1. Introduction

1.1 Overview

This 2011 periodic PM_{10} emissions inventory was developed to meet requirements set forth in Title I of the Clean Air Act Amendments of 1990 (CAAA). The CAAA require development of a baseline emission inventory and periodic revisions for areas that fail to meet the National Ambient Air Quality Standards (NAAQS). A portion of Maricopa County is classified as serious nonattainment for PM_{10}.

PM_{10} is defined as particulate matter less than or equal to ten micrometers in diameter. This inventory includes primary emissions of PM_{10} and $PM_{2.5}$ as well as three particulate matter precursors: nitrogen oxides (NO_x), sulfur oxides (SO_x) and ammonia (NH_3). The inventory provides emission estimates from point, area, nonroad mobile, onroad mobile and biogenic sources. Note that totals shown in tables may not equal the sum of individual values due to independent rounding.

1.2 Agencies responsible for the emissions inventory

Maricopa County Air Quality Department (MCAQD) has primary responsibility for preparing and submitting the 2011 Periodic PM_{10} Emissions Inventory for Maricopa County. MCAQD prepared the emission estimates for point sources, the majority of area sources, and some nonroad mobile sources. The Maricopa Association of Governments (MAG) prepared the emission estimates for onroad mobile, the majority of nonroad mobile, biogenic, and some area sources. Table 1.2–1 lists those responsible for inventory preparation and quality assurance/ quality control activities, which are described in the respective chapters.

Table 1.2–1. Chapter authors and QA/QC contacts for this report.

Chapter	Author(s)	QA/QC contacts
2. Point sources	Bob Downing, MCAQD (602) 506-6790	Eric Raisanen, MCAQD (602) 506-6790 Matt Poppen, MAG (602) 254-6300
3. Area sources	Eric Raisanen, Tom Ekren and Dena Konopka, MCAQD (602) 506-6790 Matt Poppen, MAG (602) 254-6300	Bob Downing, MCAQD (602) 506-6790 Matt Poppen, MAG (602) 254-6300 Cathy Arthur, MAG (602) 254-6300
4. Nonroad mobile sources	Matt Poppen, MAG (602) 254-6300 Dena Konopka, MCAQD (602) 506-6790	Bob Downing, MCAQD (602) 506-6790 Cathy Arthur, MAG (602) 254-6300
5. Onroad mobile sources	Ieesuck Jung, MAG (602) 254-6300	Matt Poppen, MAG (602) 254-6300 Cathy Arthur, MAG (602) 254-6300
6. Biogenic sources	Feng Liu, MAG (602) 254-6300	Matt Poppen, MAG (602) 254-6300 Cathy Arthur, MAG (602) 254-6300

