 2, 2012. Since this time, the Arizona Department of Environmental Quality (ADEQ) has been gathering and processing information to create an emission inventory for the designated nonattainment area. The resulting nonattainment area emission inventory informed control measure determination for emitting sources including, but not limited to, agriculture, construction, roads, unpaved lots, and vacant lots.

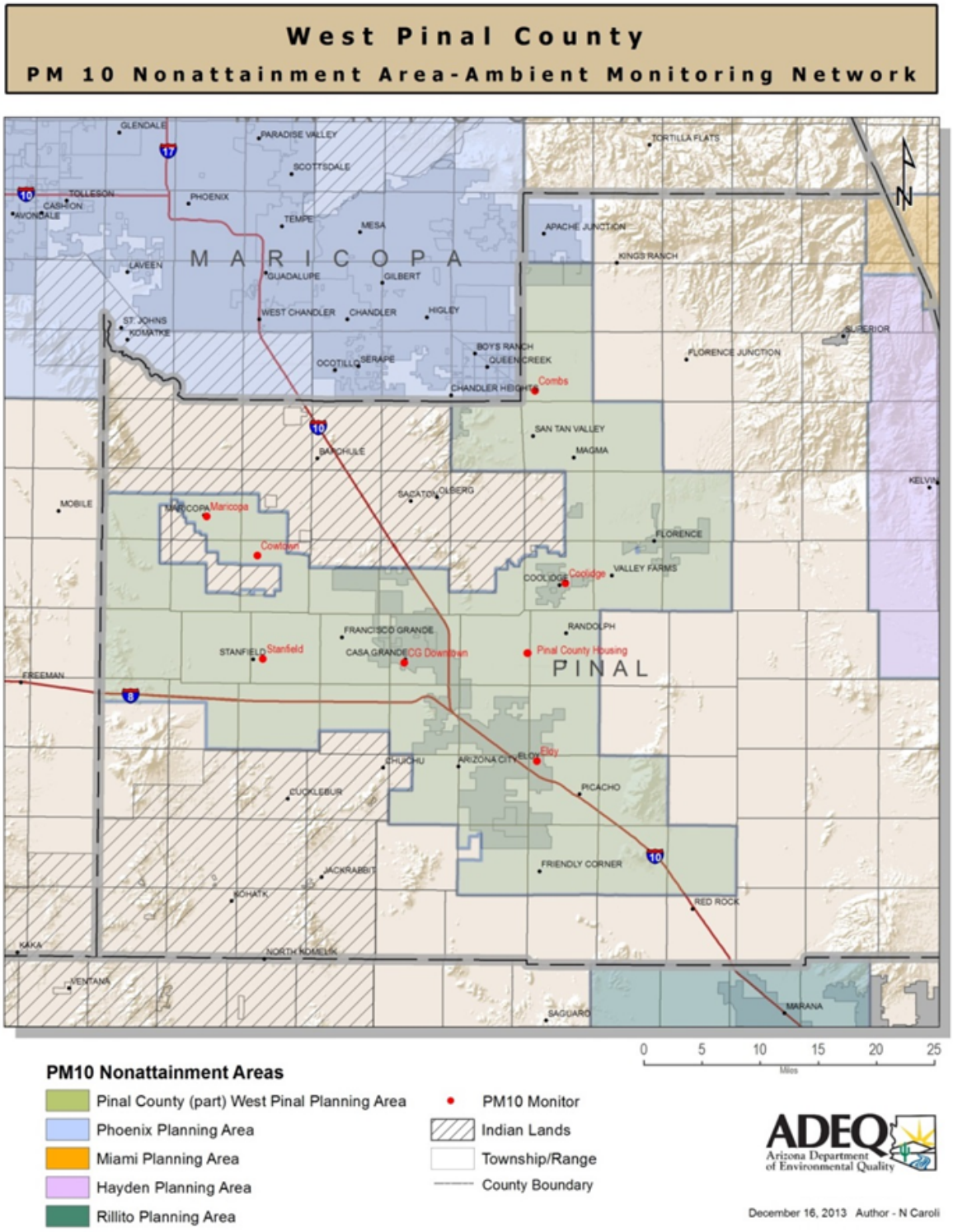
The information included in this document provides insight into the technical results of the emission inventory and control measure effectiveness determination. ADEQ is required to model attainment of the NAAQS by 2018 relying on controls codified into rule. To meet this requirement, ADEQ relied upon those controls included in the Arizona Administrative Code R18-2-610.03 (Commercial crop farm controls), Arizona Administrative Code R18-2-611.03(E) (Commercial beef feedlot controls), and Arizona Administrative Code R18-2-612.01 (Irrigation district controls). These controls were modeled to produce the emission reductions required to meet attainment for seven different design day scenarios (three stagnation and four high-wind scenarios). These controls resulted in total nonattainment area, annual PM_{10} emission reductions of 22,424.4 tons/year.

