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**IMPACT OF WILDLAND FIRES ON
2022-2024 PM_{2.5} DESIGN VALUES**

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1 CONCOURSE PARKWAY • SUITE 800 • ATLANTA, GA 30328

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Impact of Wildland Fires on 2022-2024 PM_{2.5} Design Values

Prepared by:

Daniel A. Jaffe

University of Washington

School of STEM and Department of Atmospheric Sciences

Bothell, WA 98011

djaffe@uw.edu

Prepared for:

Coordinating Research Council, Inc.

5755 North Point Parkway, Suite 265

Alpharetta, Georgia 30022

Table of Contents

Note on report organization and statistics	6
Executive Summary	7
Introduction	8
Project goals	10
Data sources.....	10
Methods	10
Results	12
Impact of smoke on PM _{2.5} design values	15
R-Shiny App	23
Summary and suggestions for future research.....	24
References.....	24
Appendix 1: Comparison with other smoke estimates.....	29
Appendix 2: Data for all sites.....;	29

Table 1. List of Figures and Tables.

Figure 1. PM _{2.5} on 6/8/23 with NOAA HMS smoke indicator.	Pg. 8
Figure 2. Mean and one sigma of the smoke criteria for all sites by month	Pg. 11
Figure 3. Fraction of all days that have surface smoke	Pg. 12
Figure 4. Smoke day frequency by year, month and amount of PM _{2.5} added on smoke days by region	Pg. 13
Figure 5. Distribution of PM _{2.5} monitoring sites showing likely attainment status for annual 9.0 µg m ⁻³ standard based on 2022-2024 data	Pg. 15
Figure 6. Number of smoke days by month for all Texas sites for 2022-2024 and fraction of days with smoke by month	Pg. 20
Figure 7. Fire locations, PM _{2.5} monitors, Hysplit back-trajectories and HMS overhead smoke for May 20, 2022	Pg. 20
Figure 8. Designated smoke days as shown from the R-Shiny app for May 20, 2022	Pg. 20
Figure 9. Screenshot of R-Shiny App	Pg. 21
Figure 10. Comparison of monthly mean smoke PM _{2.5} from Burke et al. (2023) with the probable smoke values from this work for every site with overlapping data (continental U.S. for 2019–2022)	Pg. 28
Table 1. Smoke day definitions	Pg. 11
Table 2. Number of probable smoke and no-smoke days by year.	Pg. 14
Table 3. Number of sites in various attainment categories for the 9.0 ug/m3 annual standard using 2022-2024 data	Pg. 15
Table 4. Number of monitors in each state where the 2022-2024 DV exceeds 9.0 µg m ⁻³ and where exclusion of smoke days might allow these sites to achieve compliance with the PM _{2.5} annual standard	Pg. 17
Table 5. Example case studies for exceptional event exclusions	Pg. 19
Table 6. Estimated design values (DV) for all sites in this study with various smoke calculations	Pg. 29

Note on report organization and statistics

Statistical parameters were calculated using a combination of Excel (Microsoft 365, Version 2410) and R software. For this report, a statistically significant result implies a p value <0.05 . For the correlation coefficient (R) I use the Pearson correlation coefficient. This provides a measure of association between two variables. Positive values of R represent a direct correlation, whereas negative values of R are inversely correlated. Note that the R^2 can be interpreted as to the degree to which the x variable explains the variance in the y variable. While there is no universal definition of “strong” or “weak” correlation, I consider correlations with an absolute value of R <0.5 to be “weak.” Finally, it should be noted that even weak correlations can still be statistically significant, if there are a sufficient number of observations. In any case where results are separated by U.S. regions, I use these definitions for each continental U.S. region: Western US ($> 102^\circ$ W); Central US ($82\text{--}102^\circ$ W); Eastern US ($< 82^\circ$ W). Alaska and Hawaii are not included in these regions but are reported separately.

Executive Summary

The area burned by wildfires in the U.S. has increased significantly in the last several decades, as a result wildfire smoke is now a major contributor to PM_{2.5} pollution. As industrial emissions of PM_{2.5} have decreased, emissions from wildfire are becoming a greater concern. States are charged with meeting the requirements of the Clean Air Act (CAA) and the National Ambient Air Quality Standards (NAAQS), which was recently lowered to 9.0 µg m⁻³ for the annual PM_{2.5} standard, averaged over 3 years. In many cases, smoke influenced days have caused individual monitors to exceed this level.

The CAA includes a mechanism, called the Exceptional Events Rule (EER), to exclude data that was influenced by natural events, such as wildfires. In this report I describe a method to identify smoke influenced days and quantify the influence that these days have on meeting the annual PM_{2.5} standard at 816 U.S. monitoring sites. Using satellite and surface PM_{2.5} data, I classify every day at each monitor as either “no-smoke”, “probable smoke” or “highly probable smoke”. This leads to an overall assessment that on average, 14-18% of all days at all monitoring locations are influenced by smoke. Using these results, I can ascertain the degree that smoke influences attainment of the annual PM_{2.5} NAAQS. Of the 816 monitoring locations considered in this study, 163 (20%) will likely not meet the 9.0 µg m⁻³ standard, however 106-111 of the 163 sites (65-68%) could meet the standard if smoke were excluded using the EER. While there are a large number of smoke influenced days, for most sites only a small number of very high concentration days (e.g. PM_{2.5} > 120 µg m⁻³) would need to be excluded. However, in Texas, and possibly other parts of the southeastern U.S., more days would need be excluded and these days would have lower PM_{2.5} concentrations. Thus, application of the EER is likely to be more challenging for sites in Texas and possibly other portions of the southeastern U.S. Results from this work are now available at the R-Shiny app and this should provide useful for anyone interested in identifying smoke influenced days for the 2022-2024 time period.

Introduction

In the past decade (2015–2024), wildfires have burned an average of 3.1 million hectares in the U.S., which is more than twice the amount in the years 1983–2000 (NIFC 2025). In a period when industrial emissions are declining (US EPA 2025a), emissions from wildland fires are now a major contributor to degraded air quality for both PM_{2.5} (particulate matter less than 2.5 μm in diameter; McClure and Jaffe, 2018; O’Dell et al., 2021; Burke et al., 2023) and ozone (O₃) (Lee and Jaffe, 2024a). In addition to U.S. fires, smoke emanating from Canada and Mexico are major contributors to poor air quality throughout North America (Kaulfus et al., 2017). The year 2023 was exceptional for fires in Canada, with more than 15 million hectares burned (Kirchmeier-Young et al., 2024; Jain et al., 2024; Kolden et al., 2024); these fires resulted in substantial air quality impacts in both Canada (Jain et al., 2024) and the U.S. (Lee and Jaffe, 2024). There are several causes for this increase in fires including climate change (Abatzoglou et al., 2019; Williams et al., 2019; Halofsky et al., 2020; Kirchmeier-Young et al., 2024; Jain et al., 2024) and historical forest management practices (e.g., Haggmann et al., 2021).

With the newly established annual PM_{2.5} standard of 9.0 μg m⁻³, promulgated by the U.S. EPA in 2024 to protect public health, smoke from wildfires presents a major challenge for meeting the standard. Initial attainment of the standard will be based on monitoring data from 2022-2024. The “exceptional events rule” (EER) allows states and tribal agencies the ability to request exclusions of air quality data if the source of the pollution was uncontrollable, e.g., wildland fires (US EPA 2016). However, the process is complex and time consuming for state agencies, and the exact criteria for exclusion are ambiguous. Thus, identifying specific criteria for smoke influence on air quality would be desirable for state and tribal agencies. Given the recent tightening of the PM_{2.5} annual standard to 9.0 μg m⁻³ average over a three-year period (US EPA 2024a), identifying wildfire smoke influence at individual monitoring locations is important for state efforts to meet air quality standards.

The 2023 fire season was exceptional, with relatively low area burned in the U.S. (1.1 million ha), but an extraordinary amount of burning in Canada, 17.2 million ha (NIFC 2025; CIFC 2024). This led to extremely poor air quality and high levels of PM_{2.5} in much of the Central and Eastern U.S. Figure 1 shows an example of one bad day (6/8/23). On this day, PM_{2.5} concentrations exceeded 20.0 μg m⁻³ over large parts of the Eastern and Central U.S., and

over $100.0 \mu\text{g m}^{-3}$ in New York city and other areas along the east coast. For all of 2023, there were 1246 monitor-days over $35.0 \mu\text{g m}^{-3}$ in the Central U.S. compared to just 159 in 2022. But it's not only these high $\text{PM}_{2.5}$ days that will matter for compliance with the annual standard. Any day with a $\text{PM}_{2.5}$ concentration greater than $9.0 \mu\text{g m}^{-3}$ could be important, given the new annual standard. In 2023, there were 15,917 monitor-days over $15.0 \mu\text{g m}^{-3}$ in the Central U.S. alone, compared to 7982 the year before.

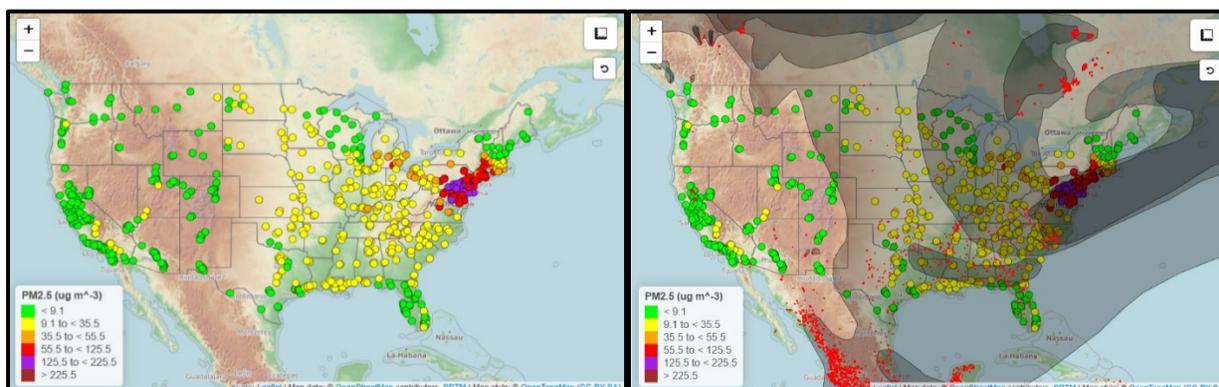


Figure 1. $\text{PM}_{2.5}$ on 6/8/23. The images on the left and right are identical, except the right figure shows the HMS smoke indicator in grey and fire locations as red dots.

The NOAA Hazard Mapping System (HMS) fire and smoke product, shown in Figure 1, is an important tool for tracking smoke plumes (Ruminski et al 2011; Kaulfus et al 2017; Buysse et al 2019). It is based on multiple geostationary satellites and gives a smoke density as high, medium or low. It uses an automated processing algorithm, but with human review to identify both fire and overhead smoke plume locations. It is available every day as both a .kml and a shape file (<https://www.ospo.noaa.gov/products/land/hms.html>). However, as the HMS is derived from satellite data, it does not provide any vertical information on smoke plumes. My previous analysis (Buysse et al 2019) indicates that enhanced $\text{PM}_{2.5}$ at the surface is found on 30-80% of days with an overhead smoke plume, depending on the location. Nevertheless, the HMS smoke product is critical to identify days when regional $\text{PM}_{2.5}$ concentrations are likely influenced by smoke (Kaulfus et al 2017).

Over the past 10 years, I have developed a method to identify smoke influence at the surface using the NOAA HMS product and the distribution of surface $\text{PM}_{2.5}$ concentrations (Jaffe 2020; 2021; Lee and Jaffe 2024). Using this method, I can evaluate the frequency and magnitude of smoke impacts on $\text{PM}_{2.5}$ at U.S. monitoring stations and evaluate the impacts on attainment of the new annual standard.

Project goals

The overall project goals are:

- 1) Identify 2022-2024 surface smoke days at all U.S. monitoring sites with sufficient data using a combination of the surface concentrations and the NOAA HMS data.
- 2) Quantify the impacts of smoke on the 2022-2024 annual $PM_{2.5}$ design values.
- 3) Make the results available for all state, local, tribal and federal agencies on the R-Shiny app: <https://smoke.shinyapps.io/rsGAM/>

Data sources

I integrated data from several sources. This includes surface $PM_{2.5}$ data from the U.S. Environmental Protection Agency's Air Quality System (AQS) and the NOAA Hazard Mapping System Fire and Smoke Product (hereafter simply HMS; Rolph et al., 2009; Ruminiski et al., 2011). For the AQS data, these were downloaded from the EPA's pre-generated data files for 2022-2024 (https://aqs.epa.gov/aqsweb/airdata/download_files.html). It should be noted that data can change even after submission into AQS. If a site had multiple valid $PM_{2.5}$ observations on the same day (i.e. different POC values), I averaged these for each day. All analyses cover the period from January–December of 2022–2024.

Methods

Daily surface $PM_{2.5}$ data for January–December of 2022–2024 were obtained from the US EPA's Air Quality System (AQS) pre-generated data files (US EPA 2024b). All data were considered final and validated by the U.S. EPA. Both parameter codes 88101 ($PM_{2.5}$ FRM/FEM Mass) and 88502 ($PM_{2.5}$ non-FRM/FEM Mass) were used. The following quality control steps were applied to the data:

- i. For each parameter code (88101 or 88502), I first merge any duplicate observations on the same date (i.e., multiple POC codes) and then merge the 88101 and 8852 datafiles by site and date. If both 88101 and 88502 data are available, only the 88101 data are used.
- ii. For hourly observations, I require at least 18 valid hours to calculate a daily average and I omit any $PM_{2.5}$ values that are 0 or negative.
- iii. I include all sites with at least 90% data coverage for 2022-2024.

To determine the presence of smoke plumes, I use the HMS smoke product which uses visible imagery from multiple satellites (> 6) to estimate smoke extent on a daily basis (Ruminski et al., 2011; NOAA 2025). The product characterizes each smoke plume by intensity (light, medium or heavy). While the HMS product has proven to be very useful in a number of studies on the distribution of smoke, it does have limitations, especially at night and in the presence of clouds. For each monitoring location, I use the HMS smoke product to identify the presence (HMS = 1) or absence (HMS = 0) of an overhead smoke plume. A “smoke day” is identified when both surface $PM_{2.5}$ is elevated above a set criteria and there is an overhead smoke plume of any intensity (HMS = 1).

I use two $PM_{2.5}$ smoke criteria representing “probable smoke day” (criteria 1) and “highly probable smoke day” (criteria 2). For criteria 1 I use $\frac{1}{2}$ the median absolute deviation (MAD) and for criteria 2 I use 1 MAD of the HMS = 0 data. The MAD (Leys et al., 2013) and $PM_{2.5}$ smoke criteria are given by:

$$\begin{aligned} \mathbf{MAD} &= \mathbf{median}_i |\mathbf{median}_i - \mathbf{X}_i| \\ \mathbf{PM}_{2.5} \text{ criteria 1} &= \mathbf{Median} + \frac{1}{2} \mathbf{MAD} \\ \mathbf{PM}_{2.5} \text{ criteria 2} &= \mathbf{Median} + 1 \mathbf{MAD} \end{aligned}$$

By definition, all days that meet criteria 1 will also meet criteria 2, but not vice versa. These criteria are calculated at each site on the HMS = 0 data by month, to account for geographic and seasonal variations. I use all monthly data across the 3-year period (e.g., January 2022, 2023, etc.) to calculate each $PM_{2.5}$ level. It is necessary to use multiple years, as some months have very few non-smoke days at some locations. While there can be modest trends in the non-smoke $PM_{2.5}$, at some locations, these are relatively small compared to the smoke impacts.

Criteria 1 and 2 represent approximately the 67th and 80th percentiles of the HMS = 0 distribution. In my previous work, I used a similar procedure (Gong et al., 2017; Lee and Jaffe, 2024), but in those studies the $PM_{2.5}$ criteria was based on the mean and standard deviation of the HMS = 0 data. The MAD is a more appropriate statistical metric than the standard deviation for non-gaussian datasets (Leys et al., 2013), such as $PM_{2.5}$ data. The highly probable smoke category includes slightly fewer smoke days compared to the probable smoke category since the $PM_{2.5}$ smoke criteria is greater. Figure 2 shows the mean and one sigma $PM_{2.5}$ smoke criteria across all sites and Table 1 summarizes the smoke day detection.

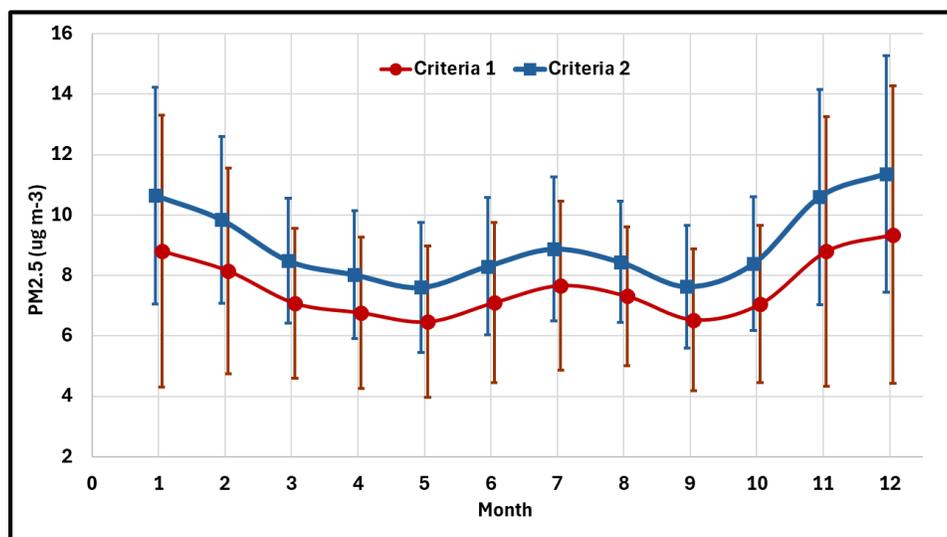


Figure 2. Mean and one sigma of the smoke criteria for all sites by month

Table 1. Smoke day definitions

Type	Overhead HMS smoke detection	PM _{2.5}
Probable smoke day	Positive detection	Greater than criteria 1
Highly probable smoke day	Positive detection	Greater than criteria 2
No smoke day	No overhead HMS or PM _{2.5} < criteria 1	

Results

This analysis includes 865,224 monitor-days of data from 816 monitoring locations in all 50 states plus D.C. Using the highly probable classification I find that 14.2% of all days are identified as smoke influenced, compared to 18.3% of all days for the probable smoke classification. Figure 3 shows the national distribution of smoke days by month and Table 2 shows the distribution by year. Figure 4 shows the distributions by region (Western US, (continental U.S. > 102° W); Central US (82–102° W); Eastern US (< 82° W); Alaska; and Hawaii). While my analysis of regulatory impacts is focused on 2022-2024, this figure shows data for 2019-2024 for context. Smoke days are most common from May-October in the Central and Eastern U.S., July-September in the Western U.S. and July in Alaska. From my analysis I identified only a small number of smoke days in Hawaii. In terms of years, 2023 had the greatest

occurrence of smoke days due to the substantial influence from the Canadian wildfires that year. In the Western U.S. 2020 and 2021 had the greatest number of smoke days, although 2023 and 2024 were not far behind. 2019 was a year of very low smoke influence across most of the country, with the exception of Alaska, which had its highest occurrence in the 2019-2024 time frame. Table 2 shows the total number of probable smoke days identified each year for 2022-2024.

