Indiana Department of Environmental Management

The States' View of the Air

State of Indiana

Massachusetts Section with Introduction

2015

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Office of Air Quality
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EXECUTIVE SUMMARY

Air quality across the nation has improved over the past ten years or more. The publication of misleading reports, and stories about them in the press, can unfortunately lead the public to believe otherwise. This analysis demonstrates the progress made from 2000 through 2013 for ozone and fine particles (PM-2.5).

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.

These assessments have been based on results of individual monitors. For example, if a county has two ozone monitors and data for one is rated as a C and the other as a D, the population of the county is split in half and half is assigned to each category; meeting the standard and not meeting the standard. This is a change in this report from previous years where the average design value was used to assign populations.

Compliance with standards is determined on a three year basis. In 2000 – 2002 approximately 53 million people lived in counties that measured ozone air quality levels better than the standard. By 2011 – 2013 this had increased to 150 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 2011 – 2013 this had increased to 185 million people. Of note, is that monitoring for PM-2.5 is only conducted in counties with a total of 192 million people.

In the 2000 – 2002 period, 138 million people lived in counties where annual PM-2.5 levels were measured below the standard. By 2011 – 2013 this had increased to 178 million people. Approximately 14.5 million people lived in counties where annual PM-2.5 levels were measured above the standard. Much of this increase is due to the implementation of the new annual PM-2.5 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 2011 – 2013 data. Ten states are included.

Figure 5 shows those states that violate the 24-hour PM-2.5 standard based on 2011 – 2013 data. Only six states are included.

Figure 6 shows those states that violate the annual PM-2.5 standard based on 2011 – 2013 data. Only California, Indiana, Maryland, Ohio, Pennsylvania and Tennessee are included.

The bottom line is that most areas of the country were meeting the PM-2.5 standard at the 2011 – 2013 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. This analysis compares historical air quality levels with this new standard.

Figure 1

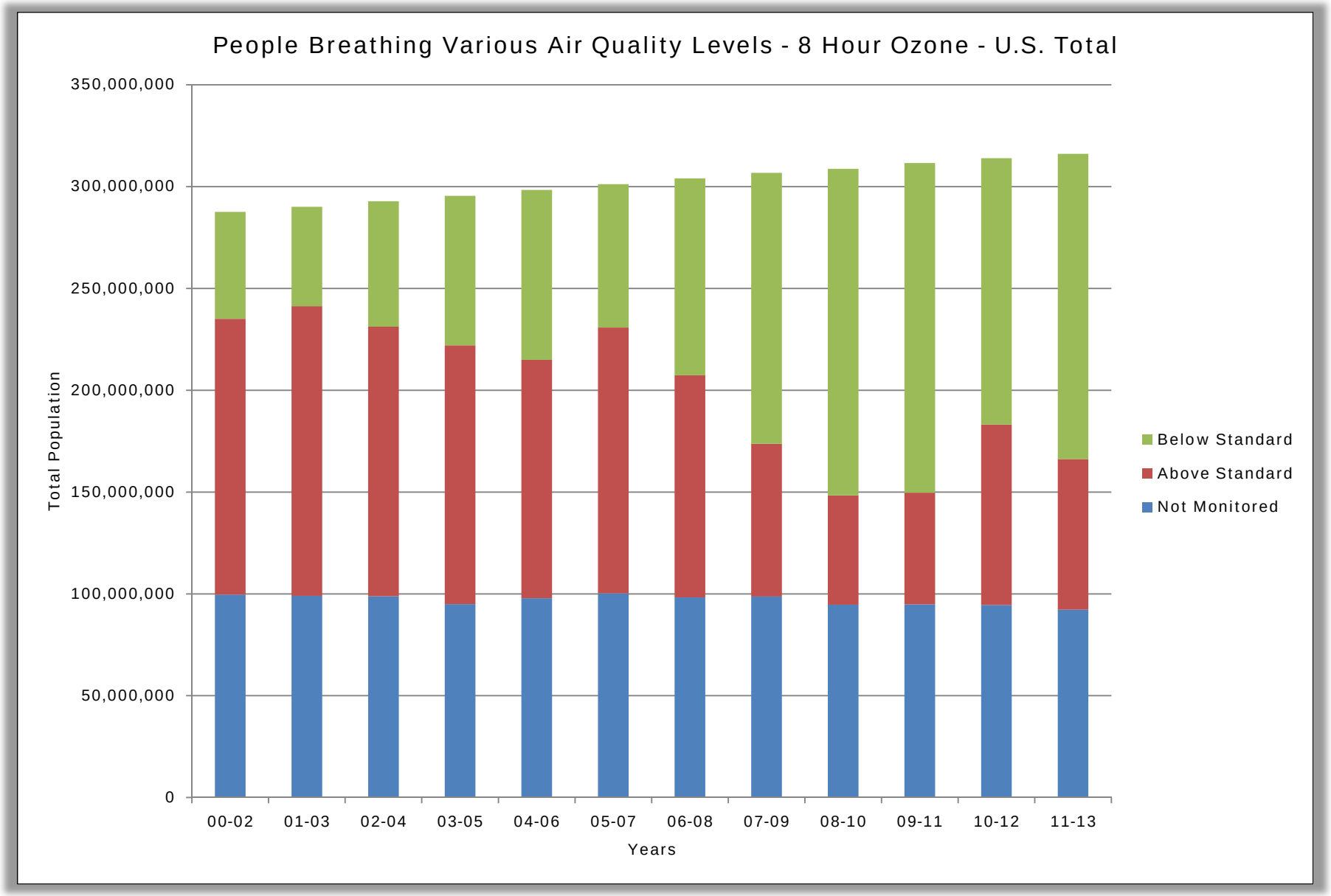

People Breathing Various Air Quality Levels - 8 Hour Ozone - U.S. Total
350,000,000
300,000,000
250,000,000
200,000,000
150,000,000
100,000,000
50,000,000
0
Total Population
00-02
01-03
02-04
03-05
04-06
05-07
06-08
07-09
08-10
09-11
10-12
11-13
Years
Below Standard
Above Standard
Not Monitored