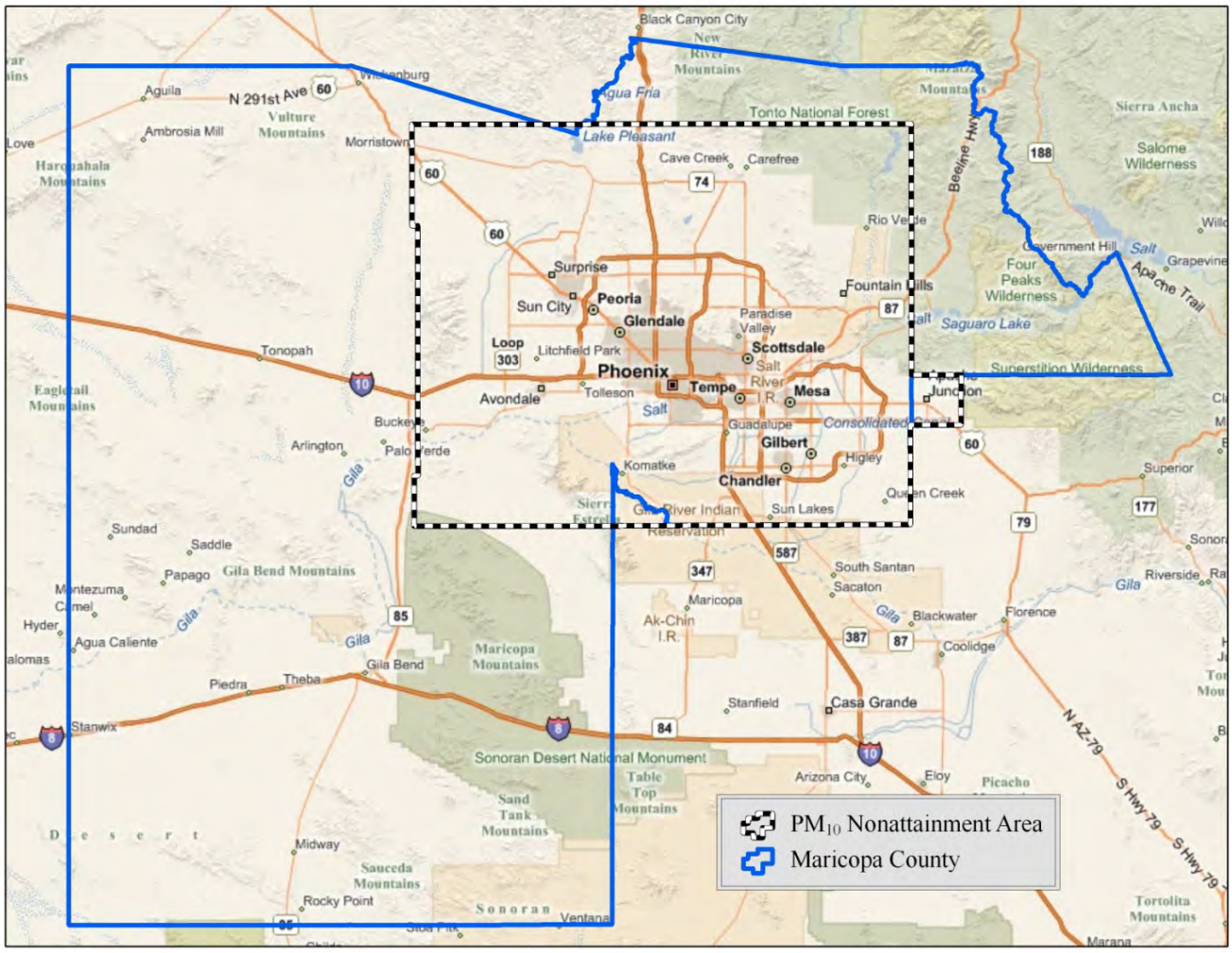
1.3 Temporal scope

Annual and typical daily emissions were estimated for the year 2011, for Maricopa County and the Maricopa County PM_{10} nonattainment area (NAA).

1.4 Geographic scope

This inventory includes emission estimates for Maricopa County and for the Maricopa County PM_{10} nonattainment area. Maricopa County encompasses approximately 9,223 square miles of land area, while the Maricopa County PM_{10} nonattainment area is approximately 2,880 square miles or approximately 31 percent of the Maricopa County land area. A map of Maricopa County and the PM_{10} nonattainment area is provided in Figure 1.4–1.

Figure 1.4–1. Map of Maricopa County and the PM_{10} nonattainment area.



1.5 Overview of local demographic and land use data

Many of the emissions estimates generated in this report were calculated using demographic and land use data provided by the Maricopa Association of Governments (MAG). These data were used to apportion and/or scale Maricopa County emissions estimates to the nonattainment area and vice versa. (For example, county-level emissions from residential natural gas usage in Maricopa County were apportioned to the nonattainment area using the ratio of total population in each area). Detailed explanations of how emission estimates were apportioned or scaled are presented in each of the following chapters, along with the data sources used.

1.5.1 Demographic profile

The demographic data provided by MAG included population, employment data, and single family/multi-family splits for calendar year 2011, for both Maricopa County and the PM_{10} nonattainment area. Table 1.5–1 provides an overview of the demographic data used in this report. As noted throughout the text, these data are frequently used to derive estimates of activity or emissions within the PM_{10} NAA from county-level calculations. It is important to note, however, that the nonattainment area includes a portion of Pinal County, AZ (Apache Junction) as shown in Figure 1.4–1. Thus in some cases (e.g., those source categories calculated based on total population), the multiplier used to derive nonattainment area estimates from County-level values may be greater than 1, and thus the resulting NAA emission totals are larger than the County-level estimates from which they are derived.

Table 1.5–1. Demographic profile of Maricopa County and the PM_{10} nonattainment area.

Demographic variable	Maricopa County	PM_{10} NAA	Percent within PM_{10} NAA
Total resident population	3,843,370	3,853,744	100.27%
Total non-resident population	286,276	302,361	100.56%
Total population:	**4,129,646**	**4,156,105**	**100.64%**
Retail employment	414,477	415,277	100.19%
Office employment	320,536	320,351	99.94%
Industrial employment	374,338	374,191	99.96%
Public employment	240,952	236,952	98.34%
Other employment	261,769	261,212	99.79%
Construction	24,026	23,103	96.16%
Work at Home	100,016	100,324	100.31%
Total employment:	**1,736,114**	**1,731,410**	**99.73%**
Single Family/Multi-Family Household Split:			
Single-Family	77%	78%	
Multi-Family	23%	22%	

Source: Maricopa Association of Governments

1.5.2 Land use data

MAG provided 2010 land use data. The 2010 land use data was assumed to be representative of 2011. Table 1.5–2 presents a summary of the land use categories and acreages used to develop emissions estimates for this inventory.

Table 1.5–2. Land use categories used to apportion emissions.

Land Use Category	Acreage within Maricopa County	Acreage within PM_{10} NAA	Percentage within PM_{10} NAA
General/active open space/golf course (e.g., parks)	210,159	202,269	96.25%
Passive/restricted open space, washes	2,614,870	428,984	16.41%
Lakes	12,525	9,510	75.93%
Agriculture	276,016	118,568	42.96%
Vacant (e.g., developable land)	2,045,587	402,332	19.67%

1.6 Emissions overview by source category

1.6.1 Point sources

The point source category includes those stationary sources that emit a significant amount of pollution into the air such as power plants, industrial processes and large manufacturing facilities. MCAQD utilizes the US EPA's Annual Emissions Reporting Requirements (AERR) rule to define which stationary sources are listed as point sources. A detailed definition of a point source can be found in Section 2.1 of Chapter 2.