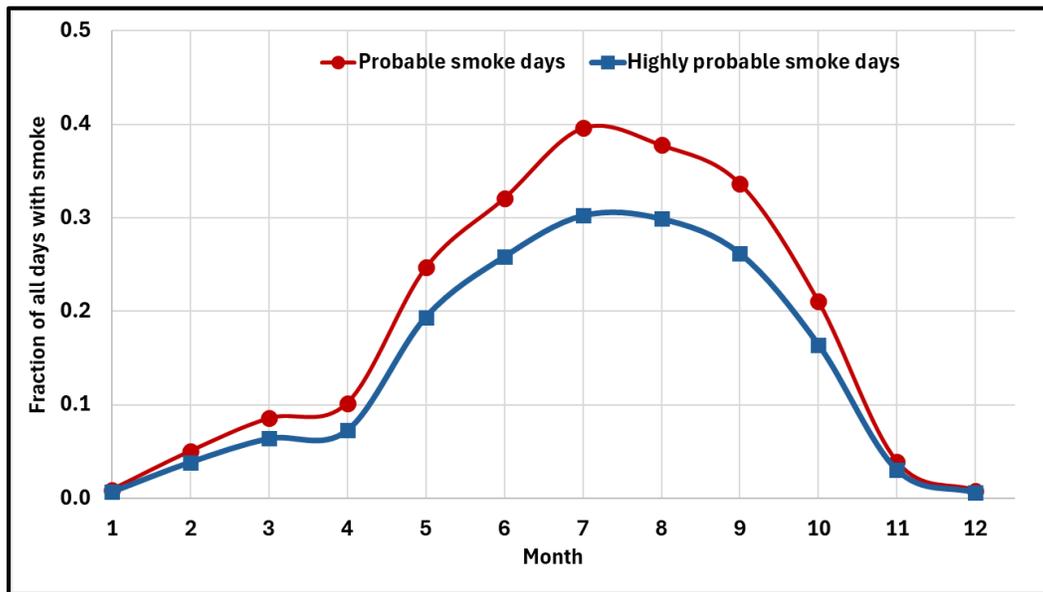


Figure 3. Fraction of all days that have surface smoke.

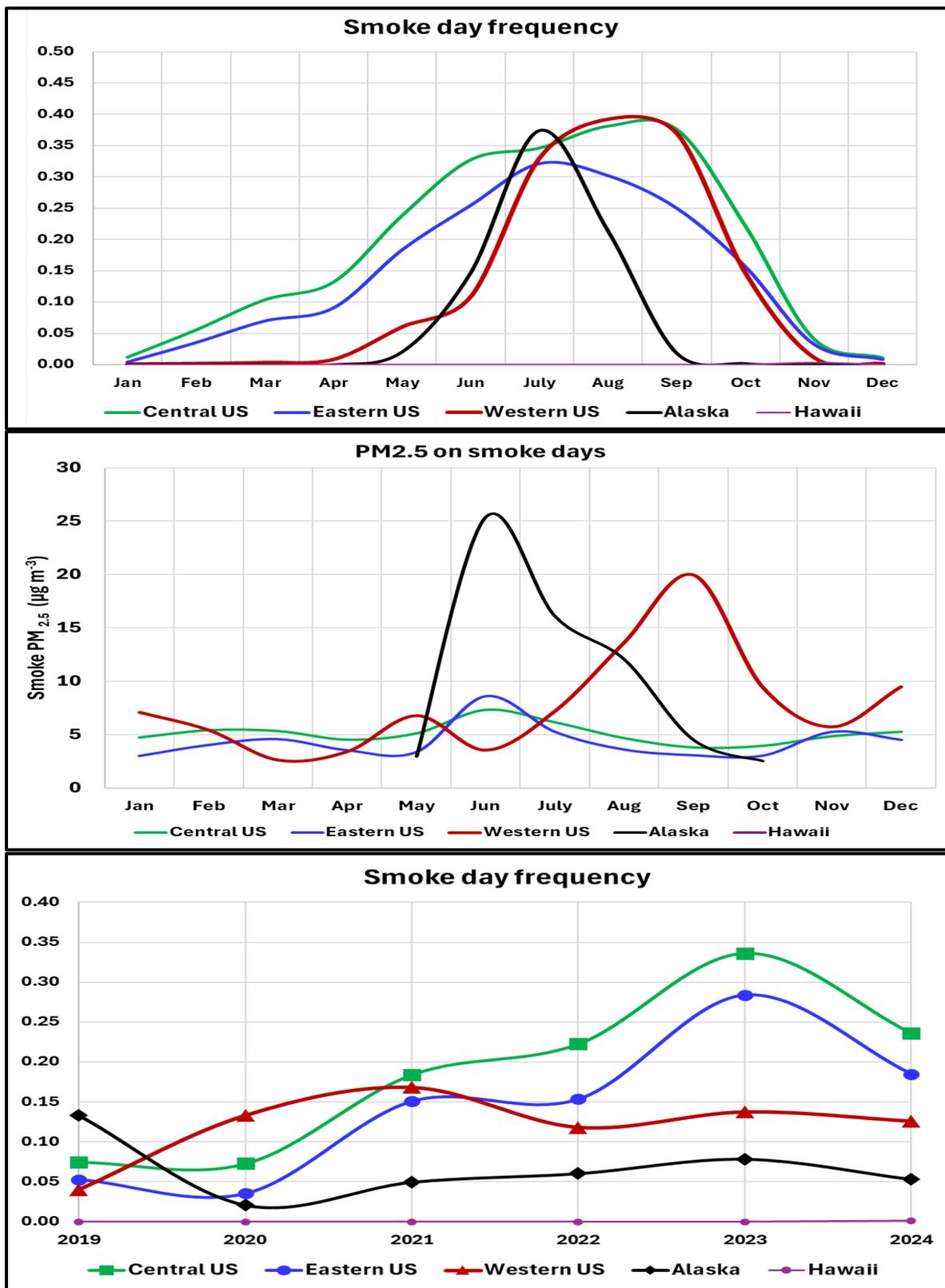


Figure 4. Smoke day frequency by year (top), month (middle) and amount of PM_{2.5} added (bottom) on smoke days by region. These figures are for the probable smoke day classification.

Table 2. Number of probable smoke and no-smoke days by year.

	2022	2023	2024	Total
No-smoke days	244,025	222,128	241,094	707,247
Smoke days	43,375	66,384	48,218	157,977

Given the significant increase in smoke days in 2023, this represents (potentially) a huge workload issue for states to request exceptional event designations. While not all of these smoke days will be policy relevant, many will be. In the next section, I explore the impacts of smoke on PM_{2.5} design values.

Impact of smoke on PM_{2.5} design values

Using the PM_{2.5} data completeness criteria of 90% at each site yields a total of 816 sites for this analysis. To determine whether a site meets the 9.0 µg m⁻³ annual standard, I compute the annual average for each year and then average the three year means. For this, I use EPA's PM_{2.5} rounding protocols as specified in 40 CFR Appendix N to Part 50, which states "Annual PM_{2.5} NAAQS DVs shall be rounded to the nearest tenth of a µg/m³ (decimals x.x5 and greater are rounded up to the next tenth, and any decimal lower than x.x5 is rounded down to the nearest tenth)." (<https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-50/appendix-Appendix%20N%20to%20Part%2050>). I do this for the original PM_{2.5} data and for non-smoke PM_{2.5} using both the probable and highly probable smoke day definitions. Table 3 shows a summary of the results for both the probable and highly probable smoke day criteria and Figure 5 shows the distribution of monitoring sites, colored by their likely attainment status using the probable smoke day criteria.

Table 3. Number of sites in various attainment categories for the 9.0 ug/m3 annual standard using 2022-2024 data.

	Number of sites
Category 1: Meets annual standard	653
Category 2: Meets annual standard if all highly probable smoke days are excluded	106
Category 3: Meets annual standard if all probable smoke days are also excluded	5
Category 4: Does not meet annual standard, regardless of smoke	52

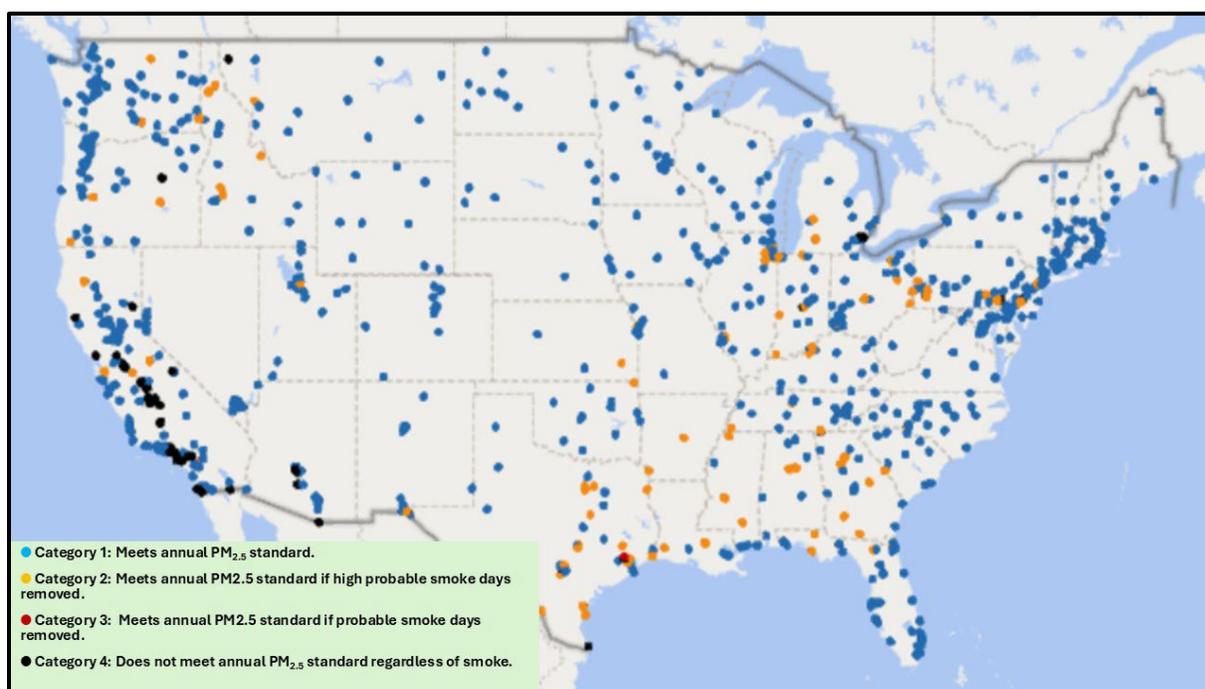


Figure 5. Distribution of PM_{2.5} monitoring sites showing likely attainment status for annual 9.0 ug/m3 standard based on 2022-2024 data and using highly probable and probable smoke day definition. Not shown are five sites in Alaska (two each in categories 1 and 2, and one in category 4) and four sites in Hawaii (all category 1). In total, there are 5 sites which are in category 3, two in TX and one each in CA, MI and PA.

Looking at the results in Table 3, the number of sites that will meet the standard changes very little regardless of the smoke definition used. Using the more restrictive “highly probable” definition means that some days with moderate PM_{2.5} are not being identified as smoke days, whereas the probable definition includes these as smoke days. Either way, my analysis indicates

that between 106-111 sites (12-13% of all PM_{2.5} sites) will not meet the annual PM_{2.5} standard due to smoke, unless states submit exceptional event documentation. Figure 5 shows the locations of these monitors; the greatest number of monitors that are influenced by smoke are in the midwest, southeast and western states.

The dataset I have assembled allows me to explore the relationship between smoke PM_{2.5} and the 2022-2024 design values. For example, I can ask the question “how many smoke days would need to be excluded to meet the annual PM_{2.5} standard?”. While the answer to this question varies at every site, I can get an estimate of this for a few typical sites. To do this, I will look at the 106 sites where highly probable smoke days cause these sites to exceed the annual standard. For these sites, there is an average of 7.4 days (for 2022-2024) with PM_{2.5} > 35.0 µg m⁻³ (range 0-54) and 74.8 days with PM_{2.5} > 15.0 µg m⁻³ (range 8-153). If I recompute the design values excluding all high probability smoke days above 35.0 µg m⁻³, I find that 36 of the 106 sites could meet the PM_{2.5} standard. Recomputing the design values by excluding all high probability smoke days above 20.0 µg m⁻³, I find that 77 of 106 sites could meet the standard. Other sites would need to identify additional smoke days, including those with PM_{2.5} < 20.0 µg m⁻³ to meet the standard. Based on this analysis, focusing on smoke days with PM_{2.5} > 20 or 35.0 µg m⁻³ will be the most efficient strategy for states to remove smoke influenced days and demonstrate compliance with the annual PM_{2.5} standard.

Table 4 shows the states where the impact of smoke is greatest on possible compliance with the annual PM_{2.5} standard. States in the Central and Southern U.S. (TX, PA, OH, IN, GA, etc) show the greatest impacts, with Texas having the largest number of sites impacted by smoke (23). PA, OH, IN, GA all have at least 6 sites where smoke will impact their ability to meet the new PM_{2.5} standard. Much of this is driven by the pattern of smoke in 2023. While the number of smoke days in 2023 was high across the entire continental U.S., it was exceptionally high in the North-central, Central and Southern U.S. In this year, sites in the North-central, Central and Southern U.S. had approximately twice as many smoke days as in prior years due to the massive Canadian wildfires that burned in 2023. It is interesting that the impact of the smoke criteria (“probable” vs “highly probable”) has only a modest influence on the number of sites where smoke will impact the DV designation. Only 5 sites across the entire US are in category 3 (as

noted in the Figure 1 caption). This category would require states to utilize the slightly less robust “probable smoke day” classification.

Table 4. Number of monitors in each state where the 2022-2024 DV exceeds $9.0 \mu\text{g m}^{-3}$ and where exclusion of smoke days might allow these sites to achieve compliance with the $\text{PM}_{2.5}$ annual standard.

State	Sites meeting standard	Sites meeting standard if highly probable smoke days excluded	Sites meeting standard if probable smoke days excluded	Sites not meeting standard regardless of smoke
Alabama	6	2	0	0
Alaska	2	2	0	1
Arizona	14	0	0	5
Arkansas	0	1	0	0
California	62	4	1	31
Colorado	12	0	0	0
Connecticut	8	0	0	0
Delaware	4	0	0	0
DC	4	0	0	0
Florida	31	5	0	0
Georgia	9	6	0	1
Hawaii	4	0	0	0
Idaho	13	5	0	0
Illinois	15	5	0	0
Indiana	10	7	0	2
Iowa	11	0	0	0
Kansas	3	2	0	0
Kentucky	13	2	0	0
Louisiana	4	3	0	0
Maine	7	0	0	0
Maryland	10	0	0	0
Massachusetts	16	0	0	0
Michigan	10	3	1	3
Minnesota	18	0	0	0
Mississippi	4	4	0	0
Missouri	9	2	0	0
Montana	11	1	0	1
Nebraska	4	0	0	0
Nevada	20	0	0	0
New Hampshire	5	0	0	0
New Jersey	12	1	0	0
New Mexico	11	0	0	0
New York	20	0	0	0
North Carolina	20	1	0	0
North Dakota	9	0	0	0
Ohio	20	8	0	0
Oklahoma	11	1	0	0
Oregon	32	3	0	1

Pennsylvania	24	9	1	2
Rhode Island	3	0	0	0
South Carolina	9	0	0	0
South Dakota	8	0	0	0
Tennessee	17	3	0	0
Texas	17	21	2	5
Utah	18	1	0	0
Vermont	3	0	0	0
Virginia	8	0	0	0
Washington	45	3	0	0
West Virginia	1	1	0	0
Wisconsin	17	0	0	0
Wyoming	9	0	0	0

While most sites have dozens of smoke influenced days over the 2022-2024 period, it is not clear how many days would need to be excluded to meet the annual $PM_{2.5}$ standard. To examine this, I chose 4 representative sites in 4 different states and looked at the number of high $PM_{2.5}$ -smoke days that would need to be excluded for each site to get to a 2022-2024 DV of $9.0 \mu\text{g m}^{-3}$. Table 5 shows these results. The table shows the DV with all days included and a possible DV when some smoke days are excluded. The $PM_{2.5}$ threshold that I used for this calculation and the number of days excluded varies by site. For all 4 sites, only a few moderate to high $PM_{2.5}$ days would need to be excluded. I note that for the Fort Worth site, the criteria to exclude days is much lower ($32.0 \mu\text{g m}^{-3}$), compared to the other sites. This results from the fact that many sites in Texas get frequent smoke from distant fires in Central America, Mexico, the Western U.S. and Canada. The smoke from these fires is often dilute (relatively low $PM_{2.5}$), but nonetheless this smoke impacts surface concentrations to a measurable degree. Additionally, the Fort Worth site also appears to have other local or regional sources of $PM_{2.5}$, besides smoke. This is apparent in the relatively high $PM_{2.5}$ smoke criteria, which is calculated from all non-HMS days. In other words, even if all smoke days are completely removed from the DV calculation, this site still has a relatively high $PM_{2.5}$ concentration. So, while the sites in CA, MI and WA could reasonably employ the EER to show compliance with the annual $PM_{2.5}$ standard, it will be more challenging for sites in Texas to do so, given the lower $PM_{2.5}$ threshold for exclusion.

Table 5. Example case studies for exceptional event exclusions. The # of identified smoke days uses the “highly probable” smoke day definition and includes all days in 2022-2024. DV1 is the 2022-2024 design value with all days included. The shaded columns show the number and $PM_{2.5}$ threshold that would be needed with the exceptional events rule for these sites to meet the annual $PM_{2.5}$ standard. DV2 shows the calculated 2022-2024 design value when days greater than the given $PM_{2.5}$ threshold are excluded.

AQS ID	State	Monitor name	CBSA	$PM_{2.5}$ smoke criteria ¹	DV1	# identified smoke days (2022-2024)	$PM_{2.5}$ threshold to exclude ²	DV2	# Days excluded
61050002	CA	Weaverville	Trinity County	4.6	9.5	120	175	8.9	3
260810020	MI	GR-Monroe	Grand Rapids	8.9	9.2	221	140	9.0	1
484391002	TX	Ft. Worth NW	Dallas-Ft. Worth	11.9	9.1	159	32	9.0	5
530770005	WA	Sunnyside	Yakima	7.6	9.2	124	140	9.0	2

¹The “ $PM_{2.5}$ smoke criteria” shows the value used (in $\mu g m^{-3}$) for the highly probable smoke day category averaged for May-September which is used to identify enhanced $PM_{2.5}$. To get designated as a smoke day, a site must have both an overhead HMS smoke plume and elevated $PM_{2.5}$ at the surface monitor.

