UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

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MEMORANDUM

SUBJECT: Information on the Interstate Transport "Good Neighbor" Provision for the 2012 Fine Particulate Matter National Ambient Air Quality Standards under Clean Air Act Section 110(a)(2)(D)(i)(I)

FROM: Stephen D. Page
Director

TO: Regional Air Division Directors, Regions 1 – 10

The purpose of this memorandum is to provide information to the Environmental Protection Agency Regional offices and the states as they develop and review state implementation plans (SIPs) that address the interstate transport provision of the Clean Air Act (CAA) section 110(a)(2)(D)(i)(I), otherwise known as the "Good Neighbor" provision, as it pertains to the 2012 fine particulate matter ($PM_{2.5}$) National Ambient Air Quality Standards (NAAQS).[1] This memo provides future year annual $PM_{2.5}$ design values for monitors in the United States based on quality assured and certified ambient monitoring data and air quality modeling. The memo further describes how these projected potential design values can be used to help determine which monitors (*i.e.,* receptors) should be further evaluated to potentially address if emissions from other states significantly contribute to nonattainment or interfere with maintenance of the $PM_{2.5}$ NAAQS at these monitoring sites. This memorandum consists of:

- a description of the framework that has been previously used to address the good neighbor provision, and
- the EPA's review of relevant modeling data and air quality projections as they relate to this NAAQS.

The EPA's goal in providing this information is to initiate discussions that will facilitate state development and the EPA's review of SIPs addressing the good neighbor provision with respect to the 2012 $PM_{2.5}$ NAAQS. At this time, there are a number of states that may not have submitted SIPs addressing the good neighbor provision. There are also a number of states that have submitted SIPs addressing the good neighbor provision that the EPA will need to review and act on in the near future. The information in this memo and the associated receptor data are not intended to be a definitive or final

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[1] On December 14, 2012, the EPA revised the annual $PM_{2.5}$ standard by lowering the level to 12.0 micrograms per cubic meter (ug/m^3). National Ambient Air Quality Standards for Particulate Matter, 78 FR 3086 (January 15, 2013).

conclusion about which receptors may have air quality problems with respect to the 2012 $PM_{2.5}$ standard.

The "Good Neighbor" Provision

Under CAA sections 110(a)(1) and 110(a)(2), each state[2] is required to submit a SIP[3] that provides for the implementation, maintenance and enforcement of each primary or secondary NAAQS. Section 110(a)(1) requires each state to make this new SIP submission within 3 years after promulgation of a new or revised NAAQS.[4] This type of SIP submission is commonly referred to as an "infrastructure SIP." Section 110(a)(2) includes a list of specific elements that each such plan submission must meet. The conceptual purpose of an infrastructure SIP submission is to assure that the state's SIP contains the necessary structural requirements for the implementation of the new or revised NAAQS, whether by demonstrating that the state's SIP already contains or sufficiently addresses the necessary provisions, or by making a substantive SIP revision to update the plan provisions.

In particular, section 110(a)(2)(D)(i)(I) requires each state to submit to the EPA new or revised SIPs that "contain adequate provisions . . . prohibiting, consistent with the provisions of this subchapter, any source or other type of emissions activity within the state from emitting any air pollutant in amounts which will … contribute significantly to nonattainment in, or interfere with maintenance by, any other state with respect to any such national primary or secondary ambient air quality standard." For purposes of this document, we refer to section 110(a)(2)(D)(i)(I) as the "good neighbor" provision and to SIP revisions addressing this requirement as "good neighbor" SIPs. For the most recent annual $PM_{2.5}$ NAAQS promulgated on December 14, 2012, the infrastructure SIPs, including good neighbor SIPs, were due by December 14, 2015.

Framework That Has Been Used Previously to Address the "Good Neighbor" Provision

The EPA has developed a consistent framework for addressing interstate transport with respect to the $PM_{2.5}$ NAAQS in several previous federal rulemakings.[5] The four basic steps of that framework include: (1) identifying downwind receptors that are expected to have problems attaining or maintaining the NAAQS; (2) identifying which upwind states contribute to these identified problems in amounts sufficient to warrant further review and analysis; (3) for states identified as contributing to downwind air quality problems, identifying upwind emissions reductions necessary to prevent an upwind state from significantly contributing to nonattainment or interfering with maintenance of the NAAQS downwind;

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[2] The term "state" as used in this memorandum has the same meaning as provided in CAA section 302(d). These CAA sections and this information may also apply, as appropriate under the Tribal Authority Rule (TAR) in 40 CFR part 49, to an Indian tribe that receives a determination of eligibility for treatment in a similar manner as a state for purposes of administering a tribal air quality management program under section 110(a) of the CAA. Tribes should look to the TAR and engage their respective EPA Regional offices in discussing how this information may impact the development and approvability of their tribal implementation plans (TIPs). We encourage states to provide outreach and engage in discussions with tribes about their SIPs as they are being developed.

[3] In the CAA and in this memorandum, "plan," "SIP" and "TIP" may, depending on context, refer either to (i) all or part of the existing state (or tribal) implementation plan (*i.e.*, the collection of all submissions previously approved by the EPA as meeting CAA requirements) or (ii) a submission that adds to or modifies the existing plan as directed by section 110(a)(l).

[4] The Administrator may specify a shorter period.

[5] *See,* for example, Clean Air Interstate Rule Final Rule, 70 FR 25162 (May 12, 2005); CSAPR Final Rule, 76 FR 48208 (August 8, 2011); *cf.* Finding of Significant Contribution and Rulemaking for Certain States in the Ozone Transport Assessment Group Region for Purposes of Reducing Regional Transport of Ozone, Final Rule, 63 FR 57356 (October 27, 1998).

and (4) for states that are found to have emissions that significantly contribute to nonattainment or interfere with maintenance of the NAAQS downwind, reducing the identified upwind emissions through adoption of permanent and enforceable measures. This framework was most recently applied in the Cross-State Air Pollution Rule (CSAPR), designed to address both the 1997 and 2006 $PM_{2.5}$ standards, as well as the 1997 ozone standard.

In this document, we only discuss steps (1) and (2) in detail. As discussed below, we anticipate that there will be few areas in the United States expected to have problems attaining and maintaining the 2012 $PM_{2.5}$ NAAQS due to the relatively small number and limited geographic scope of projected nonattainment and maintenance receptors. We expect that steps (3) and (4) would be best addressed on a case-by-case basis.

Step 1. Identification of Potential Downwind Nonattainment and Maintenance Receptors
The EPA has assessed downwind $PM_{2.5}$ air quality problems in recent federal rulemakings based on estimates of air quality concentrations in a future year aligned with the relevant attainment deadline for areas designated nonattainment for the relevant standard. This is consistent with the instructions from the D.C. Circuit in *North Carolina v. EPA*, 531 F.3d 896, 911-12 (2008), that upwind emission reductions should be harmonized, to the extent possible, with the attainment deadlines for downwind areas.[6] In assessing future air quality conditions, the EPA has considered on-the-books emissions reductions and the most up-to-date forecast of future baseline emissions that would occur by the attainment deadline. The locations of projected downwind air quality problems have typically been identified from the results of air quality modeling as those receptors that were projected to be unable to attain or maintain the NAAQS in the future analysis year.

In developing CSAPR, the EPA identified nonattainment receptors for the 1997 and 2006 $PM_{2.5}$ standards as those receptors that were expected to have nonattainment problems in the relevant future year based on the average design values projected in air quality modeling analyses. Maintenance receptors were identified as those receptors with a potential for having difficulty maintaining the NAAQS, taking into account a measure of variability. The variability in air quality was determined by evaluating the maximum future design value at each receptor based on a projection of the maximum measured design value. All nonattainment receptors were also identified as maintenance receptors since a site with a projected average design value above the standard necessarily also has a projected maximum design value above the standard.

On December 3, 2015, the EPA proposed a refinement to the CSAPR approach in the Cross-State Air Pollution Rule Update for the 2008 Ozone NAAQS, 80 FR 75705 (December 3, 2015) (CSAPR Update). In the proposed CSAPR Update, the EPA proposed to retain the process for identifying maintenance receptors for the 2008 ozone standard as those receptors that would have difficulty maintaining the relevant NAAQS by evaluating the maximum future design value at each receptor. However, the EPA proposed to modify the definition of a nonattainment receptor to incorporate consideration of current monitoring data. The EPA proposed to identify a nonattainment receptor as one that is both projected to be in nonattainment (based on the average design value) and that currently

[6] Areas that were designated as Moderate $PM_{2.5}$ nonattainment areas for the 2012 annual $PM_{2.5}$ NAAQS in 2014 must attain the NAAQS by December 31, 2021, (the end of the 6th calendar year after designation) or as expeditiously as practicable.

measures nonattainment. Those sites that are projected to be nonattainment based on the average design value but currently measuring clean data (based on the most recent certified design value data) are proposed to be identified as maintenance-only receptors. The EPA did not propose to exclude such receptors from the analysis entirely, as even those receptor sites that are not currently monitoring violations may still experience future emissions levels and/or meteorological conditions that may cause violations to reoccur and therefore have future maintenance concerns.

In order to develop data that may be useful for analyzing interstate transport with respect to the 2012 $PM_{2.5}$ NAAQS, the EPA examined recent modeling analyses developed in support of other EPA rules[7] in order to identify potential $PM_{2.5}$ nonattainment and maintenance receptors. The available modeling used the CAMx photochemical model with base case emissions and meteorology for 2011.[8] Modeling results were available for future projection years of 2017 and 2025. Attachment 1 contains more details on the base and future year EPA modeling.

From this air quality modeling, $PM_{2.5}$ concentration results were available and further post-processing[9] was performed to calculate projected design values for the 2012 annual $PM_{2.5}$ NAAQS. For each ambient monitoring site, the EPA calculated the projected average design value and projected maximum design value for the future projection years of 2017 and 2025.[10] Consistent with the approach used in CSAPR, the average projected design value was used to identify potential "nonattainment" receptors, while the maximum projected design value was used to identify potential "maintenance" receptors.

As the refinement for identifying nonattainment receptors proposed in the CSAPR Update has not yet been finalized, the EPA has not incorporated consideration of monitored data into its analysis of potential nonattainment and maintenance receptors for the 2012 $PM_{2.5}$ NAAQS. However, as noted above, both the original CSAPR rulemaking and the CSAPR Update identify all nonattainment receptors as also being maintenance receptors. Accordingly, while the refinement proposed in the CSAPR Update might change the identification of certain potential receptors from nonattainment to maintenance-only, such receptors remain air quality problems that need to be addressed.

Table 1 identifies 19 potential nonattainment and/or maintenance receptors in 2017. Seventeen of the receptors are in California, located either in the San Joaquin Valley or South Coast nonattainment areas. There is one additional projected receptor in Shoshone County, Idaho, and one receptor in Allegheny

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[7] CSAPR Update, Proposed Rule, 80 FR 75705; National Ambient Air Quality Standards for Ozone, Final Rule, 80 FR 65291 (October 26, 2015) (2015 ozone NAAQS).

[8] The base modeling year was 2011, and, therefore, based on recommendations in the $PM_{2.5}$ modeling guidance, ambient monitoring data for the 2009-2013 period was projected to the future (the 2009-2011, 2010-2012, and 2011-2013 design values). There are several states that have had recent data quality issues identified as part of the $PM_{2.5}$ designations process. Some ambient $PM_{2.5}$ data (for certain time periods between 2009 and 2013) in Florida (except Palm Beach County), Illinois, Idaho, Tennessee (except Hamilton County), and Jefferson County, Kentucky, did not meet all data quality requirements under 40 CFR Appendix L to part 50. The ambient data that were determined to be not valid were not used in the projections of data to 2017 and 2025. Documentation of the data quality issues can be found in the 2012 $PM_{2.5}$ NAAQS designations rule docket (docket number EPA-HQ-OAR-2012-0918).

[9] *See* Attachment 1 for details on the model post-processing calculation of future year design values.

[10] The analysis was completed for all ambient monitoring sites that had at least one complete (and valid) $PM_{2.5}$ design value for the annual average 2012 NAAQS in the 2009-2013 period.

County, Pennsylvania (located in the Allegheny County nonattainment area). All of the receptors, except for the Allegheny County receptor, are projected to remain problem receptors in 2025.[11] Attachment 1 contains more details on the future year design value analysis. Attachment 2 includes projected design values for all $PM_{2.5}$ monitors in the Continental U.S. with valid data.

Table 1. Potential nonattainment and maintenance receptors for the 2012 $PM_{2.5}$ NAAQS in 2017 and 2025.

Monitor ID	State	County	Projected 2017 Attainment Status	Projected 2025 Attainment Status
60190011	California	Fresno	Nonattainment	Nonattainment
60195001	California	Fresno	Nonattainment	Nonattainment
60195025	California	Fresno	Nonattainment	Nonattainment
60250005	California	Imperial	Nonattainment	Nonattainment
60290014	California	Kern	Nonattainment	Nonattainment
60290016	California	Kern	Nonattainment	Nonattainment
60311004	California	Kings	Nonattainment	Nonattainment
60371002	California	Los Angeles	Maintenance	Maintenance
60392010	California	Madera	Nonattainment	Nonattainment
60470003	California	Merced	Nonattainment[a]	Nonattainment
60658001	California	Riverside	Nonattainment	Maintenance
60658005	California	Riverside	Nonattainment	Nonattainment
60990006	California	Stanislaus	Nonattainment	Nonattainment
60990005	California	Stanislaus	Nonattainment	Maintenance
60710025	California	San Bernardino	Maintenance	Maintenance
60771002	California	San Joaquin	Maintenance	Maintenance
61072002	California	Tulare	Nonattainment	Nonattainment
160790017	Idaho	Shoshone	Maintenance	Maintenance
420030064	Pennsylvania	Allegheny	Maintenance	Attainment

[a] The Merced County monitor is attaining the 2012 $PM_{2.5}$ NAAQS based on the most recent certified air quality data (2012-2014). Therefore, in the proposed CSAPR Update, the receptor would be considered to be a maintenance receptor in both 2017 and 2025.

For purposes of evaluating interstate transport consistent with the court's holding in *North Carolina*, it may be appropriate to evaluate projected air quality in 2021, which is the attainment deadline for 2012 $PM_{2.5}$ NAAQS nonattainment areas classified as Moderate. Since modeling results are only available for

[11] The EPA modeling does not consider additional local controls that might be required as part of reasonably available control technology/reasonably available control measure and other reasonable measures that must be implemented in nonattainment areas as part of their SIP planning process. In addition, if the areas do not attain the NAAQS by 2021 and are reclassified as Serious nonattainment areas, they will be required to impose best available control technology/best available control measure controls as part of their Serious area SIP.