Figure 2

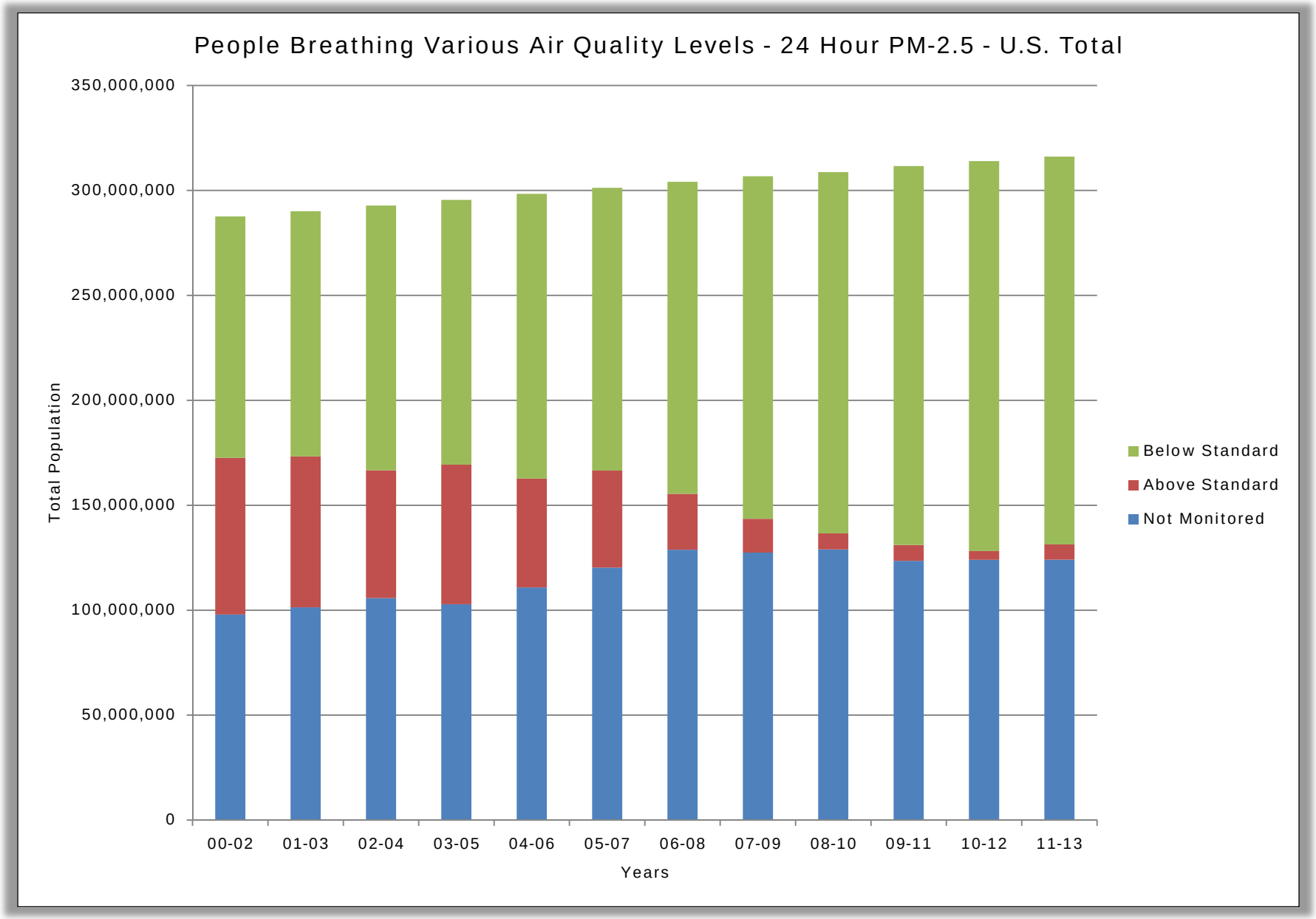

People Breathing Various Air Quality Levels - 24 Hour PM-2.5 - U.S. Total
350,000,000
300,000,000
250,000,000
200,000,000
150,000,000
100,000,000
50,000,000
0
Total Population
00-02
01-03
02-04
03-05
04-06
05-07
06-08
07-09
08-10
09-11
10-12
11-13
Years
Below Standard
Above Standard
Not Monitored

Figure 3

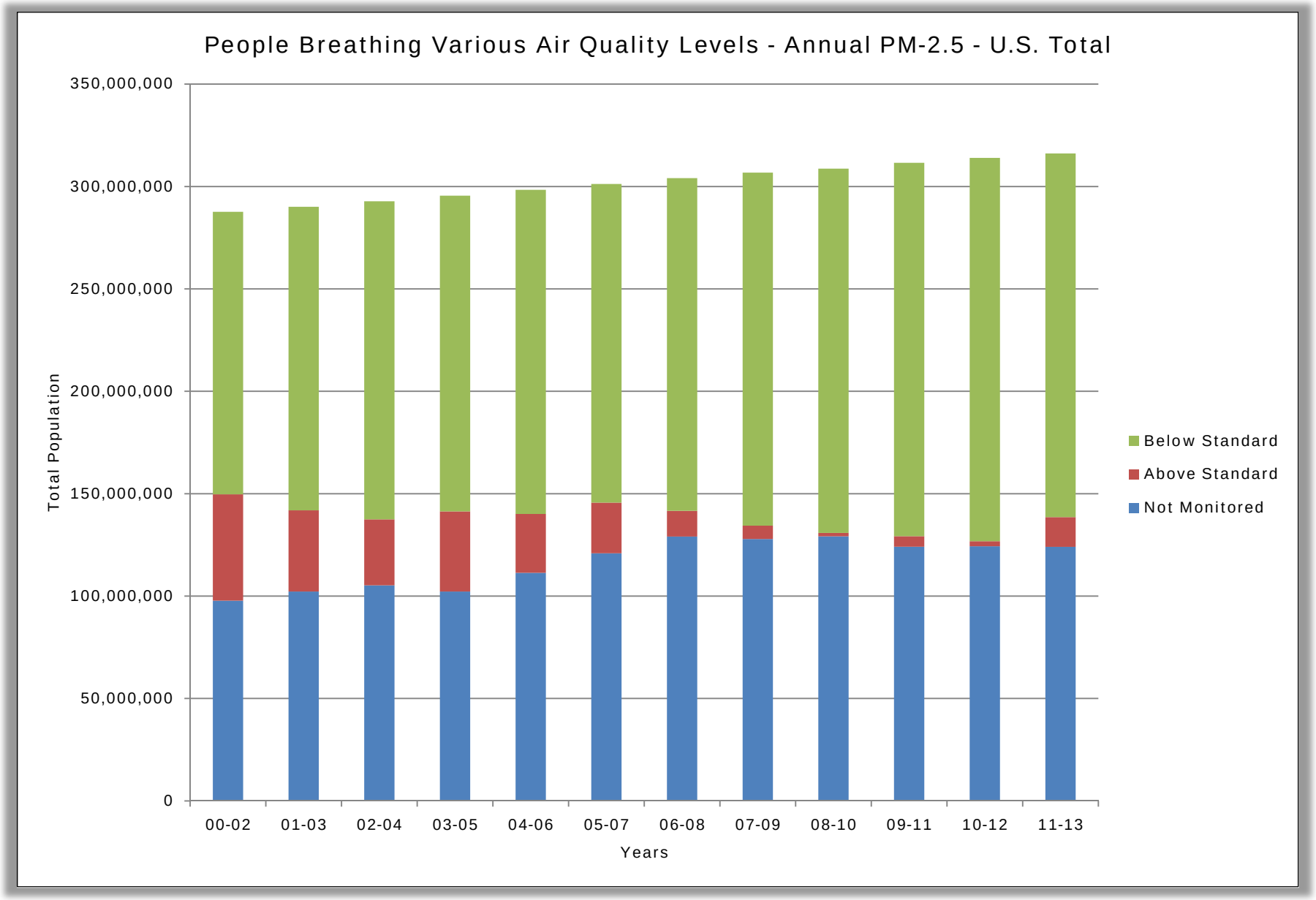

People Breathing Various Air Quality Levels - Annual PM-2.5 - U.S. Total
350,000,000
300,000,000
250,000,000
200,000,000
150,000,000
100,000,000
50,000,000
0
Total Population
00-02
01-03
02-04
03-05
04-06
05-07
06-08
07-09
08-10
09-11
10-12
11-13
Years
Below Standard
Above Standard
Not Monitored

Figure 4

Non-Attainment States - 8 Hour Ozone (Map 1)