²The “ $PM_{2.5}$ threshold to exclude” shows the $PM_{2.5}$ values that would need to get excluded to get the calculated design value below $9.0 \mu g m^{-3}$.

As noted above, Texas gets smoke from domestic wildfires in the western U.S., prescribed and agricultural fires in the southern and southeastern U.S. along with smoke from fires in Mexico and Central America. Figure 6 shows the number of smoke days across all Texas sites by month for 2022-2024, along with the fraction of smoke days by month for the same time period. The greatest number and fraction are in May. Figures 7 and 8 show a typical smoke event in May (May 20, 2022). On this date, daily $PM_{2.5}$ values across Texas ranged from about 12.0 - $30.0 \mu g m^{-3}$. Figure 4 (from the R-Shiny App), shows that nearly all sites in eastern Texas were identified as “smoke days”. The large number of smoke days, but at moderate concentrations, suggest that the use of the exceptional event rule to demonstrate compliance with the annual $PM_{2.5}$ standard will be more challenging for Texas.

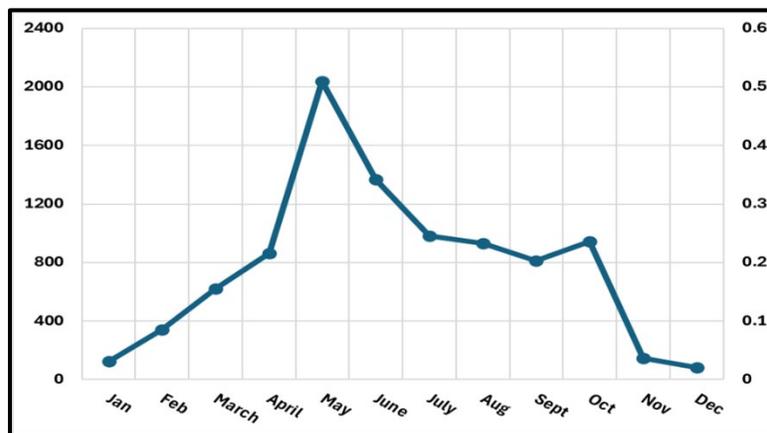


Figure 6. Number of smoke days by month for all Texas sites for 2022-2024 (left axis) and fraction of days with smoke by month (right axis).

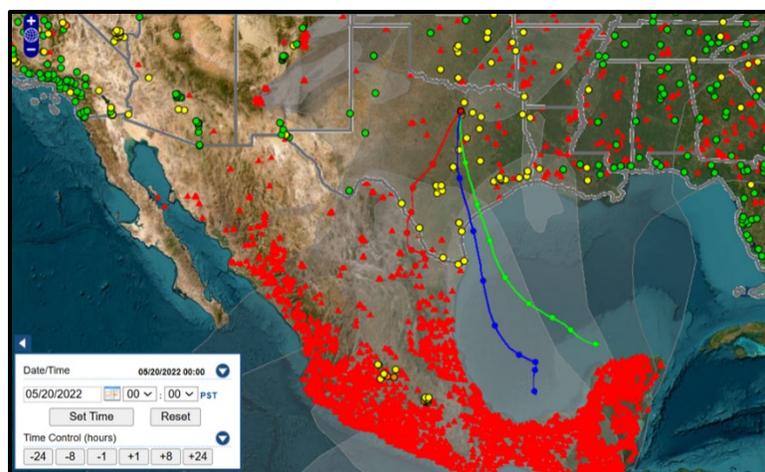


Figure 7. Fire locations (red triangles), PM_{2.5} monitors (circles), Hysplit back-trajectories (lines) and HMS overhead smoke (grey shading) for May 20, 2022. PM_{2.5} sites are color coded by the AQI.

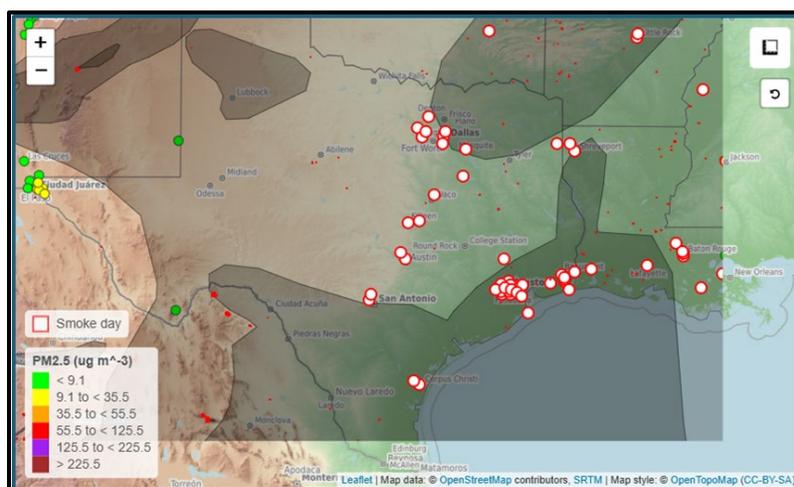


Figure 8. Designated smoke days as shown from the R-Shiny app for May 20, 2022.

More detailed results for every site (816) considered in this study are shown in Appendix 2/Table 6. This includes estimated design value with all data and design value with various smoke exclusion criteria.

R-Shiny App

Data and results from this project are available on the R-Shiny App (<https://westar.shinyapps.io/PMO3smokeTool/>). This app has been in development for over a year and now hosts the results from my smoke O₃ analyses as well as this analysis of smoke PM_{2.5}. A recent addition to the app is the inclusion of a tab for state level reports, which allows a user to quickly summarize all significant smoke events at all monitors in a state for a given time period. I expect this will be particularly useful to state agencies as they develop exceptional event requests. Figure 9 shows a screenshot of the app with the state reports tab highlighted.

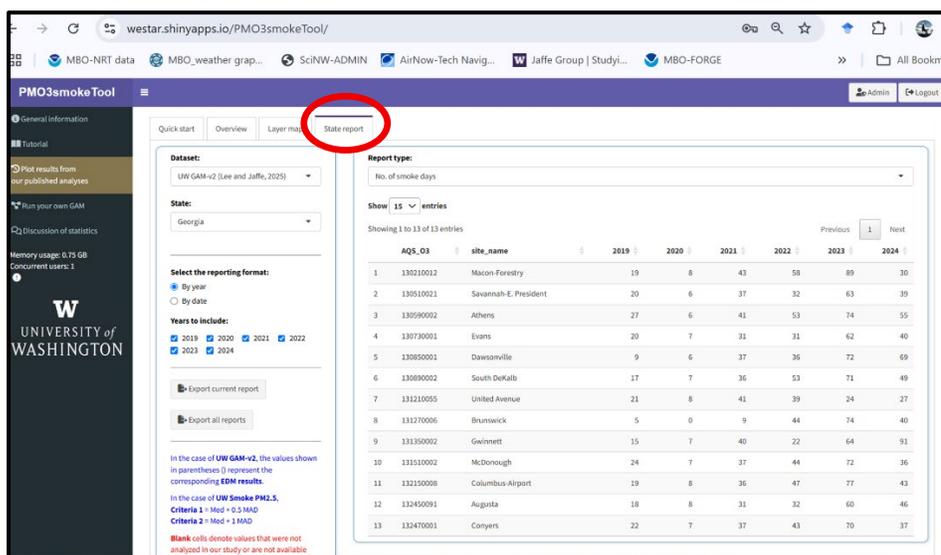


Figure 9. Screenshot of R-Shiny App. The red circle shows the tab for state reports.

Summary and suggestions for future research.

In this project I developed a method to identify smoke impacts on PM_{2.5} at nearly all regulatory monitors in the U.S. This method uses surface PM_{2.5} data with a satellite indicator of smoke. I defined two levels of smoke day influence “probable” smoke day and “highly probable” smoke day, based on the degree of PM_{2.5} enhancement. Using this metric, I then evaluated how smoke influences the overall PM_{2.5} concentrations and 2022-2024 annual PM_{2.5} design values at each monitoring site. Of the 816 monitoring sites considered in this study, 163 (20%) will likely not meet the 9.0 µg m⁻³ standard, however 106-111 of the 163 sites (65-68%) could meet the standard if smoke were excluded using the EER.

There are a number of uncertainties to consider in this analysis. The most important are:

1. Missing HMS data or obscuration by clouds.
2. Large number of small fires that can generate appreciable smoke, but are missed by the HMS smoke plume detection schemes. This is especially likely in regions of the southeastern U.S. due to agricultural or prescribed burning.

And to a lesser extent:

3. A higher PM_{2.5} smoke criteria in more polluted regions.

Missing HMS data or obscuration by clouds is not likely a big issue at high PM_{2.5} concentrations. At high concentrations (PM_{2.5}>35 µg m⁻³), there are 1292 cases (site-days) with no overhead HMS smoke detection, but the majority of these (1100) occur in the winter months (November-March), when local PM_{2.5} pollution is known to be more common. For the three-year time period (2022-2024) there are only 192 site-days with PM_{2.5} >35.0 µg m⁻³ and no overhead HMS smoke detection for the wildfire season (April-October). For the wildfire season 95% of days with PM_{2.5}>35.0 µg m⁻³, have an overhead HMS smoke plume and 92% for days with PM_{2.5}>25.0 µg m⁻³. Thus, missing HMS smoke plumes is not likely a large issue for the wildfire season.

The PM_{2.5} criteria is important in selecting smoke days at each site. Recall that it varies at every site and is calculated from the statistics at that site based on the HMS=0 (no smoke) dataset by month. For all sites, the values for the PM_{2.5} smoke criteria for April-October ranged from 2.7 µg m⁻³ to 23.3 µg m⁻³ with the highest value observed for the Donovan site near San Diego, CA. At this site, while 9.5% of days had an overhead HMS signal (i.e., HMS = 1) for

April-October, only 49% of these days experienced daily $PM_{2.5}$ exceeding the $PM_{2.5}$ -criteria compared to 55% for the mean of all California sites. So even at these sites with larger local pollution and a higher $PM_{2.5}$ criteria, this does not seem to be a major issue in identifying smoke days. Nonetheless, the higher $PM_{2.5}$ -criteria at moderately polluted locations does result in a reduced ability to detect moderate smoke levels. As this only impacts moderate smoke levels (below the $PM_{2.5}$ criteria), this probably has minimal impact on my analysis.

This work suggests a number of important follow-on questions that could be the subject of future research:

1. How do my estimates of smoke $PM_{2.5}$ and O_3 compare with estimates from other groups?
2. How large is the population exposure to $PM_{2.5}$ and O_3 from wildfire smoke and how does this compare to other sources?
3. What are the human health impacts from wildfire smoke, considering both $PM_{2.5}$ and O_3 .
4. How can we incorporate more satellite and other data products, along with machine learning, to improve our smoke estimates and the estimated smoke impacts in unmonitored locations?
5. Can I provide “smoke age” estimates along with estimates of smoke $PM_{2.5}$, which would be useful in health studies (aged smoke is thought to be more harmful than fresh smoke per gram).

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Appendix 1: Comparison with other smoke estimates

While there are very few studies that have examined national $PM_{2.5}$ from smoke at individual monitors, one study did this. Burke et al. (2023) report smoke $PM_{2.5}$ for the continental U.S. for 2000–2022 using a combination of satellite and surface data. While there are some differences between our methods, both methods rely on surface observations, combined with one or more satellite products. The data for the Burke et al (2023) analysis are publicly available at <https://github.com/echolab-stanford/wildfire-influence>.

It is important to note that the HMS data only go back to 2007 and the satellite resolution has improved significantly from its start (NOAA 2025). In particular, NOAA reported significant improvements in the resolution for the satellites used in the HMS starting with October 2018. For this reason, I only report smoke days and $PM_{2.5}$ from smoke for 2019–2024. The figure below shows my monthly mean “probable” and “highly probable” smoke $PM_{2.5}$ with the values reported by Burke et al. (2023) for each monitor with overlapping data (i.e., continental U.S., January–December 2019–2022). While there are a few small differences at some sites, overall, the comparison shows that both methods are getting similar results for smoke $PM_{2.5}$ at these monitor locations. The highly probable category shows a slight bias of 4%, mainly at sites with lower smoke $PM_{2.5}$. This makes sense as the highly probable category requires a greater threshold for smoke-day identification. Based on this comparison, I believe the “probable” smoke day category is the more accurate indicator.

While both methods get similar results, some of the key advantages of my approach is the relatively simple algorithm, which means that smoke days can be identified quickly and by non-experts for each CBSA and individual monitor. Another important improvement is that my analysis includes all 50 states and D.C.

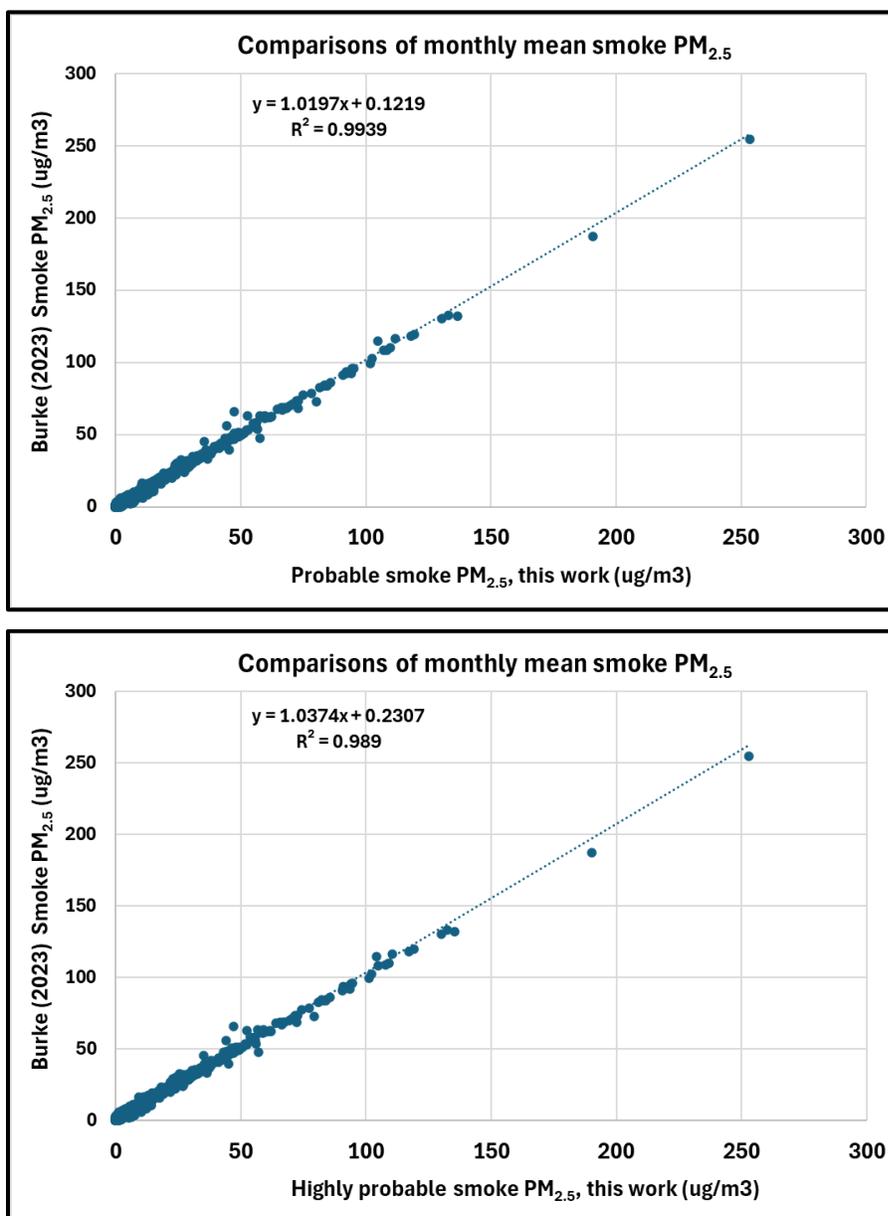


Figure 10. Comparison of monthly mean smoke PM_{2.5} from Burke et al. (2023) with the probable smoke values from this work for every site with overlapping data (continental U.S. for 2019-2022). Top figure shows our “probable” smoke category and bottom figure shows “highly probable” category.

Appendix 2: Data for all sites.

Table 6. Estimated design values (DV) for all sites in this study with various smoke calculations. DV definitions are given below table.

