Indiana Department of Environmental Management

The States' View of the Air

State of Indiana

Michigan Section with Introduction

2013

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Indiana Department of Environmental Management
Office of Air Quality
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EXECUTIVE SUMMARY

Air quality across the nation has improved over the past ten years or more. One would never know this from media reports. This analysis demonstrates the progress made from 2000 through 2011 for ozone and fine particles (PM-2.5). The national ambient air quality standards in place in 2011 were applied to all time periods in this analysis to demonstrate the progress made.

Figures 1 through 3 show the progress made for ozone, 24-hour PM-2.5 and annual PM-2.5. The bars represent the population of each period (based on the last year in the period). The portion that is green represents the number of people living in counties that measure air quality better than the standard. The portion of the bar that is red represents the number of people living in counties that measure air quality at levels above the standard. The blue portion of the bar represents the number of people that live in counties where air quality is not measured.

Compliance with standards is determined on a three year basis. In 2000 – 2002 approximately 44 million people lived in counties that measured ozone air quality levels better than the standard. By 2009 – 2011 this had increased to over 153 million people.

The situation for fine particles (PM-2.5) is very similar. In 2000 – 2002, 115 million people lived in counties where 24-hour PM-2.5 levels were measured below the standard. By 2009 – 2011 this had increased to 202 million people. Of note, is that monitoring for PM-2.5 is only conducted in counties with a total of 207 million people.

In the 2000 – 2002 period, 144 million people lived in counties where annual PM-2.5 levels were measured below the standard. By 2009 – 2011 this had increased to 207 million people. Less than 500,000 people lived in counties where annual PM-2.5 levels were measured above the standard.

Even with the improvements made in air quality, there are still areas of the country that need further improvement. Figure 4 shows states that have 8 hour ozone nonattainment areas based on 2009 – 2011 data using the average air quality method described in this document. Twenty four states, including the District of Columbia, would be included. Figure 5 shows the states that would be nonattainment based upon U.S. EPA methods. Only Arizona is added.

Figure 6 shows those states that violate the 24-hour PM-2.5 standard based on 2009 – 2011 data using average air quality data. Only six states in the northwest are included. The U.S. EPA method adds Ohio and Pennsylvania. This is shown in Figure 7.

Figure 8 shows those states that violate the annual PM-2.5 standard based on 2009 – 2011 data using average air quality data. Only California is included. Figure 9 shows the results for the same period using U.S. EPA's method and includes only California.

The bottom line is that most areas of the country were meeting the PM-2.5 standard at the 2009 – 2011 review. There are still several areas of the country that violate the current ozone standard. Many areas have made considerable progress in lowering ozone levels, but further work remains to be done. During 2012, U.S. EPA lowered the annual PM-2.5 standard. Future analyses will focus on how areas are dealing with meeting this new standard.

Figure 1

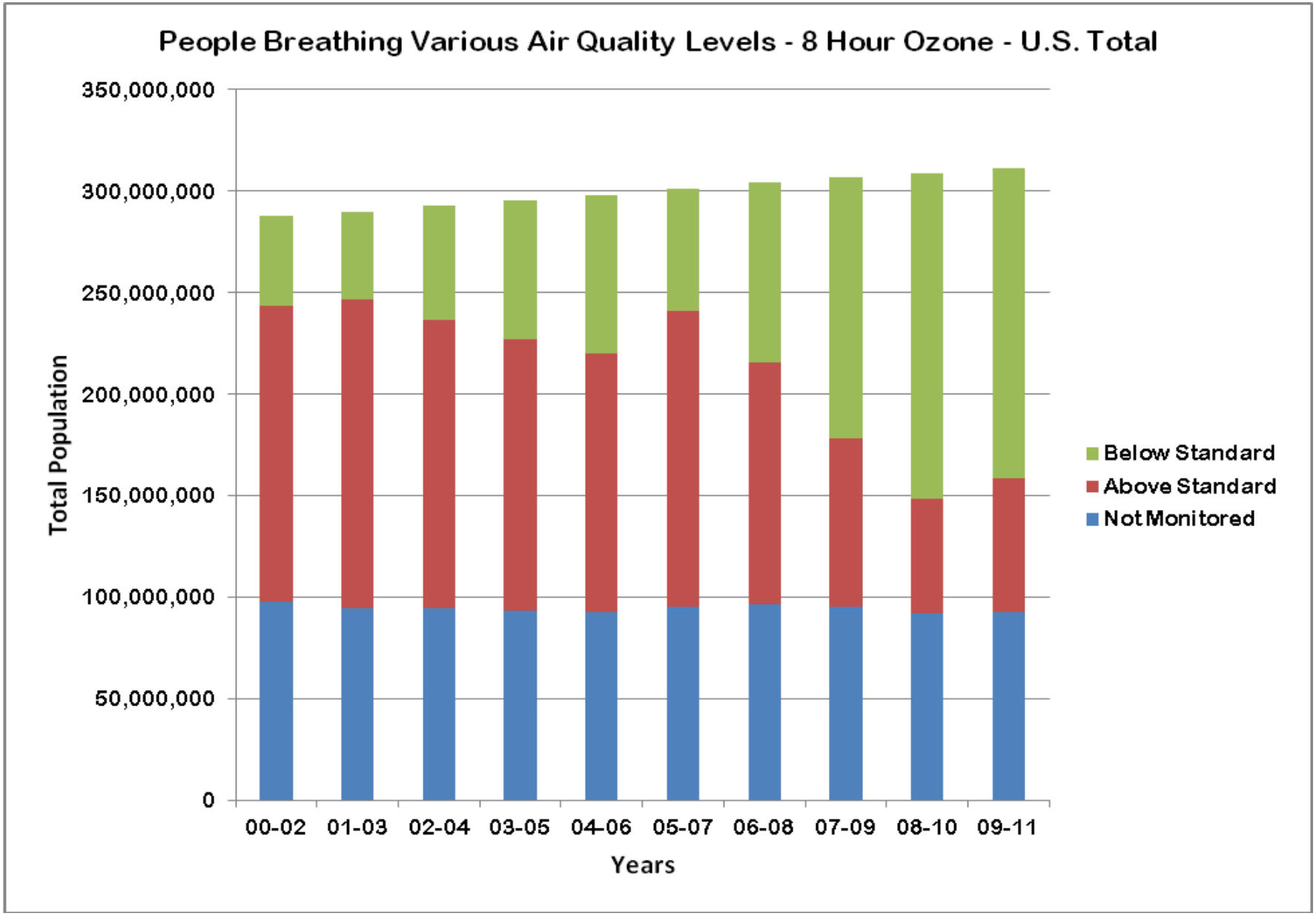

People Breathing Various Air Quality Levels - 8 Hour Ozone - U.S. Total
350,000,000
300,000,000
250,000,000
200,000,000
150,000,000
100,000,000
50,000,000
0
Total Population
00-02
01-03
02-04
03-05
04-06
05-07
06-08
07-09
08-10
09-11
Years
Below Standard
Above Standard
Not Monitored

Figure 2

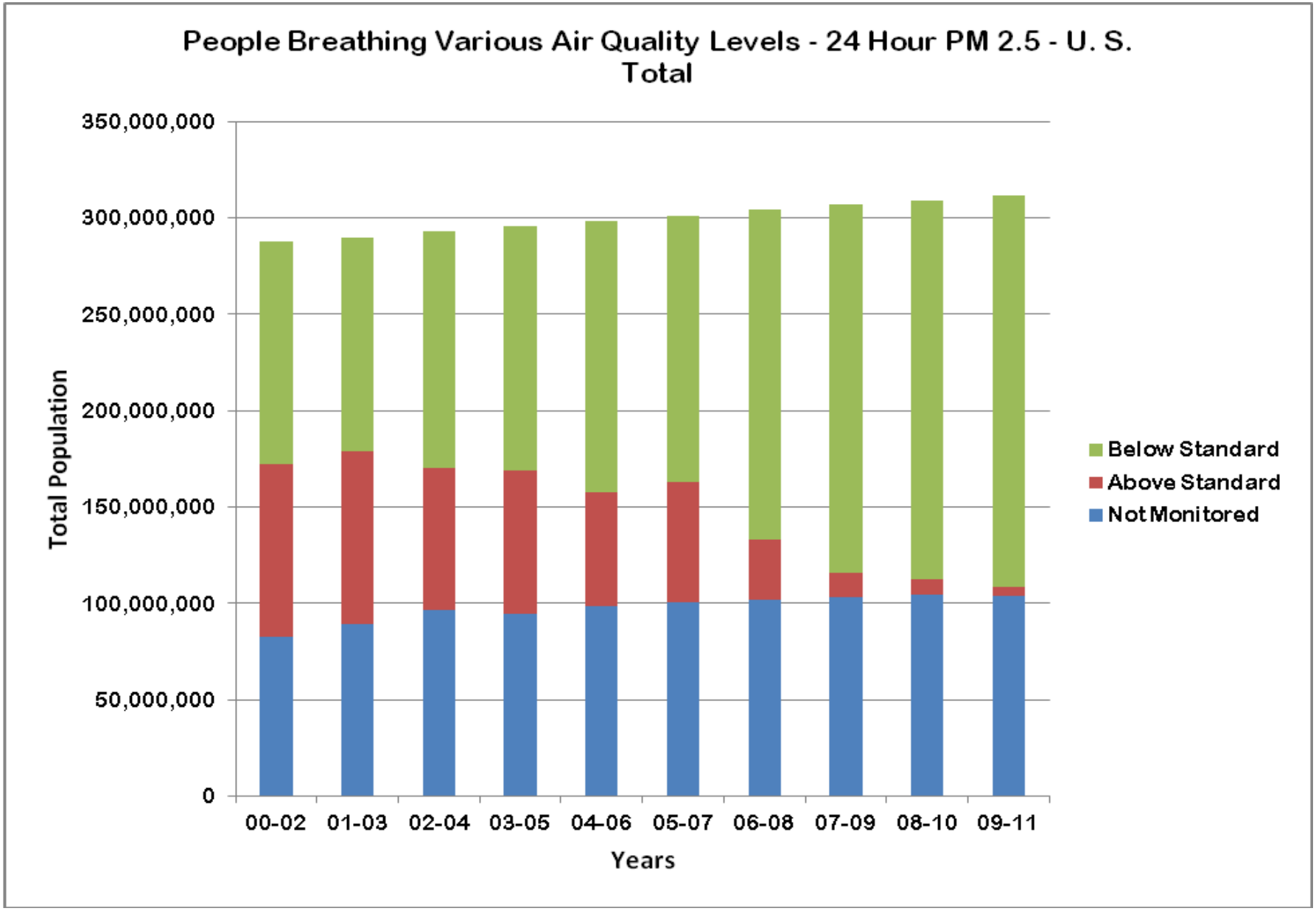

People Breathing Various Air Quality Levels - 24 Hour PM 2.5 - U. S. Total
350,000,000
300,000,000
250,000,000
200,000,000
150,000,000
100,000,000
50,000,000
0
Total Population
00-02
01-03
02-04
03-05
04-06
05-07
06-08
07-09
08-10
09-11
Years
Below Standard
Above Standard
Not Monitored