EPA further requires contingency controls be available to meet annual emission reductions equivalent to one year of reasonable further progress (RFP) for the nonattainment area. As the nonattainment area will need to meet attainment in 2018 (i.e., over the next three years, 2016-2018), these contingency controls must exceed 7,474.8 tons (7,474.8 tons = 22,424.4 tons / 3 years). To meet the contingency requirement, ADEQ is relying on Arizona Administrative Code R18-2-611.03 (Commercial dairy controls) as well as the proposed rule changes included in PCAQCD Code of Regulations §4-3-160, -170, -180, and -190 (Construction controls) and PCAQCD Code of Regulations §4-1-010, -015, -020, -030, -040, -045, -050, and -060 (General fugitive dust controls).

Finally, ADEQ is required to calculate a mobile vehicle emissions budget (MVEB) for the nonattainment area. This MVEB is derived from the nonattainment area, annual attainment emission inventory and was calculated by ADEQ as 28,542.5 tons/year. Analysis performed by ADEQ indicates that this MVEB will be adequate to meet the transportation conformity needs of the County for decades to come, assuming compliance with the proposed rule change included in PCAQCD Code of Regulations §4-1-030.4. (General fugitive dust rule, unpaved road controls).

Nonattainment Area

The following figure shows the location of air quality monitors and municipality boundaries within and surrounding the Pinal County PM_{10} nonattainment area.



Emission Inventory Sectors

Two primary scenarios produce PM_{10} emission in the Pinal County nonattainment area: 1) windblown dust emissions during high winds and 2) mechanical entrainment of dust into the atmosphere from human activities. The magnitude of windblown dust emissions depend on land stability and wind speed. The magnitude of activity related emissions are dependent on the degree to which the activity entrains PM_{10} and the duration of the activity. Table 1 and Table 2 present the source categories investigated for these two primary emission production scenarios.

Table 1 Land Use Categories for Windblown Emissions

Developed Urban Lands
Developed Rural Lands (low density residential)
Paved Roads
Unpaved Roads
Cleared Areas
Residential Construction
Dairies
CAFOs
Desert Shrubland
Agriculture
Commercial Construction
Other
Site Development

Table 2 Activity-Based Emission Source Categories

Ag Fields (Harvesting & Tilling)
CAFOs
Dairies
Paved Road
Unpaved Road (Public, Private, Agricultural, and Trails)
Nonroad
Railroad
Construction (Residential, Commercial, Road, and Site Development)
Permitted Sources
Fuel Combustion (Residential)
Fires (Agricultural, Wildfires, and Prescribed Fires)
Open Burning (Residential, Commercial, and Land Clearing)
Unpaved Parking

Pinal County PM_{10} Nonattainment Area Controls

Table 3 and Table 4 present the rules, either codified or proposed, to be implemented in Pinal County to reach attainment and meet contingency requirements and their associated annual emissions.

Table 3 Summary of Attainment Measure Reductions

Rule	Controlled Dust Sources	Implementation date	Reductions in 2018 (TPY)
Arizona Administrative Code, R18-2-610.03	Commercial crop farms (including tillage, ground operation and harvest, commercial farm roads, and noncropland)	January 1, 2016	21,420.6
Arizona Administrative Code, R18-2-611.03(E)	Commercial beef cattle feedlot	January 1, 2016	281.3
Arizona Administrative Code, R18-2-612.01	Irrigation Districts	January 1, 2016	722.3
Total			22,424.2

Table 4 Summary of Contingency Measure Reductions

Rule	Controlled Dust Sources	Implementation date	Reductions in 2018 (TPY)
Arizona Administrative Code, R18-2-611.03	Commercial dairy operations	January 1, 2016	101.2
PCAQCD Code of Regulations, §4-3-160, -170, -180, and -190	Permitted construction projects	January 1, 2016	4,679.4
PCAQCD Code of Regulations, §4-1-010, -015, -020, -030, -040, -045, -050, and -060	Several prescribed area sources of fugitive dust, including vacant lots and other open areas, roads, and other traffic areas.	Effective January 1, 2016, with some controls being implemented progressively	2,962.3
Total			7,742.9

Design Days (Attainment Demonstration)

With the implementation of the controls listed in Table 3, ADEQ is able to model attainment for the seven design days in 2018. Observed (2008) and projected modeled impacts (2018 and 2018 attainment) are presented in Table 5.