AQS	State	DVO	DV1	Days excluded	DV2	Days excluded	DV3	Days excluded	DV4	Days excluded	DV5	Days excluded	DV6	Days excluded
10550010	Alabama	8.9	8.9	0	8.9	0	8.9	0	8.7	16	7.4	250	7.3	331
10731010	Alabama	9.2	9.2	0	9.2	0	9.2	2	8.9	19	8.0	166	7.8	236
10732003	Alabama	9.9	9.9	0	9.9	0	9.9	1	9.5	32	8.4	204	8.1	284
10890014	Alabama	8.0	8.0	0	8.0	0	7.9	1	7.7	18	6.9	149	6.7	217
10970003	Alabama	8.3	8.3	0	8.3	0	8.3	0	8.1	10	7.2	148	6.9	233
11011002	Alabama	8.2	8.2	0	8.2	0	8.2	0	7.9	21	7.1	122	6.7	200
11030011	Alabama	7.7	7.7	0	7.7	0	7.7	0	7.6	9	6.6	187	6.4	267
11190003	Alabama	6.3	6.3	0	6.3	0	6.3	0	6.2	6	4.8	242	4.5	318
20200018	Alaska	4.8	4.8	0	4.8	0	4.8	1	4.8	3	4.7	29	4.8	41
20900034	Alaska	9.4	8.3	9	7.3	27	7.0	33	6.9	43	6.8	87	6.8	91
20900035	Alaska	12.5	11.5	9	10.6	26	10.4	34	10.2	46	10.2	87	10.2	92
20900040	Alaska	9.8	8.8	9	7.8	26	7.6	32	7.4	43	7.4	90	7.4	94
21100004	Alaska	5.1	5.1	0	5.1	0	5.1	0	5.0	4	4.8	59	4.8	71
40130019	Arizona	10.0	10.0	0	10.0	0	10.0	0	10.0	0	10.0	37	10.0	54
40131003	Arizona	6.6	6.6	0	6.6	0	6.6	0	6.6	1	6.5	48	6.5	69
40131004	Arizona	7.1	7.1	0	7.1	0	7.1	0	7.1	2	7.0	36	7.0	46
40132001	Arizona	6.9	6.9	0	6.9	0	6.9	0	6.9	1	6.8	47	6.8	60
40134003	Arizona	10.6	10.6	0	10.6	0	10.6	0	10.6	2	10.6	48	10.7	63
40134005	Arizona	7.3	7.3	0	7.3	0	7.3	0	7.3	0	7.2	53	7.2	70
40134021	Arizona	7.5	7.5	0	7.5	0	7.5	0	7.5	1	7.4	38	7.4	62
40139812	Arizona	9.9	9.9	0	9.9	0	9.9	0	9.9	1	9.9	40	9.9	56
40139997	Arizona	8.5	8.5	0	8.5	0	8.5	0	8.5	1	8.4	47	8.4	64
40190011	Arizona	5.6	5.6	0	5.6	0	5.6	0	5.6	1	5.5	39	5.5	55
40191028	Arizona	6.1	6.1	0	6.1	0	6.1	0	6.1	1	6.0	43	6.0	60
40191030	Arizona	3.2	3.2	0	3.2	0	3.2	0	3.2	0	3.1	46	3.0	61
40191032	Arizona	5.4	5.4	0	5.4	0	5.4	0	5.4	2	5.2	49	5.2	69

40191034	Arizona	5.4	5.4	0	5.4	0	5.4	0	5.4	0	5.3	50	5.3	63
40191113	Arizona	6.8	6.8	0	6.8	0	6.8	0	6.8	1	6.8	27	6.7	45
40210001	Arizona	7.2	7.2	0	7.2	0	7.2	0	7.2	0	7.1	44	7.0	57
40213015	Arizona	10.0	10.0	0	10.0	0	10.0	1	9.8	12	9.8	14	9.7	29
40230004	Arizona	9.2	9.2	0	9.2	0	9.2	0	9.2	0	9.2	34	9.3	48
40278011	Arizona	8.0	8.0	0	8.0	1	8.0	1	8.0	2	7.9	19	7.8	32
51190007	Arkansas	10.1	10.1	0	10.1	0	10.0	1	9.1	69	7.7	263	7.4	336
60070008	California	7.5	7.5	0	7.5	1	7.4	4	7.2	14	6.9	85	6.8	110
60074001	California	6.9	6.9	0	6.9	0	6.8	1	6.6	15	6.3	58	6.3	88
60090001	California	5.7	5.7	0	5.7	0	5.7	0	5.6	7	5.4	53	5.4	64
60111002	California	6.9	6.9	0	6.9	0	6.9	1	6.7	12	6.3	78	6.2	112
60131004	California	9.9	9.9	0	9.9	0	9.8	3	9.7	10	9.5	51	9.5	67
60190011	California	11.3	11.3	0	11.2	2	11.2	3	11.1	10	10.9	49	10.9	71
60190500	California	6.5	6.5	0	6.5	0	6.5	0	6.4	6	6.1	58	6.1	76
60192008	California	7.4	7.4	0	7.4	0	7.4	1	7.3	7	7.1	57	7.1	74
60192009	California	6.3	6.3	0	6.3	0	6.3	0	6.2	5	6.0	43	6.0	62
60192016	California	13.5	13.5	0	13.4	2	13.4	3	13.2	17	13.1	54	13.1	69
60195001	California	10.1	10.1	0	10.0	1	10.0	2	9.9	10	9.7	57	9.6	76
60195025	California	13.0	13.0	0	12.9	2	12.9	4	12.8	10	12.7	58	12.6	78
60210003	California	6.0	6.0	0	6.0	0	5.9	2	5.8	11	5.3	78	5.2	110
60250005	California	10.2	10.2	0	10.2	0	10.2	0	10.2	1	10.1	18	10.1	27
60250007	California	8.4	8.4	0	8.4	0	8.3	1	8.3	5	8.2	21	8.1	36
60270002	California	3.6	3.6	0	3.6	0	3.6	0	3.5	3	3.3	51	3.3	65
60271003	California	6.0	6.0	0	6.0	1	5.9	2	5.8	8	5.6	47	5.6	58
60271023	California	9.3	9.3	0	9.3	0	9.3	0	9.3	2	9.2	45	9.3	56
60290010	California	14.4	14.4	0	14.3	2	14.3	2	14.1	16	14.1	35	14.1	50
60290014	California	13.4	13.4	0	13.3	3	13.3	4	13.2	12	13.1	48	13.1	61
60290018	California	4.4	4.4	0	4.4	0	4.3	1	4.3	4	4.1	29	4.1	39
60292009	California	4.9	4.9	0	4.9	0	4.9	0	4.9	0	4.7	28	4.7	36
60310004	California	11.6	11.6	0	11.6	0	11.5	2	11.3	13	11.2	39	11.2	59

60311004	California	12.9	12.9	0	12.8	1	12.8	2	12.7	10	12.6	45	12.6	55
60370016	California	8.9	8.8	1	8.7	2	8.6	5	8.6	7	8.5	14	8.4	26
60371103	California	11.8	11.8	0	11.7	1	11.7	2	11.7	6	11.6	26	11.5	47
60371201	California	10.3	10.3	0	10.3	0	10.3	1	10.3	3	10.2	20	10.1	30
60371302	California	11.8	11.8	0	11.8	0	11.8	1	11.8	4	11.7	25	11.7	34
60374008	California	12.4	12.4	0	12.4	0	12.4	0	12.3	6	12.3	30	12.3	39
60374010	California	11.7	11.7	0	11.6	1	11.6	1	11.6	4	11.5	19	11.5	27
60376012	California	9.6	9.6	0	9.6	0	9.6	0	9.5	6	9.4	27	9.4	41
60392010	California	9.8	9.8	0	9.8	0	9.7	2	9.6	12	9.4	55	9.4	73
60431001	California	9.7	8.6	10	7.6	25	7.3	32	7.0	50	6.8	78	6.8	89
60450006	California	8.0	8.0	0	8.0	0	8.0	1	7.7	16	7.4	63	7.4	87
60452003	California	9.9	9.9	0	9.9	1	9.8	5	9.6	14	9.4	69	9.4	90
60472510	California	9.3	9.3	0	9.3	0	9.2	3	9.1	10	9.0	54	9.0	68
60510005	California	3.5	3.5	0	3.3	2	3.3	4	3.2	6	2.8	70	2.8	85
60530002	California	4.3	4.3	0	4.3	0	4.3	0	4.2	2	4.1	30	4.1	53
60530008	California	5.1	5.1	0	5.1	0	5.1	1	5.0	5	4.9	23	4.8	40
60531003	California	6.3	6.3	0	6.3	0	6.2	1	6.2	4	6.0	44	6.0	60
60570005	California	5.0	4.7	2	4.4	5	4.4	6	4.3	12	4.0	66	4.0	82
60590007	California	9.9	9.9	0	9.9	0	9.8	1	9.8	4	9.7	23	9.7	34
60610003	California	6.2	5.6	4	5.5	7	5.4	8	5.4	9	5.2	52	5.1	66
60610004	California	6.4	5.7	5	5.6	6	5.6	7	5.6	10	5.3	63	5.3	88
60610006	California	7.4	7.4	0	7.4	0	7.3	1	7.2	9	6.9	67	6.9	85
60611004	California	5.3	4.7	4	4.6	5	4.6	7	4.4	14	4.1	70	4.1	87
60612003	California	6.2	6.2	0	6.2	0	6.2	0	6.0	7	5.8	55	5.8	75
60631006	California	6.9	6.9	0	6.9	0	6.9	0	6.8	4	6.8	39	6.8	49
60631010	California	12.7	12.7	0	12.7	1	12.6	2	12.6	6	12.7	34	12.8	56
60650012	California	9.3	9.3	0	9.2	1	9.2	1	9.1	5	9.1	18	9.0	33
60650016	California	8.0	8.0	0	8.0	0	8.0	0	8.0	1	7.9	30	7.8	42
60651016	California	6.9	6.9	0	6.9	0	6.9	0	6.8	5	6.7	22	6.6	28
60658001	California	11.3	11.3	0	11.1	3	11.1	4	11.1	5	11.0	24	11.0	33

60658005	California	12.6	12.6	0	12.4	3	12.4	4	12.4	6	12.3	23	12.3	32
60659001	California	6.5	6.5	0	6.5	0	6.5	2	6.5	3	6.2	34	6.2	47
60670006	California	8.8	8.8	0	8.8	0	8.8	0	8.7	9	8.5	56	8.5	78
60670010	California	7.5	7.5	0	7.5	0	7.5	1	7.4	10	7.2	55	7.1	78
60670012	California	6.4	6.4	0	6.3	2	6.3	2	6.2	6	6.1	46	6.0	62
60670015	California	8.8	8.8	0	8.8	0	8.8	2	8.6	10	8.4	55	8.4	73
60675003	California	5.5	5.5	0	5.5	0	5.5	0	5.4	5	5.2	52	5.2	69
60690002	California	5.5	5.5	0	5.5	0	5.5	1	5.4	4	5.3	36	5.2	55
60710027	California	13.2	13.1	2	13.1	2	13.0	4	12.9	8	12.9	21	12.8	37
60710306	California	8.7	8.7	0	8.7	0	8.6	1	8.6	6	8.4	43	8.4	49
60718001	California	7.4	7.0	1	6.7	6	6.6	8	6.5	12	6.5	26	6.5	34
60730077	California	5.7	5.7	0	5.7	0	5.7	0	5.7	0	5.6	27	5.5	41
60731006	California	6.3	6.3	0	6.3	0	6.3	0	6.3	0	6.2	16	6.2	27
60731008	California	8.0	8.0	0	8.0	0	8.0	0	8.0	2	7.8	25	7.8	37
60731014	California	12.9	12.9	0	12.9	0	12.9	0	12.7	13	12.7	21	12.7	29
60731022	California	9.0	9.0	0	9.0	0	9.0	0	9.0	0	8.9	21	8.9	37
60731026	California	9.5	9.5	0	9.5	0	9.5	0	9.5	1	9.4	30	9.3	43
60771003	California	10.5	10.5	0	10.5	0	10.4	3	10.3	9	10.2	58	10.2	69
60772010	California	8.4	8.4	0	8.4	0	8.4	2	8.3	8	8.1	50	8.1	65
60773005	California	4.8	4.8	0	4.8	0	4.8	0	4.8	2	4.5	57	4.5	74
60792004	California	5.8	5.8	0	5.8	0	5.8	0	5.7	4	5.6	19	5.6	23
60792007	California	7.2	7.2	0	7.2	0	7.2	0	7.1	4	7.0	20	7.0	24
60792020	California	5.0	5.0	0	5.0	0	5.0	0	4.9	4	4.8	21	4.8	27
60798002	California	5.2	5.2	0	5.2	0	5.2	0	5.1	3	5.1	14	5.1	24
60830011	California	7.8	7.8	0	7.8	0	7.8	0	7.7	4	7.6	26	7.5	42
60832004	California	5.0	5.0	0	5.0	0	5.0	0	4.9	4	4.7	27	4.7	35
60832011	California	5.7	5.7	0	5.7	0	5.7	0	5.7	2	5.5	30	5.5	39
60850005	California	9.1	9.1	0	9.1	0	9.0	1	8.9	6	8.8	43	8.7	59
60870007	California	5.7	5.7	0	5.7	0	5.7	1	5.6	3	5.5	34	5.5	56
60871005	California	5.7	5.7	0	5.7	0	5.7	1	5.6	4	5.5	43	5.5	59

60890004	California	6.2	6.2	0	6.2	1	6.1	5	5.9	16	5.4	115	5.3	131
60932001	California	8.6	7.5	6	6.8	19	6.6	24	6.2	43	5.7	150	5.7	162
60990005	California	10.9	10.9	0	10.9	0	10.9	2	10.8	9	10.6	66	10.7	89
60990006	California	10.2	10.2	0	10.2	0	10.1	3	10.0	11	9.8	62	9.8	77
61010003	California	8.7	8.7	0	8.7	0	8.7	3	8.4	18	8.2	64	8.1	88
61030007	California	6.0	6.0	0	6.0	0	5.8	5	5.6	15	5.1	111	5.0	131
61050002	California	9.5	8.6	5	8.0	14	7.8	21	7.5	37	7.3	120	7.4	132
61072003	California	13.1	13.1	0	13.0	2	13.0	3	12.9	14	12.8	48	12.8	62
61072010	California	10.7	10.7	0	10.6	2	10.6	3	10.5	6	10.4	39	10.3	53
61110007	California	7.1	7.1	0	7.1	0	7.1	0	7.0	2	6.9	24	6.9	33
61110009	California	6.0	6.0	0	6.0	0	6.0	0	6.0	1	5.9	20	5.8	30
61111004	California	5.0	5.0	0	5.0	0	5.0	0	5.0	0	4.9	24	4.9	35
61112002	California	6.8	6.8	0	6.8	0	6.8	0	6.8	1	6.7	21	6.7	29
61113001	California	6.0	6.0	0	6.0	1	5.9	2	5.9	5	5.7	25	5.7	29
61130004	California	5.2	5.2	0	5.2	0	5.2	1	5.1	5	4.8	49	4.8	68
80010010	Colorado	7.5	7.5	0	7.4	2	7.3	3	7.2	13	6.8	133	6.8	159
80130003	Colorado	6.7	6.7	0	6.6	2	6.6	3	6.4	12	6.0	105	6.0	138
80310013	Colorado	6.3	6.3	0	6.1	2	6.1	2	6.0	10	5.6	103	5.6	129
80310026	Colorado	6.1	6.1	0	6.0	2	6.0	2	5.8	9	5.4	105	5.4	137
80310027	Colorado	7.2	7.2	0	7.0	2	7.0	2	6.9	11	6.5	101	6.5	128
80310028	Colorado	7.9	7.9	0	7.8	2	7.8	2	7.7	8	7.4	78	7.4	112
80350004	Colorado	4.9	4.9	0	4.7	2	4.7	3	4.6	9	4.2	87	4.2	113
80410017	Colorado	5.2	5.2	0	5.1	2	5.1	2	5.0	9	4.5	120	4.4	149
80677001	Colorado	4.8	4.8	0	4.8	0	4.8	0	4.8	2	4.6	63	4.6	84
80690009	Colorado	6.5	6.5	0	6.5	0	6.5	0	6.4	6	6.0	93	6.0	124
80770017	Colorado	4.9	4.9	0	4.9	0	4.9	0	4.8	2	4.7	64	4.7	77
81230006	Colorado	7.1	7.1	0	7.1	1	7.0	2	6.9	9	6.6	87	6.5	129
90010010	Connecticut	7.3	7.2	1	7.0	4	7.0	5	6.9	10	6.1	147	6.1	176
90011123	Connecticut	7.1	7.0	1	6.9	3	6.9	5	6.8	12	6.1	145	6.1	187
90030025	Connecticut	7.1	7.1	0	7.0	3	6.9	5	6.8	12	6.1	157	6.0	201

90031003	Connecticut	6.7	6.7	0	6.5	3	6.4	5	6.4	10	5.7	140	5.6	184
90050005	Connecticut	5.1	5.1	0	4.8	4	4.8	5	4.6	12	3.8	173	3.7	203
90090027	Connecticut	7.3	7.2	1	7.0	4	7.0	5	6.9	12	6.3	137	6.2	184
90092123	Connecticut	7.2	7.2	0	6.9	4	6.9	5	6.8	12	6.2	140	6.1	177
90110124	Connecticut	6.3	6.3	0	6.2	3	6.1	5	6.0	12	5.3	148	5.3	182
100031007	Delaware	7.3	7.1	2	7.0	4	6.9	5	6.8	14	6.1	160	6.1	214
100031008	Delaware	7.2	6.9	2	6.8	3	6.7	5	6.6	10	5.9	186	5.8	232
100032004	Delaware	7.8	7.6	2	7.5	4	7.5	5	7.3	13	6.7	153	6.6	196
100051002	Delaware	7.5	7.3	2	7.2	3	7.1	6	6.9	17	6.1	205	6.0	249
110010041	District Of Columbia	8.1	8.0	1	7.9	3	7.8	6	7.6	18	6.8	176	6.6	242
110010043	District Of Columbia	7.5	7.4	1	7.3	3	7.2	5	7.0	15	6.3	168	6.1	234
110010051	District Of Columbia	7.6	7.6	0	7.4	3	7.4	5	7.2	16	6.6	119	6.4	163
110010053	District Of Columbia	7.8	7.7	1	7.6	3	7.5	6	7.3	17	6.4	172	6.3	228
120013012	Florida	6.7	6.7	0	6.7	0	6.7	0	6.6	3	5.9	188	5.8	246
120030002	Florida	8.2	8.2	0	8.2	0	8.2	0	8.0	9	7.2	200	7.1	272
120050006	Florida	9.3	9.2	1	9.2	1	9.2	1	9.0	14	7.9	226	7.6	311
120090007	Florida	6.5	6.5	0	6.5	0	6.4	1	6.4	3	5.9	116	5.8	166
120110033	Florida	6.0	6.0	0	6.0	0	5.9	1	5.9	2	5.5	100	5.5	151
120110034	Florida	6.6	6.6	0	6.6	0	6.6	0	6.5	4	6.2	94	6.1	129
120110035	Florida	9.1	9.1	0	9.1	0	9.1	1	8.9	15	8.5	94	8.5	134
120112003	Florida	6.9	6.9	0	6.9	0	6.8	2	6.8	3	6.4	106	6.3	148
120115005	Florida	8.1	8.1	0	8.1	0	8.1	0	8.0	10	7.3	147	7.3	190
120170006	Florida	8.5	8.5	0	8.5	0	8.5	0	8.4	5	7.7	170	7.6	229
120210004	Florida	8.1	8.1	0	8.0	1	8.0	1	7.9	8	7.5	113	7.4	168
120230002	Florida	9.1	9.1	0	9.1	0	9.1	0	8.9	13	8.0	196	7.9	242
120310032	Florida	9.3	9.3	0	9.3	0	9.3	0	9.0	20	8.2	160	8.1	218
120310077	Florida	8.9	8.9	0	8.9	0	8.9	0	8.8	11	7.9	180	7.8	250
120310098	Florida	7.2	7.2	0	7.2	0	7.2	1	7.1	5	6.5	141	6.4	189