Figure 3

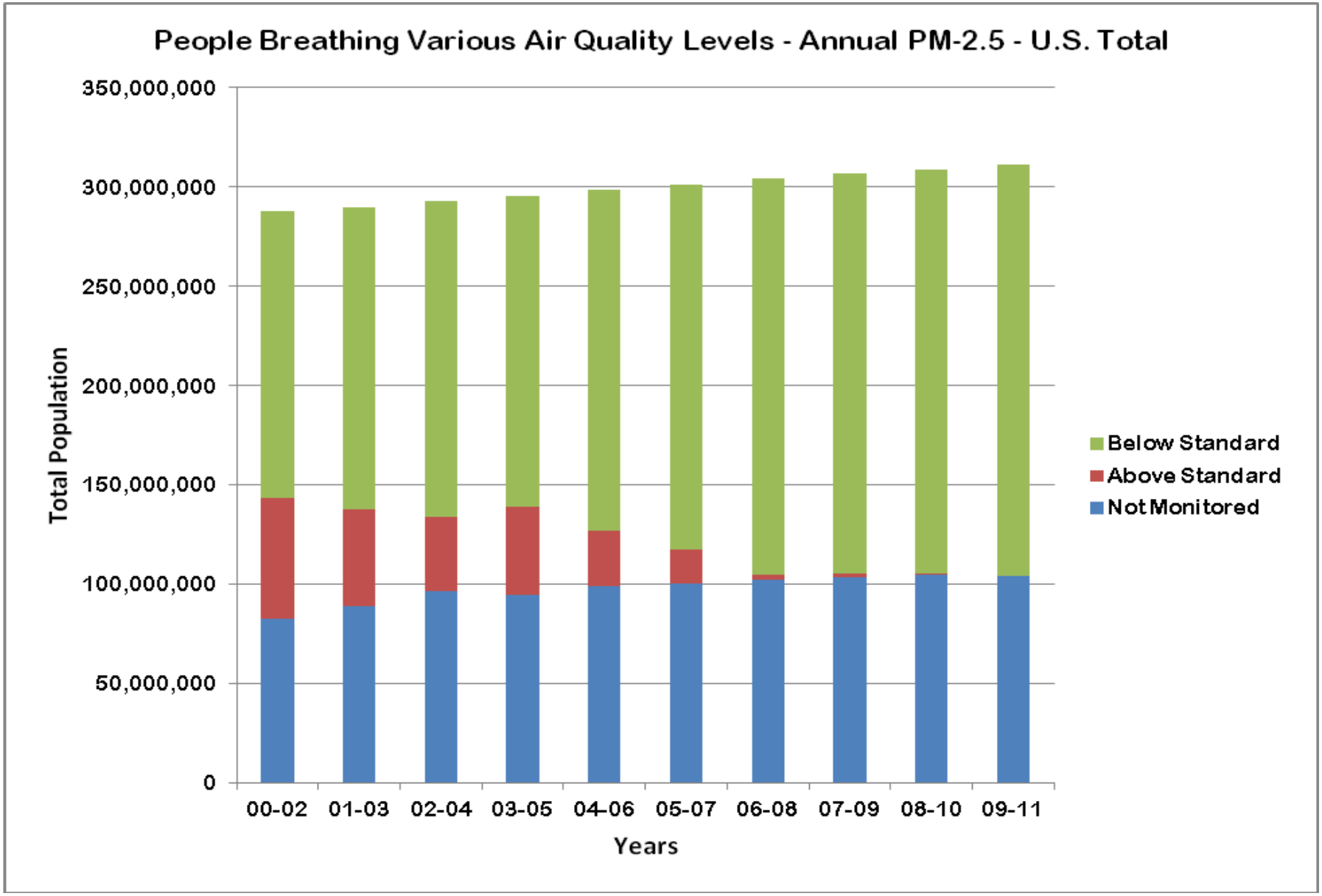

People Breathing Various Air Quality Levels - Annual PM-2.5 - U.S. Total
350,000,000
300,000,000
250,000,000
200,000,000
150,000,000
100,000,000
50,000,000
0
Total Population
00-02
01-03
02-04
03-05
04-06
05-07
06-08
07-09
08-10
09-11
Years
Below Standard
Above Standard
Not Monitored