2011-2013

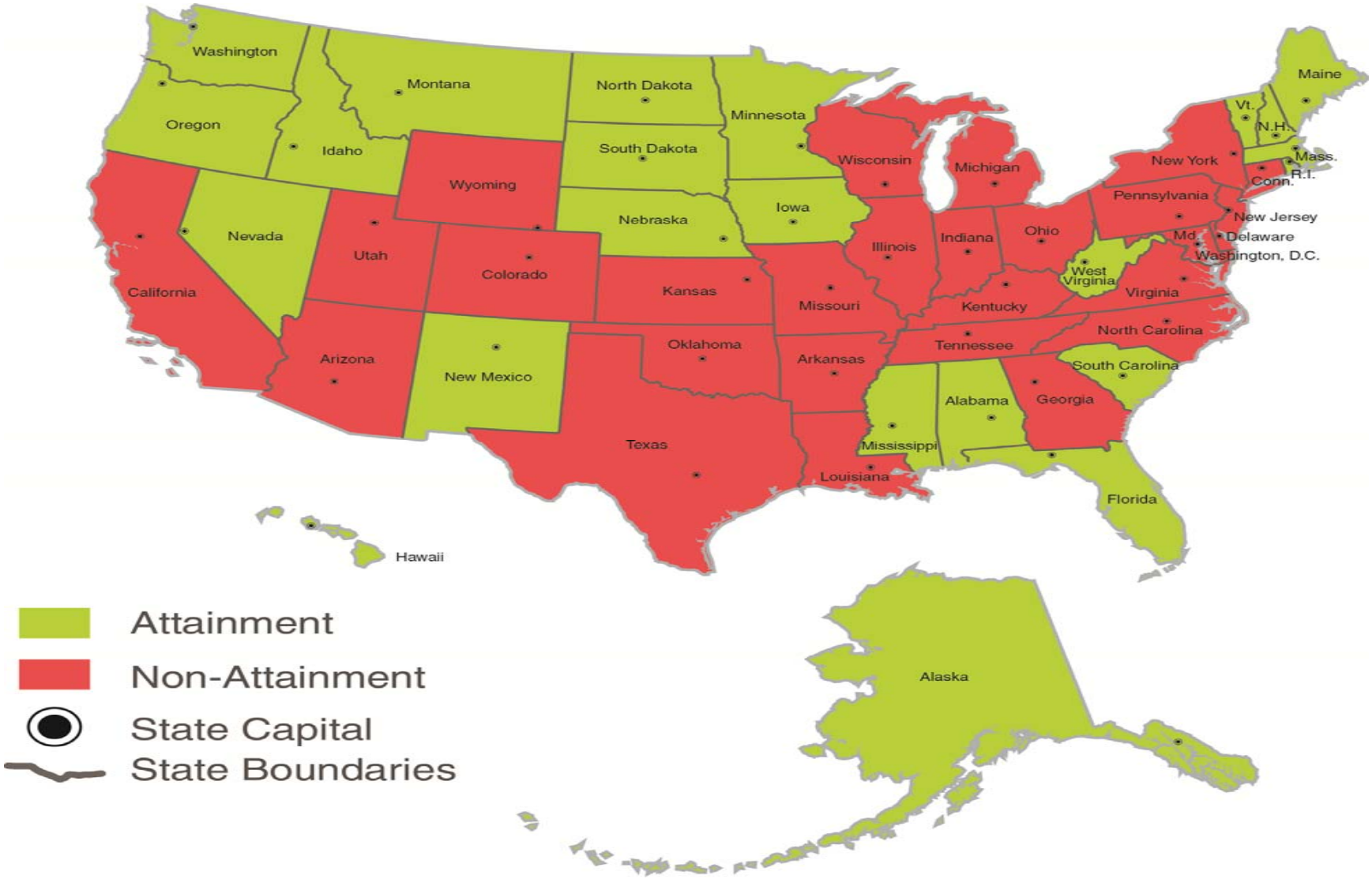


Figure 5

Non-Attainment States – 24 Hour PM-2.5 (Map 2)
2011-2013

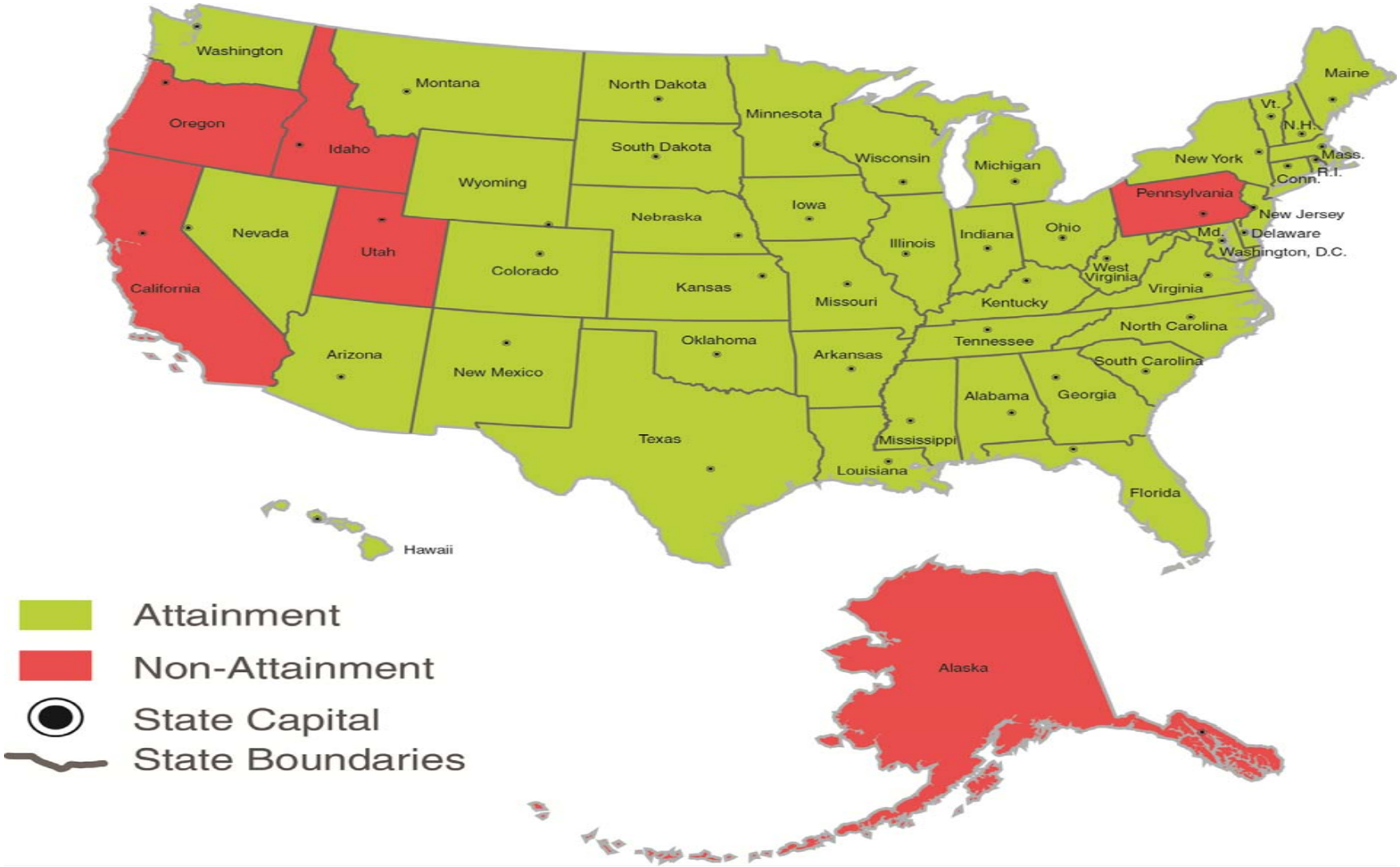
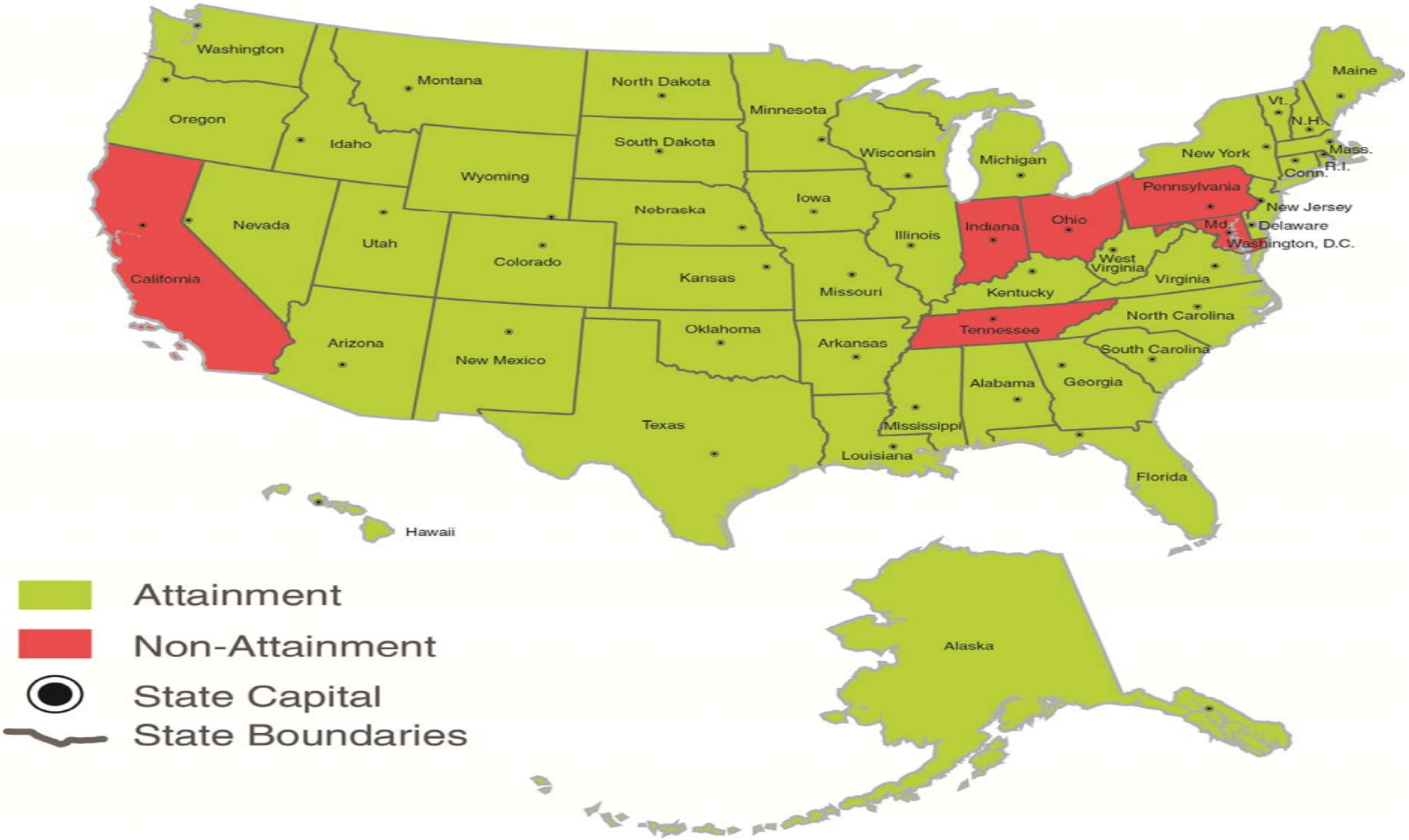


Figure 6

Non-Attainment States - Annual PM-2.5 (Map 3)
2011-2013



The States' View of the Air – 2015

This is the third 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 except for Figures 1 through 6. For this report, it includes data for the period of 2000 – 2013. 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. Average values are used to compare between cities or county ratings. However, when determining whether the population is exposed to air quality above or below the standard, the population is split based on values from individual monitors. 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 not be exposed to higher levels. However, not all residents in a county are exposed to levels associated with the highest monitor. This average design value is used only to compare between different states.

