# Texas: San Antonio

# Final Area Designations for the 2015 Ozone National Ambient Air Quality Standards Technical Support Document

## 1.0 Summary

This technical support document (TSD) describes the EPA's final designation for the San Antonio area in Texas for the 2015 ozone National Ambient Air Quality Standards (NAAQS). The final designations for other areas in Texas were announced on April 30, 2018, and November 6, 2017 and are in the docket for this action.

On October 1, 2015, the EPA promulgated revised primary and secondary ozone NAAQS (80 FR 65292; October 26, 2015). The EPA strengthened both standards to a level of 0.070 parts per million (ppm). In accordance with Section 107(d) of the Clean Air Act (CAA), whenever the EPA establishes a new or revised NAAQS, the EPA must promulgate designations for all areas of the country for that NAAQS.

Under CAA section 107(d), states were required to submit area designation recommendations to the EPA for the 2015 ozone NAAQS no later than 1 year following promulgation of the standards, i.e., by October 1, 2016. Tribes were also invited to submit area designation recommendations. On September 30, 2016, the State of Texas submitted to the EPA its recommendations for nonattainment counties. On August 23, 2017, Texas submitted updated recommendations.[1] In a letter dated September 27, 2017, the State of Texas urged EPA not to move forward with any nonattainment designations for new areas, such as the San Antonio area in Bexar County, at this time. On January 19, 2018, the EPA Region 6 sent a letter to Governor Abbott asking whether he intended the September 27, 2017 letter to serve as a revision to the September 30, 2016 recommended designations for the counties in the San Antonio area. On February 28, 2018, the Governor of Texas responded to the EPA, urging the EPA to designate the area as attainment or no worse than, unclassifiable.[2]

After considering Texas' recommendations, comments received during the public comment period, along with additional information submitted by Texas, and based on the EPA's technical analysis as described in this TSD, the EPA is modifying the state's recommendation and is designating the area listed in Table 1 as nonattainment for the 2015 ozone NAAQS. The EPA must designate an area nonattainment if it has an air quality monitor that is violating the standard or if it has sources of emissions that are contributing to a violation of the NAAQS in a nearby area. A detailed description of the nonattainment boundary for this area is found in Section 3 of the supporting technical analysis for the area. The EPA is designating the remaining counties in the San Antonio area as attainment/unclassifiable, consistent with the state's recommendation.

[1] All the state and tribal recommendations submitted to EPA are available at https://www.epa.gov/ozone-designations/2015-ozone-standards-state-recommendations.
[2] These letters are posted in the docket for this action.

**Table 1. Texas's Recommended Nonattainment Area and the EPA's Final Designated Nonattainment Area for the 2015 Ozone NAAQS**

| Area | Texas's Recommended Nonattainment Counties | EPA's Final Nonattainment Counties |
|---|---|---|
| San Antonio, TX | None | Bexar County |

On November 6, 2017 (82 FR 54232; November 16, 2017), the EPA signed a final rule designating most of the areas Texas did not recommend for designation as nonattainment as attainment/unclassifiable.[3] On December 22, 2017, the EPA announced its final designations for the remaining areas, except the eight counties in the San Antonio, Texas area (see 83 FR 651, January 5, 2018). On April 30, 2018, the EPA finalized the designations for these areas with the exception of the San Antonio, Texas area. The EPA announced its intended designations for eight counties in the San Antonio, Texas area on March 19, 2018. The EPA explains in section 2.0 the approach it is now taking to designate this remaining area in the State of Texas. No areas of Indian Country are affected by this action.

## 2.0 Nonattainment Area Analyses and Boundary Determination

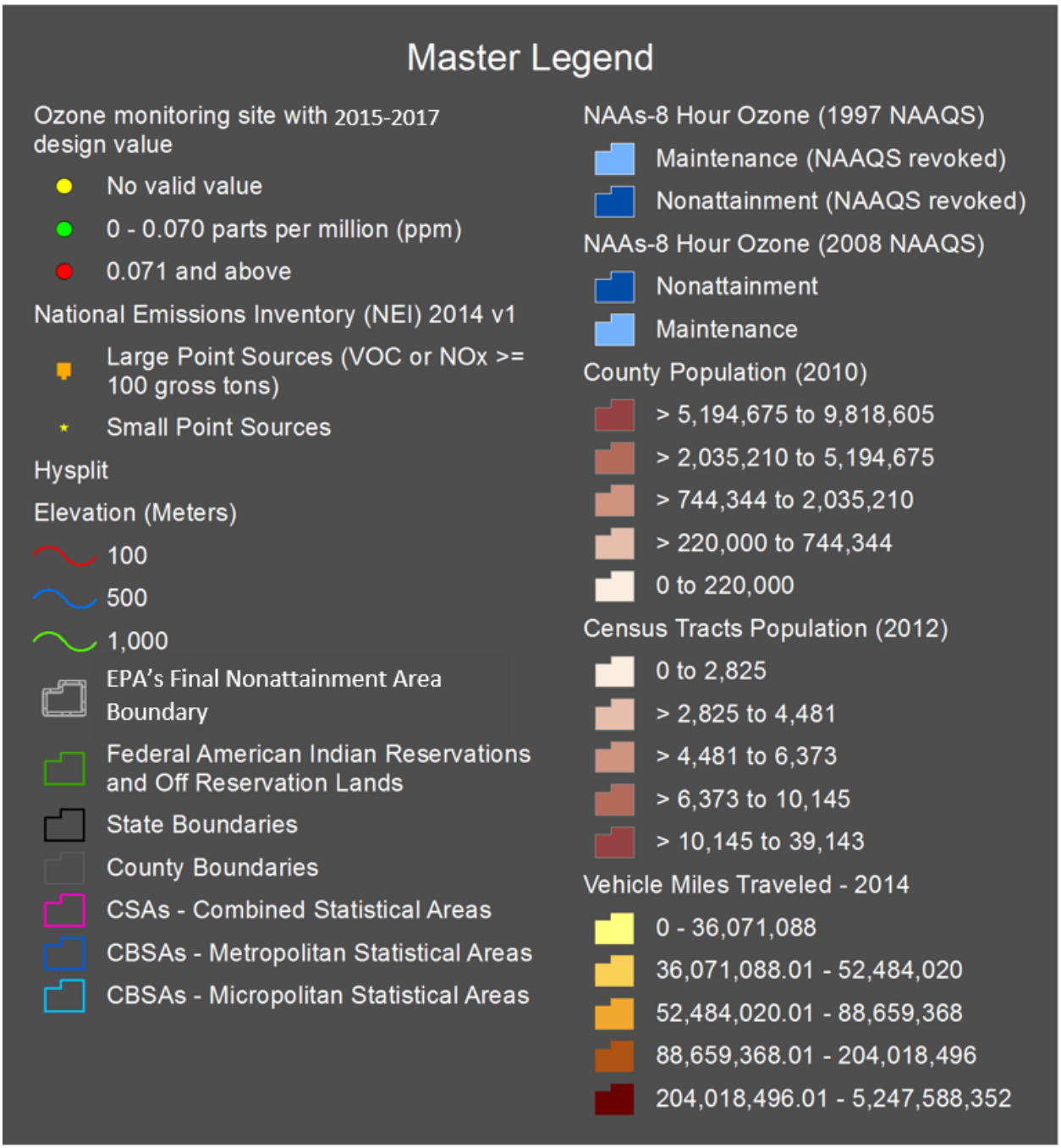
The EPA evaluated and determined the boundaries for each nonattainment area on a case-by-case basis, considering the specific facts and circumstances of the area. In accordance with the CAA section 107(d), the EPA is designating as nonattainment the areas with the monitors that are violating the 2015 ozone NAAQS. As described in the EPA's designations guidance for the 2015 NAAQS (hereafter referred to as the "ozone designations guidance"[4] after identifying each monitor indicating a violation of the ozone NAAQS in an area, the EPA analyzed those nearby areas with emissions potentially contributing to the violating area. In guidance issued in February 2016, the EPA provided that using the Core Based Statistical Area (CBSA) or Combined Statistical Area (CSA)[5] as a starting point for the contribution analysis is a reasonable approach to ensure that the nearby areas most likely to contribute to a violating area are evaluated. The area-specific analyses may support establishing nonattainment area boundaries that are smaller or larger than the CBSA or CSA.