Figure 4

Non-Attainment States Based on Average Data - 8 Hour Ozone

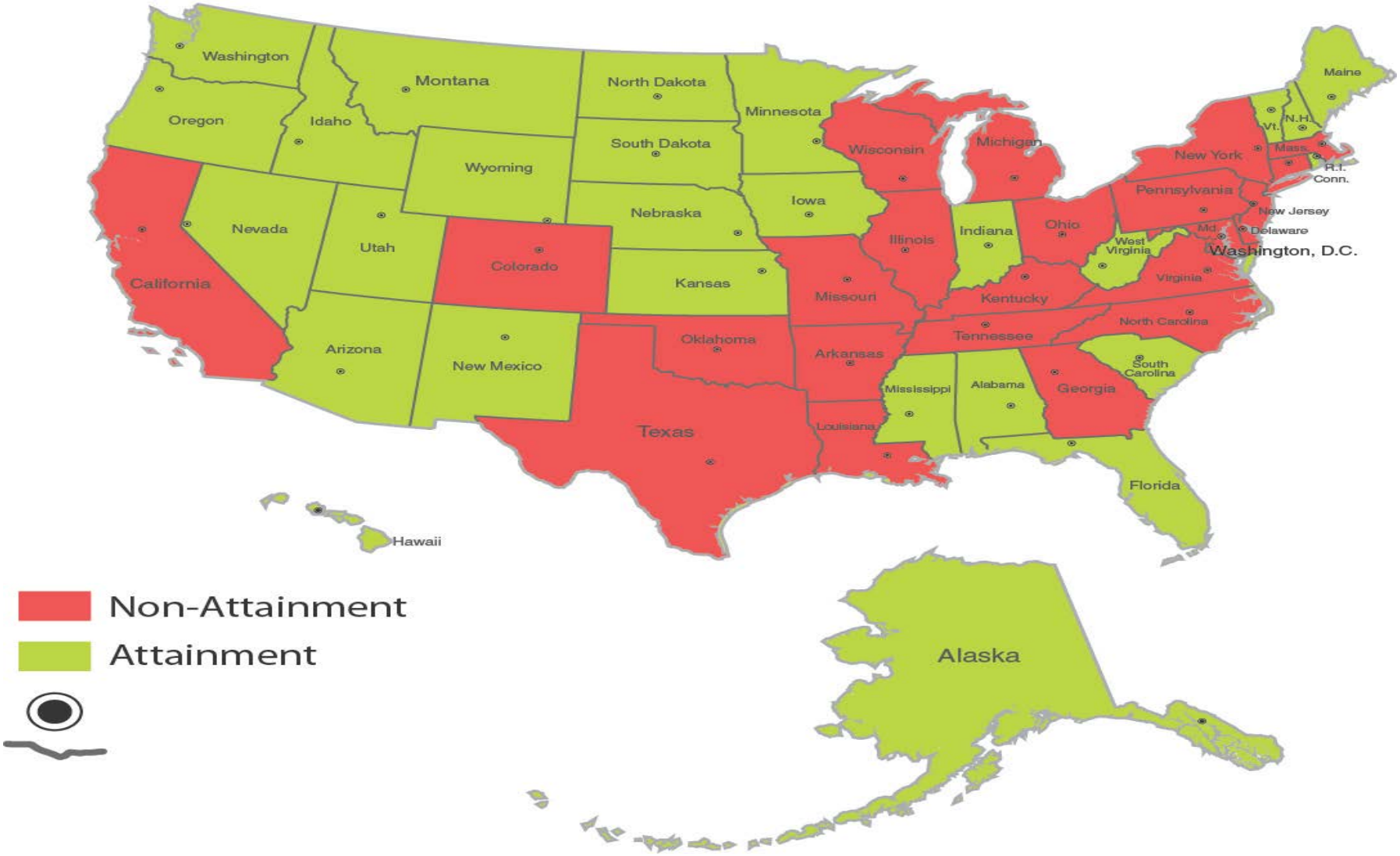


Figure 5

Non-Attainment States Based on U.S. EPA Method - 8 Hour Ozone

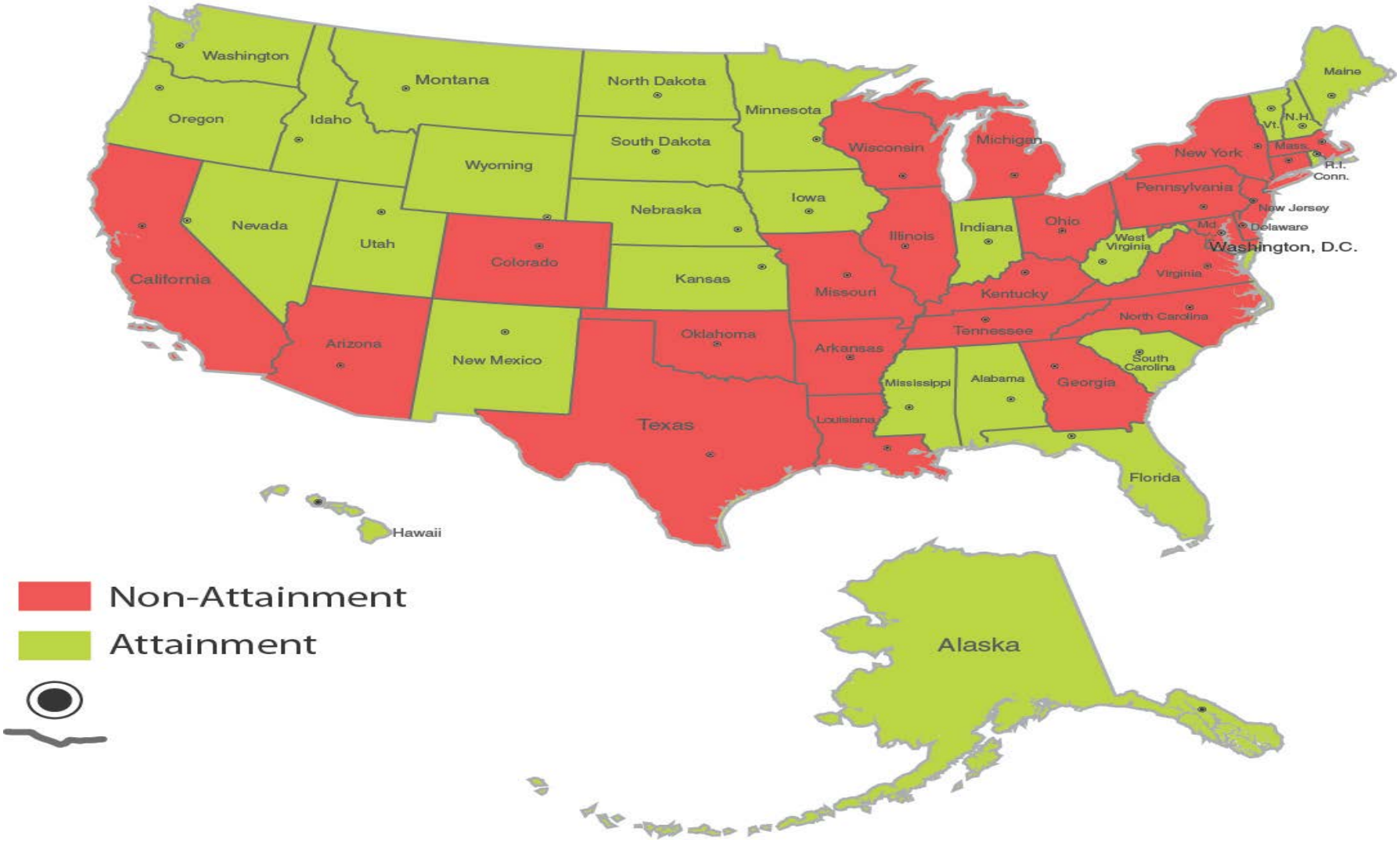


Figure 6

Non-Attainment States Based on Average Data - 24 Hour PM 2.5

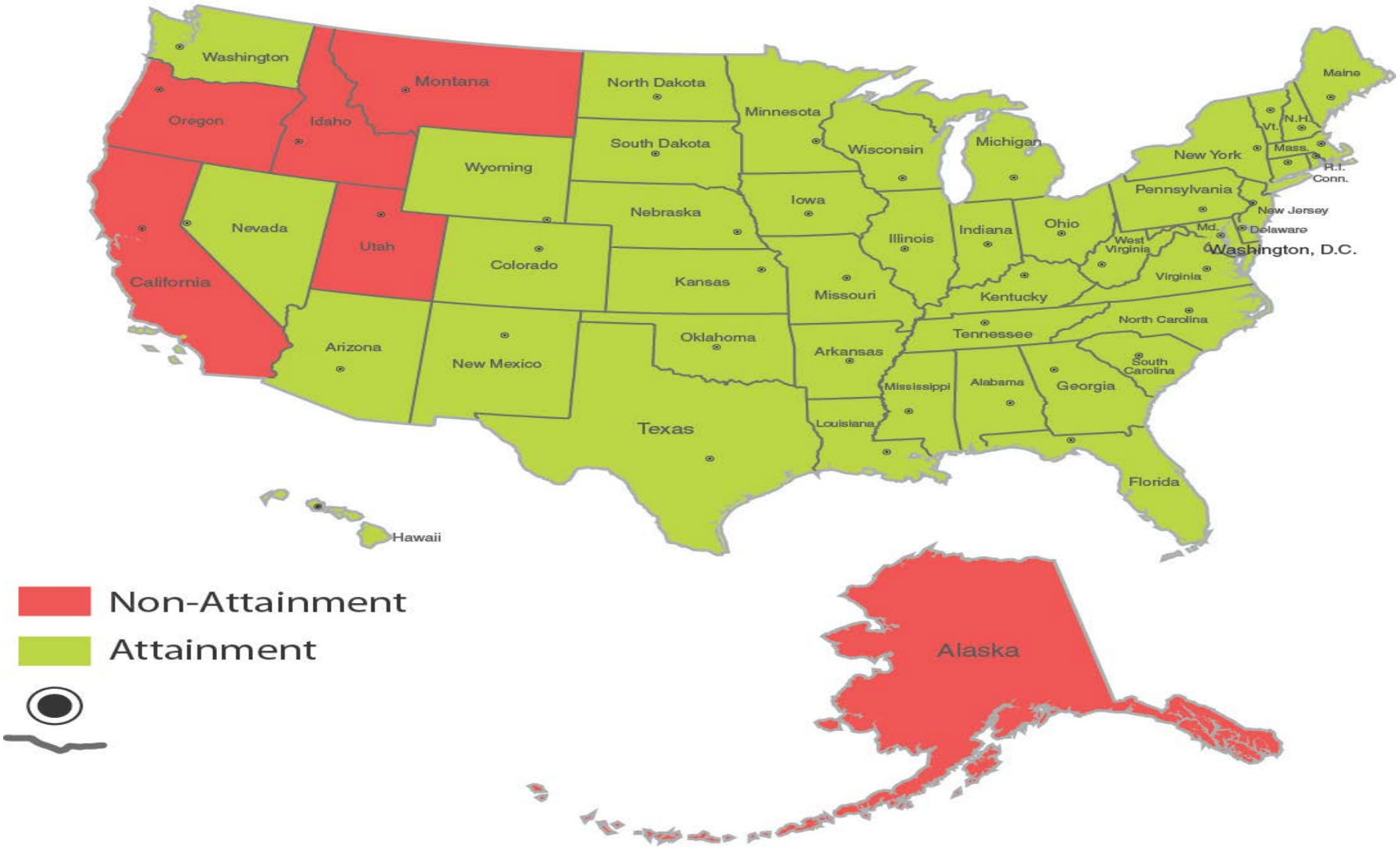


Figure 7

Non-Attainment States Based on U.S. EPA Method - 24 Hour PM 2.5

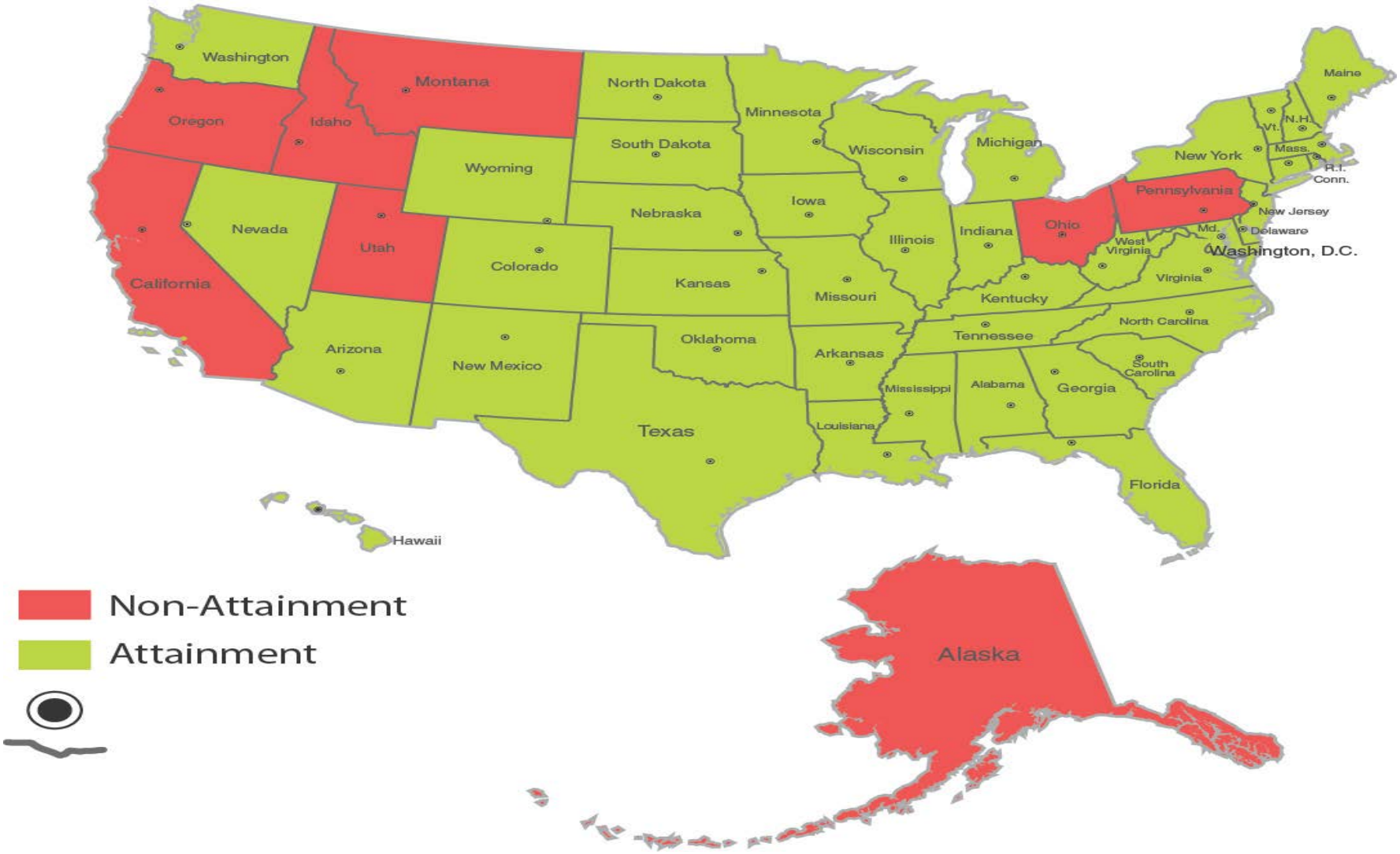


Figure 8

Non-Attainment States Based on Average Data - Annual PM 2.5

Figure 9

Non-Attainment States Based on U.S. EPA Method - Annual PM 2.5

The States' View of the Air – 2013

This is the second year for this report. It was originally intended as a complimentary document to the American Lung Association's (ALA) annual report called "The State of the Air."