2017 and 2025, one way to assess potential receptors for 2021 is to assume that receptors projected to have average and/or maximum design values above the NAAQS in both 2017 and 2025 are also likely to be either nonattainment or maintenance receptors in 2021. Similarly, it may be reasonable to assume that receptors that are projected to attain the NAAQS in both 2017 and 2025 are also likely to be attainment receptors in 2021. Where a potential receptor is projected to be nonattainment or maintenance in 2017, but projected to be attainment in 2025, further analysis of the emissions and modeling may be needed to make a further judgement regarding the receptor status in 2021. *See* Attachment 1 for a more detailed discussion of the potential receptor status in 2021.

In relying on the information provided in this memo, states should consider that there are no projected $PM_{2.5}$ design values for certain downwind states or counties with incomplete ambient monitoring data (*see* footnote 8). In evaluating their contribution to potential air quality problems in those areas that may not have been identified by the EPA's modeling, possible upwind states (especially those bordering the particular downwind states or counties identified in footnote 8) should consider additional data and information, such as the latest available ambient monitoring data (*e.g.*, 2014 and 2015) for those downwind states or counties. These possible upwind states should work with their EPA Regional offices to develop approvable demonstrations showing, where possible, that they will not contribute significantly or interfere with maintenance of the 2012 $PM_{2.5}$ NAAQS in any downwind state.

The information provided in this memo may be supplemented with any additional technical information that states believe is relevant for consideration. States may also choose to use different information from what is provided in this memo in order to identify nonattainment and maintenance receptors relevant to development of their good neighbor SIPs, in which case states should submit that information along with a full explanation and technical analysis for evaluation by the EPA.

Step 2. Identification of States Contributing to Downwind Nonattainment Maintenance Receptors
In the past, the EPA has used source apportionment "contribution modeling" in tandem with a screening threshold to identify contributing upwind states warranting further review and analysis. States whose contribution to an air quality impact at one or more downwind problem receptors was greater than or equal to the screening threshold were identified as needing further evaluation for actions to address transported emissions. States whose contribution to air quality impacts at all downwind problem receptors that were below this threshold were identified as states not requiring further evaluation for actions to address transported emissions. These latter states had no emissions reduction obligation under the good neighbor provision because they make an insignificant contribution to identified downwind air quality problems.

Where concentration estimates have been available, but contribution modeling has not been available, the EPA and states have used a weight of evidence approach to assess $PM_{2.5}$ transport from a given state to a given downwind receptor location. A state's submission for this requirement should provide the technical information that the state deems appropriate to support its conclusions. Prior guidance and EPA SIP actions suggest that suitable information might include, but is not limited to, information concerning emissions in the state, meteorological conditions in the state and in potentially impacted states, monitored ambient pollutant concentrations in the state and in potentially impacted states, distances to the nearest areas not attaining the NAAQS in other states, and air quality modeling.[12] As an example, the February 23, 2015, *Federal Register* notice for the proposed rulemaking addressing the Idaho State Implementation Plan for Interstate Transport of Fine Particulate Matter examined technical information, including meteorological and other characteristics, as well as source apportionment data that provides information on how Idaho sources influence $PM_{2.5}$ levels at monitors in National Parks and wilderness areas surrounding Idaho. This submittal demonstrated by total weight of all the evidence taken together that sources from Idaho did not significantly contribute to nonattainment or interfere with maintenance of the applicable NAAQS in any other state.[13]

The EPA has not conducted, and does not plan to conduct, contribution modeling for purposes of the 2012 $PM_{2.5}$ NAAQS. Given the limited number of receptors and their locations, nationwide contribution modeling by the EPA or the states does not appear to be necessary at this time. The EPA believes that a proper and well-supported weight of evidence approach could provide sufficient information for purposes of addressing transport with respect to the 2012 $PM_{2.5}$ NAAQS. It is, however, important and necessary that states work with their EPA Regional offices to ensure that the submittals provide an adequate technical basis for any conclusions regarding contribution to other states.

Conclusion

As noted above, the EPA expects that, with support from the modeling described in Attachment 1 and a weight of evidence assessment of a state's contribution to any identified problem receptor(s), most states will be able to develop good neighbor SIPs that demonstrate that they do not contribute significantly to nonattainment or interfere with maintenance of the 2012 $PM_{2.5}$ NAAQS in any downwind state. These SIPs will need to contain adequate information and a technical analysis to support this demonstration. If such a demonstration cannot be made, states should evaluate available measures for achieving any necessary and timely emission reductions to address the state's significant contribution to nonattainment or interference with maintenance of the NAAQS in downwind states.

For Further Information

If you have any questions concerning this information, please contact Lev Gabrilovich, at (919) 541-1496, *Gabrilovich.Lev@epa.gov*.

Attachments (2)

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[12] *See id. See also* "Guidance on SIP Elements Required Under Sections 110(a)(l) and (2) for the 2006 24-Hour Fine Particle ($PM_{2.5}$) National Ambient Air Quality Standards (NAAQS)," Memorandum from William T. Harnett, Director, Air Quality Policy Division (September 25, 2009). This guidance provided that each state's SIP submission for the 2006 24-hour $PM_{2.5}$ NAAQS should explain whether emissions from the state significantly contribute to nonattainment of the NAAQS or interference with maintenance of the NAAQS in any other state, including technical information to support the state's conclusion, and should address any such impact. This guidance is available online at *http://www3.epa.gov/ttn/caaa/t1/memoranda/20090925_harnett_pm25_sip_110a12.pdf*.

[13] *See* Proposed Rule, Approval and Promulgation of the Idaho State Implementation Plan for Interstate Transport of Fine Particulate Matter, 80 FR 9423 (February 23, 2015). *See* Final Rule, Approval and Promulgation of the Idaho State Implementation Plan for Interstate Transport of Fine Particulate Matter, 80 FR 21181 (April 17, 2015).

Attachment 1

Environmental Protection Agency Modeling for 2017 and 2025

The Environmental Protection Agency recently performed nationwide photochemical air quality modeling to support several ozone National Ambient Air Quality Standards (NAAQS) related rulemakings. Base year modeling was performed for 2011. Future year modeling was performed for 2017 to support the proposed Cross-State Air Pollution Rule Update (CSAPR Update, 80 FR 75705, December 3, 2015[1]) for the 2008 Ozone NAAQS. Future year modeling was performed for 2025 to support the Regulatory Impact Assessment (RIA) of the final 2015 Ozone NAAQS.[2] The outputs from these model runs included hourly concentrations of fine particulate matter ($PM_{2.5}$) that were used in conjunction with measured data to project annual average $PM_{2.5}$ design values for 2017 and 2025.

Areas that were designated as Moderate $PM_{2.5}$ nonattainment areas for the 2012 annual $PM_{2.5}$ NAAQS in 2014 must attain the NAAQS by December 31, 2021 (the end of the 6th calendar year after designation) or as expeditiously as practicable. Although neither the available 2017 nor 2025 future year modeling data corresponds directly to the future year attainment deadline for Moderate $PM_{2.5}$ nonattainment areas, the EPA believes the modeling information can still be useful to help identify potential nonattainment and maintenance receptors in the 2017-2021 time period.

Air Quality Modeling

The CAMx photochemical model version 6.11 (Environ, 2014) is the air quality model used for both the 2017 and 2025 modeling analyses. CAMx is a three-dimensional grid-based Eulerian air quality model designed to simulate the formation and fate of oxidant precursors, primary and secondary particulate matter concentrations, and deposition over regional and urban spatial scales [e.g., the contiguous United States (U.S.)]. Consideration of the different processes (e.g., transport and deposition) that affect primary (directly emitted) and secondary (formed by atmospheric processes) pollutants at the regional scale in different locations is fundamental to understanding and assessing the effects of emissions on air quality concentrations. Figure A-1 shows the geographic extent of the modeling domain that was used for air quality modeling in these analyses. The domain covers the 48 contiguous states along with the southern portions of Canada and the northern portions of Mexico.

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[1] *See* Notice of Data Availability, 80 FR 46271 (August 4, 2015); CSAPR Update, Proposed Rule, 80 FR 75705 (December 3, 2015).

[2] *See* 2015 ozone NAAQS RIA at: *http://www3.epa.gov/ozonepollution/pdfs/20151001ria.pdf.*

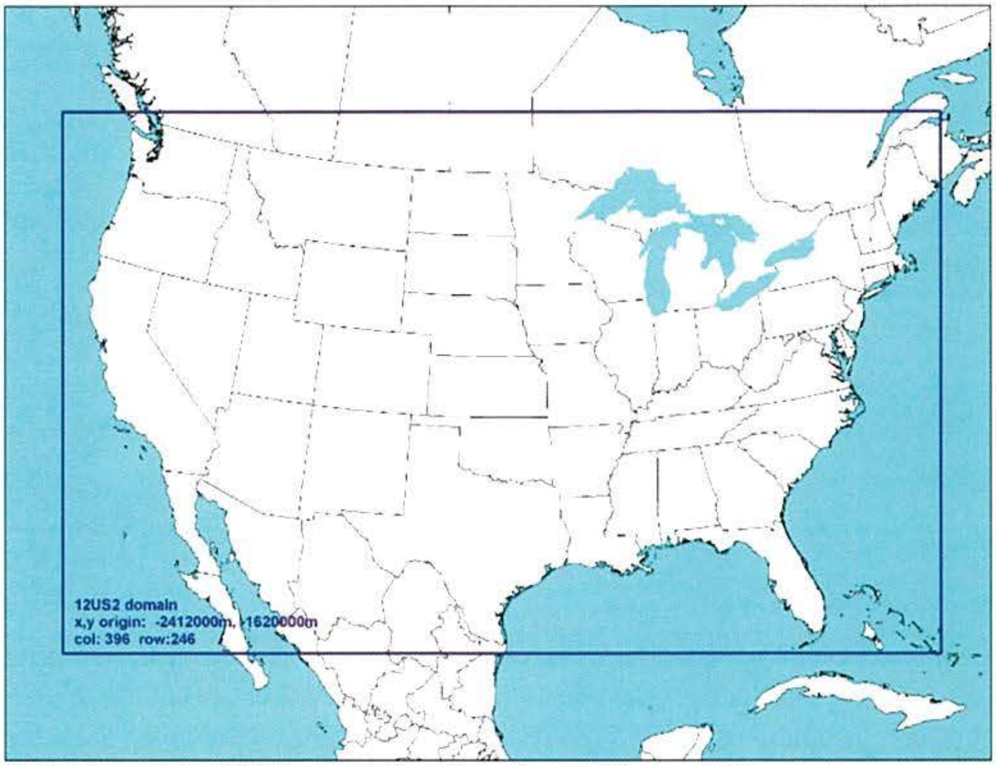

Figure A-1. Map of the CAMx modeling domain used for modeling.

CAMx requires a variety of input files that contain information pertaining to the modeling domain and simulation period. These include gridded, hourly emissions estimates and meteorological data, and initial and boundary concentrations. Separate emissions inventories were prepared for the 2011 base year and the 2017 and 2025 base cases. All other inputs (i.e., meteorological fields, initial concentrations and boundary concentrations) were specified for the 2011 base year model application and remained unchanged for the future-year model simulations. The 2011 base year modeling platform was chosen due to the availability of National Emissions Inventory (NEI) data for that year. In addition, based on nationwide trends, the $PM_{2.5}$ concentrations are generally steady or declining through the 2009-2013 time period. There does not appear to be any unusual PM concentration trends (either nationally or regionally) that would make 2011 unsuitable for use as a base year for the purpose of projecting $PM_{2.5}$ concentrations to future years (*see* the EPA PM trends website for more details: *http://www3.epa.gov/airtrends/pm.html*).

Additional details on the model setup, emissions, meteorology and model performance can be found in the air quality modeling and emissions technical support documents (TSDs) for the respective rulemakings. The CSAPR Update air quality modeling information is documented in a modeling TSD, which can be found here: *http://www3.epa.gov/airtransport/pdfs/Updated_2008_Ozone_NAAQS_Transport_AQModeling_TSD.pdf* (*see* also the ozone NAAQS RIA for more information on the 2025 modeling). The emissions inventory data used for the 2011, 2017 and 2025 modeling is documented in an emissions TSD, which can be found here: *http://www3.epa.gov/ttn/chief/emch/2011v6/2011v6_2_2017_2025_EmisMod_TSD_aug2015.pdf*. Additional information on 2011 base year $PM_{2.5}$ model performance can be found in U.S. Environmental Protection Agency, 2011. Bayesian space-time downscaling fusion model (downscaler) - Derived Estimates of Air Quality for 2011, Research Triangle Park, NC. EPA-454/S-15-001.

Modeled $PM_{2.5}$ Concentrations

Since the photochemical model was run with $PM_{2.5}$ emissions and precursors (SO_2, NO_x, VOC and NH_3), and included full aerosol chemistry, the EPA was able to perform additional post-processing of the model results in order to develop projected 2017 and 2025 annual average $PM_{2.5}$ design values.[3]

For this analysis, the EPA followed the procedures in the current $PM_{2.5}$ photochemical modeling guidance.[4] The modeling guidance recommends using air quality modeling results in a "relative" sense to project future concentrations of $PM_{2.5}$. Rather than use the absolute model-predicted future year $PM_{2.5}$ concentrations, the base year and future year predictions are used to calculate a (relative) percent change in $PM_{2.5}$ concentrations. In this approach, the ratio of future year model predictions (i.e., 2017) to 2011 base year model predictions are used to adjust (2009-2013) ambient measured data based on the relative (percent) change in model predictions for each location.

Procedures for Processing Ambient $PM_{2.5}$ Data

In this analysis we use measurements of ambient $PM_{2.5}$ data from several state and federal monitoring networks. This includes data from over 600 Federal Reference Method (FRM) $PM_{2.5}$ sites in the U.S. In addition, speciated $PM_{2.5}$ data from the Chemical Speciation Network and IMPROVE network are used to estimate $PM_{2.5}$ species concentrations at each FRM site. The certified and quality assured ambient data used in this analysis were obtained from the EPA's Air Quality System[5] for the time-period between 2009 and 2013.

