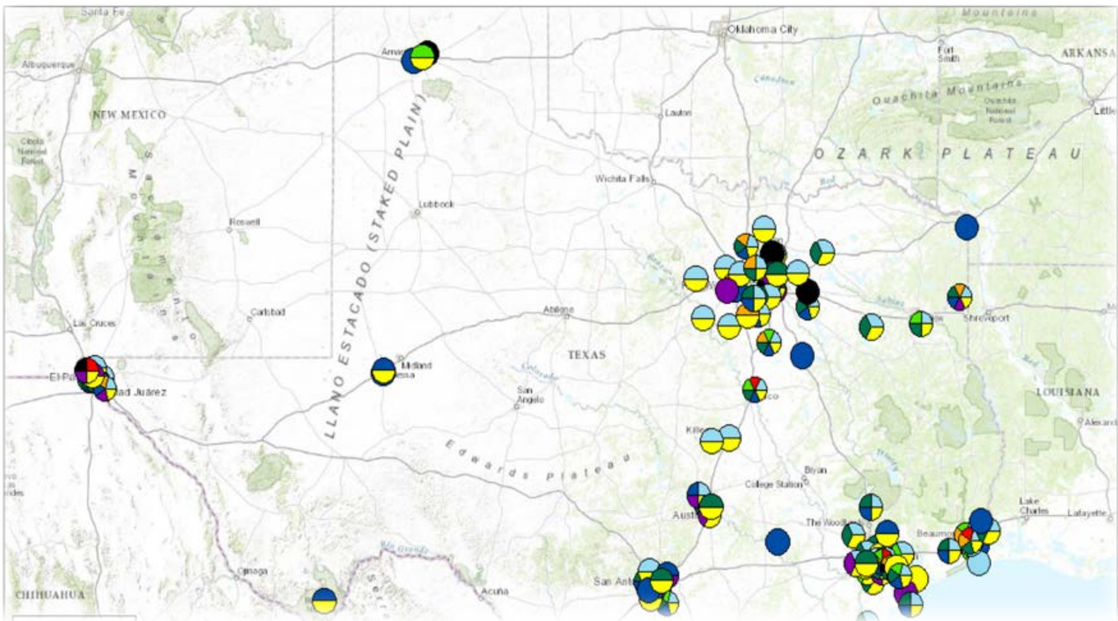
Texas Commission on Environmental Quality

# Texas Five-Year Ambient Monitoring Network Assessment





2015

TCEQ

# Executive Summary

The Texas Commission on Environmental Quality (TCEQ) conducted an assessment of the Texas air monitoring network in fulfilment of 40 Code of Federal Regulations (CFR) Part 58.10(d). The TCEQ evaluated the existing network of ambient air monitors measuring ozone, carbon monoxide (CO), oxides of nitrogen ($NO_x$), sulfur dioxide ($SO_2$), lead (Pb), particulate matter of 10 micrometers or less in diameter ($PM_{10}$), particulate matter of 2.5 micrometers or less in diameter ($PM_{2.5}$), volatile organic compounds (VOCs), carbonyls, semivolatile organic compounds (SVOCs), and speciated $PM_{2.5}$. Only monitors meeting some federal obligation, either through rule or grant commitment, were included in this evaluation.

This evaluation is intended to determine if the current network continues to meet Texas' needs and federal requirements. Any proposed changes to the monitoring network are provided to the United States Environmental Protection Agency (EPA) in the annual monitoring network plan and are, therefore, not included in this evaluation. A 30-day public comment period is provided for both this five year assessment and the annual monitoring network plan.

The assessment of the Texas air monitoring network indicates that the existing network is adequate for evaluating ambient air quality and meets federal requirements. Monitors are located in areas of dense population and, when appropriate, in areas with the greatest impact(s) from point and international sources of air pollutants.

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# Introduction

Since 1970, the United States Environmental Protection Agency (EPA) has been responsible for establishing and, when necessary, updating national ambient air quality standards (NAAQS) under the Federal Clean Air Act (FCAA). The EPA assigned responsibility for designing and implementing ambient air quality surveillance networks to determine compliance with these NAAQS to state air pollution control agencies. As monitors were deployed, air quality issues were addressed, and changes in populations and landscapes occurred, it became necessary to re-evaluate the monitoring network's design. In 2006, the EPA finalized a requirement to conduct an assessment of these networks every five years. The EPA's final regulation, found in 40 CFR Part 58.10, requires:

> (d) The state, or where applicable local, agency shall perform and submit to the EPA Regional Administrator an assessment of the air quality surveillance system every 5 years to determine, at a minimum, if the network meets the monitoring objectives defined in appendix D to this part, whether new sites are needed, whether existing sites are no longer needed and can be terminated, and whether new technologies are appropriate for incorporation into the ambient air monitoring network. The network assessment must consider the ability of existing and proposed sites to support air quality characterization for areas with relatively high populations of susceptible individuals (e.g., children with asthma), and, for any sites that are being proposed for discontinuance, the effect on data users other than the agency itself, such as nearby states and tribes or health effects studies. The state, or where applicable local, agency must submit a copy of this 5-year assessment, along with a revised annual network plan, to the Regional Administrator. The assessments are due every five years beginning July 1, 2010.

In compliance with the 40 CFR Part 58.10 requirement, the TCEQ conducted this assessment of the Texas ambient air monitoring network. The assessment was intended to determine whether the existing network of regulatory ambient air quality monitors still meets the required objectives in 40 CFR Part 58, Appendix D. This assessment also evaluated whether individual monitors within this network should be added, moved, or decommissioned to best understand and evaluate air quality given existing resources.

This assessment does not include an in-depth analysis of the monitoring network's compliance with the federal monitoring network design requirements found in 40 CFR Part 58. The TCEQ provides this detailed analysis of 40 CFR Part 58 network design requirements and how the network meets these requirements in its annual monitoring network plan. In its January 14, 2015, letter, the EPA approved the TCEQ's *2014 Annual Monitoring Network Plan*, indicating that the existing network met the current monitoring requirements. An updated analysis is provided in the TCEQ's *2015 Annual Monitoring Network Plan*, which was made available for public review and comment on May 22, 2015.

Due to the stated purpose of this assessment, the TCEQ did not include an evaluation of monitors that are funded through non-federal mechanisms or are operated for purposes other than complying with federal monitoring requirements. The TCEQ uses the data from these monitors for many purposes and often locates these monitors to address local public health and welfare concerns. Information and data from these state-initiated monitors are available to the public on the TCEQ's Texas Air Monitoring Information System (TAMIS) (http://www.tceq.texas.gov/goto/tamis).

# Evaluation Methods

## Overview

Texas has a diverse geography, population, and economy. In addition, each ambient air pollutant evaluated differs in its emission source, transport, and fate in the environment. Due to this pollutant complexity and diverse regional characteristics, the TCEQ divided the statewide monitoring assessment into smaller pollutant assessments within six major areas of Texas: coastal (Houston, Beaumont, and Corpus Christi regions), north and northeast (Dallas-Fort Worth and Tyler regions), central (Waco, Austin, and San Antonio regions), panhandle and west (Amarillo, Lubbock, Abilene, Midland, and San Angelo regions), lower Rio Grande Valley (Laredo and Harlingen regions), and far west (El Paso region).

The TCEQ used multiple techniques in assessing the monitoring network within these areas. Existing and future point sources were evaluated in conjunction with population density data to determine federal monitoring requirements and geographical monitoring coverage. Regional characteristics such as climate and topography were also considered because of their impact on ozone formation, and pollutant transport and dispersion throughout an area. Each monitor in the existing network was assessed for its purpose, history, data trends, and network value.

## Evaluation Tools

### Anthropogenic Emission Sources

The TCEQ used data from its 2011 National Emissions Inventory (NEI) and 2013 annual point source emissions inventory to evaluate the relative contributions of anthropogenic sources of each primary pollutant, as well as to evaluate the spatial placement of existing ambient air quality monitors in relation to point sources of emissions. The FCAA requires that states submit an emissions inventory (EI) for ozone precursor emissions ($NO_x$ and VOC) every three years. The total inventory of $NO_x$ and VOC emissions for an area is derived from estimates developed for four general categories of emissions sources: point, area, non-road mobile, and on-road mobile. In addition, stationary point source emissions data are collected annually from sites that meet the reporting requirements of 30 Texas Administrative Code (TAC) §101.10. More information about the Texas EI is available to the public on the TCEQ's Point Source Emissions Inventory webpage (http://www.tceq.texas.gov/airquality/point-source-ei/psei.html).

The TCEQ also reviewed its database for pending and issued air permits to evaluate potential geographic trends in the location of new point sources. Because emissions from existing sources would be included in the EI, this review focused only on the issuance of permitting actions related to the construction of new facilities at new sites from January 1, 2010, to March 2015 and excluded any permitting actions related to existing point source sites. Populated areas with a high density of point sources and areas with larger point source emissions were further evaluated to determine if the existing monitoring network was adequately representative of the airshed.

## Correlation Data

The TCEQ used the correlation tool made available through the NetAssess application developed by the Lake Michigan Air Directors Consortium (LADCO) to evaluate eight-hour ozone and 24-hour $PM_{2.5}$ monitoring data. This tool provides analyses that help to identify possible redundant monitors. More information about the NetAssess application is available on LADCO's website at http://ladco.github.io/NetAssessApp/.

The application pulled monitor location and concentration data from the EPA's Air Quality System (AQS) database and used the R statistical package to calculate a Pearson correlation coefficient, average relative difference, and distance between monitors for monitor pairs that were active between January 1, 2011, and December 31, 2013. The referenced time period was defined by the tool designers and was not customizable. Evaluation of correlation output is provided in the ozone and $PM_{2.5}$ network evaluation sections of this report. When more than two monitors were evaluated, a figure showing the correlation output is provided. Although the TCEQ's convention is to use site name, the tool only allows for the display of AQS numbers in the output. The AQS numbers associated with each site name are provided in Appendix A. The shape of the ellipses represents the Pearson correlation coefficient between sites. The circular ellipses have the weakest correlation indicating monitors are unique. The flatter, narrower ellipses have a stronger correlation indicating potential monitor redundancies. The color of the ellipse represents the average relative difference between monitors. Purple and red ellipses indicate higher average relative differences of 1 and 0.8, respectively. Lighter yellow and white ellipses indicate lower average relative differences of 0.2 and 0, respectively. The average relative difference indicates if monitors measure pollutant concentrations at levels substantially higher or lower compared to each other. Data from site pairs with a lower average relative difference are more similar to each other than pairs with a larger difference and could indicate a level of redundancy. The number in each ellipse is the distance in kilometers between the two sites.

The TCEQ used the results of the NetAssess tool to rate the uniqueness of each monitor's data on a three-point scale. Monitor pairs that were located greater than 10 kilometers (6.2 miles) apart, weakly correlated (e.g., had a Pearson correlation coefficient of less than 0.6), and had a relative percent difference greater than 0.2 were considered highly unique (not redundant). Medium value monitors were moderately correlated with nearby monitors (e.g., had a Pearson correlation coefficient of between 0.6 and 0.9), had a relative percent difference between 0.1 and 0.2, and were located between 5 and 10 kilometers (3.1 and 6.2 miles). Low value monitors were highly correlated (e.g., had a Pearson correlation coefficient of greater than 0.9) with a relative percent difference of less than 0.1, and were located less than 5 kilometers (3.1 miles) apart, and possessed the potential to be redundant with nearby monitors.

## Population Data

A review of population trends was conducted to ensure that monitors with the objective of measuring pollutant concentrations in populated areas were still properly sited. The TCEQ predominantly relied on population counts from the most recent decennial census and 2014 population estimates from the United States Census Bureau in this assessment. In Texas, the United States Census Bureau defines core based statistical areas and metropolitan statistical areas (MSAs) as the same area. Only MSA is used in this assessment.

Evaluating future population projections was also necessary because ozone, CO, nitrogen dioxide ($NO_2$), $SO_2$, $PM_{2.5}$, and $PM_{10}$ monitoring requirements are at least partially based on metropolitan statistical area population. The TCEQ evaluated population projection data available from the Texas State Data Center to evaluate potential future monitoring needs based on changing populations. The Texas State Data Center uses three projection scenarios to forecast populations. According to the Texas State Data Center, Texas experienced an uncharacteristically high urban growth rate from 2000 to 2010 as compared to the previous 10 years. One population projection scenario assumed that this growth rate would continue through 2020. The other scenarios assumed half of the 2000 to 2010 growth rate and a zero migration growth. The TCEQ conservatively used the scenario with the highest growth rate to determine if an area's projected population in 2020 was likely to trigger additional monitoring requirements. More information about these state population projections is available online at http://txsdc.utsa.edu/.

## Monitor History and Data

The TCEQ relied on TAMIS for evaluating historical changes to the monitoring network, objectives, and locations. All monitoring information discussed in this evaluation is available to the public online at http://www.tceq.texas.gov/goto/tamis. The TCEQ verified monitoring network information against the information in AQS to ensure consistency.

# *Monitor Value Calculation*

At the completion of each pollutant network evaluation, the TCEQ scored each existing monitor on a three-point scale (high, medium, and low) based on the value the monitor provides to the network. The monitor's overall value was calculated by considering the following metrics.

- Regulatory value of the monitor was assessed based on federal monitoring requirements. High value monitors met an explicit federal requirement, medium value monitors supported the number of monitors required in an area, and low value monitors supported monitoring efforts but did not satisfy an explicit requirement.
- The value of the monitoring data was assessed by evaluating the importance of the data to the network. Factors considered in this evaluation included the proximity of design values to the NAAQS, representativeness of a particular area (such as sensitive populations or incoming background), or historical trends. High value monitors provided data critical to the understanding of air quality in an area.

Medium value monitors supported other area monitors by providing meaningful data, but were not essential to the network. Low value monitors provided data of minimal use to the evaluation of air quality (such as monitoring for a specific point source pollutant in an area without that point source).

- Monitor uniqueness was scored based on monitor-by-monitor correlation, as discussed in the correlation section. The NetAssess application only provided correlation data for ozone and $PM_{2.5}$; therefore, other pollutant monitors were not rated according to this metric. High value monitors provided unique data that was only marginally correlated with nearby monitors. Data from medium value monitors indicated some correlation with nearby monitors. Data from low value monitors were potentially redundant with nearby monitors.
- Source impact value was assessed based on the monitor's value in evaluating the impacts of pollutant sources to the area's air quality. High value monitors provided important data on the impact of sources, such as a monitor downwind of a point source or a monitor placed to evaluate incoming transport of area sources. Medium value monitors helped provide information about source contribution but were not specifically sited to measure source impacts, such as speciation monitors providing data on dust composition. Low value monitors were minimally impacted by sources.
- Monitor appropriateness was assessed by comparing the intended monitoring objective to existing conditions near the location. A table detailing summary information on the monitor name, location, objective, and monitoring scale as required in 40 CFR Part 58, Appendix D, is provided in Appendix A. High value monitors continued to meet their intended objective and monitoring scale. Medium value monitors had some indication that the area may be in a transition, such as a neighborhood that was slowly changing from residential homes to commercial/industrial facilities. Low value monitors no longer met their intended objective or monitoring scale.
- Historical value was assessed based on the number of years the parameter has been monitored at the site. High value monitors have provided more than 16 years of data. Medium value monitors have provided 6 to 15 years of data. Low value monitors have provided 5 or fewer years of data.

A summary of each monitor's value assessment is provided in Appendix C. Consistent with the purpose of this document, low monitor values do not necessarily mean that the monitor will be decommissioned. The TCEQ will continue to use the annual monitoring network plan to recommend any changes to the monitoring network.

## Monitoring Technology Review

The TCEQ continually evaluates advances in ambient air monitoring technology. However, because regulatory monitors used for determination of compliance with the NAAQS are required to meet federal reference method (FRM), federal equivalent method (FEM), or approved regional method requirements, a full review of available technology was not detailed in this assessment. All of the TCEQ's regulatory monitors comply with existing monitoring method requirements and, in the vast majority of cases, provide consistent, high quality data return. When the TCEQ encounters mechanical or logistical problems, they are addressed promptly to restore data collection. The TCEQ continues to evaluate newer technologies as they become available and will propose any method changes through the annual monitoring network plan process.

# Background Information

## *Population*

As a general trend, the Texas population has increased by over 20 percent (%) from 2000 to 2010. As indicated in Figure 1, most of the largest population increases occurred in urban areas such as Austin-Round Rock, Dallas-Fort Worth, San Antonio, Houston, and Laredo.

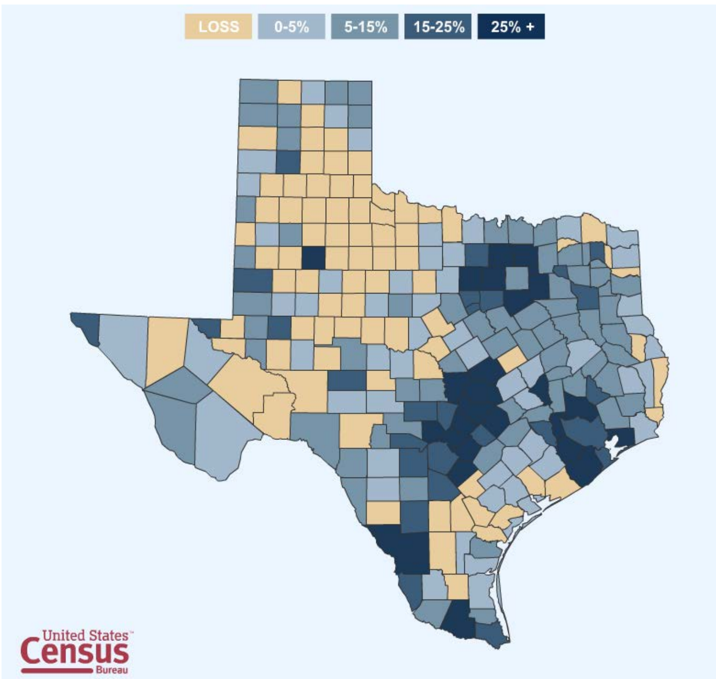



**Figure 1: Population Change by Texas County, 2000-2010**

As indicated, the period between the last two decennial censuses was marked by expansive growths in urban population. According to the Texas State Data Center, it is unlikely that the population will continue to grow at this rate in the long term. However, the TCEQ conservatively used projections made with this continued growth rate assumption as a worst-case scenario to evaluate the potential for increases in the number of monitors required in the future. The MSA population projections are provided in Table 1. According to these projections, five MSAs will continue to experience a 20% or greater increase in population by 2020.

**Table 1: Texas Population Projections, 2010-2020**

| Metropolitan Statistical Area | 2010 | 2015 | 2020 | Percent Change (2010-2015) | Percent Change (2015-2020) | Percent Change (2010-2020) |
|---|---|---|---|---|---|---|
| Abilene | 165,252 | 170,761 | 175,333 | 3 | 3 | 6 |
| Amarillo | 251,933 | 268,893 | 287,313 | 7 | 6 | 12 |
| Austin-Round Rock | 1,716,289 | 1,990,437 | 2,306,857 | 16 | 14 | 26 |
| Beaumont-Port Arthur | 403,190 | 417,449 | 432,734 | 4 | 4 | 7 |
| Brownsville-Harlingen | 406,220 | 449,166 | 493,571 | 11 | 9 | 18 |
| College Station-Bryan | 228,660 | 251,252 | 278,843 | 10 | 10 | 18 |
| Corpus Christi | 428,185 | 449,323 | 470,995 | 5 | 5 | 9 |
| Dallas-Fort Worth-Arlington | 6,426,214 | 7,117,896 | 7,920,671 | 11 | 10 | 19 |
| El Paso | 804,123 | 877,248 | 956,347 | 9 | 8 | 16 |
| Houston-The Woodlands-Sugar Land | 5,920,416 | 6,622,047 | 7,413,214 | 12 | 11 | 20 |
| Killeen-Temple | 405,300 | 454,994 | 504,546 | 12 | 10 | 20 |
| Laredo | 250,304 | 282,143 | 317,733 | 13 | 11 | 21 |
| Longview | 214,369 | 229,176 | 245,142 | 7 | 7 | 13 |
| Lubbock | 290,805 | 307,992 | 327,424 | 6 | 6 | 11 |
| McAllen-Edinburg-Mission | 774,769 | 883,903 | 1,005,539 | 14 | 12 | 23 |
| Midland | 141,671 | 152,835 | 164,862 | 8 | 7 | 14 |
| Odessa | 137,130 | 148,260 | 159,521 | 8 | 7 | 14 |
| San Angelo | 111,823 | 114,262 | 116,707 | 2 | 2 | 4 |
| San Antonio-New Braunfels | 2,142,508 | 2,380,005 | 2,635,183 | 11 | 10 | 19 |
| Sherman-Denison | 120,877 | 127,097 | 133,647 | 5 | 5 | 10 |
| Texarkana | 92,565 | 93,848 | 95,118 | 1 | 1 | 3 |
| Tyler | 209,714 | 225,731 | 243,064 | 8 | 7 | 14 |
| Victoria | 94,003 | 97,687 | 101,363 | 4 | 4 | 7 |
| Waco | 252,772 | 263,208 | 274,757 | 4 | 4 | 8 |
| Wichita Falls | 151,306 | 153,005 | 154,865 | 1 | 1 | 2 |
| State of Texas | 25,145,561 | 27,695,284 | 30,541,978 | 10 | 9 | 18 |

Source: Texas State Data Center, 2014
Projections are based on the continuation of the rapid growth rates documented in 2000-2010.

## *Pollutants*

### Ozone

Ground-level ozone is not emitted directly into the air, but is created by chemical reactions between $NO_x$ and VOCs in the presence of sunlight. Therefore, there are no source-oriented ozone monitors. Emissions from industrial facilities and electric utilities, motor vehicle exhaust, gasoline vapors, and chemical solvents are some of the major sources of $NO_x$ and VOCs. In addition, biogenic sources (mainly trees) also release VOCs that can contribute to ground-level ozone. Because it takes time for ozone to form, a dispersed network of monitors across urban areas is necessary to fully evaluate contributing sources and regional ozone levels.

### Carbon Monoxide

CO is a colorless, odorless gas formed by the incomplete reaction of air with fuel. CO is primarily emitted from fossil fuel powered engines, including motor vehicles and non-road engines and vehicles (such as construction equipment and boats). Higher levels of CO generally occur in areas with heavy traffic congestion such as downtown areas, at border crossings, and near or on major highways. Other CO emission sources can include industrial processes, residential wood burning, residential trash burning, and natural sources such as forest fires. For these reasons, the highest value is placed on source-oriented monitors in urban areas.

### Oxides of Nitrogen

The sum of nitric oxide (NO) and $NO_2$ is commonly called $NO_x$. $NO_2$ is regulated on its own as a primary pollutant, but $NO_x$ is also important as a contributor to ozone and $PM_{2.5}$ formation. $NO_x$ is most commonly emitted from on-road emissions sources such as cars, trucks, and buses as well as electric power plants and industrial combustion. For these reasons, $NO_x$ monitors are sited to evaluate emission sources and regional concentrations across ozone nonattainment areas.

### Sulfur Dioxide

Based on Texas' EI data, the largest source of $SO_2$ emissions is fossil fuel combustion at power plants and other industrial facilities. $SO_2$ emissions also come from extraction of metal from ore and burning high-sulfur fuels in locomotives, large ships, and non-road equipment. $SO_2$ monitoring, therefore, has been focused on populated areas near larger emission sources. Because of major reductions required in the sulfur content of liquid fuels, solid fossil fuel electric power plants and a few industrial plants are now the major $SO_2$ sources.

### Lead

Pb is a point-source pollutant with concentrations dropping rapidly with distance from the source. Pb can be released directly into the air as suspended particles. Since the ban of Pb gasoline in on-road vehicles in the 1990s, there have been no regional Pb air quality issues. Therefore, Pb monitoring is only required near large point sources and airports reporting large Pb emissions. Pb monitoring is also required at three locations in Texas for long-term trends analysis.

## Particulate Matter

$PM_{2.5}$ and $PM_{10}$ are composed of a complex mixture of particles and liquid droplets and can be made up of acids, salts, organic chemicals, metal, dust, or soil. Both fractions of particulate matter can be emitted from a variety of natural and anthropogenic sources. Most of the $PM_{2.5}$ in the air comes from long range transport and from atmospheric reactions that form $PM_{2.5}$ in the air from gaseous emissions including $SO_2$, $NO_x$, and both anthropogenic and biogenic VOCs. Elevated particulate matter can impact air quality locally, such as when soil is disturbed on unpaved roads, or distant from the source, such as when smoke or dust is transported from out-of-state and international sources. Therefore, monitoring is generally conducted over dispersed areas with an emphasis on placing monitors in upwind locations to evaluate incoming particulate matter concentrations.

Particulate monitoring occurs via either collection of a filter over a discrete 24-hour time period or continuous one-hour measurements. Although the $PM_{10}$ NAAQS is set to be protective of exposures to particles that are between 2.5 and 10 micrometers in size ($PM_{10-2.5}$), regulatory ambient air monitors measure all particles less than 10 micrometers in size as $PM_{10}$. In compliance with existing rules, $PM_{10-2.5}$ is only monitored at the sites of Dallas Hinton, Houston Deer Park #2, and El Paso Chamizal sites.

## Air Toxics Pollutants

The term “air toxics” includes air pollutants that may be associated with adverse health effects or environmental effects, but with no federal ambient air quality standards. Air toxics are emitted from a variety of natural and anthropogenic sources. Most air toxics monitors are deployed to evaluate regional air quality, trends in ozone precursors, and potential population exposures, rather than to evaluate a particular source.

Texas currently monitors ambient air concentrations of 142 air toxic pollutants, including VOCs, carbonyls, SVOCs, and metals at the sites provided in Appendix A. The full list of air toxics for which the TCEQ monitors is provided in Appendix B. The TCEQ collects ambient VOC data in two ways: discrete canister sampling and near-real-time automated gas chromatograph (autoGC) monitoring. Canister samplers collect ambient air in a stainless steel canister over a 24-hour period, and the sample is analyzed for 84 targeted VOCs in a laboratory. Most canister sampling sites collect one 24-hour sample every six days. AutoGCs collect a 40-minute ambient air sample every hour. The sample is analyzed onsite by the autoGC for 46 targeted VOCs. Carbonyls, SVOCs, and metals samples are typically collected once every six days.

The TCEQ uses screening levels that are set to protect human health and welfare, termed Air Monitoring Comparison Values (AMCVs), to evaluate monitored concentrations of ambient pollutants. AMCVs are used by the TCEQ to determine if there is a potential health concern. Although this evaluation focuses on federal ambient monitoring requirements and conclusions from the TCEQ Toxicology Division’s annual monitoring data evaluations for regulatory monitors, full Toxicology Division evaluations of ambient air toxic data for monitors that are operated in addition to these requirements are available online at https://www.tceq.texas.gov/toxicology/regmemo/AirMain.html.

When ambient concentrations are measured above the AMCVs, the TCEQ conducts a more in-depth review of the data and conditions during sampling. This review may include focusing additional agency resources, such as in areas on the Air Pollutant Watch List (APWL). The APWL is the TCEQ's program to address areas in Texas where monitoring data show persistent, elevated concentrations of air toxics. The TCEQ uses the APWL process to focus its resources, notify the public, engage stakeholders, and develop strategic actions to reduce emissions. More information about the APWL can be found online at http://www.tceq.texas.gov/permitting/air/apwl/apwl-index.html.

# Texas Coastal Area Evaluation

(Houston, Beaumont, and Corpus Christi Regions)

## *Texas Coastal Area Characteristics*

### Terrain

The Texas Coastal area consists of the relatively flat Gulf Coastal Plains. The flat coastal prairies lie along the Gulf of Mexico and reach a maximum elevation of 300 feet. The prairies transition to the interior coastal plains just west of Corpus Christi, Houston, and Beaumont-Port Arthur. These plains reach a maximum elevation of 800 feet and are marked by more forested vegetation and river valleys. (Wermund 1996)

Figure 2 illustrates typical coastal area annual average wind speed and direction from meteorological sensors at ambient air monitoring stations. The length of each wind rose bar corresponds to the frequency of the wind coming from the indicated direction. Outlined counties are the counties considered in this coastal area evaluation. Wind data indicate the dominant flow is from the south-southeast from the Texas Gulf Coast to the northwest. Winds can originate from the North American continent or in the Caribbean Sea or Atlantic Ocean. The coastal area, therefore, is susceptible to transported pollution due to its location, dominant wind patterns, and flat terrain.

### Climate

The Texas Gulf Coast has a sub-tropical climate and, due to its proximity to the Gulf of Mexico, the highest annual rainfall and least seasonally variable temperatures in Texas. Annual rainfall is highest in the Beaumont and Houston areas, with historical average rainfall of 45 inches each year. The Corpus Christi area has historically received 33 inches of rainfall on average each year. Since 2008, a record drought has dramatically reduced precipitation across Texas. Annual average rainfall between 2008 and 2014 has ranged from 23 to 45 inches in the Beaumont and Houston areas and from 17 to 34 inches in the South Central area. (NCDC 2015) Annual average temperatures from 2000 to 2014 ranged from 69 to 72 degrees Fahrenheit (°F). Figure 2 illustrates typical area wind patterns.

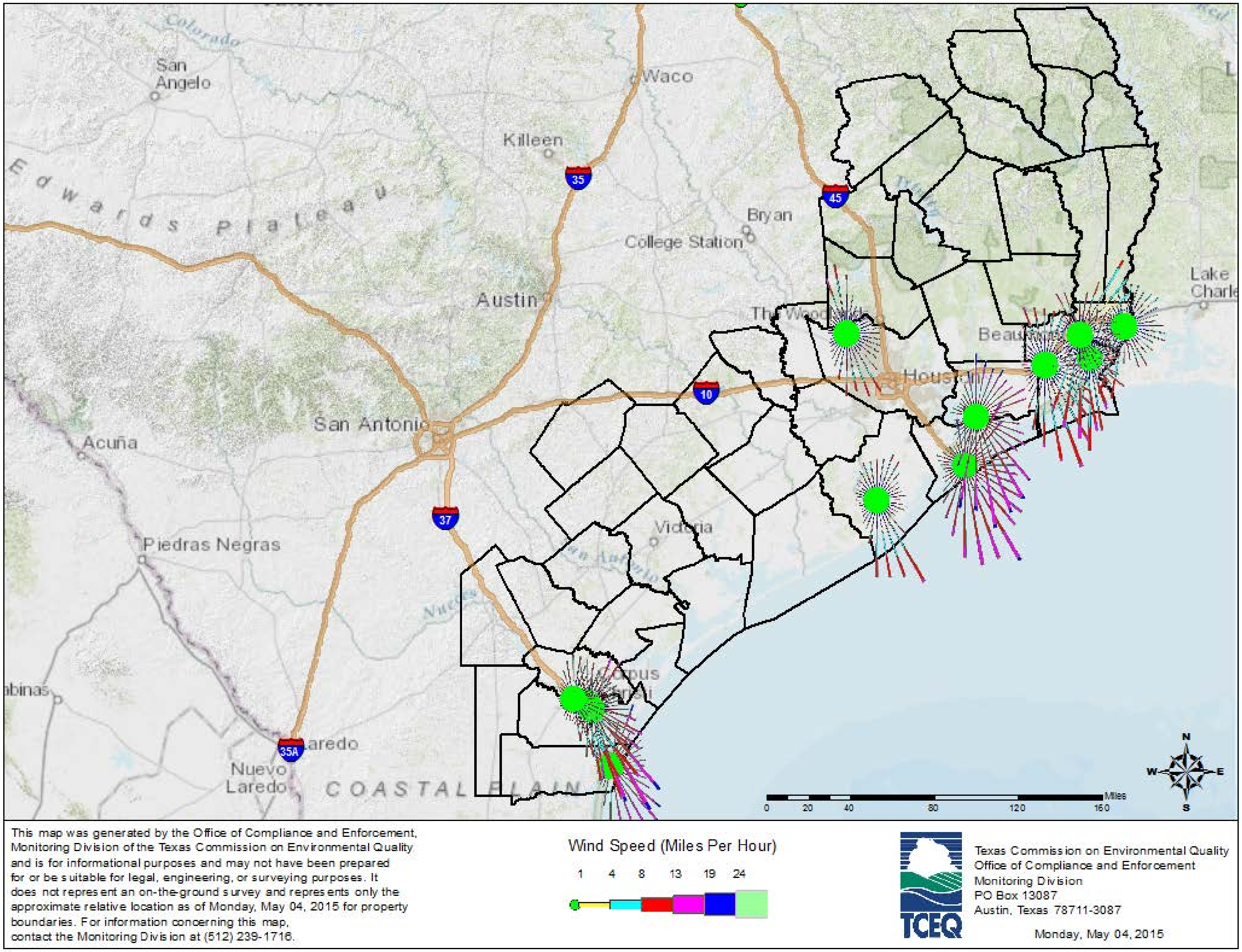



**Figure 2: Texas Coastal Area Counties, Terrain, and Wind Roses from Ambient Air Quality Monitors**

## Population

The Texas Coastal area has four major MSAs that include multiple counties.

- Houston-The Woodlands-Sugar Land: Austin, Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller Counties
- Beaumont-Port Arthur: Hardin, Jefferson, Newton, and Orange Counties
- Corpus Christi: Aransas, Nueces, and San Patricio Counties
- Victoria: Goliad, and Victoria Counties

In 2010, the combined population of these four Texas Coastal area MSAs reached over 6.8 million people. The 2014 population estimate indicates an overall 8% increase in population over the last three years. Figures 3 and 4 map the population densities across the Texas Coastal area based on 2010 United States Census Bureau data.

Minimum monitoring network design requirements in 40 CFR Part 58, Appendix D, Section 4, for ozone, CO, $NO_2$, $PM_{2.5}$, and $PM_{10}$ are partially based on MSA populations. Based on 2014 population estimates and 2014 design values, the Houston-The Woodlands-Sugar Land MSA is required to have a minimum of three ozone monitors, one CO monitor, three $NO_2$ monitors, four $PM_{2.5}$ monitors, and between four and eight $PM_{10}$ monitors. The Beaumont-Port Arthur MSA is required to have a minimum of two ozone monitors and up to one $PM_{10}$ monitor. The Corpus Christi MSA is required to have a minimum of two ozone monitors, one $PM_{2.5}$ monitor, and up to one $PM_{10}$ monitor. The Victoria MSA is required to have one ozone monitor. Additional minimum monitoring requirements are provided in separate rules and are unrelated to population.

The Texas State Data Center projects the Houston area to increase to over 7 million people by 2020 and the other three MSAs to grow approximately 7% by 2020. If these population projections are accurate, none of the minimum monitoring requirements for these Texas Coastal area MSAs would increase based on population alone.

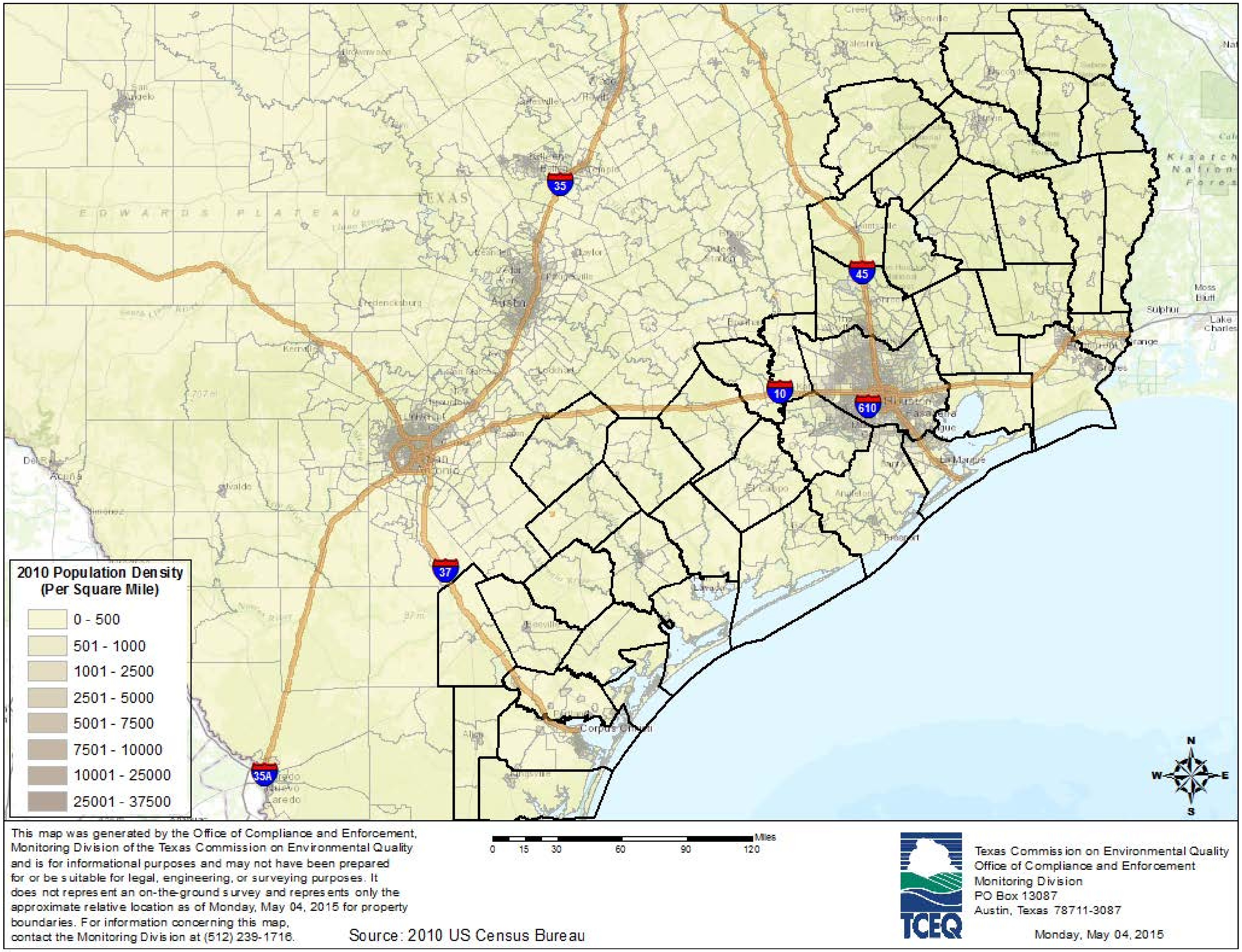



**Figure 3: Texas Coastal Area Population Density**

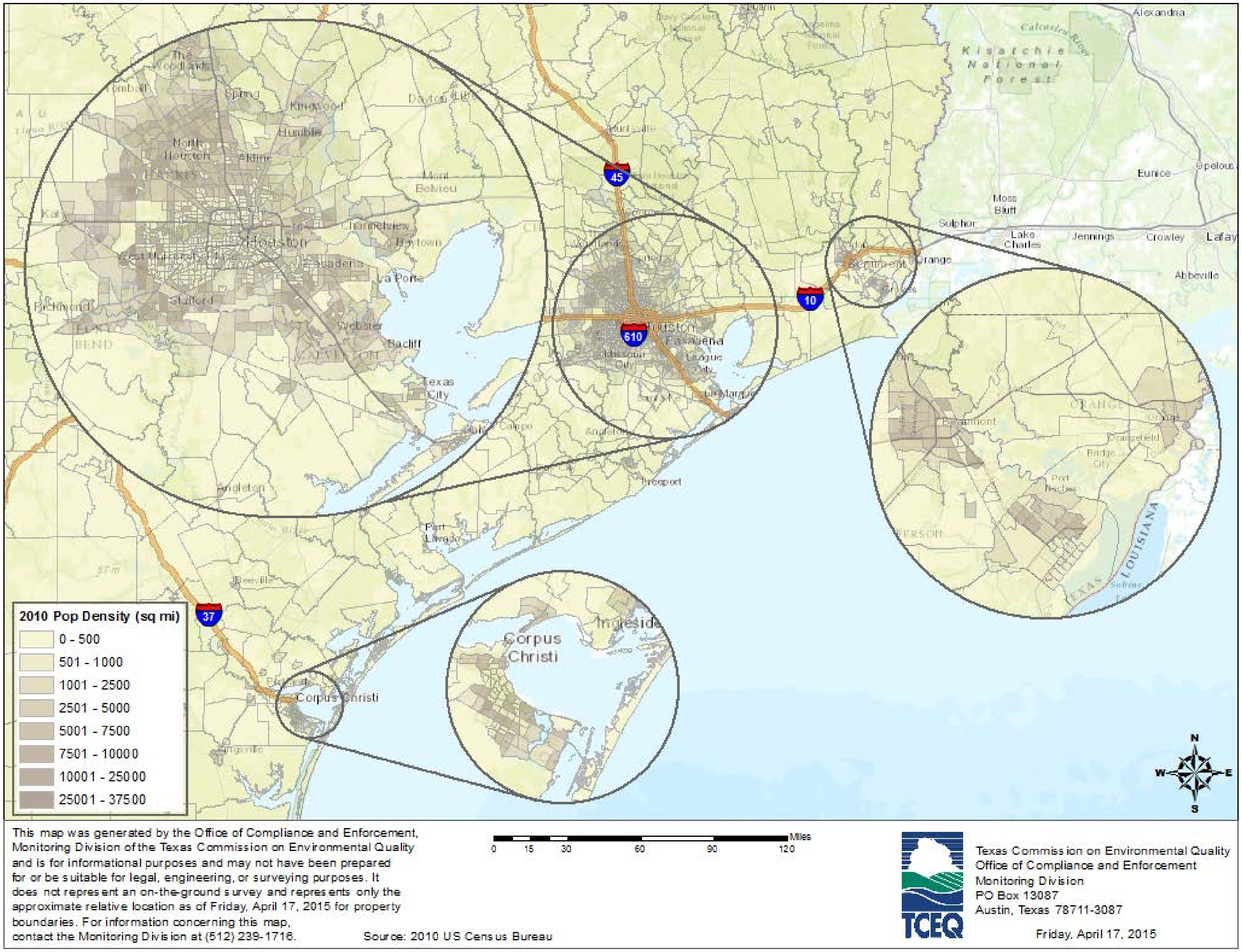



**Figure 4: Texas Coastal Area Metropolitan Statistical Area Population Density**

## Pollutant Sources

### Anthropogenic Sources

As expected, data from EI source categories show on-road mobile sources emitted the majority of CO and $NO_x$. Area sources contributed the most $PM_{2.5}$ and VOCs. In the port industrial areas along the coast, power plants, petroleum refineries, and chemical plants are major sources of $NO_x$ and VOCs. Approximately 95% of $PM_{10}$ emissions were attributed to area sources. Point sources emitted over 90% of $SO_2$. Pb emissions remained low for all sources in the Texas Coastal area.