This report starts with the same air quality data used by the ALA. For this report, it includes data for the period of 2009 – 2011. The review of data in this report differs from the ALA in a few significant ways. First, the design values used for both ozone and PM-2.5 are based on average values for each county. This is an important distinction. While U.S. EPA's guidance for attainment/nonattainment designation purposes focuses on the worst design value for a county, this is not consistent with what people are breathing. For example, if a county has ten monitors and nine have design values below the standard and one is slightly above the standard, U.S. EPA and ALA would assume that everyone in the county were breathing air at levels above the standard. That is obviously not correct. If you combine counties into metropolitan statistical areas (cities) consisting of several counties, the entire area would be assumed to be above the standard based on the one monitor described above. This report averages design values for all monitors in a county to determine the average level that is breathed by the residents of that county. This is not to say that some individuals could be exposed to higher levels. However, not all residents in a county are exposed to levels associated with the highest monitor.

A second difference is that when design values for a number of counties are being grouped to determine the overall value for a metropolitan statistical area, the individual design values for each county are weighted by the population of that county to determine a population weighted average value. This value is more consistent with what the population is being exposed to and is in line with what health research professionals use in their analyses.

A new grading system has been established for ozone and PM-2.5 in this report. Any grading system is arbitrary in nature. The key to this grading system is that any area meeting the national ambient air quality standards should not be rated lower than a "C". In essence, we have set the standard as a "C". Any level between 90 and 100% of the standard is rated a "C". Any level between 80 and 90% of the standard is rated as "B". Any level below 80% is set as an "A". Any level between 101 and 110% of the standard is set as a "D". Any level above 110% of the standard is rated as an "F". This translates into the following ranges.

Table 1
Grading Scheme

Grade	Ozone (ppm)	24-hr PM-2.5 (µg/m3)	Annual PM-2.5 (µg/m3)
A	< 0.060	< 28.0	< 12.0
B	0.060 – 0.067	28.0 – 31.4	12.0 – 13.4
C	0.068 – 0.075	31.5 – 35.0	13.5 – 15.0
D	0.076 – 0.082	35.1 – 38.5	15.1 – 16.5
F	➢ 0.082	➢ 38.5	➢ 16.5

This grading scale will need to be revised in the future as the national ambient air quality standards for PM-2.5 and ozone are revised. However, these are the appropriate levels for the standards that were in place during the time period (2009 – 2011).

This report will not report population groups by county or state (those less than 18 or 65 and older, diabetics, etc.). It is very difficult to obtain this data for each state. Also, the methodology which apportions state totals to individual counties is questionable. It is based solely upon a comparison of age distribution of the state versus the county. In many cases other variables, may be important in making these allocations more accurately.

Information on health effects is not included in this report. Instead we provide links to U.S. EPA websites that contain this information.

Ozone: **http://epa.gov/airquality/ozonepollution/health.html**

PM-2.5: **http://epa.gov/airquality/particlepollution/health.html**

The remainder of this report contains tables that are similar to those that are in the ALA report. The ALA report focuses solely on a three year block of data and does not provide any perspective. Our report will look at three year blocks of data from 2000 through 2011 so that the reader can see how the air quality is changing over time.

Ozone

In the 2000 – 2002 period approximately 44 million people (15.4% of the U.S. population) lived in counties that met the ozone standard. During the same time period approximately 98 million people (34.0%) lived in counties where ozone was not monitored. By the 2009 – 2011 period over 153 million people (49.1%) lived in counties that met the ozone standard. During the same time period over 93 million people (29.7%) lived in counties where ozone was not monitored. Figure 1 shows the distribution of people by year.

24 – Hour PM-2.5

In the 2000 – 2002 period approximately 115 million people (40.0% of the U.S. population) lived in counties that met the 24-hour PM-2.5 standard. During this same time period approximately 83 million people (28.8%) lived in counties where PM-2.5 was not monitored. By the 2009 – 2011 period over 202 million people (65.1%) lived in counties that met the 24-hour PM-2.5 standard. During the same time period nearly 104 million people (33.4%) lived in counties where PM-2.5 was not monitored. Figure 2 shows the distribution of people by year.

Annual PM-2.5

In the 2000 – 2002 period approximately 144 million people (50.2% of the U.S. population) lived in counties that met the annual PM-2.5 standard. During the same time period approximately 83 million people (28.8%) lived in counties where PM-2.5 was not monitored. By the 2009 - 2011 period nearly 207 million people (66.5%) lived in counties that met the annual PM-2.5 standard. During the same time period nearly 104 million people (33.4%) lived in counties where PM-2.5 was not monitored. Figure 3 shows the distribution of people by year.

Note:

For the state summaries, the first table shows monitoring totals at the bottom that include county totals for areas that measure either Ozone or PM-2.5. The second set of tables includes totals monitored by pollutant.

Table 2

People Breathing Ozone

Grades	2000-2002	2001-2003	2002-2004	2003-2005	2004-2006	2005-2007	2006-2008	2007-2009	2008-2010	2009-2011
A	7,324,220	4,694,728	4,003,383	5,745,195	5,287,580	5,360,498	5,011,108	10,243,596	11,980,519	13,396,528
B	11,513,254	13,814,637	14,377,454	17,563,407	17,379,741	18,234,505	22,753,182	25,017,664	44,358,793	40,702,520
C	25,458,163	24,595,515	37,536,473	44,810,623	55,695,804	36,860,447	60,830,451	93,280,488	103,701,796	98,688,848
D	42,363,493	40,121,125	53,163,390	69,172,263	67,553,184	74,353,896	71,572,547	59,293,443	40,103,047	56,096,083
F	103,078,080	112,175,945	88,952,603	64,991,911	59,733,841	70,912,974	47,447,952	23,437,441	16,589,756	10,136,744
Subtotals	189,737,210	195,401,950	198,033,303	202,283,399	205,650,150	205,722,320	207,615,240	211,272,632	216,733,911	219,020,723
Not Monitored	97,887,983	94,705,983	94,771,995	93,233,200	92,629,762	95,508,887	96,478,726	95,498,897	92,012,555	92,571,194
Totals	287,625,193	290,107,933	292,805,298	295,516,599	298,379,912	301,231,207	304,093,966	306,771,529	308,746,466	311,480,407

Table 3

People Breathing Short-term Particle Pollution (24-hour PM-2.5)

Grades	2000-2002	2001-2003	2002-2004	2003-2005	2004-2006	2005-2007	2006-2008	2007-2009	2008-2010	2009-2011
A	41,468,450	45,132,271	51,309,871	45,673,760	51,817,451	59,481,093	77,050,571	106,840,128	136,505,105	158,355,954
B	36,137,413	28,725,891	34,251,248	37,053,510	39,803,589	36,000,800	50,040,946	47,344,333	52,180,067	27,181,333
C	37,521,542	37,319,368	37,065,421	43,458,479	48,755,917	42,853,803	43,881,509	36,563,352	7,581,074	17,381,459
D	36,465,508	39,488,601	37,277,520	31,043,723	32,217,675	35,354,532	21,655,698	4,254,926	3,050,522	94,846
F	53,299,642	50,235,123	36,277,134	43,478,956	26,824,469	26,963,699	9,401,408	8,304,099	4,485,720	4,608,149
Subtotals	204,892,555	200,901,254	196,181,194	200,708,428	199,419,101	200,652,927	202,030,132	203,306,838	203,802,488	207,621,741
Not Monitored	82,732,638	89,206,679	96,624,104	94,808,171	98,960,811	100,578,280	102,063,834	103,464,691	104,943,978	103,970,176
Totals	287,625,193	290,107,933	292,805,298	295,516,599	298,379,912	301,231,207	304,093,966	306,771,529	308,746,466	311,480,407

Table 4

People Breathing Year Round Particle Pollution (Annual PM-2.5)

Grades	2000-2002	2001-2003	2002-2004	2003-2005	2004-2006	2005-2007	2006-2008	2007-2009	2008-2010	2009-2011
A	69,260,623	74,329,502	75,801,240	78,293,203	88,674,706	89,129,714	105,845,474	131,935,176	174,248,887	192,503,461
B	38,660,185	38,445,215	40,829,864	43,907,930	38,626,733	40,397,813	47,809,219	61,299,632	26,101,649	11,231,342
C	36,378,138	39,762,783	42,208,660	33,959,039	43,939,218	54,308,068	45,786,585	8,308,985	2,705,926	3,437,685
D	31,382,366	28,317,903	20,585,463	28,003,936	26,473,397	15,148,108	488,882	921,478	595,161	449,253
F	29,211,243	20,045,851	16,755,967	16,544,320	1,705,047	1,669,047	1,999,972	841,567	150,865	0
Subtotals	204,894,555	200,901,254	196,181,194	200,708,428	199,419,101	200,652,927	202,034,132	203,306,838	203,802,488	207,621,741
Not Monitored	82,732,638	89,206,679	96,624,104	94,808,171	98,960,811	100,578,280	102,063,834	103,464,691	104,943,978	103,970,176
Totals	287,625,193	290,107,933	292,805,298	295,516,599	298,379,912	301,231,207	304,093,966	306,771,529	308,746,466	311,480,407

