2013 National Ambient Air Quality Standard (NAAQS) for Fine Particulate Matter (PM2.5): Designating Nonattainment Areas

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Summary

On January 15, 2015, the Environmental Protection Agency (EPA) published a final rule designating areas for compliance with the primary *annual* National Ambient Air Quality Standard (NAAQS) for fine particulate matter ($PM_{2.5}$) as revised in the final rule published January 15, 2013. Revising a NAAQS established under the Clean Air Act (CAA) sets in motion a process under which the states and EPA identify areas that exceed the standard ("nonattainment areas") using multi-year air quality monitoring data and other criteria, requiring states to take steps to reduce pollutant concentrations in order to meet the standard. Promulgation of the 2013 PM NAAQS was the subject of considerable congressional oversight. EPA's implementation of the standard, beginning with the designation of nonattainment areas, will likewise be an issue of interest and debate among Members of Congress, states, and other stakeholders.

A summary of the PM NAAQS revisions, published January 2013:

- changed the *annual* health-based ("primary") standard for "fine" particulate matter 2.5 micrometers or less in diameter (or $PM_{2.5}$) to a limit of 12 micrograms per cubic meter ($\mu g/m^3$) from the 15 $\mu g/m^3$ limit promulgated in 1997 and retained in 2006;
- retained the existing *24-hour primary standard* for $PM_{2.5}$ of 35 $\mu g/m^3$ (as promulgated in 2006) and the existing standard for larger, but still inhalable, "coarse" particles less than 10 micrometers in diameter, or PM_{10}; and
- set "secondary" standards that provide protection against non-visibility "welfare" (non-health) effects, such as ecological effects (including impacts on plants and vegetation, soil and nutrient cycling, wildlife, and water) and material deterioration, which are identical to the primary standards of 12 $\mu g/m^3$.

EPA's January 2015 final rule included 14 areas designated as nonattainment for the revised 2013 primary annual $PM_{2.5}$ standard. These areas include 38 counties or portions of counties in six states. Many of the counties within the 14 areas were previously designated as nonattainment for the 2006 and/or the 1997 $PM_{2.5}$ NAAQS. Three counties are designated nonattainment for PM NAAQS for the first time. In accordance with a decision by the U.S. Court of Appeals for the District of Columbia Circuit on January 4, 2013, EPA classified all 14 areas determined to be in nonattainment as "moderate" nonattainment areas under the authority of Section 188 of the CAA.

In the January 2015 rulemaking, EPA indicated that it was also deferring initial designation for 10 areas in three states by up to one year due to insufficient data. Included are all of Florida, all of Tennessee except for three counties, and eight areas in Georgia (including two counties in Alabama and South Carolina). The EPA also designated three areas (including all of Illinois) as "unclassifiable." All remaining state areas and areas in Indian country are designated as "unclassifiable/attainment" for the annual $PM_{2.5}$ standard. EPA did not establish new area designations for the 24-hour $PM_{2.5}$ standard or for the coarse particles PM_{10}, as these standards were not changed.

States have 18 months from the April 15, 2015, effective date of EPA's final designations to submit State Implementation Plans, which identify specific regulations and emission control requirements intended to bring an area into compliance or maintain compliance. Section 188 of the CAA requires that moderate nonattainment areas achieve attainment as expeditiously as practicable but no later than six years after the effective date of final designation.

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Introduction

Under Sections 108-109 of the Clean Air Act (CAA), Congress mandated that the Environmental Protection Agency (EPA) set national ambient (outdoor) air quality standards (or NAAQS) for pollutants whose emissions (1) "may reasonably be anticipated to endanger public health or welfare" and (2) "results from numerous or diverse mobile or stationary sources." The statute further requires that EPA review the latest scientific studies and either reaffirm or modify previously established NAAQS every five years. EPA has identified and promulgated NAAQS for six principal pollutants commonly referred to as "criteria pollutants":

1. Particulate matter (PM),
2. Ozone (O_3—a key measure of smog),
3. Nitrogen dioxide (NO_2, or NOx—inclusively, nitrogen oxides)[1],
4. Sulfur oxides (SOx or specifically SO_2),
5. Carbon monoxide (CO), and
6. Lead (Pb).

On January 15, 2013, EPA published its revisions to the NAAQS for PM[2] to provide protection against potential health effects associated with short- and long-term exposure to particulates (including chronic respiratory disease and premature mortality).[3] Because the agency finalized its decision on December 14, 2012, EPA frequently refers to these changes as the "2012 PM NAAQS."[4] In this report, CRS will refer to the changes as the 2013 PM NAAQS based on the publication date of the final rule.

The 2013 PM NAAQS primarily tightened the pre-existing (2006 and 1997) standards for "fine" particulate matter 2.5 micrometers or less in diameter ($PM_{2.5}$) and affected only the stringency of the *annual* $PM_{2.5}$ standard.[5] The *24-hour* $PM_{2.5}$ standard as revised in 2006 was not similarly

[1] The NAAQS is for NO_2; nitrogen gases that are ozone precursors are referred to as nitrogen oxides or NOx.

[2] For background of the process used to establish the 2013 particulates NAAQS and analysis of associated issues, see CRS Report R42934, *Air Quality: EPA's 2013 Changes to the Particulate Matter (PM) Standard*, by Robert Esworthy.

[3] U.S. Environmental Protection Agency, "National Ambient Air Quality Standards for Particulate Matter; Final Rule," 78 *Federal Register* 3085-3287, January 15, 2013, http://www.gpo.gov/fdsys/pkg/FR-2013-01-15/pdf/2012-30946.pdf. See also EPA's PM Regulatory Actions website at http://epa.gov/pm/actions.html.

[4] The EPA administrator signed the final PM NAAQS rule on December 14, 2012, as per a June 6, 2012, order issued by the U.S. Court of Appeals for the District of Columbia Circuit in response to petitions filed by advocacy groups and 11 states (*American Lung Association v. EPA*, D.D.C., No. 1:12-cv-243, order issued June 6, 2012) and as agreed to in a September 4, 2012, consent decree (*American Lung Association v. EPA*, D.D.C., No. 1:12-cv-243, order signed September 4, 2012). See also EPA, "Proposed Consent Decree," 77 *Federal Register* 38060, June 26, 2012, http://www.gpo.gov/fdsys/search/pagedetails.action?granuleId=2012-15603&packageId=FR-2012-06-26&acCode=FR, and *American Lung Association v. EPA*, D.D.C., No. 1:12-cv-243, joint motion filed June 5, 2012.

[5] For the 2006 PM NAAQS see EPA, "National Ambient Air Quality Standards for Particulate Matter," 71 *Federal Register* 61144-61233, October 17, 2006, http://www.gpo.gov/fdsys/pkg/FR-2006-10-17/pdf/06-8477.pdf; for the 1997 PM NAAQS, see EPA, "National Ambient Air Quality Standards for Particulate Matter," *Federal Register* 38652-38854, July 18, 1997, http://www.gpo.gov/fdsys/pkg/FR-1997-07-18/pdf/97-18577.pdf, and http://www.gpo.gov/fdsys/pkg/FR-1997-07-18/pdf/97-18578.pdf. See also EPA's PM Regulatory Actions website at http://epa.gov/pm/actions.html, and CRS Report RL33254, *Air Quality: EPA's 2006 Changes to the Particulate Matter (PM) Standards*, by Robert Esworthy and James E. McCarthy, *Air Quality: EPA's 2006 Changes to the Particulate Matter (PM)* (continued...)

strengthened in the 2013 NAAQS revisions. The standards for slightly larger, but still inhalable, particles less than or equal to 10 micrometers (PM_{10}) established in 1987[6] were also not changed to a more stringent level in the 2013 PM NAAQS revisions.[7]

Establishing NAAQS does not directly limit emissions or directly compel specific emissions controls; rather, it represents the EPA administrator's formal judgment regarding the level of ambient pollution that will protect public health with an *adequate margin of safety*. Promulgation of NAAQS sets in motion a process under which the states and EPA first identify geographic nonattainment areas (i.e., those areas failing to meet the NAAQS) based on monitoring and analysis of relevant air quality data. States then submit State Implementation Plans (SIPs), which identify specific regulations and emission control requirements that will bring areas into compliance as well as actions for maintaining compliance.

EPA published the final designations for the 2013 $PM_{2.5}$ NAAQS on January 15, 2015.[8] The final designation rule becomes effective April 15, 2015 (90 days from the date of publication). In part in response to comments received from states, the final designations reflected some changes to proposed designations identified by the agency in an August 29, 2014, *Federal Register* notice.[9]

In the final rule, EPA designated 38 counties or portions of counties (14 areas) in six states as nonattainment only for the 2013 revised *annual* $PM_{2.5}$ standard. EPA announced that it was also deferring initial designation for 10 areas in three states by up to one year as a result of insufficient data. Included are all of Florida, all of Tennessee except for three counties, and eight areas in Georgia (including two counties in Alabama and South Carolina). The EPA also designated three areas (including all of Illinois) as "unclassifiable" due to insufficiencies in the available ambient air quality monitoring data for these areas for the three-year period (2011-2013). All remaining state areas and areas in Indian country are designated as "unclassifiable/attainment" for the annual $PM_{2.5}$ standard, indicating that "the areas either have attaining air quality monitoring data or that air quality information is not available because the areas are not monitored, and the EPA has not determined that the areas contribute to a violation in a nearby area."[10]

As EPA had specified in its April 2013 area designation guidance to states and tribes,[11] the initial area designations for all 2013 $PM_{2.5}$ NAAQS nonattainment areas are classified as "moderate" as

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Standards, by Robert Esworthy and James E. McCarthy and CRS Report RL32431, *Particulate Matter (PM2.5): Implementation of the 1997 National Ambient Air Quality Standards (NAAQS)*, by Robert Esworthy.

[6] *Federal Register* 24634-24715, July 1, 1987.

[7] EPA announced that it has initiated the next round of review of the PM NAAQS by issuing a call for research information. U.S. Environmental Protection Agency (EPA), "Notice of Workshop and Call for Information on Integrated Science Assessment for Particulate Matter," 79 *Federal Register* 71764, December 3, 2014, http://www.gpo.gov/fdsys/pkg/FR-2014-12-03/pdf/2014-28278.pdf.

[8] U.S. Environmental Protection Agency, "Air Quality Designations for the 2012 Primary Annual Fine Particle ($PM_{2.5}$) National Ambient Air Quality Standards (NAAQS)," 80 *Federal Register* 2206-2284, January 15, 2015, http://www.gpo.gov/fdsys/pkg/FR-2015-01-15/pdf/2015-00021.pdf.

[9] EPA, "EPA Responses to State and Tribal 2012 Primary Annual Fine Particle Designation Recommendations," 79 *Federal Register* 51517-51520, August 29, 2014, http://www.gpo.gov/fdsys/pkg/FR-2014-08-29/pdf/2014-20641.pdf. See also EPA, "Area Designations for the 2012 Annual Fine Particle ($PM_{2.5}$) Standard: Regulatory Actions," http://www.epa.gov/pmdesignations/2012standards/regs.htm.

[10] See footnote 8, p. 2208.

[11] See EPA, "April 2013 Guidance for Area Designations for the 2012 Annual $PM_{2.5}$ NAAQS," p. 6, http://www.epa.gov/pmdesignations/2012standards/docs/april2013guidance.pdf.

provided under Section 188(a) of Subpart 4 of Part D of Title I of the CAA.[12] EPA had previously implemented the $PM_{2.5}$ NAAQS—including nonattainment determinations for the 1997 and 2006 revisions—only under the general implementation provisions in Subpart 1 (§171-§176) of Part D in Title I of the CAA ("Subpart 1"). However, in a January 4, 2013, decision,[13] the U.S. Court of Appeals for the District of Columbia Circuit determined that EPA had erred in implementing the $PM_{2.5}$ NAAQS under Subpart 1 and required the agency to implement the $PM_{2.5}$ NAAQS under Subpart 4 of Part D in Title I of the CAA ("Subpart 4").[14]

This CRS report focuses primarily on the NAAQS implementation process for designating geographical nonattainment areas with respect to the tightening of the $PM_{2.5}$ annual standard under the 2013 particulates NAAQS, including comparisons with the final designations under the 2006 and 1997 $PM_{2.5}$ NAAQS revisions. EPA is not requiring new nonattainment designations for the $PM_{2.5}$ 24-hour standard or the PM_{10} standard, as the levels for these standards were unchanged in the 2013 revisions.