A review of pending and issued air permits within the Texas Coastal area (detailed in Appendix D) revealed most new facilities are located in the greater Houston area, particularly along the Houston Ship Channel and Galveston Bay. New point sources have also been permitted west-southwest of Houston, and in Beaumont, Port Arthur, and Corpus Christi. In most cases, these sources are in areas that could already be described as industrial and are near or downwind of existing ambient air monitors, especially when considering the expanded network of monitoring data available in TAMIS from state-initiated monitors. This review of permitting actions did not indicate the need for additional ambient air quality monitors.

### Natural Sources

The Texas Coastal area has historically been impacted by elevated incoming $PM_{2.5}$ concentrations as a result of long-range transport, as evidenced by speciation data, satellite imagery, wind flow patterns, and back trajectories. African dust from the Saharan Desert typically impacts the Texas Coastal area three to six times each summer. Daily average $PM_{2.5}$ concentrations can reach as high as 31 micrograms per cubic meter ($\mu g/m^3$) during these events. Smoke is generally associated with abnormally high organic carbon concentrations. Smoke from agricultural burning in Mexico affects the Texas Coastal area mainly from April to early June each year when the winds bring in air from eastern Mexico and Central America. Controlled burns, haze, and smoke accumulated from wildfires in the United States and Canada (also known as continental haze) are most common from May through October and often include high ozone background levels. Long-range transport from other types of events also impact the Texas Coastal area, including wildfires, and dust from large, intense regional dust storms in the West Texas-New Mexico-Northern Mexico area. More detailed information about these natural events is available in the TCEQ's Houston $PM_{2.5}$ exceptional events demonstration packages for 2010, 2011, and 2012.

# *Regional Air Quality*

## Criteria Pollutants

As of January 1, 2015, the Corpus Christi, Victoria, and Beaumont-Port Arthur areas are classified as attainment/unclassifiable for all current NAAQS. The Houston-Galveston-Brazoria (HGB) area, which includes Harris, Galveston, Brazoria, Chambers, Fort Bend, Liberty, Montgomery, and Waller Counties, is designated as a marginal nonattainment area for the 2008 eight-hour ozone NAAQS and a severe nonattainment area for the 1997 eight-hour NAAQS.

In June 2010, the primary $SO_2$ NAAQS was revised to a one-hour standard of 75 parts per billion (ppb). The Governor has recommended designating all Texas areas as attainment for the one-hour $SO_2$ NAAQS, but a final action has not been taken by the EPA. Prior to making final determinations on area designations for the revised $SO_2$ standard, the EPA proposed the $SO_2$ Data Requirements Rule. This rule, proposed in April 2014, could result in additional source-oriented $SO_2$ monitoring to characterize ambient air quality around larger $SO_2$ sources and inform area designations. Recent and historical design values for each of the criteria pollutants are provided in the Monitoring Network section below.

## Current Nonattainment Designations

### *1997 Eight-Hour Ozone*

In 2004, the Houston area was classified moderate nonattainment under the 1997 eight-hour ozone NAAQS. The TCEQ adopted the *2007 HGB 1997 Eight-Hour Ozone Nonattainment Area State Implementation Plan (SIP) Revision* in May 2007 as the first step in addressing the 1997 eight-hour ozone NAAQS in the Houston area. In 2008, the EPA approved the Governor's request to voluntarily reclassify the area from a moderate to a severe nonattainment area. On January 2, 2014, the EPA published final approval of the March 2010 Houston area Attainment Demonstration and Reasonable Further Progress SIP revisions and the 2013 Houston area Motor Vehicle Emissions Budget Update SIP revision, concluding that the Houston area will reach attainment of the 1997 eight-hour ozone standard by the end of the 2018 ozone season. In February 2015, the TCEQ requested that the EPA issue a finding of attainment for the 1997 eight-hour ozone NAAQS. The Houston area's 2014 design value of 0.08 parts per million (ppm) showed attainment of the NAAQS. More information about SIP revisions and efforts in attaining the 1997 eight-hour ozone standard is available online at http://www.tceq.state.tx.us/airquality/sip/hgb/sip-hgb.

### *2008 Eight-Hour Ozone*

On May 21, 2012, the EPA published final designations for the 2008 eight-hour ozone NAAQS in the *Federal Register* (77 FR 30088). The eight-county Houston area was classified marginal nonattainment under the 2008 eight-hour ozone NAAQS with a December 2015 attainment date. As a result of a December 23, 2014, ruling by the District of Columbia Circuit Court, the Houston area's attainment year for the 2008 eight-hour ozone standard changed from 2015 to 2014. The Houston area did not attain the 2008 eight-hour ozone standard by the end of the 2014 ozone season, but qualified for a one-year attainment date extension in accordance with FCAA, §181(a)(5). The TCEQ submitted a request for the attainment date extension to the EPA in February 2015 along with the 2014 ozone data certification.

## Prior Nonattainment Designations

In 1991, the Beaumont-Port Arthur area, which includes Jefferson, Orange, and Hardin Counties, was designated a serious nonattainment area under the one-hour ozone

NAAQS. The one-hour standard was replaced with the more stringent eight-hour standard in 1997 and was officially revoked in 2005.

In 2004, the EPA designated the Beaumont-Port Arthur area a marginal nonattainment area under the 1997 eight-hour ozone NAAQS. The area was reclassified to moderate because it failed to meet its attainment deadline. The 2007 design value showed attainment of the 1997 eight-hour NAAQS and, in 2010, the EPA approved the TCEQ's request to redesignate the area attainment (maintenance).

## Air Toxics

As of January 1, 2010, 18 pollutants in nine Texas Coastal areas were on the APWL. Due to decreasing ambient concentrations and control measures taken by area industry, the TCEQ removed 10 pollutants from the APWL between 2010 and 2015. According to the TCEQ Toxicology Division's annual evaluation of the ambient air quality data, exposure to all measured VOC, SVOC, metals, and carbonyl concentrations in the Texas Coastal area over the past five years would not be expected to cause adverse health effects or odorous conditions. Table 2 references watch list areas for certain pollutants.

**Table 2: Air Pollutant Watch List Areas in the Texas Coastal Area**

| County | City | Year Added | Pollutant(s) of Interest | Status |
|---|---|---|---|---|
| Jasper | Evadale | 2003 | Hydrogen sulfide | Active |
| Jefferson | Beaumont | 2003 | Sulfur dioxide | Active |
| Jefferson | Port Arthur | 2001 | Benzene | Delisted (2014) |
| Brazoria | Freeport | 2005 | Arsenic, cobalt, nickel, vanadium | Active |
| Galveston | Texas City | 2001 | Propionaldehyde | Active |
| Galveston | Texas City | 2003 | Benzene | Delisted (2014) |
| Galveston | Texas City | 2004 | Hydrogen sulfide | Delisted (2014) |
| Harris | Lynchburg Ferry area | 2002 | Styrene | Delisted (2014) |
| Harris | Galena Park | 2000 | Benzene | Active |
| Jefferson | Beaumont | 2004 | Benzene | Delisted (2010) |
| Galveston | Texas City | 2001 | Acrolein, butyraldehyde, valeraldehyde | Delisted (2010) |
| Harris | Lynchburg Ferry area | 2002 | Benzene | Delisted (2010) |
| Nueces | Corpus Christi | 1998 | Benzene | Delisted (2010) |

# Monitoring Network Evaluation

## Ozone

### Network History

#### Houston Area

As of January 1, 2015, 20 regulatory ozone monitors were operating across the Houston area providing ambient concentration data in areas that are frequented by the public, likely impacted by maximum ozone concentrations, or are representative of background concentrations. Appendix A provides a full list of both active and recently decommissioned ozone monitors, as well as their locations, monitoring objectives, and associated spatial scales. Ozone monitoring in the Houston area began in the early 1970s with the deployment of the Clinton, Houston East, and Houston Aldine monitors. Through the 1990s, the ozone monitoring network expanded within the urban core and to the more populated suburban areas outside of Houston to meet federal monitoring requirements and to assist in understanding of the complex photochemical reactions in the highly unique Houston area.

Since the last five-year assessment period, one significant ozone network change has occurred in the Houston area. Based on ozone concentrations measured at a non-regulatory ozone monitor near Wallisville Road in the Baytown area, the EPA requested that a new regulatory ozone monitor be deployed to this location. Upon assessing the regulatory ozone monitoring network, the TCEQ concluded that improved spatial coverage of regulatory ozone monitors could be achieved by relocating the Houston Regional Office ozone monitor to the Baytown area. In 2012, the Houston Regional Office ozone monitor was relocated to the new Baytown Eastpoint site to comply with the EPA's request and improve spatial coverage in eastern Harris County. The Baytown Eastpoint site was relocated less than a mile away to the Baytown Garth site in 2014 due to construction at the Baytown Eastpoint property. Figure 5 provides a map illustrating the active and inactive ozone monitors across the Houston area.

Ozone monitoring in the Houston area is spatially comprehensive and historically compliant with federal requirements. Three federal ozone monitoring requirements (related to NCore [National Core multipollutant monitoring stations], PAMS [photochemical air monitoring station], and the area's population and ozone design value) currently apply to the Houston area, resulting in a minimum of six required ozone monitors.

#### Beaumont Area

As of January 1, 2015, ozone monitoring is conducted at seven sites in the Beaumont area to measure ambient concentrations in areas that are frequented by the public, likely impacted by maximum ozone concentrations, and representative of background or transported ozone. A list of active and recently decommissioned ozone monitors is provided in Appendix A, along with their locations, monitoring objectives, and spatial scales. Ozone monitoring in the Beaumont area began in the early 1970s and has expanded over time based on the area's attainment status and to meet evolving federal monitoring requirements. Of the seven active monitors, four are presently located within the urban core while three monitors are located in areas to measure background concentrations and ozone transported from other urban areas. Figure 6 provides a map depicting the location of ozone monitors across the Beaumont area.

While the number of ozone monitors across the Beaumont area exceeds federal requirements that apply to the area, the spatial distribution of the network provides valuable data for evaluating background concentrations and impacts on the area from regional transport. The Beaumont area is required to measure ozone at two sites based on the area's population and design values, as well as at all PAMS sites. The monitoring objectives related to these required ozone monitors include evaluating ambient air in locations impacted by maximum ozone concentrations, maximum precursor emissions, and regional transport, as well as background concentrations in areas frequented by the public. In addition, the ozone network in the Beaumont area provides valuable real-time data to the public and allows for the assessment of ozone trends. Since the last five-year network assessment, no significant changes to the area's ozone monitoring network have occurred.

### *Corpus Christi and Victoria Area*

The TCEQ conducts ozone monitoring at two sites in Corpus Christi and one site in Victoria as required based on each area's population and ozone design values. Ozone monitoring in the Corpus Christi area began in the early 1970s to assess the influence of ozone precursor emissions from industrial sources on ozone formation in the area and to evaluate ozone concentrations in populated areas. In the late 1980s an ozone monitor was added in the Victoria area to evaluate ambient ozone concentrations in a populated area likely impacted by reported ozone precursor emissions from industrial sources. Since the last five-year network assessment, no significant changes to the ozone monitoring networks in either area have occurred. Figure 7 provides a map depicting the location of ozone monitors across the Corpus Christi and Victoria area.

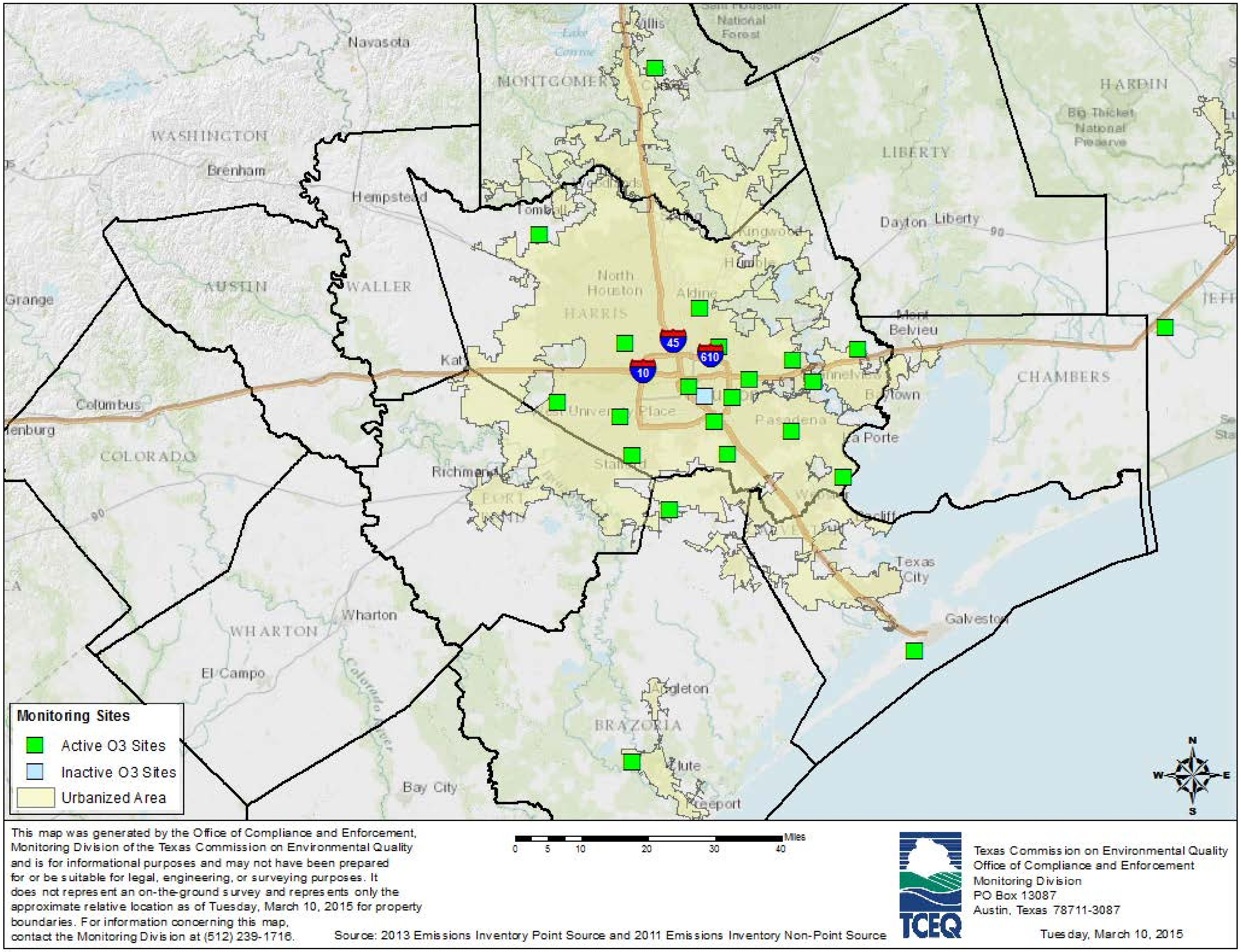



**Figure 5: Houston Area Ozone ($O_3$) Monitors**

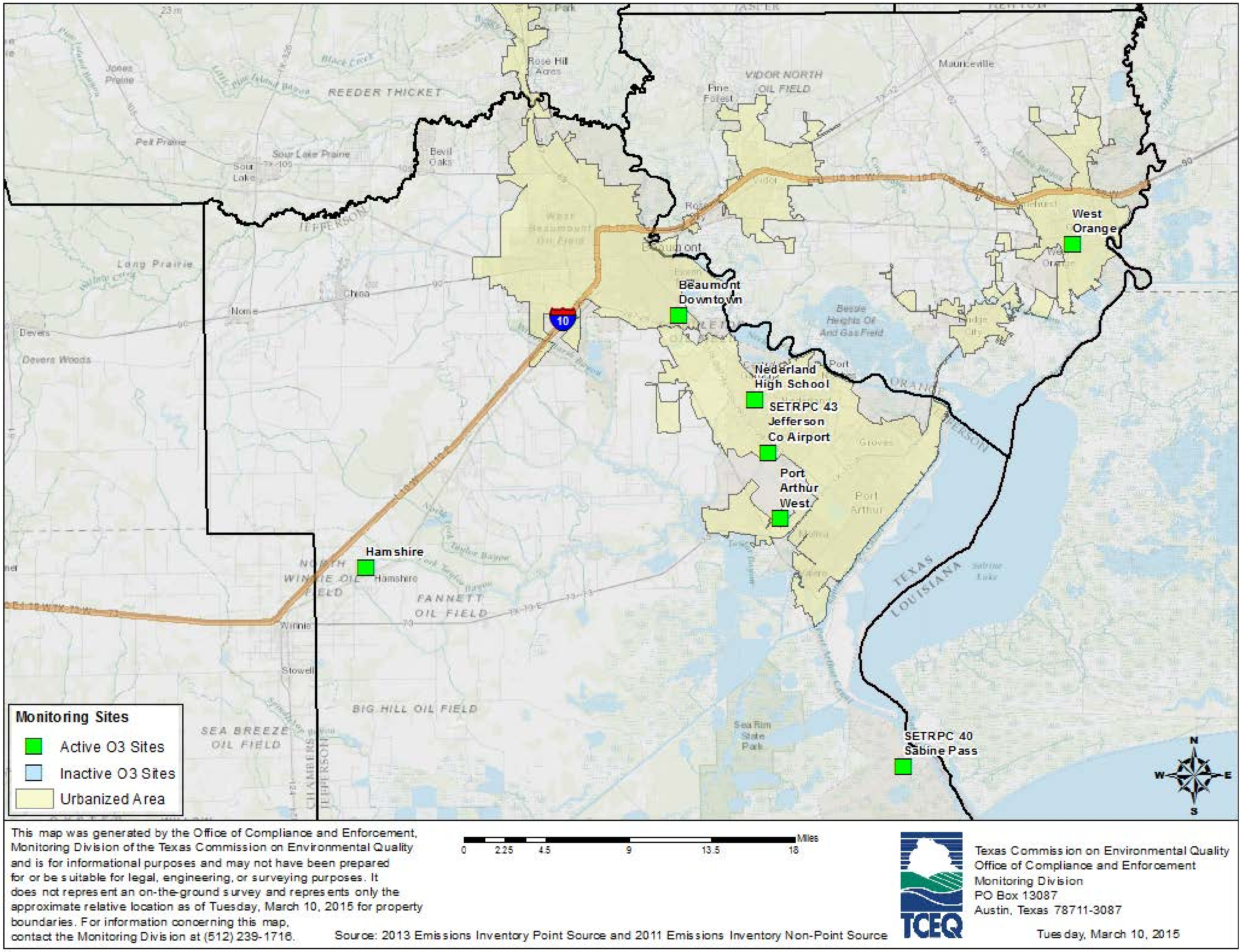



**Figure 6: Beaumont Area Ozone ($O_3$) Monitors**

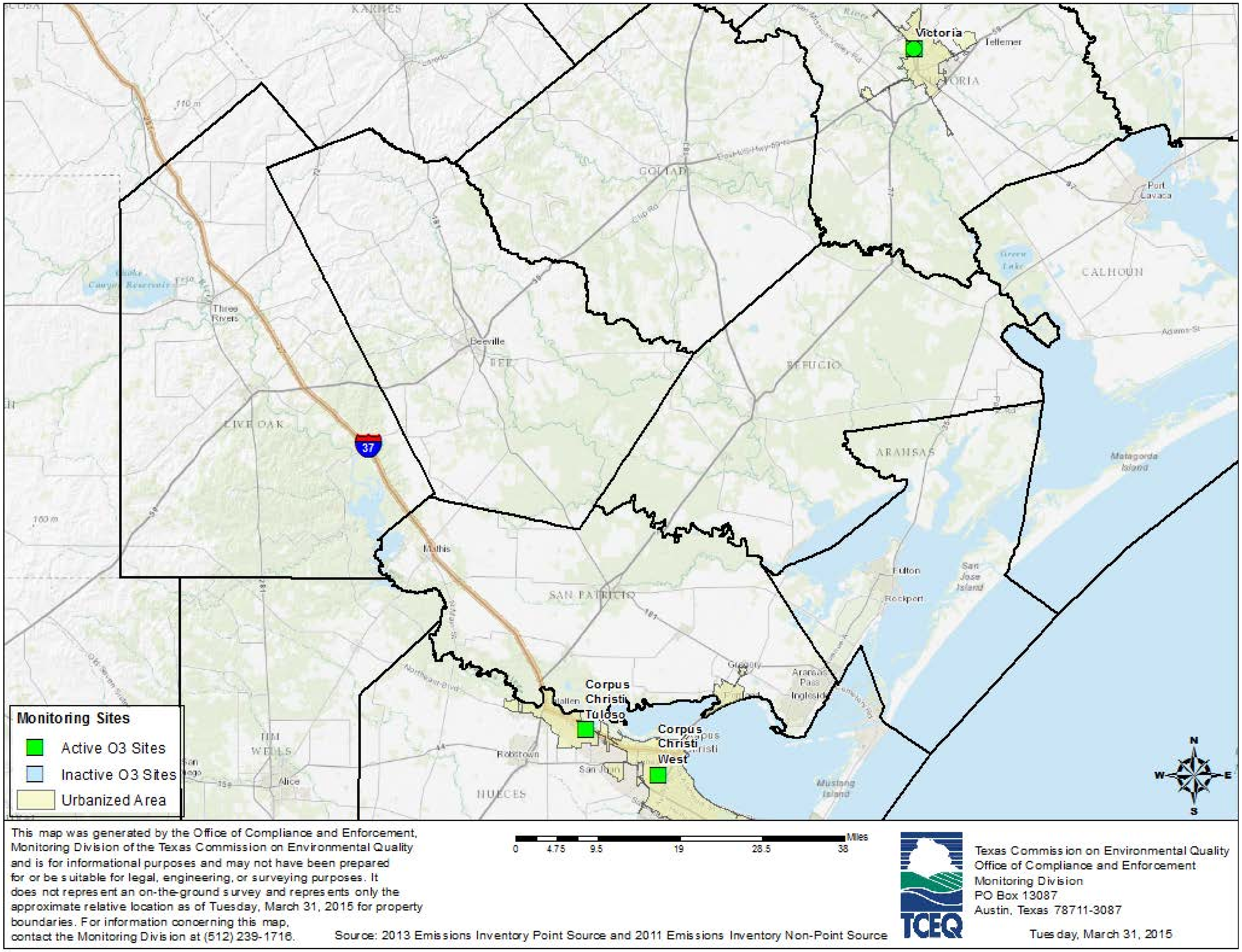



**Figure 7: Corpus Christi and Victoria Area Ozone ($O_3$) Monitors**

## Design Values and Trends

Eight-hour ozone design value trends have exhibited an overall decline in the Texas Coastal area due in large part to significant decreases in $NO_x$ and VOC emissions across the area. Current control measures in place for $NO_x$ and VOCs are effective in reducing ozone concentrations; however, ozone concentrations may not always exhibit trends identical to the concentrations of its precursors due to factors like meteorological variables.

### *Houston Area*

Houston area ozone design values show characteristics of urban formation and transport. City core monitors such as Clinton and the non-regulatory Houston Texas Avenue monitor generally show lower ozone concentrations, likely due to the time required to form ozone and $NO_x$ scavenging effects resulting from higher $NO_x$ emissions nearer to those monitors. As shown in Figure 8, sites outside of the city core have higher design values, likely because of inter- and intra-regional transport, cumulated ozone formed from precursors emitted within the city core, and lower $NO_x$ scavenging effects due to the lower levels of $NO_x$ emissions outside the city core areas. Eight-hour ozone design value trends have continued to decline in the Houston area. Figure 9 shows the highest and lowest ozone design values in the Houston area from 2000-2014.

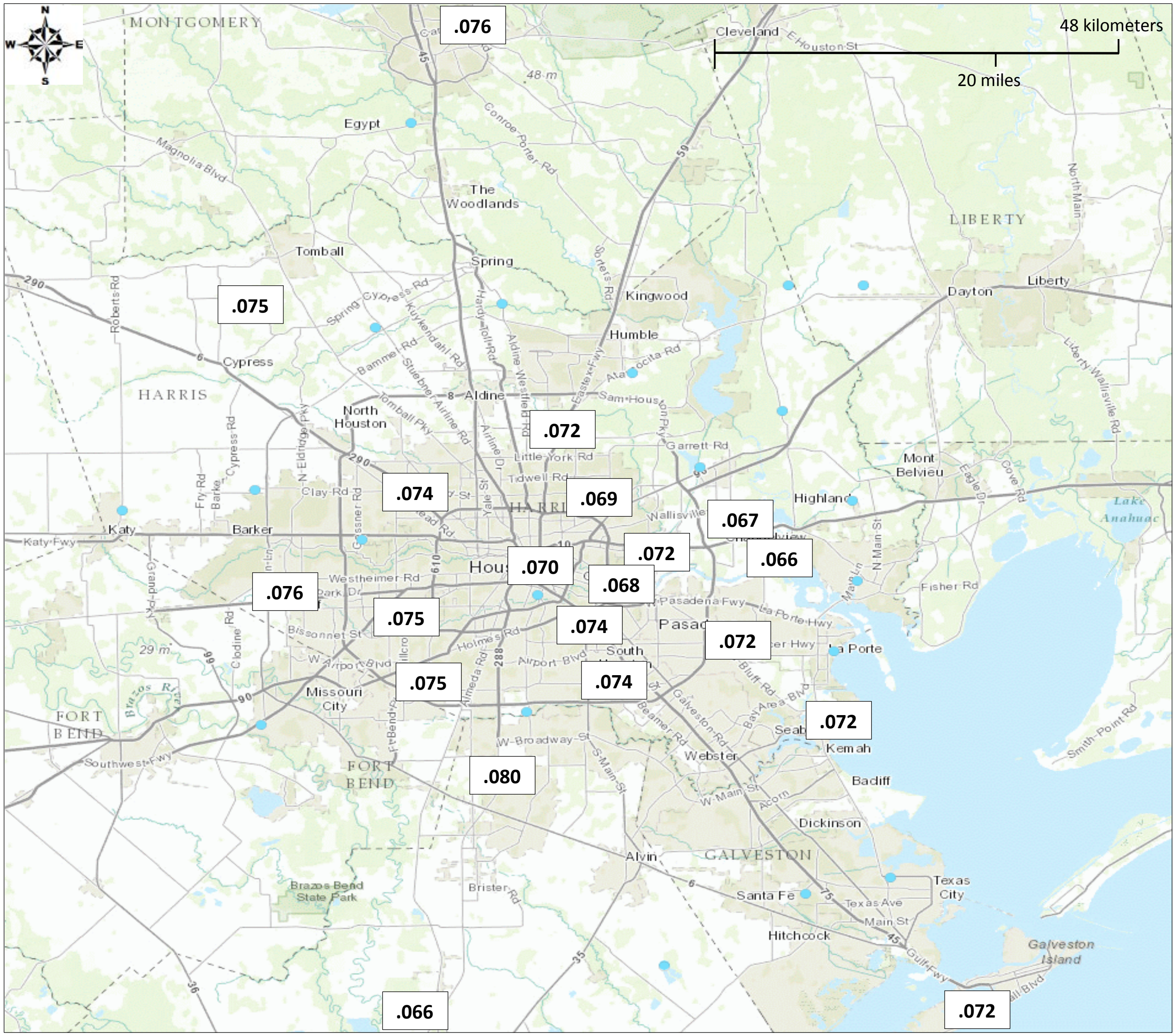
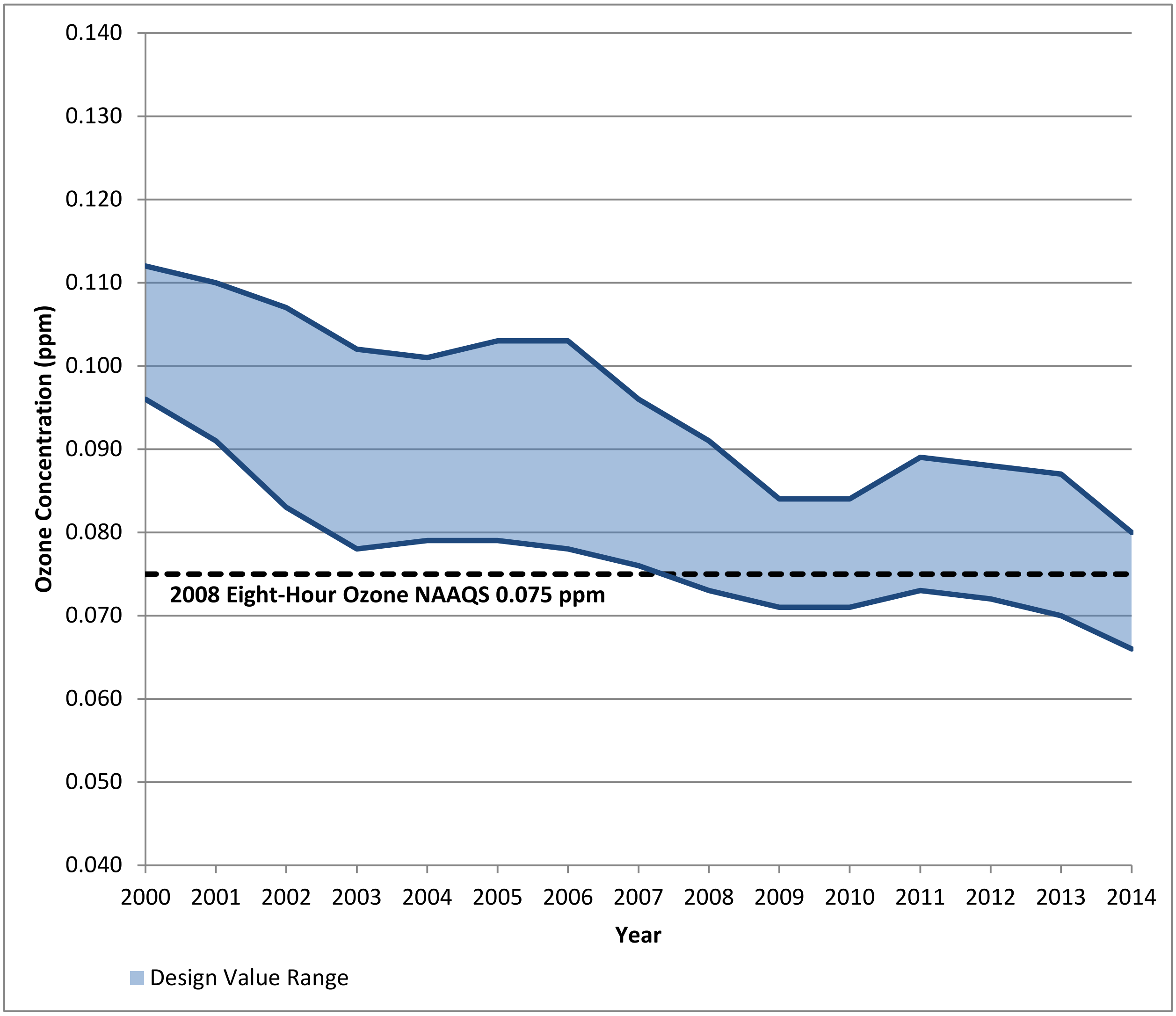



**Figure 8: 2014 Houston Area Eight-Hour Ozone Design Values in Parts Per Million (ppm)**




ppm – parts per million
NAAQS - National Ambient Air Quality Standards

**Figure 9: Eight-Hour Ozone Design Value Trends in the Houston Area, 2000-2014**

In addition to historical monitoring data, modeling data for the *2010 Houston-Galveston-Brazoria Attainment Demonstration State Implementation Plan Revision for the 1997 Eight-hour Ozone Standard* (HGB AD SIP) adopted by the commission on March 10, 2010, helps to illustrate this urban ozone formation and transport. Figure 10 shows two color contour maps of ozone concentrations produced by TCEQ for the 2010 HGB AD SIP: one for the 2006 baseline (a) and one for the 2018 future case, including controls (b). The figure shows that even with the expected improvements in ozone design values resulting from controls modeled in this attainment demonstration, the predicted maximum ozone concentrations lie outside of the urban core. This information suggests the continued need to focus monitoring efforts to evaluate transport in and out of the area, as well as upwind background concentrations.

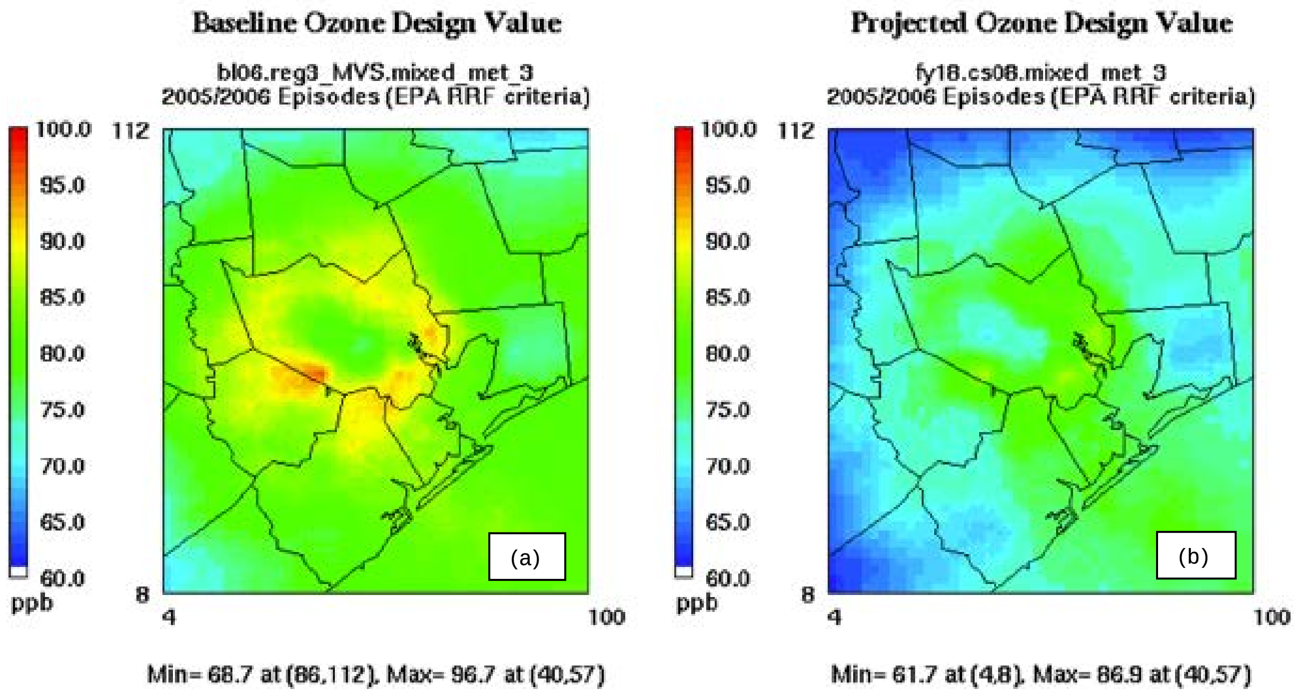
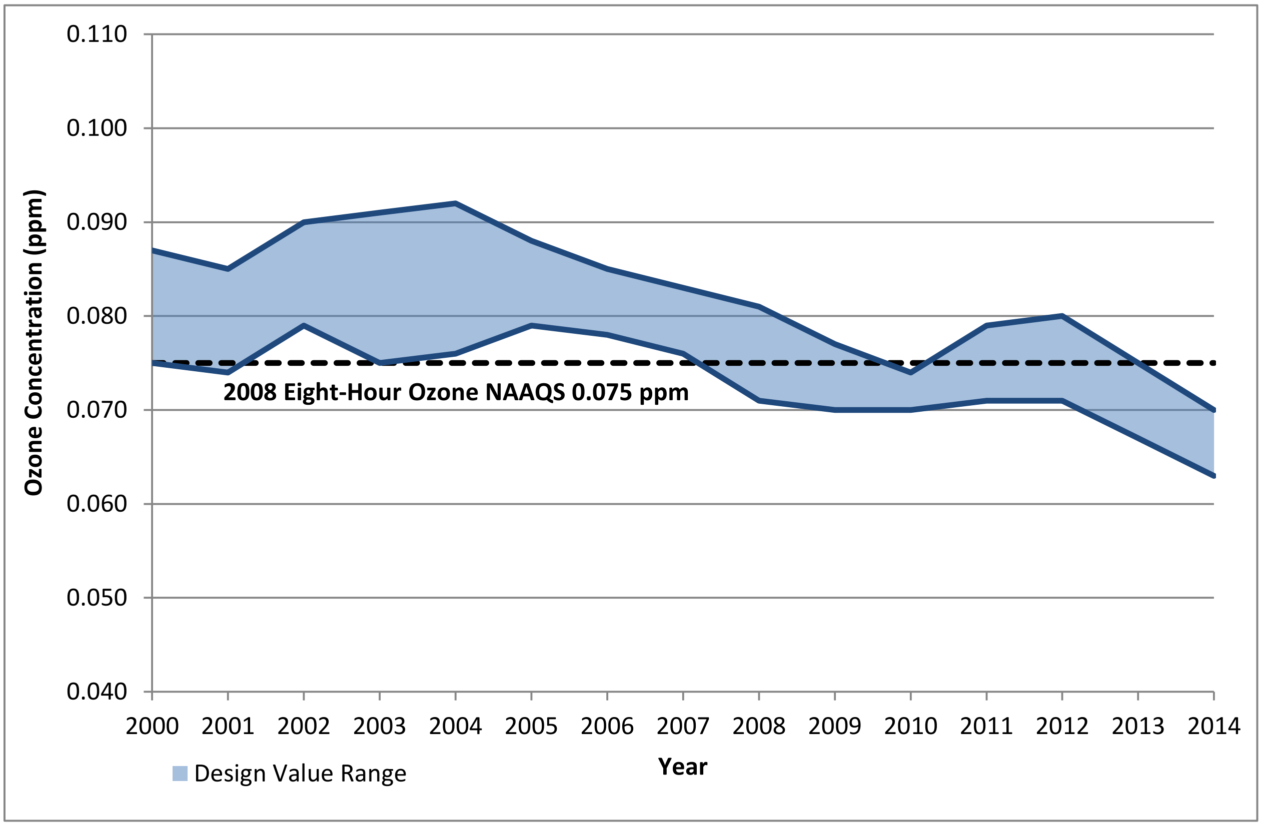



**Figure 10: Spatially Interpolated 2006 Baseline (a) and 2018 Future Case (b) Design Values for the Houston-Galveston-Brazoria Area**

### *Beaumont Area*

Eight-hour ozone design value trends have continued to decline in the Beaumont area since 2004. Figure 11 shows the highest and lowest ozone design values in the Beaumont area from 2000-2014. The Southeast Texas Regional Planning Commission (SETRPC) 40 Sabine Pass site has yielded the highest design values in the area since 2011. Given predominant wind patterns for the area, high design values at this site likely suggest high background levels, wind flow reversals, and lower air mixing heights contributing to high ozone concentrations in the area. Measured concentrations from all Beaumont area monitors have produced design values below the 2008 eight-hour ozone NAAQS of 0.075 ppm since 2012.