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 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	< 9.6
B	0.060 – 0.067	28.0 – 31.4	9.6 – 10.7
C	0.068 – 0.075	31.5 – 35.0	10.8 – 12.0
D	0.076 – 0.082	35.1 – 38.5	12.1 – 13.2
F	➢ 0.082	➢ 38.5	➢ 13.2

This grading scale has been revised since last year because the national ambient air quality standard for annual PM-2.5 was revised. These are the appropriate levels for the standards that were in place during the time period (2011 – 2013).

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 looks at three year blocks of data from 2000 through 2013 so that the reader can see how the air quality is changing over time.

Ozone

In the 2000 – 2002 period approximately 53 million people (18.3% of the U.S. population) lived in counties that met the ozone standard. During the same time period approximately 100 million people (34.6%) lived in counties where ozone was not monitored. By the 2011 – 2013 period 150 million people (47.4%) lived in counties that met the ozone standard. During the same time period over 91 million people (28.8%) 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 98 million people (34.1%) lived in counties where PM-2.5 was not monitored. By the 2011 – 2013 period over 185 million people (58.1%) lived in counties that met the 24-hour PM-2.5 standard. During the same time period nearly 124 million people (39.3%) 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 138 million people (47.9% of the U.S. population) lived in counties that met the annual PM-2.5 standard. During the same time period approximately 98 million people (34.1%) lived in counties where PM-2.5 was not monitored. By the 2011 - 2013 period nearly 178 million people (56.2%) lived in counties that met the annual PM-2.5 standard. During the same time period nearly 124 million people (39.3%) 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	2010-2012	2011-2013
A	10,131,523	6,376,588	6,564,989	7,179,887	7,438,778	9,108,266	9,329,550	11,697,719	12,873,435	17,116,889	17,577,711	17,588,417
B	10,934,876	10,379,229	15,360,917	14,281,887	16,738,616	17,327,984	26,008,122	38,548,375	51,404,139	50,594,617	34,461,410	45,163,198
C	31,457,264	32,021,777	39,633,626	51,990,459	59,279,810	43,946,615	61,381,814	82,753,537	96,126,505	94,200,993	78,782,851	87,192,869
D	39,798,643	42,296,781	44,910,528	64,018,708	61,416,817	64,353,908	64,816,984	52,256,925	37,600,509	40,633,207	64,379,495	56,190,199
F	95,662,347	99,999,209	87,448,733	63,070,320	55,634,742	66,212,862	44,238,249	22,829,013	16,042,793	14,155,462	24,254,213	17,728,174
Subtotals	187,984,653	191,073,584	193,918,793	200,541,261	200,508,763	200,949,635	205,774,719	208,085,569	214,047,381	216,712,168	219,455,680	223,862,857
Not Monitored	99,640,540	99,034,349	98,886,505	94,975,338	97,871,149	100,281,572	98,319,247	98,685,960	94,698,157	94,879,749	94,548,360	92,265,982
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	308,745,538	311,591,917	314,004,040	316,128,839

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	2010-2012	2011-2013
A	39,881,763	47,887,689	49,231,738	45,397,201	52,283,496	56,454,021	73,299,289	100,515,234	123,740,873	140,662,435	158,596,598	164,160,356
B	36,431,942	30,082,632	34,646,612	35,162,480	36,377,810	36,503,487	45,877,264	42,834,521	37,211,482	27,743,252	23,728,800	14,120,383
C	38,677,918	38,809,795	42,267,519	45,596,607	46,980,855	41,705,298	29,459,586	19,860,604	11,157,556	12,113,406	3,468,212	6,524,086
D	26,102,105	24,031,712	25,444,744	28,827,340	21,462,979	21,559,722	13,086,958	4,857,812	4,478,582	1,242,344	1,072,537	1,254,409
F	48,603,338	47,902,446	35,461,117	37,701,675	30,439,705	24,695,846	13,462,714	11,217,210	3,182,497	6,292,520	3,122,749	6,007,513
Subtotals	189,697,066	188,714,274	187,051,725	192,685,303	187,544,845	180,918,374	175,285,811	179,285,481	179,770,990	188,053,957	189,988,896	192,066,747
Not Monitored	97,928,127	101,393,659	105,753,573	102,831,296	110,835,067	120,312,833	128,808,155	127,486,148	128,974,548	123,537,960	124,015,144	124,062,092
Totals	287,625,193	290,107,933	292,805,298	295,516,599	298,379,912	301,231,207	304,093,966	306,771,629	308,745,538	311,591,917	314,004,040	316,128,839

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	2010-2012	2011-2013
A	65,326,851	70,127,621	80,452,773	60,204,962	82,674,701	87,498,801	96,640,186	121,852,039	151,225,649	164,746,645	170,012,770	113,784,047
B	34,521,401	36,264,896	36,541,564	39,483,688	39,249,507	32,830,328	38,732,333	36,788,172	19,844,125	13,048,977	15,087,987	39,133,366
C	38,049,342	41,868,373	38,353,168	34,474,313	36,334,814	35,279,983	27,076,409	13,762,659	6,813,460	4,517,511	2,105,166	24,659,204
D	23,184,888	19,155,969	14,856,077	21,734,832	16,037,478	14,515,489	7,880,525	4,785,715	1,146,913	1,986,357	1,906,695	8,208,984
F	28,786,860	20,471,466	17,349,069	17,383,298	12,734,577	10,201,029	4,669,777	1,709,042	503,779	3,165,892	530,349	6,281,149
Subtotals	189,869,342	187,888,325	187,552,651	193,281,093	187,031,077	180,325,630	174,999,230	178,897,727	179,534,926	187,465,382	189,642,967	192,066,750
Not Monitored	97,755,851	102,219,608	105,252,647	102,235,506	111,348,835	120,905,577	129,094,736	127,873,902	129,211,612	124,126,535	124,361,073	124,062,089
Totals	287,625,193	290,107,933	292,805,298	295,516,599	298,379,912	301,231,207	304,093,966	306,771,629	308,746,538	311,591,917	314,004,040	316,128,839

Table 5
High Cities - Year Round Particle Pollution (Annual PM-2.5)
(2011 - 2013)

Rank	MSA	PW DV	Grade	2013 Population
1	**Hanford, CA**	**17.0**	**F**	**150,960**
2	**Visalia, CA**	**16.6**	**F**	**454,143**
3	**Modesto, CA**	**14.7**	**F**	**525,491**
4	**Bakersfield, CA**	**13.7**	**F**	**864,924**
5	**Merced, CA**	**13.3**	**F**	**263,228**
6	**Madera, CA**	**13.2**	**D**	**152,389**
7	**Johnstown, PA**	**12.3**	**D**	**140,499**
8	**Fresno, CA**	**12.2**	**D**	**955,272**
9	**Scranton, PA**	**12.1**	**D**	**562,037**
10	Stockton, CA	12.0	C	704,379
10	Los Angeles, CA	12.0	C	13,131,431
10	Harrisburg, PA	12.0	C	967,711
13	Altoona, PA	11.9	C	126,314
14	York, PA	11.7	C	438,965
15	Shreveport, LA	11.6	C	405,793
15	Reading, PA	11.6	C	413,521
15	Erie, PA	11.6	C	280,294
15	Cincinnati, PH	11.6	C	2,153,080
19	Indianapolis, IN	11.5	C	1,823,479
19	Canton, OH	11.5	C	403,707
21	Riverside, CA	11.2	C	4,380,878
21	Houston, TX	11.2	C	6,340,014
23	Terre Haute, IN	11.1	C	172,195
24	Little Rock, AR	11.1	C	724,385

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

Of the top 24 cities, nine have air quality that exceeds the revised national ambient air quality standard. Fifteen cities are rated as C.