Table 5
High Cities - Year Round Particle Pollution (Annual PM-2.5)
(2009 -2011)

Rank	MSA	PW DV	Grade	2011 Population
1	Visalia-Porterville, CA	15.2	D	449,253
2	Fresno, CA	14.5	C	942,904
3	Fairbanks, AK	14.3	C	99,192
4	Johnstown, PA	13.1	B	143,728
4	Indianapolis-Carmel, IN	13.1	B	1,778,558
6	Canton-Massillon, OH	12.9	B	166,473
7	Modesto, CA	12.7	B	518,522
7	Cincinnati-Middletown, OH-KY-IN	12.7	B	2,138,038
9	Dayton, OH	12.6	B	845,383
9	Springfield, OH	12.6	B	137,691
11	Wheeling, WV	12.4	B	147,197
11	Evansville, IN-KY	12.4	B	359,879
11	Louisville, KY-IN	12.4	B	1,294,849
11	Terre Haute, IN	12.4	B	108,182
11	Allentown-Bethlehem, PA-NJ	12.4	B	824,916
16	Pittsburgh, PA	12.3	B	2,359,746
16	Owensboro, KY	12.3	B	115,333
16	Parkersburg-Marietta, WV-OH	12.3	B	162,248
19	Macon, GA	12.2	B	232,920
20	Rome, GA	12.1	B	95,989
21	Lancaster, PA	12.0	B	523,594
21	St. Joseph, MO-IL	12.0	B	127,574
21	Steubenville-Weirton, OH-WV	12.0	B	60,921
21	Atlanta, GA	12.0	B	5,359,205
25	Columbus, GA-AL	11.9	A	301,439

MSA – Metropolitan Statistical Area PW – Population Weighted DV – Design Value

Of the top 25 cities, only one has air quality that exceeds the national ambient air quality standard. Two cities are rated as C. Twenty one cities are rated as B and one is rated as A.

Table 6
Highest Cities – Short Term Particle Pollution (24-hour PM-2.5)
(2009 -2011)

Rank	MSA	PW DV	Grade	2011 Population
1	**Fresno, CA**	**53**	**F**	942,904
2	**Fairbanks, AK**	**51**	**F**	99,192
3	**Modesto, CA**	**48**	**F**	518,522
4	**Visalia-Porterville, CA**	**47**	**F**	449,253
5	**Logan, UT-ID**	**42**	**F**	127,549
6	**Ogden-Clearfield, UT**	**40**	**F**	244,105
7	**Merced, CA**	**39**	**F**	259,898
8	**Salt Lake City, UT**	**38**	**D**	1,145,905
9	**Provo-Orem, UT**	**37**	**D**	540,834
10	Yakima, WA	35	C	247,141
10	Chico, CA	35	C	220,266
12	Bakersfield, CA	34	C	851,710
13	Green Bay, WI	33	C	309,469
13	Grand Junction, CO	33	C	147,083
13	Johnstown, PA	32	C	143,728
16	Sacramento, CA	31	B	2,176,235
16	Lancaster, PA	31	B	523,594
16	Harrisburg-Carlisle, PA	31	B	552,911
16	Milwaukee-Waukesha, WI	31	B	1,562,216
16	Appleton, WI	31	B	227,403
16	Elkhart-Goshen, IN	31	B	198,941
16	Minneapolis-St. Paul, MN-WI	31	B	3,318,486
16	Cedar Rapids, IA	31	B	260,575
24	Los Angeles-Long Beach, CA	30	B	12,944,801
24	Pittsburgh, PA	30	B	2,359,746
24	St. Joseph, MO-IL	30	B	127,574
24	Hagerstown-Martinsburg, MD-WV	30	B	271,528
24	San Jose, CA	30	B	1,865,450
24	Madison, WI	30	B	576,467
24	Rochester, MN	30	B	187,612

MSA – Metropolitan Statistical Area PW – Population Weighted DV – Design Value

Of the 30 highest cities, 7 have ratings of F, 2 are D, 6 are C and 15 are B.

Table 7
Highest 8-Hour Ozone Cities
(2009 -2011)

Rank	MSA	PW DV	Grade	2011 Population
1	Fresno, CA	0.094	F	942,904
2	Riverside-San Bernardino, CA	0.092	F	4,304,997
3	Bakersfield, CA	0.088	F	851,710
3	Visalia-Porterville, CA	0.088	F	449,253
5	Hanford-Corcoran, CA	0.084	F	153,765
6	Merced, CA	0.082	D	259,898
7	Dallas-Ft. Worth, TX	0.081	D	6,526,548
7	Modesto, CA	0.081	D	518,522
7	Sheboygan, WI	0.081	D	115,149
10	Madera-Chowchilla, CA	0.080	D	152,925
11	Baltimore-Towson, MD	0.079	D	2,729,110
11	Bridgeport, CT	0.079	D	925,899
11	Houston-Sugarland, TX	0.079	D	2,323,738
11	Sacramento, CA	0.079	D	2,176,235
15	Longview, TX	0.078	D	216,666
15	Washington, DC-VA-MD-WV	0.078	D	5,703,948
17	Atlanta, GA	0.077	D	5,359,205
17	Baton Rouge, LA	0.077	D	808,242
17	Lancaster, PA	0.077	D	523,594
17	Norwich-New London, CT	0.077	D	273,502
17	Philadelphia-Camden, PA-NJ-DE-MD	0.077	D	5,992,414
17	Shreveport-Bossier City, LA	0.077	D	403,595
17	Vineland-Millville, NJ	0.077	D	157,095
24	Cincinnati-Middletown, OH-KY-IN	0.076	D	2,138,038
24	Los Angeles-Long Beach, CA	0.076	D	12,944,801
24	Louisville-Jefferson, KY-IN	0.076	D	1,294,849
24	Muskegon-North Shores, MI	0.076	D	171,302
24	New Haven-Milford, CT	0.076	D	861,113
24	New York, NY-NJ-PA	0.076	D	19,015,900
24	Oklahoma City, OK	0.076	D	1,268,053

MSA – Metropolitan Statistical Area PW – Population Weighted DV – Design Value

Of the 30 highest rated cities, five are rated F, while 25 are rated D.

Table 8

Highest Counties - Short Term Particle Pollution (24-hour PM-2.5)
(2009 -2011)

Rank	County/State	DV	Grade	2011 Population
1	Fresno, CA	53	F	942,904
2	Fairbanks, AK	51	F	99,192
3	Stanislaus, CA	48	F	518,522
4	Tulare, CA	47	F	449,253
5	Cache, UT	42	F	114,699
6	Davis UT	41	F	311,811
7	Box Elder, UT	40	F	50,290
8	Merced, CA	39	F	259,898
8	Salt Lake, UT	39	F	1,048,985
8	Weber, UT	39	F	234,420
11	Lemhi, ID	38	D	7,967
11	Lewis & Clark, MT	38	D	64,318
11	Klamath, OR	38	D	66,299
14	Shoshone, ID	37	D	12,672
14	Utah, UT	37	D	530,499
16	Lake, OR	36	D	7,908
17	Butte, CA	35	C	220,266
17	Sacramento, CA	35	C	1,436,105
17	Pierce, WA	35	C	807,904
17	Yakima, WA	35	C	247,141
21	Kern, CA	34	C	851,710
21	Ramsey, MN	34	C	514,696
21	Chester, PA	34	C	503,897
24	Mesa, CO	33	C	146,723
24	Northampton, PA	33	C	298,476
24	Westmoreland, PA	33	C	364,471
24	Brown, WI	33	C	251,412

DV – Design Value

Of the 27 highest counties, ten are rated F, six are D, and 11 are rated C (meeting the National ambient air quality standard).

Table 9
Highest Counties Year Round Particle Pollution (Annual PM-2.5)
(2009 -2011)

Rank	County/State	DV	Grade	2011 Population
1	Tulare, CA	15.2	D	449,253
2	Fresno, CA	14.5	C	942,904
3	Fairbanks, AK	14.3	C	99,192
3	Chester, PA	14.3	C	503,897
5	Westmoreland, PA	14.1	C	364,471
5	Mendocino, CA	14.1	C	87,553
7	Northampton, PA	13.6	C	298,476
8	Cambria, PA	13.1	B	143,728
8	Marion, IN	13.1	B	911,296
8	Hamilton, OH	13.1	B	800,362
11	Marshall, WV	13.0	B	32,800
11	Butler, OH	13.0	B	369,999
13	Montgomery, OH	12.9	B	537,602
13	Stark, OH	12.9	B	375,087
13	Dubois, IN	12.9	B	42,199
16	Vanderburgh, IN	12.8	B	180,305
17	Stanislaus, CA	12.7	B	518,522
17	Adair, OK	12.7	B	22,612
19	Beaver, PA	12.6	B	170,414
19	Clark, OH	12.6	B	137,691
21	St. Louis City, MO	12.5	B	318,069
21	Madison, IL	12.5	B	268,459
21	Clark, IN	12.5	B	111,570
21	Clayton, GA	12.5	B	261,532
21	Fulton, GA	12.5	B	949,599
21	Saint Clair, IL	12.5	B	270,259

DV – Design Value

Of the 26 highest counties, only one is rated a D. All others meet the national ambient air quality standards with six being rated as C, and 19 rated as B.