Also included in this CRS report is a brief overview of states' subsequent obligations for developing and submitting SIPs for attaining or maintaining compliance with the NAAQS. **Appendix A** presents a chronology of PM NAAQS regulations, and **Appendix B** includes a comparative table of the implementation timeline for the 1997, 2006, and 2013 PM NAAQS. The table in **Appendix D** provides a state and county breakdown of EPA's final designated nonattainment areas and areas identified in August 2014 and those proposed by the states for the 2013 $PM_{2.5}$ NAAQS compared to the final EPA designations for the 2006 and 1997 $PM_{2.5}$ NAAQS for those states and counties.

EPA's 2013 Changes to the PM NAAQS

The CAA provides for two types of NAAQS: (1) primary standards, "the attainment and maintenance of which in the judgment of the [EPA] Administrator ... are requisite to protect the public health" with "an adequate margin of safety";[15] and (2) secondary standards,[16] which are necessary to protect public welfare[17]—a broad term that includes visibility impairment as well as

[12] Subpart 4 §188(a) includes a two-tier classification ("moderate" and "serious") requirement for areas designated nonattainment for PM NAAQS. Sections 188-189 of Subpart 4 contain requirements that EPA had not previously required states to address, including, in particular, in the event that EPA reclassifies a moderate nonattainment area to a serious nonattainment area. States must therefore submit plans that reflect the additional requirements.

[13] Natural Resources Defense Council and Sierra Club v. EPA, 706 F.3d 428 (D.C. Cir. 2013). See also EPA "Particulate Matter Regulatory Actions: Summary of January 4, 2013 Court Decision," http://epa.gov/pm/2013/20130104dcdecision.pdf.

[14] EPA published a final rule reclassifying nonattainment areas as "moderate" for the 1997 and 2006 PM NAAQS and set a deadline for December 31, 2014, for states to submit outstanding State Implementation Plans (SIPs) requirements. EPA, "Identification of Nonattainment Classification and Deadlines for Submission of State Implementation Plan (SIP) Provisions for the 1997 Fine Particle ($PM_{2.5}$) National Ambient Air Quality Standard (NAAQS) and 2006 $PM_{2.5}$ NAAQS; Final Rule," 79 *Federal Register* 31566, June 2, 2014, http://www.gpo.gov/fdsys/pkg/FR-2014-06-02/pdf/2014-10395.pdf. See also EPA's "Fact Sheet" and information regarding the November 15, 2013, proposed rule and the January 4, 2013, D.C. Circuit Court decision on the agency's website "Particulate Matter Regulatory Actions" at http://epa.gov/pm/actions.html.

[15] 42 U.S.C. 7409(b)(1).

[16] 42 U.S.C. 7409(b)(2).

[17] 42 U.S.C. 7602(h).The use of public welfare in the CAA "includes, but is not limited to, effects on soils, water, crops, vegetation, manmade materials, animals, wildlife, weather, visibility, and climate, damage to and deterioration of (continued...)

damage to crops, vegetation, and effects on soil and nutrient cycling, water, wildlife, property, building materials, etc.

EPA's 1997 revisions to the PM NAAQS[18] revised the standards that focused on particles smaller than 10 microns (PM_{10} or coarse particles) established in 1987[19] and introduced standards for "fine" particles smaller than 2.5 microns ($PM_{2.5}$) for the first time. The primary NAAQS as revised include a *daily* (24-hour) limit for both $PM_{2.5}$ and PM_{10} and an *annual* limit for $PM_{2.5}$. (EPA revoked the previous annual limit for PM_{10} in 2006.)

Achieving attainment of the annual standard requires that the three-year average of the weighted annual arithmetic mean PM concentration at each monitor within an area must not exceed the maximum limit set by the agency. The 24-hour standards are a concentration-based percentile form, indicating the percentage of the time that a monitoring station can exceed the standard. For example, a 98th percentile 24-hour standard indicates that a monitoring station can exceed the standard 2% of the days during the year. For $PM_{2.5}$ and PM_{10}, EPA set the secondary (welfare) NAAQS the same as the primary standards, the same correlations as EPA established for the 2006 PM NAAQS.

As modified and published in the January 15, 2013, *Federal Register*,[20] the $PM_{2.5}$ and PM_{10} primary (public health) standards as set in the final rule are as follows:

- **$PM_{2.5}$:** EPA revised the *annual* standard of 15 micrograms per cubic meter ($\mu g/m^3$) by setting a new limit to 12 $\mu g/m^3$. (EPA's proposed rule included an optional limit of 13 $\mu g/m^3$ and solicited comment for 11 $\mu g/m^3$.) Compliance with the "annual" standard is determined by whether the three-year average of its annual average $PM_{2.5}$ concentration (at each monitoring site in the area) is less than or equal to 12 $\mu g/m^3$; as proposed, EPA retained the *daily* (24-hour) standard at 35 $\mu g/m^3$ based on the current three-year average of the 98th percentile of 24-hour $PM_{2.5}$ concentrations as established in 2006.
- **PM_{10}:** EPA retained the current *daily* PM_{10} standard of no more than one exceedance of concentrations of 150 $\mu g/m^3$ per year on average over three years; there is no current *annual* standard for PM_{10}. (EPA eliminated[21] the previous annual maximum concentration standard of 50 $\mu g/m^3$ in 2006.)

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property, and hazards to transportation, as well as effects on economic values and on personal comfort and well-being, whether caused by transformation, conversion, or combination with other air pollutants."

[18] See 62 *Federal Register* 38652-38896, July 18, 1997.

[19] PM_{10} NAAQS were promulgated in 1987. See 52 *Federal Register* 24640, July 1, 1987.

[20] See footnote 3.

[21] This decision was based on the findings in the EPA PM criteria document and staff paper, and the CASAC's concurrence, that the studies reviewed did not provide sufficient evidence regarding *long-term* exposure to warrant continuation of an annual standard. See EPA, "National Ambient Air Quality Standards," Section III, 71 *Federal Register* 2653, January 17, 2006.

Designation of Geographical Nonattainment Areas

Designating geographical areas as not achieving the established NAAQS based on monitoring and analysis of relevant air quality data is a critical step in NAAQS implementation. Section 107(d) of the CAA (42 U.S.C. 7407) establishes the process for designating "attainment" (or alternatively "unclassifiable") and "nonattainment" areas and setting their boundaries, but it allows the EPA administrator some discretion in determining what the final boundaries of the areas will be. Areas are identified as nonattainment when they violate or contribute to the violation of NAAQS.

Under Section 107(d)(1) of the CAA, the governor of each state must submit a list identifying designations for a NAAQS "by such a date as the [EPA] Administrator may reasonably require, but not later than 1 year after promulgation" of the new or revised NAAQS. EPA must promulgate final designations "as expeditiously as possible" but no later than two years from the date of promulgation of the new or revised NAAQS. Section 107(d) of the CAA provides for an extension of up to one year if the EPA administrator "has insufficient information to promulgate designations." The process leading up to final designation determinations has in the past extended beyond the established deadlines as states have continuously reviewed and analyzed data and modelling results with EPA.

For the 2013 NAAQS, state submissions were to be submitted by December 13, 2013, and EPA was to promulgate final designations by December 12, 2014.[22]

NAAQS Designation Process

The NAAQS designation process is intended as a cooperative federal-state-tribal[23] process in which states and tribes provide initial designation recommendations to EPA for consideration. Section 107(d)(1)(A) (42 U.S.C. 7407) of the CAA requires the governor of each state to submit a list to EPA of all areas in the state "designating as ... nonattainment, any area that does not meet (*or that contributes to ambient air quality in a nearby area that does not meet*) an air quality standard" (emphasis added). Areas are identified as "attainment/unclassifiable"[24] when they meet the standard or when the data are insufficient for determining compliance with the NAAQS.

Following state and tribal designation submissions, the EPA administrator has discretion to make modifications, including to the area boundaries. As required by statute (§107(d)1(B)(ii)), the agency must notify the states and tribes regarding any modifications, allowing them sufficient opportunity to demonstrate why a proposed modification is inappropriate, but the final determination rests with EPA.

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[22] See EPA, "National Ambient Air Quality Standards; Final Rule," Section IX, 78 *Federal Register* 3249-3251, January 15, 2013, http://www.gpo.gov/fdsys/pkg/FR-2013-01-15/pdf/2012-30946.pdf.

[23] Tribes have been encouraged to submit recommendations. The area designation requirements under the CAA (§107) are specific with respect to states but not to tribes. EPA follows the same designation process for tribes per Sections 110(o) and 301(d) of the CAA and pursuant to the 1988 Tribal Authority Rule, which specifies that tribes shall be treated as states in selected cases (40 C.F.R. Part 49). For information regarding tribes that have participated in the $PM_{2.5}$ designation recommendation process, see EPA, "Fine Particle ($PM_{2.5}$) Designations," http://www.epa.gov/pmdesignations.

[24] Section 107(d)(1)(A)(iii) of the CAA provides that any area that EPA cannot designate on the basis of available information as meeting or not meeting the standards should be designated as unclassifiable.

Measuring and analyzing air quality to determine where NAAQS are not being met is a key step in determining an area's designation. Attainment or nonattainment designations are made primarily on the basis of three years of federally referenced monitoring data.[25] EPA began developing methods for monitoring fine particles at the time the $PM_{2.5}$ NAAQS were being finalized in 1997, and operation of the network of monitors for $PM_{2.5}$ was phased in from 1999 through 2000. EPA's final designations for the 2013 particulates NAAQS were based on 2011-2013 monitoring data.

The network of monitors and their locations has been modified over time. In conjunction with the October 2006 publication of the revised particulates NAAQS, for example, EPA amended its national air quality monitoring requirements, including those for monitoring particle pollution.[26] The amended monitoring requirements were intended to help federal, state, and local air quality agencies by adopting improvements in monitoring technology. Additional modifications to the PM NAAQS monitoring network were included in the final January 2013 rule.[27]

EPA also considers a number of other relevant factors when designating nonattainment areas[28] and recommends that states apply these factors in their determinations in conjunction with other technical guidance. Examples of these factors include:

- population density and degree of urbanization (including commercial development);
- location of sources in relation to population;
- existing emission controls;
- traffic and commuting patterns and growth rates;
- weather and transport patterns (meteorology);
- geography/topography; and
- jurisdictional boundaries such as counties (or portions of counties), tribal reservations, metropolitan planning areas, and air districts.

States and tribes may submit additional information on factors they believe are relevant for EPA to consider.

Entire metropolitan areas may be designated nonattainment in some cases based on monitoring data in a single location taking into account other factors. States' or tribes' boundary recommendations for an area are to also show that violations are not occurring in those portions of the recommended area that have been excluded and that they do not contain emission sources that contribute to the observed violations.

[25] A federally referenced monitor is one that has been accepted for use by EPA for comparison of the NAAQS by meeting the design specifications and certain precision and bias (performance) specifications (40 C.F.R. Part 58).

[26] EPA, "Revisions to Ambient Air Monitoring Regulations; Final Rule," 71 *Federal Register* 61235-61328, October 17, 2006, http://www.gpo.gov/fdsys/pkg/FR-2006-10-17/pdf/06-8478.pdf.

[27] EPA, "National Ambient Air Quality Standards for Particulate Matter," Section VIII, 79 *Federal Register* 3233-3248, January 15, 2013, http://www.gpo.gov/fdsys/pkg/FR-2013-01-15/pdf/2012-30946.pdf.

[28] See EPA, "Area Designations for the 2012 Annual Fine Particle ($PM_{2.5}$) Standard: Designation Guidance and Data," http://www.epa.gov/airquality/particlepollution/designations/2012standards/techinfo.htm.

The CAA does not specifically require combining neighboring counties within the same nonattainment area, but it does require the use of metropolitan statistical area boundaries in the more severely polluted areas (§107(d)(4)(A)(iv)). However, unlike the 1997 $PM_{2.5}$ standards, Metropolitan Statistical Areas or Consolidated Metropolitan Statistical Areas[29] did not generally serve as the "presumptive boundary" for nonattainment areas under the 2013 $PM_{2.5}$ standards. EPA made this change when determining nonattainment for the 2006 $PM_{2.5}$ standards. Rather than establish a presumption for the minimum size of an area, in its June 2007 guidance[30] EPA instructed states and tribes to evaluate each area on a case-by-case basis. EPA expected that nonattainment areas for the 2006 24-hour $PM_{2.5}$ would include counties with monitors violating the 24-hour standard and nearby counties that contribute to that violation.