The $PM_{2.5}$ ambient data were processed consistent with the formats associated with the NAAQS for $PM_{2.5}$. For $PM_{2.5}$, we evaluated concentrations of the annual $PM_{2.5}$ NAAQS. The annual $PM_{2.5}$ standard is not met if the 3-year average of the annual mean concentration is greater than 12.0 micrograms per cubic meter ($\mu g/m^3$) (12.05 $\mu g/m^3$ or greater when rounded up). The 3-year average annual mean concentration is computed at each site by averaging the daily FRM samples by quarter, averaging these quarterly averages to obtain an annual average, and then averaging the three annual averages. The 3-year average annual mean concentration is referred to as the annual average design value.

When projecting ambient monitoring data to future time periods using relative response factors, the modeling guidance recommends using the average of the three design value periods centered on the year of the base year emissions. Since 2011 was the base emissions year, we used the design values for 2009-2011, 2010-2012 and 2011-2013 to represent the base period $PM_{2.5}$ concentrations. The most recent certified and quality assured $PM_{2.5}$ design values are accessible at: *http://www3.epa.gov/airtrends/pdfs/PM25_DesignValues_20122014_FINAL_08_19_15.xlsx*.

Ambient design values from monitoring sites were included in our analysis if the site had at least one complete[6] design value in the 2009-2013 period.[7] There were 738 monitoring sites that had at least one complete design value period for the annual $PM_{2.5}$ NAAQS. Note that several states have had recent data quality issues identified as part of the $PM_{2.5}$ designations process. Some ambient $PM_{2.5}$ data (for certain

[3] PM source apportionment modeling was not performed for any of the modeling applications referenced.
[4] $PM_{2.5}$ modeling guidance available at: *http://www3.epa.gov/ttn/scram/guidance_sip.htm*.
[5] *See http://www.epa.gov/ttn/airs/airsaqs/* for access to raw data.
[6] Design value completeness was determined according to the monitoring rules in 40 CFR part 50 Appendix N.
[7] Ambient monitoring data is generally not used for regulatory actions (e.g., designations and redesignations) unless there is enough complete, certified data to calculate a valid design value for comparison to the NAAQS. If there is only one complete design value, then the nonattainment and maintenance design values are the same.

time periods between 2009 and 2013) in Florida (except Palm Beach County), Illinois, Idaho, Tennessee (except Hamilton County), and Jefferson County, Kentucky, did not meet all data quality requirements under 40 CFR Appendix L to part 50. The ambient data that was determined to be not valid was not used in the projections of data to 2017 and 2025 for this memo. Documentation of the data quality issues can be found in the 2012 $PM_{2.5}$ NAAQS designations rule docket (docket number EPA-HQ-OAR-2012-0918).

Projection of Future Design Values and Determination of Potential Nonattainment and Maintenance for Annual $PM_{2.5}$

In order to identify receptors with potential nonattainment and maintenance concerns with respect to the 2012 $PM_{2.5}$ NAAQS, we applied the methodology used in the CSAPR, 76 FR 48208 (August 8, 2011), to identify such receptors with respect to the 1997 and 2006 $PM_{2.5}$ standards.

The procedure for calculating future year annual $PM_{2.5}$ design values is called the modeled attainment test. The modeled attainment test approach can be applied using a software tool available from EPA called Modeled Attainment Test Software, or MATS.[8] The software (including documentation) is available at: *http://www.epa.gov/scram001/modelingapps_mats.htm.*

Design values of $PM_{2.5}$ in 2017 were estimated by applying the 2011 to 2017 relative change in model-predicted $PM_{2.5}$ species concentrations to the measured (2009-2013) $PM_{2.5}$ species concentrations. The $PM_{2.5}$ species include sulfate, nitrate, ammonium, particle bound water, elemental carbon, salt, other primary $PM_{2.5}$ and organic aerosol mass (by difference). Organic aerosol mass by difference is defined as the difference between FRM $PM_{2.5}$ and the sum of all of the other components.

For each FRM $PM_{2.5}$ monitoring site, all valid design values (up to 3) from the 2009-2013 period were averaged together, resulting in the "average" design value. Averaging the three values together has the effect of creating a 5-year weighted average. The middle year (2011) is weighted 3 times, the 2nd and 4th years (2010 and 2012) are weighted twice, and the 1st and 5th years (2009 and 2013) are weighted once. We refer to this as the 5-year weighted average design value concentration. For sites that did not have three valid design values, the "average" of all valid design values from the time-period were used.

Following the procedures used in the analysis for CSAPR, the 5-year weighted average design values were used to project concentrations for the 2017 and 2025 scenarios in order to examine which monitoring sites may be potential nonattainment receptors for the future year scenarios. We also projected design values for each of the individual valid 3-year design value periods (i.e., 2009-2011, 2010-2012 and 2011-2013) for use in identifying potential receptors that may have problems maintaining the standard in the future year scenarios.

The modeling guidance methodology for determining future year $PM_{2.5}$ concentrations was applied for each FRM site. As described in the modeling guidance, the procedure is performed on a species-specific basis. For example as shown in Table A-1 below, the measured sulfate concentration at a monitoring location is 4.82 ug/m3, the modeled sulfate concentration in 2011 is 5.81 ug/m3 and the 2017 modeled sulfate concentration is 3.13 ug/m3. The modeled Relative Response Factor (RRF) (3.13/5.81) is 0.5387 (unitless). This means that based on the modeled change in emissions, the model predicted a ~46 percent reduction in sulfate concentration at the monitoring location between 2011 and 2017. The modeled RRF

[8] The latest version of MATS is version 2.6.1.

is then multiplied by the base year measure sulfate value to get the future year (2017) sulfate concentration (4.82 ug/m3 * 0.5387 = 2.59 ug/m3). The procedure is completed on a quarterly average basis (for all four quarters) and for all $PM_{2.5}$ species. The future year $PM_{2.5}$ design value is derived from the sum of all the calculated future year species concentrations.

Table A-1. Simplified example future year concentration calculation for sulfate.

Measured sulfate (2009-2013)	Modeled 2011 sulfate concentration	Modeled 2017 sulfate concentration	RRF	Projected future year sulfate concentration (2017)
4.82 ug/m^3	5.81 ug/m^3	3.13 ug/m^3	0.5387	2.59 ug/m^3

The calculated $PM_{2.5}$ design values are truncated after the second decimal place.[9] This is consistent with the truncation and rounding procedures for the 12 μg/m^3 annual $PM_{2.5}$ NAAQS. Any value that is greater than or equal to 12.05 μg/m^3 is rounded to 12.1 μg/m^3 and is considered to be violating the NAAQS. Thus, using the approach for identifying receptors applied in CSAPR, sites with future year annual $PM_{2.5}$ design values of 12.05 μg/m^3 or greater, based on the projection of 5-year weighted average concentrations, are projected to be potential nonattainment sites (we refer to the future year values projected from 5-year weighted average values as future year "average" design values). Sites with future year maximum design values[10] of 12.05 μg/m^3 or greater are projected to be potential maintenance sites. The CSAPR methodology uses the term "nonattainment sites" to refer to those sites that are projected to exceed the NAAQS based on both the average and maximum future year design values. Those sites that are projected to exceed the NAAQS based on the maximum future year design value are referred to as maintenance sites. All nonattainment sites are necessarily also maintenance sites; those sites projected to be in attainment based on the average future year design value but projected to exceed the NAAQS based on the maximum future year design values are only maintenance sites.

Evaluation of potential nonattainment and maintenance receptors for the 2012 annual $PM_{2.5}$ NAAQS

The projected design values were examined to see which sites are projected to have average or maximum design values above the standard in 2017 and 2025. In general, most $PM_{2.5}$ and $PM_{2.5}$ precursor emissions are declining over time (see the emissions TSD), and, as a result, design values beyond 2017 are in most cases expected to be lower. Therefore, if the projected design values in 2017 are below the NAAQS (attainment), then the design values would also be expected to remain below the NAAQS in the years following 2017, including the Moderate area attainment deadline of 2021. This can be verified by examining the projected 2025 design values to see if the 2017 projected attainment sites remain attainment, and whether projected 2017 nonattainment or maintenance sites are projected to become attainment by 2025. Applying the CSAPR framework for identifying potential air quality receptors, there are several possible outcomes of this analysis as described in Table A-2 below.

[9] For example, a calculated annual average concentration of 11.9475 becomes 11.94 when digits beyond two places to the right are truncated.

[10] We refer to future year values projected from the maximum base year design value as future year "maximum" design values.

Table A-2. Potential projections for 2017 and 2025 modeling.

Monitoring site projection in 2017	Monitoring site projection in 2025	Potential 2012 $PM_{2.5}$ NAAQS transport analysis
Average and maximum DV below the NAAQS	Average and maximum DV below the NAAQS	Likely not a potential nonattainment/maintenance receptor in 2021
Average or maximum DV exceeds the NAAQS	Average or maximum DV exceeds the NAAQS	Potential nonattainment/maintenance receptor in 2021
Average or maximum DV exceeds the NAAQS	Average and maximum DV below the NAAQS	Further analysis is likely needed to determine if the site may be a nonattainment or maintenance receptor in 2021

As described above in Table A-2, if a monitoring site is projected to be attainment in both 2017 and 2025, then it is likely not a potential nonattainment or maintenance receptor in 2021. If a monitoring site is projected to be nonattainment or maintenance in both 2017 and 2025, then the site should likely be considered a potential nonattainment or maintenance receptor in 2021. The more uncertain outcome is if a receptor is projected to be nonattainment or maintenance in 2017, but attainment in 2025. More analysis of such sites may be necessary to determine if they should be considered potential nonattainment or maintenance receptors for the 2012 $PM_{2.5}$ transport analysis.

Table A-3 lists the base year (2009-2013) 5-year weighted average annual $PM_{2.5}$ design values and the projected 2017 and 2025 average and maximum annual average $PM_{2.5}$ design values for monitoring sites with 2017 or 2025 average or maximum values that are above the 2012 $PM_{2.5}$ NAAQS. The full set of base and future year 2012 $PM_{2.5}$ NAAQS design values for all sites can be found in Attachment 2.[11]

Table A-3 shows that in 2017, there are 19 monitoring sites in the continental U.S. that are projected to have average or maximum future year annual average design values above the 2012 $PM_{2.5}$ NAAQS ($\geq$ 12.05 $\mu g/m^3$). Of these monitoring sites, 17 are located in either the South Coast (California) $PM_{2.5}$ nonattainment area or the San Joaquin Valley (California) $PM_{2.5}$ nonattainment area. There is one 2017 projected maintenance site in Shoshone County, Idaho, and one projected 2017 projected maintenance site in Allegheny County, Pennsylvania. All of the other monitoring sites (based on certified and quality assured ambient data) are projected to be attainment in 2017 and remain attainment in 2025 (*see* Attachment 2).

Examining the projected average and maximum future year design values for 2025 shows that 17 of these sites are projected to have average or maximum future year annual average design values above the 2012 $PM_{2.5}$ NAAQS ($\geq$ 12.05 $\mu g/m^3$) in 2025 (two sites switch from potential nonattainment to potential maintenance between 2017 and 2025). Therefore, these 17 sites could be considered potential nonattainment and maintenance receptors in 2021.

The Allegheny County, Pennsylvania monitoring site (420030064) is a projected potential maintenance receptor in 2017, but is projected to be below the NAAQS in 2025. Therefore, more analysis of this site may be necessary to determine if it should be considered a potential nonattainment or maintenance receptor for the 2012 $PM_{2.5}$ transport analysis. One possible follow-up analysis is to linearly interpolate between 2017 and 2025 to estimate the expected concentration in 2021. Whether it is appropriate to

[11] Future year design values were not calculated for ambient monitoring sites that had no valid design values for the 2009-2013 period. This includes sites previously referenced above that had invalid data due to laboratory quality assurance issues. However, based on modeled RRFs at those monitor locations, the overall $PM_{2.5}$ concentrations are expected to continue to decline through 2017 and 2025.

linearly interpolate between 2017 and 2025 may depend on the timing and location of emissions reductions that are expected to occur between those years. But, at a minimum, a linear interpolation of the data may provide useful information. A simple linear interpolation between the 2017 and 2025 projected design values for Allegheny County leads to a projected 2021 average design value of 11.42 ug/m^3 and a maximum design value of 11.91 ug/m^3, which are both below the 2012 $PM_{2.5}$ NAAQS. This could indicate that this monitor would be attaining the annual $PM_{2.5}$ NAAQS in 2021, but additional information about emissions and trends may be needed to further support that conclusion.

Table A-3. Projected 2017 and 2025 average and maximum future year annual $PM_{2.5}$ design values for monitoring sites with projected design values that are above the 2012 $PM_{2.5}$ NAAQS.

Monitor ID	State	County	5-Year Weighted Average Design Value 2009-2013 (ug/m^3)	Maximum Design Value 2009-2013 (ug/m^3)	Average Design Value 2017 (ug/m^3)	Maximum Design Value 2017 (ug/m^3)	Average Design Value 2025 (ug/m^3)	Maximum Design Value 2025 (ug/m^3)
60190011	California	Fresno	14.74	15.46	13.69	14.36	13.09	13.72
60195001	California	Fresno	16.44	16.94	15.43	15.9	14.9	15.36
60195025	California	Fresno	14.33	14.67	13.43	13.75	12.94	13.22
60250005	California	Imperial	13.64	13.76	14.19	14.32	14.83	14.97
60290014	California	Kern	15.77	16.45	14.24	14.85	13.78	14.37
60290016	California	Kern	17.02	18.18	15.4	16.43	14.94	15.93
60311004	California	Kings	16.33	16.98	15.38	16.01	14.82	15.4
60392010	California	Madera	18.32	18.58	17.37	17.62	16.9	17.14
60470003	California	Merced	14.54	16.05	13.84	15.27	13.52	14.92
60658005	California	Riverside	15.31	15.9	13.89	14.41	13.63	14.15
60990006	California	Stanislaus	15.27	15.65	14.44	14.79	13.97	14.31
61072002	California	Tulare	15.54	16.59	14.63	15.6	14.06	14.96
60658001	California	Riverside	13.6	14.15	12.25	12.74	11.99	12.47
60990005	California	Stanislaus	13.25	13.61	12.5	12.84	12.03	12.34
60371002	California	Los Angeles	12.92	13.65	11.6	12.25	11.42	12.07
60710025	California	San Bernardino	13.03	13.65	11.79	12.35	11.61	12.15
60771002	California	San Joaquin	12.09	13.78	11.49	13.09	11.16	12.71
160790017	Idaho	Shoshone	12.34	12.77	12.01	12.43	11.8	12.22
420030064	Pennsylvania	Allegheny	14.4	15.02	11.67	12.16	11.18	11.65

References:

Abt Associates, 2014. User's Guide: Modeled Attainment Test Software. *http://www3.epa.gov/scram001/modelingapps_mats.htm.*

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U.S. Environmental Protection Agency, 2011. Bayesian space-time downscaling fusion model (downscaler) - Derived Estimates of Air Quality for 2011, Research Triangle Park, NC. EPA-454/S-15-001.