Table 1.6–1 summarizes annual and typical daily emissions from point sources in Maricopa County and the PM_{10} nonattainment area, respectively. A detailed breakdown of emissions calculations for all point sources is contained in Chapter 2.

Table 1.6–1. Annual and typical daily emissions from point sources in Maricopa County and the PM_{10} NAA.

	Annual emissions (tons/yr)					Typical daily emissions (lbs/day)				
Geographic area	**PM_{10}**	**$PM_{2.5}$**	**NO_x**	**SO_x**	**NH_3**	**PM_{10}**	**$PM_{2.5}$**	**NO_x**	**SO_x**	**NH_3**
Maricopa County	404.28	337.46	1,754.12	79.55	116.69	2,347.1	1,928.4	9,798.8	554.4	641.2
PM_{10} NAA	156.10	108.39	1,154.67	45.81	42.93	982.1	668.4	6,485.7	366.6	235.9

1.6.2 Area sources

Area sources are facilities or activities whose individual emissions do not qualify them as point sources. Area sources represent numerous facilities or activities that individually release small amounts of a given pollutant, but collectively they can release significant amounts of a pollutant. Emissions from stationary sources that were not identified as point sources in this report have been included in the area source inventory. Examples of area source categories include residential wood burning, commercial cooking, waste incineration and wildfires.

Tables 1.6–2 and 1.6–3 summarize annual and typical daily emissions of the chief area source categories, for Maricopa County and the PM_{10} nonattainment area, respectively. A detailed breakdown of emissions calculations for each area source category is contained in Chapter 3.

Table 1.6–2. Annual and typical daily emissions from area sources in Maricopa County.

	Annual emissions (tons/yr)					Typical daily emissions (lbs/day)				
Source category	**PM_{10}**	**$PM_{2.5}$**	**NO_x**	**SO_x**	**NH_3**	**PM_{10}**	**$PM_{2.5}$**	**NO_x**	**SO_x**	**NH_3**
Fuel combustion	764.78	750.24	4,675.41	21.97	49.63	6,946.5	6,845.3	29,679.3	171.0	443.9
Industrial processes	7,240.06	2,208.53	263.41	48.80	1,931.23	46,228.9	13,634.0	1,472.3	312.8	12,362.8
Waste treatment/disposal	104.48	56.69	56.21	71.75	14.92	603.3	322.4	312.6	395.2	81.7
Misc. area sources	33,856.18	4,616.25	166.54	37.62	12,081.84	225,888.0	46,589.1	5,757.2	1,516.5	67,192.5
All area sources:	**41,965.49**	**7,631.71**	**5,161.56**	**180.14**	**14,077.61**	**279,666.7**	**67,390.7**	**37,221.4**	**2,395.6**	**80,081.0**

Table 1.6–3. Annual and typical daily emissions from area sources in the PM_{10} NAA.

	Annual emissions (tons/yr)					Typical daily emissions (lbs/day)				
Source category	**PM_{10}**	**$PM_{2.5}$**	**NO_x**	**SO_x**	**NH_3**	**PM_{10}**	**$PM_{2.5}$**	**NO_x**	**SO_x**	**NH_3**
Fuel combustion	767.66	753.12	4,673.91	22.02	49.78	6,978.3	6,877.0	29,670.8	171.6	445.8
Industrial processes	5,879.58	2,027.66	261.35	48.79	1,927.25	37,508.8	12,485.8	1,458.4	312.8	12,340.3
Waste treatment/disposal	83.32	43.34	48.80	59.82	15.01	484.0	246.4	271.4	329.7	82.3
Misc. area sources	13,096.36	1,945.88	66.25	11.94	7,149.26	80,434.5	12,834.9	681.4	143.3	39,228.2
All area sources:	**19,826.92**	**4,770.00**	**5,050.31**	**142.57**	**9,141.31**	**125,405.6**	**32,444.2**	**32,082.0**	**957.4**	**52,096.5**

1.6.3 Nonroad mobile sources

Nonroad mobile sources include off-highway vehicles and engines that move or are moved within a 12-month period. Tables 1.6–4 and 1.6–5 summarize annual and typical day emissions from nonroad mobile sources, for Maricopa County and the PM_{10} nonattainment area, respectively. A detailed breakdown of emissions calculations for each source category is contained in Chapter 4.

Table 1.6–4. Annual and typical daily emissions from nonroad mobile sources in Maricopa County.