Table 10
Highest Ozone Counties
(2009 -2011)

Rank	County/State	DV	Grade	2011 Population
1	Fresno, CA	0.094	F	942,904
2	San Bernardino, CA	0.093	F	2,065,377
3	Riverside , CA	0.092	F	2,239,620
4	Kern, CA	0.088	F	851,710
4	Tulare, CA	0.088	F	449,253
6	Harford, MD	0.085	F	246,489
6	Tarrant, TX	0.085	F	1,849,815
8	Kings, CA	0.084	F	153,765
9	El Dorado, CA	0.083	F	180,938
9	Richmond, NY	0.083	F	470,467
9	Denton, TX	0.083	F	686,406
12	Merced, CA	0.082	D	259,898
12	Gloucester, NJ	0.082	D	289,104
12	Fairfax, VA	0.082	D	1,100,692
15	Placer, CA	0.081	D	357,138
15	Stanislaus, CA	0.081	D	518,522
15	Bossier, LA	0.081	D	119,732
15	Anne Arundel, MD	0.081	D	544,403
15	Cecil, MD	0.081	D	101,694
15	Ocean, NJ	0.081	D	579,369
15	Bucks, PA	0.081	D	626,854
15	Collin, TX	0.081	D	812,226
15	Sheboygan, WI	0.081	D	115,149
24	Madera, CA	0.080	D	152.925
24	Fulton, GA	0.080	D	949,599
24	Middlesex, NJ	0.080	D	814,217
24	Monmouth, NJ	0.080	D	631,020
24	Arlington, VA	0.080	D	216,004

DV – Design Value

Of the top 28 counties, 11 are rated as F, while 17 are rated as D.

Table 11
Cleanest U.S. Cities for Short-term Particle Pollution (24-hr PM-2.5)
(2009 -2011)

Rank	MSA	PW DV	Grade	2011 Population
1	Cheyenne, WY	9	A	92,680
1	Santa Fe, NM	9	A	145,648
3	Prescott, AZ	10	A	211,888
4	Casper, WY	11	A	76,366
4	St. George, UT	11	A	141,666
6	Tucson, AZ	12	A	989,569
6	Honolulu, HI	12	A	963,607
8	Farmington, NM	13	A	128,200
8	Pueblo, CO	13	A	160,545
8	Miami-Ft. Lauderdale, FL	13	A	5,670,125
11	Flagstaff, AZ	14	A	134,511
11	Colorado Springs, CO	14	A	660,319
11	Cape Coral-Fort Myers, FL	14	A	631,330
11	Salinas, CA	14	A	421,898
15	Odessa, TX	15	A	140,111
15	Las Vegas, NV	15	A	1,969,975
15	North Port-Bradenton, FL	15	A	709,355
15	Lakeland-Winter Haven, FL	15	A	609,492
15	Redding, CA	15	A	177,774
15	Palm Bay-Melbourne, FL	15	A	543,566
15	Bismarck, ND	15	A	110,879
15	Rapid City, SD	15	A	128,361
23	Orlando-Kissimmee, FL	16	A	2,171,360
23	Albuquerque, NM	16	A	898,642
23	San Luis Obispo, CA	16	A	271,969

MSA – Metropolitan Statistical Area PW – Population Weighted DV – Design Value

Of the 25 cleanest cities, all are rated as A.

Table 12
Cleanest U.S. Cities for Year Round Particle Pollution (Annual PM-2.5)
(2009 -2011)

Rank	MSA	PW DV	Grade	2011 Population
1	Santa Fe, NM	4.1	A	145,648
2	St. George, UT	4.2	A	141,666
2	Cheyenne, WY	4.2	A	92,680
4	Prescott, AZ	4.3	A	211,888
5	Farmington, NM	4.5	A	128,200
5	Casper, WY	4.5	A	76,366
7	Anchorage, AK	5.2	A	387,516
8	Redding, CA	5.3	A	177,774
9	Tucson, AZ	5.4	A	989,569
10	Pueblo, CA	5.6	A	160,545
11	Albuquerque, NM	5.7	A	898,642
11	Rapid City, SD	5.7	A	128,361
13	Las Vegas, NV	5.8	A	1,969,975
13	Salinas, CA	5.8	A	421,898
15	Duluth, MN-WI	5.9	A	279,815
15	Flagstaff, AZ	5.9	A	134,511
15	Colorado Springs, CO	5.9	A	660,319
18	Burlington-S. Burlington VT	6.2	A	212,535
19	Fort Collins-Loveland, CO	6.3	A	305,525
20	Boulder, CO	6.5	A	299,378
20	Miami-Ft. Lauderdale, FL	6.5	A	5,670,125
22	Palm Bay-Melbourne, FL	6.6	A	543,566
22	Bismarck, ND	6.6	A	110,879
24	Boise City-Nampa, ID	6.7	A	627,664
25	Reno-Sparks, NV	6.8	A	429,606
25	San Luis Obispo, CA	6.8	A	271,969

MSA – Metropolitan Statistical Area PW – Population Weighted DV – Design Value

Of the 26 cleanest cities all are rated as A.

Table 13
Cleanest U.S. Cities for Ozone Air Pollution
(2009 -2011)

Rank	MSA	PW DV	Grade	2011 Population
1	Bellingham, WA	0.046	A	203,663
2	Honolulu, HI	0.047	A	963,607
3	Santa Rosa, CA	0.051	A	488,116
4	Lincoln, NE	0.052	A	306,503
5	Mt. Vernon-Anacortes, WA	0.054	A	118,109
6	San Francisco, CA	0.055	A	4,391,037
7	Duluth, MN-WI	0.056	A	279,815
7	Olympia, WA	0.056	A	256,591
7	Seattle-Tacoma, WA	0.056	A	3,500,026
10	Bangor, ME	0.057	A	153,786
10	Bismarck, ND	0.057	A	110,879
10	Coeur d'Alene, ID	0.057	A	141,132
10	Rapid City, SD	0.057	A	128,361
10	Salinas, CA	0.057	A	421,898
10	Spokane, WA	0.057	A	473,761
16	Des Moines-W. Des Moines, IA	0058	A	580,255
16	Laredo, TX	0.058	A	256,496
16	St. Cloud, MN	0.058	A	190,014
16	Tuscaloosa, AL	0.058	A	221,553
20	Bend, OR	0.059	A	160,338
20	Fargo, ND-MN	0.059	A	212,171
20	Omaha-Council Bluffs, NE-IA	0.059	A	877,110
20	Portland-Vancouver, OR-WA	0.059	A	2,262,605
24	Ames, IA	0.060	B	89,663
24	Rochester, MN	0.060	B	187,612
24	Utica-Rome, NY	0.060	B	298,447

MSA – Metropolitan Statistical Area PW – Population Weighted DV – Design Value

Of the cleanest 26 cities, 23 are rated A, while 3 are rated B.

Table 14
Cleanest Counties – Short Term Particle Pollution (24-hour PM-2.5)
(2009 -2011)

Rank	County/State	DV	Grade	2011 Population
1	Lake, CA	7	A	64,323
2	Elbert, CO	9	A	23,086
2	Santa Fe, NM	9	A	145,648
2	Laramie, WY	9	A	92,680
5	Apache, AZ	10	A	72,401
5	Yavapai, AZ	10	A	211,888
7	Grant, NM	11	A	29,380
7	Billings, ND	11	A	816
7	Jackson, SD	11	A	3,169
7	Washington, UT	11	A	141,666
7	Natrona, WY	11	A	76,366
7	Park, WY	11	A	28,592
7	Teton, WY	11	A	21,548
14	Pima, AZ	12	A	989,569
14	Honolulu, HI	12	A	963,607
14	Custer, SD	12	A	8,338
14	Sweetwater, WY	12	A	44,175
18	Siskiyou, CA	13	A	44,507
18	Pueblo, CO	13	A	159,063
18	Broward, FL	13	A	1,780,172
18	Miami-Dade, FL	13	A	2,554,766
18	Hawaii, HI	13	A	186,738
18	Hancock, ME	13	A	54,578
18	San Juan, NM	13	A	128,200
18	Mercer, ND	13	A	8,449
18	Albany, WY	13	A	36,889

DV – Design Value

The cleanest 26 counties are all rated as A.

Table 15
Cleanest Counties - Year Round Particle Pollution (Annual PM-2.5)
(2009 -2011)

Rank	County/State	DV	Grade	2011 Population
1	Lake, CA	3.3	A	64,323
2	Apache, AZ	3.5	A	72,401
3	Jackson, SD	3.8	A	3,169
4	Elbert, CO	4.0	A	23,086
5	Santa Fe, NM	4.1	A	145,648
6	Custer, SD	4.2	A	8,338
6	Washington, UT	4.2	A	141,666
6	Laramie, WY	4.2	A	92,680
9	Billings, ND	4.3	A	816
9	Yavapai, AZ	4.3	A	211,888
11	Essex, NY	4.4	A	39,181
11	Park, WY	4.4	A	28,592
13	Hancock, ME	4.5	A	54,578
13	San Juan, NM	4.5	A	128,200
13	Natrona, WY	4.5	A	76,366
13	Teton, WY	4.5	A	21,548
17	Maui, HI	4.8	A	156,674
18	Sublette, WY	4.9	A	10,146
18	Grant, NM	4.9	A	29,380
20	Piscataquis, ME	5.0	A	17,419
20	Siskiyou, CA	5.0	A	44,507
20	Albany, WY	5.0	A	36,889
23	Anchorage, AK	5.2	A	295,570
23	Nevada, CA	5.2	A	98,612
25	Humboldt, CA	5.3	A	134,761
25	Matanuska, AK	5.3	A	91,946
25	Shasta, CA	5.3	A	177,774

DV – Design Value

The cleanest 27 counties are all rated as A.

Table 16
Cleanest Counties - Ozone Air Pollution
(2009 -2011)

Rank	County/State	DV	Grade	2011 Population
1	Franklin, NY	0.045	A	51,551
2	Humboldt, CA	0.046	A	134,761
2	Whatcom, WA	0.046	A	203,663
4	San Francisco, CA	0.047	A	812,826
4	Honolulu, HI	0.047	A	963,607
6	Mendocino, CA	0.048	A	87,553
7	Sonoma, CA	0.051	A	488,116
8	Aroostook, ME	0.052	A	71,482
8	Lancaster, NE	0.052	A	289,800
10	Denali, AK	0.053	A	1,885
10	Columbia, OR	0.053	A	49,402
12	Marin, CA	0.054	A	255,031
12	Carlton, MN	0.054	A	35,455
12	Pierce, WA	0.054	A	807,904
12	Skagit, WA	0.054	A	118,109
16	Oxford, ME	0.055	A	57,695
16	Flathead, MT	0.055	A	91,301
16	Jackson, SD	0.055	A	3,169
16	Clallam, WA	0.055	A	71,838
20	San Mateo, CA	0.056	A	727,209
20	Saint Louis, MN	0.056	A	200,255
20	Thurston, WA	0.056	A	256,591
23	Lake, CA	0.057	A	64,323
23	Monterey, CA	0.057	A	421,898
23	Kootenai, ID	0.057	A	141,132
23	Rock Island, IL	0.057	A	147,556
23	Polk, IA	0.057	A	437,399
23	Penobscot, ME	0.057	A	153,786
23	Washington, ME	0.057	A	32,637
23	Burleigh, ND	0.057	A	83,145
23	Multnomah, OR	0.057	A	748,031
23	Meade, SD	0.057	A	25,546
23	Clark, WA	0.057	A	433,418
23	King, WA	0.057	A	1,969,722
23	Spokane, WA	0.057	A	473,761

DV – Design Value

Of the 35 cleanest counties, all are rated A.