U.S. Environmental Protection Agency, 2014. Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, PM2.5, and Regional Haze, Research Triangle Park, NC. *http://www3.epa.gov/ttn/scram/guidance/guide/Draft_O3-PM-RH_Modeling_Guidance-2014.pdf.*

Attachment 2

Monitor ID	State	County	5 Year Weighted Average Design Value 2009-2013 (ug/m^3)	Maximum Design Value 2009-2013 (ug/m^3)	Average Design Value 2017 (ug/m^3)	Maximum Design Value 2017 (ug/m^3)	Average Design Value 2025 (ug/m^3)	Maximum Design Value 2025 (ug/m^3)
10030010	Alabama	Baldwin	9.49	9.8	8.21	8.48	8.21	8.48
10270001	Alabama	Clay	9.74	10.07	7.99	8.26	7.97	8.23
10331002	Alabama	Colbert	9.7	9.97	8.29	8.52	8.35	8.58
10491003	Alabama	DeKalb	10.41	10.79	8.63	8.94	8.6	8.91
10550010	Alabama	Etowah	10.7	11.12	8.91	9.25	8.88	9.22
10690003	Alabama	Houston	9.62	9.99	8.29	8.6	8.3	8.61
10730023	Alabama	Jefferson	12.59	12.99	10.88	11.22	10.97	11.32
10731005	Alabama	Jefferson	11	11.29	9.41	9.65	9.44	9.68
10731009	Alabama	Jefferson	9.97	9.97	8.42	8.42	8.44	8.44
10731010	Alabama	Jefferson	11.4	11.62	9.59	9.78	9.62	9.81
10732003	Alabama	Jefferson	11.71	12.03	10.2	10.47	10.29	10.56
10732006	Alabama	Jefferson	11.08	11.08	9.51	9.51	9.58	9.58
10735002	Alabama	Jefferson	10.55	10.55	8.8	8.8	8.84	8.84
10735003	Alabama	Jefferson	10.39	10.39	8.68	8.68	8.69	8.69
10890014	Alabama	Madison	10.48	10.96	8.98	9.39	9.12	9.54
10970003	Alabama	Mobile	9.45	9.8	8.15	8.45	8.2	8.5
10972005	Alabama	Mobile	9.17	9.17	7.9	7.9	7.92	7.92
11011002	Alabama	Montgomery	10.88	11.15	9.45	9.68	9.52	9.74
11030011	Alabama	Morgan	10.02	10.55	8.56	9.01	8.69	9.14
11130001	Alabama	Russell	11.87	12.24	10.31	10.62	10.21	10.52
11170006	Alabama	Shelby	9.75	9.75	8.23	8.23	8.26	8.26
11210002	Alabama	Talladega	11.05	11.47	9.22	9.57	9.22	9.57
11250004	Alabama	Tuscaloosa	10.21	10.55	8.76	9.04	8.83	9.11
11270002	Alabama	Walker	10.84	10.84	9.21	9.21	9.2	9.2
40031005	Arizona	Cochise	6.77	6.95	7	7.19	7.36	7.56
40051008	Arizona	Coconino	5.47	5.87	5.43	5.83	5.48	5.88
40130019	Arizona	Maricopa	10.44	11.15	9.78	10.45	9.38	10.03
40131003	Arizona	Maricopa	7.49	7.49	7.09	7.09	6.9	6.9
40134003	Arizona	Maricopa	9.38	9.66	8.84	9.1	8.54	8.79
40137020	Arizona	Maricopa	5.61	5.63	5.3	5.32	5.17	5.19

Monitor ID	State	County	5 Year Weighted Average Design Value 2009-2013 (ug/m^3)	Maximum Design Value 2009-2013 (ug/m^3)	Average Design Value 2017 (ug/m^3)	Maximum Design Value 2017 (ug/m^3)	Average Design Value 2025 (ug/m^3)	Maximum Design Value 2025 (ug/m^3)
40139812	Arizona	Maricopa	11.48	11.48	10.79	10.79	10.38	10.38
40139997	Arizona	Maricopa	8.31	8.45	7.79	7.92	7.5	7.62
40190011	Arizona	Pima	5.52	5.61	5.2	5.28	4.99	5.06
40191028	Arizona	Pima	5.52	5.79	5.18	5.43	4.96	5.2
40210001	Arizona	Pinal	9.36	9.44	8.99	9.07	8.82	8.89
40213002	Arizona	Pinal	6.9	6.97	6.64	6.71	6.56	6.63
40230004	Arizona	Santa Cruz	10.07	11.03	9.97	10.92	10.04	10.99
40252002	Arizona	Yavapai	4.14	4.25	4.08	4.18	4.13	4.23
40278011	Arizona	Yuma	7.7	7.82	7.46	7.59	7.42	7.55
50010011	Arkansas	Arkansas	10.51	10.76	9.16	9.38	9.06	9.28
50030005	Arkansas	Ashley	10.48	10.77	9.32	9.58	9.36	9.62
50350005	Arkansas	Crittenden	10.94	11.15	9.15	9.33	8.92	9.09
50450002	Arkansas	Faulkner	10.76	10.76	9.46	9.46	9.36	9.36
50510003	Arkansas	Garland	10.75	10.97	9.52	9.72	9.46	9.65
50670001	Arkansas	Jackson	10	10.25	8.59	8.8	8.47	8.67
51070001	Arkansas	Phillips	10.67	10.67	9.21	9.21	9.09	9.09
51130002	Arkansas	Polk	10.67	10.8	9.58	9.7	9.58	9.69
51150003	Arkansas	Pope	11.34	11.34	10.09	10.09	10.03	10.03
51190007	Arkansas	Pulaski	11.6	11.87	10.13	10.37	9.93	10.16
51191004	Arkansas	Pulaski	11.49	11.76	10.02	10.25	9.83	10.06
51191008	Arkansas	Pulaski	12.01	12.23	10.55	10.75	10.36	10.55
51390006	Arkansas	Union	11.07	11.4	9.94	10.24	9.94	10.23
51430005	Arkansas	Washington	10.67	11.03	9.43	9.75	9.37	9.68
51450001	Arkansas	White	11.26	11.26	9.94	9.94	9.85	9.85
60010007	California	Alameda	7.71	8.21	7.16	7.62	6.99	7.45
60010009	California	Alameda	9.37	9.97	8.65	9.21	8.56	9.1
60070008	California	Butte	10.09	10.14	9.79	9.83	9.55	9.59
60070008	California	Butte	10.09	10.14	9.79	9.83	9.55	9.59
60090001	California	Calaveras	7.76	8.4	7.26	7.86	6.99	7.55
60111002	California	Colusa	6.56	7.06	6.35	6.83	6.21	6.68
60130002	California	Contra Costa	7.43	7.77	6.93	7.24	6.79	7.09
60190011	California	Fresno	14.74	15.46	13.69	14.36	13.09	13.72

Monitor ID	State	County	5 Year Weighted Average Design Value 2009-2013 (ug/m^3)	Maximum Design Value 2009-2013 (ug/m^3)	Average Design Value 2017 (ug/m^3)	Maximum Design Value 2017 (ug/m^3)	Average Design Value 2025 (ug/m^3)	Maximum Design Value 2025 (ug/m^3)
60192009	California	Fresno	7.63	7.84	7.09	7.29	6.72	6.91
60195001	California	Fresno	16.44	16.94	15.43	15.9	14.9	15.36
60195025	California	Fresno	14.33	14.67	13.43	13.75	12.94	13.22
60231002	California	Humboldt	6.01	6.15	5.91	6.06	5.9	6.05
60231004	California	Humboldt	6.21	6.42	6.12	6.33	6.1	6.31
60250005	California	Imperial	13.64	13.76	14.19	14.32	14.83	14.97
60250007	California	Imperial	7.24	7.46	7.19	7.42	7.32	7.55
60251003	California	Imperial	7.31	7.36	7.34	7.4	7.53	7.59
60271003	California	Inyo	7.38	7.58	7.22	7.42	7.18	7.38
60290014	California	Kern	15.77	16.45	14.24	14.85	13.78	14.37
60290016	California	Kern	17.02	18.18	15.4	16.43	14.94	15.93
60311004	California	Kings	16.33	16.98	15.38	16.01	14.82	15.4
60333001	California	Lake	3.51	3.75	3.37	3.6	3.34	3.57
60370002	California	Los Angeles	11.2	11.2	10.14	10.14	10.01	10.01
60371002	California	Los Angeles	12.92	13.65	11.6	12.25	11.42	12.07
60371103	California	Los Angeles	12.68	13.08	11.3	11.65	11.13	11.47
60371201	California	Los Angeles	10.34	10.58	9.26	9.46	9.2	9.4
60371302	California	Los Angeles	12.66	13.39	11.18	11.81	11.02	11.64
60371602	California	Los Angeles	12.52	13.25	11.16	11.81	11	11.63
60374002	California	Los Angeles	10.99	11.45	9.54	9.92	9.4	9.78
60374004	California	Los Angeles	10.83	11.19	9.37	9.68	9.24	9.54
60392010	California	Madera	18.32	18.58	17.37	17.62	16.9	17.14
60410001	California	Marin	9.53	9.54	8.94	8.95	8.86	8.87
60450006	California	Mendocino	8.55	8.55	8.29	8.29	8.18	8.18
60452002	California	Mendocino	8.23	8.23	8.06	8.06	7.97	7.97
60470003	California	Merced	14.54	16.05	13.84	15.27	13.52	14.92
60472510	California	Merced	11.08	11.72	10.44	11.05	10.13	10.72
60531003	California	Monterey	6.15	6.22	5.74	5.81	5.66	5.72
60570005	California	Nevada	4.38	4.59	4.18	4.37	4.13	4.32
60571001	California	Nevada	6.39	7.02	6.14	6.75	6.06	6.65
60590007	California	Orange	10.77	11.06	9.55	9.8	9.41	9.66
60592022	California	Orange	8.32	8.65	7.28	7.57	7.09	7.37

Monitor ID	State	County	5 Year Weighted Average Design Value 2009-2013 (ug/m^3)	Maximum Design Value 2009-2013 (ug/m^3)	Average Design Value 2017 (ug/m^3)	Maximum Design Value 2017 (ug/m^3)	Average Design Value 2025 (ug/m^3)	Maximum Design Value 2025 (ug/m^3)
60610003	California	Placer	5.8	5.8	5.56	5.56	5.49	5.49
60610006	California	Placer	7.54	7.91	7.14	7.49	6.92	7.26
60631006	California	Plumas	9.59	10.21	9.33	9.93	9.17	9.76
60650009	California	Riverside	7.74	7.74	7.11	7.11	7.07	7.07
60651003	California	Riverside	11.63	12.04	10.38	10.75	10.09	10.45
60652002	California	Riverside	7.4	7.72	6.96	7.26	7.03	7.33
60655001	California	Riverside	6.24	6.35	5.94	6.04	6	6.1
60658001	California	Riverside	13.6	14.15	12.25	12.74	11.99	12.47
60658005	California	Riverside	15.31	15.9	13.89	14.41	13.63	14.15
60670006	California	Sacramento	9.94	10.39	9.5	9.93	9.29	9.71
60670010	California	Sacramento	9.19	9.5	8.77	9.06	8.57	8.86
60674001	California	Sacramento	9.06	9.31	8.63	8.88	8.44	8.67
60690002	California	San Benito	5.51	5.63	5.1	5.22	4.99	5.1
60710025	California	San Bernardino	13.03	13.65	11.79	12.35	11.61	12.15
60712002	California	San Bernardino	12.63	12.9	11.43	11.68	11.26	11.5
60718001	California	San Bernardino	8.62	8.9	8.25	8.52	8.23	8.5
60719004	California	San Bernardino	11.86	12.1	10.77	10.98	10.59	10.8
60730001	California	San Diego	9.88	9.89	9.26	9.27	9.14	9.15
60730003	California	San Diego	10.79	11.18	10.17	10.54	9.99	10.35
60731002	California	San Diego	10.89	11.47	10.08	10.61	9.88	10.4
60731010	California	San Diego	10.86	11.02	10.07	10.22	9.85	9.99
60731016	California	San Diego	9.09	9.4	8.27	8.55	8.03	8.3
60731016	California	San Diego	9.09	9.4	8.27	8.55	8.03	8.3
60750005	California	San Francisco	9.51	9.9	8.78	9.15	8.69	9.05
60771002	California	San Joaquin	12.09	13.78	11.49	13.09	11.16	12.71
60772010	California	San Joaquin	10.15	10.15	9.57	9.57	9.22	9.22
60792004	California	San Luis Obispo	8.41	8.67	7.79	8.02	7.66	7.89
60792006	California	San Luis Obispo	6.25	6.55	5.71	5.99	5.56	5.82
60792007	California	San Luis Obispo	11.33	11.33	10.6	10.6	10.44	10.44
60798001	California	San Luis Obispo	7.1	7.68	6.58	7.1	6.38	6.88