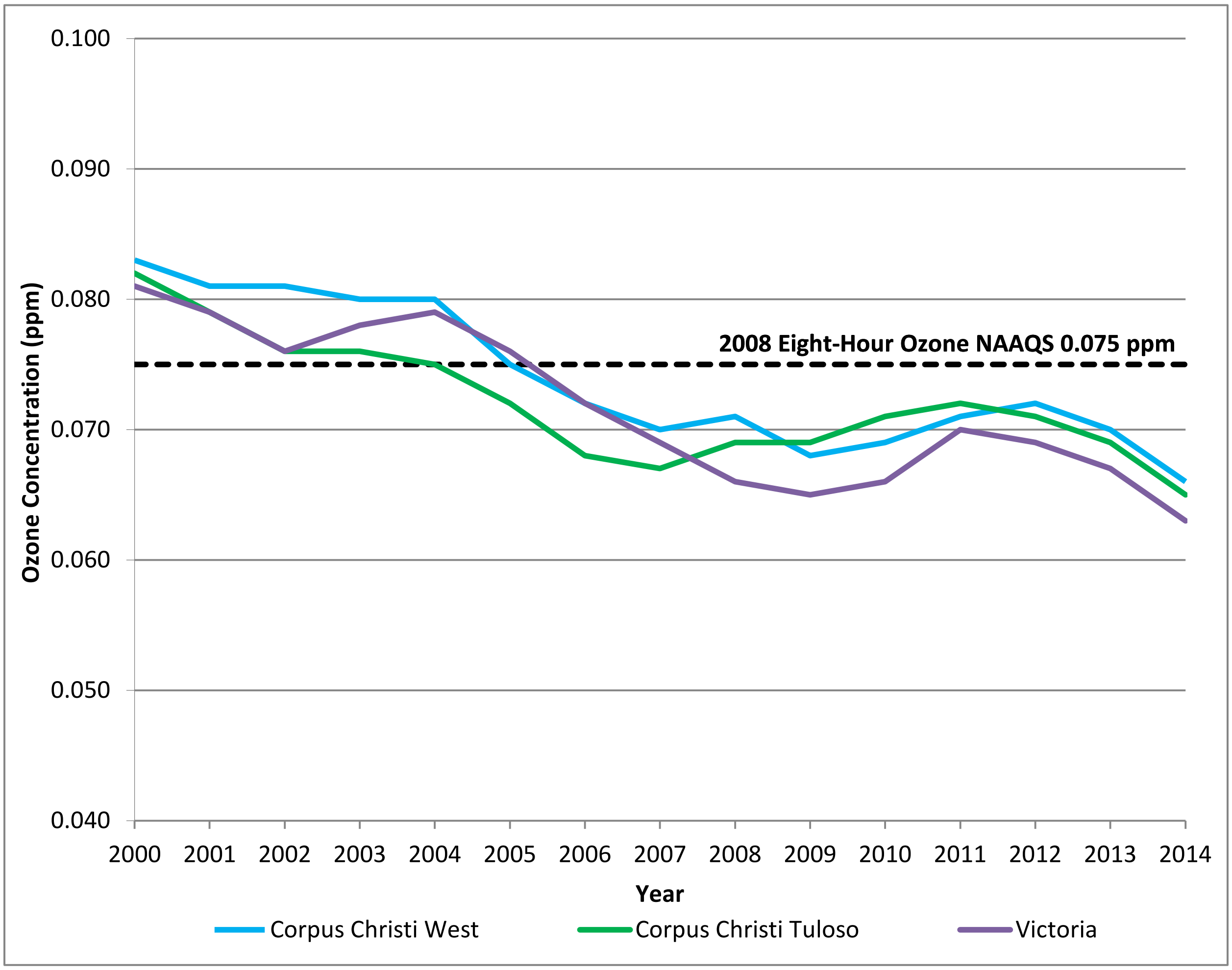



ppm – parts per million
NAAQS - National Ambient Air Quality Standards

**Figure 11: Eight-Hour Ozone Design Value Trends in the Beaumont Area, 2000-2014**

### *Corpus Christi and Victoria Area*

Consistent with the rest of the Texas Coastal area, eight-hour ozone design value trends continue to decline in Corpus Christi and Victoria and remain below the 2008 eight-hour ozone NAAQS as shown in Figure 12. Sites in Corpus Christi are reporting near background levels of ozone and show very similar design values. Ozone levels in Victoria have continually decreased from nonattainment levels of 0.081 ppm in 2000 to 0.067 ppm in 2013.




ppm – parts per million
NAAQS - National Ambient Air Quality Standards

**Figure 12: Eight-Hour Ozone Design Values in the Corpus Christi and Victoria Areas, 2000-2014**

## Network Evaluation

### *Houston Area*

Based on current ozone monitoring requirements, several Houston area ozone monitors are considered of high value. The Houston Deer Park #2 monitor is satisfying the requirement for ozone monitoring at the NCore sites, while Channelview, Clinton, Conroe Relocated, Galveston 99th Street, Houston Aldine, Houston Deer Park #2, and Northwest Harris County monitors are satisfying PAMS requirements. Additionally, ozone monitoring at Baytown Garth, Houston Bayland Park, Houston Croquet, Houston East, Houston Monroe, Houston North Wayside, Houston Texas Avenue, Houston Westhollow, Lake Jackson, Lang, Lynchburg Ferry, Manvel Croix Park, Park Place, and Seabrook Friendship Park is of medium to high value due to the spatial coverage it provides.

To assess potential redundancy, all Houston area ozone monitors were evaluated using the NetAssess correlation tool. Due to the large number of ozone monitors in the Houston area, Figure 13 illustrates the analysis results for a subset of monitors located within State Highway Beltway 8 loop. The graphed correlation matrix provides the correlation coefficient, relative difference, and distance between monitor pairs. Monitors are identified by AQS numbers, which can be referenced in Appendix A. Four monitor pairs, located within 10 kilometers of each other, had very high correlations and low relative differences:

- Houston Croquet (AQS 48-201-0051) and Houston Bayland Park (AQS 48-201-0055) monitors (Pearson's coefficient=0.986, relative difference=0.052);
- Houston Westhollow (AQS 48-201-0066) and Houston Bayland Park monitors (Pearson's coefficient=0.983, relative difference=0.059);
- Park Place (AQS 48-201-0416) and Houston Monroe (AQS 48-201-0062) monitors (Pearson's coefficient=0.976, relative difference=0.065); and
- Houston Aldine (AQS 48-201-0024) and Houston North Wayside (AQS 48-201-0046) monitors (Pearson's coefficient=0.974, relative difference=0.095).

Each monitor listed above is well sited to monitor ozone concentrations in populated areas and are considered valuable. Additionally, Clinton (AQS 48-201-1035) and Deer Park #2 (AQS 48-201-1039) were both well-correlated with 14 monitors (Pearson's coefficient greater than [>] 0.9, relative difference less than [<] 0.09) and Houston East (AQS 48-201-1034) and Park Place were both well-correlated with 12 monitors (Pearson's coefficient>0.9, relative difference<0.17). This correlation analysis indicated moderate to high correlations between many Houston area monitors, which is expected given the expanse of the area's ozone network and the regional nature of the pollutant. A detailed description of each active ozone monitor is provided in Appendix C.

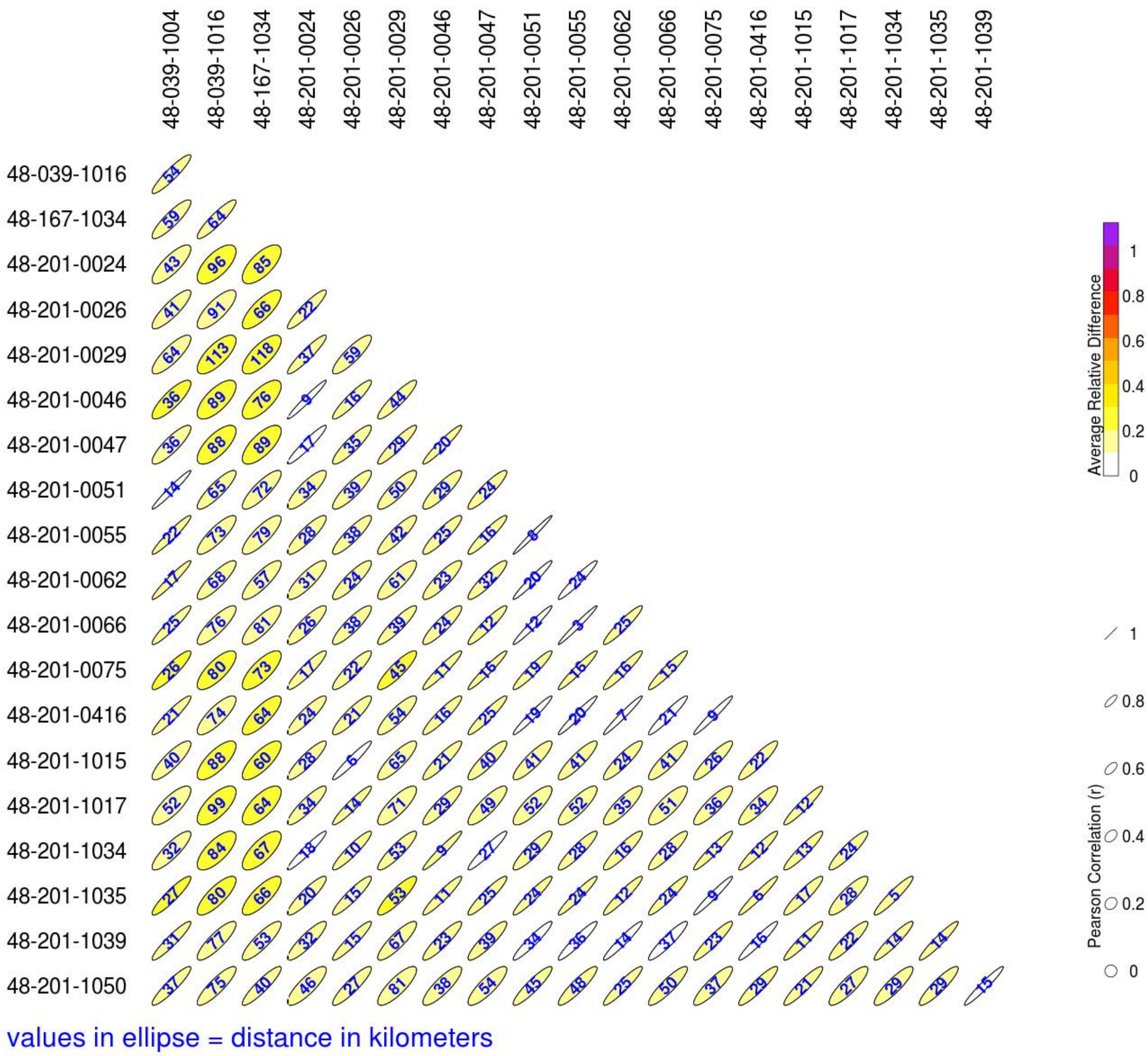


Figure 13: Eight-Hour Daily Maximum Ozone Correlation Matrix for Houston Area Ozone Monitors, 2011-2013

### *Beaumont Area*

Ozone monitoring requirements currently applicable to the Beaumont area place a high value on several monitoring sites. The Nederland High School, Beaumont Downtown, and SETRPC 40 Sabine Pass sites are meeting ozone monitoring requirements at PAMS sites in the area, while the Port Arthur West, West Orange, and Hamshire sites are fulfilling ozone monitoring requirements based on the area's population and design values.

Figure 14 shows the correlation analysis to assess spatial distribution and redundancy between the Beaumont area ozone monitors. Monitors are identified by AQS numbers, which can be referenced in Appendix A. As shown, Nederland High School (AQS 48-245-1035) is highly correlated with both the SETRPC 43 Jefferson County Airport (AQS

48-245-0102) and Beaumont Downtown (AQS 48-245-0009) monitors (Pearson's coefficient=0.974-0.976, relative difference<0.075). Port Arthur West (AQS 48-245-0011) is also correlated with the SETRPC 43 Jefferson County Airport monitor (Pearson's coefficient=0.968, relative difference=0.070). Even though the monitors are correlated, the monitor locations, the different monitoring objectives, and historical ozone trends data make all three sites independently valuable. Appendix C provides a detailed description of the value of each active ozone monitor.

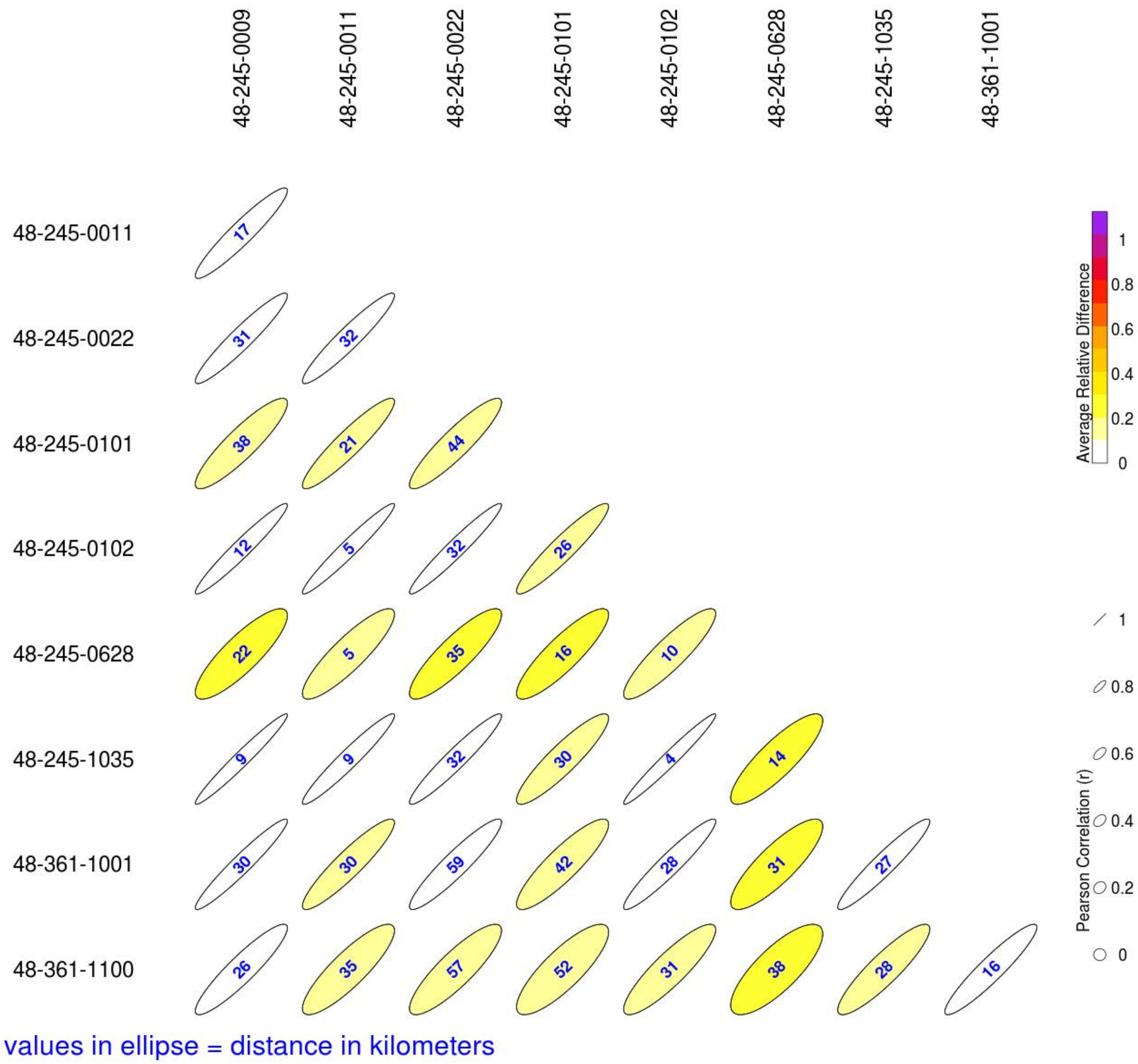



**Figure 14: Eight-Hour Daily Maximum Ozone Correlation Matrix for Beaumont Area Ozone Monitors, 2011-2013**

### *Corpus Christi and Victoria Area*

The ozone monitors at Corpus Christi West (AQS 48-355-0025) and Corpus Christi Tuloso (AQS 48-355-0026) are fulfilling federal requirements for ozone monitoring based on the area's population and design values and are considered of high value.

Despite being located approximately 9 miles apart, the monitors are well-correlated as expected for a regional pollutant (Pearson's coefficient=0.976, relative difference=0.062). The monitors are also well sited to evaluate ozone concentrations in populated regions of the Corpus Christi area.

Likewise, the Victoria ozone monitor is satisfying federal requirements for population and ozone design values and is considered of high value. Appendix C provides a detailed description of the value of each active ozone monitor.

## Carbon Monoxide

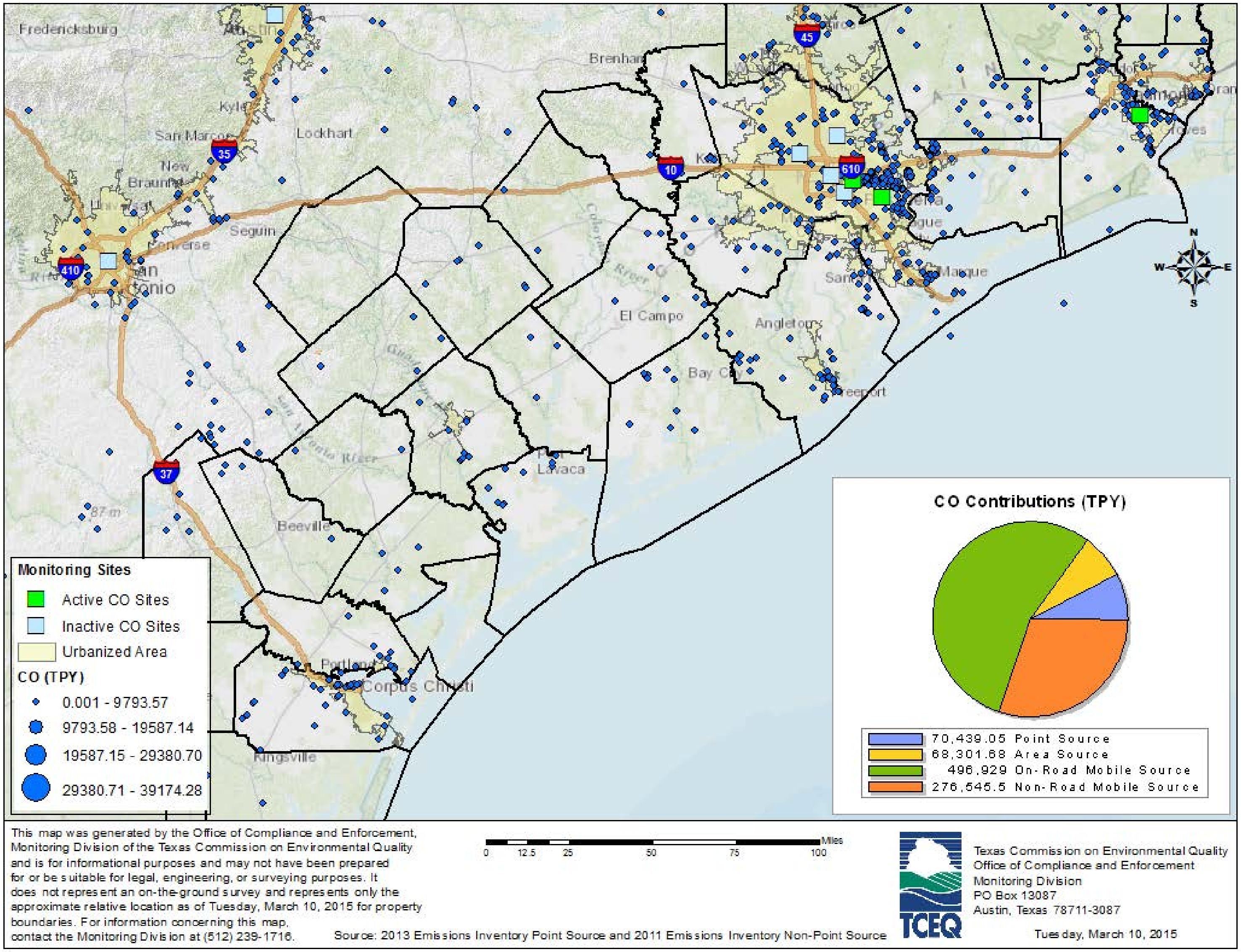
### Network History

As of January 1, 2015, three CO monitors are operating across the Texas Coastal area. Prior to 2010 no federal minimum CO monitoring requirements were applicable to metropolitan areas with the exception of monitoring for CO concurrently with ozone precursors at PAMS sites and CO monitoring at NCore sites. In 2010, the EPA promulgated new rules requiring CO monitoring at near-road $NO_2$ sites in metropolitan areas with a population of a 1,000,000 or more persons.

The Clinton CO monitor was deployed in the late 1970s to monitor ambient concentrations in a populated area and currently fulfills the PAMS requirement for the Houston area. The CO monitor at the Nederland High School site was deployed in 2006 to monitor CO as an ozone precursor for the PAMS network in Beaumont, as well as to evaluate ambient concentrations in populated areas. The high sensitivity CO monitor at Houston Deer Park #2 was deployed late in 2010 to meet both PAMS and NCore requirements. A new CO monitor was deployed at the Houston North Loop site in April 2015 to fulfill the near-road CO monitoring requirements.

Since the last five-year network assessment in 2010, four CO monitors have been decommissioned. The Houston Aldine, Lang, Houston Texas Avenue, and Park Place CO monitors were all decommissioned in late 2014. These monitors were operated beyond minimum requirements and maintained historic design values well below the one-hour and eight-hour CO NAAQS.

Appendix A provides a full list of both active and recently decommissioned ozone monitors, as well as their location, monitoring objectives, and associated spatial scales. Because the Houston North Loop monitor was deployed after January 1, 2015, the monitor is not included in Appendix A and the value of the monitor will be assessed during the next five-year assessment. Monitoring locations and CO point sources for the Texas Coastal area are shown in Figure 15.




TPY – tons per year

**Figure 15: Texas Coastal Area Carbon Monoxide (CO) Point Sources and Monitors**

### Design Values and Trends

CO design values in the Texas Coastal area have remained well below both the one-hour and eight-hour NAAQS. Since 2003, design values have consistently remained below 15% of the one-hour NAAQS of 35 ppm and below 47% of the eight-hour NAAQS of 9 ppm.

### Network Evaluation

The existing CO monitoring network in the Texas Coastal area meets all current federal monitoring requirements and is adequate to meet existing monitoring objectives. Given the historic design values for the area and the previous monitor decommissions, no additional network changes are recommended at this time.

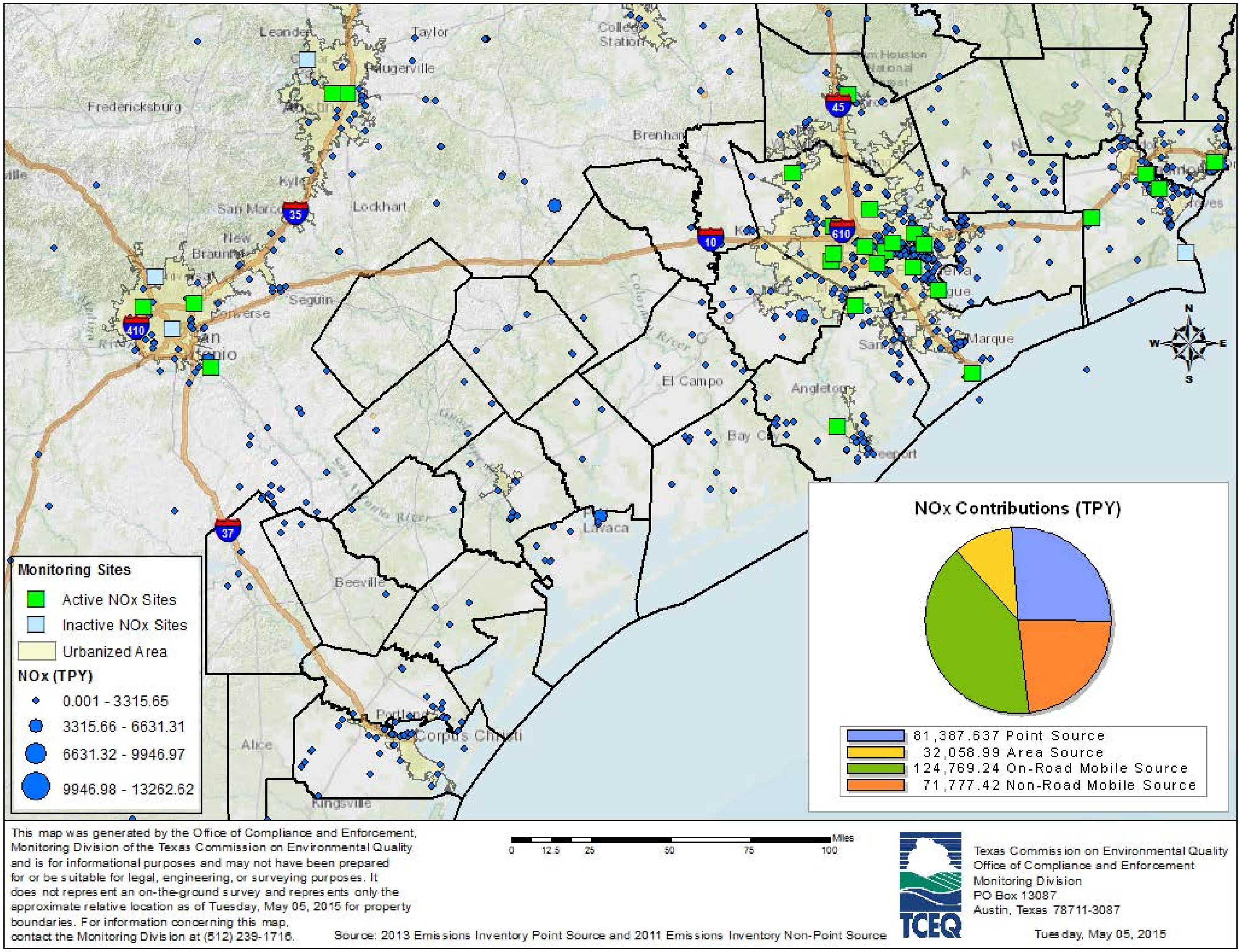
## Oxides of Nitrogen

### Network History

As of January 1, 2015, 21 regulatory $NO_x$ monitors operate in the Texas Coastal area (as shown in Figure 16) measuring ambient $NO_x$ levels in populated areas, areas likely to have maximum concentrations, areas that are important for ozone formation, areas impacted by background concentrations, and areas near sources. Prior to 2010 there were no federal minimum $NO_2$ monitoring requirements applicable to metropolitan areas with the exception of $NO_x$ monitoring at PAMS and NCore sites. In 2010, the EPA promulgated new rules requiring area-wide $NO_2$ monitoring sites in metropolitan areas with populations of 1,000,000 or more and near-road $NO_2$ monitoring sites in metropolitan areas with populations of 500,000 or more. Also, on January 1, 2011, monitoring of total reactive nitrogen compounds ($NO_y$), considered to be ozone and $PM_{2.5}$ precursors, was required at designated NCore network sites. In addition, Regional Administrator required $NO_2$ monitoring, known as RA-40, requires additional $NO_2$ monitoring above the minimum requirements with a primary focus on siting monitors in locations to protect susceptible and vulnerable populations.

While $NO_x$ monitoring was conducted in the Texas Coastal area prior to 1990, significant expansion of the $NO_x$ monitoring network occurred in the late 1990s and early 2000s in response to new federal PAMS requirements and the need to improve the agency's understanding of ozone formation and ozone precursor transport in the Houston-Galveston-Brazoria and Beaumont-Port Arthur ozone nonattainment areas. Of the 21 active $NO_x$ monitors, 17 are located in the Houston area with the remainder located in Beaumont. Four federal $NO_x$ monitoring requirements (related to NCore, PAMS, RA-40, and required as based on the area's population) currently apply to the Houston and Beaumont areas resulting in a minimum of seven required $NO_x$ monitors for Houston and two required monitors for Beaumont. Monitoring objectives related to these federal requirements include collection of ambient data in areas frequented by the public, measuring maximum ozone precursor emissions impacts, characterizing upwind and background concentrations, and characterizing downwind transport of ozone precursors. In addition, the distribution of the $NO_x$ monitoring network in the Texas Coastal area provides valuable information to evaluate the effectiveness of $NO_x$ control strategies, the performance of photochemical models in predicting ozone formation, and the spatial and diurnal variability of ozone precursor emissions.

Since the last five-year network assessment period, three changes to the $NO_x$ network in the Texas Coastal area have been implemented. In 2010, an $NO_y$ monitor was added at the Houston Deer Park #2 site to comply with NCore monitoring requirements. In 2014, the TCEQ decommissioned the $NO_y$ monitor at the SETRPC 40 Sabine Pass site that was operated to fulfill the Beaumont-Port Arthur area's previous PAMS requirements. With the area's re-designation as attainment/maintenance of the 1997 eight-hour ozone standard, the operation of this monitor was beyond minimum network requirements. In January 2014, the TCEQ deployed the first of two required near-road $NO_2$ monitors in the Houston area at the Houston Southwest Freeway site near the intersection of U.S. Highway 59 and the Westpark Tollway on the southwest side of Houston. This monitor was the first in the area to measure $NO_x$ concentrations in such close proximity to on-road emission sources. An additional near-road $NO_x$ monitor was deployed in April 2015 at the Houston North Loop site east of the Interstate Loop 610 and Interstate Highway 45 intersection. Appendix A provides a full list of both active and recently decommissioned $NO_x$ monitors, as well as their location, monitoring objectives, and associated spatial scales. Because the Houston North Loop monitor was deployed after January 1, 2015, the monitor is not included in Appendix A.

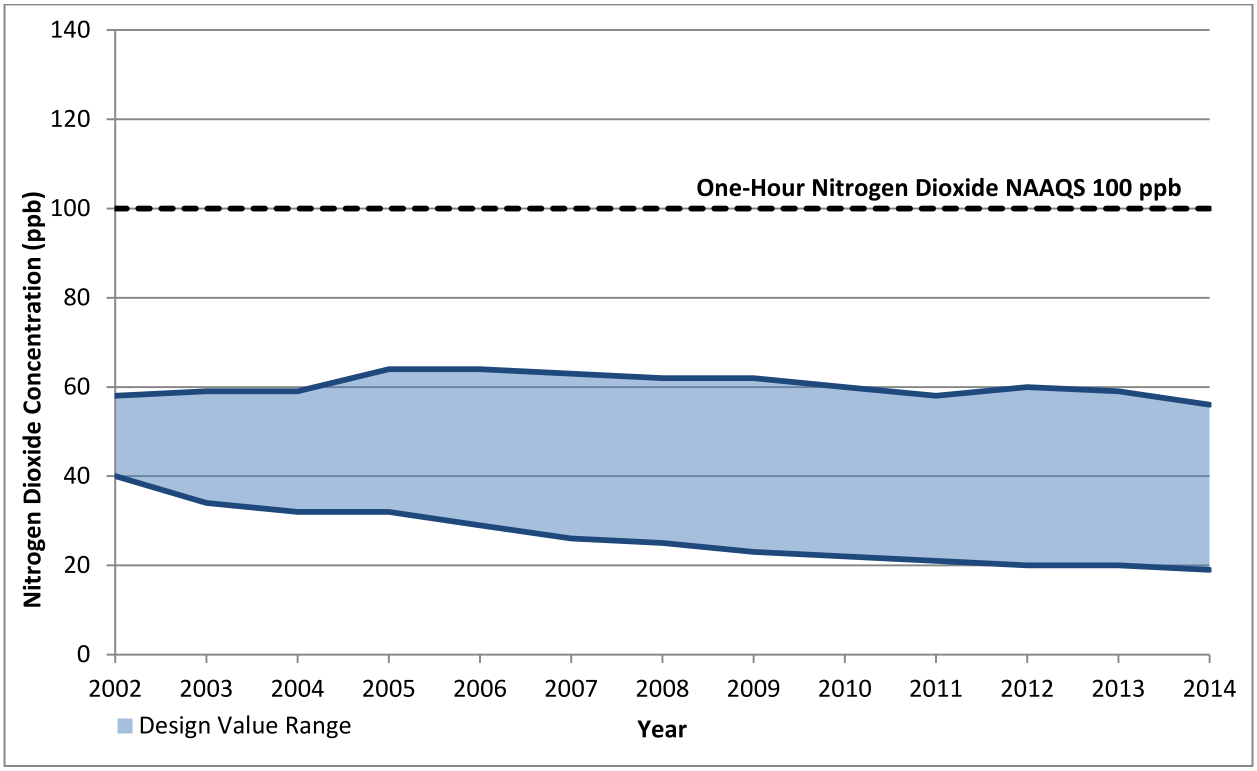



TPY – tons per year

**Figure 16: Texas Coastal Area Oxides of Nitrogen ($NO_x$) Point Sources and Monitors**

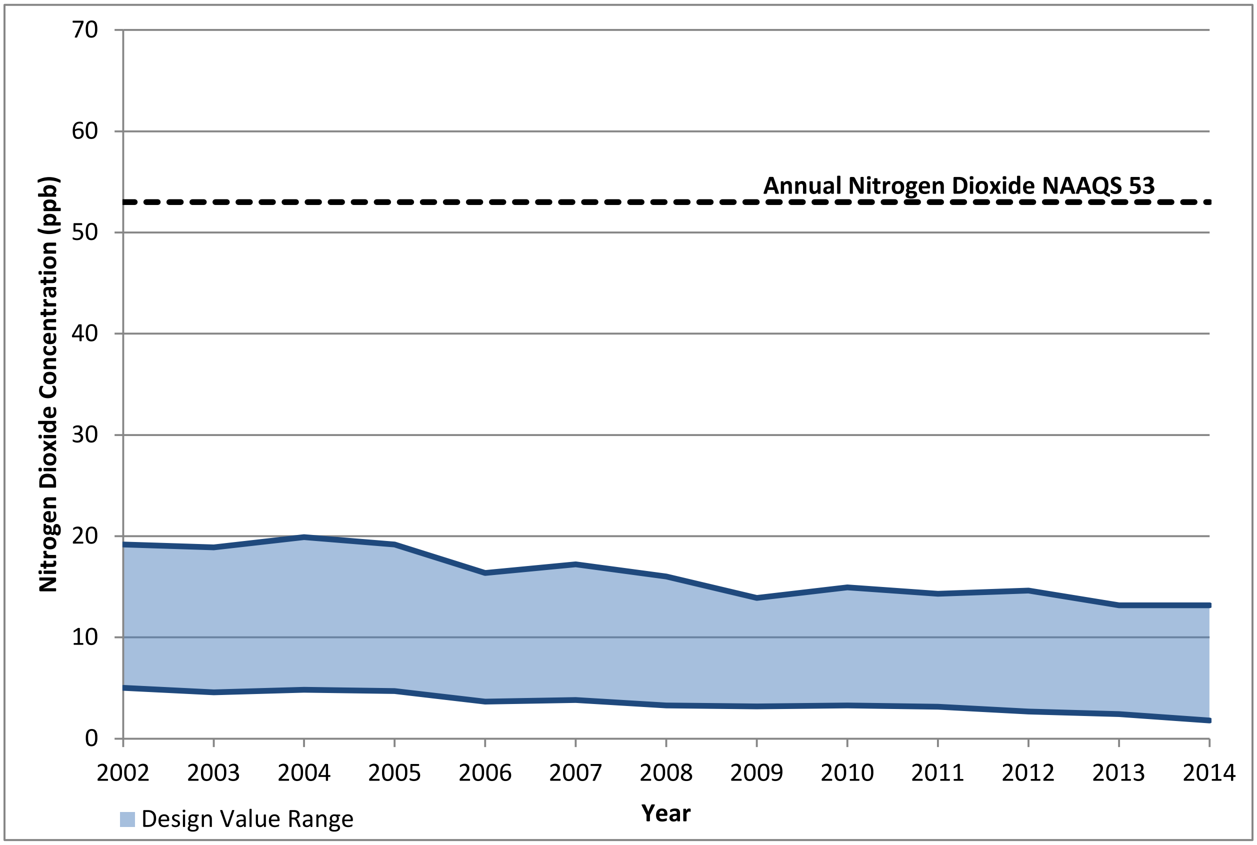
## Design Values and Trends

All regions within the Texas Coastal area presently meet the current one-hour and annual $NO_2$ NAAQS, with annual $NO_2$ concentrations measured at all monitors falling well below the one-hour NAAQS of 100 ppb and the annual NAAQS of 53 ppb since 2002. Figures 17 and 18 show the design value trends in the Texas Coastal area from 2002 through 2014. According to 2014 data, all Texas Coastal monitors have remained well below both of the NAAQS.




ppb – parts per billion
NAAQS - National Ambient Air Quality Standards

**Figure 17: Texas Coastal Area One-Hour Nitrogen Dioxide Design Value Trends, 2002–2014**




ppb – parts per billion
NAAQS - National Ambient Air Quality Standards

**Figure 18: Texas Coastal Area Annual Nitrogen Dioxide Design Value Trends, 2002–2014**

## Network Evaluation

The existing $NO_2$ monitoring network in the Texas Coastal area meets all current federal monitoring requirements and sufficiently achieves established monitoring objectives. Several Texas Coastal area $NO_x$ monitors are considered of high value based on their use in fulfilling PAMS, NCore, area-wide, and near-road monitoring requirements. The $NO_y$ monitors at Houston Aldine and Houston Deer Park # 2 satisfy both PAMS and NCore requirements respectively and are considered of high value. The Clinton $NO_x$ monitor fulfills the Houston area's requirement for an area-wide monitor at a neighborhood or larger scale, while the Houston Deer Park #2 site satisfies $NO_x$ monitoring at the NCore site. $NO_x$ monitors at several sites, including Channelview, Clinton, Houston Deer Park #2, Houston Aldine, Nederland High School, and Beaumont Downtown fulfill PAMS requirements for the Houston and Beaumont areas. Near-road monitoring requirements are satisfied by the Houston Southwest Freeway and the Houston North Loop $NO_x$ monitors. All of these monitors are considered of high value to the $NO_x$ monitoring network. However, because the Houston North Loop monitor was deployed after January 1, 2015, the value of the monitor will be assessed during the next five-year assessment.