	Annual emissions (tons/yr)					Typical daily emissions (lbs/day)				
Source category	**PM_{10}**	**$PM_{2.5}$**	**NO_x**	**SO_x**	**NH_3**	**PM_{10}**	**$PM_{2.5}$**	**NO_x**	**SO_x**	**NH_3**
Agricultural equipment	29.45	28.56	330.49	0.19	0.62	188.8	183.1	2,118.5	1.2	4.0
Airport GSE (+APU)	22.07	21.62	406.04	19.16		120.9	118.5	2,224.9	105.0	
Commercial equipment	114.81	109.77	1,361.42	1.89	20.84	736.0	703.7	8,727.0	12.1	133.6
Construction & mining	1,179.08	1,141.28	12,937.30	9.31	24.44	7,558.2	7,315.9	82,931.4	59.7	156.6
Industrial equipment	97.08	94.54	1,839.35	3.47	32.72	622.3	606.0	11,790.7	22.2	209.8
Lawn and garden	209.49	193.80	866.64	2.10	21.81	1,424.6	1,317.2	6,062.0	15.1	160.5
Pleasure craft	7.06	6.52	96.56	0.11	2.40	95.0	87.8	1,299.9	1.5	32.4
Railway maintenance	1.03	1.00	8.55	0.00	0.02	7.1	6.9	59.2	0.0	0.1
Recreational equipment	43.65	40.20	66.10	0.28	2.19	373.1	343.6	565.0	2.4	18.7
Aircraft	211.21	198.88	2,588.82	308.79		1,157.2	1,089.5	14,185.6	1,692.0	
Locomotives	40.56	39.34	1,406.08	151.98	1.06	222.3	215.6	7,704.5	832.7	5.8
All nonroad mobile sources:	**1,955.49**	**1,875.51**	**21,907.35**	**497.28**	**106.10**	**12,505.5**	**11,987.8**	**137,668.7**	**2,743.9**	**721.5**

Table 1.6–5. Annual and typical daily emissions from nonroad mobile sources in the PM_{10} NAA.

	Annual emissions (tons/yr)					Typical daily emissions (lbs/day)				
Source category	**PM_{10}**	**$PM_{2.5}$**	**NO_x**	**SO_x**	**NH_3**	**PM_{10}**	**$PM_{2.5}$**	**NO_x**	**SO_x**	**NH_3**
Agricultural equipment	12.65	12.27	141.97	0.08	0.26	81.1	78.6	910.0	0.5	1.7
Airport GSE (+APU)	21.88	21.44	400.37	19.03		119.9	117.5	2,193.8	104.3	
Commercial equipment	114.77	109.73	1,360.88	1.89	20.83	735.7	703.4	8,723.6	12.1	133.5
Construction & mining	1,133.79	1,097.44	12,440.29	8.95	23.50	7,267.9	7,034.9	79,745.5	57.4	150.6
Industrial equipment	97.04	94.50	1,838.63	3.47	32.71	622.1	605.8	11,786.1	22.2	209.7
Lawn and garden	210.83	195.04	872.19	2.11	21.95	1,433.7	1,325.6	6,100.9	15.2	161.5
Pleasure craft	5.36	4.95	73.32	0.08	1.83	72.1	66.7	987.0	1.1	24.6
Railway maintenance	1.04	1.01	8.60	0.00	0.02	7.2	7.0	59.5	0.0	0.1
Recreational equipment	7.79	7.17	11.79	0.05	0.39	66.6	61.3	100.8	0.4	3.3
Aircraft	207.15	195.15	2,583.11	307.21		1,135.0	1,069.1	14,154.3	1,683.4	
Locomotives	19.54	18.96	693.63	72.23	0.50	107.1	103.9	3,800.7	395.8	2.7
All nonroad mobile sources:	**1,831.84**	**1,757.66**	**20,424.78**	**415.10**	**101.99**	**11,648.4**	**11,173.8**	**128,562.2**	**2,292.4**	**687.6**

1.6.4 Onroad mobile sources

Emissions from onroad mobile sources were calculated for Maricopa County and the PM_{10} nonattainment area. A detailed breakout of emissions calculations for each area source category is contained in Chapter 5.

Tables 1.6–6 and 1.6–7 summarize annual and typical daily emissions from onroad mobile sources in Maricopa County and the PM_{10} nonattainment area, respectively.

Table 1.6–6. Annual and typical daily emissions from onroad mobile sources in Maricopa County.

	Annual emissions (tons/year)					Typical daily emissions (lbs/day)				
Emission Category	**PM_{10}**	**$PM_{2.5}$**	**NO_x**	**SO_x**	**NH_3**	**PM_{10}**	**$PM_{2.5}$**	**NO_x**	**SO_x**	**NH_3**
Exhaust, tire wear, and brake wear	2,833.55	1,999.22	60,269.94	219.72	1,189.18	15,526.3	10,955.1	330,245.8	1,203.3	6,517.1
Paved road fugitive dust	7,658.59	1,987.33				41,964.9	10,889.5			
Unpaved road and alley fugitive dust	9,270.31	925.36				50,796.2	5,070.5			
Totals:	**19,762.45**	**4,911.91**	**60,269.94**	**219.72**	**1,189.18**	**108,287.4**	**26,915.1**	**330,245.8**	**1,203.3**	**6,517.1**

Table 1.6–7. Annual and typical daily emissions from onroad mobile sources in the PM_{10} NAA.