Table 6
Highest Cities – Short Term Particle Pollution (24-hour PM-2.5)
(2011 - 2013)

Rank	MSA	PW DV	Grade	2013 Population
1	**Hanford, CA**	**60**	**F**	**150,960**
2	**Visalia, CA**	**56**	**F**	**454,143**
3	**Modesto, CA**	**52**	**F**	**525,491**
4	**Bakersfield, CA**	**49**	**F**	**864,924**
5	**Logan, UT**	**45**	**F**	**129,763**
5	**Provo, UT**	**45**	**F**	**562,239**
7	**Fresno, CA**	**44**	**F**	**955,272**
8	**Boise City, ID**	**43**	**F**	**550,288**
9	**Merced, CA**	**42**	**F**	**263,228**
10	**Stockton, CA**	**41**	**F**	**704,379**
10	**Fairbanks, AK**	**41**	**F**	**100,436**
12	**Madera, CA**	**38**	**D**	**152,389**
13	**Salt Lake City, UT**	**37**	**D**	**1,178,969**
14	**Ogden, UT**	**36**	**D**	**570,786**
15	Harrisburg, PA	34	C	967,711
15	Medford, PR	34	C	208,545
17	Yakima, WA	33	C	247,044
17	Portland, OR	33	C	2,314,554
19	Reading, PA	31	B	413,521
20	Johnstown, PA	30	B	140,499
20	Scranton, PA	30	B	562,037
20	Altoona, PA	30	B	126,314
20	Sacramento, CA	30	B	2,215,770

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

Of the 23 highest cities, 11 have ratings of F, 3 are a D, 4 are C and 5 are B.

Table 7
Highest 8-Hour Ozone Cities
(2011 - 2013)

Rank	MSA	PW DV	Grade	2013 Population
1	Riverside, CA	0.090	F	4,380,878
2	Fresno, CA	0.089	F	955,272
3	Visalia, CA	0.086	F	454,143
4	Sheboygan, WI	0.085	F	114,922
4	Bridgeport, CT	0.085	F	939,904
6	Bakersfield, CA	0.084	F	864,924
6	Norwich, CT	0.084	F	274,150
8	Dallas, TX	0.082	D	6,754,588
8	Niles, MI	0.082	D	155,252
10	Muskegon, MI	0.081	D	171,008
10	Merced, CA	0.081	D	263,228
10	Madera, CA	0.081	D	152,389
13	Modesto, CA	0.080	D	525,491
14	New Haven, CT	0.078	D	862,287
14	Tulsa, OK	0.078	D	461,561
16	Baltimore, MD	0.077	D	2,770,738
16	Racine, WI	0.077	D	195,041
16	Longview, TX	0.077	D	216,530
16	Lawton, OK	0.077	D	124,937
16	Joplin, MO	0.077	D	175,243
16	Los Angeles, CA	0.077	D	13,131,431
16	Owensboro, KY	0.077	D	116,401
16	St. Louis, MO	0.077	D	2,850,771
16	Shreveport, LA	0.077	D	405,793
16	Louisville, KY	0.077	D	1,312,039
16	Holland, MI	0.077	D	272,701
16	Houston, TX	0.077	D	6,340,014
16	Michigan City, IN	0.077	D	111,281
16	Oklahoma City, OK	0.077	D	1,319,677
16	Cincinnati, OH	0.077	D	2,153,080

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

Of the 30 highest rated cities, seven are rated F, while 23 are rated D.

Table 8

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

(2011 - 2013)

Rank	County/State	DV	Grade	2013 Population
1	**Kings, CA**	**60**	**F**	**150,960**
2	**Lake, OR**	**56**	**F**	**7,820**
2	**Tulare, CA**	**56**	**F**	**454,143**
4	**Stanislaus, CA**	**52**	**F**	**525,491**
5	**Kern, CA**	**49**	**F**	**864,924**
6	**Ada, ID**	**46**	**F**	**416,464**
7	**Utah, UT**	**45**	**F**	**551,891**
7	**Cache, UT**	**45**	**F**	**116,909**
9	**Fresno, CA**	**44**	**F**	**955,272**
10	**Franklin, ID**	**43**	**F**	**12,854**
11	**Merced, CA**	**42**	**F**	**263,228**
12	**Fairbanks, AK**	**41**	**F**	**100,436**
12	**San Joaquin, CA**	**41**	**F**	**704,379**
14	**Crook, OR**	**38**	**D**	**20,815**
14	**Madera, CA**	**38**	**D**	**152,389**
16	**Salt Lake, UT**	**37**	**D**	**1,079,721**
16	**Box Elder, UT**	**37**	**D**	**50,794**
18	**Plumas, CA**	**36**	**D**	**18,859**
18	**Lemhi, ID**	**36**	**D**	**7,712**
18	**Klamath, OR**	**36**	**D**	**65,910**
18	**Weber, UT**	**36**	**D**	**238,519**
22	Carbon, UT	35	C	20,988
23	Cumberland, PA	34	C	241,212
23	Inyo, CA	34	C	18,467
23	Jackson, OR	34	C	208,545
23	Washington, OR	34	C	554,996

DV – Design Value

Of the 26 highest counties, 13 are rated F, eight are D, and five are C.

Table 9
Highest Counties Year Round Particle Pollution (Annual PM-2.5)
(2011 - 2013)

Rank	County/State	DV	Grade	2013 Population
1	**Kings, CA**	**17.0**	**F**	**150,960**
2	**Tulare, CA**	**16.6**	**F**	**454,143**
3	**Stanislaus, CA**	**14.7**	**F**	**525,491**
4	**Kern, CA**	**13.7**	**F**	**864,924**
5	**Merced, CA**	**13.3**	**F**	**263,228**
6	**Madera, CA**	**13.2**	**D**	**152,389**
7	**Cambria, PA**	**12.3**	**D**	**140,499**
8	**Fresno, CA**	**12.2**	**D**	**755,272**
8	**Los Angeles, CA**	**12.2**	**D**	**10,017,068**
8	**Butler, OH**	**12.2**	**D**	**371,272**
11	**Lackawanna, PA**	**12.1**	**D**	**213,931**
12	San Joaquin, CA	12.0	C	704,379
12	Cumberland, PA	12.0	C	241,212
12	Madison, IL	12.0	C	267,225
15	Northampton, PA	11.9	C	94,076
15	Blair, PA	11.9	C	126,314
17	York, PA	11.7	C	438,965
18	Berks, PA	11.6	C	413,521
18	Erie, PA	11.6	C	280,294
18	Brooke, WV	11.6	C	23,737
18	Marshall, WV	11.6	C	32,459
18	Roane, TN	11.6	C	53,047
18	Caddo, LA	11.6	C	254,887

DV – Design Value

Of the 23 highest counties, five are rated a F and six are D. All others meet the National Ambient Air Quality Standards with 12 being rated as C.

Table 10
Highest Ozone Counties
(2011 - 2013)

Rank	County/State	DV	Grade	2013 Population
1	Uintah, UT	0.097	F	35,555
2	San Bernardino, CA	0.094	F	2,088,371
3	Fresno, CA	0.089	F	955,272
4	Riverside, CA	0.087	F	2,292,507
5	Tulare, CA	0.086	F	454,143
5	Allegan, MI	0.086	F	112,531
7	Fairfield, CT	0.085	F	939,904
7	Denton, TX	0.085	F	726,799
10	Sheboygan, WI	0.085	F	114,922
10	Kern, CA	0.084	F	864,924
10	New London, CT	0.084	F	274,150
10	Gloucester, NJ	0.084	F	290,265
14	Collin, TX	0.084	F	854,778
15	El Dorado, CA	0.083	F	181,737
15	Oldham, KY	0.082	D	62,364
15	Cecil, MD	0.082	D	101,913
15	Berrien, MI	0 093	D	155,252
15	Dallas, TX	0.082	D	2,480,331
15	Tarrant, TX	0.082	D	1,911,541
15	Kenosha, WI	0.082	D	167,757
21	Madera, CA	0.081	D	152,389
21	Merced, CA	0.081	D	263,228
21	Douglas, CO	0.081	D	305,963
21	Middlesex, CT	0.081	D	165,562
21	Anne Arundel, MD	0.081	D	555,743
21	Harford, MD	0.081	D	249,215
21	Muskegon, MI	0.081	D	171,008
21	Camden, NJ	0.081	D	512,854

DV – Design Value

Of the top 28 counties, 14 are rated as F and 14 are rated as D.

Table 11
Cleanest U.S. Cities for Short-term Particle Pollution (24-hr PM-2.5)
(2011 - 2013)

Rank	MSA	PW DV	Grade	2013 Population
1	Prescott, AZ	10	A	215,133
1	Miami, FL	10	A	5,828,191
3	Santa Fe, NM	11	A	147,423
4	Flagstaff, AZ	12	A	136,539
4	Tucson, AZ	12	A	996,554
6	Farmington, NM	13	A	126,503
6	Honolulu, HI	13	A	983,429
6	Santa Cruz, CA	13	A	269,419
9	Casper, WY	14	A	80,973
9	Rapid City, SD	14	A	132,963
9	Salinas, CA	14	A	428,826
12	Cheyenne, WY	15	A	95,809
12	Bismarck, ND	15	A	117,447
12	Las Cruces, NM	15	A	213,460
12	Cape Coral, FL	15	A	661,115
12	Lakeland, FL	15	A	623,009
17	Boulder, CO	16	A	310,048
17	Pueblo, CO	16	A	161,451
17	North Port, FL	16	A	732,535
17	Orlando, FL	16	A	2,237,846
17	Deltona, FL	16	A	500,800
17	Tampa, FL	16	A	2,870,569
17	Kingsport, TN	16	A	308,283

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

Of the 23 cleanest cities, all are rated as A.