[3] In previous ozone designations and in the designation guidance for the 2015 ozone NAAQS, the EPA used the designation category label Unclassifiable/Attainment to identify both areas that were monitoring attainment and areas that did not have monitors but for which the EPA had reason to believe were likely attainment and were not contributing to a violation in a nearby area. The EPA is now reversing the order of the label to be Attainment/Unclassifiable so the category is more clearly distinguished from the separate Unclassifiable category.
[4] The EPA issued guidance on February 25, 2016 that identified important factors that the EPA intends to evaluate in determining appropriate area designations and nonattainment boundaries for the 2015 ozone NAAQS. Available at *https://www.epa.gov/ozone-designations/epa-guidance-area-designations-2015-ozone-naaqs*
[5] Lists of CBSAs and CSAs and their geographic components are provided at www.census.gov/population/www/metroareas/metrodef.html. The Office of Management and Budget (OMB) adopts standards for defining statistical areas. The statistical areas are delineated based on U.S. Census Bureau data. The lists are periodically updated by the OMB. The EPA used the most recent July 2015 update (OMB Bulletin No. 15-01), which is based on application of the 2010 OMB standards to the 2010 Census, 2006-2010 American Community Survey, as well as 2013 Population Estimates Program data.

On November 6, 2017, the EPA issued attainment/unclassifiable designations for approximately 85% of the United States and one unclassifiable area designation.[6] At that time, consistent with statements in the designations guidance regarding the scope of the area the EPA would analyze in determining nonattainment boundaries, the EPA deferred designation for any counties in the larger of a CSA or CBSA where one or more counties in the CSA or CBSA was violating the standard and any counties with a violating monitor not located in a CSA or CBSA. In addition, the EPA deferred designation for any other counties adjacent to a county with a violating monitor. The EPA also deferred designation for any county that had incomplete monitoring data, any county in the larger of the CSA or CBSA where such a county was located, and any county located adjacent to a county with incomplete monitoring data. In the San Antonio area, Atascosa, Bandera, Bexar, Guadalupe, Comal, Kendall, Medina and Wilson Counties were deferred.

The EPA is completing the remaining designations consistent with the designations guidance (and EPA's past practice) regarding the scope of the area the EPA would analyze in determining nonattainment boundaries for the ozone NAAQS as outlined above. For the San Antonio, Texas area the technical analysis for the nonattainment area includes any counties in the larger of the relevant CSA or CBSA. These are the eight counties identified above.

[6] Air Quality Designations for the 2015 Ozone National Ambient Air Quality Standards published on November 16, 2017(82 FR 54232).




Figures in the remainder of this document refer to the master legend above.

## 3.0 Technical Analyses

This technical analysis identifies the area with monitors that violate the 2015 ozone NAAQS. It also provides EPA's evaluation of the area and any nearby areas to determine whether those nearby areas have emissions sources that potentially contribute to ambient ozone concentrations at the violating monitors in the area, based on the weight-of-evidence of the five factors recommended in the EPA's ozone designations guidance and any other relevant information. In developing this technical analysis, the EPA used the latest data and information available to the EPA (and to the states and tribes through the Ozone Designations Mapping Tool and the EPA Ozone Designations Guidance and Data web page).[7] In addition, the EPA considered any additional data or information provided to the EPA by states, tribes, or the public.

The five factors recommended in the EPA's guidance are:

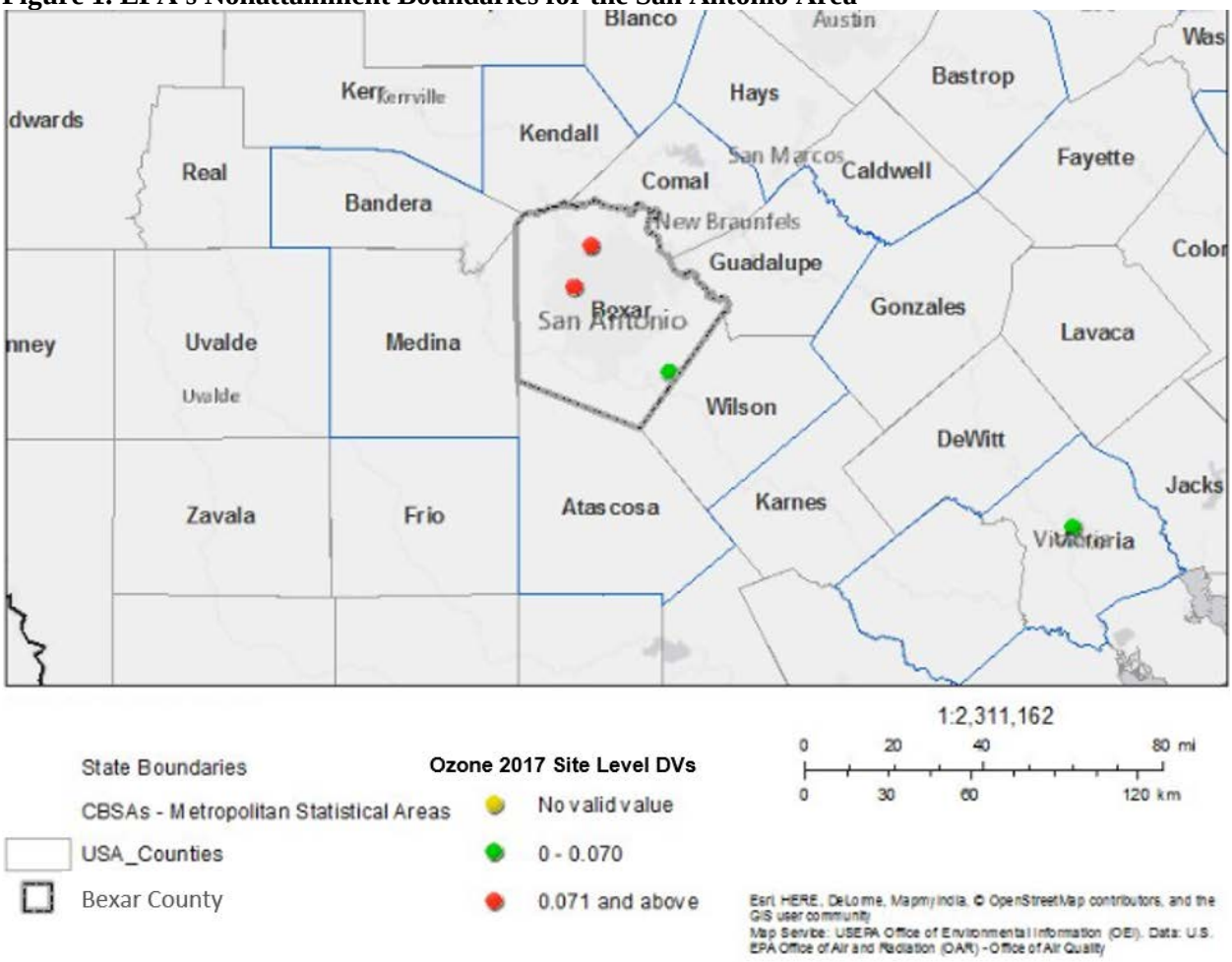
1. Air Quality Data (including the design value calculated for each Federal Reference Method (FRM) or Federal Equivalent Method (FEM) monitor;
2. Emissions and Emissions-Related Data (including locations of sources, population, amount of emissions, and urban growth patterns);
3. Meteorology (weather/transport patterns);
4. Geography/Topography (including mountain ranges or other physical features that may influence the fate and transport of emissions and ozone concentrations); and
5. Jurisdictional Boundaries (e.g., counties, air districts, existing nonattainment areas, areas of Indian country, Metropolitan Planning Organizations (MPOs)).