EPA also recommended that states and tribes consider using common boundaries for areas to be designated as nonattainment for both the annual and 24-hour $PM_{2.5}$ standards. In April 2013, EPA provided similar guidance to states and tribes with regard to the 2013 revisions of the annual $PM_{2.5}$ standards.[31] States used this information, in conjunction with air emission and air quality data—as well other relevant factors listed above as recommended in EPA's guidance in determining the boundaries for the designated areas.

Designations for the 2013 $PM_{2.5}$ Annual NAAQS[32]

Section 107(d)(1) of the CAA requires states to submit area designation recommendations no later than one year following the promulgation of a NAAQS standard.[33] During November 2013, four states—California, Idaho, Ohio, and Pennsylvania—provided EPA with recommended nonattainment boundaries for the 2013 revised primary *annual* $PM_{2.5}$ standard. Remaining states, the District of Columbia, Puerto Rico, and Guam recommended all areas as attainment or unclassifiable/attainment.[34] EPA also received six tribal recommendations of attainment or unclassifiable/attainment.[35]

EPA responded to these recommendations in August 2014, and subsequently promulgated the final area designations published January 15, 2015. The final EPA designations for the 2013 $PM_{2.5}$

[29] As defined by the Office of Management Budget. For more information on metropolitan areas, see U.S. Census Bureau, "Metropolitan and Micropolitan Statistical Areas Main," http://www.census.gov/population/www/estimates/aboutmetro.html.

[30] See EPA's June 2007 guidance for area designations for the 2006 24-hour $PM_{2.5}$ NAAQS at http://www.epa.gov/airquality/particlepollution/designations/2006standards/techinfo/june_2007_guidance_for_area_designations_for_2006_24-hour_pm2.5.pdf.

[31] See EPA's April 2013 guidance for area designations for the 2012 annual $PM_{2.5}$ NAAQS at http://www.epa.gov/pmdesignations/2012standards/docs/april2013guidance.pdf.

[32] For detailed $PM_{2.5}$ state/county geographical designation recommendations by EPA and those from individual states and tribes for the 1997, 2006, and 2012 $PM_{2.5}$ NAAQS, see EPA, "Fine Particle ($PM_{2.5}$) Designations," http://www.epa.gov/pmdesignations.

[33] For the 2013 PM NAAQS, state recommendations were due by December 13, 2013.

[34] See EPA, "Area Designations for the 2012 Annual Fine Particle ($PM_{2.5}$) Standard: State Recommendations and EPA Responses for Area Designations," http://www.epa.gov/pmdesignations/2012standards/state.htm.

[35] See EPA, "Area Designations for the 2012 Annual Fine Particle ($PM_{2.5}$) Standard: Initial Designations for Tribes," http://www.epa.gov/pmdesignations/2012standards/tribal.htm.

NAAQS, published January 15, 2015, reflected some modifications to EPA's August 2014 proposed designations.[36]

EPA January 2015 Final Designations

In the January 2015 final rule, EPA designated 14 areas in six states—California, Idaho, Indiana, Kentucky, Ohio, and Pennsylvania—as nonattainment only for the 2013 revised *annual* $PM_{2.5}$ standard, the same as the agency proposed in August 2014 counties (see **Table B-1** for state-by-state county/area nonattainment designations). However, the 14 nonattainment areas included 38 counties or portions of counties, one less than proposed (Lake County, OH).

Comparatively, EPA's final designations for nonattainment of the 2006 and 1997 $PM_{2.5}$ NAAQS (those areas with or contributing to air quality levels exceeding the annual and 24-hour $PM_{2.5}$ standards or both) included all or part of 242 counties in 28 states and the District of Columbia.[37] More than 2,900 counties in 30 states were designated as attainment/unclassifiable for the 2006 24-hour and 1997 annual $PM_{2.5}$ NAAQS.

As EPA indicated in its April 2013 area designation guidance to states and tribes, the initial area designations for all 2013 $PM_{2.5}$ NAAQS nonattainment areas were classified as "Moderate" as provided under Subpart 4 of Part D of Title I of the CAA (Section 188(a)).[38] EPA may reclassify as "serious" those nonattainment areas that EPA determines cannot practicably attain the $PM_{2.5}$ NAAQS by the applicable attainment date or has not in fact attained the $PM_{2.5}$ NAAQS after each area's applicable attainment date has passed. Such a determination would trigger additional implementation requirements on the state that were not previously included in SIPs under Subpart 1 of the CAA.

Counties included in the EPA final nonattainment area designations for the 2013 $PM_{2.5}$ NAAQS are indicated in the map in **Figure 1**. Although EPA's final designations for the 2013 PM NAAQS do not identify areas violating the 24-hour $PM_{2.5}$ standard, as the level is unchanged from the 2006 PM NAAQS, the map distinguishes those proposed counties not previously designated as nonattainment for the annual or the 24-hour $PM_{2.5}$ standards.

EPA announced that it was also deferring initial designation for 10 areas in three states by up to one year as a result of data validity issues. Included are all of Florida, all of Tennessee except for three counties, and eight areas in Georgia (including two counties in Alabama and South Carolina). EPA had previously proposed to designate the areas in Tennessee and three of the eight areas in Georgia as unclassifiable. Florida was added as EPA indicated that it had only recently identified data quality issues in that state.[39]

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[36] See EPA, "Final Area Designations for the 2012 National Air Quality Standard for Fine Particles: Responses to Significant Comments on the State and Tribal Designation Recommendations for the 2012 Annual $PM_{2.5}$ National Ambient Air Quality Standard (NAAQS)," December 17, 2014, Docket Number EPA-HQ-OAR-2012-0918, http://www.epa.gov/pmdesignations/2012standards/final/20141217rtc.pdf.

[37] See EPA's $PM_{2.5}$ designations websites at http://www.epa.gov/pmdesignations and http://www.epa.gov/oar/oaqps/greenbk/qnca.html. See also CRS Report R40096, *2006 National Ambient Air Quality Standards (NAAQS) for Fine Particulate Matter (PM2.5): Designating Nonattainment Areas*, by Robert Esworthy.

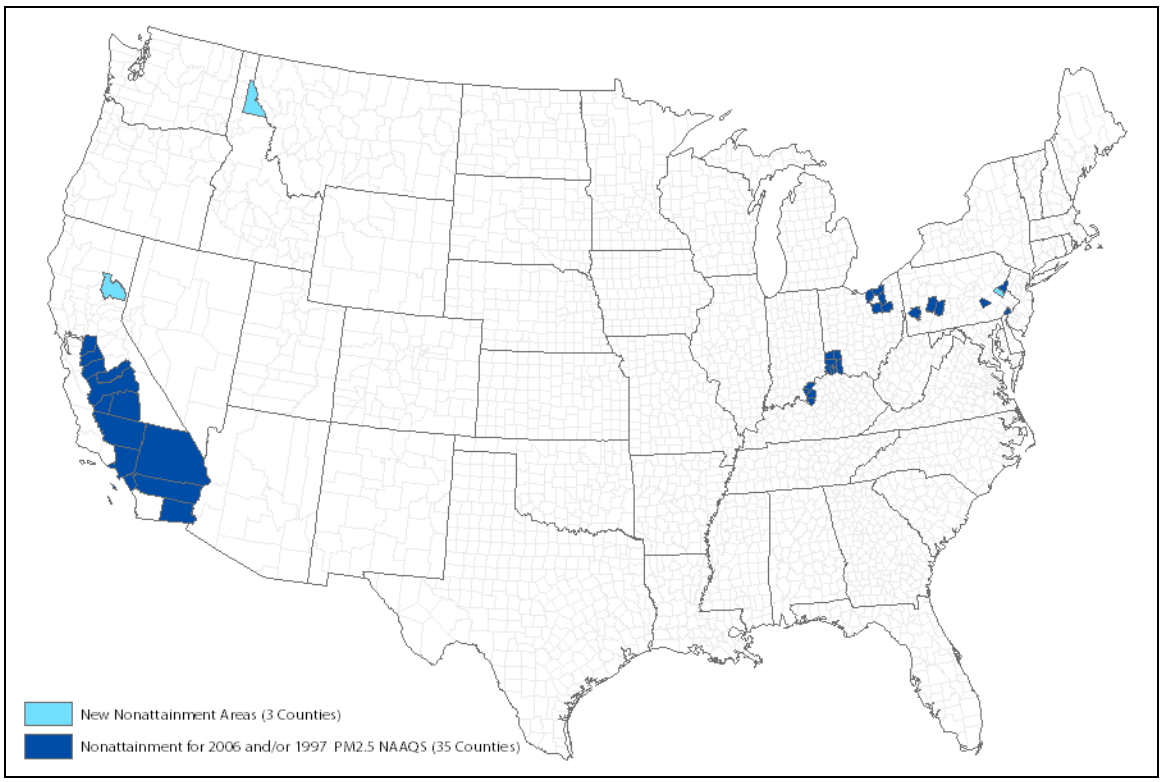
[38] See EPA, "April 2013 Guidance for Area Designations for the 2012 Annual $PM_{2.5}$ NAAQS," p. 6, http://www.epa.gov/pmdesignations/2012standards/docs/april2013guidance.pdf.

[39] See EPA, "Final Area Designations for the 2012 National Air Quality Standard for Fine Particles: Fact Sheet," (continued...)

The EPA also designated three areas as unclassifiable: Puerto Rico, the U.S. Virgin Islands, and all of Illinois (including two adjacent counties in Indiana as part of the Chicago area and four counties and one city in Missouri included in the St. Louis area) as "unclassifiable." All remaining state areas and areas in Indian country are designated as "unclassifiable/attainment" for the annual $PM_{2.5}$ standard.

Figure 1. EPA's Final Designations of Geographical Areas as Nonattainment for the 2013 Annual $PM_{2.5}$ NAAQS

(violating the 2013 $PM_{2.5}$ primary annual standard (12 µg/m^3) only)



Source: Prepared by the Congressional Research Service based on EPA's final designations for the 2013 $PM_{2.5}$ revised annual NAAQS, with data compiled from EPA's website for prior PM NAAQS final designations, http://www.epa.gov/pmdesignations/.

Note: Partial counties are shown on the map as whole counties. EPA's final designations did not include any counties or partial counties in Alaska or Hawaii.

While the intended nonattainment areas for the 2013 NAAQS may seem small compared with the approximately 3,000 counties in the United States, PM NAAQS nonattainment counties tend to have larger populations than those in attainment. Roughly 28 million people[40] reside in the 39 counties EPA designated as nonattainment for the 2013 annual $PM_{2.5}$ NAAQS. Comparably, at the

(...continued)

http://www.epa.gov/pmdesignations/2012standards/final/20141218fs.pdf.

[40] Based on extrapolation of the county population (2010 Census), which EPA identified in its "Book Nonattainment Areas for Criteria Pollutants" (see http://www.epa.gov/oar/oaqps/greenbk/anayo_pa.html). Estimated total population is 316 million for 2013 based on U.S. Census Bureau, "USA Quick Facts," http://quickfacts.census.gov/qfd/states/00000.html.

time of EPA's final designation for the 2006 PM NAAQS, more than 70 million people (over 20% of the U.S. population)[41] lived in the 120 counties designated as nonattainment for the 2006 24-hour $PM_{2.5}$ NAAQS. For the areas designated for 1997 PM NAAQS, nearly 90 million people (about 30% of the U.S. population)[42] lived in the 205 counties designated as nonattainment.

State Recommendations and EPA August 2014 EPA Proposed Designations in Response

Four states—California, Idaho, Ohio, and Pennsylvania—identified 12 areas comprising 25 counties, including six partial counties (see **Table B-1** for state-by-state county/area nonattainment designations).[43] The recommended designations were primarily based on 2010-2012 monitoring data, criteria and technical guidance from EPA and assistance from its regional offices, and states' own relevant information and criteria. States providing revised determinations based their area designation recommendations on 2011-2013 monitoring data.