Table 12
Cleanest U.S. Cities for Year Round Particle Pollution (Annual PM-2.5)
(2011 - 2013)

Rank	MSA	PW DV	Grade	2013 Population
1	Prescott, AZ	4.1	A	215,133
2	Casper, WY	4.7	A	80,973
2	Farmington, NM	4.7	A	26,503
4	Santa Fe, NM	4.8	A	147,423
5	Cheyenne, WY	4.9	A	95,809
6	Anchorage, AK	5.1	A	396,142
7	Flagstaff, AZ	5.3	A	136,539
8	Pocatello, ID	5.6	A	90,968
8	Tucson, AZ	5.6	A	996,554
10	Honolulu, HI	5.7	A	983,429
10	Redding, CA	5.7	A	178,980
12	Duluth, MN	5.9	A	279,887
13	Boulder, CO	6.0	A	310,048
13	Rapid City, SD	6.0	A	132,963
15	Burlington, VT	6.1	A	214,796
15	Palm Bay, FL	6.1	A	550,823
15	Salinas, CA	6.1	A	428,826
18	Bismarck, ND	6.2	A	117,447
18	Manchester, OH	6.2	A	403,985
20	Colorado Springs, CO	6.3	A	678,319
20	Las Cruces, NM	6.3	A	213,460
20	Pueblo, CO	6.3	A	161,451
20	Santa Cruz, CA	6.3	A	269,419
24	Miami, FL	6.5	A	5,828,191

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

Of the 24 cleanest cities all are rated as A.

Table 13
Cleanest U.S. Cities for Ozone Air Pollution
(2011 - 2013)

Rank	MSA	PW DV	Grade	2013 Population
1	Bellingham, WA	0.044	A	206,353
1	Mount Vernon, WA	0.044	A	118,837
3	Honolulu, HI	0.045	A	983,429
4	Santa Rosa, CA	0.047	A	495,025
5	Santa Cruz, CA	0.051	A	269,419
6	Duluth, MN	0.054	A	279,887
6	Salinas, CA	0.054	A	428,826
6	San Francisco, CA	0.054	A	4,516,076
6	Seattle, WA	0.054	A	3,610,105
10	Lincoln, NE	0.055	A	314,125
10	Olympia, WA	0.055	A	262,388
12	Portland, OR	0.057	A	2,314,554
12	Santa Barbara, CA	0.057	A	435,697
14	Bend, OR	0.058	A	165,954
14	Bismarck, ND	0.058	A	117,447
14	Brunswick, GA	0.058	A	113,807
14	Eugene, OR	0.058	A	356,212
14	Salem, OR	0.058	A	400,408
19	Bangor, ME	0.059	A	153,364
19	Fargo, ND	0.059	A	178,231
19	Napa, CA	0.059	A	140,326
19	Tuscaloosa, AL	0.059	A	224,671
23	Brownsville, TX	0.060	B	417,276
23	Naples, FL	0.060	B	339,642
23	Spokane, WA	0.060	B	474,398

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

Of the cleanest 25 cities, 22 are rated A, while 3 are rated B.

Table 14
Cleanest Counties – Short Term Particle Pollution (24-hour PM-2.5)
(2011 - 2013)

Rank	County/State	DV	Grade	2013 Population
1	Lake, CA	10	A	63,860
1	Yavapai, AZ	10	A	215,133
3	Billings, ND	11	A	874
3	Santa Fe, NM	11	A	147,423
5	Jackson, SD	12	A	3,216
5	Custer, SD	12	A	8,468
5	Sweetwater, WY	12	A	45,237
5	Hancock, ME	12	A	54,845
5	Pima, AZ	12	A	996,554
5	Coconino, AZ	12	A	136,539
5	Albany, WY	12	A	37,422
5	Hawaii, HI	12	A	190,621
13	Honolulu, HI	13	A	983,429
13	Santa Cruz, CA	13	A	269,419
13	Montezuma, CO	13	A	25,642
13	San Juan, NM	13	A	126,503
13	Teton, WY	13	A	22,268
13	Maui, HI	13	A	160,202
19	Monterey, CA	14	A	428,826
19	Palm Beach, FL	14	A	1,372,171
19	Miami, Dade, FL	14	A	2,617,176
19	Essex, NY	14	A	38,762
19	Park, WY	14	A	29,227
19	Natrona, WY	14	A	80,973
19	Pennington, SD	14	A	105,761

DV – Design Value

The cleanest 25 counties are all rated as A.

Table 15
Cleanest Counties - Year Round Particle Pollution (Annual PM-2.5)
(2011 - 2013)

Rank	County/State	DV	Grade	2013 Population
1	Lake, CA	3.8	A	63,860
2	Custer, SD	3.9	A	8,468
3	Yavapai, AZ	4.1	A	215,133
3	La Plata, CO	4.1	A	53,284
5	Jackson, SD	4.3	A	3,216
5	Essex, NY	4.3	A	38,762
7	Billings, ND	4.4	A	874
8	Sweetwater, WY	4.6	A	45,237
8	Hancock, ME	4.6	A	54,845
8	Park, WY	4.6	A	29,227
12	Matanuska, AK	4.6	A	95,192
12	San Juan, NM	4.7	A	126,503
14	Natrona, WY	4.7	A	80,973
15	Santa Fe, NM	4.8	A	147,423
15	Albany, WY	4.9	A	37,422
15	Laramie, WY	4.9	A	95,809
17	Ashland, WI	5.1	A	16,016
18	Teton, WY	5.2	A	22,268
19	Coconino, AZ	5.3	A	136,539
19	Anchorage, AK	5.3	A	300,950
21	Lewis & Clark, MT	5.4	A	65,336
22	Dunn, ND	5.5	A	4,162
22	San Benito, CA	5.5	A	57,600
22	Litchfield, CT	5.5	A	186,924
22	Arapahoe, CO	5.5	A	607,070

DV – Design Value

The cleanest 25 counties are all rated as A.

Table 16
Cleanest Counties - Ozone Air Pollution
(2011 - 2013)

Rank	County/State	DV	Grade	2013 Population
1	Whatcom, WA	0.044	A	206,353
1	Skagit, WA	0.044	A	118,837
3	Honolulu, HI	0.045	A	983,429
3	Humboldt, CA	0.045	A	134,493
5	San Francisco, CA	0.046	A	837,442
6	Sonoma, CA	0.047	A	495,025
7	Columbia, OR	0.050	A	49,344
8	Aroostook, ME	0.051	A	70,055
8	Santa Cruz, CA	0.051	A	269,419
10	Denali, AK	0.052	A	1,867
11	King, WA	0.053	A	2,044,449
11	San Mateo, CA	0.053	A	747,373
11	Marin, CA	0.053	A	258,365
14	Lewis & Clark, MT	0.054	A	65,338
14	Flathead, MT	0.054	A	93,069
14	St. Louis, MN	0.054	A	200,540
14	Oxford, ME	0.054	A	57,277
14	Monterey, CA	0.054	A	428,826
14	Alameda, CA	0.054	A	1,578,891
20	Thurston, WA	0.055	A	262,388
20	Pierce, WA	0.055	A	819,743
20	Lancaster, NE	0.055	A	297,036
20	Rosebud, MT	0.055	A	9,329
20	Powder River, MT	0.055	A	1,748
20	Washington, ME	0.055	A	32,190

DV – Design Value

Of the 25 cleanest counties, all are rated A.

MASSACHUSETTS

Ozone

Significant progress has been made in ozone levels in Massachusetts. In the 2000 – 2002 time period, approximately 600 thousand people (9.3%) lived in counties that met the ozone standard. By 2011 – 2013 this had increased to approximately 5.4 million people (81.1%). The remainder of the population lived in counties where ozone was no monitored. Figure MA-1 shows the distribution of people by year.

24-Hour PM-2.5

24-hour PM-2.5 levels in Massachusetts have generally been better than the standard, except for the first three periods. In the 2000 – 2002 time period, approximately 5.3 million people (82.6%) lived in counties where 24-hour PM-2.5 levels met the standard. By 2011 - 2013 this was approximately 4.0 million people (59.4%). The remainder of the population lived in counties where PM-2.5 was not measured. Figure MA-2 shows the distribution of people by year.

Annual PM-2.5

Annual PM-2.5 levels in Massachusetts have historically been better than the standard. In the 2000 – 2002 time period, approximately 5.8 million people (90.1%) lived in counties where annual PM-2.5 levels met the standard. By 2011 – 2013 this was approximately 4.0 million people (59.4%). The remainder of the population lived in counties where PM-2.5 was not measured. Figure MA-3 shows the distribution of people by year.