120310100	Florida	8.5	8.5	0	8.5	0	8.4	1	8.4	7	7.6	168	7.5	231
120310108	Florida	7.8	7.8	0	7.8	0	7.8	0	7.7	8	7.0	175	6.9	228
120330004	Florida	8.7	8.7	0	8.7	0	8.7	0	8.4	17	7.2	237	7.0	296
120570113	Florida	7.7	7.7	0	7.7	0	7.7	1	7.7	2	7.0	164	6.9	220
120573002	Florida	7.4	7.4	0	7.4	0	7.4	0	7.4	3	6.8	128	6.7	180
120590004	Florida	9.3	9.3	0	9.3	0	9.3	0	9.1	16	8.0	231	7.8	311
120730012	Florida	8.7	8.7	0	8.7	0	8.7	2	8.4	22	7.4	201	7.2	267
120830003	Florida	8.6	8.6	0	8.6	0	8.6	1	8.5	5	7.9	149	7.8	211
120850007	Florida	7.2	7.2	0	7.2	0	7.1	1	7.1	4	6.7	90	6.6	124
120860034	Florida	8.5	8.5	0	8.5	0	8.5	0	8.4	9	8.0	89	8.0	118
120861016	Florida	7.8	7.8	0	7.8	0	7.8	0	7.8	5	7.5	88	7.4	136
120990008	Florida	6.8	6.8	0	6.8	0	6.8	1	6.7	6	6.0	170	5.9	236
120990022	Florida	6.5	6.5	0	6.5	0	6.5	1	6.4	2	5.9	125	5.8	160
120992005	Florida	6.9	6.9	0	6.9	0	6.9	1	6.9	3	6.4	121	6.4	164
121030004	Florida	6.4	6.4	0	6.4	0	6.4	0	6.4	1	5.8	175	5.7	233
121030018	Florida	7.3	7.3	0	7.3	0	7.3	1	7.3	2	6.5	174	6.5	227
121130015	Florida	8.8	8.8	0	8.8	0	8.8	1	8.6	12	7.6	232	7.3	311
121150013	Florida	7.1	7.1	0	7.1	0	7.1	1	7.1	1	6.4	177	6.3	236
121152002	Florida	8.3	8.3	0	8.3	1	8.3	1	8.2	6	7.6	162	7.5	223
121275002	Florida	7.5	7.5	0	7.5	0	7.5	1	7.4	6	6.7	170	6.6	216
121290001	Florida	7.6	7.6	0	7.6	0	7.6	1	7.5	9	6.5	198	6.4	257
130210012	Georgia	8.4	8.4	0	8.3	1	8.3	1	8.0	23	6.8	233	6.7	302
130511002	Georgia	8.8	8.8	0	8.8	0	8.7	2	8.4	24	7.5	192	7.4	256
130590002	Georgia	8.9	8.9	0	8.8	1	8.8	3	8.3	33	7.4	234	7.3	282
130890002	Georgia	9.1	9.1	0	9.1	0	9.0	2	8.6	27	7.6	222	7.4	298
130950007	Georgia	9.8	9.8	0	9.7	3	9.4	12	8.9	44	7.8	232	7.6	292
131150003	Georgia	7.9	7.9	0	7.9	0	7.8	1	7.6	15	6.7	145	6.4	212
131270006	Georgia	8.1	8.1	0	8.1	0	8.1	1	7.8	20	6.9	214	6.9	266
131350002	Georgia	9.5	9.5	0	9.5	0	9.4	4	8.9	34	7.9	223	7.7	292
131390003	Georgia	9.0	9.0	0	9.0	0	8.9	3	8.6	25	7.6	210	7.4	285

131510002	Georgia	7.4	7.4	0	7.3	1	7.3	2	7.1	14	6.0	200	5.7	284
131530001	Georgia	8.9	8.9	0	8.9	1	8.8	3	8.4	30	7.4	220	7.2	289
131850003	Georgia	9.4	9.4	0	9.4	0	9.3	4	8.9	30	7.7	248	7.6	303
132150008	Georgia	9.0	9.0	0	8.9	1	8.9	2	8.4	35	7.2	240	7.0	311
132450091	Georgia	9.6	9.6	0	9.6	0	9.6	0	9.0	41	8.2	183	8.0	249
132950004	Georgia	10.7	10.7	0	10.7	0	10.6	3	10.1	38	9.3	240	9.2	318
133030001	Georgia	10.2	10.2	0	10.1	1	10.0	6	9.3	48	8.2	281	8.1	354
150030010	Hawaii	4.3	4.3	0	4.3	0	4.3	0	4.3	0	4.3	1	4.3	1
150031001	Hawaii	3.9	3.9	0	3.9	0	3.9	0	3.9	0	3.9	0	3.9	0
150031004	Hawaii	3.8	3.8	0	3.8	0	3.8	0	3.8	0	3.8	0	3.8	0
150090025	Hawaii	4.0	4.0	0	4.0	0	4.0	0	4.0	0	4.0	1	4.0	1
160010010	Idaho	7.7	7.7	0	7.3	7	6.9	18	6.4	47	5.7	148	5.7	166
160010020	Idaho	7.6	7.6	0	7.0	9	6.7	18	6.4	37	5.9	129	5.9	149
160050015	Idaho	5.8	5.8	0	5.8	0	5.8	2	5.6	11	5.0	119	4.9	141
160090010	Idaho	9.2	9.2	0	8.9	5	8.8	9	8.5	27	8.2	165	8.2	191
160130004	Idaho	5.2	5.1	1	4.8	6	4.6	11	4.3	26	3.7	135	3.6	144
160150001	Idaho	9.3	8.7	6	8.5	11	8.1	22	7.9	38	7.6	119	7.6	136
160150002	Idaho	9.5	8.3	11	6.7	37	6.3	50	5.9	69	5.5	143	5.4	172
160190011	Idaho	5.3	5.3	0	5.3	0	5.2	1	5.1	10	4.5	110	4.5	138
160410002	Idaho	5.7	5.7	0	5.7	0	5.7	1	5.5	7	5.2	80	5.2	99
160490002	Idaho	7.4	7.1	3	6.9	8	6.7	12	6.2	37	5.5	176	5.4	201
160490003	Idaho	8.5	7.8	5	7.5	11	7.2	18	7.0	32	6.6	138	6.6	168
160550015	Idaho	7.1	6.9	2	6.7	5	6.6	9	6.4	21	5.6	194	5.5	213
160590004	Idaho	10.2	9.8	4	9.1	16	8.4	40	7.9	70	7.5	198	7.5	211
160690012	Idaho	8.2	7.8	3	7.6	6	7.3	15	6.9	37	6.2	176	6.1	203
160690013	Idaho	6.0	5.7	3	5.4	7	5.3	11	5.0	30	4.1	184	4.1	210
160790017	Idaho	9.4	9.4	0	9.2	5	9.1	6	8.9	23	8.7	175	8.7	199
160830007	Idaho	6.3	6.3	0	6.1	4	5.9	10	5.6	26	5.1	110	5.1	131
160850002	Idaho	8.9	8.9	0	8.7	4	8.3	17	7.8	42	7.4	154	7.4	186
170191001	Illinois	7.7	7.5	1	7.4	3	7.4	3	7.1	16	6.3	217	6.2	286

170310001	Illinois	9.0	9.0	0	8.9	2	8.8	4	8.6	18	8.0	125	7.8	183
170310057	Illinois	9.1	9.1	0	8.9	3	8.9	4	8.6	19	7.9	139	7.8	198
170310119	Illinois	9.6	9.4	2	9.2	5	9.2	6	8.8	35	8.2	158	8.0	215
170314007	Illinois	8.6	8.4	2	8.3	4	8.3	5	7.9	27	7.0	214	7.0	269
170314201	Illinois	8.3	8.1	2	8.0	3	7.9	5	7.6	24	6.7	220	6.6	274
170316005	Illinois	8.9	8.9	1	8.7	3	8.7	4	8.5	20	7.7	132	7.5	200
170434002	Illinois	9.3	9.0	2	9.0	3	9.0	4	8.6	28	7.8	190	7.6	256
170650002	Illinois	8.2	8.2	0	8.2	1	8.1	3	7.8	23	6.9	191	6.7	256
170830117	Illinois	7.5	7.5	0	7.4	2	7.4	3	7.1	20	6.2	224	6.0	294
171110001	Illinois	8.7	8.4	2	8.4	3	8.3	6	8.0	25	7.1	184	7.0	232
171132003	Illinois	8.3	8.0	2	7.9	3	7.9	4	7.6	24	6.8	191	6.7	257
171150013	Illinois	8.6	8.4	1	8.3	3	8.3	3	8.0	26	7.2	190	7.0	266
171570001	Illinois	7.3	7.3	0	7.3	0	7.3	1	7.1	15	6.2	217	6.1	274
171613002	Illinois	8.5	8.2	2	8.1	4	8.1	6	7.8	28	6.9	213	6.9	273
171630010	Illinois	9.7	9.7	0	9.7	1	9.7	2	9.3	31	8.3	205	8.1	284
171670012	Illinois	8.5	8.4	1	8.3	2	8.2	4	7.9	26	6.9	247	6.8	301
171971002	Illinois	9.2	8.9	2	8.8	4	8.8	6	8.3	34	7.6	174	7.4	246
171971011	Illinois	8.3	8.0	2	8.0	3	7.9	4	7.7	22	6.9	192	6.8	257
172010118	Illinois	8.7	8.3	3	8.3	3	8.2	7	7.8	26	7.0	176	6.9	232
180050008	Indiana	7.2	7.1	1	7.1	2	7.0	3	6.8	13	6.2	131	6.0	200
180190010	Indiana	9.6	9.6	0	9.6	1	9.4	6	9.0	30	8.2	201	8.1	271
180390008	Indiana	8.7	8.6	1	8.5	3	8.4	5	8.2	22	7.2	202	7.1	248
180570007	Indiana	7.6	7.5	1	7.4	2	7.3	5	7.1	17	6.3	155	6.1	224
180670004	Indiana	7.5	7.3	2	7.3	2	7.2	5	7.1	12	6.3	197	6.2	243
180890022	Indiana	8.7	8.7	0	8.5	2	8.4	5	8.2	20	7.2	211	7.1	288
180890034	Indiana	9.2	9.0	2	8.9	4	8.9	5	8.5	35	7.8	228	7.7	291
180890036	Indiana	9.1	8.9	2	8.9	3	8.8	6	8.4	33	7.5	226	7.5	287
180950011	Indiana	8.4	8.1	2	8.1	3	7.9	9	7.7	20	7.0	159	6.9	224
180970078	Indiana	10.1	9.9	2	9.8	3	9.7	7	9.3	38	8.4	180	8.3	248
180970081	Indiana	12.1	11.8	2	11.7	5	11.4	16	10.7	67	10.0	203	9.8	268

180970087	Indiana	11.5	11.3	2	11.2	3	11.0	9	10.4	54	9.7	167	9.6	237
181050003	Indiana	7.4	7.3	1	7.3	2	7.2	5	6.9	18	6.3	142	6.1	202
181270024	Indiana	8.4	8.4	0	8.3	2	8.2	5	7.9	21	7.1	190	6.9	263
181410015	Indiana	9.2	8.9	2	8.9	4	8.8	6	8.4	32	7.6	208	7.6	254
181570008	Indiana	7.8	7.6	2	7.6	2	7.5	5	7.3	14	6.6	142	6.4	213
181630021	Indiana	9.2	9.2	0	9.1	1	9.1	2	8.8	28	7.8	280	7.7	327
181670018	Indiana	9.5	9.3	1	9.3	2	9.2	4	8.8	32	7.9	192	7.7	262
181830003	Indiana	8.6	8.3	2	8.2	4	8.1	7	7.9	19	7.3	158	7.2	214
190130009	Iowa	8.7	8.7	1	8.5	4	8.5	6	8.3	17	7.3	264	7.3	318
190450019	Iowa	8.9	8.7	2	8.6	4	8.5	6	8.2	30	7.4	219	7.3	285
191032001	Iowa	8.6	8.3	3	8.3	4	8.2	6	8.0	20	7.1	237	7.0	301
191130040	Iowa	8.8	8.5	3	8.4	5	8.4	6	8.2	23	7.1	249	7.0	320
191370002	Iowa	6.5	6.5	0	6.5	1	6.4	2	6.3	9	5.2	242	5.1	309
191390015	Iowa	8.0	7.9	1	7.7	4	7.7	4	7.6	11	6.7	211	6.6	283
191390019	Iowa	7.1	7.0	1	6.8	4	6.8	4	6.6	16	5.5	241	5.4	298
191471002	Iowa	7.4	7.4	0	7.2	3	7.1	5	6.9	17	5.8	256	5.8	319
191530030	Iowa	7.1	7.1	0	7.0	3	6.9	5	6.8	15	5.7	238	5.6	304
191630015	Iowa	8.4	8.2	2	8.1	4	8.1	5	7.9	19	6.9	246	6.9	313
191770006	Iowa	7.6	7.6	0	7.4	4	7.4	5	7.3	11	6.1	308	6.1	362
200910010	Kansas	8.4	8.4	0	8.3	1	8.3	2	8.0	24	6.8	259	6.7	331
201330003	Kansas	9.2	9.2	0	9.1	2	9.0	5	8.6	30	7.4	257	7.2	332
201910002	Kansas	8.6	8.5	1	8.4	2	8.4	4	8.1	23	6.9	238	6.7	299
201950001	Kansas	7.0	7.0	0	6.9	1	6.9	4	6.7	15	5.6	230	5.5	286
202090021	Kansas	9.5	9.5	0	9.5	1	9.5	2	9.1	25	8.1	212	7.9	287
210130002	Kentucky	9.0	9.0	0	9.0	0	8.9	3	8.5	26	7.9	191	7.8	260
210190017	Kentucky	7.5	7.5	0	7.4	2	7.4	4	7.2	14	6.4	192	6.3	245
210373002	Kentucky	7.5	7.4	1	7.3	2	7.2	5	7.0	17	6.4	159	6.3	236
210430500	Kentucky	6.3	6.3	0	6.2	1	6.2	2	6.0	11	5.3	156	5.2	206
210470006	Kentucky	8.2	8.2	0	8.2	0	8.2	2	8.0	16	7.0	197	6.9	246
210670012	Kentucky	7.5	7.5	0	7.4	1	7.4	3	7.1	17	6.4	152	6.3	207

211110051	Kentucky	9.2	9.2	0	9.2	1	9.1	2	8.7	31	8.0	186	7.9	264
211110067	Kentucky	8.2	8.2	0	8.1	1	8.0	4	7.8	21	7.0	174	6.9	246
211110075	Kentucky	9.1	9.1	0	9.1	0	9.1	2	8.8	22	8.1	152	8.0	227
211110080	Kentucky	8.6	8.6	0	8.5	1	8.5	4	8.1	26	7.4	188	7.3	249
211111041	Kentucky	8.8	8.8	0	8.7	1	8.6	5	8.3	23	7.6	174	7.4	236
211930003	Kentucky	8.2	8.2	0	8.1	1	7.9	6	7.6	23	6.7	215	6.7	264
211950002	Kentucky	6.7	6.7	0	6.7	0	6.6	2	6.4	16	5.5	191	5.4	254
211990003	Kentucky	7.4	7.4	0	7.4	0	7.4	2	7.2	13	6.4	181	6.3	242
212270009	Kentucky	7.3	7.3	0	7.3	1	7.2	2	7.0	15	6.3	183	6.2	245
220190008	Louisiana	9.7	9.7	0	9.7	0	9.7	3	9.2	33	8.4	171	8.1	244
220330009	Louisiana	9.3	9.3	0	9.3	0	9.2	2	9.0	17	7.7	303	7.4	393
220511001	Louisiana	8.2	8.2	0	8.2	0	8.2	0	8.1	8	6.6	324	6.5	411
220550007	Louisiana	8.2	8.2	0	8.2	0	8.2	1	8.1	10	7.0	200	6.7	300
220710012	Louisiana	6.9	6.9	0	6.9	0	6.9	2	6.7	11	5.4	253	5.2	345
220870007	Louisiana	8.9	8.9	0	8.9	0	8.9	0	8.7	8	7.7	185	7.4	282
221210001	Louisiana	9.1	9.1	0	9.1	0	9.1	2	8.9	16	7.7	250	7.4	347
230010011	Maine	4.8	4.8	0	4.8	0	4.8	0	4.7	5	4.0	136	4.0	167
230030014	Maine	5.8	5.8	0	5.8	1	5.7	4	5.5	14	4.9	155	4.8	189
230031011	Maine	5.1	5.1	0	5.1	1	5.1	1	4.9	10	4.3	173	4.3	213
230050029	Maine	5.2	5.2	0	5.2	0	5.2	0	5.1	6	4.5	93	4.4	130
230090103	Maine	3.7	3.7	0	3.7	0	3.7	0	3.7	1	2.9	158	2.8	197
230172011	Maine	5.2	5.2	0	5.2	0	5.2	0	5.1	3	4.5	142	4.5	177
230190017	Maine	5.0	5.0	0	5.0	0	5.0	0	5.0	4	4.3	150	4.2	186
240051007	Maryland	7.3	7.3	0	7.1	3	7.1	4	6.9	11	6.4	109	6.3	163
240150003	Maryland	7.3	7.1	2	7.0	4	7.0	4	6.9	11	6.1	177	6.0	227
240190004	Maryland	6.7	6.7	0	6.5	3	6.4	4	6.3	9	5.6	180	5.5	231
240230002	Maryland	5.3	5.3	0	5.2	2	5.2	2	5.1	8	4.4	153	4.3	214
240251001	Maryland	6.7	6.6	1	6.4	3	6.4	4	6.2	11	5.6	157	5.5	216
240270006	Maryland	7.4	7.3	1	7.1	3	7.1	4	6.9	11	6.4	131	6.3	182
240290002	Maryland	5.8	5.7	1	5.6	3	5.5	4	5.5	8	4.9	150	4.8	194

240313001	Maryland	6.6	6.6	0	6.4	3	6.4	3	6.3	9	5.7	172	5.6	229
240430009	Maryland	6.0	6.0	0	5.9	2	5.7	5	5.7	8	5.2	102	5.1	155
245105253	Maryland	7.3	7.2	1	7.1	3	7.0	4	6.8	13	6.1	187	6.0	246
250030008	Massachusetts	6.3	6.3	0	6.0	4	5.9	7	5.9	12	5.3	115	5.2	158
250036001	Massachusetts	6.5	6.5	0	6.3	3	6.2	6	6.1	13	5.6	149	5.5	197
250051004	Massachusetts	5.9	5.9	0	5.9	0	5.7	5	5.6	11	5.0	139	5.0	191
250092006	Massachusetts	6.9	6.9	0	6.9	0	6.9	0	6.8	6	6.3	116	6.3	164
250112005	Massachusetts	7.1	7.1	0	7.1	1	6.9	5	6.8	11	6.4	126	6.3	168
250130008	Massachusetts	5.8	5.8	0	5.7	3	5.6	5	5.5	9	5.0	135	4.9	174
250130018	Massachusetts	7.4	7.4	0	7.4	0	7.2	5	7.1	12	6.5	133	6.4	174
250154002	Massachusetts	5.7	5.7	0	5.7	0	5.5	5	5.4	12	4.9	112	4.8	156
250170010	Massachusetts	5.9	5.9	0	5.9	0	5.9	0	5.7	8	5.1	120	5.1	154
250212005	Massachusetts	5.8	5.8	0	5.8	0	5.8	0	5.6	10	5.0	149	4.9	181
250230005	Massachusetts	7.1	7.1	0	7.1	0	7.0	2	6.8	13	6.2	122	6.1	153
250250002	Massachusetts	6.4	6.4	0	6.4	0	6.4	0	6.3	11	5.6	156	5.5	196
250250042	Massachusetts	6.3	6.3	0	6.3	0	6.3	0	6.1	9	5.4	134	5.3	191
250250044	Massachusetts	6.7	6.7	0	6.7	0	6.7	0	6.5	11	5.9	114	5.8	159
250251004	Massachusetts	6.6	6.6	0	6.6	0	6.6	0	6.4	11	5.7	168	5.6	204
250270023	Massachusetts	7.0	7.0	0	7.0	2	6.9	3	6.8	11	6.3	89	6.2	123
260170014	Michigan	7.8	7.7	1	7.5	4	7.5	6	7.2	20	6.5	225	6.5	277
260490021	Michigan	7.9	7.9	0	7.7	3	7.6	7	7.4	20	6.7	181	6.6	237
260770008	Michigan	10.0	9.6	3	9.6	4	9.5	8	9.0	37	8.3	218	8.3	270
260810020	Michigan	9.1	8.9	2	8.8	3	8.7	6	8.2	39	7.2	221	7.2	276
260910007	Michigan	8.3	8.3	0	8.1	3	8.0	6	7.8	18	7.3	149	7.3	207
260990009	Michigan	8.6	8.4	2	8.3	4	8.2	6	7.8	29	7.0	196	7.0	246
261130001	Michigan	7.6	7.5	1	7.5	2	7.5	2	7.2	19	6.5	155	6.3	213
261390005	Michigan	8.5	8.3	2	8.2	3	8.1	6	7.7	30	6.9	181	6.9	228
261470005	Michigan	8.4	8.2	2	8.1	4	7.9	9	7.6	27	6.9	167	6.8	210
261530001	Michigan	5.3	5.3	0	5.3	0	5.3	1	5.2	5	4.3	187	4.2	219
261610008	Michigan	8.9	8.6	3	8.5	5	8.5	6	8.1	31	7.3	202	7.3	258