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60811001	California	San Mateo	8.8	9.3	8.17	8.64	8.08	8.54
60830011	California	Santa Barbara	9.59	9.85	9	9.24	9.01	9.25
60831008	California	Santa Barbara	7.24	7.64	6.73	7.1	6.64	7.01
60850002	California	Santa Clara	8.11	8.39	7.55	7.8	7.38	7.63
60850005	California	Santa Clara	9.79	10.47	9.16	9.81	9.03	9.66
60870007	California	Santa Cruz	6.25	6.29	5.84	5.88	5.75	5.79
60890004	California	Shasta	5.42	5.73	5.31	5.62	5.29	5.59
60932001	California	Siskiyou	5.54	6.34	5.45	6.24	5.43	6.22
60950004	California	Solano	9.15	9.56	8.53	8.91	8.39	8.76
60970003	California	Sonoma	8.15	8.43	7.81	8.07	7.73	7.99
60990005	California	Stanislaus	13.25	13.61	12.5	12.84	12.03	12.34
60990006	California	Stanislaus	15.27	15.65	14.44	14.79	13.97	14.31
61010003	California	Sutter	7.3	7.7	6.97	7.34	6.77	7.13
61072002	California	Tulare	15.54	16.59	14.63	15.6	14.06	14.96
61110007	California	Ventura	9.13	9.34	8.25	8.44	8.18	8.37
61110009	California	Ventura	8.41	8.55	7.72	7.86	7.67	7.8
61111004	California	Ventura	8.98	8.98	8.49	8.49	8.45	8.45
61112002	California	Ventura	9.09	9.25	8.2	8.35	8.17	8.31
61113001	California	Ventura	8.94	9.17	8.1	8.31	8.04	8.25
61131003	California	Yolo	6.87	7.16	6.52	6.79	6.36	6.62
80010006	Colorado	Adams	8.06	8.06	7.38	7.38	7	7
80050005	Colorado	Arapahoe	6.29	6.29	5.72	5.72	5.43	5.43
80130003	Colorado	Boulder	6.92	6.92	6.47	6.47	6.33	6.33
80130012	Colorado	Boulder	6.27	6.27	5.85	5.85	5.64	5.64
80310002	Colorado	Denver	7.63	7.63	6.98	6.98	6.62	6.62
80310023	Colorado	Denver	7.51	7.51	6.86	6.86	6.5	6.5
80310025	Colorado	Denver	7.24	7.24	6.6	6.6	6.25	6.25
80350004	Colorado	Douglas	5.68	5.68	5.2	5.2	4.95	4.95
80410017	Colorado	El Paso	5.87	5.87	5.48	5.48	5.28	5.28
80690009	Colorado	Larimer	6.32	6.32	5.96	5.96	5.81	5.81
80770017	Colorado	Mesa	8.6	8.6	8.34	8.34	8.1	8.1
80830006	Colorado	Montezuma	6.05	6.28	6	6.23	5.99	6.22

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81030006	Colorado	Rio Blanco	9.55	9.55	9.48	9.48	9.59	9.59
81230006	Colorado	Weld	7.25	7.25	6.78	6.78	6.69	6.69
81230008	Colorado	Weld	7.49	7.49	7	7	6.98	6.98
90010010	Connecticut	Fairfield	9.35	9.39	7.94	7.96	7.56	7.58
90011123	Connecticut	Fairfield	8.99	9.31	7.73	7.99	7.36	7.62
90013005	Connecticut	Fairfield	9.21	9.36	7.7	7.81	7.35	7.46
90019003	Connecticut	Fairfield	8.69	8.98	7.24	7.48	6.91	7.13
90031003	Connecticut	Hartford	8.05	8.21	7.04	7.18	6.77	6.9
90032006	Connecticut	Hartford	8.78	8.95	7.74	7.87	7.44	7.57
90050005	Connecticut	Litchfield	5.63	5.74	4.77	4.86	4.64	4.72
90090027	Connecticut	New Haven	9.22	9.55	7.84	8.12	7.45	7.71
90091123	Connecticut	New Haven	9.45	9.64	8.12	8.27	7.69	7.83
90092123	Connecticut	New Haven	9.18	9.48	8.02	8.26	7.61	7.85
90113002	Connecticut	New London	8.19	8.44	7.07	7.28	6.77	6.97
100010002	Delaware	Kent	8.66	9.1	7.05	7.39	6.83	7.17
100010003	Delaware	Kent	8.93	9.37	7.31	7.65	7.07	7.41
100031003	Delaware	New Castle	9.56	9.93	7.76	8.05	7.5	7.78
100031007	Delaware	New Castle	9.03	9.6	7.24	7.68	7	7.43
100031012	Delaware	New Castle	10.08	10.47	8.24	8.54	7.96	8.25
100032004	Delaware	New Castle	10.35	10.67	8.52	8.77	8.23	8.47
100051002	Delaware	Sussex	8.97	9.44	7.3	7.67	7.09	7.45
110010041	District Of Columbia	District of Columbia	10.29	10.63	8.42	8.68	8.18	8.44
110010042	District Of Columbia	District of Columbia	10.06	10.45	8.21	8.51	7.98	8.28
110010043	District Of Columbia	District of Columbia	10.04	10.32	8.15	8.37	7.93	8.14
120990008	Florida	Palm Beach	7.37	7.77	6.93	7.3	7	7.38
120990009	Florida	Palm Beach	6.84	7.23	6.25	6.61	6.14	6.5
130210007	Georgia	Bibb	12.78	13.39	11.19	11.72	11.02	11.54
130210012	Georgia	Bibb	9.93	10.48	8.47	8.93	8.35	8.8
130510017	Georgia	Chatham	10.7	10.71	9.06	9.07	8.9	8.91
130510091	Georgia	Chatham	10.58	10.96	8.96	9.28	8.81	9.12
130590002	Georgia	Clarke	10.35	10.76	8.46	8.78	8.3	8.61

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130630091	Georgia	Clayton	11.97	12.56	9.95	10.43	9.59	10.05
130670004	Georgia	Cobb	11.1	11.1	9.09	9.09	8.77	8.77
130890002	Georgia	DeKalb	11.31	11.91	9.26	9.74	8.87	9.33
130950007	Georgia	Dougherty	12.05	12.05	10.64	10.64	10.63	10.63
131150003	Georgia	Floyd	11.72	12.27	9.82	10.26	9.65	10.08
131210039	Georgia	Fulton	13.08	13.21	10.91	11.01	10.46	10.57
131390003	Georgia	Hall	10.22	10.74	8.41	8.82	8.21	8.62
131530001	Georgia	Houston	10.45	11.04	9	9.5	8.88	9.37
132150001	Georgia	Muscogee	12.58	12.65	10.94	10.99	10.84	10.89
132450005	Georgia	Richmond	11.65	11.66	9.92	9.92	9.79	9.79
132450091	Georgia	Richmond	12.05	12.05	10.26	10.26	10.13	10.13
132950002	Georgia	Walker	10.16	10.45	8.39	8.64	8.16	8.4
133190001	Georgia	Wilkinson	12.27	13.05	10.72	11.42	10.59	11.28
160050020	Idaho	Bannock	6.45	7.69	6.33	7.55	6.15	7.34
160590004	Idaho	Lemhi	11.59	11.96	11.42	11.79	11.29	11.65
160790017	Idaho	Shoshone	12.34	12.77	12.01	12.43	11.8	12.22
180030004	Indiana	Allen	10.51	10.97	8.66	9.05	8.22	8.58
180190006	Indiana	Clark	12.91	13.52	10.44	10.93	10.13	10.61
180190008	Indiana	Clark	10.8	11.42	8.44	8.92	8.19	8.65
180350006	Indiana	Delaware	10.74	11.24	8.9	9.33	8.49	8.89
180372001	Indiana	Dubois	12.23	12.91	9.96	10.51	9.59	10.12
180390008	Indiana	Elkhart	11.1	11.66	9.33	9.81	8.87	9.31
180431004	Indiana	Floyd	11.6	12.31	9.21	9.79	8.94	9.5
180510012	Indiana	Gibson	11.43	11.43	9.34	9.34	9.02	9.02
180550001	Indiana	Greene	9.89	9.89	7.77	7.77	7.51	7.51
180650003	Indiana	Henry	10.43	11.06	8.53	9.05	8.13	8.62
180670003	Indiana	Howard	11.61	11.61	9.71	9.71	9.26	9.26
180830004	Indiana	Knox	11.7	11.7	9.57	9.57	9.23	9.23
180890006	Indiana	Lake	11.36	11.73	9.49	9.81	9.02	9.33
180890027	Indiana	Lake	11.52	11.52	9.62	9.62	9.16	9.16
180890031	Indiana	Lake	12.04	12.36	10.18	10.46	9.69	9.96
180892004	Indiana	Lake	11.11	11.42	9.26	9.52	8.81	9.06

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180892010	Indiana	Lake	11.07	11.13	9.24	9.3	8.78	8.83
180910011	Indiana	LaPorte	9.96	10.22	8.25	8.48	7.87	8.08
180950011	Indiana	Madison	10.08	10.08	8.23	8.23	7.87	7.87
180970078	Indiana	Marion	11.79	12.28	9.55	9.94	9.12	9.5
180970081	Indiana	Marion	12.57	13.13	10.3	10.76	9.83	10.27
180970083	Indiana	Marion	12.37	13.01	10.12	10.64	9.66	10.16
180970084	Indiana	Marion	12.29	12.79	10.04	10.44	9.59	9.97
181050003	Indiana	Monroe	10.14	10.41	8.06	8.28	7.81	8.02
181270024	Indiana	Porter	10.73	11.14	8.94	9.29	8.53	8.86
181410015	Indiana	St. Joseph	10.54	11.05	8.81	9.24	8.39	8.79
181470009	Indiana	Spencer	11.82	12.43	9.62	10.12	9.27	9.75
181570008	Indiana	Tippecanoe	10.51	10.96	8.63	9.01	8.27	8.62
181630016	Indiana	Vanderburgh	12.06	12.71	10.04	10.58	9.7	10.22
181630021	Indiana	Vanderburgh	11.78	12.36	9.74	10.23	9.41	9.88
181670018	Indiana	Vigo	11.8	12.4	9.74	10.24	9.32	9.79
181830003	Indiana	Whitley	9.61	9.61	7.92	7.92	7.53	7.53
190130008	Iowa	Black Hawk	10.63	10.63	9.19	9.19	8.79	8.79
190130009	Iowa	Black Hawk	10.28	10.57	8.87	9.12	8.49	8.72
190450019	Iowa	Clinton	11.34	11.72	9.71	10.04	9.28	9.58
190450021	Iowa	Clinton	10.56	11.11	8.98	9.44	8.57	9.01
190550001	Iowa	Delaware	9.49	9.6	8.08	8.17	7.77	7.85
191032001	Iowa	Johnson	10.29	10.77	8.79	9.21	8.43	8.82
191110008	Iowa	Lee	11.14	11.36	9.68	9.88	9.33	9.51
191130037	Iowa	Linn	9.91	9.91	8.38	8.38	8.02	8.02
191130040	Iowa	Linn	10.19	10.58	8.75	9.08	8.38	8.69
191370002	Iowa	Montgomery	9.1	9.37	7.9	8.13	7.66	7.88
191390015	Iowa	Muscatine	12.1	12.79	10.43	11.02	10.01	10.57
191390016	Iowa	Muscatine	10.94	11.33	9.3	9.63	8.93	9.25
191390018	Iowa	Muscatine	11.6	12.09	9.94	10.37	9.54	9.95
191390020	Iowa	Muscatine	11.52	11.6	9.86	9.93	9.48	9.55
191471002	Iowa	Palo Alto	8.82	9	7.66	7.8	7.38	7.51
191530030	Iowa	Polk	9.52	9.67	8	8.13	7.64	7.76

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191532510	Iowa	Polk	9.46	9.59	7.95	8.06	7.59	7.68
191550009	Iowa	Pottawattamie	10.7	11.05	9.2	9.5	8.82	9.1
191630015	Iowa	Scott	10.85	11.41	9.13	9.6	8.73	9.18
191630018	Iowa	Scott	11.02	11.47	9.3	9.67	8.89	9.24
191630019	Iowa	Scott	11.42	12.22	9.69	10.37	9.27	9.91
191630020	Iowa	Scott	11.27	11.79	9.52	9.96	9.11	9.52
191770006	Iowa	Van Buren	9.4	9.62	8.11	8.3	7.86	8.05
191930019	Iowa	Woodbury	9.65	9.87	8.42	8.61	8.11	8.29
200910007	Kansas	Johnson	8.32	8.32	7.08	7.08	6.87	6.87
200910010	Kansas	Johnson	7.76	8.06	6.55	6.8	6.38	6.63
201070002	Kansas	Linn	9.08	9.35	7.85	8.08	7.72	7.94
201730008	Kansas	Sedgwick	8.99	9.05	7.9	7.95	7.73	7.78
201730009	Kansas	Sedgwick	9.24	9.44	8.15	8.32	7.98	8.15
201730010	Kansas	Sedgwick	8.87	8.93	7.79	7.84	7.62	7.67
201770013	Kansas	Shawnee	9.1	9.19	7.96	8.04	7.79	7.87
201910002	Kansas	Sumner	8.56	8.64	7.52	7.59	7.38	7.45
202090021	Kansas	Wyandotte	10.09	10.37	8.74	8.98	8.46	8.69
202090022	Kansas	Wyandotte	8.78	8.78	7.49	7.49	7.26	7.26
210130002	Kentucky	Bell	10.83	11.27	9.08	9.45	8.88	9.24
210190017	Kentucky	Boyd	10.44	10.84	8.45	8.78	8.22	8.54
210290006	Kentucky	Bullitt	12.18	12.18	9.85	9.85	9.53	9.53
210373002	Kentucky	Campbell	10.53	11.14	8.02	8.49	7.68	8.13
210430500	Kentucky	Carter	8.71	9.08	6.91	7.19	6.78	7.06
210470006	Kentucky	Christian	10.51	10.74	8.69	8.88	8.47	8.66
210590005	Kentucky	Daviess	11.73	12.26	9.63	10.07	9.33	9.75
210670012	Kentucky	Fayette	10.59	11.2	8.35	8.82	8.1	8.56
210930006	Kentucky	Hardin	11.08	11.08	8.83	8.83	8.57	8.57
211010014	Kentucky	Henderson	11.22	11.7	9.2	9.59	8.91	9.29
211110067	Kentucky	Jefferson	12.38	12.72	9.83	10.08	9.53	9.78
211451004	Kentucky	McCracken	10.84	11.1	8.94	9.15	8.72	8.92
211510003	Kentucky	Madison	9.37	9.86	7.27	7.64	7.08	7.44
211950002	Kentucky	Pike	9.42	9.74	7.59	7.84	7.44	7.69