As required by statute, EPA responded to the states with its recommended modifications to the states' proposed area designations for the 2013 $PM_{2.5}$ NAAQS for the annual standard in letters on or about August 19, 2014.[44] As EPA did in implementing the 2006 and 1997 $PM_{2.5}$ NAAQS, and as it has done with NAAQS for other criteria pollutants, the agency used its discretion to identify areas as nonattainment in states that had recommended all areas as attainment or unclassifiable/attainment, expand the size of nonattainment areas (i.e., added more counties or portions of counties), or combine areas that states listed as separate areas into a single larger unit. EPA also combined nonattainment counties across state lines into the same nonattainment areas if the counties are part of the same metropolitan area.

In its August 2014 response to states, EPA proposed 14 areas comprised of 39 counties—25 whole and 14 partial counties—in six states as nonattainment only for the revised 2013 primary annual $PM_{2.5}$ standard. (See table in **Appendix C** for state-by-state county/area nonattainment designations.) In addition to the four states that had previously identified counties as nonattainment for the 2013 $PM_{2.5}$ NAAQS, EPA added seven counties in Kentucky and Indiana, four of which are included in the nonattainment area designated as Louisville-KY/IN. The three additional counties in Kentucky are adjacent to counties in an area previously recommended for nonattainment designation by Ohio; EPA refers to the area as Cincinnati/Hamilton-OH/KY. EPA also designated as nonattainment additional counties in Pennsylvania and Ohio that had not been previously recommended as nonattainment by those states for the 2013 $PM_{2.5}$ NAAQS. Several of the 14 nonattainment areas included counties from multiple states.

In the August 29, 2014, *Federal Register* notice[45] announcing the posting of the response letters, EPA also indicated that due to data validity issues it was extending the designation period by up

[41] Based on estimated total population of 314 million for 2012 from the U.S. Census Bureau, 2000 Census data, http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=PEP_2012_PEPAGESEX&prodType=table.

[42] See footnote 41.

[43] See footnote 34.

[44] For information regarding EPA's August 19, 2014, intended designations, see EPA, "Area Designations for the 2012 Annual Fine Particle ($PM_{2.5}$) Standard," http://www.epa.gov/airquality/particlepollution/designations/2012standards/index.htm.

[45] EPA, "EPA Responses to Significant Comments on the State and Tribal Designation Recommendations for the 2012 (continued...)

to one year, to December 2015, for 10 counties in Alabama, Georgia, and South Carolina.[46] EPA determined that the information currently available for these areas was insufficient for making designations.[47] In addition, due to data quality assurance issues at several monitoring sites, EPA indicated that it intended to designate as "unclassifiable" two territories, one area in Indian country, three areas in Georgia, all counties in Illinois, two counties in Indiana, four counties and a city in Missouri, and all counties except three (Chattanooga area) in Tennessee.[48] EPA indicated that it intended to designate all remaining areas throughout the United States, including areas in Indian country and territories, as unclassifiable/attainment.

Per the CAA, states were provided the opportunity to submit additional relevant information to demonstrate why EPA's modifications to the states' recommendations were inappropriate prior to the agency's final designations. Although the CAA provides for up to 120 days, the EPA August 2014 response letters for all states with areas intended to be designated nonattainment urged states to submit "additional information for the EPA to consider" by October 29, 2014. Several states, including all those with areas EPA intended to designate nonattainment, submitted their responses to the EPA's August 2014 proposed designations by the October 2014 deadline.[49] As with past designations by EPA, a number of states challenged the agency and maintained support for their original recommendations.

Comparing EPA's Final Nonattainment Designations for the 2013 PM NAAQS with the 2006 and 1997 $PM_{2.5}$ NAAQS Final Designations

EPA's final designations for nonattainment of the 2006 and 1997 $PM_{2.5}$ NAAQS (those areas with or contributing to air quality levels exceeding the annual and 24-hour $PM_{2.5}$ standards or both) included all or part of 242 counties in 28 states and the District of Columbia.[50] More than 2,900

(...continued)

Annual $PM_{2.5}$ National Ambient Air Quality Standard (NAAQS)," http://www.epa.gov/pmdesignations/2012standards/final/20141217rtc.pdf. See additional information at EPA, "Area Designations for the 2012 Annual Fine Particle ($PM_{2.5}$) Standard: Regulatory Actions," http://www.epa.gov/pmdesignations/2012standards/regs.htm.

[46] EPA, "Area Designations for the 2012 Annual Fine Particle (PM2.5) Standard Regulatory Actions: Fact Sheet," http://www.epa.gov/pmdesignations/2012standards/docs/20140819factsheet.pdf.

[47] For a list of the deferred areas, see EPA, "Area Designations for the 2012 Annual Fine Particle (PM2.5) Standard Regulatory Actions: Deferred Areas," http://www.epa.gov/pmdesignations/2012standards/docs/20140819deferredlist.pdf.

[48] For a list of the areas EPA proposed to designate as unclassified, see EPA, "Area Designations for the 2012 Annual PM2.5 Standards," http://www.epa.gov/pmdesignations/2012standards/docs/20140819unclassifiablelist.pdf. See also EPA, "Area Designations for the 2012 Annual Fine Particle (PM2.5) Standard Regulatory Actions: Fact Sheet," http://www.epa.gov/pmdesignations/2012standards/docs/20140819factsheet.pdf.

[49] See communications between states and EPA at EPA, "Recommended Area Designations for the 2012 National Air Quality Standards for Fine Particles: State Recommendations and EPA Responses for Area Designations," http://www.epa.gov/pmdesignations/2012standards/staterec.htm; for tribes see "Recommended Area Designations for the 2012 National Air Quality Standards for Fine Particles: Tribal Recommendations and EPA Responses for Area Designations," http://www.epa.gov/pmdesignations/2012standards/tribalrec.htm.

[50] See EPA's $PM_{2.5}$ designations websites at http://www.epa.gov/pmdesignations and http://www.epa.gov/oar/oaqps/greenbk/qnca.html. See also CRS Report R40096, *2006 National Ambient Air Quality Standards (NAAQS) for Fine Particulate Matter (PM2.5): Designating Nonattainment Areas*, by Robert Esworthy.

counties in 30 states were designated as attainment/unclassifiable for the 2006 24-hour and 1997 annual $PM_{2.5}$ NAAQS. See the map in **Figure 2**.

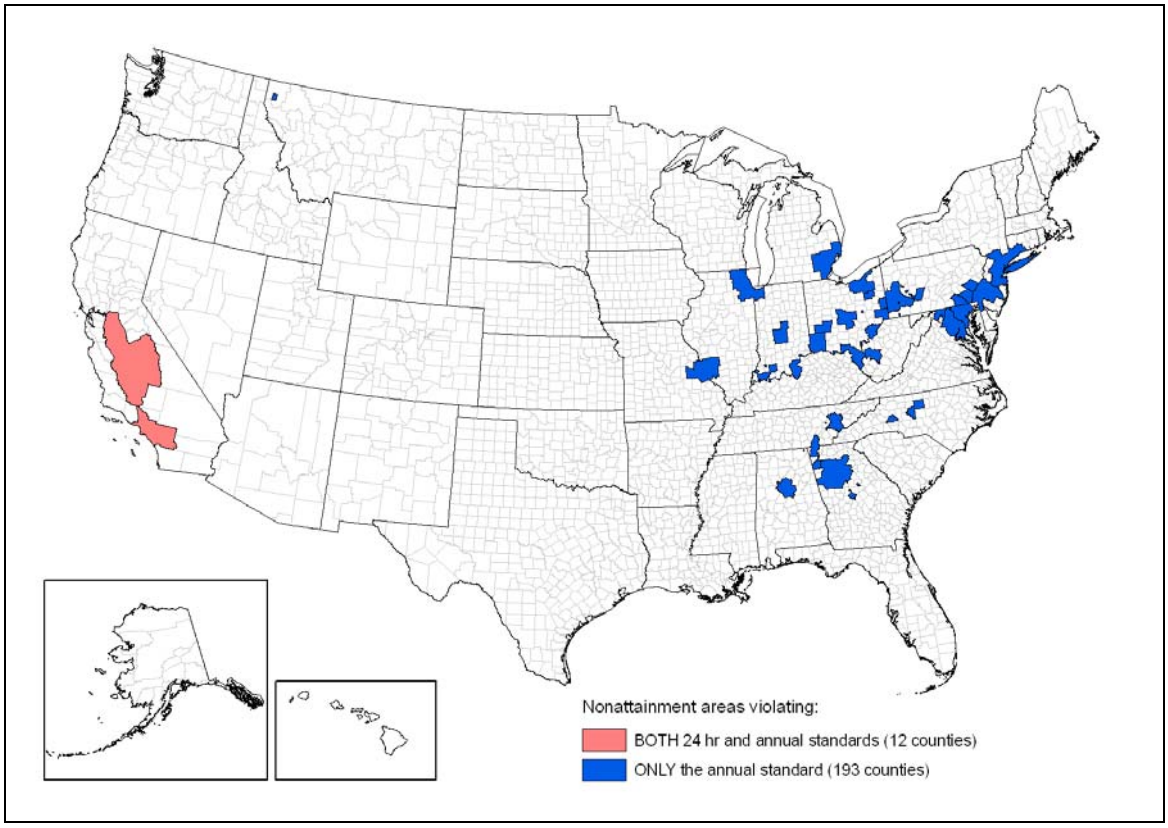
Based on EPA's January 2015 final designations for the 2013 $PM_{2.5}$ annual standard, three counties (or portions) of the 38 counties would be designated nonattainment for $PM_{2.5}$ for the first time, but the majority of the counties overlap with EPA's final nonattainment designations for the 2006 and 1997 $PM_{2.5}$ annual and/or 24-hour standards. Of the remaining 35 counties designated as nonattainment for the 2013 annual $PM_{2.5}$ standard as revised, five have not been previously designated for the annual standard but were designated as nonattainment for the 24-hour standard, and the remaining 30 counties have been previously designated as nonattainment only for the annual standard or for the annual and the 24-hour $PM_{2.5}$ standards (see Table in **Appendix C**). The map in **Figure 3** presents the overlap of the January 2015 nonattainment designations for the 2013 $PM_{2.5}$ annual standard with those areas designated nonattainment for the 2006 and 1997 $PM_{2.5}$ standards.

EPA final designations published on November 13, 2009, for the 2006 PM NAAQS included 31 areas in 18 states comprising 120 counties (89 counties and portions of 31 additional counties) for nonattainment of only the revised 2006 24-hour $PM_{2.5}$ standard.[51] EPA's November 2009 final designations did not include new counties violating the annual standard, as the level was unchanged from the 1997 $PM_{2.5}$ NAAQS. EPA's designations for the 1997 $PM_{2.5}$ NAAQS included all or part of 204 counties in 20 states and the District of Columbia. Most of the counties were exceeding *only* the annual standard, only 12 counties were exceeding both the 24-hour and the annual standards, and no counties were exceeding only the 24-hour standard. (For a historical presentation of the 1997 NAAQS designations, see **Figure D-1** in **Appendix D**.)[52]

[51] 74 *Federal Register* 58688-58781, November 13, 2009; see also EPA, "Area Designations for 2006 24-Hour Fine Particulate ($PM_{2.5}$) Standards—Regulatory Actions," http://www.epa.gov/pmdesignations/2006standards/regs.htm#4.

[52] For a detailed side-by-side presentation of EPA final designations for the 2006 and 1997 $PM_{2.5}$ see Table B-1 in Appendix B of CRS Report R40096, *2006 National Ambient Air Quality Standards (NAAQS) for Fine Particulate Matter (PM2.5): Designating Nonattainment Areas*, by Robert Esworthy.