261630001	Michigan	8.6	8.4	2	8.2	4	8.1	8	7.9	24	7.2	147	7.1	214
261630015	Michigan	10.4	10.4	0	10.4	1	10.2	6	9.9	27	9.4	127	9.3	181
261630033	Michigan	10.8	10.6	2	10.4	4	10.3	10	9.8	43	9.0	180	8.9	242
261630093	Michigan	11.4	11.3	1	11.0	4	10.9	7	10.5	38	9.9	174	9.9	227
261630098	Michigan	10.6	10.5	1	10.3	4	10.1	12	9.5	49	8.8	201	8.7	256
261630099	Michigan	11.7	11.5	2	11.3	5	11.0	15	10.4	62	9.8	172	9.7	227
270031002	Minnesota	7.1	7.1	0	7.0	2	6.9	4	6.7	17	5.8	246	5.8	289
270052013	Minnesota	6.8	6.8	0	6.6	3	6.4	7	6.0	30	5.0	247	4.9	296
270072304	Minnesota	6.4	6.4	0	6.2	4	6.0	11	5.3	46	4.4	222	4.4	256
270213410	Minnesota	6.6	6.6	0	6.4	4	6.3	6	6.0	25	5.0	257	4.9	302
270353204	Minnesota	6.5	6.5	0	6.4	3	6.3	5	6.0	24	5.0	286	5.0	322
270370470	Minnesota	8.0	8.0	0	7.8	3	7.7	7	7.3	32	6.3	259	6.3	305
270370480	Minnesota	7.6	7.6	0	7.4	4	7.3	7	6.9	30	6.0	250	6.0	286
270530962	Minnesota	8.5	8.4	1	8.3	2	8.2	7	7.8	33	7.0	255	7.0	288
270530963	Minnesota	8.5	8.5	0	8.3	2	8.2	6	7.8	27	7.2	177	7.1	222
270750005	Minnesota	4.9	4.9	0	4.9	0	4.8	3	4.4	23	3.5	167	3.4	197
270834210	Minnesota	7.8	7.8	0	7.5	4	7.3	11	6.9	34	5.8	295	5.8	349
271095008	Minnesota	8.2	8.2	0	8.0	3	7.9	8	7.6	28	6.4	268	6.4	327
271230871	Minnesota	8.0	7.9	1	7.8	2	7.7	6	7.3	32	6.4	235	6.4	280
271377001	Minnesota	6.0	6.0	0	5.9	1	5.8	4	5.4	26	4.3	239	4.3	275
271377550	Minnesota	6.0	6.0	0	5.9	2	5.7	7	5.3	28	4.3	176	4.3	198
271390505	Minnesota	8.4	8.4	0	8.2	4	8.1	6	7.7	34	6.8	254	6.8	311
271453052	Minnesota	7.8	7.7	1	7.7	2	7.6	6	7.1	32	6.2	254	6.2	280
271713201	Minnesota	7.4	7.3	1	7.3	2	7.1	7	6.7	28	5.7	276	5.7	308
280110002	Mississippi	8.8	8.8	0	8.8	0	8.8	1	8.2	35	6.7	298	6.6	362
280330002	Mississippi	9.5	9.5	0	9.5	0	9.4	2	8.8	48	7.4	299	7.3	375
280350004	Mississippi	9.7	9.7	0	9.7	0	9.7	1	9.4	27	8.0	284	7.9	350
280450003	Mississippi	8.2	8.2	0	8.2	0	8.2	0	7.9	13	6.7	263	6.6	337
280470008	Mississippi	8.5	8.5	0	8.4	1	8.4	1	8.3	9	7.2	217	6.9	299
280490020	Mississippi	9.2	9.2	0	9.2	0	9.2	2	8.8	30	7.6	224	7.5	289

280490021	Mississippi	9.3	9.3	0	9.3	0	9.3	1	8.8	33	7.7	239	7.5	320
280590006	Mississippi	8.3	8.3	0	8.3	0	8.3	0	8.1	10	7.0	245	6.9	314
290210005	Missouri	8.0	8.0	0	8.0	0	7.9	3	7.7	14	6.7	226	6.5	314
290370003	Missouri	6.0	6.0	0	6.0	0	5.9	2	5.8	6	4.9	185	4.7	266
290470005	Missouri	5.6	5.6	0	5.6	0	5.5	1	5.4	7	4.5	193	4.3	263
290770036	Missouri	7.8	7.8	0	7.8	0	7.8	1	7.6	16	6.5	225	6.3	290
290950034	Missouri	8.5	8.5	0	8.5	1	8.5	2	8.2	20	7.3	233	7.1	304
290990019	Missouri	7.5	7.5	0	7.5	0	7.5	1	7.3	11	6.4	199	6.3	276
291893001	Missouri	7.0	7.0	0	7.0	1	7.0	1	6.9	7	6.0	171	5.9	239
295100007	Missouri	7.1	7.1	0	7.0	1	7.0	1	6.9	8	5.9	175	5.7	250
295100085	Missouri	9.1	9.1	0	9.1	1	9.1	2	8.7	25	7.7	255	7.5	323
295100093	Missouri	10.4	10.4	0	10.4	1	10.3	3	9.8	42	8.5	287	8.4	359
295100094	Missouri	8.3	8.3	0	8.2	1	8.2	1	8.0	20	7.1	176	6.9	266
300170005	Montana	6.2	6.0	2	5.6	8	5.4	13	5.2	24	4.3	184	4.2	228
300270006	Montana	4.9	4.8	1	4.7	3	4.4	11	4.0	29	3.0	191	2.9	232
300290049	Montana	8.7	8.7	0	8.5	3	8.3	10	7.8	39	7.3	193	7.3	230
300310017	Montana	3.3	3.3	0	3.3	0	3.3	1	3.2	7	2.3	153	2.3	175
300490026	Montana	8.2	8.2	0	7.9	6	7.7	13	7.2	40	6.7	208	6.7	235
300530018	Montana	11.6	11.5	1	11.3	4	11.1	10	10.9	24	10.8	171	10.9	204
300630024	Montana	6.2	6.1	1	5.8	7	5.7	10	5.2	34	4.6	116	4.6	138
300630037	Montana	9.5	9.5	0	9.2	6	9.0	12	8.6	38	8.0	208	8.0	233
300710010	Montana	5.6	5.4	2	5.0	9	4.8	13	4.4	31	3.7	165	3.5	216
300810007	Montana	8.0	7.7	2	6.6	18	6.3	28	5.9	48	5.4	167	5.4	196
300830002	Montana	6.1	6.0	1	5.7	6	5.5	15	5.0	39	3.7	259	3.6	294
300930005	Montana	8.0	8.0	0	7.7	6	7.3	16	7.0	35	6.5	165	6.5	188
301110087	Montana	6.7	6.6	1	6.6	1	6.5	5	6.0	31	5.4	138	5.3	173
310550019	Nebraska	6.9	6.9	0	6.9	1	6.8	3	6.6	14	5.6	193	5.5	248
310790005	Nebraska	6.7	6.6	1	6.4	3	6.4	3	6.2	14	4.9	260	4.9	308
311530007	Nebraska	7.4	7.4	0	7.3	1	7.3	3	7.1	14	6.1	181	6.0	218
311770002	Nebraska	6.4	6.4	0	6.4	1	6.2	5	6.1	14	5.0	207	4.9	262

320030024	Nevada	3.8	3.8	0	3.8	1	3.8	1	3.7	2	3.6	41	3.6	47
320030043	Nevada	5.3	5.3	0	5.3	0	5.3	1	5.2	5	5.1	41	5.1	55
320030044	Nevada	4.1	4.1	0	4.1	0	4.0	1	4.0	3	3.9	32	3.9	45
320030071	Nevada	5.0	5.0	0	5.0	0	5.0	1	4.9	6	4.8	41	4.8	50
320030073	Nevada	4.4	4.4	0	4.4	0	4.4	0	4.3	5	4.1	46	4.1	54
320030075	Nevada	5.0	5.0	0	5.0	0	4.9	3	4.9	4	4.7	37	4.7	52
320030298	Nevada	5.1	5.1	0	5.0	2	5.0	2	4.9	8	4.8	39	4.8	46
320030299	Nevada	4.8	4.8	0	4.7	1	4.7	1	4.7	4	4.5	37	4.5	45
320030540	Nevada	8.7	8.7	0	8.7	1	8.5	6	8.5	7	8.5	31	8.5	38
320030561	Nevada	9.0	9.0	0	9.0	0	8.8	5	8.8	7	8.7	35	8.8	44
320030602	Nevada	3.9	3.9	0	3.8	1	3.8	2	3.7	5	3.6	32	3.6	39
320031019	Nevada	3.9	3.9	0	3.8	1	3.8	1	3.8	3	3.6	33	3.6	40
320031501	Nevada	7.0	7.0	0	7.0	1	6.9	3	6.8	8	6.7	34	6.7	46
320032003	Nevada	7.0	7.0	0	6.9	1	6.8	4	6.8	7	6.7	34	6.7	42
320050007	Nevada	5.7	5.6	1	5.3	5	5.3	6	5.3	8	5.0	70	5.0	88
320310025	Nevada	5.1	4.6	4	4.4	6	4.4	6	4.3	12	4.0	63	4.0	79
320310031	Nevada	6.2	5.8	3	5.5	7	5.5	7	5.4	11	5.2	56	5.2	79
320311005	Nevada	8.0	7.6	3	7.3	7	7.3	7	7.3	10	7.1	65	7.1	86
320311007	Nevada	6.4	6.2	1	6.0	4	5.9	7	5.8	10	5.7	48	5.7	59
325100020	Nevada	5.8	5.4	3	5.3	4	5.2	8	5.1	12	4.8	71	4.8	87
330050007	New Hampshire	6.5	6.5	0	6.5	0	6.4	2	6.3	10	5.7	151	5.7	193
330090010	New Hampshire	5.1	5.1	0	5.1	0	5.1	1	5.0	6	4.4	163	4.3	200
330115001	New Hampshire	4.1	4.1	0	4.1	0	4.0	2	3.9	7	3.0	198	3.0	232
330150014	New Hampshire	5.7	5.7	0	5.7	0	5.7	0	5.6	6	4.9	154	4.8	197
330150018	New Hampshire	5.2	5.2	0	5.2	0	5.2	0	5.1	7	4.4	155	4.3	193
340010006	New Jersey	6.5	6.2	3	6.2	3	6.1	6	5.9	13	5.1	162	5.0	205
340030010	New Jersey	8.0	7.9	1	7.7	4	7.7	5	7.5	16	6.9	103	6.7	161
340110007	New Jersey	6.6	6.4	2	6.3	4	6.3	5	6.2	10	5.6	104	5.4	154
340170008	New Jersey	6.6	6.5	1	6.3	4	6.3	5	6.1	14	5.5	137	5.3	189
340171003	New Jersey	7.8	7.6	1	7.5	4	7.5	5	7.3	13	6.5	158	6.5	202

340190001	New Jersey	7.9	7.6	2	7.5	4	7.5	5	7.4	10	6.8	137	6.6	191
340210005	New Jersey	8.4	8.1	2	8.1	3	8.0	5	7.9	11	7.1	162	7.0	209
340210008	New Jersey	8.0	7.8	1	7.6	5	7.6	5	7.5	11	6.6	166	6.5	215
340230011	New Jersey	7.3	7.2	1	7.0	4	6.9	5	6.8	12	6.1	130	6.0	183
340292002	New Jersey	6.9	6.7	2	6.7	2	6.6	5	6.4	14	5.7	133	5.6	171
340390004	New Jersey	9.1	9.0	1	8.8	4	8.8	5	8.7	15	8.0	135	7.8	187
340392003	New Jersey	7.8	7.6	1	7.4	4	7.4	5	7.3	13	6.5	153	6.4	199
340410007	New Jersey	7.4	7.3	1	7.2	4	7.2	5	7.1	8	6.5	155	6.4	202
350010023	New Mexico	5.1	5.1	0	5.1	0	5.1	0	5.1	0	4.8	72	4.8	93
350010026	New Mexico	6.7	6.7	0	6.7	0	6.7	0	6.7	0	6.5	64	6.5	83
350010029	New Mexico	8.0	8.0	0	8.0	0	8.0	1	7.9	7	7.7	76	7.7	97
350011012	New Mexico	4.0	4.0	0	4.0	0	4.0	0	4.0	0	3.7	70	3.7	86
350011013	New Mexico	7.0	7.0	0	7.0	0	7.0	0	7.0	0	6.8	53	6.8	67
350012022	New Mexico	8.6	8.6	0	8.6	0	8.6	0	8.5	3	8.4	77	8.4	90
350130016	New Mexico	7.8	7.8	0	7.8	0	7.7	1	7.7	6	7.3	77	7.2	105
350130022	New Mexico	5.9	5.9	0	5.9	0	5.9	0	5.9	2	5.6	61	5.5	97
350130025	New Mexico	4.5	4.5	0	4.5	0	4.5	0	4.5	1	4.2	55	4.1	87
350250008	New Mexico	6.6	6.6	0	6.6	0	6.5	2	6.4	11	5.7	111	5.5	160
350550005	New Mexico	4.1	4.1	0	4.1	0	4.1	0	4.0	4	3.8	63	3.8	80
360010005	New York	7.1	7.1	1	6.9	5	6.8	6	6.7	13	5.9	177	5.8	210
360050080	New York	6.7	6.6	1	6.4	4	6.4	4	6.3	12	5.6	148	5.6	192
360050110	New York	8.0	7.9	1	7.7	4	7.7	4	7.5	14	6.8	146	6.7	185
360290005	New York	7.9	7.9	0	7.6	4	7.6	6	7.3	20	6.5	184	6.4	234
360291014	New York	7.4	7.4	0	7.3	2	7.2	6	6.9	20	6.0	207	6.0	246
360310003	New York	4.6	4.6	0	4.5	2	4.4	5	4.2	10	3.3	198	3.3	241
360470052	New York	8.5	8.3	2	8.2	4	8.1	5	8.0	15	7.2	185	7.1	249
360550015	New York	7.2	7.2	0	6.9	5	6.9	6	6.8	14	6.0	190	5.9	248
360551007	New York	6.5	6.5	0	6.3	3	6.2	4	6.0	17	5.3	193	5.3	231
360610115	New York	7.9	7.8	1	7.6	4	7.6	5	7.5	12	6.9	134	6.9	175
360652001	New York	6.2	6.1	1	5.9	4	5.9	6	5.7	12	5.0	191	5.0	225

360671015	New York	6.2	6.0	1	5.8	4	5.7	6	5.6	12	5.0	170	4.9	214
360710002	New York	6.4	6.3	1	6.1	4	6.1	6	6.0	11	5.3	154	5.3	199
360810120	New York	7.0	6.9	1	6.8	4	6.7	5	6.6	11	5.9	176	5.9	224
360810124	New York	8.7	8.4	2	8.3	4	8.3	6	8.0	22	7.2	189	7.1	244
360810125	New York	7.7	7.6	1	7.5	4	7.5	4	7.3	12	6.6	150	6.5	197
360850055	New York	6.4	6.3	1	6.2	3	6.1	6	6.1	10	5.6	103	5.5	155
360870005	New York	5.5	5.4	1	5.3	4	5.2	6	5.1	10	4.5	159	4.4	205
361010003	New York	6.0	5.7	2	5.5	5	5.5	7	5.4	12	4.6	193	4.5	245
361192004	New York	5.7	5.6	1	5.5	3	5.5	4	5.4	9	4.7	172	4.7	215
370210034	North Carolina	6.6	6.6	0	6.6	0	6.6	0	6.4	10	5.5	193	5.4	260
370350004	North Carolina	7.9	7.9	0	7.9	0	7.8	3	7.6	13	6.9	152	6.7	222
370510009	North Carolina	8.3	8.3	0	8.3	0	8.3	1	8.0	20	7.0	240	6.9	319
370570002	North Carolina	8.8	8.8	0	8.8	0	8.7	3	8.5	16	7.8	157	7.6	225
370630015	North Carolina	8.1	8.1	0	8.1	0	8.1	3	7.8	17	7.1	187	6.9	274
370650099	North Carolina	6.4	6.4	0	6.4	0	6.4	1	6.1	14	5.3	173	5.1	236
370670022	North Carolina	8.3	8.3	0	8.3	2	8.1	6	7.9	20	6.9	229	6.8	294
370670030	North Carolina	8.1	8.1	0	8.1	0	7.9	6	7.7	15	7.0	179	6.8	241
370810013	North Carolina	8.6	8.6	0	8.6	0	8.5	3	8.2	19	7.2	233	7.1	308
371010002	North Carolina	7.4	7.4	0	7.4	0	7.4	2	7.2	13	6.4	168	6.1	253
371190041	North Carolina	8.0	8.0	0	8.0	0	7.9	3	7.8	14	7.0	175	6.8	245
371190045	North Carolina	9.2	9.2	0	9.2	0	9.1	3	8.8	21	8.1	172	7.9	237
371190048	North Carolina	7.9	7.9	0	7.9	0	7.8	3	7.7	13	6.7	205	6.6	280
371210004	North Carolina	6.2	6.2	0	6.2	0	6.2	2	6.1	7	5.2	192	5.1	256
371230001	North Carolina	8.3	8.3	0	8.3	0	8.1	4	7.9	19	6.9	199	6.7	271
371290002	North Carolina	6.6	6.6	0	6.6	0	6.6	1	6.4	14	5.5	239	5.4	301
371310003	North Carolina	7.0	7.0	0	7.0	0	7.0	1	6.7	16	5.7	201	5.5	266
371470006	North Carolina	6.5	6.5	0	6.5	0	6.5	1	6.2	16	5.3	182	5.2	246
371590021	North Carolina	8.1	8.1	0	8.1	0	8.0	3	7.7	19	6.9	185	6.7	254
371730002	North Carolina	6.3	6.3	0	6.3	0	6.3	1	6.2	7	5.5	131	5.3	207
371830021	North Carolina	7.7	7.7	0	7.7	0	7.6	3	7.4	17	6.3	224	6.1	293