All remaining $NO_x$ monitors are considered of medium value to the Texas Coastal area network, but provide valuable data pertaining to the effectiveness of $NO_x$ control strategies, the performance of photochemical ozone modeling, and the characterization of background and transported ozone precursor concentrations. Based on current monitoring objectives, no additional network changes are recommended at this time. The TCEQ will reevaluate the network once the EPA finalizes its proposed ozone rule, as PAMS requirements and ozone nonattainment areas are likely to change.

## Sulfur Dioxide

### Network History

As of January 1, 2015, 13 $SO_2$ monitors were deployed across the Texas Coastal area (Figure 19) to measure ambient concentrations of $SO_2$ near populated areas or downwind of known $SO_2$ point sources. Many of the area's $SO_2$ monitors that were deployed under the former National Air Monitoring Station requirements are still in operation and fulfill current federal $SO_2$ monitoring requirements based on an area's population-weighted emissions index (PWEI). Under these current monitoring requirements, the Houston area is required to have two $SO_2$ monitors while the Beaumont area is required to have only one. Based on its PWEI, the Corpus Christi area does not meet the threshold to trigger $SO_2$ monitoring requirements.

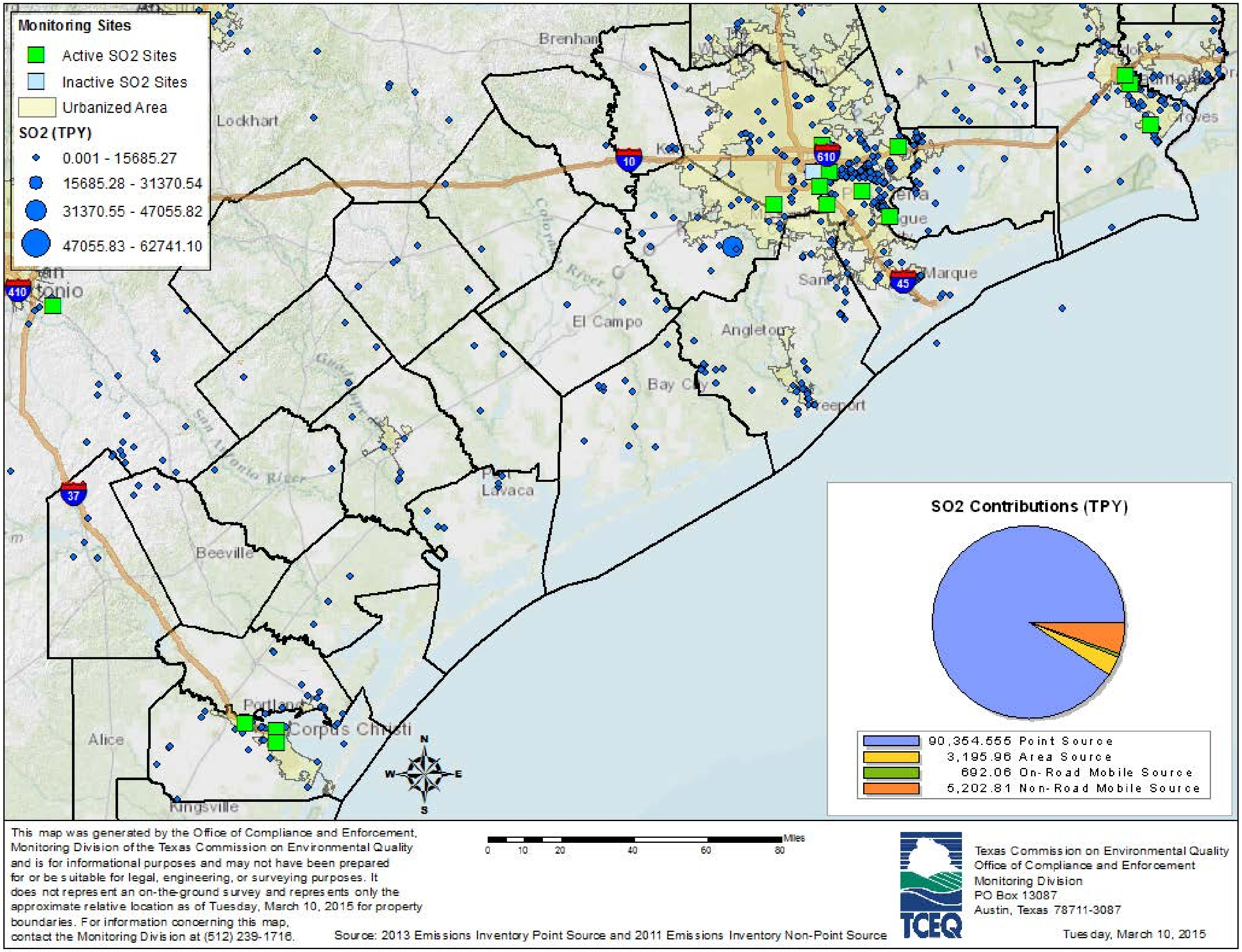
In the Beaumont-Port Arthur area, $SO_2$ is monitored at two sites. The monitor at the Beaumont Downtown site, located just east of Lamar University in an area of high population density, was deployed in 1980. In 1997, TCEQ deployed a source-oriented $SO_2$ monitor at the Port Arthur West site, five miles northwest and downwind of Oxbow Calcining, the biggest $SO_2$ source in the area. Emissions reported for this source were just under 8000 tons per year (tpy) in both 2012 and 2013.

In the Houston area, $SO_2$ is monitored at the Clinton site, located at the edge of a neighborhood and near the ship channel in Southwest Houston, since 1982. By 2001, $SO_2$ concentrations were monitored at five additional sites: Houston Croquet, Houston Monroe, North Wayside, Houston Regional Office, and Seabrook Friendship Park. In 2006, SO2 monitoring was added to the new Park Place site. All of these monitors were sited to measure ambient concentrations in populated areas across the Houston area. In late 2010, a high sensitivity $SO_2$ monitor was deployed at the Houston Deer Park #2 site to fulfill requirements for $SO_2$ monitoring at NCore sites.

While $SO_2$ monitoring is not required by federal rule in Corpus Christi, $SO_2$ is monitored at three sites, Corpus Christi Tuloso, Corpus Christi West, and Corpus Christi Huisache. The Corpus Christi Huisache site is located in close proximity to the heavily industrialized area along the Corpus Christi ship channel. The Corpus Christi Tuloso and Corpus Christi West sites are both located in more suburban areas and sited to monitor ambient concentrations near populated areas on the west and south sides of Corpus Christi.

Two minor changes to the Texas Coastal area's $SO_2$ network have occurred since the last five-year network assessment. In 2012, the Port Arthur West site was temporarily decommissioned for five months to allow for relocation after the monitoring site property was sold by the land owner. The site was re-established in the nearby El Vista

Community Park, at 623 Ellias Street, Port Arthur. Due to the close proximity of the two sites, the site name and AQS number remained the same. Since collection of 2012 data was incomplete, three complete years of data are not yet available to calculate an official design value for this monitor. Also in 2012, the Houston Regional Office site was decommissioned. The TCEQ relocated the $SO_2$ monitor from this site to the Baytown Eastpoint site. In 2014 the Baytown Eastpoint site was relocated less than a mile away to the Baytown Garth site due to construction at the Eastpoint property. Appendix A provides a full list of both active and recently decommissioned $SO_2$ monitors, as well as their location, monitoring objectives, and associated spatial scales.




TPY – tons per year

**Figure 19: Texas Coastal Area Sulfur Dioxide ($SO_2$) Point Sources and Monitors**

### Design Values and Trends

Since 2010, design values for $SO_2$ monitors in the Texas Coastal area have remained less than 50% of the revised 2010 $SO_2$ one-hour standard of 75 ppb. In addition, the overall trend in measured design values for the Texas Coastal area shows a significant decrease from 2009 to 2014. The highest design values occurred at the Beaumont Downtown site in the Beaumont area, the Park Place site in the Houston area, and at the Corpus Christi Huisache site in the Corpus Christi area.

### Network Evaluation

The current $SO_2$ monitoring network is sufficient to comply with existing federal requirements and continues to satisfy established monitoring objectives. Monitoring is currently not required in Texas Coastal MSAs based on population and reported emissions from existing sources.

The Beaumont Downtown and Port Arthur West monitors fulfill the Beaumont area's minimum $SO_2$ monitoring requirements. The Beaumont Downtown site, located in a residential area near Lamar University, provides valuable data relevant to ambient $SO_2$ concentrations in areas frequented by the public. The Port Arthur West site, located downwind of a heavily industrialized area along the Port Arthur ship channel, serves as a source-oriented monitor providing information important to assess $SO_2$ contributions from point sources in the area.

The $SO_2$ monitors at the Baytown Garth and Houston Clinton sites are currently satisfying the Houston area's minimum $SO_2$ monitoring requirements and are considered of high value. The high sensitivity $SO_2$ monitor at the Houston Deer Park #2 site is required for the NCore monitoring network, placing high value on this monitor. The remaining $SO_2$ monitors in the Houston area are sited to measure ambient $SO_2$ levels in populated areas and continue to meet their monitoring objectives. These monitors are all sited at the neighborhood scale in proximity to $SO_2$ point sources. All design values from area monitors are less than 50% of the NAAQS.

While beyond minimum federal monitoring requirements, the three $SO_2$ monitors in Corpus Christi are all sited near residential areas and have historically provided useful information relevant to ambient $SO_2$ concentrations in areas frequented by the public. The Corpus Christi Tuloso and Corpus Christi West sites have historically measured low $SO_2$ concentrations and are considered of medium value. The Corpus Christi Huisache site is located just south of several industrial sources and the ship channel and just north of a neighborhood. This site is of high value as it monitors the area's highest expected $SO_2$ concentrations in a populated area.

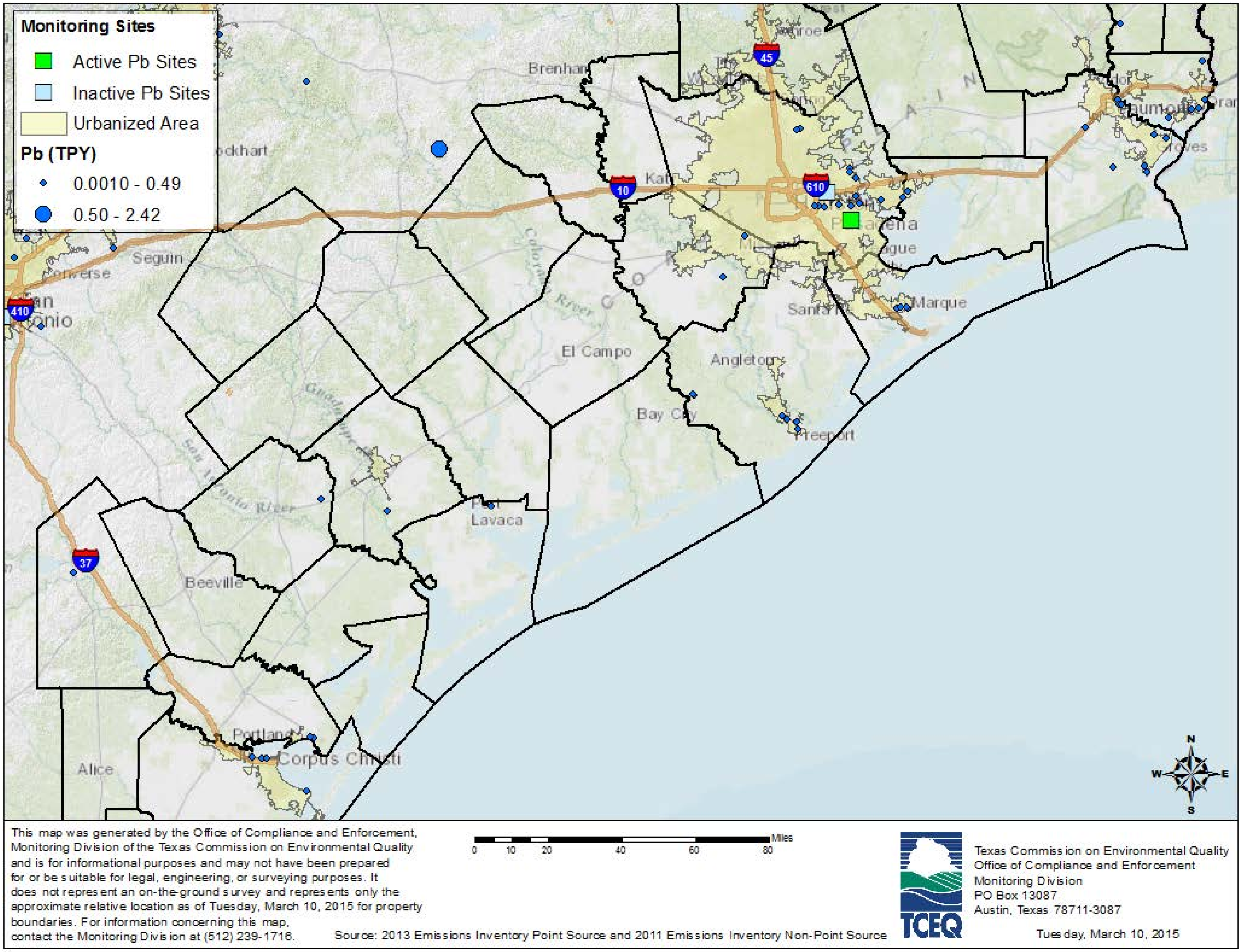
All remaining $SO_2$ monitors in the Texas Coastal area are considered of low value at this time. Due to proposed federal regulatory action and pending designations for the 2010 one-hour $SO_2$ standard, no network changes are currently recommended. Once the EPA's final $SO_2$ Data Requirements Rule is promulgated, the TCEQ will evaluate the existing $SO_2$ network for potential optimization that will provide for compliance with any associated $SO_2$ monitoring requirement changes. These network changes will be included in the *2016 Annual Monitoring Network Plan*.

## Lead

### Network History

As of January 1, 2015, Pb monitoring is only conducted at one monitoring site within the Texas Coastal area as shown in Figure 20. Current federal rules require source-oriented monitoring to measure maximum Pb concentrations near each point source emitting 0.50 tpy or more of Pb and each airport emitting 1.0 tons per year or more of Pb based on the NEI or other justifiable methods. In addition, Pb monitoring is required at all NCore monitoring sites. Due to reported Pb point source and airport emissions within the Texas Coastal area, no source-oriented Pb monitoring is required. The Houston Deer Park #2 site continues to monitor for Pb to fulfill NCore requirements.

Since the five-year network assessment conducted in 2010, the only change to the Pb monitoring network in the Texas Coastal area is the decommissioning of the Pb monitor at the Houston East site. Based on the absence of a localized Pb source emitting 0.50 tpy or more of Pb and low monitored concentrations at this site, the TCEQ requested and received approval from the EPA to decommission this monitor in 2014. Appendix A provides a list of both active and decommissioned Pb monitors, as well as their location, monitoring objectives, and associated spatial scales.




TPY – tons per year

**Figure 20: Texas Coastal Area Lead (Pb) Point Sources and Monitors**

### Design Values and Trends

Highest three-month rolling averages for the two Texas Coastal area Pb monitors are presented in Table 3. As expected because of low point source emissions, ambient Pb concentrations have remained extremely low in the Texas Coastal area. In the December 2010, EPA final rule on Pb (75 *FR* 81134), the average time and form for evaluating Pb design values was changed to a rolling 3-month average evaluated over a 3-year period. Due to data loss issues in 2013 at Houston Deer Park #2 and 2012 at Houston East, the TCEQ was unable to calculate 2014 design values for these Pb monitors, therefore the highest three-month rolling averages were evaluated.

**Table 3: Highest Three-Month Rolling Averages at Current and Historical Lead (Pb) Monitors in the Houston Area, 2011-2014**

| Site Name | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|
| Houston East | 0.01 | 0.01 | 0.01 | 0.01 |
| Houston Deer Park #2 | * | 0.00 | 0.00 | 0.00 |

Concentrations are provided in micrograms per cubic meter.
* Data not available for this year.

### Network Evaluation

The existing Pb monitoring network in the Texas Coastal area meets all current federal monitoring requirements and is adequate to meet existing monitoring objectives. The Houston Deer Park #2 Pb monitor is of high value as it satisfies the federal requirement for Pb monitoring at NCore sites. Given the reported Pb emissions from existing point sources in the area, low historic design values, and previous monitor decommissions, no additional network changes are recommended at this time.

### Pb Waivers

The Oxbow Calcining facility in Port Arthur currently has a Pb waiver per EPA approval of the *2010 Annual Network Review*. Stack testing data since the approval of the 2010 Pb waiver has indicated actual emissions were much lower than originally calculated. Taking this data into account, reported emissions have been below 0.50 tpy since 2011. Renewal of this monitoring waiver is unnecessary since emissions are below the monitoring threshold.

Coleto Creek Power Limited Partnership (LP) in Goliad Country has a Pb waiver per EPA approval of the 2011 Annual Network Review. Based on reported emissions below 0.50 tpy in 2013, the renewal of this waiver is unnecessary.

## Particulate Matter of 2.5 Micrometers or Less

### Network History

#### *Houston Area*

The Houston area $PM_{2.5}$ network consists of a variety of $PM_{2.5}$ samplers located at sites distributed on a north-south line with a monitor located on the coast, multiple monitors scattered through the urban core, and a downwind monitor located north of Houston. Nine monitoring sites across the Houston area provide ambient $PM_{2.5}$ concentration data through gravimetric, speciation, and continuous measurements to determine maximum concentrations, concentrations in areas of high population density, and background and transport concentrations. Figure 21 shows the location of all regulatory and continuous $PM_{2.5}$ monitors in the Texas Coastal area. This comprehensive network of samplers provides valuable information on contributions due to both local sources and transported particulate, $PM_{2.5}$ concentrations in highly populated areas, and data to assist in the identification of sources of particulate. A full site list of both active and decommissioned $PM_{2.5}$ monitors, as well as their location, monitoring objectives, and associated spatial scales is provided in Appendix A.

Multiple federal $PM_{2.5}$ monitoring requirements with unique monitoring objectives currently apply to the Houston area. Based on population and design values, a minimum of three FRM monitors are required to measure concentrations representative of area-wide air quality with at least one sited in an area of expected maximum concentrations and one collocated at a near-road $NO_2$ site. In addition, two continuous $PM_{2.5}$ monitors are required in the area with at least one of these collocated with a required FRM monitor. To evaluate $PM_{2.5}$ background and transport concentrations, at least one monitor is required to be sited for measurement of background concentrations and one monitor is to be sited to measure regional transport. Finally, $PM_{2.5}$ monitoring is required at designated NCore sites, and speciation monitoring is required at designated $PM_{2.5}$ Speciation Trends Network (STN) sites to evaluate elemental constituents, selected anions and cations, and carbon.

Since the last five-year network assessment, various $PM_{2.5}$ network changes were implemented to meet federal requirements and provide additional data related to $PM_{2.5}$ transport into the area. The TCEQ relocated the continuous $PM_{2.5}$ monitor from the Channelview site to the Baytown site to reduce the required sampling frequency of the FRM at the Baytown site from every third day to every sixth day. An FRM monitor was deployed at the Houston Deer Park #2 site to fulfill requirements for $PM_{2.5}$ monitoring at NCore sites. All of these changes were implemented in 2013. Finally, a new $PM_{2.5}$ FRM monitor operated on a one in three day schedule was deployed at the Houston North Loop site in April 2015 to fulfill Houston's near-road $PM_{2.5}$ monitoring requirements. Because the Houston North Loop monitor was deployed after January 1, 2015, the monitor is not included in Appendix A and the value of the monitor will be assessed during the next five-year assessment.

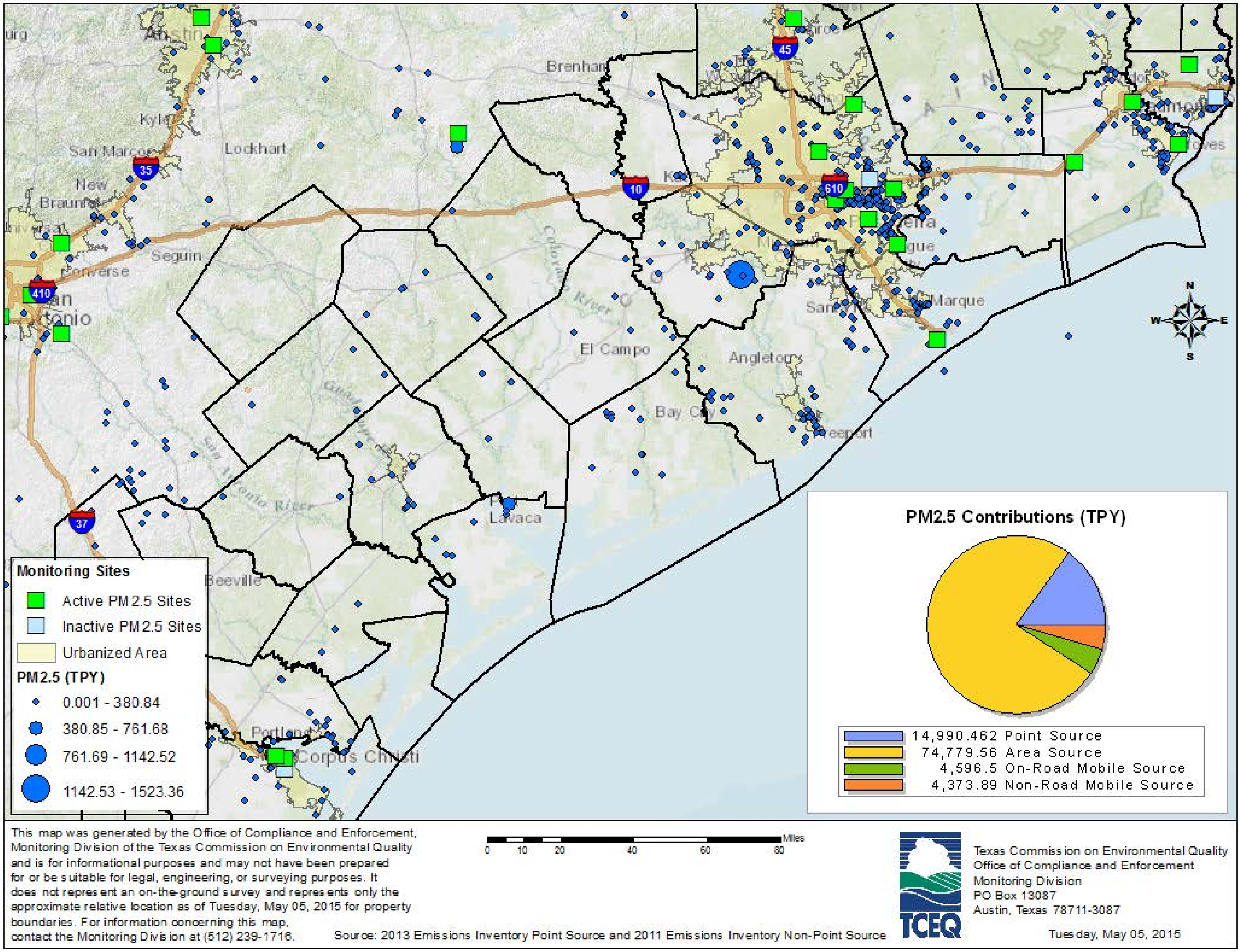
### *Beaumont Area*

Continuous $PM_{2.5}$ monitoring is conducted at three sites in the Beaumont area: Hamshire, Port Arthur Memorial School, and SETRPC 42 Mauriceville. Based on the area's population, no federal $PM_{2.5}$ monitoring requirements apply to Beaumont; however, these three monitors provide valuable data related to background $PM_{2.5}$ concentrations and concentrations in areas frequented by the public. Since the 2010 five-year network assessment, a $PM_{2.5}$ speciation monitor at the Port Arthur Memorial School site and an FRM monitor at the West Orange site were decommissioned. The monitors at these two sites were being operated beyond minimum requirements and the FRM consistently measured $PM_{2.5}$ levels well below the 24-hour and annual $PM_{2.5}$

standards. Appendix A provides a full site list of both active and decommissioned $PM_{2.5}$ monitors, as well as their location, monitoring objectives, and associated spatial scales.

### *Corpus Christi Area*

$PM_{2.5}$ is measured at three sites in the Corpus Christi area, providing data relevant to the evaluation of concentrations in areas frequented by the public and impacted by $PM_{2.5}$ transport. Based on area population and design values, Corpus Christi is required to have one FRM and one continuous $PM_{2.5}$ monitor. The TCEQ currently operates an FRM at the Corpus Christi Huisache site and a continuous monitor at the Dona Park site to fulfill these requirements. Both of these monitors are located in populated areas in close proximity to the heavily industrialized area along the Corpus Christi ship channel. In addition to these monitors, a supplemental speciation monitor is located at the Dona Park site and a continuous $PM_{2.5}$ monitor is located at the National Seashore site. The only significant $PM_{2.5}$ network change since the last five-year assessment was the relocation of the continuous monitor at Corpus Christi West to the Dona Park site in 2013. This change was implemented to reduce the required sampling frequency of the FRM at the Dona Park site from every third day to every sixth day. Appendix A provides a full site list of both active and decommissioned $PM_{2.5}$ monitors, as well as their location, monitoring objectives, and associated spatial scales.




TPY – tons per year

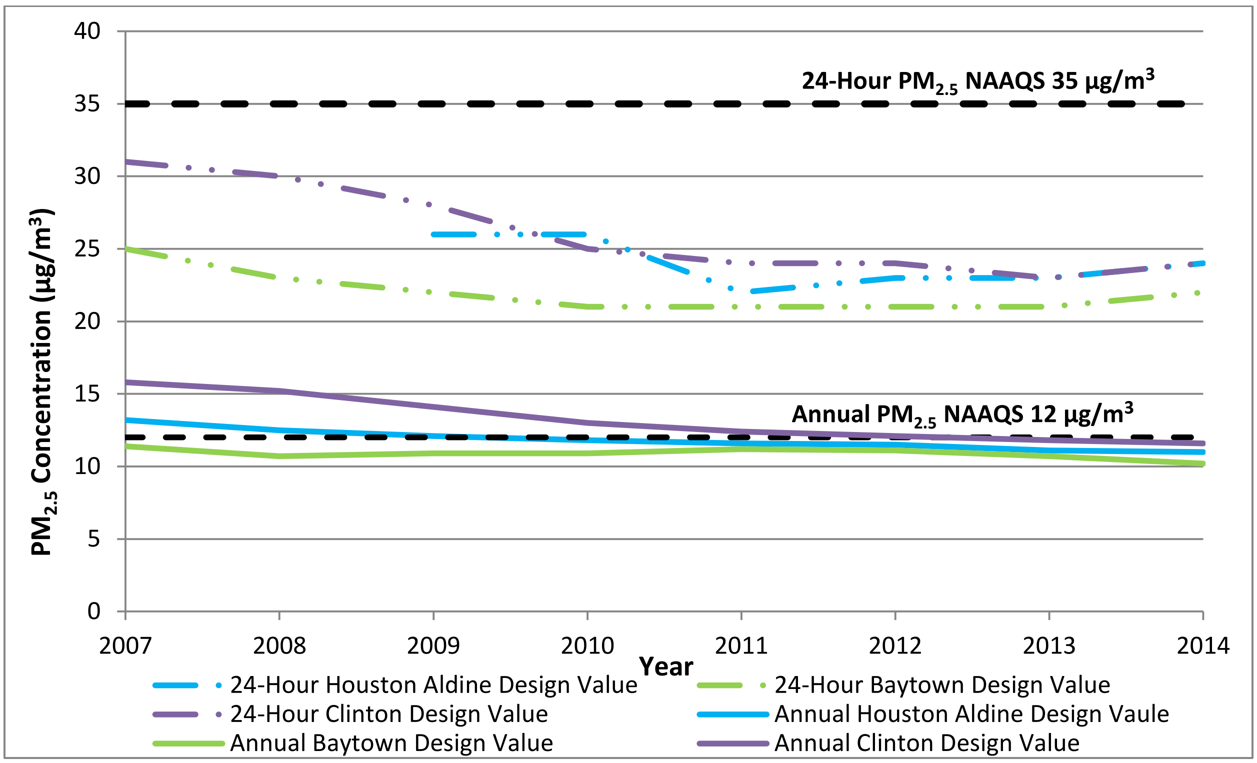
**Figure 21: Texas Coastal Area Particulate Matter of 2.5 Micrometers or Less in Diameter ($PM_{2.5}$) Point Sources and Monitors**

## Design Values and Trends

Six Texas Coastal area $PM_{2.5}$ monitors meet FRM/FEM requirements and are suitable for calculating a design value for comparison to the NAAQS. These monitors are the Houston Aldine, Baytown, Clinton, and Houston Deer Park #2 monitors in Houston and the Corpus Christi Huisache and Dona Park monitors in Corpus Christi. Although not FRM monitors, unofficial design values from the Port Arthur, Hamshire, and Mauriceville sites are provided for informational purposes in Figure 23.

### *Houston Area*

Overall, $PM_{2.5}$ levels in the Houston area have decreased over the past several years. Figure 22 shows annual and 24-hour $PM_{2.5}$ design values for three of the Houston area's regulatory monitors. Data indicate that measured concentrations have consistently remained below the 24-hour $PM_{2.5}$ standard of 35 µg/m³ since 2007. In addition, annual average $PM_{2.5}$ concentrations have exhibited a large decrease over this same time period with design values from all regulatory monitors remaining below the 12 µg/m³ annual standard for 2013 and 2014. The Houston Deer Park #2 and Galveston 99th Street $PM_{2.5}$ FRM monitors have not yet obtained three complete years of data, so design values are not available at this time.



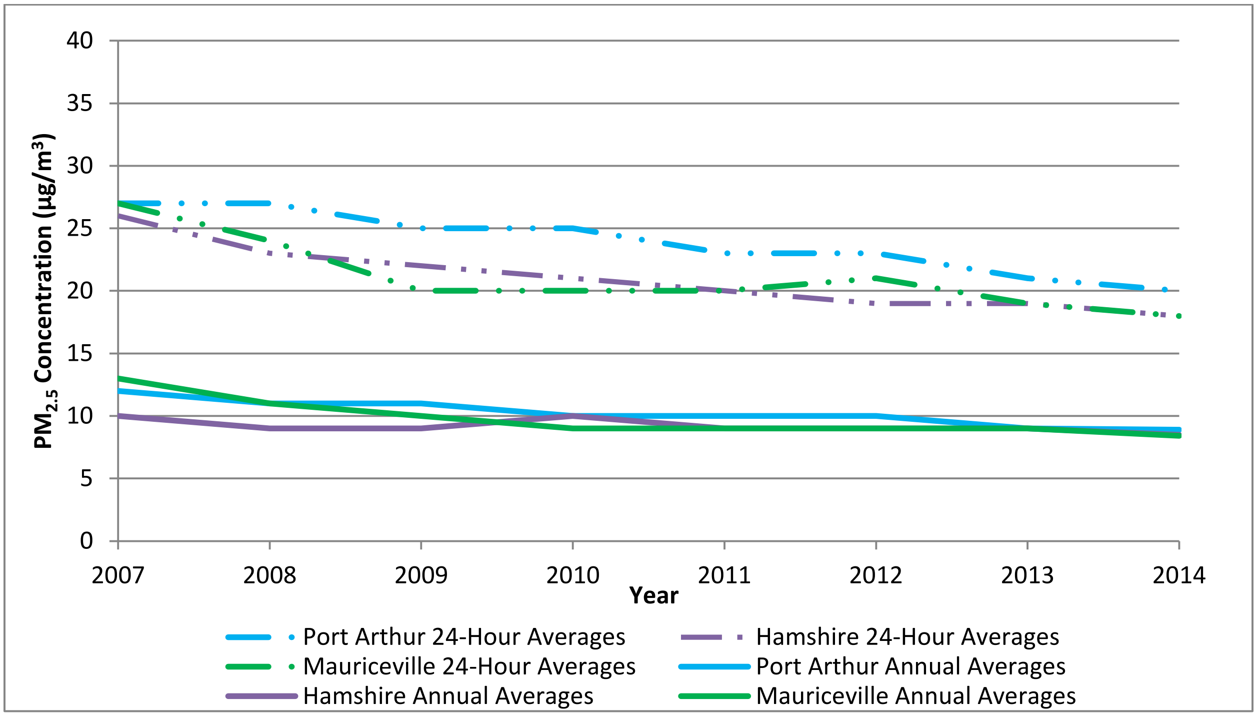

NAAQS - National Ambient Air Quality Standards

µg/m³ - microgram per cubic meter

**Figure 22: Houston Area 24-Hour and Annual Design Value Trends of Particulate Matter of 2.5 Micrometers or Less in Diameter ($PM_{2.5}$), 2007-2014**

*Beaumont Area*

Although no regulatory monitors are operated in the Beaumont area to calculate a valid design value, the TCEQ calculated an annual average over three years and a 98th percentile of 24-hour averages over 3 years using data from the three non-regulatory monitors operating in the area to unofficially compare to the annual and the 24-hour standards, respectively. As shown in Figure 23, $PM_{2.5}$ concentrations at all three monitors have consistently been declining since 2007.




µg/m³ - microgram per cubic meter

**Figure 23: Beaumont Area 98th Percentile of 24-Hour Averages and Annual Average Concentrations of Particulate Matter of 2.5 ($PM_{2.5}$) Micrometers or Less in Diameter, 2007-2014**

### *Corpus Christi Area*

Design values in the Corpus Christi area have consistently remained below the 24-hour $PM_{2.5}$ NAAQS. Both 24-hour and annual design values from Corpus Christi Huisache have shown a slightly increasing trend since 2003; however, the 2014 24-hour and annual design values remain below the NAAQS at 31 µg/m³ and 10.1 µg/m³, respectively. The 2014 $PM_{2.5}$ 24-hour and annual concentrations at Dona Park also showed a slight increase since 2003, but are still below the standard at 23 µg/m³ and 9.3 µg/m³, respectively.

## Network Evaluation

The Texas Coastal area $PM_{2.5}$ monitoring network is geographically distributed to provide valuable data for the evaluation of both local and transported sources of particulate matter. Currently, $PM_{2.5}$ monitors are located along the gulf coast to measure incoming background and transport concentrations, and within the city centers of Beaumont, Houston, and Corpus Christi to measure concentrations in areas of high population density. The placement of these monitors continues to be appropriate with their identified monitoring objectives.

### *Houston Area*

Based on current $PM_{2.5}$ monitoring requirements, several Houston area $PM_{2.5}$ monitors are considered of high value. FRM monitors at the Houston Aldine, Baytown, Clinton, and Houston Deer Park #2 sites fulfill monitoring requirements based on population and design value, and provide neighborhood scale monitoring to determine concentrations in populated areas. In addition, the FRM monitor at the Houston Deer Park #2 site satisfies requirements for $PM_{2.5}$ monitoring at NCore sites. The $PM_{2.5}$ FRM monitor at Galveston 99th Street is in excess of requirements; however, provides international transport and exceptional event data. The collocated continuous monitors at these sites provide flexibility for sampling frequency and valuable data in between discrete sampling periods. Although continuous $PM_{2.5}$ monitoring in the Houston area exceeds minimum federal requirements, continuous monitors at Conroe Relocated, Galveston 99th Street, Houston East, Kingwood, and Seabrook Friendship Park are highly valued due to spatial coverage or the unique information they provide about background and transported particulate concentrations. The continuous $PM_{2.5}$ monitor at the Houston Deer Park #2 site is considered a medium value monitor because data collected is similar to the data collected with the continuous $PM_{10-2.5}$ monitor at this site.

Texas is required to conduct chemical speciation monitoring at sites designated as $PM_{2.5}$ STN. This includes analysis for elements, selected anions and cations, and carbon. The STN site in the Houston area is Houston Deer Park #2. The Houston Aldine monitor's $PM_{2.5}$ FRM filter is further analyzed for speciated cations, anions, and metals as a special purpose monitor. Speciation monitoring at both of these sites is highly valued as they provide information on the chemical composition of $PM_{2.5}$ measurements to assist in determining source contributions and regional background concentrations.Figure 24 shows the correlation, relative difference, and distance between 24-hour averages from Houston area FRM $PM_{2.5}$ monitors. The Clinton (AQS 48-201-1035) and Houston Aldine (AQS 48-201-0024) monitors (Pearson's coefficient=0.914, relative difference=0.154), and the Clinton and Baytown (AQS 48-201-0058) monitors

(Pearson's coefficient=0.915, relative difference=0.18) exhibit only a medium correlation. This analysis suggests that all $PM_{2.5}$ monitors in the Houston area provide unique, valuable data.