The CBSA is known as San Antonio-New Braunfels and includes eight counties: Atascosa, Bandera, Bexar, Comal, Guadalupe, Kendall, Medina, and Wilson. There is not a CSA that includes any of the counties in the San Antonio-New Braunfels CBSA. The CBSA is shown in Figure 1 below and we refer to these eight counties as the area of analysis. Figure 1 also shows the EPA's nonattainment boundary, the ambient air quality monitors, county and other jurisdictional boundaries. For purposes of the 1997 ozone NAAQS, three counties within the area of analysis were designated nonattainment/deferred: Bexar, Comal, and Guadalupe.[8] For purposes of the 2008 ozone NAAQS, all the counties within the area of analysis were designated as unclassifiable/attainment.

[7] The EPA's Ozone Designations Guidance and Data web page can be found at *https://www.epa.gov/ozone-designations/ozone-designations-guidance-and-data.*

[8] These areas received a deferred effective date of the designation because of their participation in the EPA's Early Action Compact program. To participate in that program, the areas agreed to reduce ground-level ozone pollution earlier than the CAA would require (see 69 FR 23858, April 30, 2004) and met specified milestone. Consistent with the goal of the program, these counties met the required milestones, attained the 1997 ozone standard, and were designated as attainment for that standard on April 2, 2008 (73 FR 17897).

**Figure 1. EPA's Nonattainment Boundaries for the San Antonio Area**




The EPA must designate as nonattainment any area that violates the NAAQS and any nearby areas that contribute to the violation in the violating area. Bexar County has two monitors in violation of the 2015 ozone NAAQS, therefore Bexar County is included in the final nonattainment area. The following sections describe the weight-of-evidence five-factor analysis for the eight counties in the area of analysis. While the factors are presented individually, they are not independent. The five-factor analysis process carefully considers the interconnections among the different factors and the dependence of each factor on one or more of the others, such as the interaction between emissions and meteorology for the area being evaluated.

## Factor Assessment

### Factor 1: Air Quality Data

The EPA considered 8-hour ozone design values in ppm for air quality monitors in the area of analysis based on data for the most recent three-year period (i.e., the design value, or DV) with fully-certified air quality data. As described in the EPA's ozone designations guidance, EPA evaluates areas using the most recent complete three consecutive calendar years of quality-assured, certified air quality data in the EPA Air Quality System (AQS). In accordance with 40 CFR 58.15, states are required to certify their air

monitoring data for the previous year by May 1 of each year. Texas certified their 2017 data on May 1, 2018. The 2015-2017 design values for the San Antonio-New Braunfels CBSA show violations of the NAAQS at two monitors in Bexar County. The two violating monitors (Camp Bullis and Northwest) are the same monitors that showed violations of the NAAQS with 2014-2016 design values. The EPA used the 2014-2016 DVs as the basis for the intended designations for the San Antonio, Texas area in the 120-day letter sent to Texas on March 19, 2018. The 2014-2016 DVs for the San Antonio-New Braunfels CBSA are shown in Table 2a below and the 2015-2017 DVs for this CBSA are shown in Table 2b below.

**Table 2a. 2014-2016 Air Quality Data (all values in ppm)[a]**

| County | State Recommended Nonattainment? | AQS Site ID | 2014-2016 DV | 2014 4th highest daily max value | 2015 4th highest daily max value | 2016 4th highest daily max value |
|---|---|---|---|---|---|---|
| Atascosa | No | No monitor | N/A | | | |
| Bandera | No | No monitor | N/A | | | |
| Bexar | No | 480290052 "Camp Bullis" | **0.073** | 0.072 | 0.080 | 0.069 |
| | | 480290032 "Northwest" | **0.073** | 0.069 | 0.079 | 0.071 |
| | | 480290059 "Calaveras Lake" | 0.064 | 0.063 | 0.068 | 0.062 |
| Guadalupe | No | No monitor | N/A | | | |
| Comal | No | No monitor | N/A | | | |
| Kendall | No | No monitor | N/A | | | |
| Medina | No | No monitor | N/A | | | |
| Wilson | No | No monitor | N/A | | | |

[a] The highest design value in each county is indicated in bold type.
N/A means that no data exists for the county.

**Table 2b. 2015-2017 Air Quality Data (all values in ppm)[a]**

| County | State Recommended Nonattainment? | AQS Site ID | 2015-2017 DV | 2015 4th highest daily max value | 2016 4th highest daily max value | 2017 4th highest daily max value |
|---|---|---|---|---|---|---|
| Atascosa | No | No monitor | N/A | | | |
| Bandera | No | No monitor | N/A | | | |
| Bexar | No | 480290052 "Camp Bullis" | **0.073** | 0.080 | 0.069 | 0.072 |
| | | 480290032 "Northwest" | **0.074** | 0.079 | 0.071 | 0.073 |
| | | 480290059 "Calaveras Lake" | 0.065 | 0.068 | 0.062 | 0.065 |
| Guadalupe | No | No monitor | N/A | | | |
| Comal | No | No monitor | N/A | | | |
| Kendall | No | No monitor | N/A | | | |
| Medina | No | No monitor | N/A | | | |
| Wilson | No | No monitor | N/A | | | |

[a] The highest design value in each county is indicated in bold type.
N/A means that no data exists for the county.

Two of the regulatory monitors in Bexar County show a violation of the 2015 ozone NAAQS, therefore Bexar County is included in the nonattainment area. A county (or partial county) must also be designated nonattainment if it contributes to a violation in a nearby area. Each county without a violating monitor that is located near a county with a violating monitor has been evaluated based on the weight-of-evidence of the five factors and other relevant information to determine whether it contributes to the nearby violation.

Figure 1, shown previously, identifies the San Antonio nonattainment area (Bexar County), the San Antonio-New Braunfels CBSA boundary (outlined in blue) and the violating monitors. Tables 2a and 2b identify the 2014-2016 and 2015-2017 DVs for all monitors in the area of analysis and Figure 2 below shows the historical trend of DVs for the violating monitors. As indicated on the map, there are three regulatory monitors in the area of analysis, two of which are violating the 2015 ozone NAAQS. The two violating monitors are in the northwest quadrant of Bexar County. There is also one monitor in the southeast quadrant of Bexar County that is not violating based on air quality data from 2014-2016 and 2015-2017. As shown in Figure 2, even with the increases in the 2010, 2012, and 2013 design values and recent uptick at the Northwest monitor, the overall trend in three-year design values is downward.

**Figure 2. Three-Year Design Values for Violating Monitors (2006-2017)**


Bexar County has two violating monitors with 2014-2016 design values of 0.073 ppm, and 2015-2017 design values of 0.073 ppm and 0.074 ppm. The other monitor in the CBSA has a 2014-2016 design value of 0.064 ppm and a 2015-2017 design value of 0.065 ppm. Therefore, EPA is designating Bexar County as nonattainment. The remaining counties in the CBSA are evaluated for contribution to violating monitors using the weight-of-evidence of the five factors. Any nearby areas determined to be contributing to the two violating monitors would be included in the designated nonattainment area.

**Factor 2: Emissions and Emissions-Related Data**

The EPA evaluated ozone precursor emissions of nitrogen oxides (NOx) and volatile organic compounds (VOC) and other emissions-related data that provide information on areas contributing to violating monitors.

**Emissions Data**

The EPA reviewed data from the 2014 National Emissions Inventory (NEI).[9] For each county in the area of analysis, the EPA examined the magnitude of large sources (NOx or VOC emissions greater than 100 tons per year (tpy)) and small point sources and the magnitude of county-level emissions reported in the

[9] The NEI numbers do not include biogenic emissions.

NEI. These county-level emissions represent the sum of emissions from the following general source categories: point sources, non-point (i.e., area) sources, non-road mobile, on-road mobile, and fires. Emissions levels from sources in a nearby area indicate the potential for the area to contribute to monitored violations.