380070002	North Dakota	6.5	6.4	1	6.0	8	5.7	18	5.2	42	4.1	294	4.1	314
380130004	North Dakota	7.9	7.7	1	6.9	15	6.5	26	5.9	57	4.9	291	4.9	316
380150003	North Dakota	8.4	8.2	1	7.9	8	7.4	21	6.9	52	5.7	286	5.7	311
380171004	North Dakota	8.5	8.5	0	8.3	4	8.1	10	7.5	46	6.4	255	6.4	305
380250004	North Dakota	7.2	6.9	1	6.3	12	6.0	22	5.5	52	4.2	297	4.2	326
380530002	North Dakota	6.4	6.2	1	5.7	9	5.3	20	5.0	39	3.7	246	3.7	274
380570004	North Dakota	7.0	6.8	1	6.4	9	6.0	18	5.6	40	4.5	261	4.5	300
380650002	North Dakota	7.8	7.6	1	7.0	13	6.7	23	6.2	49	4.8	296	4.8	321
381010003	North Dakota	7.4	7.2	1	6.5	15	6.3	23	5.7	54	4.5	277	4.4	309
390030009	Ohio	7.1	7.0	1	6.9	3	6.8	7	6.6	15	6.1	166	6.0	226
390170019	Ohio	9.0	8.9	1	8.7	4	8.6	6	8.4	21	7.5	194	7.4	251
390170020	Ohio	10.4	10.3	1	10.1	4	10.0	8	9.7	28	8.8	194	8.7	257
390230005	Ohio	8.7	8.6	1	8.5	3	8.4	7	8.0	28	7.3	160	7.2	222
390250022	Ohio	6.2	6.2	0	6.1	1	6.0	3	5.9	12	5.4	93	5.3	131
390350038	Ohio	10.0	9.9	1	9.7	5	9.6	8	9.3	35	8.3	206	8.3	264
390350060	Ohio	10.4	10.3	1	10.1	5	10.0	9	9.5	45	8.6	208	8.5	262
390350073	Ohio	8.1	7.9	1	7.8	4	7.7	8	7.5	17	6.9	137	6.8	197
390490029	Ohio	6.5	6.4	1	6.2	3	6.2	5	6.0	14	5.4	106	5.3	161
390490038	Ohio	9.2	9.1	1	8.9	4	8.8	9	8.5	26	7.9	154	7.8	210
390610006	Ohio	8.0	7.9	1	7.8	3	7.7	4	7.5	19	6.7	137	6.5	184
390610010	Ohio	7.6	7.6	0	7.5	1	7.5	3	7.3	12	6.6	157	6.4	237
390610014	Ohio	9.6	9.6	1	9.4	4	9.3	7	9.1	27	8.3	166	8.2	242
390610040	Ohio	8.9	8.8	1	8.7	3	8.6	6	8.3	29	7.6	156	7.5	217
390610042	Ohio	9.0	8.9	1	8.8	3	8.7	6	8.4	26	7.6	185	7.5	246
390610048	Ohio	9.3	9.3	0	9.2	2	9.0	6	8.8	18	8.2	115	7.9	175
390810017	Ohio	9.3	9.1	2	9.1	2	9.1	3	8.8	23	8.1	146	8.0	205
390850007	Ohio	6.7	6.7	0	6.5	3	6.5	5	6.3	14	5.6	169	5.5	219
390870012	Ohio	7.9	7.9	0	7.8	2	7.7	4	7.5	15	6.7	193	6.6	242
390950024	Ohio	8.3	8.2	1	8.1	3	8.0	5	7.8	20	7.0	153	6.9	199
390990015	Ohio	8.5	8.3	1	8.2	3	8.1	5	7.9	22	7.1	192	7.0	243

391030004	Ohio	7.5	7.3	1	7.2	3	7.1	7	6.8	21	6.1	168	6.0	230
391130038	Ohio	8.8	8.7	1	8.6	3	8.5	7	8.2	21	7.5	162	7.3	226
391351001	Ohio	8.1	8.0	1	7.8	4	7.7	8	7.5	19	6.8	149	6.7	199
391510020	Ohio	9.1	8.8	2	8.8	3	8.7	7	8.3	30	7.6	146	7.4	206
391530017	Ohio	8.2	8.0	1	7.9	3	7.9	4	7.7	17	6.9	135	6.8	194
391550014	Ohio	8.4	8.3	1	8.2	3	8.1	6	7.7	33	6.6	249	6.6	297
391650007	Ohio	7.5	7.4	1	7.3	2	7.2	5	7.0	19	6.3	142	6.1	200
400019009	Oklahoma	8.6	8.6	0	8.6	0	8.4	5	8.2	21	6.8	291	6.8	371
400190297	Oklahoma	7.8	7.8	0	7.8	1	7.8	2	7.6	14	6.6	164	6.4	224
400310651	Oklahoma	7.1	7.1	0	7.1	0	7.1	0	6.9	11	6.0	185	5.9	236
400430860	Oklahoma	7.3	7.3	0	7.3	0	7.2	2	7.0	17	5.8	225	5.6	291
400710604	Oklahoma	8.8	8.7	1	8.7	1	8.6	5	8.3	28	7.2	228	7.0	294
401090097	Oklahoma	9.0	9.0	0	9.0	0	9.0	0	8.8	14	7.7	227	7.5	283
401091037	Oklahoma	8.4	8.4	0	8.4	0	8.4	0	8.1	17	7.2	164	7.0	227
401159004	Oklahoma	9.8	9.8	0	9.8	1	9.7	2	9.2	38	7.9	282	7.8	348
401210415	Oklahoma	8.5	8.5	0	8.5	1	8.4	4	8.2	17	7.0	229	6.8	293
401359021	Oklahoma	7.7	7.7	0	7.7	0	7.7	2	7.5	15	6.4	237	6.2	320
401430174	Oklahoma	8.1	8.1	0	8.1	1	8.1	1	7.9	13	7.0	215	6.8	280
401431127	Oklahoma	9.0	9.0	0	9.0	1	8.9	3	8.7	21	7.4	271	7.2	350
410010004	Oregon	7.2	7.2	0	7.1	2	7.0	6	6.6	30	6.0	176	6.0	199
410050004	Oregon	5.4	5.4	0	5.3	2	5.2	4	5.1	14	4.7	108	4.7	135
410090004	Oregon	5.5	5.5	0	5.4	2	5.3	4	5.1	17	4.7	124	4.7	145
410130100	Oregon	7.2	7.2	0	6.7	10	6.3	21	6.0	35	5.5	169	5.5	195
410170120	Oregon	8.6	7.8	7	7.1	22	6.6	38	5.7	85	5.1	199	5.1	217
410230002	Oregon	11.1	10.8	3	10.1	15	9.9	21	9.6	41	9.6	160	9.6	173
410250003	Oregon	11.4	10.5	8	9.8	19	9.5	27	9.1	55	9.0	144	9.0	161
410290019	Oregon	5.6	5.6	0	5.4	2	5.1	10	4.7	37	4.2	149	4.2	164
410290201	Oregon	7.0	6.3	5	5.8	14	5.6	20	5.2	38	4.5	138	4.5	146
410290203	Oregon	7.1	6.4	6	5.8	17	5.6	22	5.1	48	4.6	145	4.6	156
410310007	Oregon	7.5	7.2	2	7.0	7	7.0	8	6.6	27	6.1	161	6.1	185

410330036	Oregon	11.6	9.3	13	8.7	23	8.3	35	8.0	55	7.8	155	7.9	168
410330114	Oregon	8.8	8.0	6	7.6	15	7.4	20	7.1	39	6.8	156	6.8	172
410350004	Oregon	8.8	8.8	0	8.6	5	8.4	13	8.0	36	7.6	132	7.6	152
410370001	Oregon	7.2	7.2	0	7.1	2	6.9	8	6.6	23	6.3	134	6.3	142
410390059	Oregon	7.7	7.6	1	7.5	3	7.4	7	7.1	27	6.8	118	6.8	146
410390060	Oregon	6.3	6.3	0	6.1	5	5.9	11	5.7	21	5.3	96	5.2	115
410390100	Oregon	4.0	4.0	0	4.0	0	4.0	0	4.0	1	3.7	59	3.7	81
410390101	Oregon	5.7	5.7	0	5.6	2	5.4	6	5.3	16	4.9	76	4.9	88
410391009	Oregon	5.5	5.5	0	5.3	3	5.2	5	5.0	17	4.6	86	4.5	110
410392013	Oregon	13.8	9.8	22	8.4	44	8.1	54	7.5	88	7.1	186	7.1	206
410399004	Oregon	7.2	7.2	0	6.9	5	6.6	15	6.3	32	6.0	97	6.0	126
410430009	Oregon	5.6	5.6	0	5.6	0	5.5	3	5.3	14	5.0	108	5.0	124
410432002	Oregon	5.9	5.9	0	5.9	0	5.8	3	5.6	14	5.3	102	5.4	130
410470004	Oregon	6.2	6.2	0	6.2	0	6.1	3	5.8	19	5.5	114	5.5	132
410470007	Oregon	5.8	5.8	0	5.7	1	5.7	3	5.5	12	5.2	89	5.1	118
410470041	Oregon	6.6	6.6	0	6.5	2	6.4	4	6.2	19	5.9	102	5.9	123
410510080	Oregon	6.1	6.1	0	6.0	2	6.0	4	5.8	14	5.4	108	5.4	142
410512011	Oregon	6.1	6.1	0	5.9	3	5.9	4	5.7	16	5.3	130	5.3	153
410590121	Oregon	6.3	6.0	2	6.0	3	5.9	6	5.8	13	5.1	182	5.1	205
410591003	Oregon	6.8	6.5	2	6.4	4	6.3	6	6.1	18	5.4	175	5.4	204
410610123	Oregon	6.3	6.3	0	6.3	0	6.2	4	5.8	24	5.0	181	5.0	203
410630001	Oregon	6.7	6.4	3	6.3	5	6.1	8	5.6	37	5.0	179	5.0	196
410670004	Oregon	5.8	5.8	0	5.7	1	5.7	3	5.5	11	5.3	101	5.3	122
410670005	Oregon	6.1	6.1	0	6.0	2	5.9	4	5.7	16	5.3	94	5.3	109
410670111	Oregon	5.0	5.0	0	4.9	2	4.9	3	4.7	11	4.4	109	4.4	134
420010001	Pennsylvania	8.9	8.6	3	8.5	5	8.4	9	8.2	19	7.6	174	7.5	230
420030002	Pennsylvania	8.5	8.3	2	8.3	2	8.2	4	7.9	21	7.3	135	7.2	188
420030008	Pennsylvania	8.6	8.4	2	8.4	2	8.3	4	8.0	25	7.2	154	7.1	210
420030064	Pennsylvania	11.1	11.0	1	11.0	2	10.8	10	9.8	79	9.2	175	9.0	230
420031301	Pennsylvania	9.5	9.3	2	9.3	2	9.2	5	8.7	37	7.7	228	7.6	267

420031376	Pennsylvania	8.5	8.3	2	8.3	2	8.2	5	7.9	23	7.1	139	7.0	194
420033007	Pennsylvania	8.0	7.8	2	7.8	2	7.8	4	7.5	22	6.5	207	6.4	255
420050001	Pennsylvania	8.0	7.8	2	7.8	3	7.7	4	7.5	20	6.8	153	6.7	213
420070014	Pennsylvania	9.1	8.8	2	8.8	3	8.7	5	8.4	26	7.6	185	7.5	236
420110011	Pennsylvania	8.3	7.9	2	7.7	5	7.7	6	7.6	14	7.1	139	7.1	197
420130801	Pennsylvania	7.6	7.4	1	7.2	5	7.2	6	7.0	14	6.4	150	6.3	206
420210011	Pennsylvania	8.5	8.4	1	8.3	3	8.3	3	8.1	16	7.3	167	7.3	219
420270100	Pennsylvania	7.6	7.4	1	7.2	5	7.1	6	7.0	14	6.4	156	6.3	211
420290100	Pennsylvania	8.0	7.7	2	7.5	5	7.5	6	7.3	17	6.7	154	6.6	202
420410101	Pennsylvania	8.3	8.1	2	7.9	5	7.9	6	7.7	17	7.2	144	7.2	196
420430401	Pennsylvania	9.7	9.4	2	9.1	6	9.1	7	8.9	24	8.2	173	8.2	233
420450002	Pennsylvania	8.6	8.4	2	8.3	4	8.2	5	8.1	15	7.5	148	7.4	194
420450109	Pennsylvania	8.5	8.2	2	8.0	5	8.0	5	7.8	16	7.2	145	7.1	186
420490003	Pennsylvania	7.1	7.1	0	7.0	3	6.9	6	6.6	21	5.7	232	5.7	284
420630004	Pennsylvania	7.1	6.9	2	6.9	3	6.8	6	6.6	15	5.9	174	5.8	220
420692006	Pennsylvania	7.9	7.6	2	7.3	6	7.3	6	7.2	11	6.3	217	6.3	259
420710007	Pennsylvania	9.1	8.9	2	8.8	4	8.7	7	8.5	17	7.9	186	7.9	239
420710012	Pennsylvania	11.5	11.2	2	11.0	5	11.0	7	10.7	30	10.1	197	10.1	253
420750101	Pennsylvania	8.7	8.5	2	8.3	5	8.2	7	8.1	15	7.6	151	7.5	218
420770004	Pennsylvania	8.1	7.8	2	7.6	5	7.5	6	7.4	12	6.7	149	6.7	193
420910013	Pennsylvania	8.0	7.7	2	7.5	5	7.5	5	7.4	14	6.8	138	6.7	181
420950025	Pennsylvania	8.3	8.0	2	7.8	5	7.7	6	7.6	12	7.1	138	7.0	193
421010004	Pennsylvania	10.3	10.0	2	9.9	5	9.9	5	9.5	32	8.6	207	8.6	248
421010048	Pennsylvania	9.4	9.1	2	8.9	5	8.9	5	8.7	22	8.0	164	7.9	217
421010055	Pennsylvania	9.2	8.9	2	8.8	5	8.7	6	8.4	30	7.5	197	7.5	249
421010057	Pennsylvania	9.2	8.9	2	8.7	5	8.7	5	8.4	22	7.8	154	7.8	197
421010075	Pennsylvania	10.6	10.2	2	10.1	5	10.0	7	9.6	33	9.0	199	9.0	240
421010076	Pennsylvania	8.8	8.5	2	8.3	5	8.3	5	8.1	20	7.6	128	7.5	175
421250005	Pennsylvania	9.1	8.9	2	8.9	2	8.7	6	8.4	24	7.6	220	7.6	264
421255001	Pennsylvania	6.9	6.7	2	6.6	3	6.6	4	6.4	13	5.8	131	5.7	175

421330008	Pennsylvania	8.8	8.5	2	8.4	4	8.3	7	8.1	15	7.5	145	7.5	197
440030002	Rhode Island	4.6	4.6	0	4.6	0	4.6	2	4.4	8	3.8	140	3.7	185
440070022	Rhode Island	5.9	5.9	0	5.9	0	5.9	1	5.7	10	5.1	135	5.0	173
440090007	Rhode Island	4.9	4.9	0	4.8	1	4.8	4	4.6	9	3.9	138	3.9	175
450190020	South Carolina	7.8	7.8	0	7.8	0	7.8	0	7.7	8	6.7	230	6.6	295
450190046	South Carolina	7.0	7.0	0	7.0	0	7.0	0	6.8	9	5.9	215	5.8	280
450250001	South Carolina	7.6	7.6	0	7.6	0	7.5	1	7.2	21	6.2	212	6.1	276
450370001	South Carolina	8.2	8.2	0	8.2	0	8.2	0	7.8	23	6.9	199	6.8	258
450410003	South Carolina	8.7	8.7	0	8.7	0	8.7	1	8.3	22	7.4	235	7.3	318
450450015	South Carolina	9.0	9.0	0	9.0	0	9.0	2	8.7	19	7.8	205	7.7	273
450790007	South Carolina	7.7	7.7	0	7.7	0	7.6	2	7.4	15	6.5	189	6.4	251
450830011	South Carolina	8.9	8.9	0	8.9	0	8.8	2	8.6	18	7.6	207	7.5	277
450918801	South Carolina	7.8	7.8	0	7.8	0	7.7	1	7.5	15	6.7	175	6.6	266
460110003	South Dakota	5.5	5.5	0	5.4	2	5.3	4	5.0	18	3.8	252	3.7	298
460130004	South Dakota	5.6	5.6	0	5.5	2	5.3	9	5.0	23	4.1	200	4.0	239
460270001	South Dakota	7.1	7.1	0	6.9	4	6.6	10	6.5	19	5.6	259	5.6	310
460290002	South Dakota	8.0	8.0	0	7.9	1	7.8	5	7.4	30	6.2	282	6.1	320
460330132	South Dakota	5.4	5.4	0	5.1	4	5.0	9	4.7	24	3.4	284	3.4	307
460710001	South Dakota	6.3	6.1	1	5.9	5	5.8	7	5.5	26	4.4	229	4.3	277
460990009	South Dakota	5.7	5.7	0	5.4	4	5.4	5	5.2	17	4.1	217	4.0	264
461030020	South Dakota	7.4	7.4	0	7.2	4	7.0	8	6.6	31	5.7	194	5.6	248
470090011	Tennessee	7.2	7.2	0	7.2	0	7.1	4	6.9	15	6.0	200	5.9	272
470090101	Tennessee	7.3	7.3	0	7.3	0	7.2	3	7.0	12	6.1	181	5.9	249
470370023	Tennessee	8.9	8.9	0	8.9	0	8.8	1	8.6	17	7.7	195	7.6	262
470370040	Tennessee	9.3	9.3	0	9.3	0	9.3	0	9.0	17	8.2	185	8.0	275
470450004	Tennessee	7.1	7.1	0	7.1	0	7.1	1	6.9	7	5.7	230	5.5	301
470654002	Tennessee	9.1	9.1	0	9.1	0	9.0	2	8.7	23	7.7	207	7.5	280
470931013	Tennessee	8.6	8.6	0	8.6	0	8.5	3	8.2	22	7.3	208	7.2	277
470931017	Tennessee	8.9	8.9	0	8.9	0	8.8	4	8.5	19	7.6	196	7.5	253
470931020	Tennessee	8.9	8.9	0	8.9	2	8.8	4	8.5	23	7.4	238	7.3	302