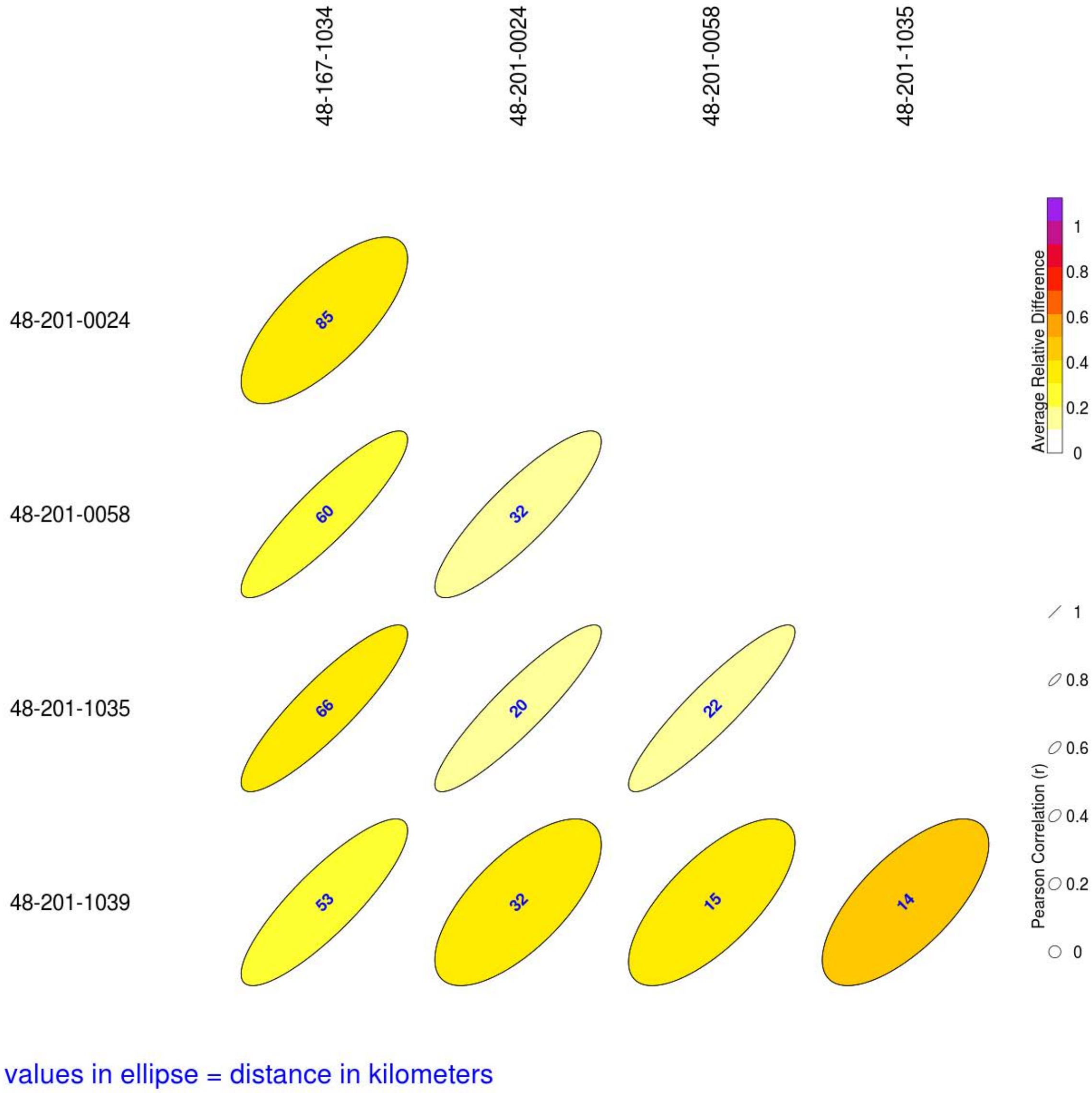



**Figure 24: Correlation Matrix for 24-hour Average Concentrations from Houston Area Federal Reference or Federal Equivalent Method Monitors for Particulate Matter of 2.5 Micrometers or Less in Diameter, 2011-2013**

Figure 25 shows the correlation, relative difference, and distance between 24-hour averages from Houston area continuous $PM_{2.5}$ monitors. The Houston area currently has nine continuous $PM_{2.5}$ monitors. The Houston East (AQS 48-201-1034) and Clinton (AQS 48-201-1035) monitors, located 5 kilometers apart (Pearson's coefficient=0.932, relative difference=0.118) and the Houston East and Park Place (AQS 48-201-0416) monitors located 12 kilometers apart (Pearson's coefficient=0.921, relative difference=0.116) are highly correlated; however, data from these locations provide valuable gradient information, particularly on days marked by high incoming transported pollutants. None of the other monitor pairs are highly correlated. This analysis suggests that all continuous $PM_{2.5}$ monitors in the Houston area provide valuable, distinct data.

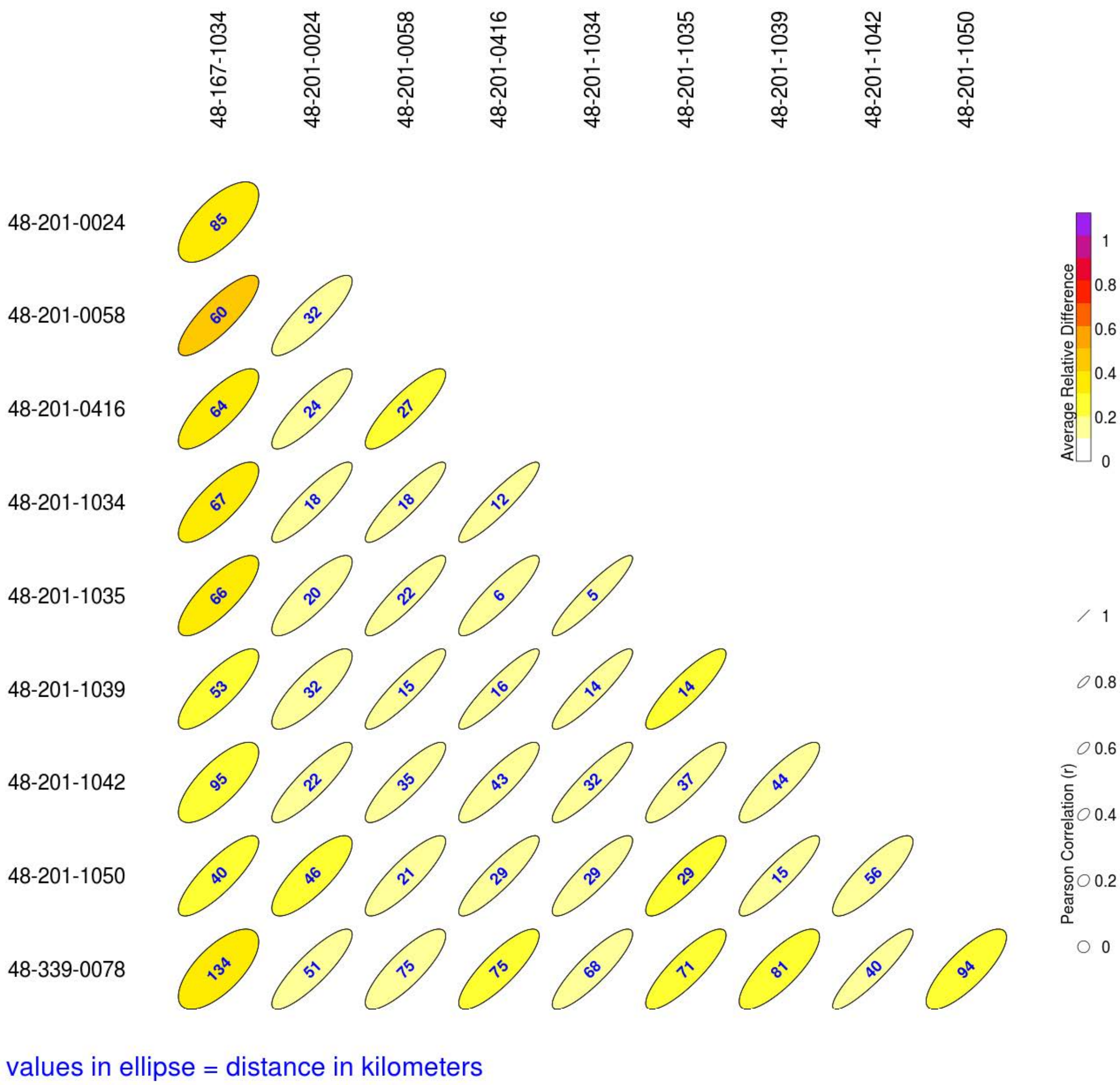



**Figure 25: Correlation Matrix for 24-hour Average Concentrations from Houston Area Continuous (Non-Federal Equivalent) Monitors for Particulate Matter of 2.5 Micrometers or Less in Diameter, 2011-2013**

Based on this evaluation, no significant $PM_{2.5}$ network changes are being recommended at this time. The TCEQ may consider additional monitoring on the southwest side of Houston to further evaluate area wide sources and regional transport in the area as population increases.

### *Beaumont Area*

Although beyond minimum federal monitoring requirements, the three continuous, non-FRM, $PM_{2.5}$ monitors in the Beaumont area provide valuable spatial coverage and unique data about inter- and intra-regional transport of $PM_{2.5}$, making these monitors of high value. None of the $PM_{2.5}$ monitors in the Beaumont area are considered redundant. As shown in Figure 26, all $PM_{2.5}$ monitor pairs show only medium correlation with one another (Pearson's coefficients=0.852-0.901 and relative percent differences of 0.151-0.156). Based on spatial coverage and the existing monitors continuing to meet their monitoring objectives, no network changes are recommended at this time for the Beaumont $PM_{2.5}$ network.

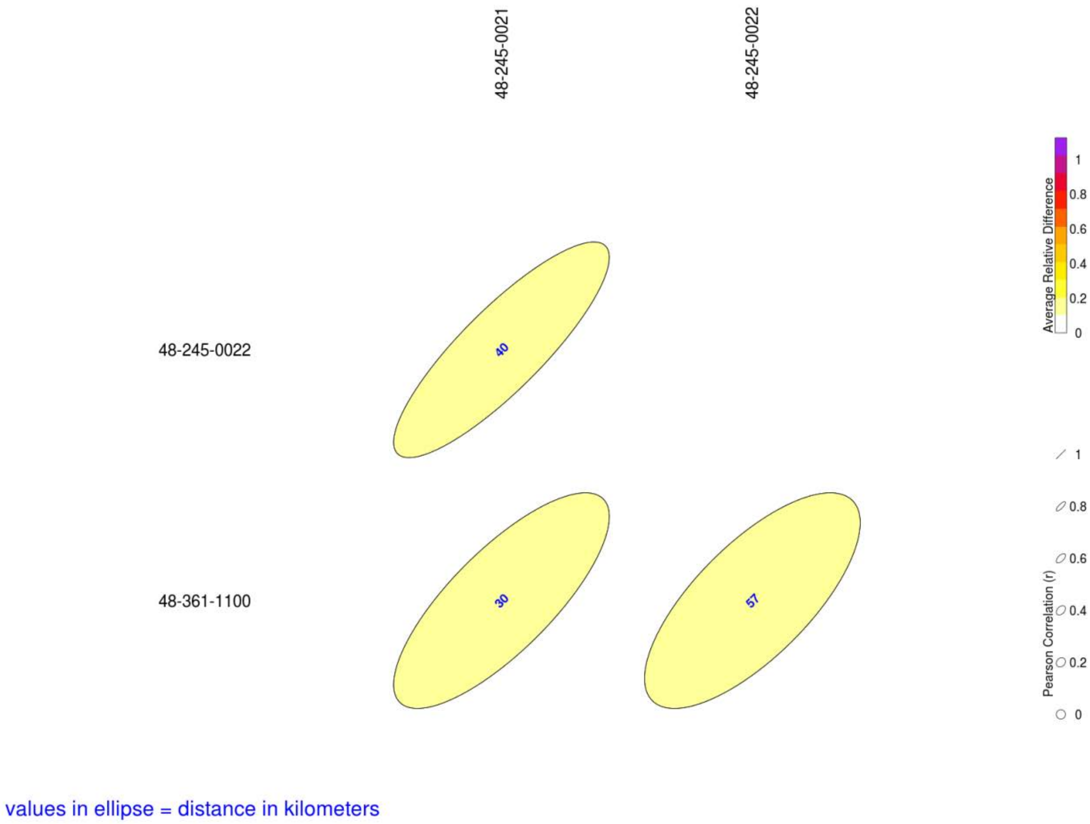



**Figure 26: Correlation Matrix for 24-hour Average Concentrations from Beaumont Area Continuous (Non-Federal Equivalent Method) Monitors for Particulate Matter of 2.5 Micrometers or Less in Diameter, 2011-2013**

### *Corpus Christi Area*

Existing $PM_{2.5}$ monitoring rules require one FRM and one continuous $PM_{2.5}$ monitor for the Corpus Christi area. The current $PM_{2.5}$ monitoring network in Corpus Christi exceeds these minimum requirements, but provides spatial coverage and valuable data to assess both local source and transported particulate concentrations. The Corpus Christi Huisache FRM and Dona Park continuous $PM_{2.5}$ monitors fulfill these monitoring requirements based on the city's population and design value. The Corpus Christi Huisache site, located in close proximity to the urban core, industrial sources along the ship channel, and urban neighborhoods, is situated to provide $PM_{2.5}$

concentration data in an area of high population density. The FRM, speciation monitor, and continuous monitor located at the Dona Park site is also sited near an urban neighborhood but downwind of industrial sources along the ship channel and provides relevant data to assess $PM_{2.5}$ concentrations in a populated area. The National Seashore continuous monitor located on Padre Island to the southeast of the Corpus Christi city center provides information about background $PM_{2.5}$ levels coming into Corpus Christi off the Gulf of Mexico.

All $PM_{2.5}$ monitors in the Corpus Christi area provide meaningful data and are not considered redundant. The Dona Park and Corpus Christi Huisache FRM monitors, located 3 kilometers apart, are highly correlated (Pearson's coefficient=0.918, relative difference=0.119); however, both monitors are valuable because of their position in relation to populated areas and pollutant sources. Based on spatial coverage and the existing monitors continuing to meet their monitoring objectives, no network changes are recommended at this time for the Corpus Christi $PM_{2.5}$ network.

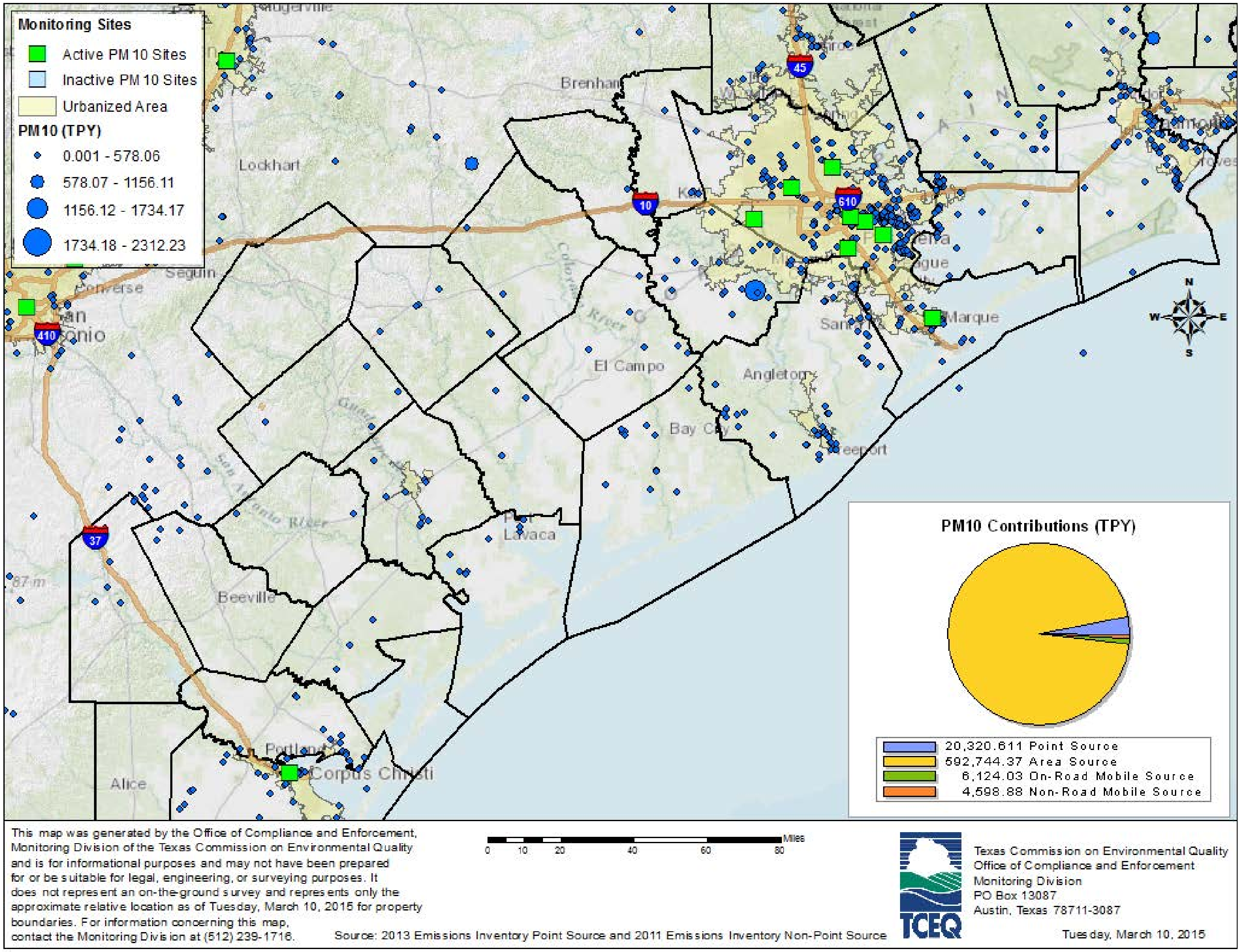
## Particulate Matter of 10 Micrometers or Less

### Network History

As of January 1, 2015, $PM_{10}$ in the Texas Coastal area was monitored at nine sites to evaluate regional air quality trends and concentrations in populated areas. Monitoring of $PM_{10}$ in the Texas Coastal area began in the mid-1980s and has evolved considerably with $PM_{10}$ monitoring conducted at over 23 different locations since that time. A map illustrating the location of current monitors and point sources is shown in Figure 27.

Current federal minimum requirements specify $PM_{10}$ monitoring in metropolitan areas based on population and measured concentrations, if available. Based on the latest concentration and population data, the Beaumont/Port Arthur and Corpus Christi areas are each required to have zero to one $PM_{10}$ monitor, and the Houston area is required to have between four and eight $PM_{10}$ monitors. $PM_{10-2.5}$ is also required at NCore sites. Currently, those requirements are met.

In the Corpus Christi area, $PM_{10}$ has been monitored at the Dona Park site since 2002 to measure pollutant concentrations in a populated neighborhood downwind of industrial sources along the ship channel. In the Houston area, $PM_{10}$ is monitored at eight sites spatially distributed throughout the metropolitan area. $PM_{10}$ FRM monitors located at Aldine, Clinton, Houston Deer Park #2, Houston Monroe, Houston Westhollow, Lang, Pasadena Houston Light and Power (HL&P), and Texas City Fire Station fulfill monitoring requirements and are sited to measure concentrations near populated areas and characterize regional air quality. Appendix A provides a full list of active and decommissioned $PM_{10}$ monitors, as well as their locations, monitoring objectives, and associated spatial scales.




TPY – tons per year

**Figure 27: Texas Coastal Area Particulate Matter of 10 Micrometers or Less ($PM_{10}$) Point Sources and Monitors**

### Design Values and Trends

Compliance with the 24-hour $PM_{10}$ standard is based on the number of measured exceedances of the 150 µ/m³ standard on average over a three year period. The average number of exceedances at all but the Clinton site have remained consistent at zero since 2008. No exceedances at Clinton have been recorded since 2009.

### Network Evaluation

The $PM_{10}$ monitoring network in the Texas Coastal area meets federal requirements based on population and monitored concentrations.

The current locations of active Texas Coastal area $PM_{10}$ monitors continue to be sufficient to meet established monitoring objectives. The Dona Park $PM_{10}$ monitor in the Corpus Christi area is located in a neighborhood with proximity to point sources and is considered of high value. In addition, the Clinton and Houston Deer Park #2 $PM_{10}$ monitors are considered of high value based on their historical data, regulatory requirements, and placement for measuring ambient concentrations that are impacted by both local and distant sources. The $PM_{10-2.5}$ monitor at Houston Deer Park #2 also continues to meet the federal NCore requirements and is of high value. All other Texas Coastal area $PM_{10}$ monitors provide spatial coverage for assessing regional air quality and are considered of medium value.

Based on spatial coverage and the existing monitors continuing to meet their monitoring objectives, no network changes are recommended at this time for the Texas Coastal area $PM_{10}$ network.

## Air Toxics

### Network History

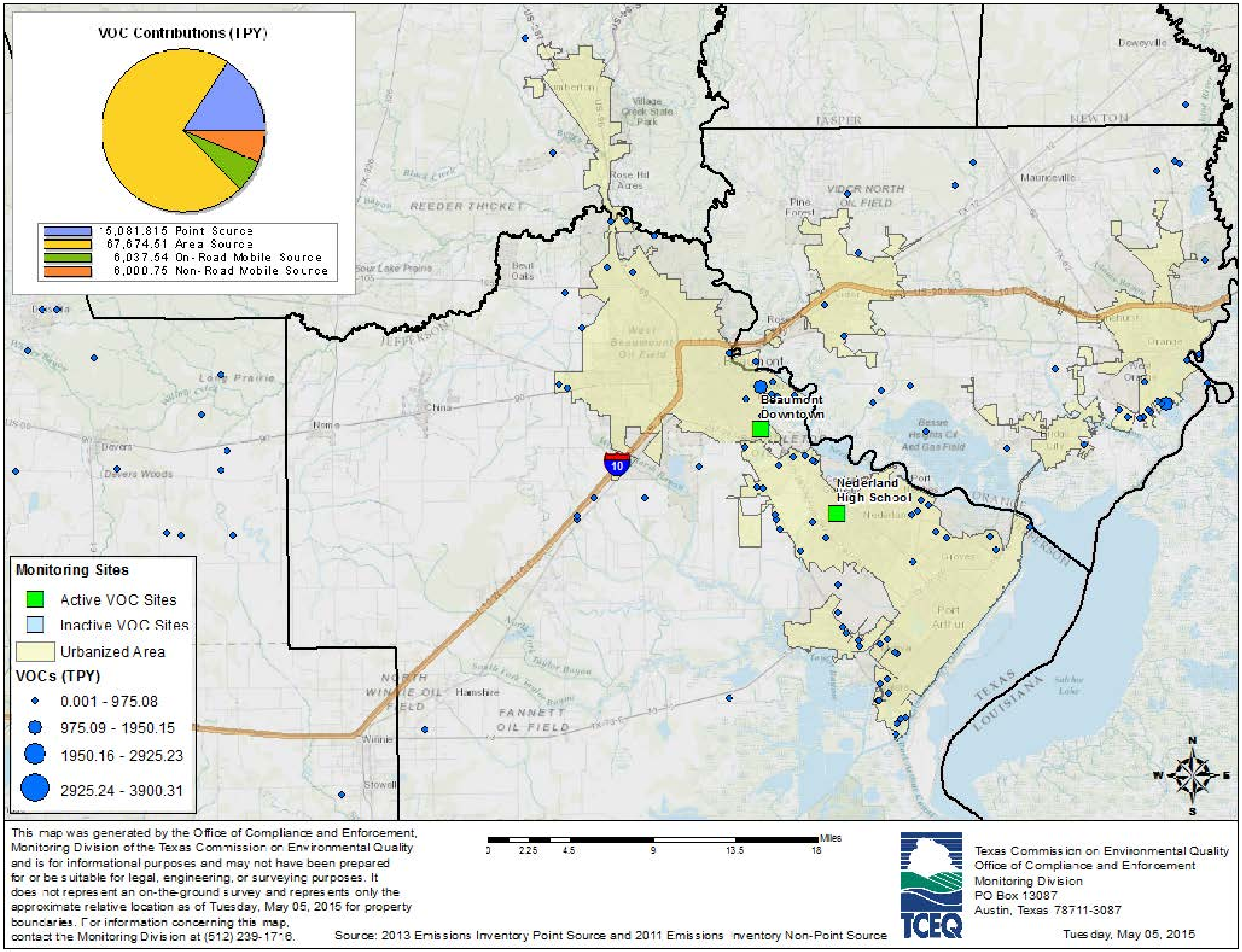
*VOCs*

As of January 1, 2015, there were five autoGCs and two collocated canister samplers operating in the Texas Coastal area, as shown in Figure 28, Figure 29, and Figure 30. The Nederland High School and Beaumont Downtown autoGCs were deployed to the Beaumont-Port Arthur area in 2006 and were sited to evaluate ambient VOC concentrations in populated areas in terms of ozone formation and potential for health effects.

VOCs have historically been measured at seven sites throughout the greater Houston area. The Galveston 99th Street canister was deployed to measure VOC concentrations upwind of the Houston area in a suburban setting. The Northwest Harris County and Conroe Relocated canister samplers were deployed in locations predominantly downwind of the Houston area. The Houston Deer Park #2 and Houston Aldine canister samplers were deployed at locations likely to have elevated ozone concentrations in order to study ozone precursor concentrations and trends. The Houston Deer Park #2 site was located near the Houston Ship Channel, a large industrial area with larger point source VOC emissions. In 1995, 1997, and 2001, autoGCs were added to the Clinton, Houston Deer Park #2, and Channelview sites to further evaluate ozone precursors in populated areas.

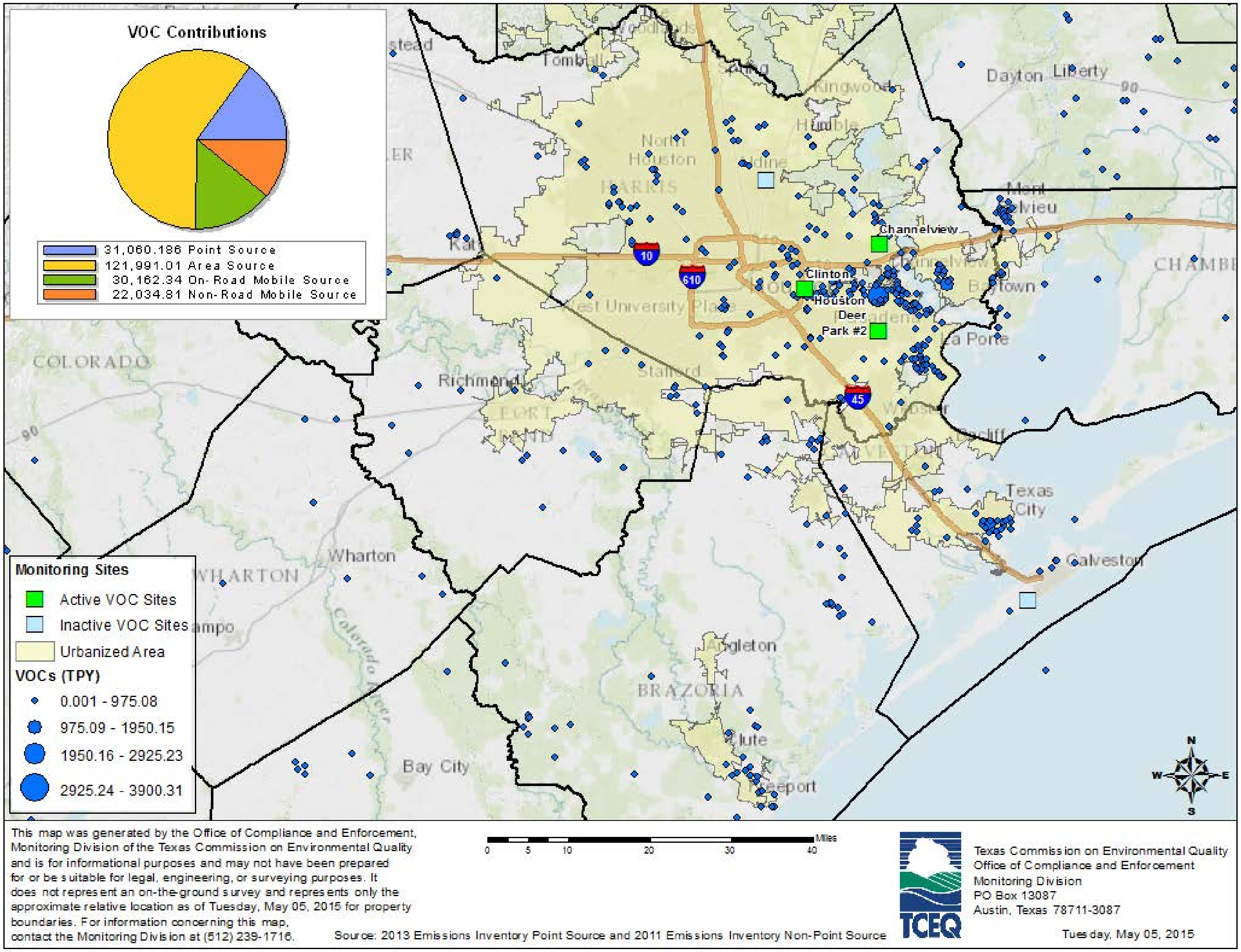
Since the last five-year assessment, the canister samplers at the Galveston 99th, Houston Aldine, Conroe Relocated, and Northwest Harris County sites were decommissioned due to low historical concentrations and lack of federal monitoring requirements. No other VOC monitoring network changes have occurred.

The VOC monitoring network is supplemented by state- and industry-initiated monitoring dispersed throughout the Texas Coastal area, although the review of these monitors and their placement is outside the scope of this assessment. More information about the 24 autoGCs and 48 canister samplers funded through these other mechanisms is available online at
http://www17.tceq.texas.gov/tamis/index.cfm?fuseaction=home.welcome.



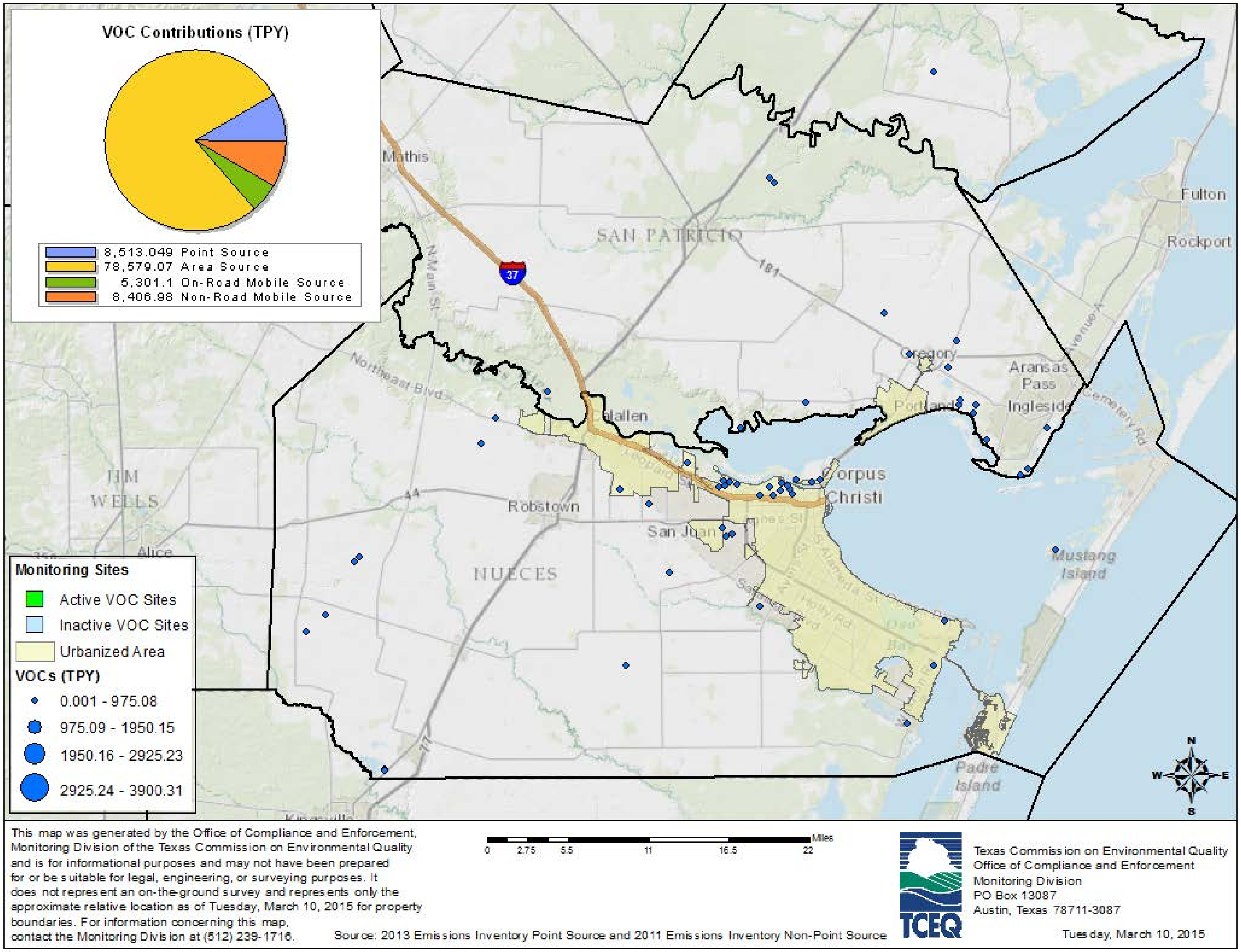

TPY – tons per year

**Figure 28: Beaumont Area Volatile Organic Compound (VOC) Point Sources and Monitors**




TPY – tons per year

**Figure 29: Houston Area Volatile Organic Compound (VOC) Point Sources and Monitors**




TPY – tons per year

**Figure 30: Corpus Christi Area Volatile Organic Compound (VOC) Point Sources**

### *Other Air Toxics*

As of January 2015, there are two carbonyl monitors, two collocated SVOC monitors, four $PM_{2.5}$ speciation monitors, and two $PM_{10}$ speciation monitors in the Texas Coastal area. Most of these air toxics monitors were deployed in the Houston area. The Houston Deer Park #2 and Clinton carbonyl monitors were deployed to study ozone precursor emissions and evaluate concentrations to which the public may be exposed. The primary Houston Deer Park #2 SVOC and $PM_{10}$ speciation monitors were deployed to evaluate long-term pollutant trends in support of the National-Scale Air Toxics Assessment, and collocated SVOC and $PM_{10}$ speciation monitors were used for quality assurance purposes. The primary Houston Deer Park #2 $PM_{2.5}$ speciation monitor, and the Galveston 99th, Houston Aldine, Dona Park, and Clinton $PM_{10}$ speciation monitors were deployed to evaluate trends in particulate matter species, and the Houston Deer Park #2 collocated $PM_{2.5}$ speciation monitor is also used for quality assurance purposes. No changes to the network have occurred since the last five-year assessment.

## Trends

Ambient concentrations of all air toxics in the Texas Coastal area have remained below a level of potential health concern for over four consecutive years, even in areas expected to have peak concentrations. Benzene, an ambient air risk driver for most urban settings, has shown a decreasing trend since 2008, as shown in Figures 31 and 32. This decreasing trend is consistent with the statewide decrease in benzene over the past five years.