Table 3 below provides a county-level emissions summary of NOx and VOC emissions for the area of analysis considered for inclusion in the San Antonio nonattainment area.

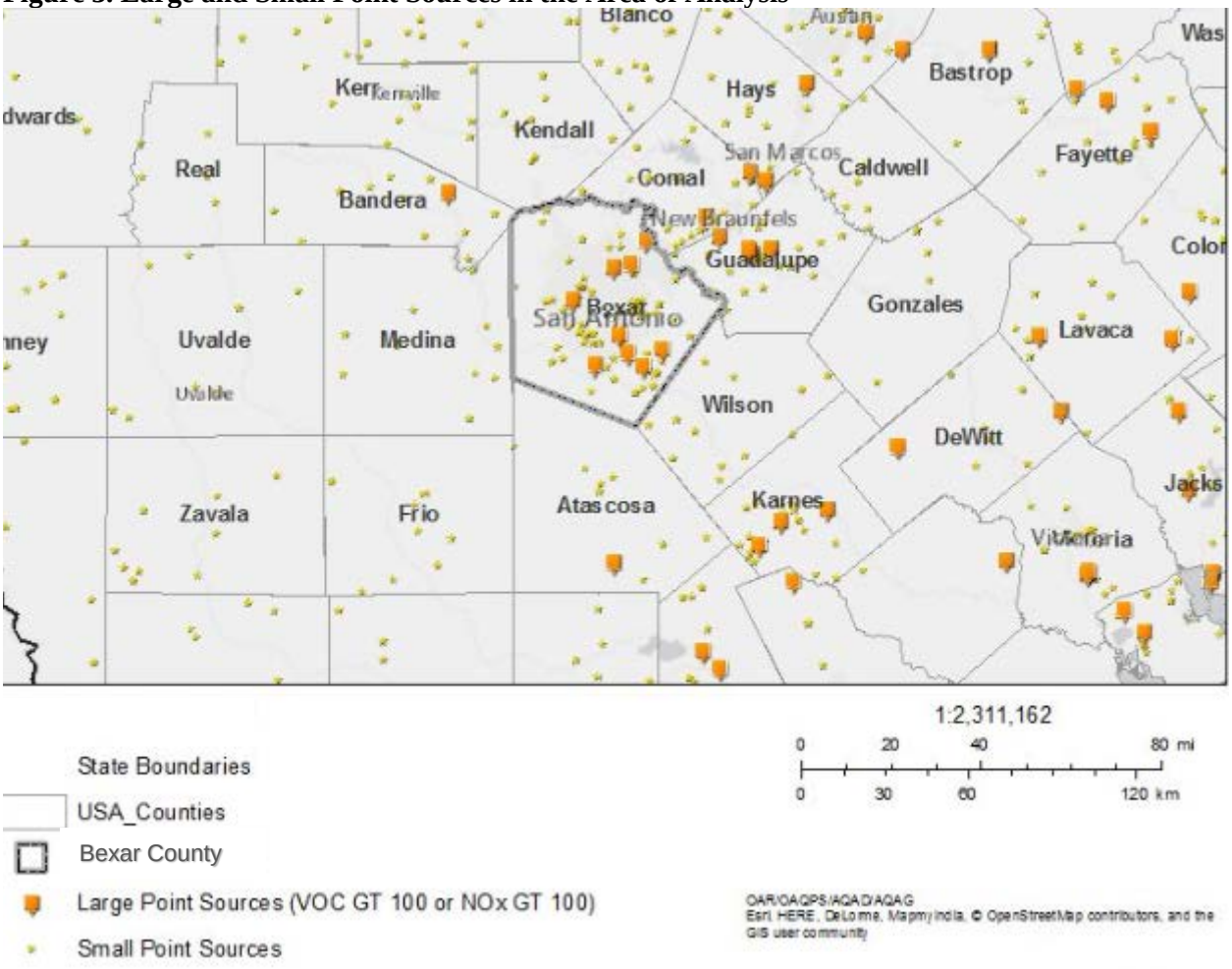
**Table 3. Total County-Level NOx and VOC Emissions**

| County | State Recommended Nonattainment? | Total NOx (tpy) | Total VOC (tpy) |
|---|---|---|---|
| **Bexar** | **No** | **38,094** | **35,111** |
| Atascosa | No | 8,097 | 8,960 |
| Comal | No | 7,282 | 3,863 |
| Guadalupe | No | 4,704 | 6,565 |
| Medina | No | 2,379 | 3,047 |
| Wilson | No | 1,889 | 2,885 |
| Kendall | No | 983 | 1,097 |
| Bandera | No | 593 | 1,122 |
| | Area wide: | 64,021 | 62,750 |

Counties with monitors violating the NAAQS are indicated in bold.

In addition to reviewing county-wide emissions of $NO_x$ and VOC in the area of analysis, the EPA also reviewed emissions from large point sources. The location of these sources, together with the other factors, can help inform nonattainment boundaries. Locations of the large and small point sources are shown in Figure 3 below. The nonattainment boundary is also shown.

**Figure 3. Large and Small Point Sources in the Area of Analysis**




In summary, the EPA's analysis of relevant county-level emissions and the geographic locations of the relevant emissions showed that Bexar County has higher NOx emissions than the other counties. The counties with the next highest levels of NOx emissions, Atascosa and Comal Counties, have NOx emissions that are approximately 21 and 19 percent of the emissions in Bexar County, respectively. After Atascosa and Comal, the county with the next highest NOx emissions - Guadalupe – has approximately 12 percent of those in Bexar County. The NOx emissions in the remaining counties are all less than 7 percent of the level in Bexar County with the lowest emissions in Kendall and Bandera Counties.

Bexar County also has the highest VOC emissions with Atascosa County emitting approximately 26 percent of that amount and Guadalupe approximately 19 percent. VOC emissions in Comal County are approximately 11 percent the level in Bexar County and Medina and Wilson approximately 9 and 8 percent, respectively. VOC emissions in the remaining counties are less than 4 percent of the level in Bexar County with the lowest emissions in Kendall and Bandera Counties.

The large and small sources are most heavily concentrated in Bexar County, which has 9 large sources. Guadalupe County has 4 large sources, Comal has 3, and Atascosa and Bandera Counties each have one large point source. Wilson, Medina and Kendall Counties have no large point sources.

## Population Density and Degree of Urbanization

The EPA evaluated the population and vehicle use characteristics and trends of the area as indicators of the probable location and magnitude of non-point source emissions. These include emissions of NOx and VOC from on-road and non-road vehicles and engines, consumer products, residential fuel combustion, and consumer services. Areas of dense population or commercial development are an indicator of area source and mobile source NOx and VOC emissions that may contribute to violations of the NAAQS. Table 4 shows the population, population density, and population growth information for each county in the area of analysis. Figure 4 contains a county-level density map of the area of analysis.