470990003	Tennessee	7.0	7.0	0	7.0	0	7.0	0	6.8	10	5.6	234	5.5	313
471050109	Tennessee	6.3	6.3	0	6.3	0	6.2	1	6.1	11	5.3	159	5.1	237
471071002	Tennessee	7.4	7.4	0	7.4	0	7.4	2	7.2	14	6.3	177	6.1	252
471130010	Tennessee	7.6	7.6	0	7.6	0	7.6	1	7.4	11	6.1	248	5.9	319
471192007	Tennessee	6.9	6.9	0	6.9	0	6.9	0	6.7	10	5.7	205	5.5	281
471252001	Tennessee	6.8	6.8	0	6.8	0	6.7	1	6.5	14	5.6	194	5.4	265
471410005	Tennessee	6.7	6.7	0	6.7	0	6.7	2	6.5	12	5.5	205	5.4	273
471450004	Tennessee	7.1	7.1	0	7.0	1	7.0	3	6.8	11	6.0	178	5.8	255
471570075	Tennessee	9.6	9.6	0	9.6	0	9.6	1	8.9	41	7.8	236	7.7	290
471631007	Tennessee	6.3	6.3	0	6.3	0	6.2	2	6.0	11	5.2	161	5.0	225
471650007	Tennessee	7.5	7.5	0	7.5	0	7.5	1	7.3	12	6.4	180	6.2	258
480131090	Texas	9.4	9.4	0	9.4	0	9.2	8	8.5	54	7.6	214	7.4	269
480271045	Texas	7.4	7.4	0	7.4	0	7.4	1	7.0	23	6.2	161	6.0	223
480290032	Texas	9.0	9.0	0	9.0	0	8.8	5	8.1	46	7.4	169	7.2	232
480290059	Texas	7.5	7.5	0	7.5	0	7.4	2	6.8	37	5.9	184	5.7	249
480290677	Texas	11.0	11.0	0	11.0	0	10.9	2	10.3	43	9.7	140	9.5	205
480291069	Texas	9.2	9.2	0	9.2	0	9.1	3	8.4	44	7.5	188	7.3	238
480371031	Texas	10.0	10.0	0	10.0	0	10.0	0	9.6	29	8.7	174	8.3	273
480411086	Texas	8.1	8.1	0	8.1	0	8.1	0	7.7	24	6.6	216	6.4	298
480612004	Texas	14.1	14.1	0	13.1	20	11.9	61	10.3	163	9.3	294	9.0	357
481130069	Texas	9.5	9.5	0	9.5	0	9.5	1	9.1	28	8.1	189	7.9	267
481210034	Texas	7.7	7.7	0	7.7	0	7.7	1	7.4	16	6.2	202	6.0	282
481351014	Texas	7.2	7.2	0	7.2	0	7.2	0	7.1	10	6.4	132	6.3	188
481410044	Texas	9.4	9.4	0	9.4	0	9.3	2	9.3	5	8.9	82	8.9	108
481410055	Texas	13.2	13.2	0	13.2	0	13.2	0	12.7	50	12.4	117	12.4	149
481410057	Texas	8.5	8.5	0	8.5	0	8.5	0	8.4	6	8.0	86	8.0	120
481671034	Texas	8.2	8.2	0	8.2	0	8.2	1	7.8	22	6.6	250	6.3	323
482010024	Texas	10.5	10.5	0	10.5	0	10.5	2	10.1	30	9.2	219	8.9	324
482010046	Texas	12.7	12.7	0	12.7	0	12.6	3	11.8	70	11.0	257	10.8	342
482010058	Texas	10.7	10.7	0	10.7	0	10.6	2	10.1	40	9.0	248	8.6	341

482010066	Texas	8.9	8.9	0	8.9	0	8.8	3	8.3	36	7.1	234	6.8	321
482011034	Texas	10.3	10.3	0	10.3	0	10.3	2	9.9	30	8.9	202	8.6	298
482011035	Texas	10.8	10.8	0	10.8	0	10.7	4	10.2	46	9.2	229	8.9	321
482011039	Texas	9.3	9.3	0	9.3	0	9.2	2	8.8	28	7.6	245	7.4	343
482011050	Texas	8.3	8.3	0	8.3	0	8.3	0	8.0	20	6.8	255	6.5	344
482011052	Texas	11.9	11.9	0	11.9	0	11.8	4	11.2	57	10.3	231	10.0	329
482030002	Texas	9.4	9.2	1	9.0	3	9.0	5	8.7	22	7.5	224	7.3	298
482450021	Texas	9.6	9.6	0	9.6	0	9.5	2	9.3	19	8.0	277	7.7	381
482570005	Texas	7.6	7.6	0	7.6	0	7.5	1	7.3	15	6.1	219	5.9	288
482730314	Texas	9.7	9.7	0	9.7	0	9.5	7	8.6	62	7.3	239	7.0	297
483031028	Texas	5.2	5.2	0	5.2	1	5.2	2	5.1	6	4.5	95	4.4	142
483091037	Texas	10.1	10.1	0	10.1	0	10.1	0	9.6	32	8.4	352	8.3	418
483230004	Texas	8.1	8.1	0	8.1	0	8.0	3	7.3	42	6.4	174	6.2	230
483390078	Texas	10.7	10.7	0	10.7	0	10.7	1	10.0	50	8.9	276	8.7	369
483491051	Texas	8.3	8.3	0	8.3	0	8.3	0	8.0	20	6.8	242	6.5	322
483550032	Texas	9.4	9.4	0	9.4	0	9.3	6	8.4	63	7.1	264	6.8	346
483550034	Texas	9.2	9.2	0	9.1	2	8.8	13	7.9	69	6.5	277	6.3	340
483611100	Texas	8.6	8.6	0	8.6	0	8.5	2	8.3	16	7.2	203	6.9	291
483750320	Texas	6.0	6.0	0	6.0	0	5.9	2	5.8	8	5.1	148	5.0	194
484391002	Texas	9.1	9.1	0	9.1	0	9.1	0	8.6	29	7.8	159	7.6	220
484391006	Texas	9.5	9.5	0	9.5	0	9.4	2	8.8	42	8.0	181	7.7	261
484391053	Texas	9.8	9.8	0	9.8	0	9.8	0	9.4	27	8.4	209	8.2	284
484530014	Texas	9.0	9.0	0	9.0	0	9.0	2	8.3	43	7.1	257	7.0	322
484530021	Texas	9.7	9.7	0	9.7	0	9.6	3	9.0	42	8.3	166	8.0	254
484531068	Texas	10.0	10.0	0	10.0	0	9.9	2	9.3	47	8.5	196	8.2	296
484790313	Texas	9.7	9.7	0	9.7	0	9.4	12	8.2	82	7.4	183	7.2	235
490050007	Utah	7.7	7.7	0	7.6	1	7.6	1	7.5	13	7.1	109	7.1	121
490071003	Utah	3.9	3.9	0	3.9	0	3.9	0	3.9	0	3.5	74	3.5	84
490110004	Utah	6.8	6.8	0	6.8	0	6.8	0	6.6	10	6.3	75	6.3	95
490130002	Utah	6.7	6.7	0	6.6	1	6.6	1	6.6	5	6.3	70	6.3	93

490210005	Utah	5.1	5.1	0	5.1	0	5.1	0	5.1	1	5.0	33	4.9	50
490352005	Utah	7.8	7.8	0	7.8	0	7.8	0	7.6	11	7.4	56	7.4	75
490353006	Utah	7.3	7.3	0	7.3	0	7.3	0	7.1	9	6.9	83	6.9	88
490353010	Utah	7.8	7.8	0	7.8	0	7.7	2	7.6	10	7.4	76	7.4	94
490353013	Utah	6.1	6.1	0	6.1	0	6.0	2	5.8	12	5.5	78	5.5	100
490353014	Utah	7.8	7.8	0	7.8	0	7.8	0	7.6	13	7.4	76	7.4	96
490353015	Utah	7.9	7.9	0	7.9	0	7.9	0	7.7	12	7.4	72	7.4	96
490353016	Utah	7.1	7.1	0	7.1	0	7.1	0	6.9	13	6.6	70	6.6	91
490354002	Utah	9.1	9.1	0	9.1	0	9.1	1	8.9	14	8.7	65	8.7	83
490450004	Utah	6.0	6.0	0	6.0	0	6.0	2	5.8	14	5.4	74	5.4	84
490471004	Utah	5.3	5.3	0	5.3	0	5.3	0	5.2	4	5.0	72	5.0	92
490494001	Utah	6.7	6.7	0	6.7	0	6.7	0	6.6	6	6.3	70	6.2	85
490495010	Utah	6.7	6.7	0	6.7	0	6.7	0	6.6	6	6.2	74	6.2	86
490530007	Utah	4.4	4.4	0	4.4	0	4.4	0	4.4	1	4.3	25	4.3	32
490571003	Utah	6.2	6.2	0	6.2	0	6.2	1	6.0	11	5.7	80	5.7	94
500030004	Vermont	5.5	5.5	0	5.3	3	5.2	6	5.1	10	4.4	180	4.4	210
500070007	Vermont	4.5	4.5	0	4.4	2	4.4	3	4.3	7	3.5	181	3.4	213
500210002	Vermont	6.8	6.8	0	6.8	1	6.7	2	6.6	11	6.0	153	6.0	201
510030001	Virginia	7.4	7.4	0	7.2	3	7.1	6	6.9	17	6.1	194	6.0	253
510590030	Virginia	7.7	7.5	2	7.4	3	7.2	7	7.1	18	6.4	175	6.3	235
510590031	Virginia	7.9	7.8	1	7.7	3	7.6	6	7.4	17	6.9	111	6.8	165
510690010	Virginia	7.9	7.9	0	7.6	4	7.5	6	7.4	12	6.8	148	6.7	216
510870014	Virginia	7.5	7.5	0	7.4	2	7.3	4	7.1	19	6.3	196	6.2	266
511611004	Virginia	7.0	7.0	0	6.9	2	6.9	4	6.7	16	5.8	183	5.7	237
516500008	Virginia	7.2	7.2	0	7.1	1	7.1	2	6.8	15	6.0	185	5.9	234
517600025	Virginia	7.7	7.7	0	7.6	3	7.6	4	7.3	19	6.7	168	6.5	238
530010003	Washington	5.0	4.7	2	4.5	5	4.4	7	4.4	12	3.6	200	3.6	217
530030004	Washington	9.7	9.3	4	9.0	9	8.8	16	8.4	41	7.9	174	7.8	210
530050002	Washington	5.5	5.1	3	5.0	5	5.0	6	4.9	9	4.2	157	4.2	176
530070007	Washington	6.0	5.5	3	5.4	6	5.2	11	4.6	40	3.8	199	3.8	214

530070010	Washington	7.5	6.9	4	6.1	17	5.9	24	5.6	41	5.2	195	5.2	213
530070011	Washington	7.8	7.2	5	6.5	17	6.2	24	6.0	36	5.7	140	5.7	157
530090015	Washington	3.7	3.7	0	3.7	0	3.7	0	3.7	3	3.4	86	3.4	107
530110022	Washington	5.0	5.0	0	4.7	4	4.7	5	4.6	9	4.4	120	4.4	143
530110024	Washington	6.3	6.3	0	6.1	3	6.1	4	5.9	15	5.6	98	5.6	120
530130002	Washington	5.2	5.0	2	4.9	3	4.8	7	4.7	9	4.1	168	4.1	191
530150015	Washington	5.0	5.0	0	4.9	1	4.9	1	4.8	8	4.5	101	4.5	134
530230001	Washington	4.7	4.5	1	4.3	5	4.2	6	4.1	11	3.4	157	3.4	178
530251002	Washington	6.7	6.3	3	6.2	5	6.1	8	5.9	19	5.3	199	5.3	219
530251003	Washington	5.0	4.6	3	4.6	4	4.5	6	4.3	15	3.5	181	3.5	204
530272002	Washington	4.1	4.1	0	4.1	0	4.1	1	4.0	4	3.8	75	3.8	92
530310003	Washington	4.5	4.5	0	4.5	0	4.5	0	4.4	5	4.2	85	4.2	99
530330017	Washington	4.0	3.8	1	3.8	2	3.6	6	3.3	20	2.8	141	2.8	162
530330024	Washington	6.4	6.3	1	6.1	5	6.0	6	5.7	22	5.4	110	5.4	135
530330030	Washington	7.7	7.6	1	7.6	1	7.5	5	7.1	25	6.7	112	6.7	140
530330031	Washington	3.9	3.8	1	3.7	2	3.6	5	3.4	18	2.9	144	2.9	167
530330047	Washington	7.3	7.2	1	6.9	5	6.8	9	6.5	22	6.2	119	6.2	140
530330057	Washington	7.7	7.7	0	7.6	1	7.5	4	7.2	21	7.0	107	7.0	122
530330069	Washington	7.5	7.5	0	7.4	2	7.3	6	6.9	26	6.6	119	6.6	141
530330080	Washington	5.8	5.7	1	5.6	2	5.6	4	5.2	21	4.7	133	4.7	169
530331011	Washington	8.3	8.2	1	8.1	3	8.0	7	7.7	23	7.4	115	7.4	134
530350007	Washington	5.1	5.1	0	5.1	1	5.0	3	4.8	11	4.4	92	4.4	120
530370002	Washington	6.1	5.9	2	5.8	3	5.8	4	5.6	12	5.2	142	5.2	167
530410004	Washington	6.1	6.0	1	5.8	4	5.6	10	5.5	19	5.3	106	5.3	134
530450007	Washington	5.4	5.4	0	5.4	0	5.3	2	5.1	12	4.8	93	4.8	121
530470013	Washington	10.2	9.6	4	9.5	7	9.4	10	9.0	35	8.6	153	8.6	176
530530024	Washington	6.6	6.6	0	6.4	2	6.3	7	6.1	18	5.8	96	5.8	118
530530029	Washington	7.1	7.0	1	6.7	5	6.6	10	6.3	21	6.0	109	6.0	129
530530031	Washington	7.8	7.8	0	7.6	4	7.5	7	7.2	25	6.9	119	6.9	144
530570011	Washington	5.1	5.0	1	5.0	1	5.0	2	4.9	7	4.5	96	4.5	113

530570015	Washington	4.2	4.2	0	4.2	1	4.1	3	4.0	8	3.7	85	3.7	116
530610020	Washington	7.3	6.7	3	6.2	11	5.9	18	5.8	27	5.5	120	5.6	141
530611007	Washington	8.5	8.4	1	8.4	1	8.2	8	8.0	20	7.8	100	7.8	124
530630017	Washington	7.2	6.7	3	6.6	5	6.4	11	6.3	23	5.6	193	5.6	208
530630047	Washington	7.3	6.9	2	6.7	6	6.6	7	6.4	22	5.7	185	5.7	216
530650002	Washington	5.0	4.7	2	4.7	3	4.5	6	4.3	18	3.5	176	3.5	204
530650005	Washington	8.6	8.4	2	8.1	7	8.1	9	7.8	25	7.4	171	7.4	199
530670013	Washington	4.4	4.4	0	4.3	1	4.3	2	4.1	10	3.8	93	3.8	113
530710005	Washington	6.1	5.7	2	5.6	4	5.6	6	5.4	13	4.7	174	4.7	199
530730019	Washington	5.6	5.5	1	5.4	2	5.3	5	5.2	10	4.7	136	4.7	163
530750003	Washington	5.1	4.9	2	4.7	6	4.7	6	4.4	21	3.4	205	3.4	232
530770005	Washington	9.2	8.9	2	8.8	5	8.7	7	8.3	30	8.0	124	8.0	152
530770009	Washington	8.4	8.1	2	7.9	5	7.9	6	7.7	17	7.4	167	7.4	185
530770015	Washington	9.0	8.7	2	8.5	5	8.4	10	8.1	26	7.6	159	7.6	190
540390020	West Virginia	7.3	7.3	0	7.3	1	7.3	1	7.1	10	6.3	167	6.2	219
540511002	West Virginia	9.6	9.4	2	9.4	2	9.4	3	9.1	21	8.5	193	8.5	242
550030010	Wisconsin	5.3	5.3	0	5.3	0	5.2	6	4.9	22	3.9	203	3.9	250
550090005	Wisconsin	7.6	7.6	0	7.2	6	7.1	9	6.7	30	5.9	223	5.9	259
550250041	Wisconsin	7.6	7.3	3	7.3	3	7.1	8	6.8	25	6.1	216	6.1	268
550250047	Wisconsin	8.6	8.2	3	8.1	4	8.0	10	7.6	31	6.8	218	6.8	286
550270001	Wisconsin	7.3	7.0	2	6.9	4	6.8	8	6.5	23	5.8	224	5.7	272
550350014	Wisconsin	7.7	7.7	0	7.4	6	7.2	10	7.0	25	6.2	227	6.2	278
550410007	Wisconsin	6.0	6.0	0	5.7	5	5.5	9	5.3	19	4.4	212	4.3	242
550430009	Wisconsin	8.5	8.3	2	8.2	4	8.1	7	7.8	28	7.0	236	7.0	295
550532002	Wisconsin	6.7	6.7	0	6.6	2	6.4	6	6.2	16	5.3	211	5.3	257
550590019	Wisconsin	7.4	7.2	2	7.1	3	7.1	5	6.9	16	6.1	231	6.1	282
550790010	Wisconsin	8.9	8.7	2	8.6	3	8.4	8	8.0	38	7.1	215	7.1	284
550790056	Wisconsin	8.6	8.3	2	8.2	4	8.0	8	7.6	37	7.0	227	7.0	282
550812001	Wisconsin	6.7	6.7	0	6.4	4	6.4	5	6.2	16	5.4	200	5.3	249
550870009	Wisconsin	7.9	7.7	2	7.5	6	7.4	9	7.0	32	6.2	232	6.1	271

550890009	Wisconsin	6.7	6.4	2	6.4	3	6.3	6	6.0	20	5.2	241	5.2	283
551110007	Wisconsin	7.3	7.0	2	6.9	4	6.8	8	6.5	23	5.7	216	5.7	263
551330027	Wisconsin	8.8	8.5	2	8.4	3	8.2	9	7.9	33	7.1	219	7.0	278
560010012	Wyoming	2.4	2.4	0	2.4	0	2.4	1	2.3	4	2.0	85	1.9	107
560051002	Wyoming	5.8	5.8	0	5.5	4	5.3	11	4.9	31	3.9	234	3.9	260
560131003	Wyoming	6.2	6.2	0	6.1	2	6.1	2	6.0	6	5.7	110	5.8	137
560210100	Wyoming	4.6	4.6	0	4.5	1	4.5	1	4.4	8	3.8	141	3.8	178
560250100	Wyoming	3.5	3.5	0	3.5	0	3.4	2	3.3	7	2.7	136	2.6	173
560290001	Wyoming	3.8	3.8	0	3.8	0	3.8	1	3.6	9	2.8	164	2.7	197
560330002	Wyoming	7.3	7.2	1	6.7	9	6.6	13	6.1	38	5.5	193	5.5	212
560350101	Wyoming	3.5	3.5	0	3.5	0	3.5	0	3.5	3	3.0	120	3.0	130
560370007	Wyoming	4.0	4.0	0	4.0	0	3.9	1	3.9	3	3.4	110	3.3	125

DV0: Design value calculated using all valid 2022-2024 data.

DV1: Design values excluding high probability smoke days with $PM_{2.5} > 100 \mu g m^{-3}$

DV2: Design values excluding high probability smoke days with $PM_{2.5} > 50 \mu g m^{-3}$

DV3: Design values excluding high probability smoke days with $PM_{2.5} > 35 \mu g m^{-3}$

DV4: Design values excluding high probability smoke days with $PM_{2.5} > 20 \mu g m^{-3}$

DV5: Design values excluding high probability smoke days.

DV6: Design values excluding probable smoke days.

Note that in a few cases, DV5 is greater than DV4 since some of the days excluded have moderate $PM_{2.5}$ concentrations (but still $PM_{2.5}$ on all smoke days must be greater than $PM_{2.5}$ criteria for that site and month). A similar result is found for DV6.