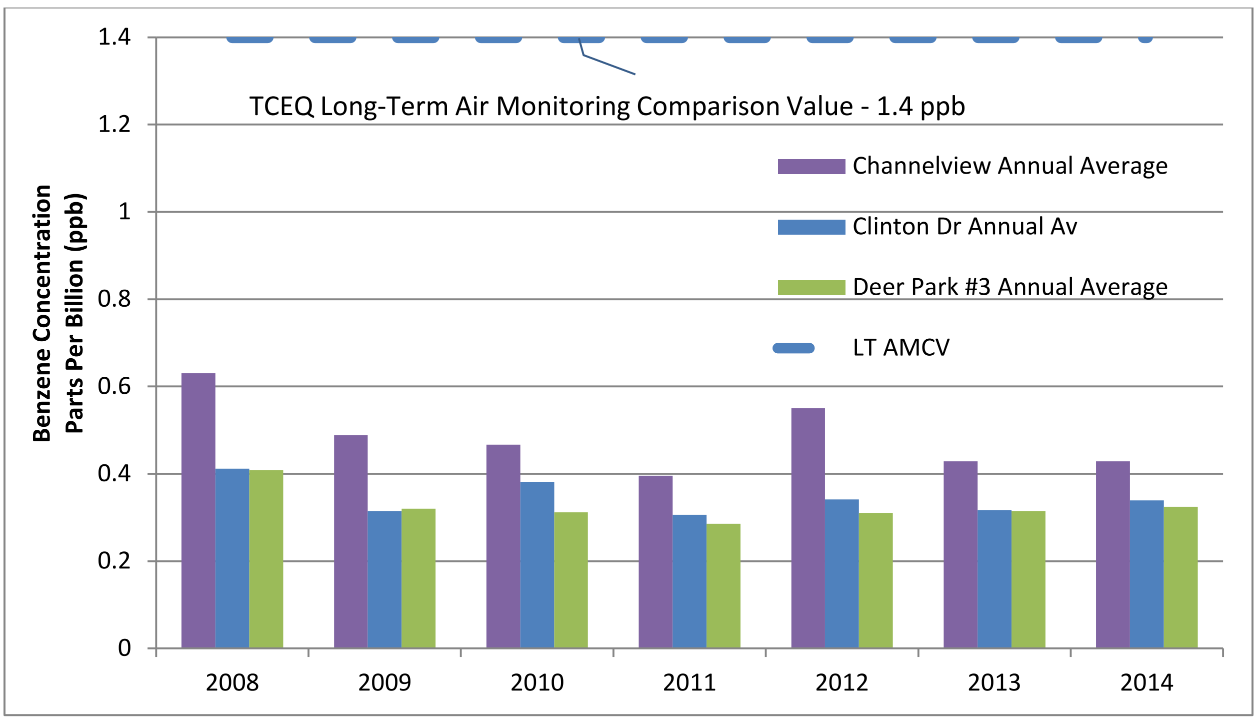



**Figure 31: Houston Area Annual Average Benzene Trends, 2008-2014**

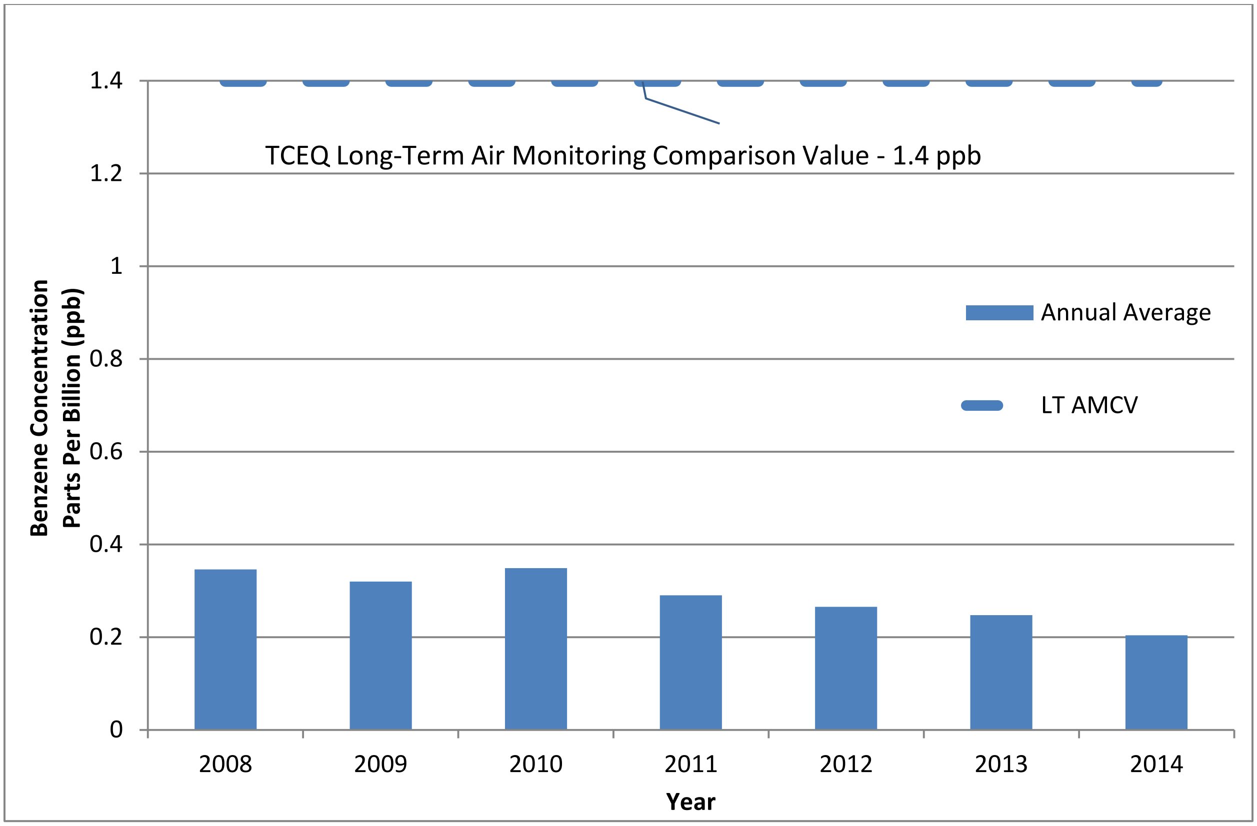



**Figure 32: Beaumont Area Annual Average Benzene Trends at the Nederland High School Site, 2008-2014**

## Network Evaluation

Elevated historical concentrations and recent decreasing concentrations concurrent with emission reduction efforts indicate the air toxics monitors are measuring impacts from local pollutant sources. Monitors are located in areas of dense population and appear to be appropriate for meeting the original monitoring objectives.

Air toxics monitors in the Texas Coastal area are considered of medium to high value. The carbonyl samplers at Clinton and Deer Park and the VOC monitoring at Channelview, Clinton, and Houston Deer Park #2 meet PAMS requirements and are of high value. VOC monitoring in Beaumont was deployed to meet previous PAMS requirements and is of medium value due to its usefulness in evaluating pollutant trends. Houston Deer Park #2 SVOC sampling is considered of medium values because of the long-term trends data it provides in support of the National-Scale Air Toxics Assessment.

Additional monitoring is not anticipated at this time. Air toxics concentrations have consistently remained below a level of concern, monitors are appropriately sited for both health effects evaluations and evaluation of ozone precursor emissions, and supporting evidence from the expanded monitoring network available to the TCEQ in these areas suggests adequate coverage. Monitoring needs will continue to be assessed in this area as new data and regulatory requirements are made available.

# North and Northeast Texas Area Evaluation

(Dallas-Fort Worth-Arlington and Tyler Region)

## North and Northeast Texas Area Characteristics

### Terrain

The Grand Prairie area lies to the west of Fort Worth and is characterized by low hills with a maximum elevation of approximately 1,200 feet to the west and a mostly flat plain to the east that slopes gently to the southeast with a minimum elevation of approximately 450 feet. The Blackland Prairie region lies to the east of the Grand Prairie and extends along the eastern half of the Oklahoma border near the Red River and down through the Dallas area. The Blackland Prairie region is marked by gently rolling hills and elevations between approximately 450 and 1,000 feet. Northeast Texas, which includes the Tyler and Longview areas, consists of interior coastal plains from the Louisiana border to just east of Dallas. Elevation ranges from 500 to 800 feet. Northeast Texas is considered part of the Piney Woods ecological area and includes some of the most densely forested regions of Texas. (Wermund 1996)

### Climate

The North and Northeast Texas area is characterized by a sub-tropical climate. Due to its geography and location, North Texas is more susceptible to occasional extreme weather intrusions from the north, which can include thunderstorms and ice storms. From 2000 to 2014, annual average temperatures for both areas ranged from 64 to 68°F. Annual average rainfall for the North Texas area from 1901 to 2000 was 33 inches; however, this average rainfall fell to a low of 23 inches from 2011 to 2014. The Northeast Texas area typically receives greater rainfall, with annual averages that ranged from 30 inches to 47 inches per year from 2011 to 2014. (NCDC 2015) Figure 33 illustrates typical area wind patterns. Outlined in bold on Figure 33 are the counties considered in this North and Northeast Texas area evaluation. Wind data, collected from ambient air monitoring stations, indicate the dominant flow is from the south and southeast.

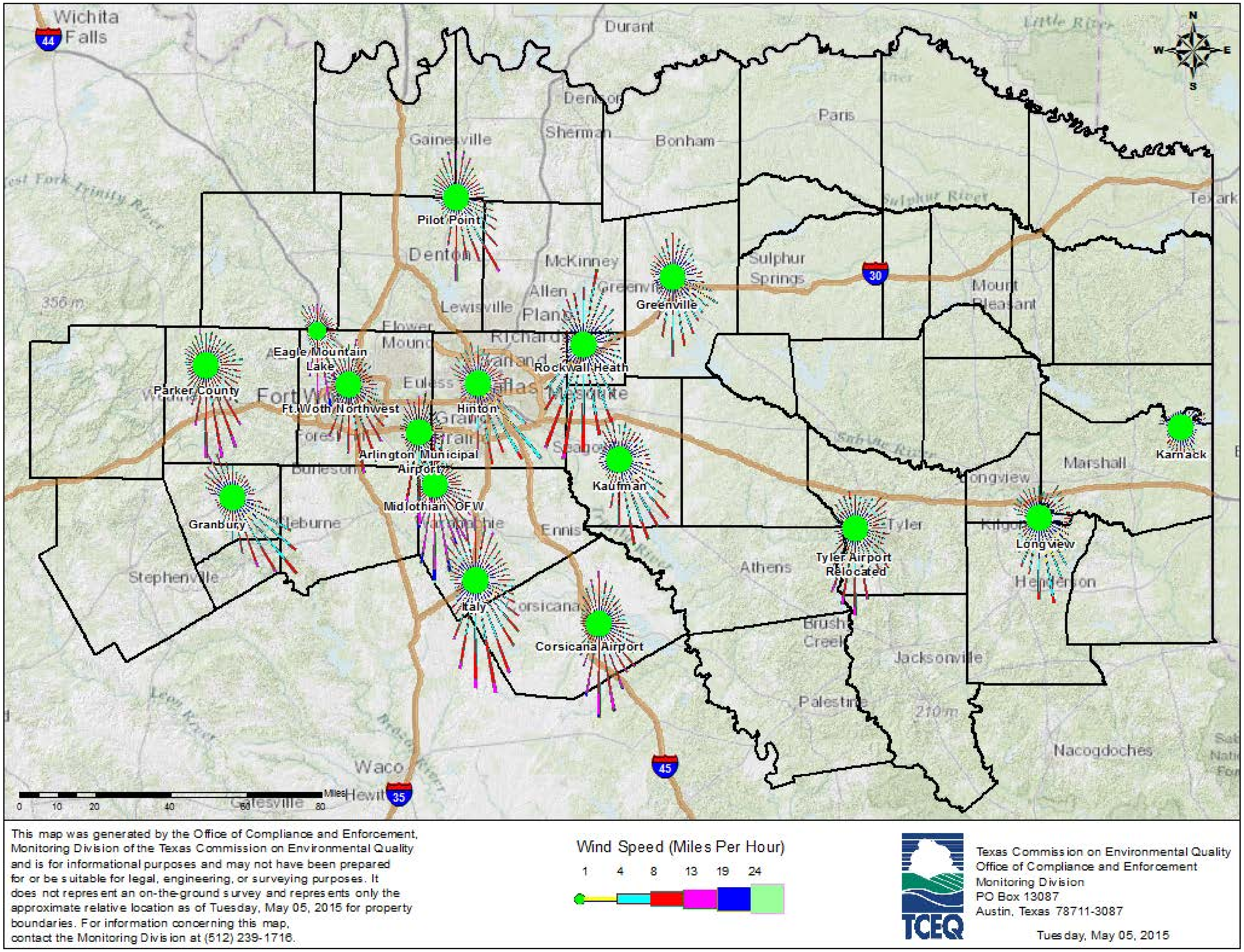



**Figure 33: North and Northeast Texas Area Counties, Terrain, and Wind Data from Ambient Air Quality Monitors**

## Population

Dallas-Fort Worth-Arlington and Sherman-Denison are the only MSAs in the North Texas Area. In 2010, the population of the Dallas-Fort Worth-Arlington MSA (Collin, Dallas, Delta, Denton, Ellis, Hood, Hunt, Johnson, Kaufman, Parker, Rockwall, Somervell, Tarrant, and Wise Counties) alone reached 6.4 million people, and 2014 population estimates indicate the population has since increased to over 6.9 million. The Sherman-Denison MSA (Grayson County) had a much smaller growth rate from 120,000 people in 2010 to an estimated 123,500 people in 2014.

The Northeast Texas area includes three smaller MSAs: Longview (Gregg, Rusk, and Upshur Counties), Texarkana (Bowie County), and Tyler (Smith County). The populations of Longview and Tyler were each at just over 200,000 in 2010 and were estimated to be around 218,000 in 2014. The Texarkana population of 149,000 is not estimated to have grown since 2010. Figures 34 and 35 map the population densities across the North and Northeast Texas area based on 2010 United States Census Bureau data.

Minimum monitoring network design requirements in 40 CFR Part 58, Appendix D, Section 4, for ozone, CO, $NO_2$, $PM_{2.5}$, and $PM_{10}$ are partially based on MSA populations. Based on these 2014 population estimates and 2014 design values, the Dallas-Fort Worth-Arlington MSA is required to have a minimum of three ozone, two CO, five $NO_2$, three $PM_{2.5}$, and between two and four $PM_{10}$ monitors. The Sherman-Denison MSA is not required to have any monitors to comply with population and design value based minimum monitoring requirements. The Longview MSA is required to have a minimum of one ozone monitor, the Texarkana MSA is required to have a minimum of one $PM_{2.5}$ monitor, and the Tyler MSA is required to have a minimum of one ozone and up to one $PM_{10}$ monitor based on 2014 population estimates and design values.

The Texas State Data Center projects the Dallas-Fort Worth-Arlington and Sherman-Denison MSAs will increase by 19% and 10%, respectively, by 2020. The Longview and Tyler MSAs are also expected to grow by 13% and 11%, respectively. The Texarkana MSA is projected to grow by 3%. If these projections are accurate, none of the North or Northeast Texas MSAs would be required to have additional monitoring based on population driven minimum monitoring requirements.

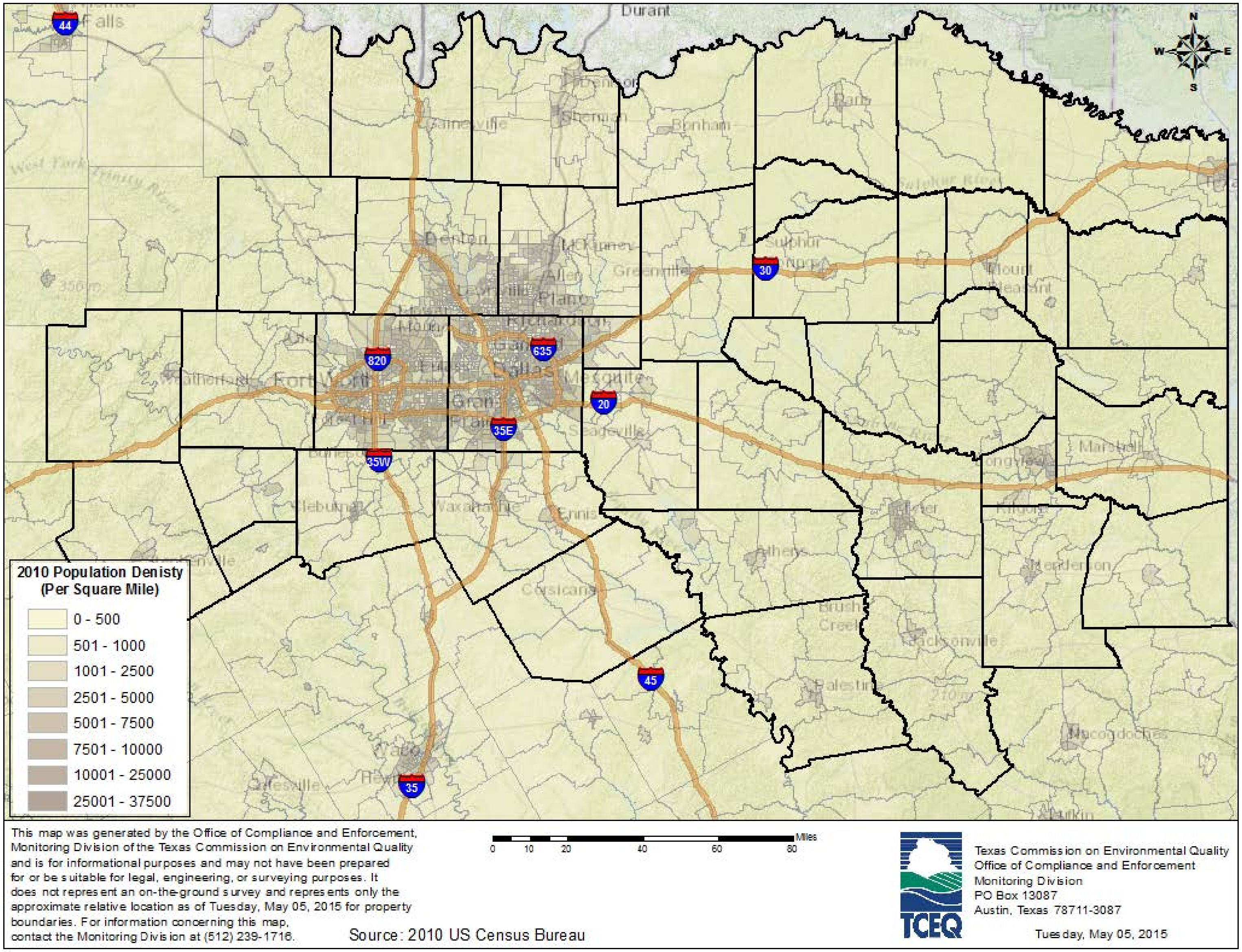
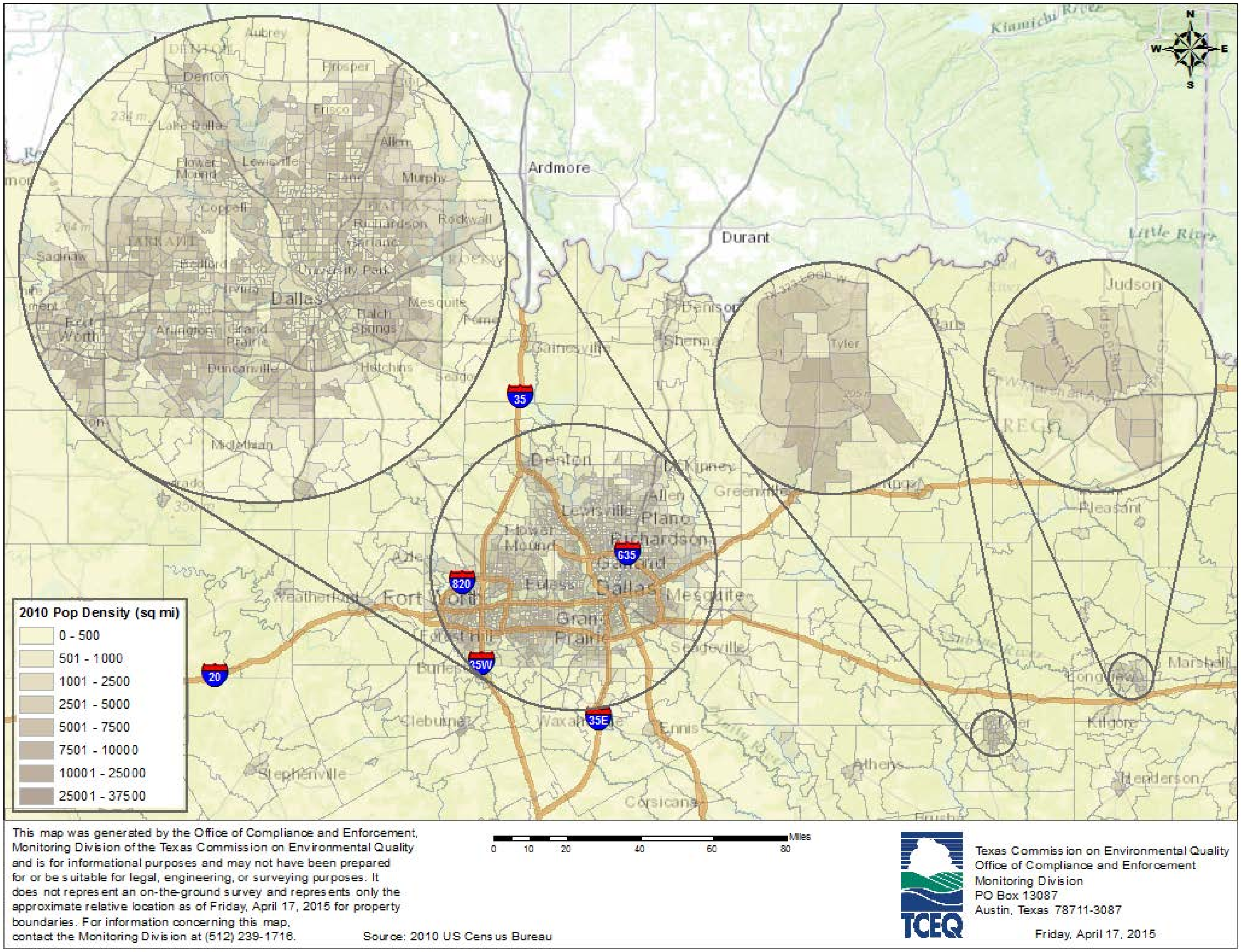



**Figure 34: North and Northeast Texas Area Population Density**




sq mi – square mile

**Figure 35: North and Northeast Texas Metropolitan Statistical Area (MSA) Population Density**

## Pollutant Sources

### Anthropogenic Sources

Mobile sources (on and off road) and area sources are the dominant contributors of emissions across the North and Northeast Texas areas. Mobile sources account for 82% of the area's CO and 66% of the $NO_x$ emissions across the area with non-road mobile sources accounting for 56% of the lead emissions. Area sources, such as printing operations, industrial coatings facilities, oil and gas production facilities, and small fossil fuel combustion facilities, contributed the most $PM_{10}$ (97%), $PM_{2.5}$ (83%), and VOCs (67%). Significant point sources across the area include electric generating units, cement kilns, and oil and gas operations. While point sources contribute minimally to the North and Northeast Texas area's $NO_x$, VOC, and particulate emissions, they account for the vast majority (over 90%) of $SO_2$ reported in the combined area.

The Barnett Shale play, a 5,000-mile hydrocarbon-producing geologic formation stretching from the Dallas-Fort Worth-Arlington area to the west and south, has been an important location for oil and gas activities since the 1980s. Beginning in approximately 2002, the area experienced an extreme increase in oil and gas activity due to advances in unconventional gas drilling techniques. Based on the TCEQ's significant sampling efforts in this area, including historical and recently deployed stationary ambient air quality monitors, these activities predominantly emit a mixture of VOCs, though the specific VOCs and their concentrations depend on a variety of factors, including the location of the activity and facility operations. Although outside the scope of this report, the TCEQ continues to collect ambient VOC data from both stationary monitors and discrete samples collected during investigations through state funding mechanisms. More information about these data and the toxicological review are available online at https://www.tceq.texas.gov/airquality/barnettshale. With this supporting monitoring data, no additional monitors are necessary to evaluate sources in this area.

Additionally, the TCEQ reviewed pending and issued air permits within the North and Northeast Texas areas. New facilities were well dispersed, with the majority of facilities roughly along the Interstate 20 and Interstate 35 corridors and between Fort Worth and Wichita Falls. Locations of the reviewed sources are provided in Appendix D. This review did not reveal any dense clusters of new sources that would necessitate additional air quality monitors.

### Natural Sources

The North and Northeast Texas areas are impacted by seasonal pollutant transport that originates outside of Texas. Accumulated smoke and haze from the eastern United States is typically noted from late spring through summer into early fall. Smoke from agricultural burning in Mexico and Central America arrives in April and May. These smoke events can impact $PM_{2.5}$ concentrations, as well as play a role in elevated ozone formation. Other transport events that impact $PM_{2.5}$ concentrations include African dust, which typically arrives between June and August, and dust from dust storms in the western Great Plains and northern Mexico, which mainly occur in the spring. These transport events often cause most of the highest daily averages during the year and therefore dominate the annual averages.

Both areas are also affected by large forest fires in East Texas as well as range fires in North Central and West Texas. However, the frequency and duration of these events are small and imported concentrations do not significantly affect the annual averages.

# *Regional Air Quality*

## Criteria Pollutants

As of January 2015, the Sherman-Denison, Longview, Tyler, and Texarkana areas are classified as attainment for all current NAAQS. The Dallas-Fort Worth-Arlington area, which includes Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, Tarrant, and Wise Counties, is designated as a moderate nonattainment area for the 2008 eight-hour ozone NAAQS. In addition, Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, and Tarrant Counties are classified as a serious nonattainment area for the 1997 eight-hour ozone NAAQS. Finally, the portion of Collin County directly around the former Exide Technologies facility is classified as a nonattainment area for the 2008 lead NAAQS.

In June 2010, the primary $SO_2$ NAAQS was revised to a one-hour standard of 75 ppb. The Governor has recommended designating all Texas areas as attainment for the one-hour $SO_2$ NAAQS, but a final action has not been taken by the EPA. Prior to making final determinations on area designations for the revised $SO_2$ standard, the EPA proposed the $SO_2$ Data Requirements Rule. This rule, proposed in April 2014, could result in additional source-oriented $SO_2$ monitoring to characterize ambient air quality around larger $SO_2$ sources and inform area designations. Recent and historical design values for the criteria pollutants are provided in the Network Evaluation sections below.

### Current Nonattainment Designations

#### *1997 Eight-Hour Ozone*

In 2004, the Dallas-Fort Worth-Arlington area was classified as a moderate nonattainment area for the 1997 eight-hour ozone NAAQS. The TCEQ adopted the *Dallas-Fort Worth 1997 Eight-Hour Ozone Attainment Demonstration and Reasonable Further Progress Demonstration SIP Revisions* in May 2007 as the first steps in addressing the 1997 eight-hour ozone NAAQS in the Dallas-Fort Worth-Arlington area. Subsequent revisions to the initial attainment demonstration SIP revision were adopted and submitted for EPA consideration in 2008. In January 2009, the EPA published final conditional approval of components of the attainment demonstration, including the original *May 2007 Dallas-Fort Worth 1997 Eight-Hour Ozone Attainment Demonstration SIP Revision*.

In January 2011, the EPA published a final determination that the Dallas-Fort Worth-Arlington area failed to attain the 1997 eight-hour ozone standard by the attainment deadline of June 15, 2010, based on certified monitoring data from 2007, 2008, and 2009. Accordingly, the EPA reclassified the area from moderate to serious with a new attainment deadline of June 15, 2013. In December 2011, the TCEQ adopted an attainment demonstration SIP revision demonstrating that the Dallas-Fort Worth-Arlington area would attain the 1997 eight-hour ozone standard by the new June 2013 attainment deadline. In February 2015, the TCEQ requested that the EPA issue a finding of attainment for the 1997 eight-hour ozone NAAQS based on the Dallas-Fort Worth-Arlington area's 2014 design value of 0.081 ppm. More information about the SIP revisions and efforts in attaining the 1997 eight-hour ozone standard is available online at http://www.tceq.state.tx.us/airquality/sip/dfw/dfw-ozone-history.

### *2008 Eight-Hour Ozone*

On May 21, 2012, the EPA published final designations for the 2008 eight-hour ozone NAAQS in the *Federal Register* (77 FR 30088). Ten counties in the Dallas-Fort Worth-Arlington area (Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, Tarrant, and Wise Counties) were classified moderate nonattainment under the 2008 eight-hour ozone standard with an attainment deadline of December 2018. On December 10, 2014, the commission approved proposal of two revisions to the Texas SIP for the Dallas-Fort Worth-Arlington 2008 eight-hour ozone nonattainment area: the *Dallas-Fort Worth Attainment Demonstration (AD) SIP Revision for the 2008 Eight-Hour Ozone NAAQS* and the *Dallas-Fort Worth Reasonable Further Progress (RFP) SIP Revision for the 2008 Eight-Hour Ozone NAAQS*.

### *2008 Lead*

On October 15, 2008, the EPA substantially strengthened the NAAQS for lead, lowering it tenfold, from 1.5 $\mu g/m^3$ to 0.15 $\mu g/m^3$. The highest monitored rolling three-month average concentration of lead in ambient air from 2006 through 2008 was 0.23 $\mu g/m^3$ at the lead monitor located on Ash Street in Frisco, Texas. Based on monitored data, the governor recommended to the EPA that a portion of Collin County near the Exide Technologies (Exide) Recycling Center in Frisco be designated as nonattainment for the 2008 lead NAAQS. In November 2010, the EPA designated the area in Collin County surrounding the Exide Recycling Center nonattainment for the 2008 lead NAAQS with an attainment deadline of December 31, 2015. (75 FR 71033)

On June 4, 2012, the City of Frisco and Exide approved an agreement that resulted in the sale of approximately 180 acres of undeveloped land surrounding Exide's plant. Under the terms of the agreement, the land around Exide's plant was sold to the Frisco Community Development Corporation and the Frisco Economic Development Corporation. The agreement stipulates that Exide will retain ownership of the federal and state permitted plant site. As part of the agreement, Exide would cease business operations. Effective November 1, 2012, Exide began curtailing operations, and all recycling ceased on November 30, 2012, resulting in significantly lower rolling three-month averages. The facility is now permanently shut down, and remedial activities are ongoing.

## Air Toxics

In addition to federally required monitoring for air toxics, the TCEQ often conducts supplemental monitoring in APWL areas. There are two APWL Areas in the North and Northeast Texas areas. The area near the Dal Chrome facility in central Dallas was listed on the APWL in 2004 because nickel concentrations in total suspended particulate (TSP) samples at a state-funded monitor indicated a potential health concern. Subsequent monitoring of TSP and $PM_{10}$ nickel concentrations at this site indicated concentrations are not at a level of health and/or welfare concern. The area near the International Paper Company in Bowie and Cass Counties was listed on the APWL in 1999 because hydrogen sulfide concentrations near the International Paper Company were monitored above the Texas standard during investigations conducted in 1998 and 1999. Exposure to measured VOC, SVOC, $PM_{2.5}$ metals, and carbonyl concentrations from North and Northeast Texas area monitors, as well as investigation samples over the past five years, would not be expected to cause adverse health effects or odorous conditions.

# Monitoring Network Evaluation

## Ozone

### Network History

#### *Dallas-Fort Worth-Arlington Area*

As of January 1, 2015, there were 19 ozone monitors operating in the Dallas-Fort Worth-Arlington area (shown in Figure 36) providing ambient concentration data to evaluate general air quality in populated areas, background concentrations in areas predominantly upwind of urban areas, and concentrations in areas likely to have maximum ozone and ozone precursor impacts. Appendix A provides a full list of the area's ozone monitors, as well as their locations, monitoring objectives, and associated spatial scales.

Ozone monitoring in the area began in the urban core with the deployment of monitors such as the Dallas Hinton monitor and soon expanded to include additional monitors in the urban core and at suburban locations downwind of the urban core. These monitors, which included Fort Worth Northwest, Keller, and Frisco, were sited to measure maximum ozone concentrations in areas of high population density and maximum ozone precursor impacts. Beginning in 2000, the TCEQ expanded ozone monitoring outward from the city core at locations such as Kaufman, Cleburne Airport, Parker County, Eagle Mountain Lake, and Rockwall Heath to provide information on upwind background concentrations entering the Dallas-Fort Worth-Arlington area, regional transport of ozone out of the area, and ozone concentrations in populated areas. Finally, the Pilot Point and Italy sites were deployed in 2006 and 2007, respectively, to evaluate ozone concentrations upwind and downwind of the Dallas-Fort Worth-Arlington area. Since the last five-year assessment period, no significant ozone network changes have occurred in the Dallas-Fort Worth-Arlington area.

Ozone monitoring in the Dallas-Fort Worth-Arlington area exceeds current minimum federal monitoring requirements. Three federal ozone monitoring requirements (related to NCore, PAMS, and the area's population and ozone design value) currently apply to the Dallas-Fort Worth-Arlington area, resulting in a minimum of six required ozone monitors. Monitoring objectives related to these federal requirements include collection of ambient data in areas frequented by the public, likely impacted by maximum ozone concentrations, representative of upwind background concentrations, and downwind of the Dallas-Fort Worth-Arlington urban core. The geographic distribution of the expanded ozone monitoring network in the Dallas-Fort Worth-Arlington area provides valuable data to the public and allows for the assessment of ozone trends, spatial and diurnal variability, and complex ozone-related atmospheric processes.

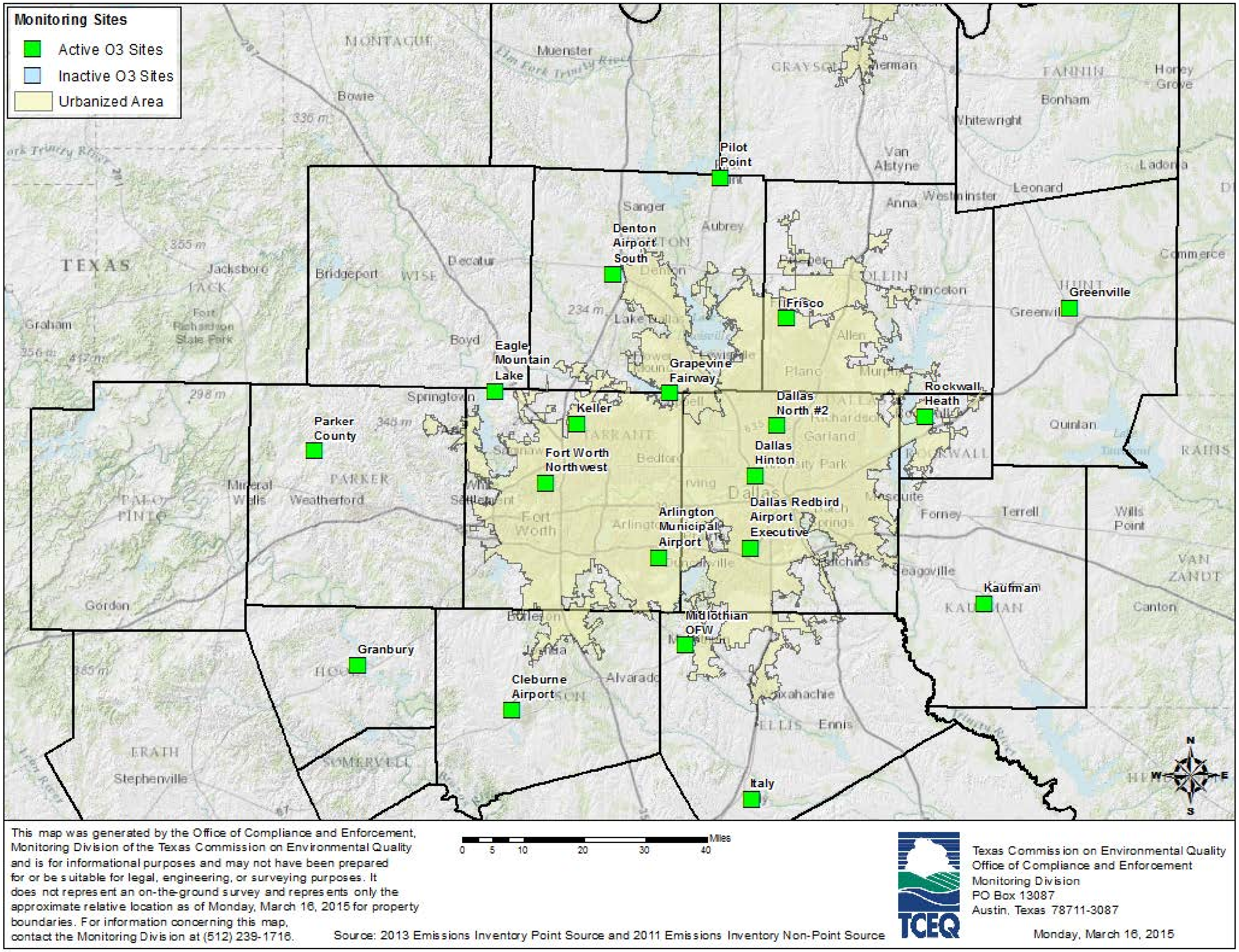



**Figure 36: Dallas-Fort Worth-Arlington Area Ozone ($O_3$) Monitors**

### *Northeast Texas Area*

Three ozone monitors (shown in Figure 37) were operating in the Northeast Texas area as of January 1, 2015, measuring ambient ozone concentrations related to general background levels and in areas frequented by the public. Appendix A lists the area's ozone monitors, as well as their locations, monitoring objectives, and associated spatial scales. Ozone monitoring in the area began in the 1980s with the deployment of the Longview monitor located to the south of the city and has expanded over time to include monitors at the Tyler Airport Relocated site west of Tyler and the Karnack site east of Marshall on the Texas/Louisiana border. All three monitors provide useful ozone data representative of general background concentrations in both populated and rural areas. The Karnack site is also used as an upwind monitor for the whole state to assess background and interstate transport.

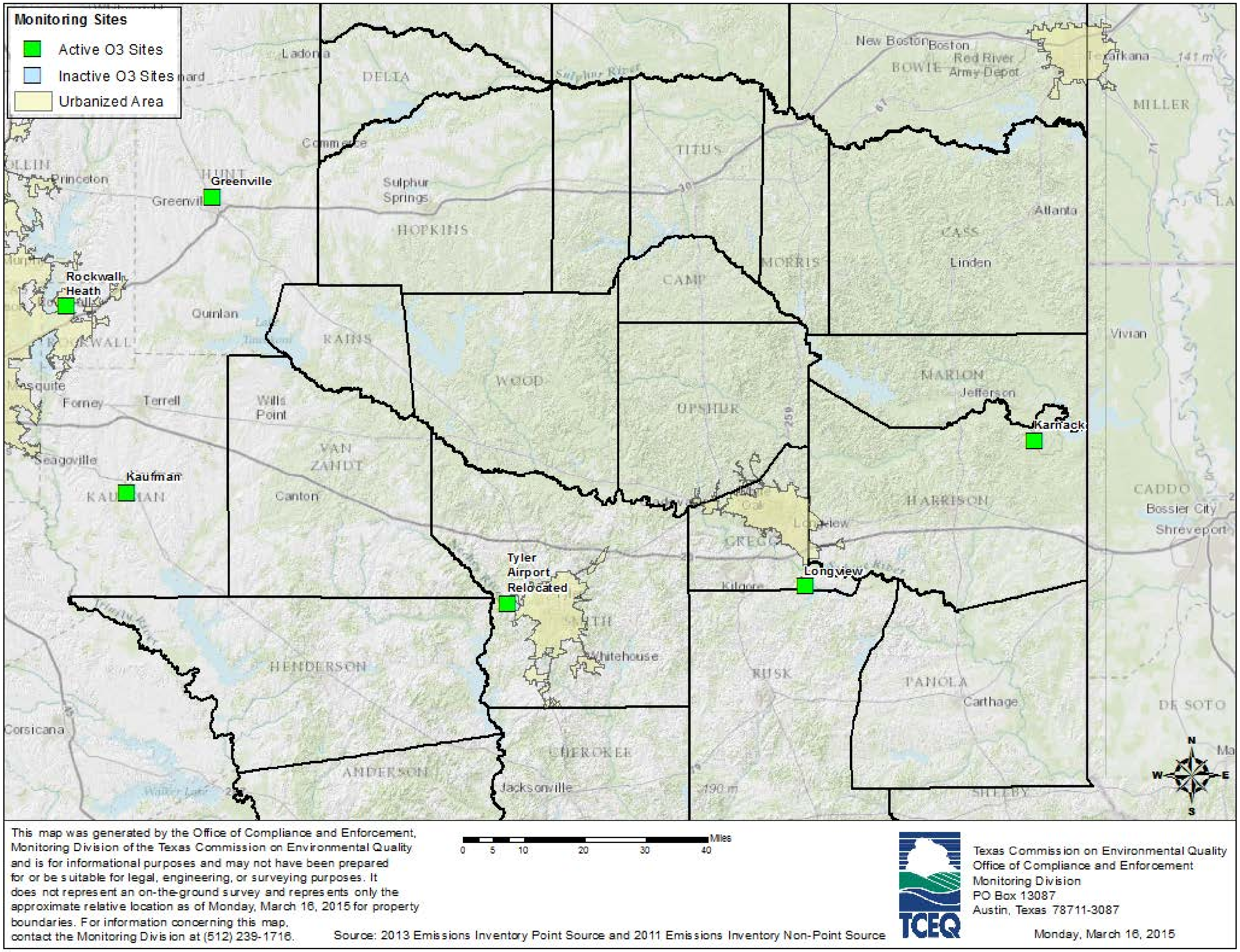



**Figure 37: Northeast Texas Area Ozone ($O_3$) Monitors**

## Design Values and Trends

### *Dallas-Fort Worth-Arlington Area*

As shown in Figure 38, the highest design values in the Dallas-Fort Worth-Arlington area over the past several years have been measured north of the city core at sites such as Denton Airport South, Grapevine Fairway, and Keller. The highest 2014 design value was at Denton Airport South at 0.081 ppm. These observed higher design values suggest inter- and intra-regional transport, cumulated ozone formed from precursors emitted within the city core, and lower $NO_x$ scavenging effects due to the lower levels of $NO_x$ emissions outside the city core areas.