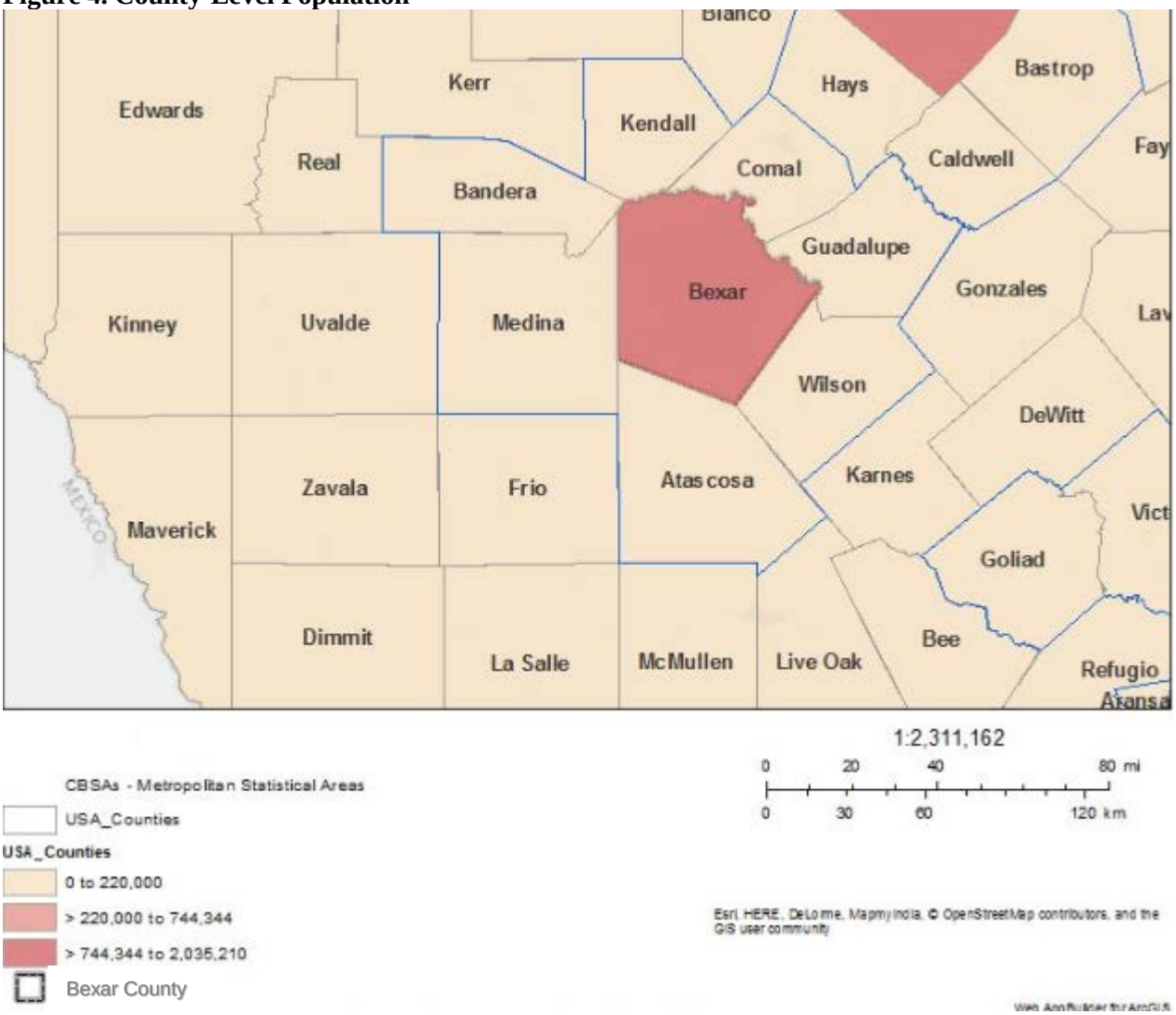
**Table 4. Population and Growth**

| County | State Recommended Nonattainment? | 2010 Population | 2015 Population | 2015 Population Density (per sq. mi.) | Absolute change in population (2010-2015) | Population % change (2010-2015) |
|---|---|---|---|---|---|---|
| **Bexar** | **No** | **1,714,773** | **1,897,753** | **1,531** | **182,980** | **11** |
| Guadalupe | No | 131,533 | 151,249 | 213 | 19,716 | 15 |
| Comal | No | 108,472 | 129,048 | 231 | 20,576 | 19 |
| Atascosa | No | 44,911 | 48,435 | 40 | 3,524 | 8 |
| Medina | No | 46,006 | 48,417 | 37 | 2,411 | 5 |
| Wilson | No | 42,918 | 47,520 | 59 | 4,602 | 11 |
| Kendall | No | 33,410 | 40,384 | 61 | 6,974 | 21 |
| Bandera | No | 20,485 | 21,269 | 27 | 784 | 4 |
| | Area wide: | 2,142,508 | 2,384,075 | 326 | 241,567 | 11 |

Source: U.S. Census Bureau population estimates for 2010 and 2015. www.census.gov/data.html
Counties with monitors violating the NAAQS are indicated in bold.

The 2015 Census data indicate that the majority of the population in the area of analysis (nearly 80 percent) reside in Bexar County, and it the most densely populated, with 1530 people per square mile. The next most populated counties are Comal and Guadalupe, each with less than 10 percent of Bexar County's population and the population densities are about 13 percent of that in Bexar County. The remaining counties are significantly less populous (see Figure 4 below) and less densely populated as well, with Bandera ranking the lowest in both metrics. There has been moderate to high population growth in the area – the highest growth was in Kendall and Comal Counties at 21 and 19 percent, followed by Guadalupe at 15 percent, and Bexar and Wilson at 11 percent each. Atascosa, Medina and Bandera Counties experienced 8, 5, and 4 percent growth, respectively.

**Figure 4. County-Level Population**




## Traffic and Vehicle Miles Travelled (VMT)

The EPA evaluated the commuting patterns of residents, as well as the total vehicle miles traveled (VMT) for each county in the area of analysis.[10] In combination with the population/population density data and the location of main transportation arteries, this information helps identify the probable location of non-point source emissions. A county with high VMT and/or a high number of commuters is generally an integral part of an urban area and indicates the presence of motor vehicle emissions that may contribute to violations of the NAAQS. Rapid population or VMT growth in a county on the urban perimeter may signify increasing integration with the core urban area, and thus could indicate that the associated area source and mobile source emissions may be appropriate to include in the nonattainment area. In addition to VMT, the EPA evaluated worker data collected by the U.S. Census Bureau for the CBSA.[11] Table 5 below shows the traffic and commuting pattern data, including total VMT for each county, the number of

[10] The VMT data are available from the NEI (see https://www.epa.gov/air-emissions-inventories/national-emissions-inventory-nei). See also https://www.epa.gov/ozone-designations/ozone-designations-guidance-and-data.
[11] The worker data can be accessed at: http://onthemap.ces.census.gov/.

residents who work in each county and number of residents commuting to Bexar County (which has the violating monitors), and the percent of residents commuting to Bexar County. The data in Table 5 are 2014 data.