Table MA-1

2011 – 2013

		OZONE			PARTICLE POLLUTION (PM-2.5)				
County	Population	Avg. DV	Grade	MM	Avg. 24-Hr DV	Grade	Avg. Ann DV	Grade	MM
Barnstable	214,990	0.072	C	N	ND	--	ND	--	--
Berkshire	129,585	ND	--	--	22	A	8.3	A	N
Bristol	552,780	ND	--	--	17	A	7.3	A	N
Dukes	17,256	0.075	C	N	ND	--	ND	--	--
Essex	762,550	0.070	C	Y	17	A	7.2	A	Y
Hampden	467,319	0.073	C	N	21	A	8.2	A	Y
Hampshire	159,596	0.066	B	Y	ND	--	ND	--	--
Middlesex	1,552,802	0.067	B	N	ND	--	ND	--	--
Norfolk	687,802	0.072	C	N	ND	--	ND	--	--
Plymouth	501,915	ND	--	--	18	A	7.5	A	N
Suffolk	755,503	0.064	B	Y	20	A	8.7	A	Y
Worcester	819,106	0.067	B	Y	20	A	8.1	A	Y
Subtotal	**6,621,204**								
Not Monitored	71,620								
Total	**6,692,824**								

DV – Design Value ND - No Data MM- Multiple Monitors

MASSACHUSETTS

Table MA-2

People Breathing Ozone

Grade	2000-2002	2001-2003	2002-2004	2003-2005	2004-2006	2005-2007	2006-2008	2007-2009	2008-2010	2009-2011	2010-2012	2011-2013
A	0	0	0	0	0	0	0	0	0	0	0	0
B	0	0	0	77,692	343,596	0	702,201	716,214	361,012	221,191	824,324	2,414,905
C	594,744	0	423,146	1,798,168	78,084	693,368	817,332	1,504,925	4,036,650	3,779,259	3,542,087	3,012,020
D	76,731	420,851	1,592,308	1,566,695	3,642,429	2,705,807	3,820,330	3,259,342	1,556,970	0	17,041	0
F	3,744,491	3,982,866	2,959,142	2,377,119	1,777,678	2,462,571	556,993	462,777	0	0	0	0
Subtotal	4,415,966	4,403,817	4,974,596	5,819,674	5,741,787	5,861,746	5,896,856	5,943,258	5,954,632	5,991,450	4,383,452	5,426,925
NM	2,001,240	2,018,848	1,437,685	583,616	568,297	569,813	572,111	574,355	592,997	596,086	2,262,692	1,265,899
Total	6,417,206	6,422,565	6,412,281	6,403,290	6,410.084	6,431,559	6,468,967	6,517,613	6,547,629	6,587,536	6,646,144	6,692,824

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

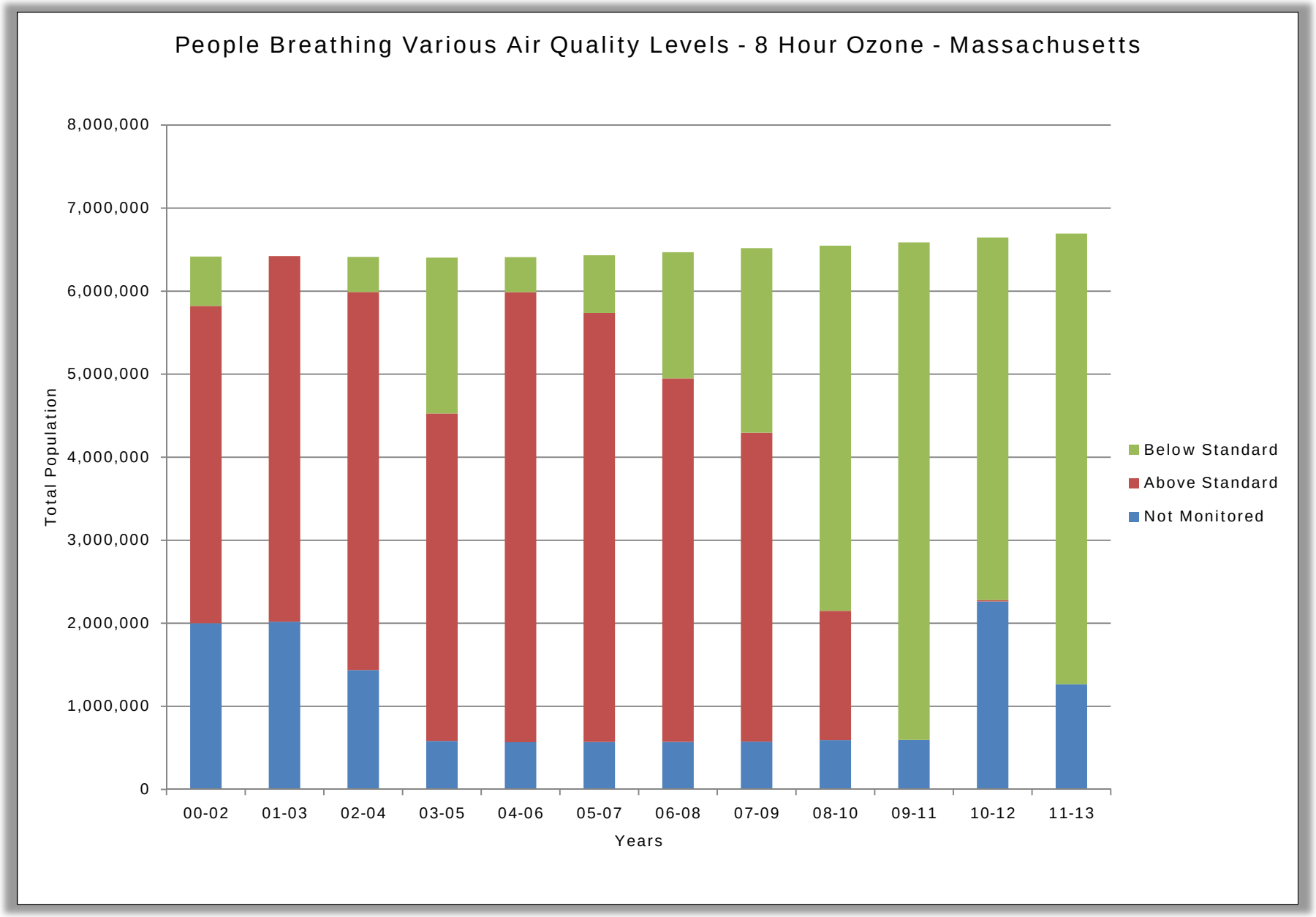
Grade	2000-2002	2001-2003	2002-2004	2003-2005	2004-2006	2005-2007	2006-2008	2007-2009	2008-2010	2009-2011	2010-2012	2011-2013
A	658,702	0	0	545,437	1,184,593	2,495,503	2,933,415	5,070,900	5,404,732	5,440,002	3,952,987	3,978,758
B	3,832,954	0	0	2,422,074	2,334,345	2,652,959	2,401,294	308,518	0	0	0	0
C	809,511	2,876,835	1,024,999	854,570	307,605	153,811	0	0	0	0	0	0
D	480,520	0	921,369	0	0	0	0	0	0	0	0	0
F	0	230,337	153,614	0	0	0	0	0	0	0	0	0
Subtotal	5,781,687	3,106,172	2,099,982	3,822,081	3,826,543	3,302,293	5,334,700	5,379,417	5,404,732	5,445,002	3,952,987	3,978,758
NM	635,519	3,315,393	4,312,299	2,581,209	2,583,541	1,129,286	1,134,257	1,138,195	1,142,897	1,142,534	2,693,157	2,714,066
Total	6,417,206	6,422,565	6,412,281	6,403,290	6,410,084	6,431,559	6,468,967	6,517,613	6,547,629	6,587,536	6,646,144	6,692,824

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

Grade	2000-2002	2001-2003	2002-2004	2003-2005	2004-2006	2005-2007	2006-2008	2007-2009	2008-2010	2009-2011	2010-2012	2011-2013
A	3,970,654	2,354,025	1,427,914	2,999,700	3,329,144	4,975,121	5,334,710	5,225,159	5,404,732	5,440,002	3,952,987	3,978,758
B	979,845	578,877	499,250	1,431,996	497,399	327,153	0	0	0	0	0	0
C	631,186	348,546	172,818	171,650	0	0	0	0	0	0	0	0
D	0	0	0	0	0	0	0	0	0	0	0	0
F	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	5,781,685	3,281,442	2,099,982	4,603,346	3,826,543	3,302,293	5,334,700	5,225,159	5,404,732	5,445,002	3,952,987	3,978,758
NM	635,521	3,141,123	4,312,299	1,799,944	2,583,541	1,129,285	1,134,257	1,292,454	1,142,897	1,142,534	2,693,157	2,714,066
Total	6,417,206	6,422,565	6,412,281	6,403,290	5,410,084	6,431,559	6,468,967	6,517,613	6,547,629	6,587,536	6,646,144	6,692,824