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212270008	Kentucky	Warren	11.03	11.03	9.18	9.18	8.96	8.96
220170008	Louisiana	Caddo	11.5	11.75	10.4	10.62	10.48	10.71
220190009	Louisiana	Calcasieu	8.46	8.65	7.51	7.69	7.53	7.7
220190010	Louisiana	Calcasieu	8.8	9.12	7.79	8.06	7.81	8.08
220330009	Louisiana	East Baton Rouge	9.95	10.23	8.73	8.97	8.86	9.11
220470005	Louisiana	Iberville	9.78	10	8.7	8.9	8.93	9.13
220470009	Louisiana	Iberville	8.77	8.9	7.62	7.73	7.78	7.89
220511001	Louisiana	Jefferson	8.7	8.98	7.44	7.67	7.51	7.75
220512001	Louisiana	Jefferson	9.03	9.26	7.62	7.8	7.69	7.88
220550007	Louisiana	Lafayette	8.89	9.1	7.83	8.01	7.97	8.15
220730004	Louisiana	Ouachita	9.14	9.36	8.05	8.24	8.1	8.29
220790002	Louisiana	Rapides	8.56	8.78	7.48	7.68	7.51	7.71
220870007	Louisiana	St. Bernard	10.23	10.59	8.74	9.04	8.79	9.1
221050001	Louisiana	Tangipahoa	8.8	9	7.53	7.71	7.53	7.71
221090001	Louisiana	Terrebonne	8.26	8.57	7.18	7.44	7.35	7.62
221210001	Louisiana	West Baton Rouge	10.5	10.83	9.27	9.56	9.41	9.7
230010011	Maine	Androscoggin	7.5	7.52	6.86	6.87	6.49	6.5
230031011	Maine	Aroostook	6.53	6.74	6.3	6.51	6.14	6.34
230050015	Maine	Cumberland	8.37	8.51	7.59	7.73	7.23	7.35
230050029	Maine	Cumberland	8.17	8.4	7.38	7.6	7.04	7.24
230090103	Maine	Hancock	4.59	4.68	4.21	4.3	4.11	4.2
230110016	Maine	Kennebec	7.16	7.26	6.56	6.64	6.22	6.31
230172011	Maine	Oxford	8.2	8.21	7.65	7.66	7.34	7.35
230190002	Maine	Penobscot	7.21	7.31	6.69	6.77	6.39	6.48
240031003	Maryland	Anne Arundel	10.53	10.93	8.71	9.03	8.5	8.81
240051007	Maryland	Baltimore	9.58	10.1	7.76	8.16	7.53	7.93
240053001	Maryland	Baltimore	10.79	11.1	8.89	9.14	8.65	8.89
240150003	Maryland	Cecil	10.27	10.42	8.45	8.56	8.17	8.28
240230002	Maryland	Garrett	8.93	8.93	7.41	7.41	7.27	7.27
240251001	Maryland	Harford	10.11	10.3	8.27	8.45	8.02	8.19
240290002	Maryland	Kent	10.16	10.16	8.47	8.47	8.22	8.22

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240313001	Maryland	Montgomery	10.14	10.49	8.45	8.73	8.26	8.54
240330025	Maryland	Prince George's	10.75	10.75	8.88	8.88	8.64	8.64
240330030	Maryland	Prince George's	10.53	10.79	8.86	9.08	8.67	8.88
240338003	Maryland	Prince George's	8.7	9.13	6.95	7.29	6.76	7.09
240430009	Maryland	Washington	10.89	11.27	9.14	9.45	8.88	9.18
245100006	Maryland	Baltimore (City)	10.01	10.01	8.11	8.11	7.89	7.89
245100007	Maryland	Baltimore (City)	9.79	10.2	7.96	8.28	7.76	8.07
245100008	Maryland	Baltimore (City)	10.4	10.92	8.48	8.89	8.25	8.66
245100040	Maryland	Baltimore (City)	10.97	11.33	9.07	9.36	8.83	9.12
250035001	Massachusetts	Berkshire	8.68	8.9	7.75	7.95	7.42	7.61
250051004	Massachusetts	Bristol	7.58	7.88	6.42	6.67	6.21	6.45
250092006	Massachusetts	Essex	7.17	7.34	6.08	6.23	5.92	6.06
250095005	Massachusetts	Essex	7.31	7.51	6.46	6.63	6.27	6.44
250096001	Massachusetts	Essex	7.91	8.19	7.02	7.26	6.8	7.04
250130008	Massachusetts	Hampden	7.64	7.79	6.68	6.8	6.45	6.57
250130016	Massachusetts	Hampden	9.22	9.47	8.23	8.45	7.93	8.15
250132009	Massachusetts	Hampden	8.77	9.06	7.8	8.05	7.52	7.76
250170009	Massachusetts	Middlesex	7.49	7.7	6.58	6.76	6.4	6.57
250230004	Massachusetts	Plymouth	7.85	8.15	6.71	6.96	6.51	6.76
250250002	Massachusetts	Suffolk	9.01	9.23	7.75	7.94	7.51	7.7
250250027	Massachusetts	Suffolk	8.8	9.18	7.53	7.86	7.3	7.61
250250042	Massachusetts	Suffolk	8.28	8.48	7.03	7.2	6.82	6.98
250250043	Massachusetts	Suffolk	9.87	10.17	8.56	8.82	8.29	8.54
250270016	Massachusetts	Worcester	8.19	8.43	7.24	7.44	7	7.2
250270023	Massachusetts	Worcester	8.71	8.96	7.74	7.96	7.48	7.69
260050003	Michigan	Allegan	8.42	8.52	6.99	7.1	6.71	6.81
260170014	Michigan	Bay	7.81	7.98	6.66	6.82	6.43	6.58
260210014	Michigan	Berrien	8.66	8.82	7.19	7.34	6.88	7.02
260330901	Michigan	Chippewa	6.23	6.23	5.87	5.87	5.71	5.71
260490021	Michigan	Genesee	8.35	8.68	6.99	7.28	6.74	7.02

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260650012	Michigan	Ingham	8.65	8.9	7.26	7.48	7.01	7.22
260770008	Michigan	Kalamazoo	9.16	9.36	7.63	7.8	7.31	7.47
260810007	Michigan	Kent	9.53	9.65	8.05	8.17	7.73	7.84
260810020	Michigan	Kent	9.34	9.48	7.88	8.01	7.56	7.68
260910007	Michigan	Lenawee	9.13	9.41	7.63	7.87	7.33	7.56
260990009	Michigan	Macomb	8.73	9	7.35	7.6	7.12	7.36
261010922	Michigan	Manistee	6.58	6.71	5.76	5.88	5.57	5.68
261130001	Michigan	Missaukee	5.96	6.01	5.25	5.3	5.05	5.1
261150005	Michigan	Monroe	9.72	9.87	8	8.13	7.66	7.78
261210040	Michigan	Muskegon	8.48	8.49	7.17	7.18	6.89	6.89
261250001	Michigan	Oakland	9.23	9.42	7.71	7.89	7.42	7.6
261390005	Michigan	Ottawa	8.99	9.15	7.5	7.64	7.19	7.33
261470005	Michigan	St. Clair	9.13	9.27	7.99	8.12	7.77	7.9
261610008	Michigan	Washtenaw	9.35	9.57	7.81	8.01	7.55	7.74
261630001	Michigan	Wayne	10.26	10.54	8.69	8.93	8.37	8.6
261630015	Michigan	Wayne	10.83	10.9	9.14	9.2	8.82	8.87
261630016	Michigan	Wayne	9.9	10.09	8.38	8.56	8.1	8.27
261630019	Michigan	Wayne	9.67	9.94	8.15	8.4	7.87	8.1
261630025	Michigan	Wayne	9.37	9.48	7.79	7.9	7.51	7.61
261630033	Michigan	Wayne	11.47	11.6	10.02	10.15	9.69	9.81
261630036	Michigan	Wayne	9.18	9.57	7.7	8.05	7.43	7.76
261630038	Michigan	Wayne	10.23	10.26	8.68	8.71	8.39	8.42
261630039	Michigan	Wayne	10.16	10.4	8.58	8.79	8.29	8.49
270031002	Minnesota	Anoka	8.44	8.7	7.64	7.87	7.4	7.62
270370470	Minnesota	Dakota	8.89	9.19	8.04	8.3	7.78	8.02
270530963	Minnesota	Hennepin	8.94	9.5	8.11	8.6	7.88	8.35
270532006	Minnesota	Hennepin	8.83	8.98	8.01	8.13	7.78	7.88
271095008	Minnesota	Olmsted	8.96	9.56	7.8	8.32	7.45	7.93
271230868	Minnesota	Ramsey	9.86	10.01	8.99	9.12	8.71	8.83
271230871	Minnesota	Ramsey	9.15	9.65	8.32	8.75	8.07	8.48
271377001	Minnesota	Saint Louis	5.61	6.13	5.29	5.78	5.18	5.66
271377550	Minnesota	Saint Louis	5.63	5.78	5.15	5.29	4.99	5.11

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271377551	Minnesota	Saint Louis	6.59	6.59	6.09	6.09	5.88	5.88
271377554	Minnesota	Saint Louis	5.62	5.62	5.13	5.13	4.98	4.98
271390505	Minnesota	Scott	8.62	8.82	7.76	7.93	7.5	7.66
271453052	Minnesota	Stearns	8.34	8.6	7.56	7.8	7.26	7.48
271630447	Minnesota	Washington	8.47	8.47	7.6	7.6	7.29	7.29
271630448	Minnesota	Washington	9.21	9.21	8.34	8.34	8.02	8.02
280330002	Mississippi	DeSoto	9.76	9.9	8.18	8.3	8.08	8.19
280350004	Mississippi	Forrest	11.36	11.58	9.83	10.01	9.74	9.92
280430001	Mississippi	Grenada	9.41	9.49	7.98	8.05	7.91	7.98
280450003	Mississippi	Hancock	9.44	9.84	8.09	8.43	8.08	8.41
280470008	Mississippi	Harrison	9.66	9.84	8.22	8.37	8.17	8.33
280490010	Mississippi	Hinds	10.83	11.1	9.39	9.63	9.28	9.51
280590006	Mississippi	Jackson	9.38	9.49	8	8.09	7.93	8.02
280670002	Mississippi	Jones	11.67	11.78	10.08	10.18	10	10.1
280750003	Mississippi	Lauderdale	10.86	10.91	9.32	9.36	9.24	9.27
280810005	Mississippi	Lee	10.77	10.89	9.22	9.31	9.15	9.25
290370003	Missouri	Cass	10.65	11.07	9.33	9.7	9.1	9.47
290390001	Missouri	Cedar	10.48	10.79	9.27	9.55	9.16	9.42
290470005	Missouri	Clay	9.38	9.49	8	8.09	7.76	7.85
290770032	Missouri	Greene	10.15	10.39	8.87	9.08	8.73	8.94
290950034	Missouri	Jackson	10.25	10.49	8.88	9.09	8.59	8.79
290990019	Missouri	Jefferson	10.05	10.31	8.19	8.4	8.05	8.25
291893001	Missouri	Saint Louis	10.89	10.91	8.64	8.65	8.5	8.51
295100007	Missouri	St. Louis City	11.16	11.96	9.07	9.73	8.86	9.49
295100085	Missouri	St. Louis City	11.61	12.01	9.38	9.71	9.15	9.46
300490004	Montana	Lewis and Clark	4.58	4.62	4.51	4.55	4.49	4.53
300490026	Montana	Lewis and Clark	8.45	8.81	8.3	8.64	8.19	8.52
300530018	Montana	Lincoln	11.43	11.52	11.16	11.25	11.02	11.11
300630024	Montana	Missoula	8.52	9.18	8.32	8.97	8.18	8.84
300630037	Montana	Missoula	10.83	10.87	10.62	10.66	10.52	10.56
300750001	Montana	Powder River	5.83	5.83	5.76	5.76	5.77	5.77

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300810007	Montana	Ravalli	10	11.2	9.86	11.07	9.81	11.02
300830001	Montana	Richland	6.81	7.57	6.66	7.41	6.62	7.36
300930005	Montana	Silver Bow	10.07	10.24	9.75	9.92	9.5	9.68
310550019	Nebraska	Douglas	8.93	8.93	7.46	7.46	7.18	7.18
310550052	Nebraska	Douglas	10.34	10.89	8.91	9.38	8.57	9.02
310790004	Nebraska	Hall	7.24	7.37	6.28	6.39	6.12	6.23
311090022	Nebraska	Lancaster	8.57	8.74	7.35	7.5	7.13	7.27
311530007	Nebraska	Sarpy	11.26	11.49	9.73	9.94	9.34	9.53
311770002	Nebraska	Washington	9.09	9.33	7.77	7.98	7.52	7.71
320030540	Nevada	Clark	8.1	8.1	7.44	7.44	7.21	7.21
320030561	Nevada	Clark	8.16	8.83	7.48	8.1	7.24	7.84
320031019	Nevada	Clark	4.12	4.64	3.95	4.44	3.93	4.43
320310016	Nevada	Washoe	6.9	7.57	6.5	7.14	6.27	6.89
330012004	New Hampshire	Belknap	5.91	6	5.29	5.37	5.11	5.18
330050007	New Hampshire	Cheshire	9.27	9.63	8.49	8.8	7.99	8.29
330090010	New Hampshire	Grafton	6.75	6.89	6.12	6.23	5.74	5.85
330111015	New Hampshire	Hillsborough	7.78	7.86	6.98	7.05	6.72	6.79
330131006	New Hampshire	Merrimack	8.48	8.68	7.73	7.91	7.39	7.56
330150014	New Hampshire	Rockingham	7.49	7.49	6.71	6.71	6.47	6.47
340010006	New Jersey	Atlantic	8.14	8.35	6.61	6.78	6.44	6.6
340011006	New Jersey	Atlantic	8.91	9.16	7.35	7.54	7.16	7.35
340030003	New Jersey	Bergen	9.17	9.22	7.44	7.47	7.08	7.11
340071007	New Jersey	Camden	9.51	9.69	7.75	7.88	7.49	7.61
340130003	New Jersey	Essex	9.45	9.53	7.88	7.93	7.5	7.55
340150004	New Jersey	Gloucester	9.3	9.33	7.37	7.41	7.11	7.15
340171003	New Jersey	Hudson	10.15	10.25	8.36	8.43	7.95	8.02
340172002	New Jersey	Hudson	11.1	11.13	9.25	9.28	8.8	8.83
340210008	New Jersey	Mercer	9.54	9.71	8.11	8.25	7.78	7.91
340218001	New Jersey	Mercer	8.17	8.2	6.74	6.77	6.5	6.54
340230006	New Jersey	Middlesex	8.01	8.16	6.74	6.88	6.41	6.53
340270004	New Jersey	Morris	8.39	8.45	7.04	7.09	6.7	6.74
340273001	New Jersey	Morris	7.55	7.64	6.34	6.41	6.09	6.16