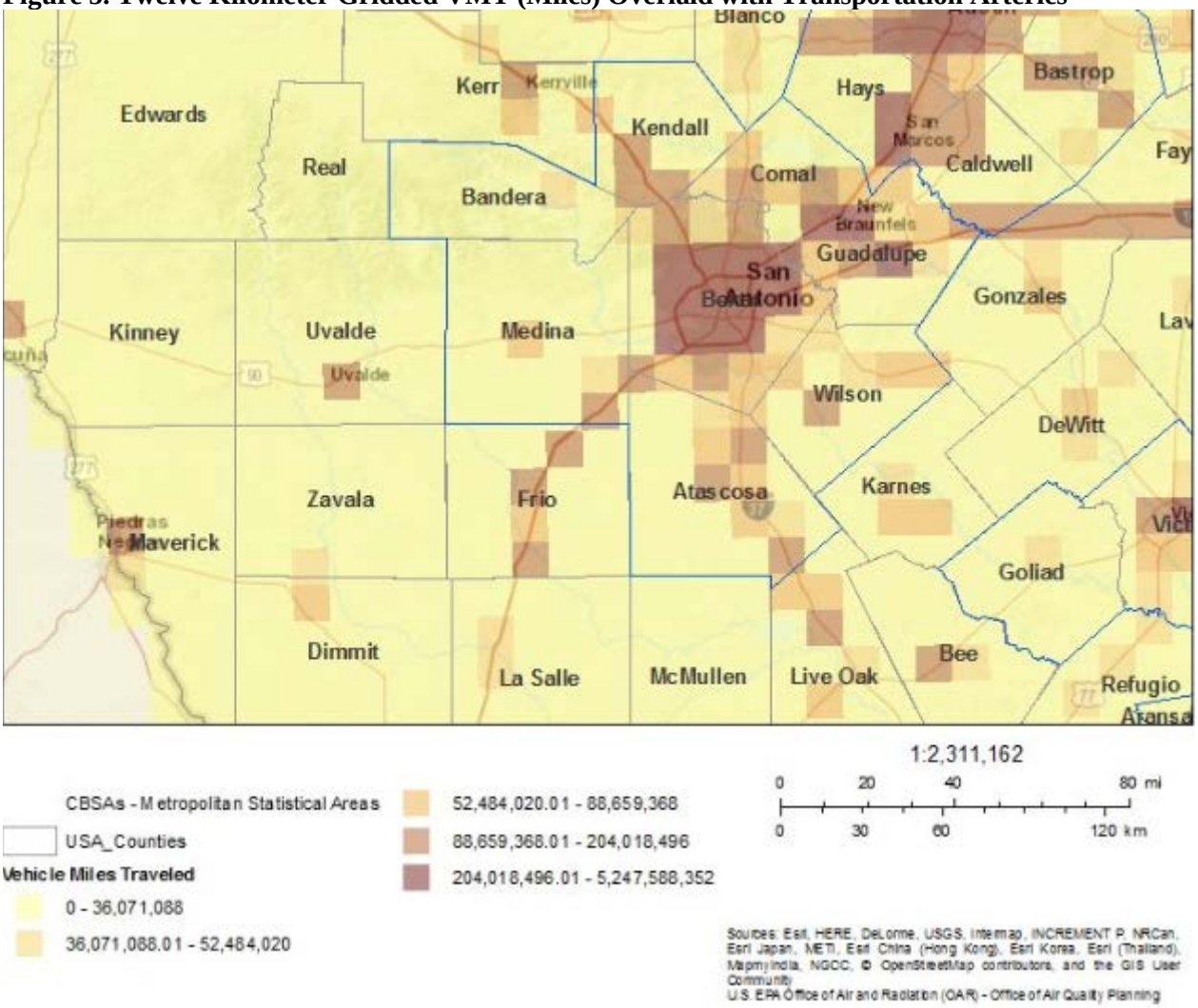
**Table 5. Traffic and Commuting Patterns**

| County | State Recommended Nonattainment? | 2008 Total VMT (Million Miles) | 2014 Total VMT (Million Miles) | VMT Growth 2008 to 2014 (percent) | Number of County Residents Who Work | Number Commuting to or Within County with Violating Monitors | Percentage Commuting to or Within County with Violating Monitors |
|---|---|---|---|---|---|---|---|
| **Bexar** | **No** | **14,497** | **15,515** | **7%** | **745,493** | **579,420** | **77.7%** |
| Comal | No | 1,421 | 1,642 | 15.5% | 52,488 | 16,981 | 32.4% |
| Guadalupe | No | 1,230 | 1,391 | 13.1% | 64,271 | 23,079 | 35.9% |
| Atascosa | No | 610 | 832 | 36.4% | 18,781 | 6,874 | 36.6% |
| Medina | No | 526 | 572 | 8.7% | 18,512 | 7,929 | 42.8% |
| Wilson | No | 358 | 472 | 31.6% | 21,030 | 8,936 | 42.5% |
| Kendall | No | 392 | 405 | 3.3% | 15,139 | 6,625 | 43.8% |
| Bandera | No | 167 | 165 | -0.9% | 8,088 | 2,998 | 37.1% |
| | Totals: | 19,201 | 20,994 | 9.3% | 943,802 | 652,842 | 69.2% |

Counties with monitors violating the NAAQS are indicated in bold.

To show traffic and commuting patterns, Figure 5 (below) overlays twelve-kilometer gridded VMT from the 2014 NEI with a map of the transportation arteries.

**Figure 5. Twelve Kilometer Gridded VMT (Miles) Overlaid with Transportation Arteries**




Counties are listed in Table 5 in order of VMT from largest to smallest. The county with violating monitors (Bexar) has the largest VMT of the eight counties in the area of analysis. While Comal and Guadalupe Counties have the second and third highest VMT, which account for about 8 percent and 7 percent of the VMT in the area of analysis, respectively, less than 16% of the population in each of those counties commutes to Bexar County for work. Bexar County accounts for approximately 74 percent of the VMT in the area of analysis. Approximately 19 percent of the population in Wilson County commutes to Bexar County for work and Wilson County contributes about 2 percent of the VMT in the area of analysis. Approximately 16 percent of the population in each of Medina and Kendall Counties commutes to Bexar County for work and these counties each contribute 3 percent or less of the VMT in the area of analysis. Approximately 14 percent of the population in each of Atascosa and Bandera Counties commutes to Bexar County for work and these counties each contribute 4 percent or less of the VMT in the area of analysis.

**Factor 3: Meteorology**

Evaluation of meteorological data helps to assess the fate and transport of emissions contributing to ozone concentrations and to identify areas potentially contributing to the monitored violations. Results of meteorological data analysis may inform the determination of nonattainment area boundaries. In order to determine how meteorological conditions, including, but not limited to, weather, transport patterns, and stagnation conditions, could affect the fate and transport of ozone and precursor emissions from sources in the area. The EPA conducted analyses to better understand the area's meteorological transport conditions using the National Oceanic and Atmospheric Administration Hybrid Single Particle Lagrangian Integrated Trajectory Model (NOAA HYSPLIT or HYSPLIT). The HYSPLIT model yields an estimate of the path an air mass has traveled before reaching a monitor at a specific location and time. Specifically, the model provides the centerline of the probable path. By evaluating these estimates of where an air mass has traveled before reaching a monitor where an exceedance has occurred, one can consider what potential areas and emission sources could have contributed to the exceedance. The EPA evaluated 2014-2016 HYSPLIT trajectories at 100, 500, and 1000 meters AGL that illustrate the three-dimensional paths traveled by air parcels to a violating monitor. Figures 6a and 6b show the 24-hour HYSPLIT back trajectories for each exceedance day (i.e., daily maximum 8-hour values that exceed the 2015 ozone NAAQS) for the violating monitors.