NM – Not Monitored

Figure MA-1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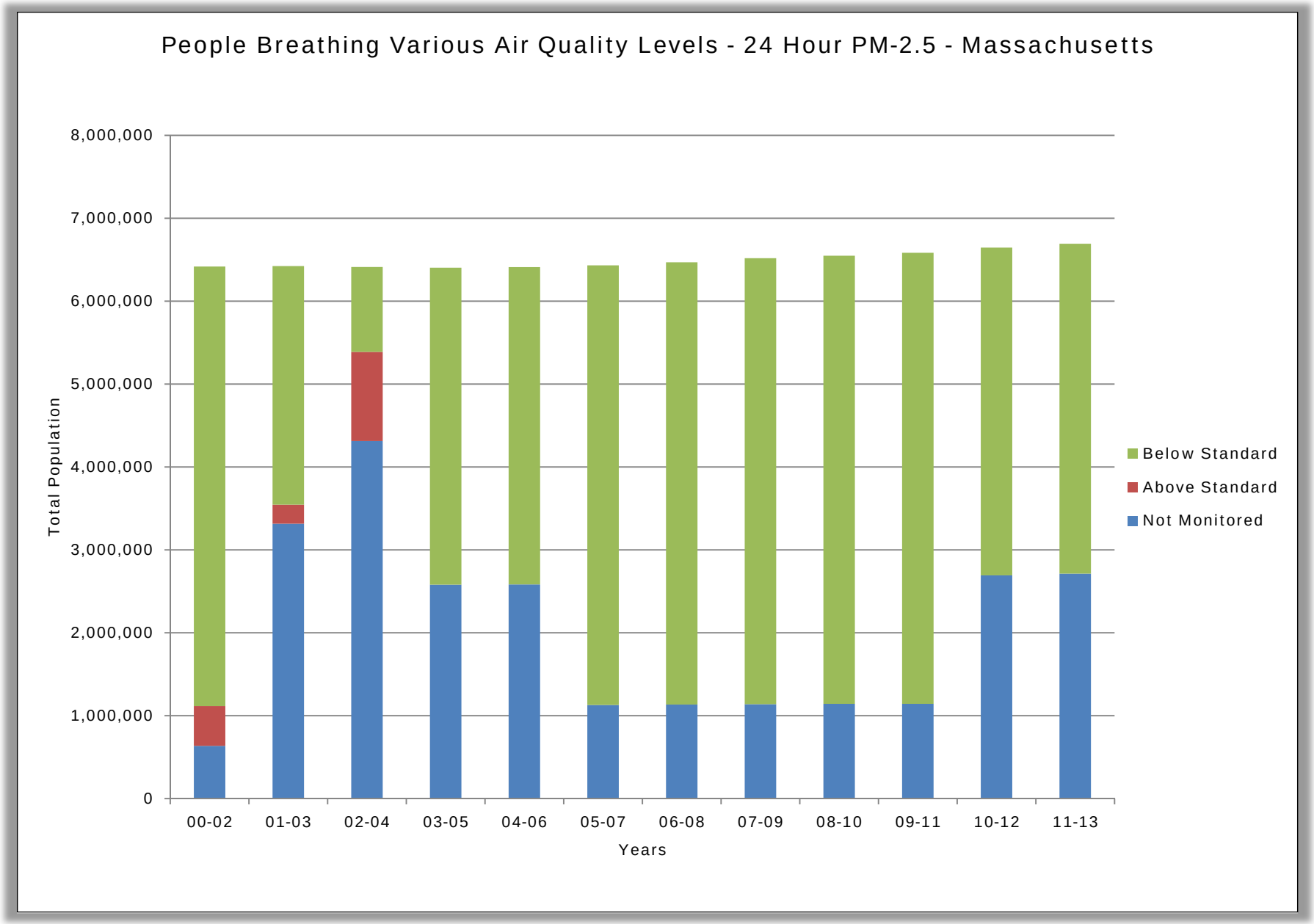
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
0
Total Population
00-02
01-03
02-04
03-05
04-06
05-07
06-08
07-09
08-10
09-11
10-12
11-13
Years
Below Standard
Above Standard
Not Monitored

Figure MA-2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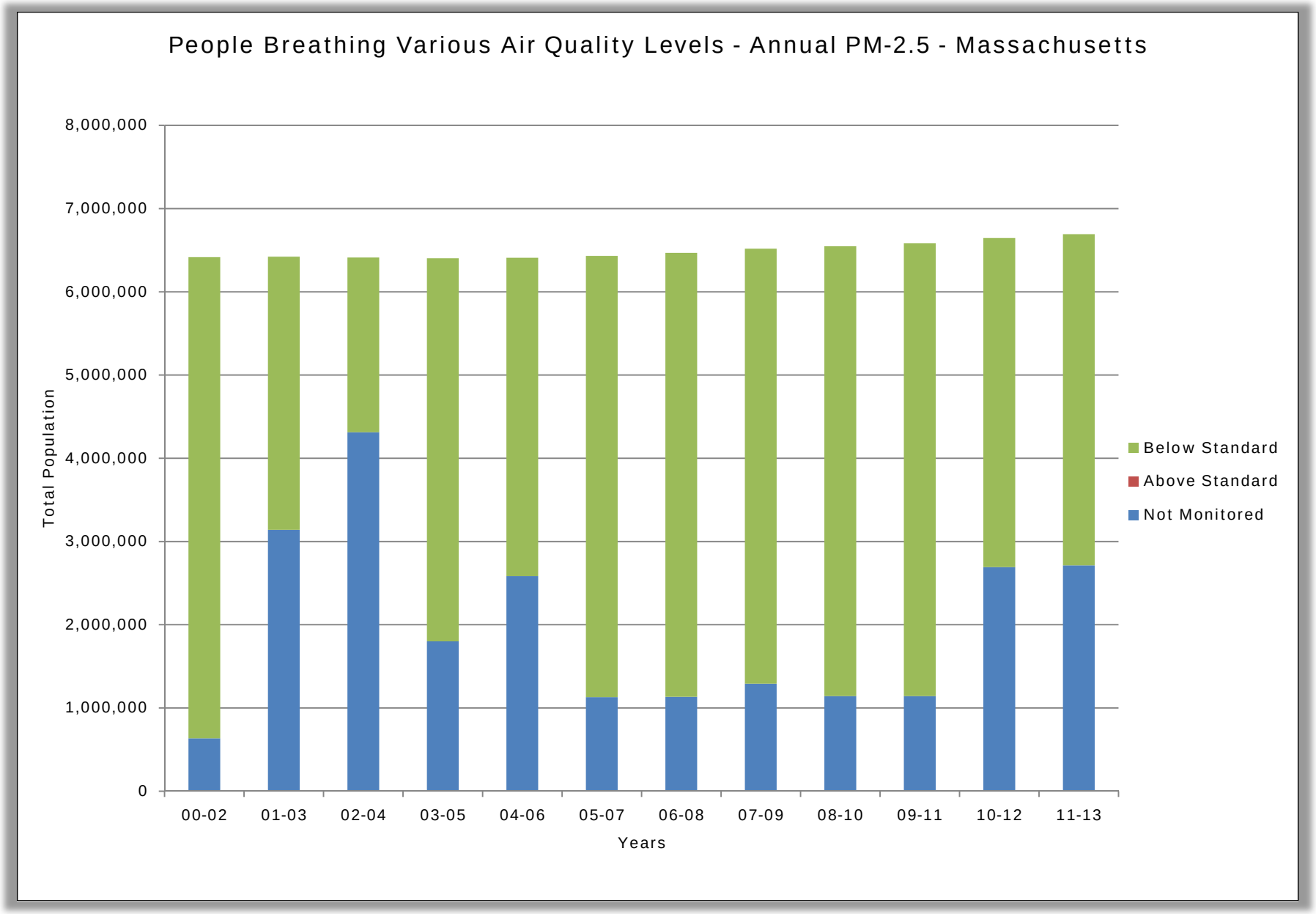
7,000,000
6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
0
Total Population
00-02
01-03
02-04
03-05
04-06
05-07
06-08
07-09
08-10
09-11
10-12
11-13
Years
Below Standard
Above Standard
Not Monitored

Figure MA-3


People Breathing Various Air Quality Levels - Annual PM-2.5 - Massachusetts
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7,000,000
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4,000,000
3,000,000
2,000,000
1,000,000
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Total Population
00-02
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02-04
03-05
04-06
05-07
06-08
07-09
08-10
09-11
10-12
11-13
Years
Below Standard
Above Standard
Not Monitored