	Annual emissions (tons/year)					Typical daily emissions (lbs/day)				
Emission Category	**PM_{10}**	**$PM_{2.5}$**	**NO_x**	**SO_x**	**NH_3**	**PM_{10}**	**$PM_{2.5}$**	**NO_x**	**SO_x**	**NH_3**
Exhaust, tire wear, and brake wear	2,663.31	1,869.88	56,267.92	205.82	1,108.89	14,592.8	10,246.6	308,316.8	1,127.5	6,076.6
Paved road fugitive dust	6,941.31	1,802.10				38,034.6	9,874.5			
Unpaved road and alley fugitive dust	8,468.55	845.34				46,403.0	4,632.0			
Totals:	**18,073.17**	**4,517.32**	**56,267.92**	**205.82**	**1,108.89**	**99,030.4**	**24,753.1**	**308,316.8**	**1,127.5**	**6,076.6**

1.6.5 Biogenic sources

The biogenic source category includes emissions from all vegetation (e.g., crops, indigenous vegetation, landscaping, etc.) in Maricopa County and the PM_{10} nonattainment area. Emissions were estimated using the Model of Emissions of Gases and Aerosols from Nature (MEGAN). MEGAN is a state-of-the-art biogenic emissions model developed by the National Center for Atmospheric Research (NCAR). Some corrections and improvements were made in the latest version of MEGAN2.1. MEGAN2.1 was used to compute biogenic emissions in Maricopa County and the PM_{10} nonattainment area. Annual and typical daily NO_x emissions from biogenic sources are shown in Table 1.6–8 for Maricopa County and the PM_{10} nonattainment area.

Table 1.6–8. Annual and typical daily emissions from biogenic sources in Maricopa County and the PM_{10} NAA.

Geographic area	**Annual NO_x emissions (tons/yr)**	**Typical daily NO_x emissions (lbs/day)**
Maricopa County	779.52	4,250.7
PM_{10} NAA	321.97	1,755.7

1.6.6 Summary of all source categories

Tables 1.6–9 and 1.6–10 provide summary totals of annual and typical daily emissions from all emission sources in Maricopa County and the PM_{10} nonattainment area, respectively.

Table 1.6–9. Annual and typical daily emissions from all sources in Maricopa County.

	Annual emissions (tons/year)					Typical daily emissions (lbs/day)				
Section	**PM_{10}**	**$PM_{2.5}$**	**NO_x**	**SO_x**	**NH_3**	**PM_{10}**	**$PM_{2.5}$**	**NO_x**	**SO_x**	**NH_3**
POINT SOURCES:	**404.28**	**337.46**	**1,754.12**	**79.55**	**116.69**	**2,347.1**	**1,928.4**	**9,798.8**	**554.4**	**641.2**
AREA SOURCES:										
Fuel combustion:										
Industrial distillate oil: boilers	10.04	5.48	60.87	1.30	2.43	64.4	35.1	390.2	8.3	15.6
Industrial distillate oil: engines	129.35	121.13	1,838.26	0.00	0.00	829.2	776.5	11,783.7	0.0	0.0
Industrial natural gas	39.11	39.11	730.94	3.07	16.13	250.7	250.7	4,685.5	19.7	103.4
Comm./inst. distillate oil: boilers	0.02	0.02	0.12	0.00	0.00	0.1	0.1	0.8	0.0	0.0
Comm./inst. distillate oil: engines	0.26	0.26	3.72	0.00	0.00	1.7	1.7	23.8	0.0	0.0
Comm./inst. natural gas	56.75	56.75	1,080.73	4.46	3.58	363.8	363.8	6,927.8	28.6	22.9
Residential distillate oil	0.07	0.06	0.35	0.82	0.02	0.7	0.6	3.8	9.0	0.2
Residential natural gas	68.83	68.83	851.32	5.43	0.00	377.1	377.1	4,664.7	29.8	0.0
Residential LPG	0.19	0.16	51.35	0.22	0.18	2.1	1.7	564.3	2.4	2.0
Residential kerosene	0.01	0.01	0.03	0.08	0.00	0.1	0.1	0.4	0.9	0.0
Residential wood combustion	460.15	458.44	57.72	6.59	27.28	5,056.6	5,037.9	634.3	72.4	299.8
All Fuel Combustion	**764.78**	**750.24**	**4,675.41**	**21.97**	**49.63**	**6,946.5**	**6,845.3**	**29,679.3**	**171.0**	**443.9**
Industrial processes:										
Chemical manufacturing	121.46	73.32				1,172.4	732.7			
Commercial cooking	1,058.55	1,058.33				5,800.3	5,799.1			
Grain handling/processing	70.09	19.10				443.1	122.3			
Ammonia cold storage					1,911.36					12,252.3
Secondary metal production	42.27	34.37	15.02	8.03	0.25	308.9	256.3	106.9	89.3	2.3
Mineral processes	149.32	75.94				1,065.9	542.0			
Mining/quarrying	106.28	33.49				712.7	220.5			
Wood product manufacturing	59.64	52.76				442.4	385.7			
Rubber/plastic product mfg.	218.58	164.33				1,478.5	1,083.8			
Fabricated metals	25.87	22.97				181.2	160.4			
Residential construction	476.06	47.61				3,051.7	305.2			
Commercial construction	2,221.62	222.16				14,241.1	1,424.1			
Road construction	1,820.80	182.08				11,671.8	1,167.2			
Construction, other	347.22	34.72				2,225.8	222.6			
Electrical equipment manufacturing	7.66	5.00	23.47	0.28	9.63	42.7	28.0	129.0	1.6	52.9
Industrial paved/unpaved road travel	356.35	101.68				2,486.7	718.7			
Industrial processes, NEC	158.29	80.67	224.92	40.48	9.98	903.6	465.4	1,236.4	222.0	55.3
All Industrial Processes	**7,240.06**	**2,208.53**	**263.41**	**48.80**	**1,931.23**	**46,228.9**	**13,634.0**	**1,472.3**	**312.8**	**12,362.8**
Waste treatment/disposal:										
On-site incineration	0.62	0.41	3.31	1.05		4.1	2.7	21.4	6.8	
Open burning: Land clearing debris	1.11	1.11	0.30			8.6	8.6	2.3		
Landfills	76.05	40.73	30.40	7.17		421.1	225.5	167.1	39.4	
Publicly owned treatment works					14.92					81.7
Other waste	26.71	14.44	22.19	63.53		169.6	85.6	121.9	349.0	
All Waste Treatment/Disposal	**104.48**	**56.69**	**56.21**	**71.75**	**14.92**	**603.3**	**322.4**	**312.6**	**395.2**	**81.7**