**Figure 6a. HYSPLIT Back Trajectories for 2014-2016 at the Camp Bullis Violating Monitor**

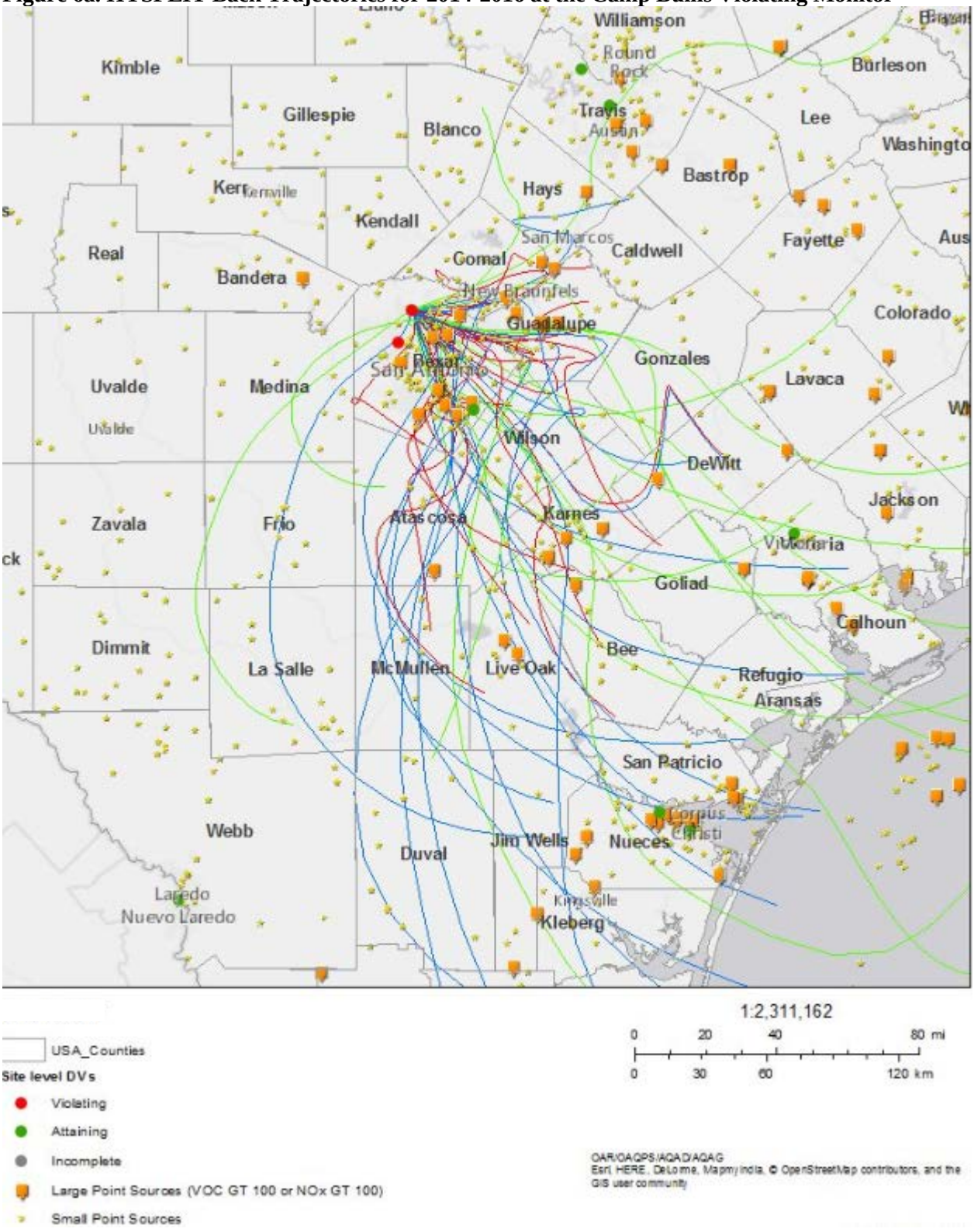
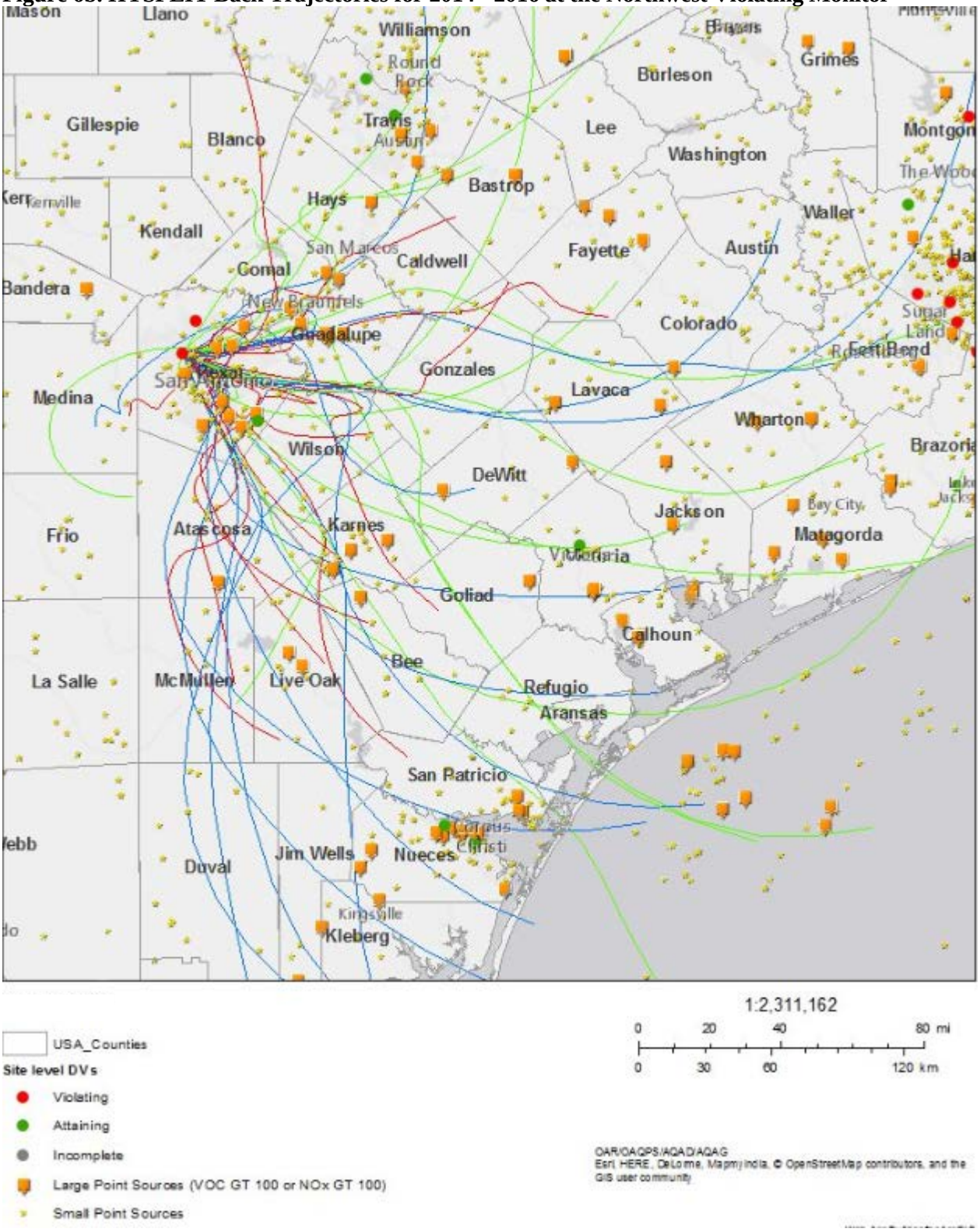


**Figure 6b. HYSPLIT Back Trajectories for 2014 - 2016 at the Northwest Violating Monitor**



The HYSPLIT data show that the back trajectories for each exceedance day are predominantly from the east, southeast, and south, with very few trajectories directly from the north, northwest, west, and southwest. Thus, these HYSPLIT maps show an absence of back trajectories from Bandera and Kendall Counties to the violating monitors in nearby Bexar County on days when those monitors exceeded the 2015 ozone NAAQS.

**Factor 4: Geography/topography**

Consideration of geography or topography can provide additional information relevant to defining nonattainment area boundaries. Analyses should examine the physical features of the land that might define the airshed. Mountains or other physical features may influence the fate and transport of emissions as well as the formation and distribution of ozone concentrations. The absence of any such geographic or topographic features may also be a relevant consideration in selecting boundaries for a given area.

The EPA used geography/topography analysis to evaluate the physical features of the land that might affect the airshed and, therefore, the distribution of ozone over the area.

The San Antonio area does not have any geographical or topographical features significantly limiting air pollution transport within its air shed. Therefore, we did not weigh this factor in our weight-of-evidence analysis.

**Factor 5: Jurisdictional boundaries**

Once the geographic extent of the violating area and the nearby area contributing to violations is determined, the EPA considered existing jurisdictional boundaries for the purposes of providing a clearly defined legal boundary to carry out the air quality planning and enforcement functions for nonattainment areas. In defining the boundaries of the San Antonio nonattainment area, the EPA considered existing jurisdictional boundaries, which can provide easily identifiable and recognized boundaries for purposes of implementing the NAAQS. Examples of jurisdictional boundaries include, but are not limited to: counties, air districts, areas of Indian country, metropolitan planning organizations, and existing nonattainment areas. If an existing jurisdictional boundary is used to help define the nonattainment area, it must encompass all of the area that has been identified as meeting the nonattainment definition. Where existing jurisdictional boundaries are not adequate or appropriate to describe the nonattainment area, the EPA considered other clearly defined and permanent landmarks or geographic coordinates for purposes of identifying the boundaries of the designated areas.