Table 5: Design Day Concentrations: 2008, Projected 2018, and Projected Controlled 2018

Year	Design day		Design value (µg/m³)	
2008	Stagnation	Cowtown	244.5	Monitor observations
		Pinal County Housing	178.0	
		Stanfield	162.0	
	High-Wind	Cowtown	168.3	
		Maricopa	159.4	
		Pinal County Housing	264.9	
		Stanfield	178.6	
2018	Stagnation	Cowtown	188.2	Modeled projections
		Pinal County Housing	179.5	
		Stanfield	197.6	
	High-Wind	Cowtown	165.2	
		Maricopa	139.8	
		Pinal County Housing	263.2	
		Stanfield	186.8	
2018 - Attainment	Stagnation	Cowtown[1]	152.3	Modeled projections
		Pinal County Housing[1]	154.8	
		Stanfield[1]	154.7	
	High-Wind	Cowtown	122.1	
		Maricopa	124.2	
		Pinal County Housing	135.7	
		Stanfield	112.6	

[1] Design values are rounded to two significant figures for determination of NAAQS attainment. As such, any value < 155 µg/m³ is rounded down to 150 µg/m³ and will attain the NAAQS.

Annual Emission Reductions

Sector		Base 2008 Emissions Inventory (TPY)	Base 2018 Emissions Inventory (TPY)	Attainment 2018 Emissions Inventory (TPY)	Post-contingency 2018 Emissions Inventory (TPY)
Windblown dust	Developed Urban Lands	200.7	248.1	248.1	192.9
	Developed Rural Lands (low density residential)	1,959.7	1,959.7	1,959.7	1,895.6
	Unpaved Roads (including Ag roads)	4,688.6	4,657.0	3,809.1	3,800.0
	Cleared Areas	398.1	457.0	457.0	325.7
	Residential Construction	1,302.4	837.5	837.5	430.5
	Dairies	449.6	449.6	449.6	384.2
	CAFOs	273.7	155.2	125.3	125.3
	Desert Shrubland	38,276.7	38,276.7	38,276.7	36,709.1
	Agriculture	19,510.1	19,510.1	7,122.0	7,122.0
	Commercial Construction	686.4	441.4	441.4	216.3
	Other	4,243.9	4,243.9	4,243.9	4,239.5
	Site Development	858.7	552.2	552.2	278.9
	Subtotal	72,848.6	71,788.4	58,522.5	55,720.0
Activity-based emissions	Ag Fields - Harvesting	312.9	312.9	207.1	207.1
	Ag Fields - Tilling	2,540.3	2,540.3	1,658.0	1,658.0
	CAFOs	2,614.3	1,620.6	1,369.2	1,369.2
	Paved Road	1,180.7	1,408.0	1,408.0	1,402.3
	Unpaved Road	43,656.2	45,688.6	37,769.6	36,716.9
	Fuel Combustion	28.3	34.8	34.8	34.8
	Fires	19.9	22.2	22.2	22.2
	Open Burning	13.6	16.7	16.7	16.7
	Nonroad	121.3	155.6	155.6	155.6
	Railroad	85.9	45.5	45.5	45.5
	Construction	12,955.3	8,471.9	8,471.9	4,702.9
	Dairy	186.6	184.0	184.0	148.2
	Permitted Sources	781.3	781.3	781.3	781.3
	Unpaved Parking	251.5	251.5	251.5	172.5
	Subtotal	64,748.1	61,533.9	52,375.4	47,433.2
Total		137,596.7	133,322.3	110,897.9	103,153.2

Motor Vehicle Emissions Budget

The MVEB presented in Table 6 considers the combined contributions of motor vehicles traveling roads within the nonattainment area, as well as the emissions from construction projects on those roads. Emissions from non-road vehicles are not included in the budget, nor are emissions produced by wind traveling over the roads and construction sites. Emissions from certain commercial roads, which are expected to remain fairly constant from one year to the next, are also omitted. The budget is established for annual emissions totals, and anticipates various changes in traffic, fleet characteristics, road work, and new rules and regulations up through calendar year 2018.

Table 6: Annual MVEB by Source Sector

Source	Tons of PM_{10}
Exhaust, tire-, & brake-wear (paved and unpaved roads)	173.7
Reentrained unpaved road dust (including public and private roads, excluding trials and agricultural roads)	27,016.7
Reentrained paved road dust	1,211.1
Road construction/maintenance	140.9
Total	28,542.5