Table 1.6–9 (continued). Annual and typical daily emissions from all sources in Maricopa County.

	Annual emissions (tons/year)					Typical daily emissions (lbs/day)				
Section	**PM_{10}**	**$PM_{2.5}$**	**NO_x**	**SO_x**	**NH_3**	**PM_{10}**	**$PM_{2.5}$**	**NO_x**	**SO_x**	**NH_3**
Miscellaneous area sources:										
Windblown dust	7,690.52	1,153.58				42,140.0	6,321.1			
Cotton ginning	45.02	12.86				263.8	75.4			
Tilling	3,328.28	499.24				32,099.9	4,815.0			
Harvesting	161.95	24.29				3,927.0	589.0			
Travel on unpaved ag. roads	1,987.45	198.75				12,740.1	1,274.0			
Agricultural field burning	43.56	43.56	11.62			446.8	446.8	119.1		
Fertilizer application					1,775.51					9,728.8
Livestock	435.21	47.87			9,150.95	2,384.7	262.3			50,142.2
Humans					1,135.65					6,222.8
Structure fires	14.51	14.51	1.88			79.5	79.5	10.3		
Aircraft engine testing	2.39	2.38	46.36	9.98		13.2	13.2	259.3	56.6	
Vehicle fires	28.98	28.98	1.16			158.8	158.8	6.4		
Crematories	3.08	2.82	11.19	1.77		23.9	21.8	88.5	13.9	
Accidental releases	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0
Wildfires	425.81	365.19	93.95	25.76	19.70	23,655.9	20,288.5	5,219.5	1,431.1	1,094.4
Prescribed fires	0.49	0.49	0.38	0.10	0.03	69.9	69.9	54.1	14.8	4.4
Travel on unpaved parking lots	4,214.89	423.02				23,095.3	2,317.9			
Leaf blowers fugitive dust	941.12	355.19				5,156.8	1,946.2			
Offroad rec. vehicles fugitive dust	14,532.91	1,443.50				79,632.4	7,909.6			
All Misc. Area Sources	**33,856.18**	**4,616.25**	**166.54**	**37.62**	**12,081.84**	**225,888.0**	**46,589.1**	**5,757.2**	**1,516.5**	**67,192.5**
All Area Sources	**41,965.49**	**7,631.71**	**5,161.56**	**180.14**	**14,077.61**	**279,666.7**	**67,390.7**	**37,221.4**	**2,395.6**	**80,081.0**
NONROAD MOBILE SOURCES:										
Agricultural equipment	29.45	28.56	330.49	0.19	0.62	188.8	183.1	2,118.5	1.2	4.0
Airport GSE (+APU)	22.07	21.62	406.04	19.16		120.9	118.5	2,224.9	105.0	
Commercial equipment	114.81	109.77	1,361.42	1.89	20.84	736.0	703.7	8,727.0	12.1	133.6
Construction & mining equipment	1,179.08	1,141.28	12,937.30	9.31	24.44	7,558.2	7,315.9	82,931.4	59.7	156.6
Industrial equipment	97.08	94.54	1,839.35	3.47	32.72	622.3	606.0	11,790.7	22.2	209.8
Lawn and garden equipment	209.49	193.80	866.64	2.10	21.81	1,424.6	1,317.2	6,062.0	15.1	160.5
Pleasure craft	7.06	6.52	96.56	0.11	2.40	95.0	87.8	1,299.9	1.5	32.4
Railway maintenance equipment	1.03	1.00	8.55	0.00	0.02	7.1	6.9	59.2	0.0	0.1
Recreational equipment	43.65	40.20	66.10	0.28	2.19	373.1	343.6	565.0	2.4	18.7
Aircraft	211.21	198.88	2,588.82	308.79		1,157.2	1,089.5	14,185.6	1,692.0	
Locomotives	40.56	39.34	1,406.08	151.98	1.06	222.3	215.6	7,704.5	832.7	5.8
All Nonroad Mobile Sources	**1,955.49**	**1,875.51**	**21,907.35**	**497.28**	**106.10**	**12,505.5**	**11,987.8**	**137,668.7**	**2,743.9**	**721.5**
ONROAD MOBILE SOURCES:										
Exhaust / tire wear / brake wear	2,833.55	1,999.22	60,269.94	219.72	1,189.18	15,526.3	10,955.1	330,245.8	1,203.3	6,517.1
Paved road fugitive dust	7,658.59	1,987.33				41,964.9	10,889.5			
Unpaved road fugitive dust	9,270.31	925.36				50,796.2	5,070.5			
All Onroad Mobile Sources	**19,762.45**	**4,911.91**	**60,269.94**	**219.72**	**1,189.18**	**108,287.4**	**26,915.1**	**330,245.8**	**1,203.3**	**6,517.1**
BIOGENIC SOURCES			**779.52**					**4,250.7**		
TOTAL, ALL SOURCE CATEGORIES	**64,087.72**	**14,756.60**	**89,872.48**	**976.69**	**15,489.58**	**402,806.6**	**108,222.0**	**519,185.5**	**6,897.3**	**87,960.8**