The area of analysis has a previously established nonattainment boundary associated with the 1997 ozone NAAQS which included Bexar, Comal, and Guadalupe Counties.[12] The previous nonattainment boundary for the area falls within the boundary of the metropolitan planning organization (MPO) known as the Alamo Area Council of Governments (AACOG), which serves all 8 counties in the area of analysis, plus Frio, Gillespie, Karnes, Kerr, and McMullen Counties. Among other services, the AACOG provides program specific technical assistance for regional planning in the areas of economic development, air

[12] See 69 FR 23858, April 30, 2014. The effective date of designation for nonattainment was deferred because the State and 3-county area participated in the Early Action Compact. The area was ultimately designated as attainment on April 2, 2008 (73 FR 17897).

quality, and transportation. Texas does not have jurisdiction in Indian country and the area of analysis does not include Indian country.

**Texas Modeling Results Submitted**

On February 28, 2018, the Governor of Texas provided a letter, urging the EPA to designate the area as attainment or at most, unclassifiable.[13] That letter included information on a photochemical modeling analysis that is discussed in more detail below.

Texas used a photochemical model known as the Comprehensive Air Quality Model with Extensions (CAMx) to relate source emissions to their quantitative impact on ambient air pollution, termed "source apportionment modeling." Texas used CAMx with 36 km resolution over the US, 12 km resolution over the southern US, and 4 km resolution over East Texas. Base year emissions from 2012 were projected to 3 future years: 2017, 2020, and 2023.

The analysis presented source apportionment modeling for the 2023 projected year which included: a national simulation that broke out contributions on a state-by-state level and into international sources (36 km resolution), a Texas simulation that broke out contributions by source regions within Texas (12 km resolution), and a San Antonio simulation that broke out contributions by county within the San Antonio-New Braunfels MSA (4 km resolution). While the source apportionment modeling is for a future year, it provides a relative indication of the impact of emission from various sources in the area.

Texas's source apportionment modeling for 2023 shows that on high ozone days (days > 60 ppb) Bexar County contributes 8-9 ppb (82-83% of the San Antonio-New Braunfels MSA contribution to predicted peak ozone values), while the other counties in the area of analysis with remaining highest emissions contribute less than 1 ppb, as follows: Atascosa 0.6-0.7 ppb (6-8% of MSA contributions), Guadalupe 0.6-0.8 ppb (6-7% of MSA contributions), and Comal <0.1 ppb (<1% of MSA contributions). When looking at only days above 70 ppb, the contribution from Bexar County increases slightly to 10-11 ppb (84% of San Antonio-New Braunfels MSA contributions to predicted peak ozone values).

**Conclusion for the San Antonio-New Braunfels Area**

Based on the assessment of the factors described above, the EPA is modifying Texas' recommendation of attainment or unclassifiable for Bexar County in the San Antonio area and is designating it as nonattainment. Bexar County has air quality monitors whose latest available design values (2015-2017) show violations of the 2015 ozone NAAQS.

For the remaining seven counties in the area of analysis, our analysis of the totality of the factors presented in the preceding sections for each county support the State's recommendation and include them as part of the nonattainment area.

Within the area of analysis, outlying Bandera and Kendall Counties rank among the lowest for most of the evaluated factors: they have the lowest levels of NOx and VOC emissions; Kendall had the highest percentage population growth, but these two counties have the lowest absolute population numbers; and the lowest VMT. About 37 – 44 percent of the workers living in each of these counties commute to Bexar

[13] Letter available at: https://www.epa.gov/sites/production/files/2018-07/documents/sa_tceq_comment.pdf

County. While these percentages may seem high, because of the comparatively lower population in these counties these numbers account for 1 percent or less of commuters in the area of analysis that commute to Bexar County. Analysis of HYSPLIT data show there are no back trajectories from Bandera or Kendall Counties to the violating monitors on days when those monitors exceeded the 2015 ozone NAAQS. While three HYPLIT trajectories pass through the eastern portion of Medina County, it falls within the lower half of the counties in the area of analysis for all of the evaluated factors. Medina County has no large point sources to potentially contribute emissions to the violating monitors. In addition, these three counties were not part of the ozone nonattainment area for the 1997 ozone NAAQS.

Within the area of analysis, Wilson County falls near the bottom for all of the evaluated factors and has no large point sources to potentially contribute emissions to the violating monitors. While numerous HYSPLIT trajectories pass through Wilson County, these same trajectories subsequently sweep across most of Bexar County to reach the violating monitors. In comparison, Bexar County has about 20 times more NOx and 12 times more VOC emissions, 33 times more VMT, and 64 times more commuters than Wilson County. In addition, the Calaveras Lake monitor in Bexar County, located less than 2 miles from the Wilson County border and in the path of air flow toward the violating monitors, is meeting the 2015 ozone NAAQS. Finally, while Wilson County was inside the ozone nonattainment boundary under the 1997 ozone standard, it was initially designated as unclassifiable/attainment and maintained that designation.

Atascosa County has the second highest emissions of NOx and VOC in the area of analysis, which account for about 13 percent of the total NOx and 14 percent of the total VOC emissions. Atascosa County has one major source to potentially contribute emissions to the violating monitors, located at the southern end of the county, more than 50 miles south of the monitors. While numerous HYSPLIT trajectories pass through Atascosa County, these same trajectories subsequently sweep across most of Bexar County to reach the violating monitors. In comparison, Bexar County has about 5 times more NOx and 4 times more VOC emissions, 18 times more VMT, and 84 times more commuters than Atascosa County. Furthermore, the Calaveras Lake monitor, located at the southern edge of Bexar County and in the path of air flow toward the violating monitors, is meeting the 2015 ozone NAAQS. In addition, the CAMx source apportionment modeling submitted by Texas estimated that Atascosa County accounted for between 6 and 8% of the San Antonio-New Braunfels MSA ozone contributions to violating monitors on high ozone days. Finally, Atascosa County was not part of the ozone nonattainment area for the 1997 ozone NAAQS.

Comal and Guadalupe Counties have the third and fourth highest emissions of NOx in the area of analysis, which account for about 11 and 7 percent of the total NOx, respectively. Guadalupe County has the third highest emissions of VOC in the area of analysis, which accounts for about 10 percent of the total VOC. Comal County the fourth highest emissions of VOC in the area of analysis, which accounts for about 10 percent of the total VOC. HYSPLIT data show some back trajectories flowed through these counties. However, these same trajectories subsequently sweep through Bexar County, which has much higher emissions. For example, Bexar County has about 9 times more VMT, 34 times more commuters, 9 times more VOC emissions, and 5 times more NOx emissions than Comal County. Similarly, Bexar County has about 11 times more VMT, 25 times more commuters, 5 times more VOC emissions, and 8 times more NOx emissions than Guadalupe County. In addition, the CAMx source apportionment modeling submitted by Texas estimated that Comal County accounted for less than 1% of the San

Antonio-New Braunfels MSA ozone contributions to violating monitors on high ozone days. The source apportionment modeling estimated that Guadalupe County accounted for between 6-7% of the San Antonio-New Braunfels MSA ozone contributions to violating monitors on high ozone days.

Overall, the CAMx results submitted by Texas show that the individual outlying counties are contributing less than 20% of MSA contributions to the violating monitors on high ozone days (days > 60 ppb). We acknowledge that the CAMx shows 2023 future year predictions of contribution rather than current conditions. However, examination of the county-level mobile source emissions summaries included in the Texas modeling submission as well as EPA's own projected county-level total emissions[14] for this area show that the relative distribution of emissions between counties within the San Antonio-New Braunfels MSA, is expected to change little between 2017 and 2023.

[14] EPA's emissions totals were pulled from the 2011v6.3 platform available at: https://www.epa.gov/air-emissions-modeling/2011-version-63-platform. Specifically, we examined 2017ek and 2023el emissions versions. Data files summarizing these emissions are available in the docket for this action.