MICHIGAN

Ozone

Significant progress has been made in ozone levels in Michigan. In the 2000 – 2002 time period, no people lived in counties that met the ozone standard. By 2009 – 2011 this had increased to approximately 5.9 million people (59.4%). Figure MI-1 shows the distribution of people by year.

24-Hour PM-2.5

Significant progress has been made in 24-hour PM-2.5 levels in Michigan. In the 2000 – 2002 time period, approximately 1.8 million people (17.8%) lived in counties where 24-hour PM-2.5 levels met the standard. By 2009 -2011 this was approximately 7.1 million people (71.6%). The remainder of the population lived in counties where PM-2.5 was not measured. Figure MI-2 shows the distribution of people by year.

Annual PM-2.5

Significant progress has been made in annual PM-2.5 levels in Michigan. In the 2000 – 2002 time period, approximately 4.8 million people (48.1%) lived in counties where annual PM-2.5 levels met the standard. By 2009 – 2011 this had increased to approximately 7.1 million people (71.6%). The remainder of the population lived in counties where PM-2.5 was not measured. Figure MI-3 shows the distribution of people by year.

MICHIGAN

Table MI-1

2009 – 2011

		OZONE		PARTICLE POLLUTION (PM-2.5)			
County	Population	Avg. DV	Grade	Avg. 24-Hr DV	Grade	Avg. Ann DV	Grade
Allegan	**111,234**	**0.078**	**D**	25	A	8.5	A
Bay	107,110	ND	---	25	A	8.0	A
Benzie	17,443	0.071	C	ND	---	ND	---
Berrien	156,941	0.075	C	22	A	8.8	A
Cass	51,988	0.074	C	ND	---	ND	---
Chippewa	38,797	ND	---	32	B	12.3	B
Clinton	75,469	0.066	B	ND	---	ND	---
Genesee	422,080	0.070	C	24	A	8.7	A
Huron	32,675	0.068	C	ND	---	ND	---
Ingham	281,613	0.068	C	24	A	8.9	A
Kalamazoo	252,074	0.071	C	24	A	9.5	A
Kent	608,453	0.071	C	26	A	9.6	A
Lenawee	99,440	0.070	C	25	A	9.4	A
Macomb	**842,145**	**0.076**	**D**	25	A	9.0	A
Manistee	24,709	0.069	C	20	A	6.4	A
Mason	28,678	0.070	C	ND	---	ND	---
Missaukee	14,911	0.066	B	18	A	6.0	A
Monroe	151,560	ND	---	25	A	9.9	A
Muskegon	**171,302**	**0.076**	**D**	24	A	8.5	A
Oakland	1,210,145	0.075	C	27	A	9.4	A
Ottawa	266,300	0.074	C	25	A	9.1	A
St. Clair	161,642	0.074	C	26	A	9.2	A
Schoolcraft	8,490	0.068	C	ND	---	ND	---
Washtenaw	347,962	0.069	C	25	A	9.6	A
Wayne	1,802,096	0.074	C	27	A	10.3	A
Subtotal	7,373,527						
Not Monitored	2,502,660						
Total	9,876,187						

DV – Design Value ND - No Data

MICHIGAN

Table MI-2

People Breathing Ozone

Grade	00-02	01-03	02-04	03-05	04-06	05-07	06-08	07-09	08-10	09-11
A	0	0	0	0	0	0	0	0	0	0
B	0	0	0	0	0	0	0	0	501,358	90,380
C	0	0	0	0	3,805,133	15,009	1,455,890	4,358,405	6,489,227	5,772,729
D	944,823	15,031	3,258,025	5,604,281	3,007,209	4,732,781	5,485,999	2,645,402	0	1,124,681
F	6,137,725	7,025,788	3,792,065	1,457,654	284,366	2,321,749	111,589	0	0	0
Subtotal	7,082,548	7,040,819	7,050,090	7,061,935	7,097,208	7,069,539	7,053,478	7,003,807	6,990,585	6,987,790
NM	2,933,162	3,000,333	3,005,225	2,989,202	2,938,873	2,931,745	2,893,411	2,897,784	2,893,055	2,888,397
Total	10,015,710	10,041,152	10,055,315	10,051,137	10,036,081	10,001,284	9,946,889	9,901,591	9,883,640	9,876,187

People Breathing Short-term Particle Pollution (24-Hour PM-2.5)

Grade	00-02	01-03	02-04	03-05	04-06	05-07	06-08	07-09	08-10	09-11
A	0	38,789	247,292	54,089	54,094	15,009	962,705	1,560,310	3,854,883	7,031,717
B	481,896	318,314	995,315	207,368	842,879	830,986	2,922,322	4,062,421	3,185,986	38,797
C	1,299,228	1,306,283	2,699,400	1,602,538	933,684	1,819,989	3,230,562	1,364,901	0	0
D	2,083,450	3,462,021	3,338,759	1,936,817	1,772,537	751,501	0	0	0	0
F	3,372,583	2,155,901	0	3,484,099	3,456,518	3,613,690	0	0	0	0
Subtotal	7,237,157	7,281,308	7,280,766	7,284,911	7,059,712	7,031,175	7,115,589	6,987,632	7,040,869	7,070,514
NM	2,778,553	2,759,844	2,774,549	2,766,226	2,976,369	2,970,109	2,831,300	2,913,959	2,842,771	2,805,673
Total	10,015,710	10,041,152	10,055,315	10,051,137	10,036,081	10,001,284	9,946,889	9,901,591	9,883,640	9,876,187

People Breathing Year Round Particle Pollution (Annual PM-2.5)

Grade	00-02	01-03	02-04	03-05	04-06	05-07	06-08	07-09	08-10	09-11
A	321,292	357,103	959,021	1,145,248	1,046,372	1,043,107	3,209,723	5,150,096	7,040,869	7,031,717
B	880,432	1,949,274	2,982,986	2,655,564	3,583,372	2,388,480	3,805,866	1,837,536	0	38,797
C	3,619,802	2,819,030	1,354,929	1,523,836	2,429,968	3,599,588	0	0	0	0
D	390,498	2,155,901	1,983,830	1,960,263	0	0	0	0	0	0
F	2,025,133	0	0	0	0	0	0	0	0	0
Subtotal	7,237,157	7,281,308	7,280,766	7,284,911	7,059,712	7,031,175	7,015,589	6,987,632	7,040,869	7,070,514
NM	2,778,553	2,759,844	2,774,549	2,766,226	2,976,369	2,970,109	2,931,300	2,913,959	2,842,771	2,805,673
Total	10,015,710	10,041,152	10,055,315	10,051,137	10,036,081	10,001,284	9,946,889	9,901,591	9,883,640	9,876,187