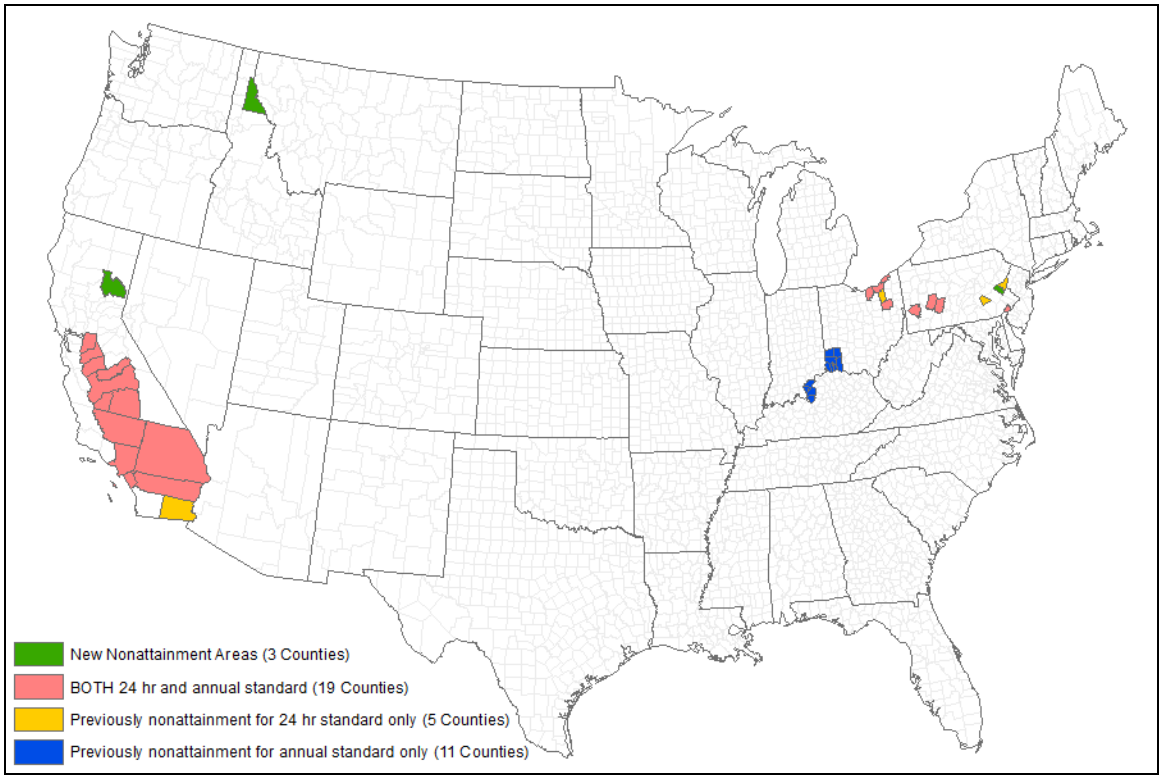
Figure 2. Counties in Nonattainment for the 2006 24-Hour (65 µg/m³) Standards and/or 1997 $PM_{2.5}$ NAAQS Annual (15 µg/m³): U.S. EPA Final Designations



Source: Prepared by the Congressional Research Service based on EPA final designations for the 2006 and 1997 $PM_{2.5}$ NAAQS. Nonattainment counties for the annual standard are based on the October 2006 final area designations for the 1997 $PM_{2.5}$ NAAQS; nonattainment counties for the 24-hour standard are based on EPA's November 2009 final designations for the 2006 $PM_{2.5}$ NAAQS.

Figure 3. EPA Final Area Designation: Nonattainment Areas for the 2013 $PM_{2.5}$ NAAQS Compared to EPA's Final Designations for 2006 and 1997 $PM_{2.5}$ NAAQS

(violating the 2013 annual [12 µg/m^3], compared to 1997 annual standard [15 µg/m^3] and/or the 2006 24-hour [35 µg/m^3] standard)



Source: Prepared by the Congressional Research Service with data compiled from EPA's website for PM designations, http://www.epa.gov/pmdesignations/. Nonattainment counties for the 2013 annual standard are based on EPA January 2015 final designations; previously designated nonattainment counties for the annual standard are based on the October 2006 final area designations for the 1997 $PM_{2.5}$ NAAQS; previously designated nonattainment counties for the 24-hour standard are based on EPA's November 2009 final designations for the 2006 $PM_{2.5}$ NAAQS.

Note: Partial counties are shown on the map as whole counties. EPA's August 14 prosed designations did not include any counties or partial counties in Alaska or Hawaii.

Table 1 below illustrates the comparative geographic distribution of counties in areas that EPA designated as nonattainment for the 2013 $PM_{2.5}$ NAAQS and those counties in EPA's final area designations for the 2006 and 1997 $PM_{2.5}$ NAAQS.

Table 1. U.S. EPA Final Nonattainment Designations of Counties Cumulative for the 1997 $PM_{2.5}$ NAAQS, 2006 $PM_{2.5}$ NAAQS, and the 2013 $PM_{2.5}$ NAAQS

	$PM_{2.5}$ NAAQS (annual/24-hour µg/m³)								
	1997 standard 15/65 µg/m³			2006 standard 15/35 µg/m³			2013 standard 12/35 µg/m³		
	National	West	East	National	West	East	National	West	East
	Number of counties (including partial counties and DC)								
Total exceeding the standard	204	13	191	242	43	199	245	45	200
Exceeding the 24-hour and annual standards	12	12	0	81	11	70	86	13	74
Exceeding the 24-hour standard only	0	0	0	39	31	8	34	30	4
Exceeding the annual standard only	192	1	191	122	1	121	125	2	122

Source: Prepared by the Congressional Research Service with data compiled from EPA's websites for PM designations at http://www.epa.gov/pmdesignations/ and http://www.epa.gov/oar/oaqps/greenbk/qnca.html. Nonattainment counties are based on EPA's final designations for the 2013 $PM_{2.5}$ NAAQS as published January 15, 2015; final designations for the 2006 $PM_{2.5}$ NAAQS for the 24-hour standard published November 13, 2009; and final area designations for the 1997 $PM_{2.5}$ NAAQS for the 24-hour and annual standards as of July 31, 2009.

Note: The counties in the table for the 2013 standards reflect EPA's final designation for the revised annual standards overlaid with the those presented in the previous column for the 2006 standards; the counties in the table for the 2006 standards reflect EPA's final designations for nonattainment area boundaries for the 2006 24-hour only $PM_{2.5}$ NAAQS based on 2006-2008 air quality monitoring data overlaid with the final designations for the annual standards (which were unchanged) for the 1997 $PM_{2.5}$ NAAQS as of July 31, 2009.

It is difficult to anticipate what effect the EPA final area designations for the 2013 $PM_{2.5}$ NAAQS may have on current control measures in these areas. In some of these areas, current measures focused on achieving attainment for the 1997 annual standard and 2006 24-hour $PM_{2.5}$ standard may require supplemental or significant modifications to ensure compliance with the stricter annual standard. The impacts could vary substantially from area to area within a state and from state to state depending on many factors, including the type and locations of primary emission sources, current control measures, the extent to which the area is exceeding the standard, topography, weather, etc. For the most part, these measures will be established by the states in their SIPs.

Once final designations take effect, they become an important component of state, local, and tribal governments' efforts to reduce fine particle pollution. The designations govern what subsequent regulatory actions states, tribes, and EPA must take in order to improve or preserve air quality in each area.

Demonstrating Attainment with the 2013 $PM_{2.5}$ NAAQS

Under the CAA, EPA sets the nationwide standard for criteria pollutants, and EPA and states are responsible for placing limits on emissions that contribute to criteria pollution and for regulating entities that emit criteria pollutants. Areas designated as attainment/unclassifiable will not have to take steps to improve air quality, but under the statute they must take steps to prevent air quality from deteriorating to unhealthy levels. For those areas designated as nonattainment, state, local, and tribal governments must outline detailed control requirements in plans demonstrating how they will meet and/or maintain compliance with the 2013 $PM_{2.5}$ annual standard. These plans are defined as state implementation plans and referred to as SIPs (TIPs for tribal implementation plans).

As discussed previously in this report, in response to a January 2013 D.C. Circuit Court decision[53] EPA has classified all initial nonattainment area designations for the 2013 $PM_{2.5}$ annual standard as moderate. EPA had previously implemented the $PM_{2.5}$ NAAQS, only under the general implementation provisions in Subpart 1 of the act. Subpart 4 requires EPA to classify areas based on the severity of their fine particle pollution problem. Subpart 1 does not include classification requirements for nonattainment areas but does authorize EPA to establish classifications if the agency deems it appropriate.

The Subpart 4 requirements for areas classified as moderate are generally comparable to those of Subpart 1. However, under Subpart 4,[54] states have 18 months from the date of EPA's final designations to submit SIPs, which identify specific regulations and emission control requirements that will bring an area into compliance. Implementing the $PM_{2.5}$ NAAQS under Subpart 1 required submission of SIPs three years from the date of EPA's final designations.

Under Subpart 4, EPA may reclassify as "serious" any nonattainment area that the agency determines cannot practicably attain the $PM_{2.5}$ NAAQS by the applicable attainment date or those areas classified as moderate that do not attain the $PM_{2.5}$ NAAQS after their applicable attainment date has passed. Subpart 4 introduces additional statutory SIP planning requirements for areas classified as serious.[55] These additional requirements must be reflected in the states' initial SIP submissions.

States must achieve attainment for moderate areas as expeditiously as practicable but no later than six years after designation, and serious areas must achieve attainment no later than 10 years from designation as nonattainment under Subpart 4. Under the general provisions in Subpart 1, which

[53] See footnote 13.

[54] Part D of Title I §189(a)(2)(B).

[55] EPA references the "General Preamble" of the CAA and "Addendum" as guidance for the specific Subpart 4 statutory requirements: "State Implementation Plans; General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990," 57 *Federal Register* 13498, April 16, 1992, and "State Implementation Plans for Serious PM_{10} Nonattainment Areas, and Attainment Date Waivers for PM_{10} Nonattainment Areas Generally; Addendum to the General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990," 59 *Federal Register* 41998, August 16, 1994.

has no classifications, attainment must be achieved no later than five years from the effective designation date. Both Subpart 4[56] and Subpart 1[57] include provisions for extensions.

Even though EPA has concluded that although in many cases attainment will be reached as the result of several promulgated federal regulations, states will very likely require some local controls because of the requirements of the CAA. All areas no matter their classification of attainment or nonattainment will be required under the CAA[58] to conduct emission inventories which will provide states the basis for states to analyze and estimate the extent to which various sources are contributing to nonattainment.

To achieve the most expeditious attainment date for an area, EPA has recommended that states first identify emission reduction programs that have already been adopted and are being implemented at the federal, state, and local levels. The agency also recommends that states evaluate additional control measures and control technologies—reasonably available control measures (RACM) and reasonably available control technology (RACT)—for an area. States are required under the CAA[59] to impose RACM and RACT that can be implemented on sources located in nonattainment areas and to adopt enforceable regulations to ensure these areas will attain as expeditiously as practicable.

Some have expressed concern that a nonattainment designation may negatively impact an area's economic development, as potential additional requirements associated with achieving compliance may deter investment. EPA and others contend that the benefits associated with the CAA exceed the costs and that, while short-term impacts may vary, historical evidence suggests that impacts on overall economic growth concurrent with environmental (including CAA) regulations are generally less significant than often anticipated.[60]

As indicated earlier in this report, based on EPA's January 2015 final designations for the 2013 $PM_{2.5}$ annual standard, three counties (or portions) of the 38 counties identified in the rule would be designated nonattainment for $PM_{2.5}$ for the first time. Nevertheless, exceeding the 2013 $PM_{2.5}$ annual standard may have implications with respect to existing SIPs, the extent of which could vary significantly from area to area based on many factors. In some cases SIPs may require substantial modifications, while in other cases the current SIP may be sufficient to achieve compliance with both standards.

State Implementation Plans (SIPs)

Section 110(a)(1) of the CAA requires states to submit new or revised SIPs that provide for implementation, maintenance, and enforcement of the new or revised NAAQS. All states are required to submit SIPs that include the basic program requirements for managing air quality required in Section 110(a)(2) of the CAA showing that they have the capacity to attain, maintain,

[56] EPA may grant no more than two one-year extensions of the initial attainment date for moderate designated areas under Section 188(d) of the CAA and no more than five years for areas designated as serious under Section 188(e).

[57] Under Section 172(a)(2)(A) of the CAA, EPA may grant an area an extension of the initial attainment date for one to five years (in no case later than 10 years after the designation date for the area).

[58] Under 40 C.F.R Part 51, Subpart A, states are required to provide annual statewide inventory data for selected source categories no matter the area designations determinations.

[59] Section 172(c)(1).