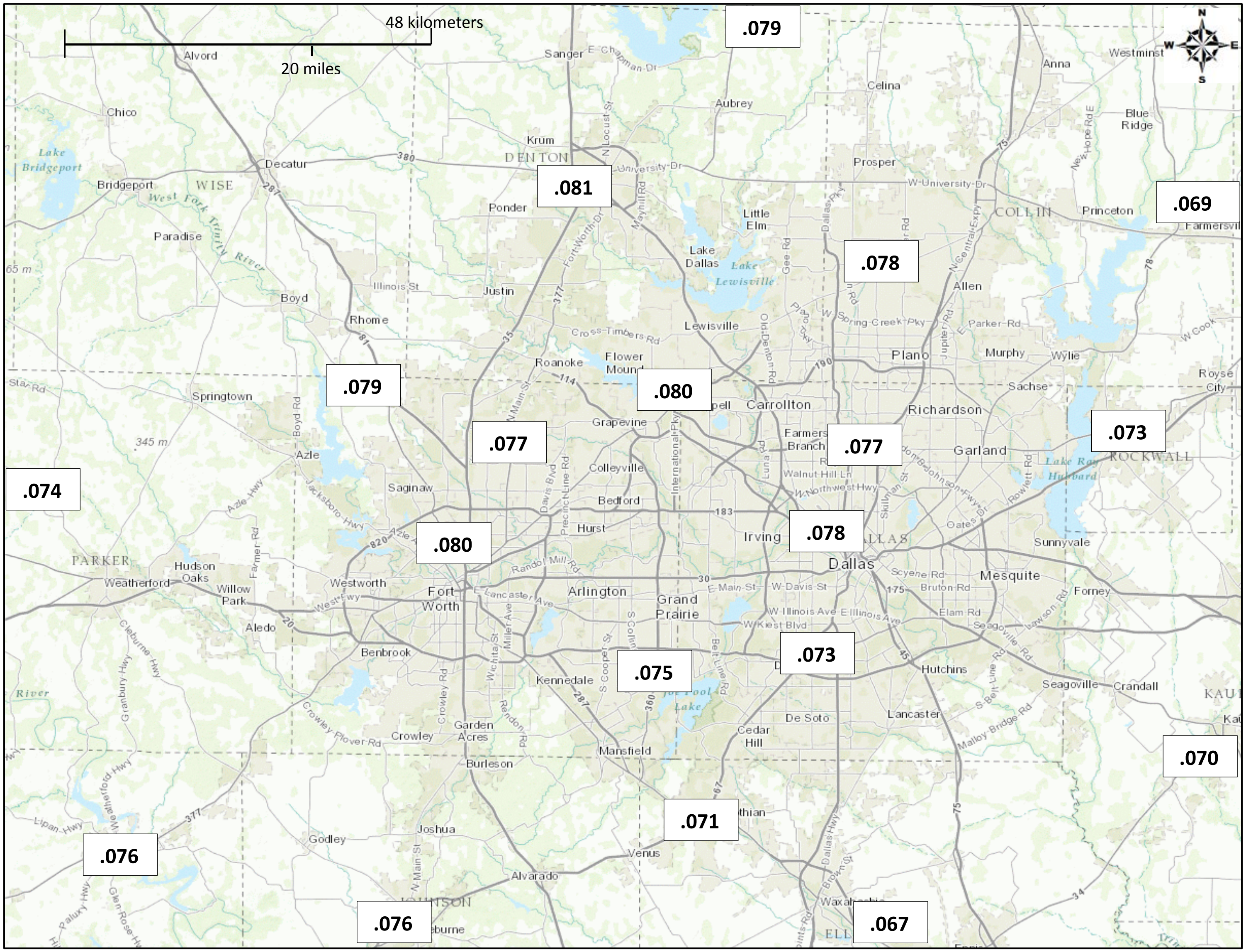
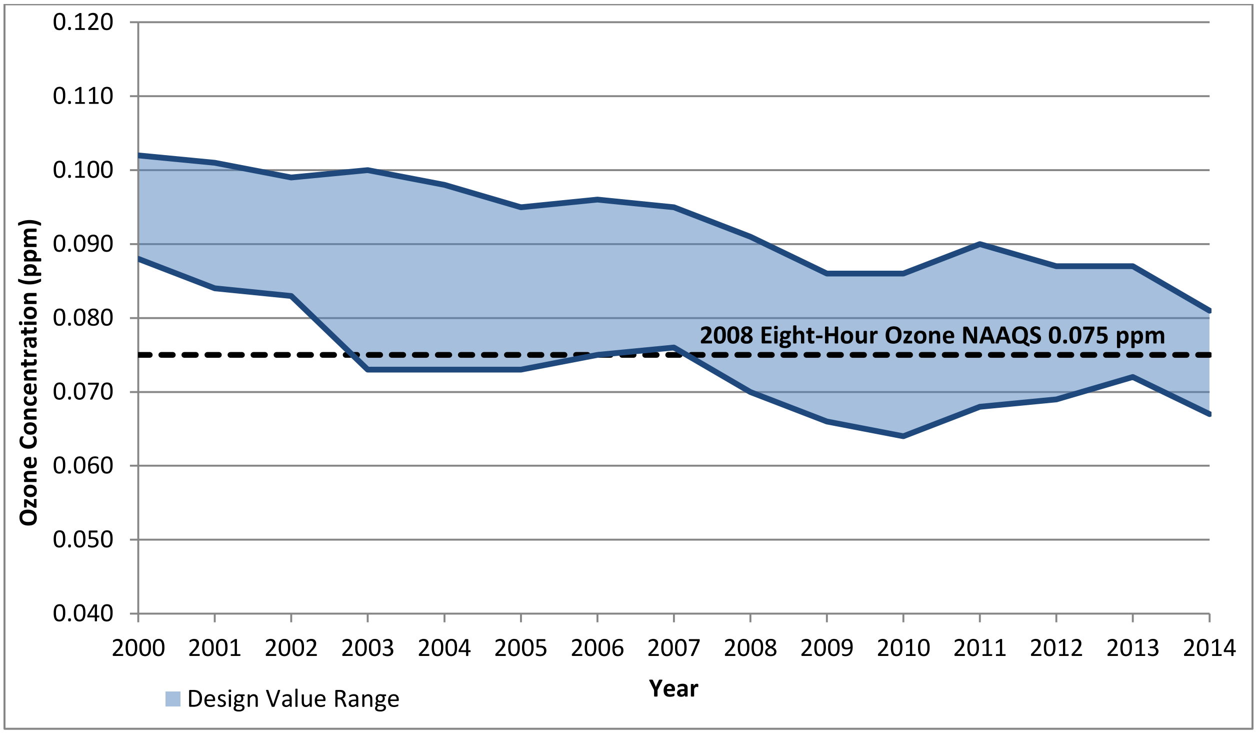



**Figure 38: 2014 Dallas-Fort Worth-Arlington Area Ozone 8-Hour Design Values in Parts Per Million**

Figure 39 shows the decrease in Dallas-Fort Worth-Arlington area ozone concentrations between 2000 and 2014 using annual design values from each area monitor. The top blue line represents the highest design value for a given year, and the lower blue line represents the lowest design value for a given year. The range between the highest and lowest design values is shown as the shaded region.




ppm – parts per million
NAAQS – National Ambient Air Quality Standards

**Figure 39: Eight-Hour Ozone Design Value Trends in the Dallas-Fort Worth-Arlington Area, 2000-2014**

In addition to ambient monitoring data, modeling data for the *Dallas-Fort Worth-Arlington Attainment Demonstration State Implementation Plan Revision for the 1997 Eight-Hour Ozone Standard Nonattainment Area*, December 7, 2011, also aids in illustrating regional transport and predicts areas of future maximum concentrations. Figure 40 shows two ozone concentration color contour maps, one for the 2006 baseline (a) and one for the 2018 future case (b). Figure 40b shows that even with the expected improvements in ozone design values resulting from controls modeled in this attainment demonstration, the predicted maximum ozone concentrations lie to the north of the urban core, roughly between the Keller and Denton Airport South monitors. This information suggests the continued need to focus monitoring efforts to evaluate transport in and out of the area, as well as upwind background concentrations.

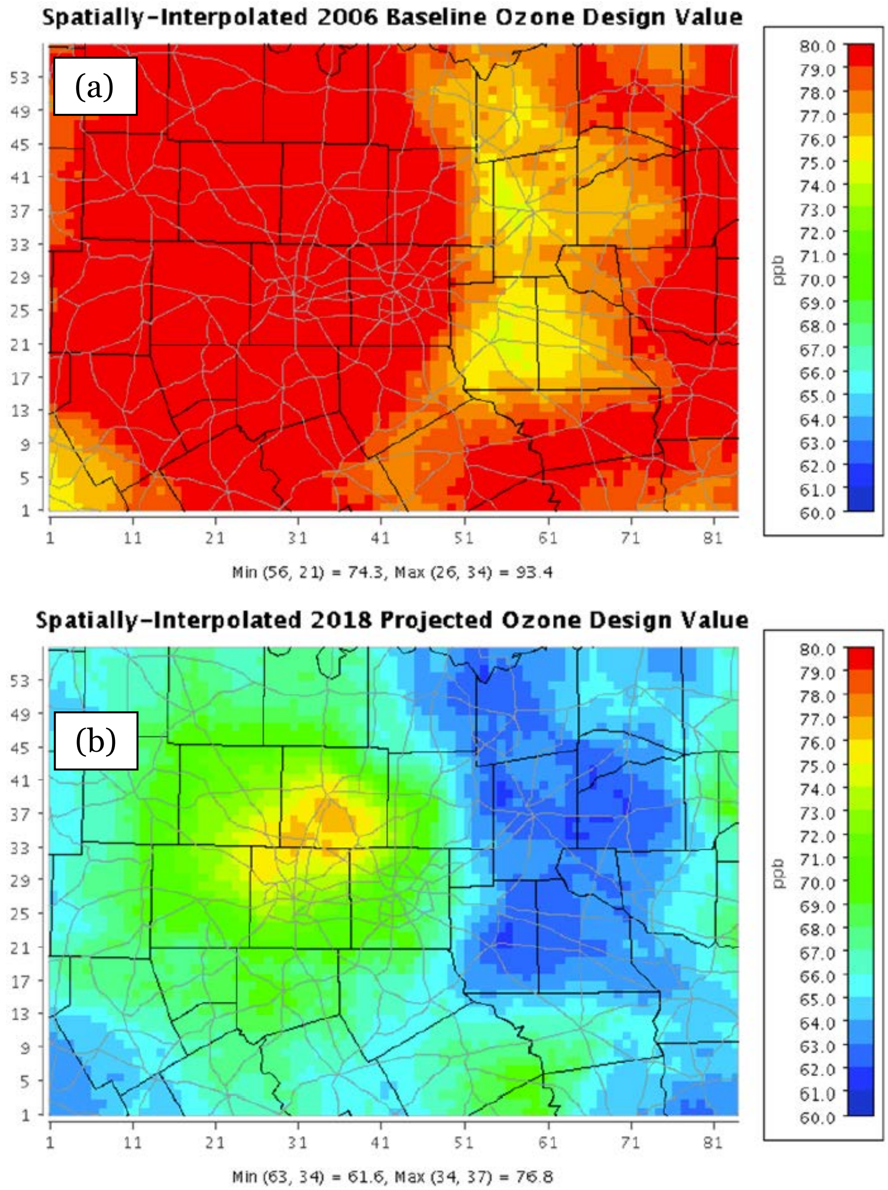
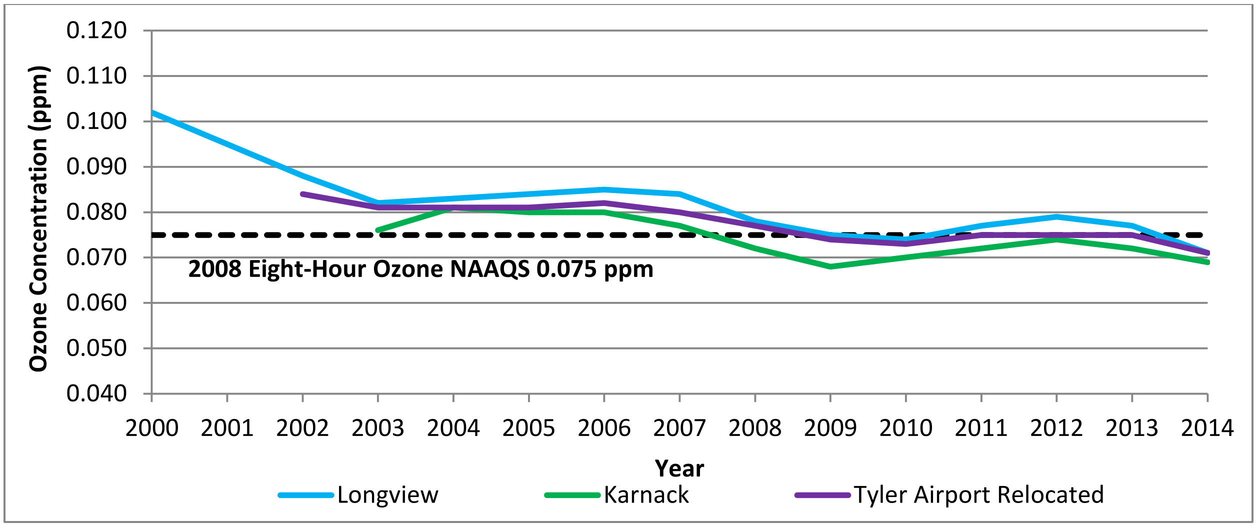



**Figure 40: Spatially Interpolated 2006 Baseline (a) and 2018 Future Case Design Values (b) for the Dallas-Fort Worth-Arlington Area**

### *Northeast Texas Area*

Eight-hour ozone design value trends have declined in the Northeast Texas area since the early 2000s (shown in Figure 41) with all three monitors measuring ozone concentrations below the 2008 eight-hour ozone standard. The location of the Karnack monitor makes it useful as an upwind site to evaluate regional and intrastate ozone transport into the Northeast Texas area. Karnack ozone design values have historically been considered representative of incoming background with measured concentrations lingering in the low 70 ppb range.




ppm – parts per million

NAAQS – National Ambient Air Quality Standards

**Figure 41: Eight-Hour Ozone Design Value Trends in the Northeast Texas Area, 2000-2014**

## Network Evaluation

### *Dallas-Fort Worth-Arlington Area*

Based on current ozone monitoring requirements, several Dallas-Fort Worth-Arlington area ozone monitors are considered of high value. The Dallas Hinton monitor simultaneously satisfies the ozone monitoring requirement for NCore and PAMS, while monitors at Denton Airport South, Kaufman, Italy, Grapevine Fairway, and Fort Worth Northwest are fulfilling additional PAMS ozone monitoring requirements. Based on their regulatory value, all of these monitors are considered of high value. In addition, ozone monitors at Dallas Redbird Airport Executive, Keller, Dallas North #2, Eagle Mountain Lake, Arlington Municipal Airport, Rockwall Heath, Parker County, Midlothian OFW, Greenville, Granbury, Frisco, Cleburne Airport, and Pilot Point are sited to measure ozone concentrations in populated areas and maximum ozone precursor impacts. These monitors satisfy minimum ozone monitoring requirements based on population and design value.

To assess potential redundancy, all Dallas-Fort Worth-Arlington area ozone monitors were evaluated using the NetAssess correlation tool. Figure 42 shows the graphed correlation, relative difference, and distance between monitor pairs. Monitors are identified by AQS numbers, which are referenced in Appendix A. This correlation analysis indicated moderate to high correlations between many Dallas-Fort Worth-Arlington area monitors, which is expected given the expanse of the area's ozone network and the regional nature of the pollutant. The Dallas Hinton (AQS 48-113-0069) and Dallas North #2 (AQS 48-113-0075) monitors (Pearson's coefficient=0.973, relative difference=0.0783) and Dallas Hinton and Dallas Redbird Airport Executive (AQS 48-113-0087) monitors (Pearson's coefficient=0.964, relative difference=0.0785) appear to be highly correlated. However, the distance between the monitors is too great for the monitors to be considered redundant.

Based on this evaluation, none of the ozone monitors in the Dallas-Fort Worth-Arlington area are considered fully redundant and all provide valuable historical data and trends. Appendix C provides a detailed description of the value of each active ozone monitor.

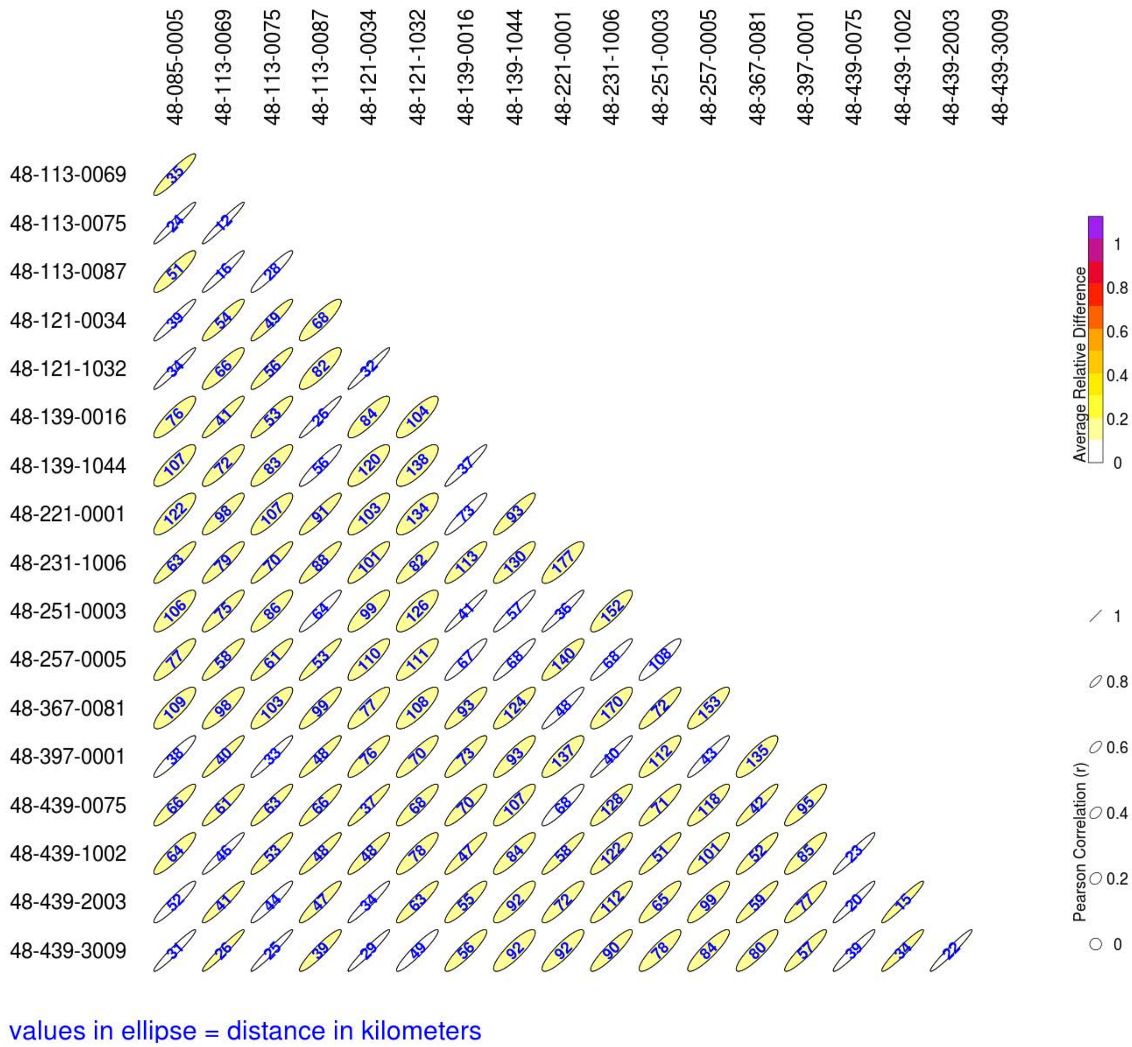


Figure 42: Eight-Hour Daily Maximum Ozone Correlation Matrix in the Dallas-Fort Worth-Arlington Area, 2011-2013

## Northeast Texas Area

Ozone monitors at both the Tyler Airport Relocated and Longview sites fulfill minimum federal requirements based on population and design values and are considered of high value. While ozone measurements at Tyler Airport Relocated and Longview show a high correlation (Pearson's coefficient=0.929, relative difference=0.0995), the distance between the two monitors (approximately 41 miles) provides adequate spatial coverage. In addition, the Karnack monitor is operated beyond minimum federal requirements but provides valuable information related to intrastate transport and background ozone concentrations for the state. All three of the current ozone monitors in the Northeast Texas area are considered of high value and no network changes are recommended at this time. Appendix C provides a detailed description of the value of each active ozone monitor.

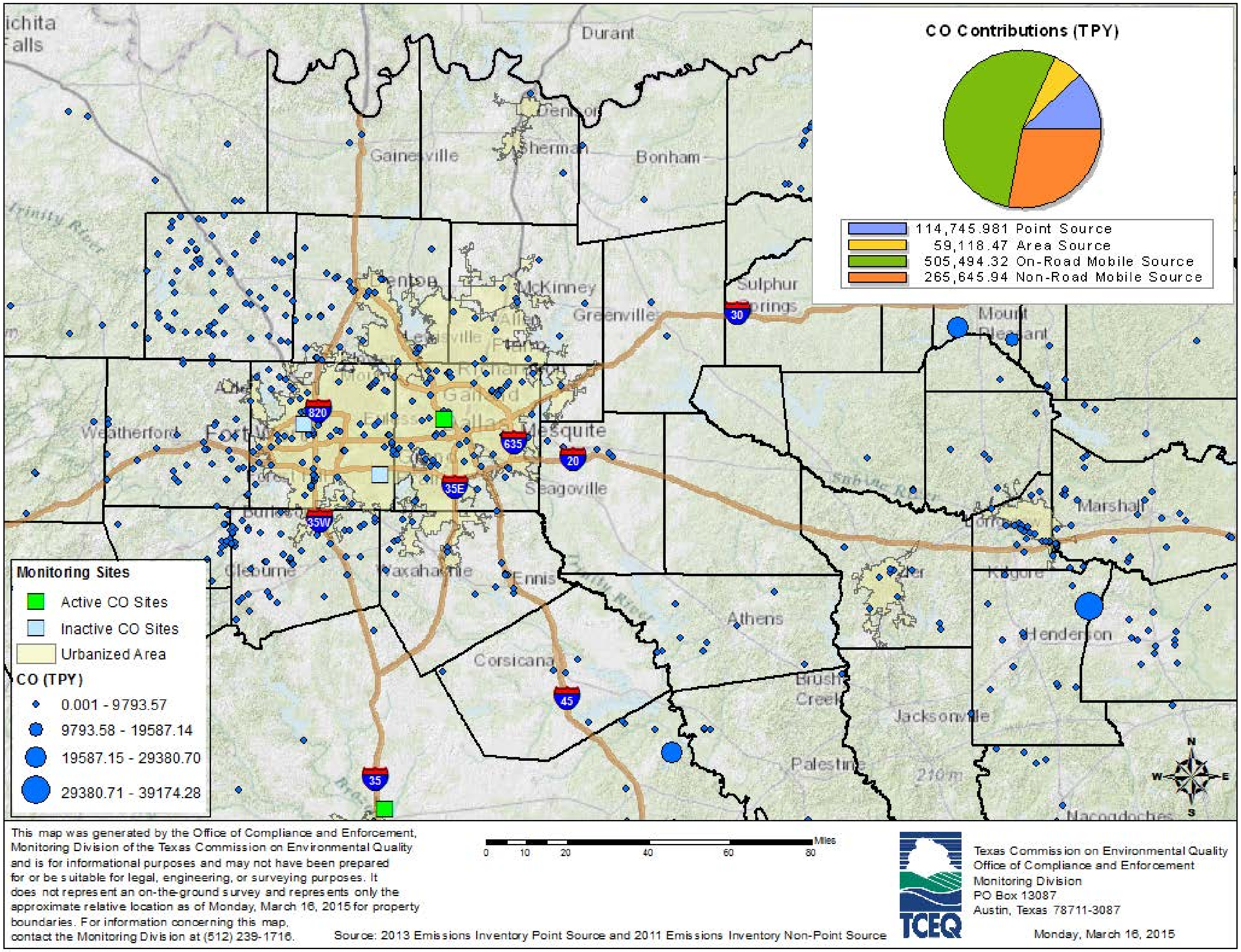
# Carbon Monoxide

## Network History

As of January 1, 2015, the Dallas Hinton CO monitor was the only CO monitor in the North and Northeast Texas areas. Prior to 2010 there were no federal CO monitoring requirements applicable to metropolitan areas with the exception of monitoring for CO concurrently with ozone precursors at PAMS sites and CO monitoring at NCore sites. In 2010, the EPA promulgated new rules requiring CO monitoring at near-road $NO_2$ sites in metropolitan areas with a population of a 1,000,000 or more persons.

The Dallas Hinton CO monitor was deployed in 1995 to measure CO concentrations in an area of high population density. In 2010, the Dallas Hinton site was selected as an NCore site to meet new federal monitoring requirements, and the CO monitor was replaced with a high sensitivity CO monitor in 2011. The Dallas Hinton monitor currently fulfills both the NCore and PAMS requirements for the Dallas-Fort Worth-Arlington area and provides information to evaluate CO concentrations in a populated area and impacts from ozone precursor emissions. In addition to the Dallas Hinton site, CO was previously measured at the Fort Worth Northwest and Arlington Municipal Airport sites to evaluate concentrations in populated areas. Both of these monitors were being operated in excess of minimum federal requirements and were decommissioned in 2014 due to historic design values well below the one-hour and eight-hour CO NAAQS.

In March 2015, a new CO monitor was deployed at the Fort Worth California Parkway North site to fulfill the near-road CO monitoring requirements. Appendix A provides a full list of both active and recently decommissioned ozone monitors, as well as their location, monitoring objectives, and associated spatial scales. Because the Fort Worth California Parkway North monitor was deployed after January 1, 2015, the monitor was not included in Appendix A. Locations of CO monitors and point sources are shown in Figure 43.




TPY – tons per year

**Figure 43: North and Northeast Texas Area Carbon Monoxide (CO) Point Sources and Monitors**

### Design Values and Trends

The CO design values in the North and Northeast Texas area have remained well below both the one-hour and eight-hour NAAQS, since 2006. Design values have consistently been below 8% of the one-hour NAAQS of 35 ppm and below 19% of the eight-hour NAAQS of 9 ppm.

### Network Evaluation

The existing network of CO monitors in the North and Northeast Texas area meets all current federal monitoring requirements and is adequate to meet existing monitoring objectives. The high sensitivity monitor at the Dallas Hinton site fulfills CO monitoring requirements at NCore sites and is considered of high value. Based on the area's population, CO monitoring is not required for the Northeast Texas area. Given the historic design values for the Northeast Texas area and the previous monitor decommissions, no additional network changes are recommended at this time.

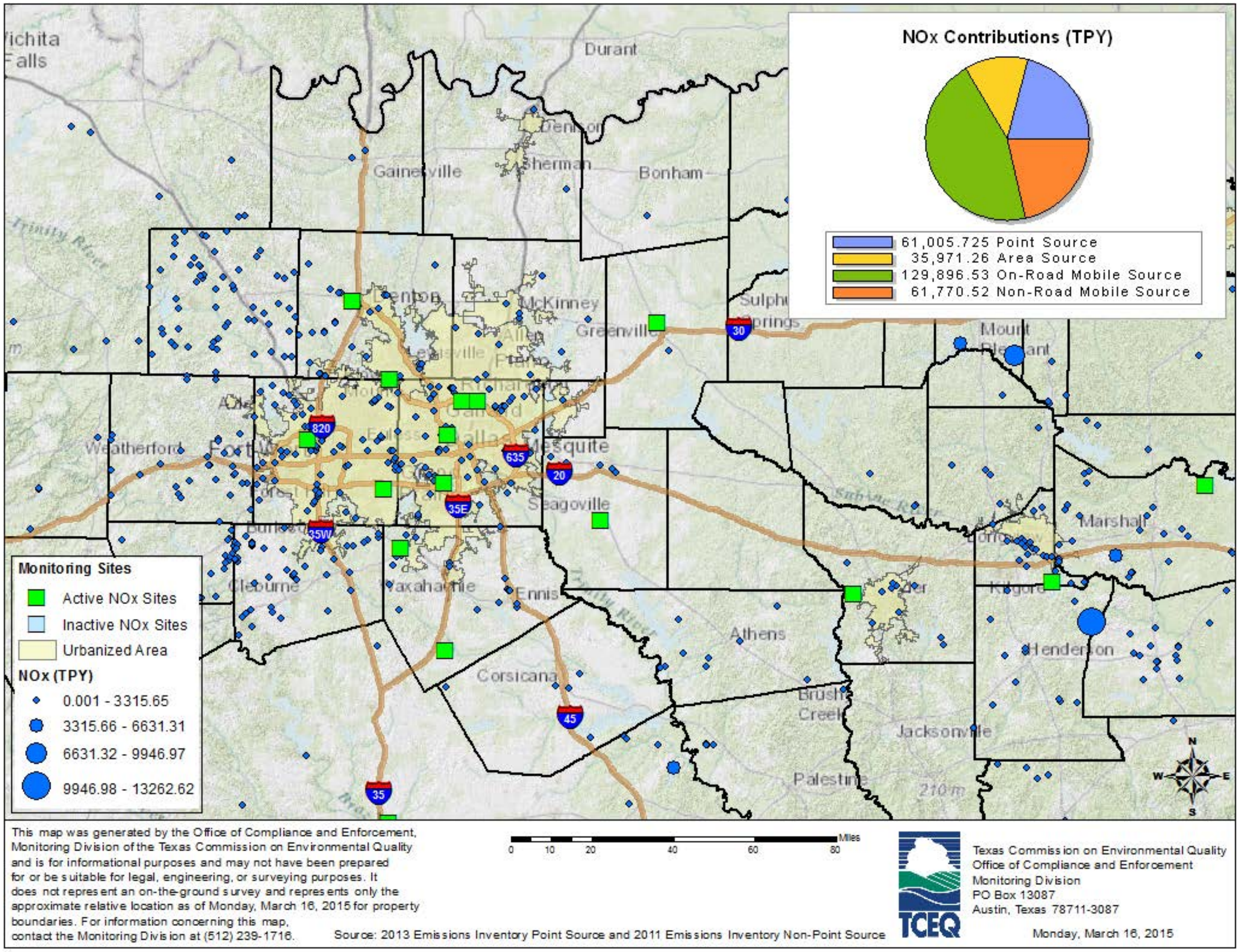
## Oxides of Nitrogen

### Network History

Fifteen $NO_x$ monitors were operating in the North and Northeast Texas areas as of January 1, 2015, as shown in Figure 44. The monitors provide data on ambient $NO_2$ levels in populated areas likely to have maximum concentrations, areas that are important for ozone formation, and areas representative of background concentrations. Prior to 2010 there were no federal minimum $NO_2$ monitoring requirements applicable to metropolitan areas with the exception of $NO_2$ monitoring at PAMS and NCore sites. In 2010, the EPA promulgated new rules requiring area-wide $NO_2$ monitoring sites in metropolitan areas with populations of 1,000,000 or more and near-road $NO_2$ monitoring in metropolitan areas with populations of 500,000 or more. In addition, Regional Administrator required $NO_2$ monitoring, known as RA-40, requires additional $NO_2$ monitoring above the minimum requirements with a primary focus on siting monitors in locations to protect susceptible and vulnerable populations. These sites are determined by collaboration between the EPA Regional Administrators and the States. The Arlington Municipal Airport $NO_x$ monitor fulfills this requirement.

While $NO_2$ monitoring was conducted in the area prior to 1990, significant expansion of the $NO_2$ monitoring network occurred in the late 1990s and early 2000s in response to new federal PAMS requirements and the need to improve the agency's understanding of ozone formation and ozone precursor transport in the North and Northeast Texas areas. Of the 15 active $NO_x$ monitors, 12 are located in the Dallas-Fort Worth-Arlington area with the remainder spaced across Northeast Texas. Four federal $NO_x$ monitoring requirements (related to NCore, PAMS, RA-40, and required as based on the area's population) currently apply to the Dallas-Fort Worth-Arlington area resulting in a minimum of five required $NO_x$ monitors and two $NO_y$ monitors. The required $NO_x$ monitors include Arlington Municipal Airport, Dallas Hinton, Fort Worth Northwest, Dallas LBJ Freeway, and Fort Worth California Parkway North. The required $NO_y$ monitors are located at Denton Airport South to meet PAMS requirements and at Dallas Hinton, which was deployed in 2011 to meet NCore requirements. Monitoring objectives related to these federally required monitors include collection of ambient data in areas frequented by the public and measuring maximum ozone precursor emissions impacts. In addition, the distribution of the $NO_2$ monitoring network across the North and Northeast Texas area provides valuable information to evaluate the effectiveness of $NO_2$ control strategies, the performance of photochemical models in predicting ozone formation and transport, and the spatial and diurnal variability of ozone precursor emissions.

Since the last five-year network assessment in 2010, the TCEQ has deployed two new $NO_x$ monitors in the North Texas area. In April 2014, the Dallas LBJ Freeway site was deployed to comply with Phase I near-road $NO_2$ monitoring requirements near the intersection of Interstate Highway 635 and United States Highway 75 on the north side of Dallas. This monitor was the first in the area to measure $NO_2$ concentrations in such close proximity to on-road emission sources. An additional near-road $NO_2$ monitor was deployed in March 2015 at the Fort Worth California Parkway North site west of the Interstate Highway 35 West and Interstate Highway 20 intersection in Fort Worth. Appendix A provides a full list of both active and recently decommissioned $NO_x$ monitors, as well as their location, monitoring objectives, and associated spatial scales. However, because the Fort Worth California Parkway North monitor was deployed after January 1, 2015, the monitor was not included in Appendix A. The value of the monitor will be assessed during the next five-year assessment.




TPY – tons per year

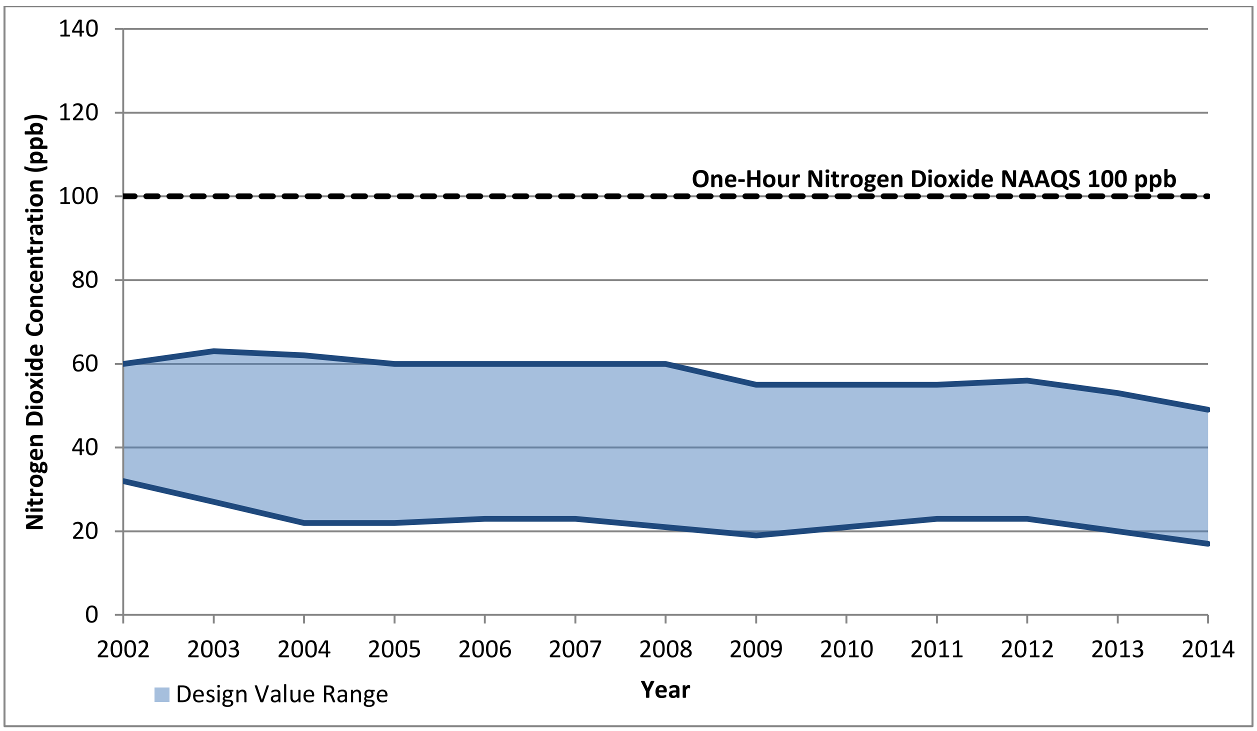
**Figure 44: North and Northeast Texas Area Oxides of Nitrogen ($NO_x$) Point Sources and Monitors**

## Design Values and Trends

All monitored values within the North and Northeast Texas area meet the current one-hour and eight-hour $NO_2$ NAAQS with concentrations measured at all monitors falling consistently below the one-hour NAAQS of 100 ppb and the annual NAAQS of 53 ppb since at least 2002.

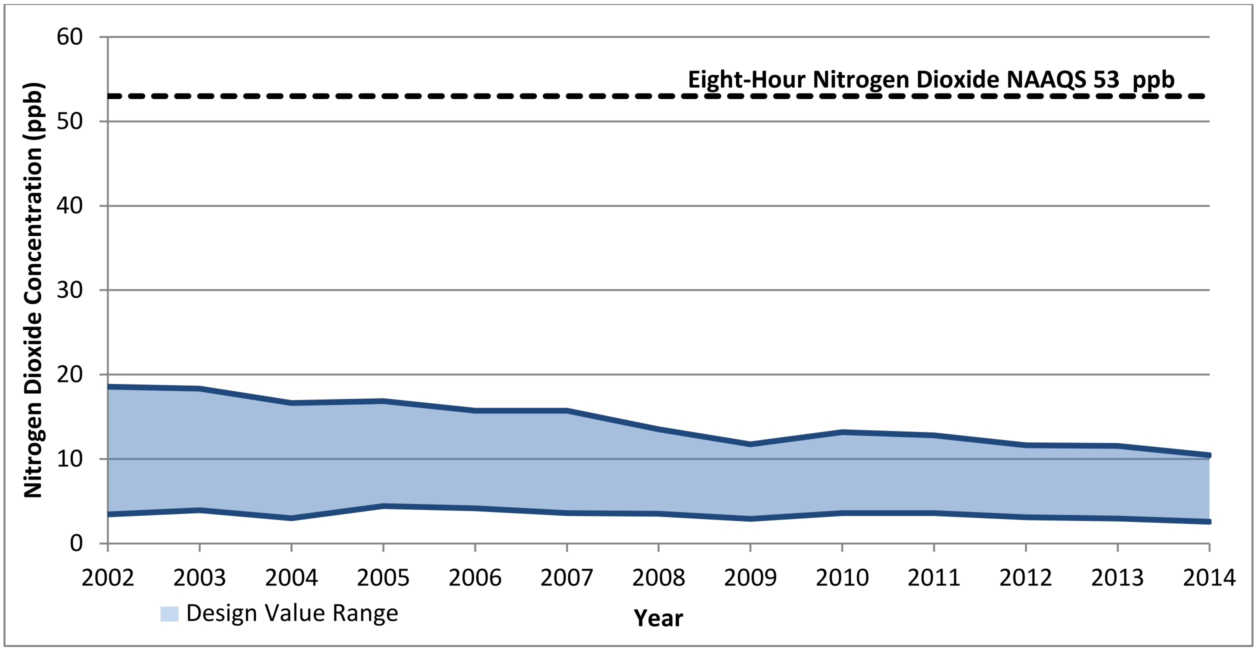
Figures 45 and 46 show the decrease in $NO_2$ concentrations in the North and Northeast Texas area from 2002 through 2014 using annual design values from each area monitor. The top blue line in each figure represents the highest design value for a given year, and the lower blue line in each figure represents the lowest design value for a given year. The range between the highest and lowest design values is shown as the shaded region.