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340292002	New Jersey	Ocean	8.48	8.62	7.09	7.19	6.77	6.87
340310005	New Jersey	Passaic	9.32	9.34	7.75	7.76	7.36	7.38
340390004	New Jersey	Union	11.24	11.37	9.37	9.46	8.79	8.88
340390006	New Jersey	Union	9.55	9.59	7.83	7.86	7.38	7.41
340392003	New Jersey	Union	9.66	9.73	7.96	8.02	7.49	7.54
340410006	New Jersey	Warren	9.24	9.4	7.8	7.93	7.5	7.62
340410007	New Jersey	Warren	8.55	8.55	7.22	7.22	6.93	6.93
350010023	New Mexico	Bernalillo	6.36	6.66	6.09	6.38	5.97	6.26
350010024	New Mexico	Bernalillo	6.25	6.71	5.99	6.43	5.87	6.3
350130025	New Mexico	Dona Ana	5.78	6.33	5.64	6.17	5.75	6.3
350250008	New Mexico	Lea	8.02	8.41	7.95	8.34	8.11	8.51
350450019	New Mexico	San Juan	4.6	4.7	4.63	4.73	4.78	4.89
350490020	New Mexico	Santa Fe	4.55	4.88	4.48	4.81	4.54	4.89
360010005	New York	Albany	8.05	8.31	7.02	7.24	6.72	6.93
360010012	New York	Albany	7.16	7.32	6.17	6.32	5.92	6.06
360050080	New York	Bronx	11.91	11.91	9.83	9.83	9.38	9.38
360050133	New York	Bronx	9.78	9.96	7.93	8.07	7.57	7.7
360130011	New York	Chautauqua	7.43	7.47	6.18	6.21	6.03	6.06
360290005	New York	Erie	9.43	9.69	8.05	8.29	7.82	8.05
360310003	New York	Essex	4.33	4.36	3.75	3.77	3.7	3.73
360470122	New York	Kings	9.98	10.27	8.16	8.38	7.8	8.02
360590008	New York	Nassau	8.88	8.88	7.21	7.21	6.93	6.93
360610079	New York	New York	9.78	10.19	7.89	8.21	7.53	7.83
360610128	New York	New York	11.75	11.75	9.81	9.81	9.37	9.37
360610134	New York	New York	11.32	11.67	9.44	9.71	9.02	9.28
360671015	New York	Onondaga	7.52	7.73	6.44	6.63	6.22	6.4
360710002	New York	Orange	8.04	8.19	6.77	6.89	6.51	6.62
360810124	New York	Queens	9.08	9.43	7.39	7.67	7.11	7.39
360850055	New York	Richmond	9.47	9.77	7.72	7.96	7.29	7.51
360850067	New York	Richmond	8.51	8.51	6.86	6.86	6.48	6.48
361010003	New York	Steuben	6.85	7.05	5.7	5.86	5.59	5.75
361030002	New York	Suffolk	8.31	8.43	6.64	6.73	6.39	6.47

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361191002	New York	Westchester	9.09	9.09	7.37	7.37	7.06	7.06
370010002	North Carolina	Alamance	9.53	10.06	7.65	8.05	7.51	7.91
370210034	North Carolina	Buncombe	9.07	9.31	7.21	7.4	7.07	7.25
370330001	North Carolina	Caswell	8.66	8.88	6.85	7	6.71	6.86
370350004	North Carolina	Catawba	10.14	10.6	8.33	8.69	8.15	8.51
370370004	North Carolina	Chatham	8.08	8.51	6.37	6.69	6.26	6.57
370510009	North Carolina	Cumberland	9.78	10.25	8.04	8.4	7.9	8.26
370570002	North Carolina	Davidson	10.77	11.13	8.83	9.11	8.64	8.91
370610002	North Carolina	Duplin	8.57	8.86	6.88	7.11	6.79	7.01
370630015	North Carolina	Durham	9.12	9.71	7.3	7.75	7.14	7.59
370650004	North Carolina	Edgecombe	8.73	9.08	7.03	7.29	6.91	7.17
370670022	North Carolina	Forsyth	9.53	9.96	7.56	7.89	7.39	7.71
370670030	North Carolina	Forsyth	9.46	9.92	7.52	7.87	7.35	7.7
370710016	North Carolina	Gaston	10	10.5	8.08	8.47	7.94	8.32
370810013	North Carolina	Guilford	9.14	9.51	7.23	7.5	7.06	7.33
370810014	North Carolina	Guilford	9.29	9.76	7.36	7.71	7.19	7.54
370870012	North Carolina	Haywood	9.65	9.98	8.18	8.45	8.06	8.32
370990006	North Carolina	Jackson	8.96	9.38	7.4	7.73	7.29	7.62
371010002	North Carolina	Johnston	8.76	9.24	7.03	7.4	6.9	7.27
371070004	North Carolina	Lenoir	8.88	9.33	7.16	7.51	7.05	7.4
371110004	North Carolina	McDowell	9.48	9.76	7.86	8.07	7.73	7.94
371170001	North Carolina	Martin	8.3	8.69	6.56	6.86	6.44	6.74
371190041	North Carolina	Mecklenburg	10.3	10.81	8.36	8.75	8.21	8.6
371190042	North Carolina	Mecklenburg	10.65	11.23	8.71	9.17	8.55	9.01
371190043	North Carolina	Mecklenburg	9.81	10.36	7.87	8.3	7.74	8.16
371210001	North Carolina	Mitchell	8.94	9.25	7.42	7.65	7.33	7.55
371230001	North Carolina	Montgomery	8.88	9.3	7.19	7.5	7.08	7.39
371290002	North Carolina	New Hanover	7.77	8.3	6.06	6.46	6	6.4
371470006	North Carolina	Pitt	8.27	8.67	6.55	6.84	6.44	6.74
371550005	North Carolina	Robeson	9.56	10.01	8.06	8.41	7.94	8.3
371590021	North Carolina	Rowan	9.97	10.46	8.15	8.53	8	8.37
371730002	North Carolina	Swain	9.36	9.7	7.76	8.01	7.64	7.89

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371830014	North Carolina	Wake	9.97	10.06	8.18	8.28	8.01	8.1
371830020	North Carolina	Wake	9.16	9.52	7.36	7.63	7.21	7.48
371890003	North Carolina	Watauga	7.99	8.26	6.42	6.63	6.32	6.53
371910005	North Carolina	Wayne	9.51	9.91	7.81	8.12	7.71	8.02
380070002	North Dakota	Billings	4.38	4.42	4.2	4.24	4.17	4.21
380130004	North Dakota	Burke	6.76	6.76	6.62	6.62	6.56	6.56
380150003	North Dakota	Burleigh	6.6	6.86	6.24	6.48	6.14	6.37
380171004	North Dakota	Cass	7.7	8.13	7.1	7.48	6.92	7.29
380530002	North Dakota	McKenzie	6.46	6.46	6.34	6.34	6.29	6.29
380570004	North Dakota	Mercer	6.14	6.31	5.96	6.12	5.9	6.06
390090003	Ohio	Athens	8.8	9.03	6.87	7.06	6.63	6.81
390170003	Ohio	Butler	12.39	13.03	10.12	10.64	9.64	10.14
390170016	Ohio	Butler	12.16	12.98	9.74	10.4	9.31	9.93
390230005	Ohio	Clark	11.83	12.61	9.53	10.17	9.07	9.67
390250022	Ohio	Clermont	11.34	11.34	8.84	8.84	8.48	8.48
390350034	Ohio	Cuyahoga	10.02	10.37	8.07	8.37	7.79	8.08
390350038	Ohio	Cuyahoga	12.82	13.11	10.81	11.08	10.42	10.68
390350045	Ohio	Cuyahoga	11.99	12.32	9.92	10.19	9.56	9.82
390350060	Ohio	Cuyahoga	12.79	13.02	10.52	10.71	10.13	10.31
390350065	Ohio	Cuyahoga	12.49	12.72	10.42	10.62	10.04	10.23
390351002	Ohio	Cuyahoga	10.36	10.87	8.43	8.85	8.14	8.54
390490024	Ohio	Franklin	11.63	12.15	9.35	9.77	8.86	9.25
390490025	Ohio	Franklin	11.43	11.88	9.17	9.55	8.7	9.05
390490081	Ohio	Franklin	10.82	11.21	8.57	8.9	8.13	8.44
390570005	Ohio	Greene	11.18	12	8.9	9.54	8.48	9.09
390610006	Ohio	Hamilton	11.48	12.18	9.01	9.56	8.62	9.14
390610014	Ohio	Hamilton	13.17	13.82	10.57	11.09	10.1	10.59
390610040	Ohio	Hamilton	11.92	12.72	9.46	10.1	9.06	9.67
390610042	Ohio	Hamilton	13.06	13.84	10.49	11.12	10.03	10.63
390810017	Ohio	Jefferson	12.07	12.46	9.66	9.99	9.33	9.64
390811001	Ohio	Jefferson	11.55	11.75	9.07	9.23	8.76	8.9
390850007	Ohio	Lake	9.54	10.06	7.76	8.19	7.51	7.92

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390870012	Ohio	Lawrence	10.97	11.39	8.92	9.26	8.68	9.01
390933002	Ohio	Lorain	9.64	9.91	8.06	8.3	7.75	7.97
390950024	Ohio	Lucas	10.57	11.06	8.85	9.28	8.43	8.83
390950026	Ohio	Lucas	10.58	11	8.87	9.23	8.43	8.77
390950028	Ohio	Lucas	10.89	11.41	9.14	9.6	8.72	9.14
390990005	Ohio	Mahoning	11.13	11.44	9.28	9.55	8.93	9.19
390990014	Ohio	Mahoning	11.14	11.81	9.3	9.87	8.95	9.49
391130032	Ohio	Montgomery	12.06	12.85	9.69	10.32	9.2	9.8
391330002	Ohio	Portage	10.26	10.93	8.25	8.79	7.94	8.46
391351001	Ohio	Preble	10.66	11.31	8.69	9.22	8.27	8.77
391450013	Ohio	Scioto	10.37	10.92	8.34	8.79	8.07	8.5
391510017	Ohio	Stark	12.85	13.43	10.86	11.35	10.42	10.89
391510020	Ohio	Stark	11.64	12.31	9.7	10.27	9.32	9.86
391530017	Ohio	Summit	11.85	12.58	9.7	10.29	9.29	9.86
391530023	Ohio	Summit	11.08	11.68	8.99	9.48	8.62	9.09
391550005	Ohio	Trumbull	10.57	11.25	8.73	9.28	8.42	8.95
391650007	Ohio	Warren	11.54	11.54	9.23	9.23	8.82	8.82
401090035	Oklahoma	Oklahoma	9.61	9.7	8.63	8.71	8.57	8.65
401091037	Oklahoma	Oklahoma	9.39	9.5	8.4	8.51	8.34	8.45
401210415	Oklahoma	Pittsburg	10.25	10.34	9.29	9.37	9.34	9.42
401359021	Oklahoma	Sequoyah	10.68	10.88	9.49	9.66	9.48	9.65
401431127	Oklahoma	Tulsa	10.46	10.84	9.24	9.56	9.21	9.53
410130100	Oregon	Crook	9.02	9.77	8.93	9.67	8.91	9.65
410250003	Oregon	Harney	9.05	9.46	8.9	9.3	8.83	9.23
410290133	Oregon	Jackson	9.43	10.92	9.3	10.76	9.23	10.69
410330114	Oregon	Josephine	7.76	8.83	7.67	8.72	7.63	8.67
410350004	Oregon	Klamath	10.67	10.98	10.44	10.75	10.32	10.63
410370001	Oregon	Lake	9.66	11.12	9.58	11.03	9.53	10.97
410390060	Oregon	Lane	6.74	6.98	6.65	6.88	6.56	6.79
410391009	Oregon	Lane	5.83	6.05	5.75	5.96	5.68	5.89
410392013	Oregon	Lane	9.32	9.97	9.13	9.77	9.02	9.65
410399004	Oregon	Lane	7.18	7.51	7.06	7.38	6.98	7.29

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410510080	Oregon	Multnomah	7.61	8.12	7.46	7.97	7.29	7.79
410590121	Oregon	Umatilla	7.41	7.59	7.18	7.36	7.09	7.26
410670004	Oregon	Washington	7.82	8.19	7.68	8.04	7.55	7.91
420010001	Pennsylvania	Adams	11.49	11.65	9.72	9.84	9.45	9.57
420030002	Pennsylvania	Allegheny	13.19	14.72	10.76	11.99	10.43	11.62
420030008	Pennsylvania	Allegheny	11.01	11.63	9.03	9.53	8.76	9.25
420030064	Pennsylvania	Allegheny	14.4	15.02	11.67	12.16	11.18	11.65
420030067	Pennsylvania	Allegheny	10.34	11	8.34	8.87	8.1	8.61
420030093	Pennsylvania	Allegheny	9.28	9.72	7.44	7.79	7.23	7.58
420031008	Pennsylvania	Allegheny	11.48	12.41	9.49	10.26	9.2	9.95
420031301	Pennsylvania	Allegheny	12.59	12.69	10.13	10.2	9.74	9.81
420050001	Pennsylvania	Armstrong	11.6	12.33	9.84	10.46	9.58	10.18
420070014	Pennsylvania	Beaver	12	12.4	10.22	10.55	9.89	10.21
420110011	Pennsylvania	Berks	10.88	11.04	9.12	9.29	8.74	8.89
420130801	Pennsylvania	Blair	11.89	11.89	9.64	9.64	9.33	9.33
420170012	Pennsylvania	Bucks	10.88	10.93	9.3	9.32	8.92	8.94
420210011	Pennsylvania	Cambria	12.34	12.4	10.27	10.31	10	10.04
420270100	Pennsylvania	Centre	9.36	9.46	7.7	7.78	7.45	7.52
420290100	Pennsylvania	Chester	12.33	13.69	10.45	11.55	10.07	11.15
420410101	Pennsylvania	Cumberland	11	11.04	9.22	9.26	8.85	8.87
420430401	Pennsylvania	Dauphin	11.97	12.08	10.17	10.26	9.72	9.81
420450002	Pennsylvania	Delaware	12.81	13.08	10.79	11.01	10.41	10.63
420490003	Pennsylvania	Erie	11.6	11.6	10.2	10.2	9.91	9.91
420692006	Pennsylvania	Lackawanna	9.16	9.43	7.84	8.06	7.55	7.76
420710007	Pennsylvania	Lancaster	12.01	12.1	10.04	10.12	9.59	9.66
420750100	Pennsylvania	Lebanon	12.56	12.83	10.67	10.9	10.18	10.4
420850100	Pennsylvania	Mercer	10.44	10.61	8.67	8.81	8.37	8.51
420890002	Pennsylvania	Monroe	7.9	7.9	6.58	6.58	6.34	6.34
420910013	Pennsylvania	Montgomery	9.9	10.07	8.22	8.34	7.93	8.06
420950025	Pennsylvania	Northampton	12.9	13.35	11.32	11.7	10.86	11.23
420950027	Pennsylvania	Northampton	10.58	10.64	9.06	9.14	8.68	8.75
421010004	Pennsylvania	Philadelphia	9.71	10.11	8.26	8.59	7.99	8.31