Table 1.6–10. Annual and typical daily emissions from all sources in the PM_{10} nonattainment area.

	Annual emissions (tons/year)					Typical daily emissions (lbs/day)				
Section	**PM_{10}**	**$PM_{2.5}$**	**NO_x**	**SO_x**	**NH_3**	**PM_{10}**	**$PM_{2.5}$**	**NO_x**	**SO_x**	**NH_3**
POINT SOURCES:	**156.10**	**108.39**	**1,154.67**	**45.81**	**42.93**	**982.1**	**668.4**	**6,485.7**	**366.6**	**235.9**
AREA SOURCES:										
Fuel combustion:										
Industrial distillate oil: boilers	10.04	5.48	60.85	1.30	2.43	64.4	35.1	390.0	8.3	15.6
Industrial distillate oil: engines	129.30	121.08	1,837.52	0.00	0.00	828.8	776.2	11,779.0	0.0	0.0
Industrial natural gas	39.09	39.09	730.65	3.07	16.12	250.6	250.6	4,683.6	19.7	103.4
Comm./inst. distillate oil: boilers	0.02	0.02	0.12	0.00	0.00	0.1	0.1	0.8	0.0	0.0
Comm./inst. distillate oil: engines	0.26	0.26	3.72	0.00	0.00	1.7	1.7	23.8	0.0	0.0
Comm./inst. natural gas	56.57	56.57	1,077.29	4.44	3.57	362.6	362.6	6,905.7	28.5	22.9
Residential distillate oil	0.07	0.06	0.35	0.83	0.02	0.7	0.6	3.8	9.1	0.2
Residential natural gas	69.02	69.02	853.61	5.45	0.00	378.2	378.2	4,677.3	29.9	0.0
Residential LPG	0.19	0.16	51.68	0.22	0.18	2.1	1.7	567.9	2.4	2.0
Residential kerosene	0.01	0.01	0.03	0.08	0.00	0.1	0.1	0.4	0.9	0.0
Residential wood combustion	463.10	461.38	58.09	6.63	27.45	5,089.0	5,070.1	638.4	72.8	301.7
All Fuel Combustion	**767.66**	**753.12**	**4,673.91**	**22.02**	**49.78**	**6,978.3**	**6,877.0**	**29,670.8**	**171.6**	**445.8**
Industrial processes:										
Chemical manufacturing	121.41	73.30				1,171.9	732.4			
Commercial cooking	1,065.33	1,065.1				5,837.4	5,836.2			
Grain handling/processing	70.06	19.10				443.0	122.2			
Ammonia cold storage					1,910.60					12,247.4
Secondary metal production	42.27	34.37	15.02	8.03	0.25	308.9	256.3	106.9	89.3	2.3
Mineral processes	133.99	69.39				953.9	493.9			
Mining/quarrying	86.58	27.95				564.9	179.0			
Wood product manufacturing	59.61	52.73				442.2	385.6			
Rubber/plastic product mfg.	218.49	164.26				1,478.0	1,083.3			
Fabricated metals	25.86	22.96				181.2	160.3			
Residential construction	477.07	47.71				3,058.1	305.8			
Commercial construction	1,343.10	134.31				8,609.6	861.0			
Road construction	1,619.73	161.97				10,382.9	1,038.3			
Construction, other	243.64	24.36				1,561.8	156.2			
Electrical equipment manufacturing	7.66	5.00	23.47	0.28	9.63	42.7	28.0	129.0	1.6	52.9
Industrial paved/unpaved road travel	262.12	79.73				1,874.6	575.7			
Industrial processes, NEC	102.65	45.41	222.86	40.48	6.77	597.8	271.6	1,222.5	221.9	37.6
All Industrial Processes	**5,879.58**	**2,027.66**	**261.35**	**48.79**	**1,927.25**	**37,508.8**	**12,485.8**	**1,458.4**	**312.8**	**12,340.3**
Waste treatment/disposal:										
On-site incineration	0.62	0.41	3.31	1.05		4.1	2.7	21.4	6.8	
Open burning: Land clearing debris	0.22	0.22	0.06			1.7	1.7	0.4		
Landfills	56.90	29.06	23.84	2.38		314.8	160.8	131.0	13.1	
Publicly owned treatment works					15.01					82.3
Other waste	25.58	13.64	21.59	56.39		163.4	81.2	118.6	309.8	
All Waste Treatment/Disposal	**83.32**	**43.34**	**48.80**	**59.82**	**15.01**	**484.0**	**246.4**	**271.4**	**329.7**	**82.3**

Table 1.6–10 (continued). Annual and typical daily emissions from all sources in the PM_{10} nonattainment area.