[60] See EPA, "The Clean Air Act and the Economy," http://www.epa.gov/air/sect812/economy.html.

and enforce the revisions associated with the $PM_{2.5}$ NAAQS. These "infrastructure SIP" submissions must address a number of basic elements, including:

- Ambient air quality monitoring and data systems,
- Programs for enforcement of control measures,
- Adequate authority and resources to implement the plan, and
- Prohibition of interstate pollution transport.

Section 110(a)(2)(D)(i) of the act contains four elements that revised SIPs must address. The first two elements of this section require each state in its SIP to demonstrate adequate provisions for the ability to prohibit air emissions within the state that (1) contribute significantly to another state's nonattainment of the NAAQS, or (2) interfere with another state's maintenance of the NAAQS.

The specific provisions for requirements for all nonattainment areas designated as moderate under Subpart 4 of Part D of the CAA include:

- Nonattainment new source review (§172(c)(5)) permit program providing that permits meet the requirements of Section 173 of the act (§189(a)(1)(A));
- Attainment demonstration or demonstration that attainment by the applicable attainment date is impracticable (§189(a)(1)(B));
- Assurance of implementation of RACM and RACT (§189(a)(1)(C));
- Quantitative milestones and demonstration of reasonable further progress (§189(c)); and
- Control requirements applicable to major stationary sources precursors[61] (§189(e)).

EPA NAAQS Implementation Rules/Guidance

The EPA typically publishes an "implementation rule" that describes the requirements that states and tribes must meet in their implementation plans to achieve and maintain attainment. The rule also provides guidance and procedures for establishing controls to achieve and maintain attainment. In addition, the implementation rule generally includes guidance for submitting a SIP when reaching attainment within the five-year requirement is impractical. The implementation rule takes into account existing (oftentimes pending) federal regulations that contribute to controlling criteria pollutants and their precursors.

EPA published a proposed implementation rule for the $PM_{2.5}$ NAAQS on March 23, 2015.[62] The EPA proposal would apply to the 2013 annual $PM_{2.5}$ NAAQS, the 2006 24-hour $PM_{2.5}$ NAAQS,

[61] The term *precursor* refers to a directly emitted pollutant that, when released to the atmosphere, forms or contributes to the formation of a secondary pollutant for which an ambient air quality standard has been adopted.

[62] EPA, "Fine Particulate Matter National Ambient Air Quality Standards: State Implementation Plan Requirements; Proposed Rule," 73 *Federal Register* 15340- 15474, March 23, 2015, http://www.gpo.gov/fdsys/pkg/FR-2015-03-23/pdf/2015-06138.pdf. See also EPA's PM Regulatory Actions website at http://epa.gov/pm/actions.html for a fact sheet and prepublication version of the proposed rule as signed by the EPA administrator on March 10, 2015.

and "any future revisions to the $PM_{2.5}$ NAAQS." EPA also proposes revocation of the 1997 primary annual $PM_{2.5}$ standard because it was revised in the 2013 PM NAAQS. The proposal details (1) how air agencies are to meet statutory SIP requirements under Subpart 4 for areas designated nonattainment $PM_{2.5}$ NAAQS, (2) "specific attainment planning requirements" as they would pertain to areas based on their classification as moderate or serious, and (3) the process for reclassifying moderate areas to serious. The proposed $PM_{2.5}$ NAAQS implementation rule would replace EPA's "2007 $PM_{2.5}$ Implementation Rule"[63] and portions of the "2008 $PM_{2.5}$ New Source Review (NSR) Rule."[64] These rules were remanded to EPA by the U.S. Court of Appeals for the D.C. Circuit Court in its January 2013 decision.[65]

In June 2014, EPA published a final rule reclassifying 1997 and 2006 nonattainment as "moderate" and set a deadline for December 31, 2014, for states to submit outstanding SIP requirements.[66] The basic framework of the implementation rule for the 1997 $PM_{2.5}$ NAAQS published in April 2007 included a description of the requirements that states and tribes must meet in their implementation plans to achieve and maintain attainment of the 2006 standards. The 2007 rule was based on statutory requirements under Subpart 1 of the CAA. In addition to the 2007 implementation rule for the 1997 $PM_{2.5}$ NAAQS, EPA outlined implementation guidance regarding the development of SIPs to demonstrate attainment with the 2006 $PM_{2.5}$ NAAQS in a March 12, 2012, memorandum to EPA regional air directors.[67] The memorandum was withdrawn on June 6, 2013, following the January 2013 D.C. Circuit Court decision.

National Regulations

EPA expects that in many cases emission reductions from implementing existing national regulations and strategies will provide a framework for helping states achieve attainment with the $PM_{2.5}$ NAAQS. These national actions include:

- Cross-State Air Pollution Rule;[68]
- Mercury and Air Toxics Standards;[69]

[63] EPA, "Final Clean Air Fine Particle Implementation Rule," 72 *Federal Register* 20286-20667, April 25, 2007, http://www.gpo.gov/fdsys/pkg/FR-2007-04-25/pdf/E7-6347.pdf. The rule addresses attainment demonstration and modeling, local emission reduction measures (including RACT, RACM, and reasonable further progress), regional emission reduction strategies, innovative program guidance, emission inventory requirements, transportation conformity, and stationary source test methods.

[64] EPA, "Implementation of the New Source Review (NSR) Program for Particulate Matter Less Than 2.5 Micrometers ($PM_{2.5}$); Final Rule," 73 *Federal Register* 28321-28350, May 26, 2008, http://www.gpo.gov/fdsys/pkg/FR-2008-05-16/pdf/E8-10768.pdf.

[65] See footnote 13.

[66] EPA, "Identification of Nonattainment Classification and Deadlines for Submission of State Implementation Plan (SIP) Provisions for the 1997 Fine Particle ($PM_{2.5}$) National Ambient Air Quality Standard (NAAQS) and 2006 $PM_{2.5}$ NAAQS; Final Rule," 79 *Federal Register* 31566, June 2, 2014. See also EPA's "Fact Sheet" and information regarding the November 15, 2013, proposed rule and the January 2013 D.C. Circuit Court decision on the agency's website at http://epa.gov/pm/actions.html.

[67] Memorandum from Stephen D. Page, Director, Office of Air Quality Planning and Standards, to EPA Regional Air Directors (Regions I-X), "Implementation Guidance for the 2006 24-Hour Fine Particle ($PM_{2.5}$) National Ambient Air Quality Standards (NAAQS)," http://www.epa.gov/ttn/naaqs/pm/pdfs/20120302_implement_guidance_24-hr_pm2.5_naaqs.pdf.

[68] See EPA's website "Interstate Air Pollution Transport" at http://www.epa.gov/airtransport/.

[69] See EPA's website "Mercury and Air Toxics Standards" at http://www.epa.gov/mats/.

- Light-Duty Vehicle Tier 2 Rule;[70]
- Motor Vehicle Emission and Fuel Standards Tier 3 Rule;[71]
- Heavy Duty Diesel Rule;[72]
- Clean Air Nonroad Diesel Rule;[73]
- Regional Haze Regulations and Guidelines for Best Available Retrofit Technology Determinations;[74]
- NOx Emission Standard for New Commercial Aircraft Engines;[75]
- Emissions Standards for Locomotives and Marine Compression-Ignition Engines;[76]
- Emission Standards for Ignition Engines, Control of Emissions for Nonroad Spark Ignition Engines and Equipment;[77]
- Category 3 Oceangoing Vessels;[78]
- Reciprocating Internal Combustion Engines National Emissions Standards for Hazardous Air Pollutants;[79] and

[70] EPA, "Control of Air Pollution from New Motor Vehicles: Tier 2 Motor Vehicle Emissions Standards and Gasoline Sulfur Control Requirements," 65 *Federal Register* 6698-6870, February 10, 2000, http://www.gpo.gov/fdsys/pkg/FR-2000-02-10/pdf/00-19.pdf.

[71] Tier 3 vehicle standards set new limits starting September 2017 for tailpipe and evaporative emissions from passenger cars, light-duty trucks, medium-duty passenger vehicles, and some heavy-duty vehicles. EPA, "Control of Air Pollution from Motor Vehicles: Tier 3 Motor Vehicle Emission and Fuel Standards," 70 *Federal Register* 23413-23886, April 28, 2014, http://www.gpo.gov/fdsys/pkg/FR-2014-04-28/pdf/2014-06954.pdf. EPA released amendments and clarifications to the rule in January of 2015; see EPA's website "Tier 3 Vehicle Emission and Fuel Standards Program" at http://www.epa.gov/otaq/tier3.htm.

[72] EPA, "Control of Emissions of Air Pollution from 2004 and Later Model Year Heavy-Duty Highway Engines and Vehicles; Revision of Light-Duty On-Board Diagnostics Requirements," 65 *Federal Register* 59896-59978, October 6, 2000, http://www.gpo.gov/fdsys/pkg/FR-2000-10-06/pdf/00-20144.pdf.

[73] EPA, "Control of Emissions of Air Pollution from Nonroad Diesel Engines and Fuel," 69 *Federal Register* 38958-39273, June 29, 2004, http://www.gpo.gov/fdsys/pkg/FR-2004-06-29/pdf/04-11293.pdf.

[74] EPA, "Regional Haze Regulations and Guidelines for Best Available Retrofit Technology (BART) Determinations," 70 *Federal Register* 39104-39172, July 6, 2005, http://www.gpo.gov/fdsys/pkg/FR-2005-07-06/pdf/05-12526.pdf.

[75] EPA, "Control of Air Pollution from Aircraft and Aircraft Engines; Emission Standards and Test Procedures," 70 *Federal Register* 69644-69687, November 17, 2005, http://www.gpo.gov/fdsys/pkg/FR-2005-11-17/pdf/05-22704.pdf.

[76] EPA, "Control of Emissions of Air Pollution from Locomotive Engines and Marine Compression-Ignition Engines Less Than 30 Liters per Cylinder; Republication," 73 *Federal Register* 37095-37350, republished June 30, 2008, http://www.gpo.gov/fdsys/pkg/FR-2008-06-30/pdf/R8-7999.pdf.

[77] EPA, "Control of Emissions from Nonroad Spark-Ignition Engines and Equipment," 73 *Federal Register* 59034-59380, October 8, 2008, http://www.gpo.gov/fdsys/pkg/FR-2008-10-08/pdf/E8-21093.pdf.

[78] EPA, "Control of Emissions from New Marine Compression-Ignition Engines at or Above 30 Liters per Cylinder," 75 *Federal Register* 22895-23065, April 30, 2010, http://www.gpo.gov/fdsys/pkg/FR-2010-04-30/pdf/2010-2534.pdf.

[79] EPA, "National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines," 75 *Federal Register* 51569-51608, August 20, 2010, http://www.gpo.gov/fdsys/pkg/FR-2010-08-20/pdf/2010-20298.pdf; EPA, "National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines; New Source Performance Standards for Stationary Internal Combustion Engines; Final Rule," Final Amendments, 78 *Federal Register* 6674-6724, January 30, 2013, http://www.gpo.gov/fdsys/pkg/FR-2013-01-30/pdf/2013-01288.pdf; see also EPA's Air Toxics website "Stationary Internal Combustion Engines" at http://www.epa.gov/ttn/atw/icengines/index.html.

- New Source Performance Standards and Emissions Guidelines for Hospital/Medical/Infectious Waste Incinerators Final Rule Amendments.[80]

New Source Review[81]

Areas designated nonattainment, as well as those designated unclassifiable or unclassifiable/attainment for the NAAQS, are also subject to new source review (NSR) requirements. Enacted as part of the 1977 CAA amendments and modified in the 1990 CAA amendments, NSR is designed to ensure that newly constructed facilities or substantially modified existing facilities do not result in violation of applicable air quality standards. NSR provisions outline permitting requirements both for construction of new major pollution sources and for modifications to existing major pollution sources. The specific NSR requirements for affected sources depend on whether the sources are subject to "Prevention of Significant Deterioration" (PSD) or nonattainment provisions.[82]

Over time, EPA has promulgated rules[83] that contain certain NSR program requirements for sources that emit $PM_{2.5}$ and its precursors, including SIP modifications to state NSR programs to account for emissions of $PM_{2.5}$. For example, the January 2013 final PM NAAQS includes revisions to the PSD permitting program (rules) with respect to the revised PM NAAQS so as not to "unreasonably delay" pending permits and establish a "grandfather" provision for permit applications if (1) the permitting agency deemed an application complete by December 14, 2012; or (2) a draft permit or preliminary determination has been issued for public comment by the date the revised 2013 PM NAAQS went into effect (60 days after January 15, 2013, publication in the *Federal Register*).[84]

Transportation Conformity[85]

If new or revised SIPs for attainment establish or revise a transportation-related emissions budget or add or delete transportation control measures, they will trigger "conformity" determinations. Transportation conformity is required by the CAA, Section 176(c),[86] to prohibit federal funding and approval for highway and transit projects unless they are consistent with ("conform to") the air quality goals established by a SIP and will not cause new air quality violations, worsen existing violations, or delay timely attainment of the national ambient air quality standards.