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421010047	Pennsylvania	Philadelphia	10.81	11.16	8.79	9.07	8.47	8.74
421010055	Pennsylvania	Philadelphia	11.15	11.35	9.07	9.22	8.73	8.88
421010057	Pennsylvania	Philadelphia	10.85	11.11	8.93	9.13	8.62	8.81
421011002	Pennsylvania	Philadelphia	9.6	9.6	8.14	8.14	7.84	7.84
421250005	Pennsylvania	Washington	11.81	12.58	9.55	10.16	9.21	9.8
421250200	Pennsylvania	Washington	10.93	11.32	8.89	9.2	8.63	8.93
421255001	Pennsylvania	Washington	7.79	8.98	6.09	7.01	5.94	6.83
421290008	Pennsylvania	Westmoreland	12.63	13.71	10.73	11.62	10.43	11.3
421330008	Pennsylvania	York	11.48	11.65	9.62	9.75	9.28	9.41
440030002	Rhode Island	Kent	6.15	6.28	5.1	5.19	4.93	5.02
440070022	Rhode Island	Providence	7.94	8.21	6.69	6.91	6.44	6.65
440070026	Rhode Island	Providence	9.38	9.38	8.19	8.19	7.86	7.86
440070028	Rhode Island	Providence	8.12	8.17	6.85	6.89	6.59	6.63
440071010	Rhode Island	Providence	8.06	8.18	6.93	7.03	6.66	6.76
450190048	South Carolina	Charleston	8.89	8.89	7.24	7.24	7.17	7.17
450190049	South Carolina	Charleston	8.75	9.19	7	7.35	6.93	7.27
450250001	South Carolina	Chesterfield	9.15	9.74	7.48	7.94	7.38	7.84
450370001	South Carolina	Edgefield	9.75	10.13	8.08	8.38	7.99	8.29
450410003	South Carolina	Florence	10.26	10.74	8.59	8.97	8.48	8.85
450450009	South Carolina	Greenville	10.74	10.87	8.76	8.87	8.63	8.73
450450015	South Carolina	Greenville	10.68	11.18	8.76	9.15	8.62	9
450450016	South Carolina	Greenville	9.66	9.88	7.74	7.91	7.62	7.78
450630008	South Carolina	Lexington	10.89	11.32	9.16	9.51	8.99	9.34
450790007	South Carolina	Richland	10.06	10.68	8.34	8.83	8.18	8.67
450790019	South Carolina	Richland	10.41	10.74	8.72	8.99	8.57	8.83
450830011	South Carolina	Spartanburg	10.53	10.96	8.62	8.95	8.48	8.81
460110002	South Dakota	Brookings	8.34	8.39	7.39	7.44	7.18	7.22
460130003	South Dakota	Brown	7.67	7.95	7.04	7.29	6.89	7.13
460290002	South Dakota	Codington	9.11	9.55	8.3	8.7	8.08	8.49
460330132	South Dakota	Custer	4.2	4.47	4.03	4.28	4.04	4.28
460710001	South Dakota	Jackson	3.96	4.3	3.7	4.01	3.69	4.01
460990006	South Dakota	Minnehaha	8.83	8.98	7.69	7.82	7.42	7.52

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460990008	South Dakota	Minnehaha	8.28	9.09	7.09	7.76	6.84	7.48
461030020	South Dakota	Pennington	5.6	6.2	5.36	5.95	5.34	5.93
461031001	South Dakota	Pennington	5.89	5.94	5.67	5.72	5.63	5.68
461270001	South Dakota	Union	9.22	9.57	8.11	8.41	7.85	8.14
461270002	South Dakota	Union	8.57	8.7	7.43	7.52	7.18	7.27
470650031	Tennessee	Hamilton	10.79	11.18	8.94	9.26	8.7	9.01
470651011	Tennessee	Hamilton	10.68	11.19	8.8	9.22	8.59	9
470654002	Tennessee	Hamilton	10.67	11.08	8.67	9	8.43	8.75
480290032	Texas	Bexar	9.03	9.23	8.52	8.7	8.61	8.8
480290059	Texas	Bexar	8.94	9.2	8.51	8.76	8.59	8.84
480370004	Texas	Bowie	10.94	11.13	9.9	10.08	9.9	10.08
481130069	Texas	Dallas	10.07	10.13	9.03	9.09	9.08	9.14
481410037	Texas	El Paso	9.3	9.41	9.23	9.34	9.46	9.58
481410044	Texas	El Paso	10.39	11.26	10.37	11.25	10.63	11.54
482010058	Texas	Harris	10.99	11.21	10.25	10.43	10.59	10.79
482011035	Texas	Harris	12.05	12.31	11.29	11.53	11.66	11.91
482030002	Texas	Harrison	10.65	10.87	9.64	9.85	9.67	9.87
482150043	Texas	Hidalgo	10.37	10.45	10.35	10.43	10.58	10.66
483550032	Texas	Nueces	10.28	10.4	9.82	9.93	9.89	10.01
484391002	Texas	Tarrant	10.27	10.54	9.36	9.61	9.42	9.66
484391006	Texas	Tarrant	10.59	10.66	9.69	9.75	9.75	9.81
484530020	Texas	Travis	8.15	8.53	7.58	7.93	7.6	7.95
484530021	Texas	Travis	10.01	10.21	9.44	9.62	9.51	9.69
490030003	Utah	Box Elder	8.03	8.23	7.64	7.83	7.12	7.27
490050004	Utah	Cache	9.4	9.79	8.98	9.36	8.37	8.74
490110004	Utah	Davis	8.65	9.15	8.22	8.7	7.55	7.96
490351001	Utah	Salt Lake	8.03	8.36	7.59	7.9	6.91	7.18
490353006	Utah	Salt Lake	9.35	9.67	8.82	9.12	7.99	8.25
490353010	Utah	Salt Lake	9.6	9.91	9.08	9.37	8.27	8.53
490450003	Utah	Tooele	6.48	6.75	6.25	6.51	5.81	6.02
490490002	Utah	Utah	8.62	9.09	8.52	8.98	7.55	7.94
490494001	Utah	Utah	8.71	9.14	8.53	8.95	7.63	7.97

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490495010	Utah	Utah	8.22	8.5	8.16	8.43	7.2	7.42
490530130	Utah	Washington	4.63	5.07	4.6	5.04	4.63	5.08
490570002	Utah	Weber	9.38	9.73	8.88	9.21	8.16	8.47
490571003	Utah	Weber	8.09	8.41	7.65	7.95	7.06	7.33
500030004	Vermont	Bennington	6.83	6.96	6.1	6.22	5.85	5.96
500070007	Vermont	Chittenden	5.08	5.23	4.54	4.68	4.39	4.52
500070012	Vermont	Chittenden	7.12	7.26	6.53	6.65	6.26	6.38
500210002	Vermont	Rutland	9.49	9.78	8.77	9.04	8.21	8.46
510030001	Virginia	Albemarle	8.4	8.74	6.85	7.12	6.72	6.98
510360002	Virginia	Charles	8.61	8.93	6.93	7.16	6.73	6.96
510410003	Virginia	Chesterfield	9.54	9.6	7.77	7.81	7.56	7.6
510590030	Virginia	Fairfax	9.23	9.64	7.47	7.79	7.28	7.59
510690010	Virginia	Frederick	10.04	10.39	8.36	8.63	8.16	8.43
510870014	Virginia	Henrico	9.22	9.59	7.51	7.8	7.3	7.58
510870015	Virginia	Henrico	8.72	9.03	7	7.24	6.81	7.04
511071005	Virginia	Loudoun	9.27	9.52	7.63	7.82	7.49	7.68
511390004	Virginia	Page	8.79	9.25	7.32	7.69	7.17	7.54
511650003	Virginia	Rockingham	9.66	10.19	8.13	8.57	7.98	8.41
515100009	Virginia	Alexandria City	10.74	10.74	8.89	8.89	8.65	8.65
515200006	Virginia	Bristol City	9.58	9.94	7.88	8.16	7.77	8.05
516500008	Virginia	Hampton City	7.85	7.85	6.22	6.22	6.07	6.07
516800015	Virginia	Lynchburg City	8.4	8.84	6.8	7.14	6.69	7.03
517100024	Virginia	Norfolk City	9.2	9.79	7.47	7.93	7.28	7.74
517700015	Virginia	Roanoke City	9.85	9.91	8.09	8.13	7.89	7.93
517750011	Virginia	Salem City	9.59	9.97	7.84	8.14	7.64	7.94
518100008	Virginia	Virginia Beach City	9.11	9.56	7.34	7.69	7.16	7.5
530110013	Washington	Clark	7.34	7.71	7.13	7.48	6.96	7.31
530330057	Washington	King	10.13	10.13	9.32	9.32	9	9
530330080	Washington	King	6.1	6.32	5.61	5.82	5.45	5.65
530332004	Washington	King	7.13	7.13	6.55	6.55	6.32	6.32
530530029	Washington	Pierce	7.88	8.28	7.33	7.7	7.08	7.44

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530610005	Washington	Snohomish	5.67	5.86	5.2	5.38	5.03	5.2
530610020	Washington	Snohomish	7.02	7.45	6.7	7.11	6.57	6.97
530611007	Washington	Snohomish	7.62	7.92	7.14	7.42	6.95	7.22
530630021	Washington	Spokane	7.69	7.97	7.4	7.67	7.26	7.53
530770009	Washington	Yakima	8.91	9.1	8.3	8.47	7.98	8.15
540030003	West Virginia	Berkeley	11.38	11.83	9.61	9.96	9.34	9.68
540090005	West Virginia	Brooke	12.41	12.96	9.97	10.43	9.61	10.05
540110006	West Virginia	Cabell	11.36	12.11	9.3	9.91	9.03	9.62
540291004	West Virginia	Hancock	11.17	11.71	9.01	9.46	8.72	9.15
540390010	West Virginia	Kanawha	10.49	11.04	8.39	8.83	8.14	8.56
540391005	West Virginia	Kanawha	11.76	12.49	9.58	10.18	9.28	9.86
540490006	West Virginia	Marion	11.34	12.09	9.45	10.07	9.21	9.81
540511002	West Virginia	Marshall	12.46	12.96	10.57	10.99	10.18	10.59
540610003	West Virginia	Monongalia	10.2	10.9	8.25	8.81	8.04	8.58
540690010	West Virginia	Ohio	11.35	11.89	9.11	9.55	8.82	9.25
540810002	West Virginia	Raleigh	9.06	9.58	7.14	7.53	6.97	7.35
541071002	West Virginia	Wood	11.51	12.32	9.56	10.23	9.21	9.85
550030010	Wisconsin	Ashland	5.32	5.52	4.81	4.99	4.67	4.84
550090005	Wisconsin	Brown	9.57	10.37	8.49	9.21	8.11	8.79
550250041	Wisconsin	Dane	9.37	9.37	8.07	8.07	7.72	7.72
550250047	Wisconsin	Dane	10.07	10.64	8.7	9.19	8.29	8.75
550270001	Wisconsin	Dodge	8.99	9.25	7.79	8.01	7.4	7.61
550410007	Wisconsin	Forest	5.57	6.02	4.9	5.29	4.71	5.08
550430009	Wisconsin	Grant	10.04	10.71	8.63	9.21	8.21	8.74
550590019	Wisconsin	Kenosha	9.33	9.7	7.92	8.24	7.6	7.9
550630012	Wisconsin	La Crosse	8.98	9.58	8	8.54	7.62	8.12
550790010	Wisconsin	Milwaukee	10.82	11.14	9.34	9.63	8.9	9.16
550790026	Wisconsin	Milwaukee	10.18	10.77	8.71	9.23	8.3	8.78
550790099	Wisconsin	Milwaukee	9.45	9.45	8.04	8.04	7.67	7.67
550870009	Wisconsin	Outagamie	9.22	9.8	8.15	8.66	7.73	8.21
550890009	Wisconsin	Ozaukee	9.02	9.5	7.71	8.14	7.36	7.76
551110007	Wisconsin	Sauk	8.36	8.98	7.15	7.69	6.79	7.28

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551198001	Wisconsin	Taylor	7.62	7.89	6.84	7.08	6.56	6.79
551250001	Wisconsin	Vilas	5.76	6.11	5.17	5.48	4.98	5.28
551330027	Wisconsin	Waukesha	11.26	11.73	9.72	10.14	9.24	9.63
560010006	Wyoming	Albany	4.97	5.01	4.78	4.82	4.72	4.75
560131003	Wyoming	Fremont	8.19	8.46	8.05	8.31	8.02	8.28
560210001	Wyoming	Laramie	4.54	4.75	4.27	4.46	4.23	4.42
560210100	Wyoming	Laramie	3.88	4.22	3.64	3.96	3.61	3.92
560250001	Wyoming	Natrona	4.79	4.84	4.68	4.72	4.68	4.72
560290001	Wyoming	Park	4.55	4.66	4.51	4.62	4.53	4.63
560330002	Wyoming	Sheridan	8.04	8.3	7.9	8.15	7.85	8.09
560330003	Wyoming	Sheridan	5.31	5.31	5.23	5.23	5.21	5.21
560350097	Wyoming	Sublette	3.82	3.82	3.75	3.75	3.75	3.75
560370007	Wyoming	Sweetwater	5.77	5.97	5.54	5.73	5.36	5.55
560391006	Wyoming	Teton	4.94	5.26	4.86	5.17	4.81	5.12