NM – Not Monitored

Figure MI-1

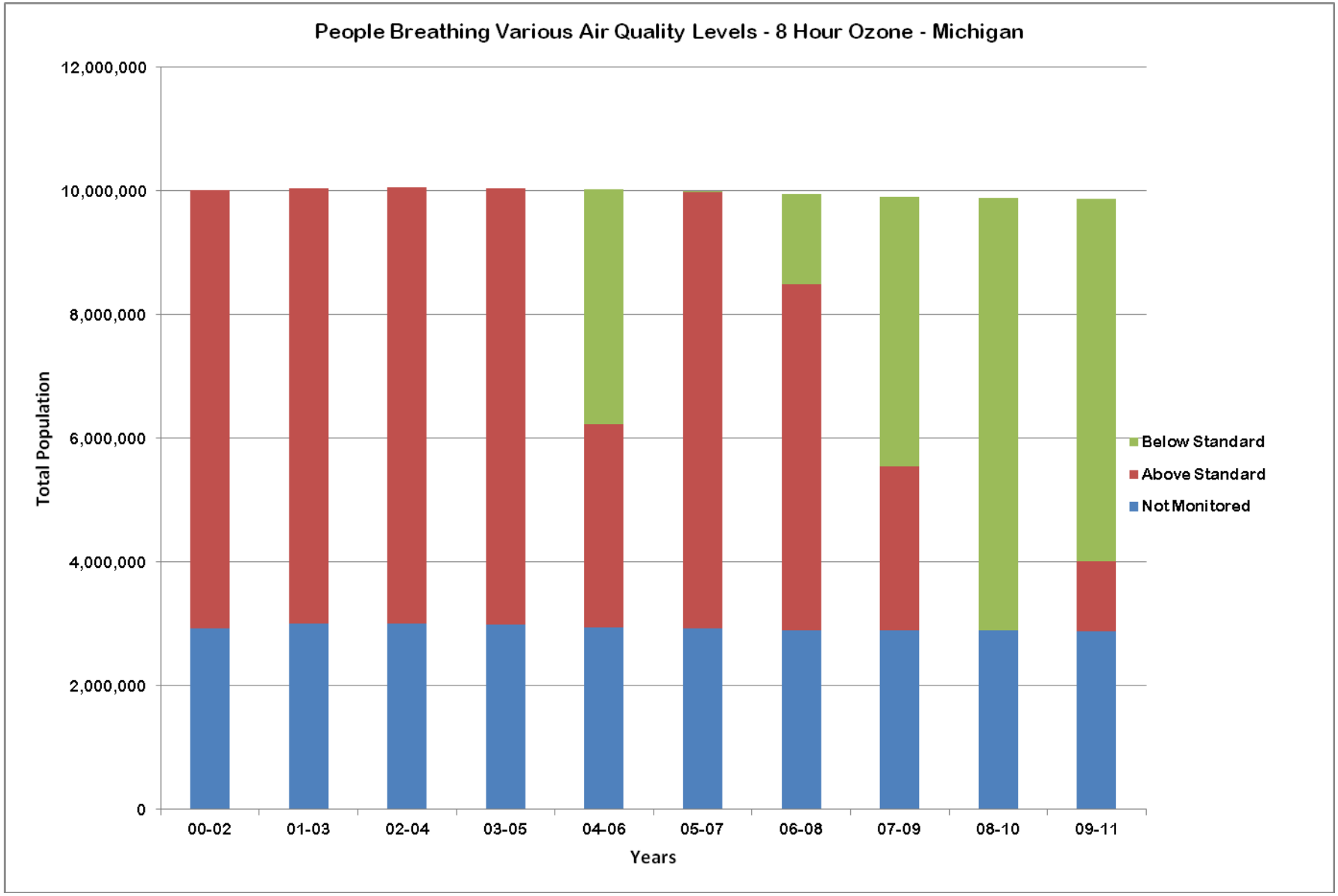

People Breathing Various Air Quality Levels - 8 Hour Ozone - Michigan
12,000,000
10,000,000
8,000,000
6,000,000
4,000,000
2,000,000
0
Total Population
00-02
01-03
02-04
03-05
04-06
05-07
06-08
07-09
08-10
09-11
Years
Below Standard
Above Standard
Not Monitored

Figure MI-2

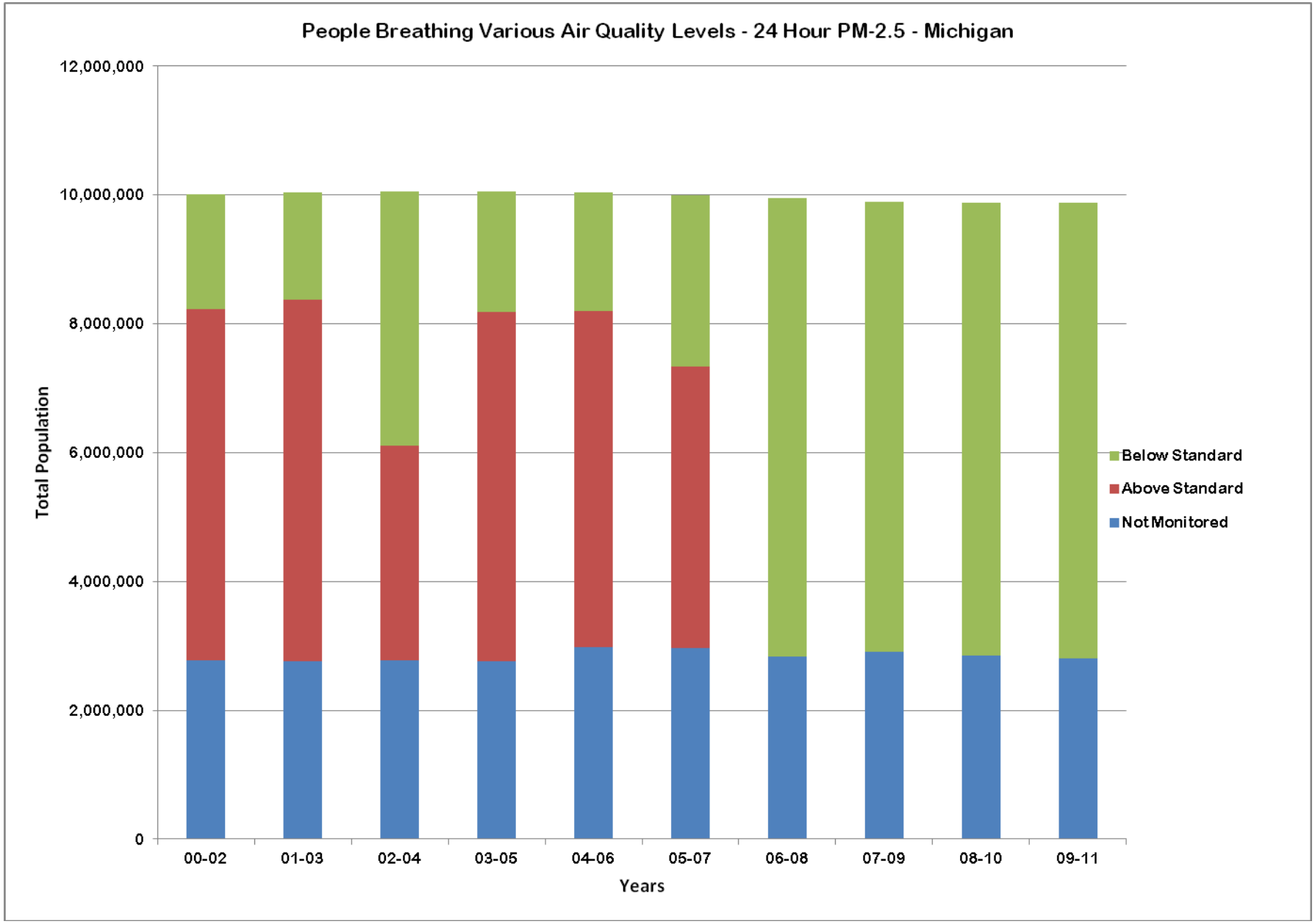
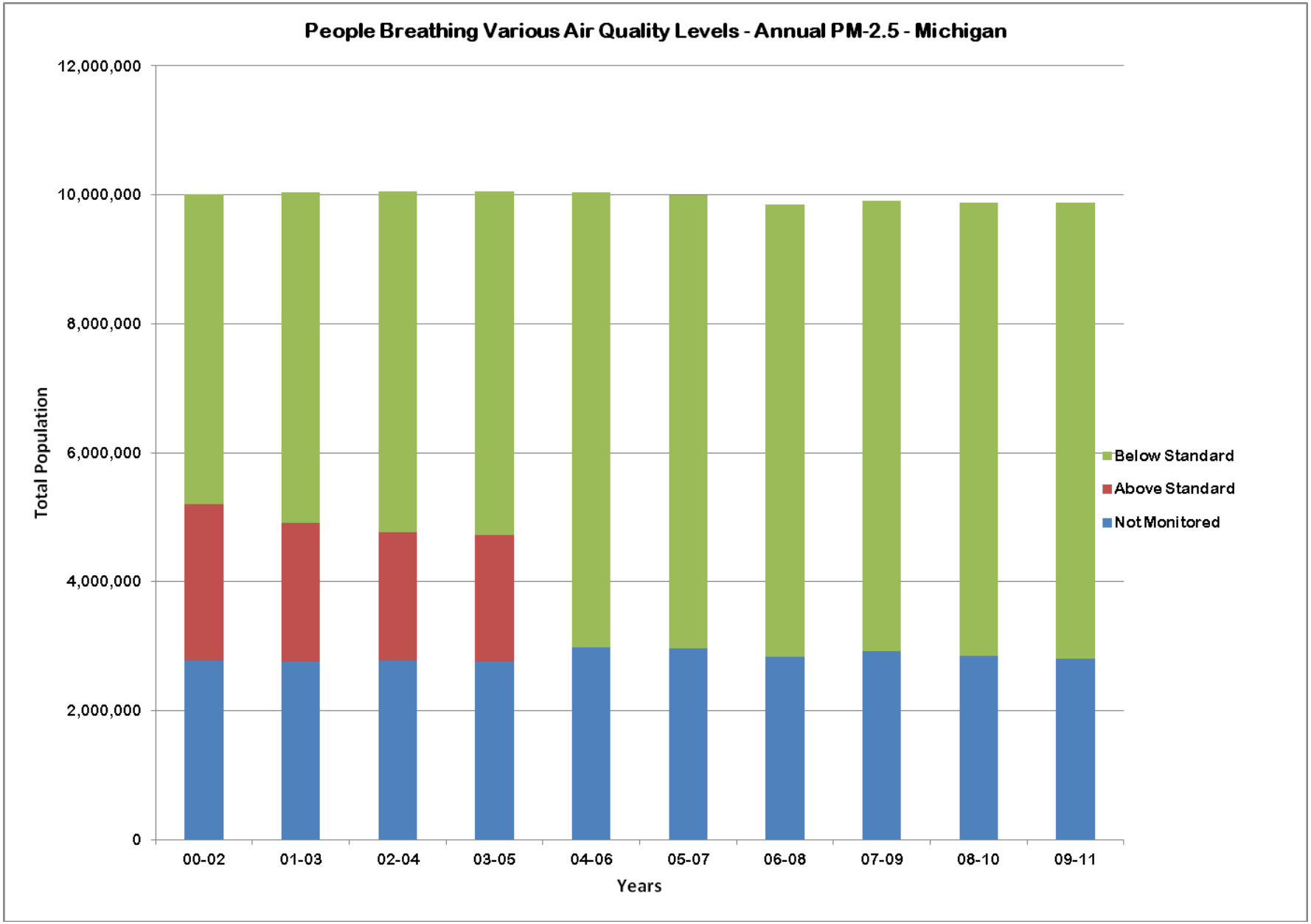

People Breathing Various Air Quality Levels - 24 Hour PM-2.5 - Michigan
12,000,000
10,000,000
8,000,000
6,000,000
4,000,000
2,000,000
0
Total Population
00-02
01-03
02-04
03-05
04-06
05-07
06-08
07-09
08-10
09-11
Years
Below Standard
Above Standard
Not Monitored

Figure MI-3


People Breathing Various Air Quality Levels - Annual PM-2.5 - Michigan
12,000,000
10,000,000
8,000,000
6,000,000
4,000,000
2,000,000
0
Total Population
00-02
01-03
02-04
03-05
04-06
05-07
06-08
07-09
08-10
09-11
Years
Below Standard
Above Standard
Not Monitored