	Annual emissions (tons/year)					Typical daily emissions (lbs/day)				
Section	**PM_{10}**	**$PM_{2.5}$**	**NO_x**	**SO_x**	**NH_3**	**PM_{10}**	**$PM_{2.5}$**	**NO_x**	**SO_x**	**NH_3**
Miscellaneous area sources:										
Windblown dust	4,786.57	717.98				26,227.7	3,934.2			
Cotton ginning	9.68	2.77				53.2	15.2			
Tilling	1,292.04	193.81				12,582.4	1,887.4			
Harvesting	61.29	9.19				1,490.4	223.6			
Travel on unpaved ag. roads	807.79	80.78				5,178.1	517.8			
Agricultural field burning	18.71	18.71	4.99			191.9	191.9	51.2		
Fertilizer application					762.71					4,179.2
Livestock	249.37	27.43			5,243.49	1,366.4	150.3			28,731.5
Humans					1,142.93					6,262.6
Structure fires	14.61	14.61	1.89			80.0	80.0	10.4		
Aircraft engine testing	2.39	2.38	46.36	9.98		13.2	13.2	259.3	56.6	
Vehicle fires	29.17	29.17	1.17			159.8	159.8	6.4		
Crematories	3.08	2.82	11.19	1.77		23.9	21.8	88.4	13.9	
Accidental releases	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0
Wildfires	2.94	2.52	0.65	0.18	0.14	1,176.0	1,008.6	259.5	71.1	54.4
Prescribed fires	0.01	0.01	0.01	0.00	0.00	8.0	8.0	6.2	1.7	0.5
Travel on unpaved parking lots	2,278.88	228.72				12,487.0	1,253.3			
Leaf blowers fugitive dust	947.15	357.46				5,189.9	1,958.7			
Offroad rec. vehicles fugitive dust	2,592.67	257.52				14,206.4	1,411.1			
All Misc. Area Sources	**13,096.36**	**1,945.88**	**66.25**	**11.94**	**7,149.26**	**80,434.5**	**12,834.9**	**681.4**	**143.3**	**39,228.2**
All Area Sources	**19,826.92**	**4,770.00**	**5,050.31**	**142.57**	**9,141.31**	**125,405.6**	**32,444.2**	**32,082.0**	**957.4**	**52,096.5**
NONROAD MOBILE SOURCES:										
Agricultural equipment	12.65	12.27	141.97	0.08	0.26	81.1	78.6	910.0	0.5	1.7
Airport GSE (+APU)	21.88	21.44	400.37	19.03		119.9	117.5	2,193.8	104.3	
Commercial equipment	114.77	109.73	1,360.88	1.89	20.83	735.7	703.4	8,723.6	12.1	133.5
Construction & mining equipment	1,133.79	1,097.44	12,440.29	8.95	23.50	7,267.9	7,034.9	79,745.5	57.4	150.6
Industrial equipment	97.04	94.50	1,838.63	3.47	32.71	622.1	605.8	11,786.1	22.2	209.7
Lawn and garden equipment	210.83	195.04	872.19	2.11	21.95	1,433.7	1,325.6	6,100.9	15.2	161.5
Pleasure craft	5.36	4.95	73.32	0.08	1.83	72.1	66.7	987.0	1.1	24.6
Railway maintenance equipment	1.04	1.01	8.60	0.00	0.02	7.2	7.0	59.5	0.0	0.1
Recreational equipment	7.79	7.17	11.79	0.05	0.39	66.6	61.3	100.8	0.4	3.3
Aircraft	207.15	195.15	2,583.11	307.21		1,135.0	1,069.1	14,154.3	1,683.4	
Locomotives	19.54	18.96	693.63	72.23	0.50	107.1	103.9	3,800.7	395.8	2.7
All Nonroad Mobile Sources	**1,831.84**	**1,757.66**	**20,424.78**	**415.10**	**101.99**	**11,648.4**	**11,173.8**	**128,562.2**	**2,292.4**	**687.7**
ONROAD MOBILE SOURCES:										
Exhaust / tire wear / brake wear	2,663.31	1,869.88	56,267.92	205.82	1,108.89	14,592.8	10,246.6	308,316.8	1,127.5	6,076.6
Paved road fugitive dust	6,941.31	1,802.10				38,034.6	9,874.5			
Unpaved road fugitive dust	8,468.55	845.34				46,403.0	4,632.0			
All Onroad Mobile Sources	**18,073.17**	**4,517.32**	**56,267.92**	**205.82**	**1,108.89**	**99,030.4**	**24,753.1**	**308,316.8**	**1,127.5**	**6,076.6**
BIOGENIC SOURCES			**321.97**					**1,755.7**		
TOTAL, ALL SOURCE CATEGORIES	**39,888.03**	**11,153.37**	**83,219.65**	**809.29**	**10,395.12**	**237,066.5**	**69,039.5**	**477,202.3**	**4,743.8**	**59,096.7**