[80] EPA, "Standards of Performance for New Stationary Sources and Emissions Guidelines for Existing Sources: Hospital/Medical/Infectious Waste Incinerators," 74 *Federal Register* 51368-51415, October 6, 2009, http://www.gpo.gov/fdsys/pkg/FR-2009-10-06/pdf/E9-22928.pdf.

[81] For an overview, including statutory authority and regulations, see EPA, "New Source Review (NSR)," http://www.epa.gov/air/nsr/.

[82] See CAA, §§171-178, codified at 40 C.F.R. 52.24(f)(10). Section 166 of the CAA authorizes EPA to establish regulations for PSD of any pollutant for which EPA has issued a national standard.

[83] For more information regarding these NSR rules and standards, see EPA, "New Source Review: Regulations and Standards," http://www.epa.gov/air/nsr/actions.html.

[84] See EPA, *EPA's Revised Air Quality Standards for Particle Pollution: Monitoring, Designations and Permitting Requirements*, fact sheet, http://www.epa.gov/pm/2012/decfsimp.pdf. See also EPA, *EPA's Proposal to Update the Air Quality Standards for Particle Pollution: Monitoring, Designations and Permitting Requirements*, fact sheet, http://www.epa.gov/airquality/particlepollution/2012/fsimp.pdf.

[85] See EPA's "Transportation Conformity" at http://www.epa.gov/otaq/stateresources/transconf/index.htm.

[86] 42 U.S.C. 7506(c).

On March 24, 2010, EPA published a final rule amending the transportation conformity regulation primarily to incorporate the October 17, 2006, strengthening of the 24-hour $PM_{2.5}$ air quality standard and revocation of the annual PM_{10} standard.[87] The final rule, which affects implementation of conformity in $PM_{2.5}$ and PM_{10} nonattainment and maintenance areas, also addresses a court remand concerning hot-spot[88] analyses as they apply to $PM_{2.5}$ and PM_{10}, as well as to carbon monoxide and nonattainment and maintenance areas.

On March 14, 2012, EPA published a final rule[89] restructuring sections of the conformity rule (40 C.F.R. 93.109 and 93.119) so that existing requirements apply to new or revised NAAQS. EPA also released associated implementation guidance in July 2012. The rule is intended to remove the need to amend the transportation conformity rule merely to reference specific new NAAQS.

Conclusion

States will have 18 months from April 15, 2015, the effective date of EPA's final designations for the 2013 $PM_{2.5}$ NAAQS, to submit SIPs, which identify specific regulations and emission control requirements that will bring an area into compliance. Following EPA approval of SIPs, implementation through imposition of control measures, where necessary, will occur for several years. Under CAA, Section 188 of Subpart 4, states must achieve attainment as expeditiously as practicable but no later than six years after designation:[90] April 2021 for the 2013 $PM_{2.5}$ standard. (See timeline presented in **Appendix B**).

Because of health and cost implications, NAAQS decisions have historically been the source of significant concern to Members of Congress. The evolution and development of the PM NAAQS, in particular, has been the subject of extensive oversight. (**Appendix A** presents a chronology of PM NAAQS regulations.) EPA's failure to complete timely review and revision of the NAAQS as required under the CAA has also been an area of concern to some in Congress and others.

Some Members expressed concerns in hearings, letters to the EPA administrator, and proposed legislation in anticipation of potential changes to the PM NAAQS leading up to the January 2013 final published revisions. Some Members[91] and industry stakeholders had urged EPA to delay the

[87] EPA, "Guidance for Transportation Conformity Implementation in Multi-Jurisdictional Nonattainment and Maintenance Areas," http://www.epa.gov/otaq/stateresources/transconf/regs/420b12046.pdf. See also EPA Transportation Conformity Rule $PM_{2.5}$ and PM_{10} Amendments, 75 *Federal Register* 14259, March 24, 2010, http://www.gpo.gov/fdsys/pkg/FR-2010-03-24/pdf/2010-5703.pdf. Prior to the final rule EPA provided interim guidance for meeting conformity requirements: *Interim Transportation Conformity Guidance for 2006 $PM_{2.5}$ NAAQS Nonattainment Areas* (EPA-420-B-09-036, November 2009). See also EPA's "Transportation Conformity: Regulations" at http://www.epa.gov/otaq/stateresources/transconf/conf-regs.htm.

[88] Transportation projects that must be analyzed for local air quality impacts.

[89] EPA, "Transportation Conformity Rule Restructuring Amendments," 77 *Federal Register* 14979, March 14, 2012, http://www.gpo.gov/fdsys/pkg/FR-2012-03-14/pdf/2012-6207.pdf.

[90] Implementing PM NAAQS under Section 176 of Subpart 1 in the CAA requires submission of SIPs three years from the date of EPA's final designations and compliance with the new standard no later than five years from the effective designation date.

[91] See letter from Representative Bob Latta et al. to EPA administrator Lisa Jackson, November 21, 2012, http://latta.house.gov/uploadedfiles/2012_11_29_final_pm2_5_letter_signed_w_attchmt.pdf. See also press release, "Latta Sends Letter to EPA Expressing Concerns for Proposed Legislation," Representative Bob Latta, http://latta.house.gov/news/documentsingle.aspx?DocumentID=314585.

final rule, while others, including some states[92] and various environmental and public health advocacy groups, urged timely completion of a tighter standard.

Changes to the NAAQS have historically triggered litigation alleging that the standards are too stringent or not stringent enough and often result in delays in implementation. The agency's final designations of nonttainment areas and the implementation of the 2013 $PM_{2.5}$ NAAQS are expected to generate further interest and oversight.

[92] See December 6, 2012, letter from nine state attorneys general to the acting administrator of the Office of Information and Regulatory Affairs, White House Office of Management and Budget, http://www.eenews.net/assets/2012/12/10/document_gw_02.pdf.

Appendix A. Chronology of EPA's National Ambient Air Quality Standards (NAAQS) Regulations for Total Suspended Particulates (TSP) and Particulate Matter (PM) 1971-2013

EPA first promulgated annual and 24-hour NAAQS for $PM_{2.5}$ in July 1997. EPA had previously addressed particulate matter by regulating "total suspended particles" (TSP) in 1971, followed by the agency's regulation of PM_{10} in 1987.

Table A-1. History of Particulate Matter (PM) and Total Suspended Particles (TSP) National Ambient Air Quality Standards (NAAQS)

1971-2013

Year	Final Rule/Decision	Primary/ Secondary	Indicator	Averaging Time	Level[a]	Form
1971	36 *FR* 8186 April 30, 1971	Primary	TSP[b]	24-hour	260 µg/m³	Not to be exceeded more than once per year
				Annual	75 µg/m³	Annual geometric mean
		Secondary	TSP	24-hour	150 µg/m³	Not to be exceeded more than once per year
				Annual	60 µg/m³	Annual geometric mean
1987	52 *FR* 24634 February 8, 1979	Primary and Secondary	PM_{10}	24-hour	150 µg/m³	Not to be exceeded more than once per year on average over a 3-year period
				Annual	50 µg/m³	Annual arithmetic mean, averaged over 3 years
1997	62 *FR* 38652 July 18, 1997	Primary and Secondary	$PM_{2.5}$	24-hour	65 µg/m³	98th percentile, averaged over 3 years
				Annual	15.0 µg/m³	Annual arithmetic mean, averaged over 3 years[c,d]
			PM_{10}	24-hour	150 µg/m³	Initially promulgated 99th percentile, averaged over three years; when 1997 standards for PM_{10} were vacated, the form of 1987 standards remained in place (not to be exceeded more than once per year on average over a 3-year period)[e]
				Annual	50 µg/m³	Annual arithmetic mean, averaged over 3 years
2006	73 *FR* 16483 March 27, 2008	Primary and Secondary	$PM_{2.5}$	24-hour	35 µg/m³	98th percentile, averaged over 3 years[f]
				Annual	15.0 µg/m³	Annual arithmetic mean, averaged over 3 years[g]

Year	Final Rule/Decision	Primary/ Secondary	Indicator	Averaging Time	Level[a]	Form
			PM_{10}	24-hour	150 µg/m³	Not to be exceeded more than once per year on average over a 3-year period
				Annual	—	EPA revoked the annual PM_{10} NAAQS
2012/ 2013	78 *FR* 3085 January 15, 2013 EPA finalized its decision on December 14, 2012	Primary	$PM_{2.5}$	Annual	12.0 µg/m³	Annual arithmetic mean, averaged over 3 years
		Secondary		Annual	15.0 µg/m³	Annual arithmetic mean, averaged over 3 years
		Primary and Secondary		24-hour	35 µg/m³	98th percentile, averaged over 3 years
		Primary and Secondary	PM_{10}	24-hour	150 µg/m³	Not to be exceeded more than once per year on average over a 3-year period

Source: Congressional Research Service based on data adapted from the U.S. Environmental Protection Agency's (EPA's) "Particulate Matter (PM) Standards-Table of Historical PM NAAQS," http://epa.gov/ttn/naaqs/standards/pm/s_pm_history.html.

a. Units of measure are micrograms per cubic meter of air µg/m³.

b. TSP = total suspended particles.

c. The level of the annual standard is defined to one decimal place (i.e., 15.0 µg/m³) as determined by rounding. For example, a three-year average annual mean of 15.04 µg/m³ would round to 15.0 µg/m³ and, thus, meet the annual standard, and a three-year average of 15.05 µg/m³ would round to 15.1 µg/m³ and, hence, violate the annual standard (40 CFR part 50, Appendix N).

d. The level of the standard was to be compared to measurements made at sites that represent "community-wide air quality" recording the highest level, or, if specific requirements were satisfied, to average measurements from multiple community-wide air quality monitoring sites ("spatial averaging").

e. See 69 *Federal Register* 45592, July 30, 2004.

f. The level of the 24-hour standard is defined as an integer (zero decimal places) as determined by rounding. For example, a three-year average 98th percentile concentration of 35.49 µg/m³ would round to 35 µg/m³ and thus meet the 24-hour standard, and a three-year average of 35.50 µg/m³ would round to 36 and, hence, violate the 24-hour standard (40 CFR part 50, Appendix N).

g. The EPA tightened the constraints on the spatial averaging criteria by further limiting the conditions under which some areas may average measurements from multiple community-oriented monitors to determine compliance (see 71 *Federal Register* 61165-61167).

Appendix B. Comparative Timeline for Implementing the 1997, 2006, and 2013 $PM_{2.5}$ NAAQS

The timeline presented in **Table B-1** reflects the most recent key milestone dates for implementing the 1997 and 2006 NAAQS and estimates for the 2013 $PM_{2.5}$ NAAQS, including actual completions. These milestones are driven primarily by statutory requirements. The table mimics an EPA milestone schedule outlined in an April 1, 2003, memorandum to EPA regional administrators that also provided the nonbinding guidance for implementation of the 1997 $PM_{2.5}$ area designations[93] and the agency's projected timeline for the 2006 $PM_{2.5}$ NAAQS.[94]

Table B-1. Schedule for Implementation of the 1997, 2006, and 2013 $PM_{2.5}$ NAAQS

Milestones	1997 $PM_{2.5}$ NAAQS	2006 $PM_{2.5}$ NAAQS	2013 $PM_{2.5}$ NAAQS
Revised standard promulgated (*Federal Register* notice)	July 18, 1997	October 17, 2006	January 15, 2013
Revised standard effective date	September 1997	December 18, 2006	March 18, 2013
State-tribal area designation recommendations	February 2004 (based on 2000-2002 monitoring data)	December 18, 2007 (based on 2004-2006 monitoring data)	December 12, 2013 (based primarily on 2010-2012 monitoring data)
EPA notifies states and tribes regarding modifications to their recommendations	June-July 2004	August 2008	August 2014
EPA promulgates final area designations and publishes in the *Federal Register* (required one year after states and tribes make recommendations)	January 5, 2005	November 13, 2009 (based on 2006-2008 monitoring data) (following delay due to new Administration's review)[a]	December 13, 2014 (published January 15, 2015)
EPA publishes proposed $PM_{2.5}$ implementation rule/guidance	November 1, 2005	March 2, 2012 (withdrawn June 6, 2013)	March 23, 2015
Final area designations effective date (typically not later than 90 days after *Federal Register* publication)	April 5, 2005	December 14, 2009	April 15, 2015
States with new transportation projects submit conformity determination (required within one year of the effective date of nonattainment designation)	April 5, 2006	December 14, 2010	April 15, 2016
EPA promulgates final $PM_{2.5}$ implementation rule	April 25, 2007	March 2, 2012 (withdrawn June 6, 2013)	NA

[93] EPA memorandum from the Office of Air and Radiation Assistant administrator Jeffrey R. Holmstead to EPA Regional Administrators, "Designations for the Fine Particle National Ambient Air Quality Standards," April 1, 2003, p. 3, http://www.epa.gov/ttn/oa rpg/t1/memoranda/naqsfp_gda.pdf.

[94] See EPA overview for the 2006 review of the PM NAAQS, http://www.epa.gov/airquality/particlepollution/pdfs/20061013_presentation.pdf, slide #9.

Milestones	1997 $PM_{2.5}$ NAAQS	2006 $PM_{2.5}$ NAAQS	2013 $PM_{2.5}$ NAAQS
States and tribes submit revised implementation plans (SIPs) (required three years after final area designations effective date unless extension granted for 1997 and 2006 PM NAAQS, 18 months after final designations for 2013 PM NAAQS)	April 2008 (ongoing)	December 2012 (some states delayed)	August 2016
NAAQS statutory compliance deadline for attainment (required within five years after final area designations effective date for 1997 and 2006 NAAQS, up to 10 years with extension, six years after for the 2013 NAAQS)	April 2010-2015	December 2014-2019 (projected)	April 2021

Source: Prepared by the Congressional Research Service based on U.S. Environmental Protection Agency fact sheets and guidance documents and relevant *Federal Register* notices. NA = not available.

a. EPA issued implementation guidance regarding the development of implementation plans in a March 2, 2012, memorandum to EPA regional directors: http://www.epa.gov/ttn/naaqs/pm/pdfs/20120302_implement_guidance_24-hr_pm2.5_naaqs.pdf. Subsequently, in a June 6, 2013, memorandum, EPA withdrew the guidance in response to the January 4, 2013, U.S. Court of Appeals for the District of Columbia Circuit decision that EPA incorrectly interpreted the CAA with respect to statutory requirements for the implementation of the 1997 $PM_{2.5}$: http://www.epa.gov/ttn/naaqs/pm/pdfs/implementationguidancewithdrawmemo.pdf.

Appendix C. Comparison of EPA Nonattainment Areas for the 2013 $PM_{2.5}$ Annual Standard and Previous $PM_{2.5}$ Standards

Table C-1. EPA Final, EPA Proposed, and State Recommended Nonattainment Areas for the 2013 $PM_{2.5}$ NAAQS and Final Nonattainment Designations for the 2006 $PM_{2.5}$ and 1997 $PM_{2.5}$ NAAQS

	2013 $PM_{2.5}$ NAAQS Designations			2006 and 1997 $PM_{2.5}$ NAAQS Designations	
	EPA Final (Dec. 2014)	EPA Proposed (Aug. 2014)	State Recommended	Final (as revised 2006)	Final (1997)
	Annual Standard			24-Hour Standard	Annual Standard
State/Area Name	Counties and Partial Counties (p)				
CALIFORNIA					
Imperial County, CA	Imperial (p)	Imperial (p)	Yes	Yes	No
Los Angeles-South Coast Air Basin, CA	Los Angeles (p)	Los Angeles (p)	Yes	Yes	Yes
	Orange	Orange	Yes	Yes	Yes
	Riverside (p)	Riverside (p)	Yes	Yes	Yes
	San Bernardino (p)	San Bernardino (p)	Yes	Yes	Yes
Plumas County, CA	Plumas (p)**	Plumas (p)**	Yes	No	No
San Joaquin Valley, CA	Fresno	Fresno	Yes	Yes	Yes
	Kern (p)	Kern (p)	Yes	Yes	Yes
	Kings	Kings	Yes	Yes	Yes
	Madera	Madera	Yes	Yes	Yes
	Merced	Merced	Yes	Yes	Yes
	San Joaquin	San Joaquin	Yes	Yes	Yes
	Stanislaus	Stanislaus	Yes	Yes	Yes
	Tulare	Tulare	Yes	Yes	Yes
IDAHO					
West Silver Valley, ID	Shoshone (p)**	Shoshone (p)**	Yes	No	No
INDIANA					
Louisville, KY-IN	Clark	Clark	No	No	Yes
	Floyd	Floyd	No	No	Yes

State/Area Name	2013 $PM_{2.5}$ NAAQS Designations			2006 and 1997 $PM_{2.5}$ NAAQS Designations	
	EPA Final (Dec. 2014)	EPA Proposed (Aug. 2014)	State Recommended	Final (as revised 2006)	Final (1997)
	Annual Standard			24-Hour Standard	Annual Standard
	Counties and Partial Counties (p)				
KENTUCKY					
Cincinnati-Hamilton, OH-KY	Boone (p)	Boone (p)	No	No	Yes
	Campbell (p)	Campbell (p)	No	No	Yes
	Kenton (p)	Kenton (p)	No	No	Yes
Louisville, KY-IN	Bullitt (p)	Bullitt (p)	No	No	Yes
	Jefferson	Jefferson	No	No	Yes
OHIO					
Canton-Massillon, OH	Stark	Stark	Yes	Yes	Yes
	Summit	Summit	No	Yes	No
	Wayne (p)**	Wayne (p)**	No	No	No
Cincinnati-Hamilton, OH-KY	Butler	Butler	Yes	No	Yes
	Clermont	Clermont	Yes	No	Yes
	Hamilton	Hamilton	Yes	No	Yes
	Warren (p)	Warren (p)	No	No	Yes
Cleveland, OH	Cuyahoga	Cuyahoga	Yes	Yes	Yes
	—	Lake	No	Yes	Yes
	Lorain	Lorain	No	Yes	Yes
PENNSYLVANIA				Yes	
Allegheny, PA	Allegheny (p)	Allegheny (p)	Yes	Yes	Yes
Allentown, PA	Lehigh	Lehigh	No	Yes	No
	Northampton	Northampton	Yes	Yes	No
Delaware, PA	Delaware	Delaware	Yes	Yes	Yes
Lebanon, PA	Lebanon	Lebanon	Yes	Yes	No
Johnstown, PA	Cambria	Cambria	Yes	Yes	Yes
	Indiana (p)	Indiana (p)	No	Yes	Yes
			TOTALS		
	6 states	6 states	4 states	3 states	5 states
	14 areas (39 counties)	14 areas (39 counties)	13 areas (25 counties)	10 areas (25 counties)	11 areas (31 counties)

State/Area Name	2013 $PM_{2.5}$ NAAQS Designations			2006 and 1997 $PM_{2.5}$ NAAQS Designations	
	EPA Final (Dec. 2014)	EPA Proposed (Aug. 2014)	State Recommended	Final (as revised 2006)	Final (1997)
	Annual Standard			24-Hour Standard	Annual Standard
	Counties and Partial Counties (p)				
	24 whole counties	25 whole counties	18 whole counties	18 whole counties	20 whole counties
	14 partial counties	14 partial counties	7 partial counties	7 partial counties	11 partial counties

Source: Compiled by CRS using data from EPA $PM_{2.5}$ NAAQS designations websites.

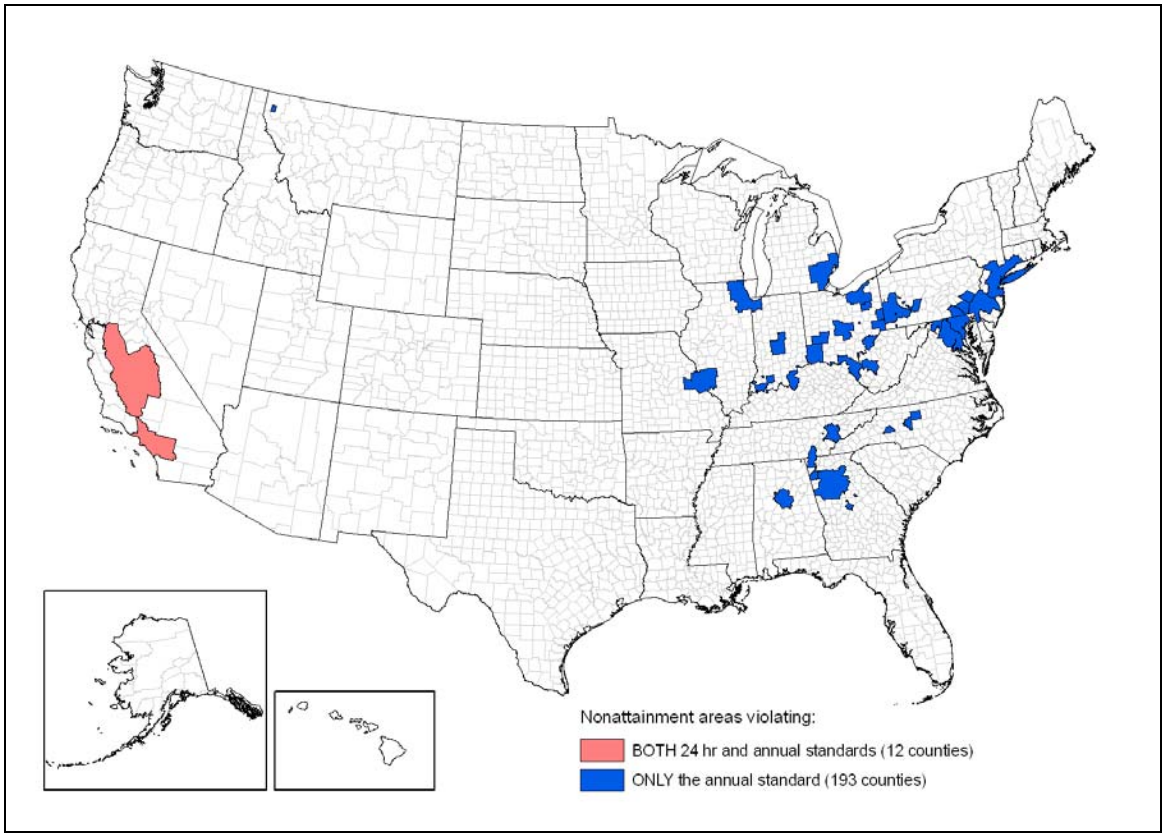
Notes: ** indicates first time a county has been designated nonattainment for PM NAAQS. "Yes" indicates a county was designated nonattainment, "No" indicates it was not for the specified PM NAAQS Standard.

Appendix D. Counties in Nonattainment for the 1997 $PM_{2.5}$ NAAQS Annual (15 μg/m³) and/or 24-Hour (65 μg/m³) Standards: U.S. EPA Final Designations

The figure below provides a historical presentation of counties designated as nonattainment for the 1997 $PM_{2.5}$ NAAQS. All counties were designated nonattainment for the $PM_{2.5}$ annual standard or both the annual and 24-hour $PM_{2.5}$ standards. No counties were designated nonattainment only for the 24-hour $PM_{2.5}$ standard.

Figure D-1. Counties in Nonattainment for the 1997 $PM_{2.5}$ NAAQS Annual and/or 24-Hour Standards: U.S. EPA Final Designations

annual (15 μg/m³) and/or 24-hour (65 μg/m³)



Source: Prepared by the Congressional Research Service based on EPA's final designations for the 1997 $PM_{2.5}$ NAAQS with data obtained from EPA. There were no $PM_{2.5}$ nonattainment areas in Hawaii or Alaska.

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