Dallas Hinton and Fort Worth Northwest consistently had the highest one-hour and annual $NO_2$ design values over the five-year assessment period. Tyler Airport Relocated and Karnack have consistently had the area's lowest design values over the same period.




ppb – parts per billion
NAAQS – National Ambient Air Quality Standards

**Figure 45: One-Hour Nitrogen Dioxide ($NO_2$) Design Value Trends in the North and Northeast Texas Area, 2002–2014**




ppb – parts per billion
NAAQS – National Ambient Air Quality Standards

**Figure 46: Annual Nitrogen Dioxide Design Values Trends in the North and Northeast Texas Area, 2002–2014**

## Network Evaluation

The existing $NO_2$ monitoring network in the North and Northeast Texas area is sufficient to meet all current federal monitoring requirements and achieves established monitoring objectives. Six monitors in the North Texas area are considered of high value based on their regulatory importance. The Dallas Hinton monitor fulfills requirements for $NO_2$ monitoring at both NCore and PAMS designated sites, as well as satisfying area-wide $NO_2$ monitoring requirements based on population. Due to its location, the Hinton site provides valuable data that are representative of areas throughout the metropolitan area. The Arlington Municipal Airport $NO_x$ monitor fulfills the RA-40 requirement. The Dallas Hinton monitor and the Fort Worth Northwest $NO_x$ monitor fulfill the area's remaining requirements for PAMS and area-wide $NO_2$ monitoring, respectively. The $NO_y$ monitors at Denton Airport South and Dallas Hinton fulfill the area's PAMS and NCore requirements, respectively, and are considered of high value. Finally, the Dallas LBJ Freeway and Fort Worth California Parkway North monitors satisfy near-road monitoring requirements for the Dallas-Fort Worth-Arlington area. However, because the Fort Worth California Parkway North monitor was deployed after January 1, 2015, the value of the monitor will be assessed during the next five-year assessment.

All other existing $NO_x$ monitors in the North and Northeast Texas area are considered of medium value to the network, but provide meaningful data pertaining to the effectiveness of $NO_x$ control strategies, the performance of photochemical ozone modeling, the characterization of background and transported ozone precursor concentrations, and additional PAMS requirements. Based on current monitoring objectives, no additional network changes are recommended at this time.

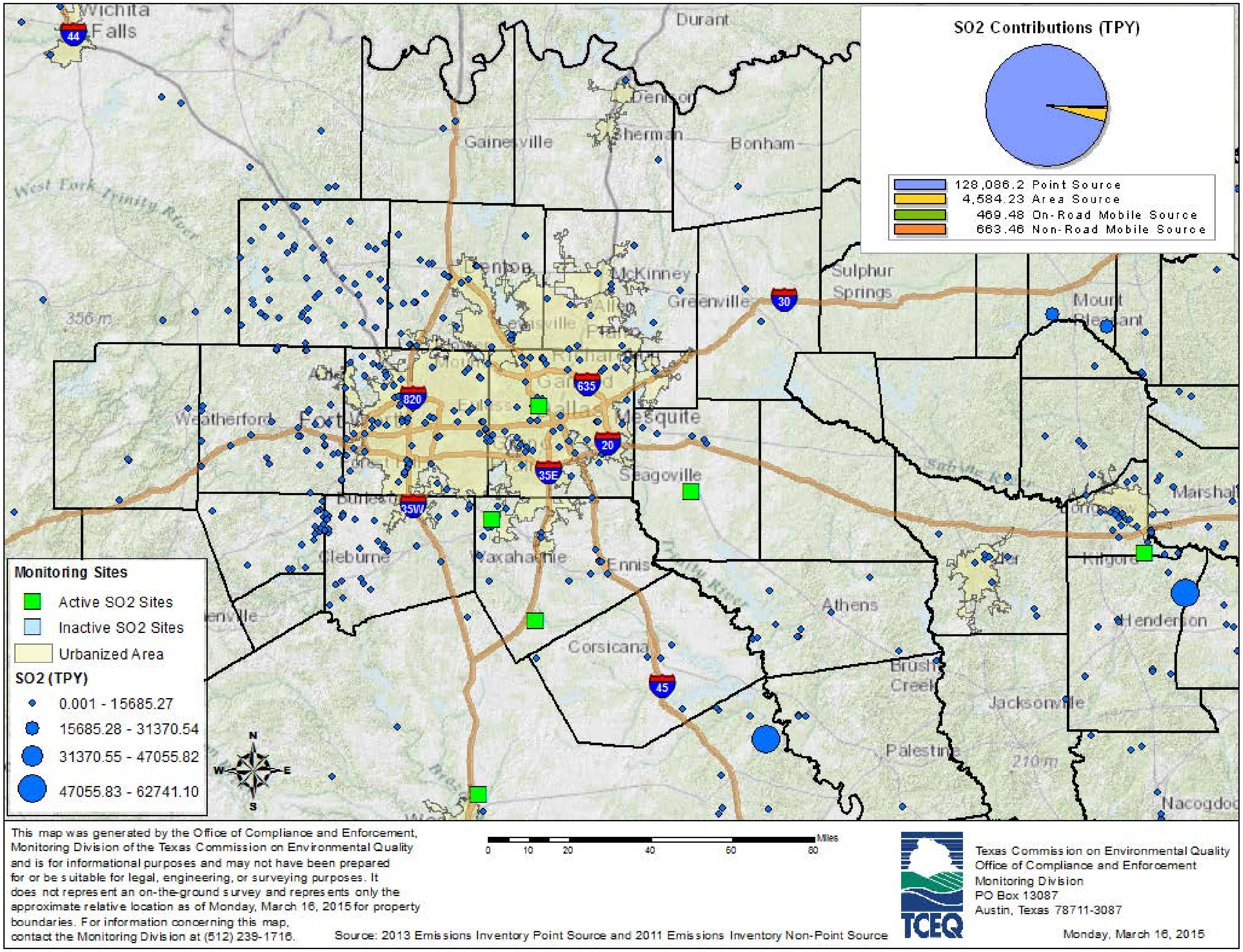
The TCEQ will reevaluate the network once the EPA finalizes its proposed ozone rule, as PAMS requirements and ozone nonattainment areas are likely to change.

## Sulfur Dioxide

### Network History

As of January 1, 2015, five $SO_2$ monitors operated in the North and Northeast Texas area (shown in Figure 47), to measure ambient $SO_2$ concentrations near populated areas or downwind of known $SO_2$ point sources. Three of these existing monitors fulfill current federal $SO_2$ monitoring requirements based on an area's PWEI. Under these current monitoring requirements, the Dallas-Fort Worth-Arlington area is required to have two $SO_2$ monitors while the Longview area is required to have only one. Based on its PWEI, the Tyler area does not meet the threshold to trigger $SO_2$ monitoring requirements. In addition, a high-sensitivity $SO_2$ monitor is required at the NCore site.

In the Dallas area, $SO_2$ is monitored at four sites: Dallas Hinton, Midlothian OFW, Kaufman, and Italy. The Dallas Hinton site, located just to the north of downtown Dallas, satisfies $SO_2$ monitoring requirements for NCore sites and provides $SO_2$ concentration data in a highly populated area. The Midlothian OFW monitor is located south of Arlington in a rural area west of Midlothian. This site was established to monitor $SO_2$ emissions impacts from area cement kilns. Both the Kaufman and Italy sites were established to monitor the transport of $SO_2$ concentrations and associated ozone precursor contributions from upwind power plants in East Texas into the Dallas-Fort Worth-Arlington area. The Longview $SO_2$ monitor is located at the East Texas Regional Airport in a rural area south of Longview. This monitor is located to measure background $SO_2$ concentrations coming into the Longview area. No significant changes to the North and Northeast Texas area's $SO_2$ network have occurred since the last five-year network assessment. Appendix A lists the area's $SO_2$ monitors, as well as their location, monitoring objectives, and associated spatial scales.




TPY – tons per year

**Figure 47: North and Northeast Texas Area Sulfur Dioxide ($SO_2$) Point Sources and Monitors**

### Design Values and Trends

Design values for the $SO_2$ monitors in the North and Northeast Texas area are well below the one-hour NAAQS of 75 ppb. In the Northeast Texas area, design values at the Longview $SO_2$ monitor show a steady decrease since 2008, falling 35% from 77 ppb in 2008 to 50 ppb in 2014. In the North Texas area, design values at the Midlothian $SO_2$ monitor have also shown a steady decrease, falling 85% from 86 ppb in 2008 to 13 ppb in 2014. Design values from other $SO_2$ monitors in the North and Northeast Texas areas such as the Dallas Hinton, Italy, and Kaufman monitors continue to remain well below the NAAQS as well.

### Network Evaluation

The current $SO_2$ monitoring network in the North and Northeast Texas area exceeds minimum federal monitoring requirements and continues to satisfy established monitoring objectives. Monitoring is currently not required in the counties between the Dallas-Fort Worth-Arlington area and Longview based on the PWEI criteria.

The $SO_2$ monitors at Midlothian OFW, Kaufman, Dallas Hinton, and Longview are currently fulfilling federal requirements and are considered of high value based on their regulatory obligation. In addition, the Midlothian OFW monitor continues to provide valuable source-oriented $SO_2$ concentration data for the area. While the Italy monitor is not necessary to meet federal regulatory requirements, it is considered of medium value based on its usefulness in evaluating transport into the Dallas-Fort Worth-Arlington area from upwind sources. Details on each monitor's value are provided in Appendix C.

Due to proposed federal regulatory action and pending designations for the 2010 one-hour $SO_2$ standard, no network changes are currently recommended. Once the EPA's final $SO_2$ Data Requirements Rule is promulgated, the TCEQ will evaluate the existing $SO_2$ network for potential optimization that will provide for compliance with any associated $SO_2$ monitoring requirement changes. These network changes will be included in the *2016 Annual Monitoring Network Plan*.

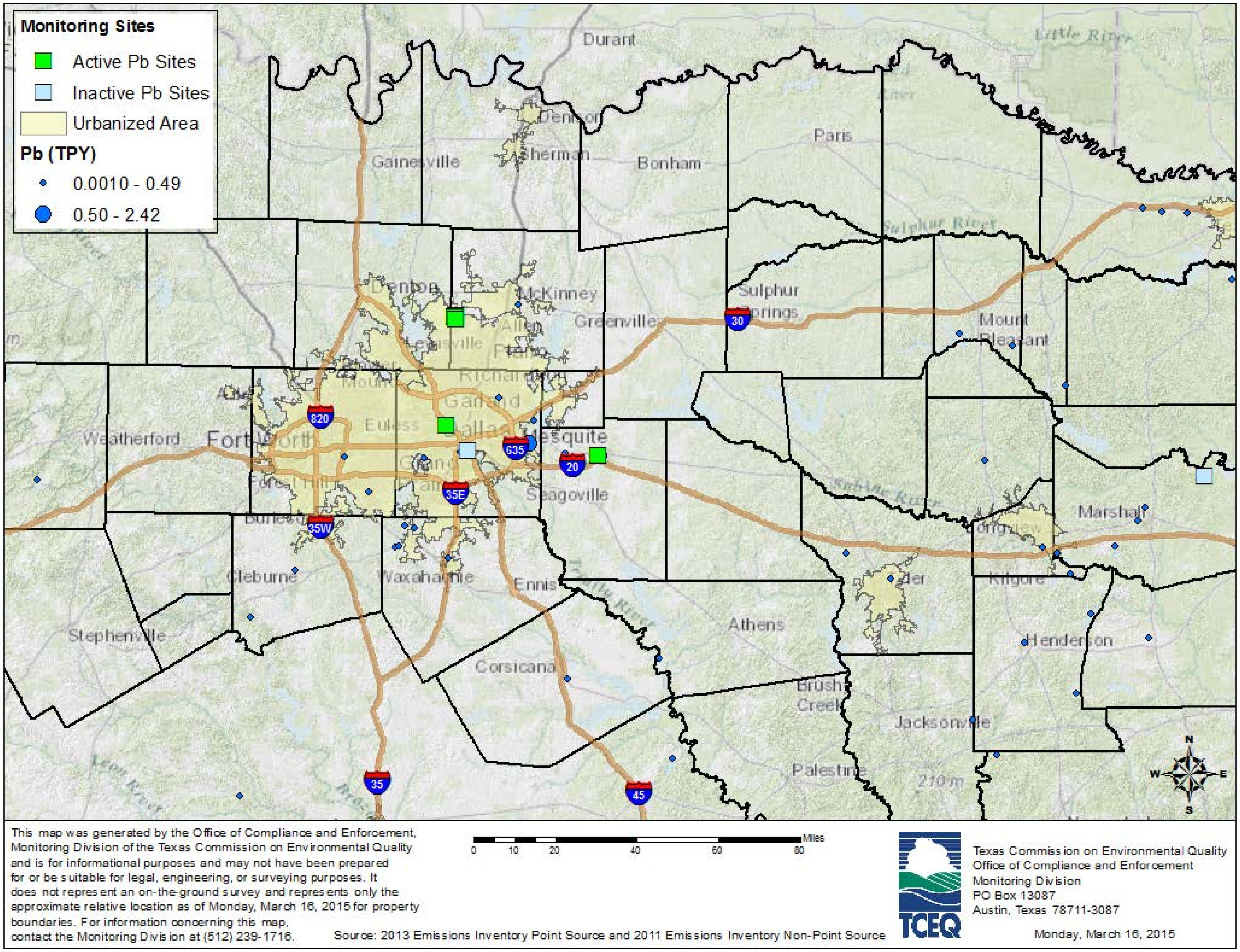
## Lead

### Network History

Pb monitoring was conducted at six locations in the North Texas area (shown in Figure 48) as of January 1, 2015. Current federal rules require monitoring in locations likely to measure maximum Pb concentrations near each point source emitting 0.50 tons per year or more of Pb and each airport emitting 1.0 ton per year or more of Pb based on the National Emissions Inventory or other justifiable method. In addition, Pb monitoring is required at all NCore monitoring sites.

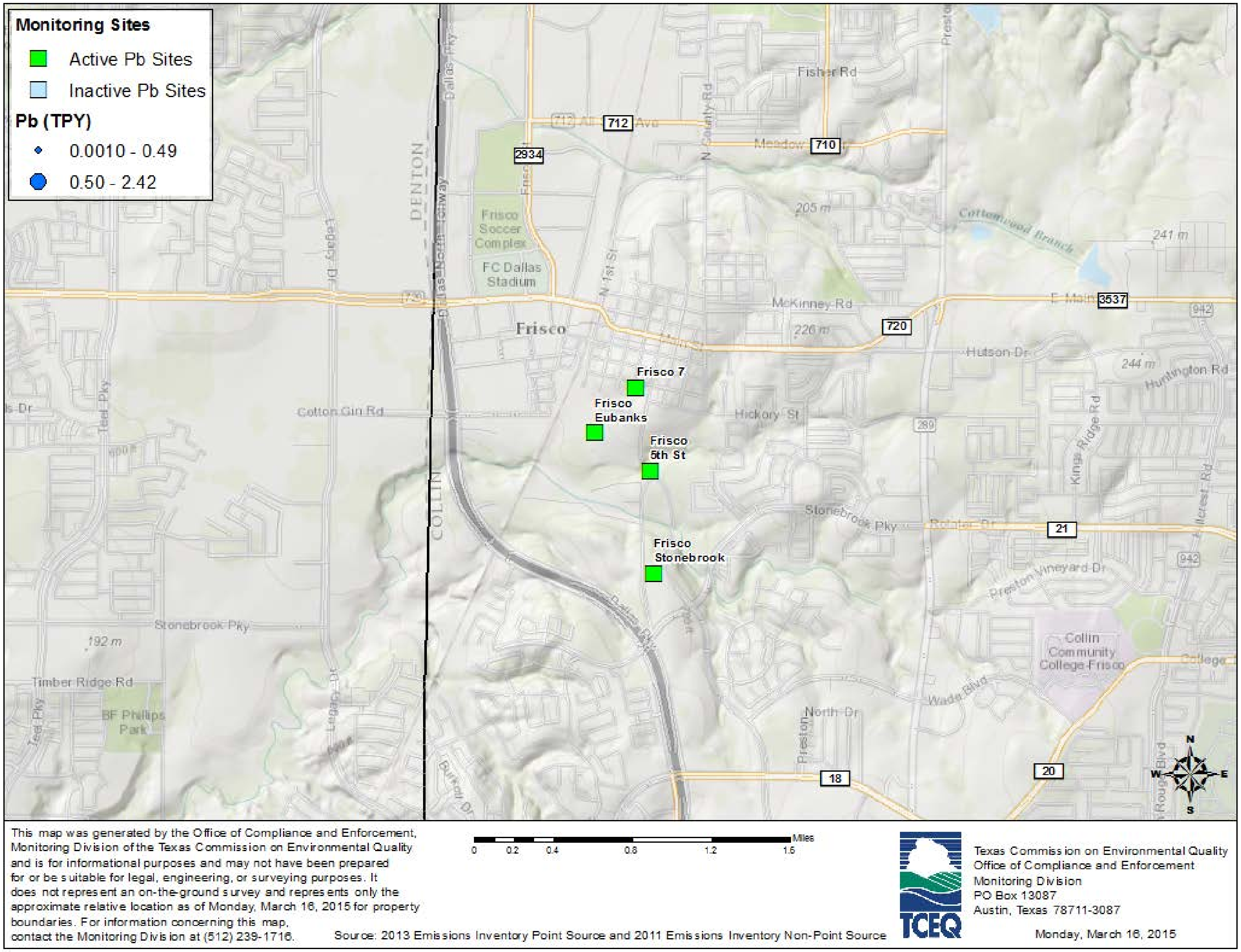
Based on 2013 Pb point source emissions and 2011 area source emissions, no source-oriented Pb monitoring is required in the Northeast Texas area and two source-oriented Pb monitors are currently required in the North Texas area. The largest historical Pb source in the North Texas area was the Exide Frisco Battery Recycling Center, located south of downtown Frisco. The secondary smelter operated from 1964 to 2012. Lead monitoring began at the Frisco 5$^{th}$ Street site in the 1980s to evaluate ambient concentrations near the facility. The Frisco Eubanks, Frisco 7, and Frisco Stonebrook Pb monitors were added to the network in 1995, 1999, and 2011, respectively. Locations of the Frisco Pb monitors are shown in Figure 49. Demolition of the operating plant was completed in 2013, and remediation of the former operating plant area is ongoing. In addition, the Terrell Temtex site, located just west of the City of Terrell, was deployed in 2011 to monitor ambient Pb concentrations downwind of the Conecsus, LLC facility. Finally, the Dallas Hinton monitor fulfills Pb monitoring requirements at NCore sites.

Appendix A provides a list of active Pb monitors, as well as their location, monitoring objectives, and associated spatial scales.




TPY – tons per year

**Figure 48: North Texas Lead (Pb) Point Sources and Monitors**




TPY – tons per year

**Figure 49: Frisco Area Lead (Pb) Monitors**

## Design Values and Trends

Design values for the six current Pb monitors in the North Texas area are presented in Table 4. The design values for the monitors near the Exide facility in Frisco remain above the 0.15 µg/m$^3$ NAAQS level, but the three month rolling averages have steadily decreased below the NAAQS level since the plant's closure. Due to its deployment in 2011, a 3-year design value for the Terrell Temtex was not available until 2014. Due to additional data loss in 2013, a design value was unavailable for Dallas Hinton in 2014. The highest 2014 three-month rolling average at Hinton of 0.01 µg/m$^3$ was well below the NAAQS of 0.15 µg/m$^3$.

**Table 4: Design Values at North Texas Area Lead Monitors, 2008-2014**

| Site Name | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|
| Frisco 5$^{th}$ Street | 0.39 | 0.32 | 0.37 | 0.37 | 0.37 | 0.19 | 0.12 |
| Frisco 7 | 0.23 | 0.17 | 0.20 | 0.20 | 0.20 | 0.19 | 0.07 |
| Frisco Eubanks | * | * | 0.76 | 0.76 | 0.76 | 0.52 | 0.31 |
| Frisco Stonebrook | * | * | * | 0.18 | 0.18 | 0.18 | 0.07 |
| Terrell Temtex | * | * | * | * | * | * | 0.05 |
| Dallas Hinton | * | * | * | * | * | * | 0.01** |

Design values are the rolling three month averages in micrograms per cubic meter.
*Design values are not available for these years.
**Due to a data loss issue in 2013, the TCEQ was unable to calculate a design value for 2014; therefore the highest three-month rolling average was evaluated.

## Network Evaluation

The existing Pb monitoring network in the North and Northeast Texas areas meets all current federal monitoring requirements and continues to meet existing monitoring objectives. The Dallas Hinton Pb monitor is of high value as it satisfies the federal requirement for Pb monitoring at NCore sites.

Two sources in the North or Northeast Texas areas emitted more than 0.50 tpy of Pb based on the 2013 point source emissions reported to the TCEQ. Dal Tile, located in Dallas County, notified the TCEQ on March 23, 2015, that their 2013 Pb emissions had been revised to 0.2975 tpy. In addition, Conecsus LLC, located in Kaufman County, reported 2013 Pb emissions of 2.42 tpy. Conecsus' preliminary 2014 reported emissions have decreased below the 0.5 tpy level. Historically, the Exide Battery Recycling Center in Frisco; the Conecsus, LLC facility near Terrell; and the Red River Army Depot facility in Texarkana have reported emissions over the 0.50 tpy threshold. The TCEQ has complied with federal monitoring requirements near these facilities through a combination of Pb monitoring and monitoring waivers.

While demolition of the Exide facility was completed in 2013, the Pb monitors around this former source provide valuable air quality data as remediation continues and are considered of medium to high value. The TCEQ may further evaluate the continued need for all four monitors as design values continue to decrease. More site background and information about remediation of the Exide site can be found online at https://www.tceq.texas.gov/remediation/sites/exide/exide and http://www.exidefriscoclosure.com/. The Terrell Temtex monitor, located downwind of the Conecsus, LLC facility, continues to provide valuable data sufficient to understand point source emissions from this facility. Appendix C provides a detailed description of the assessed value for each active Pb monitor in the North Texas area.

#### *Lead Monitor Waivers*

In 2010, the EPA approved the TCEQ's waiver requests for the source-oriented Pb monitoring required at the Red River Army Depot facility in Texarkana. Based on point source emissions data for 2013 and preliminary data for 2014 reported to the TCEQ, Pb emissions from this facility have decreased below the 0.50 tpy threshold and a waiver is no longer required.

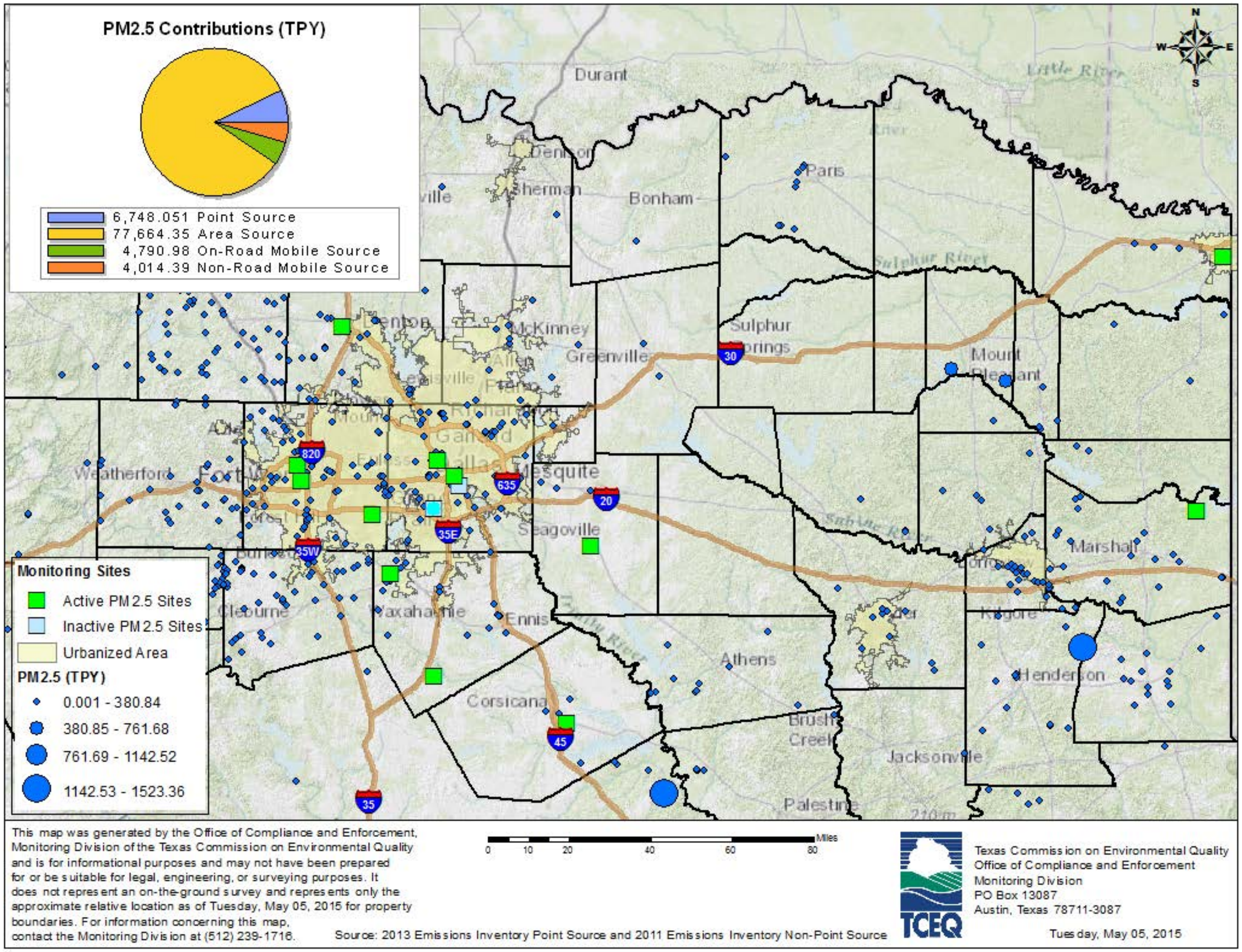
## Particulate Matter of 2.5 Micrometers or Less

### Network History

As of January 1, 2015, there were seven $PM_{2.5}$ FRM, nine continuous $PM_{2.5}$, and three speciation monitors in the North and Northeast Texas areas, as shown in Figure 50. The Dallas-Fort Worth-Arlington area $PM_{2.5}$ network consists of a variety of $PM_{2.5}$ samplers located at sites distributed on a northwest-southeast line from Denton to southeast Corsicana with most monitors disbursed throughout the Dallas, Fort Worth, and Arlington urban cores. Additional $PM_{2.5}$ monitors are deployed in Texarkana and Karnack in Northeast Texas. The monitoring objectives include evaluating regional transport, $PM_{2.5}$ background levels, and ambient $PM_{2.5}$ concentrations in rural (in the case of Karnack) and populated areas. A full site list of both active and decommissioned $PM_{2.5}$ monitors, as well as their location, monitoring objectives, and associated spatial scales is provided in Appendix A.

Since the last five-year network assessment, one speciation monitor was discontinued. In February 2015, the speciation sampling at Dallas Convention Center was discontinued due to monitor proximity to the NCore site in Dallas, which is still operational. A new $PM_{2.5}$ FRM monitor operated on a one in three day schedule was deployed at the Fort Worth California Parkway site in March 2015 to fulfill the Dallas-Fort Worth-Arlington area's near-road $PM_{2.5}$ monitoring requirements.

Multiple federal $PM_{2.5}$ monitoring requirements with unique monitoring objectives currently apply to the North and Northeast Texas area. Based on population and design values, a minimum of three FRM monitors in the Dallas-Fort Worth-Arlington MSA and one FRM monitor in the Texarkana MSA are required to measure concentrations representative of area-wide air quality with at least one sited in an area of expected maximum concentrations. One FRM monitor is also required to be collocated at a near-road $NO_2$ site in the Dallas-Fort Worth-Arlington area. In addition, two continuous $PM_{2.5}$ monitors are required in the area with at least one these collocated with a required FRM monitor. To evaluate $PM_{2.5}$ background and transport concentrations, at least one monitor is required to be sited for measurement of background concentrations and one monitor is to be sited to measure regional transport. Finally, $PM_{2.5}$ monitoring is required at designated NCore sites, and speciation monitoring is required at designated $PM_{2.5}$ Speciation Trends Network sites to evaluate elemental constituents, selected anions and cations, and carbon. The current network meets or exceeds these requirements.



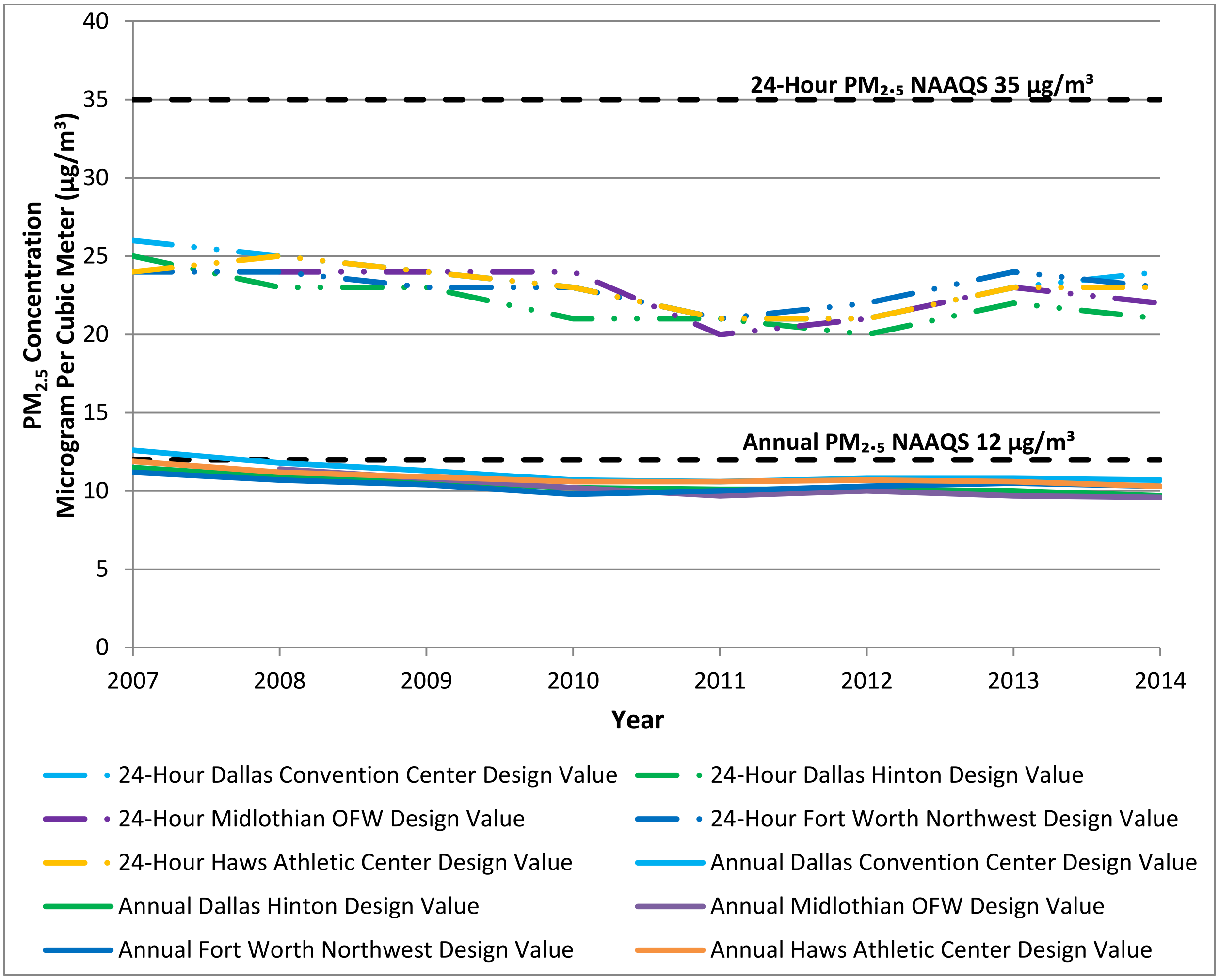

TPY – tons per year

**Figure 50: North and Northeast Texas Area Particulate Matter of 2.5 Micrometers or Less in Diameter ($PM_{2.5}$) Point Sources and Monitors**

## Design Values and Trends

### *North Texas*

Five $PM_{2.5}$ monitors in the North Texas area meet FRM requirements and are suitable for calculating a design value for comparison to the NAAQS. As shown in Figure 51, 24-hour and annual $PM_{2.5}$ design values have remained below the current NAAQS since 2008. Annual design values have been stable since 2008, measuring consistently within 80% to 90% of the annual NAAQS. Although 24-hour design values have steadily decreased from 2007 to 2011, North Texas area design values have recently shown a slight increase. Even with the increase, 24-hour design values have remained in the 20 to 24 $\mu g/m^3$ range since 2010. The 24-hour design values are significantly more susceptible to elevated $PM_{2.5}$ from small events, such as fires in the east, high regional transport into the Dallas-Fort Worth-Arlington area, or air stagnation, which could explain the slight increase in $PM_{2.5}$ concentrations in the 2013 and 2014 24-hour design values.

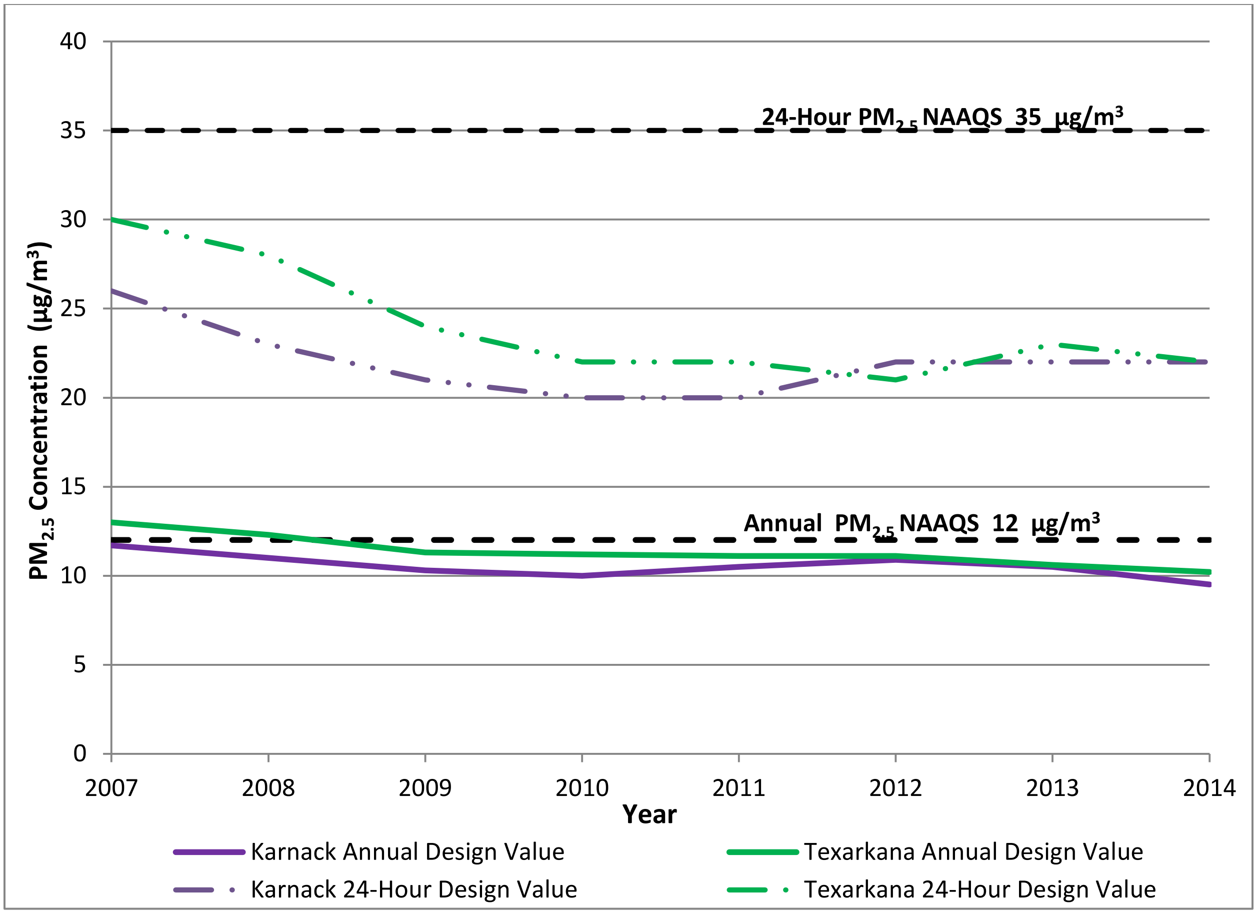



µg/m³ - micrograms per cubic meter

**Figure 51: 24-Hour and Annual Particulate Matter of 2.5 Micrometers or Less in Diameter ($PM_{2.5}$) Design Value Trends for Dallas-Fort Worth-Arlington Area Monitors and Proximity to the National Ambient Air Quality Standard (NAAQS), 2007-2014**

## *Northeast Texas*

Northeast Texas $PM_{2.5}$ design values have remained below both the annual and 24-hour NAAQS since 2009. Figure 52 shows annual and 24-hour $PM_{2.5}$ design values for the two Northeast Texas regulatory monitors. Over the last five years, annual $PM_{2.5}$ design values have been variable at Karnack, but have remained between 9.5 and 10.9 µg/m³. Texarkana annual $PM_{2.5}$ design values have continued to decrease since 2007. Karnack and Texarkana 24-hour design values have shown slightly more variability from year to year though design values have remained below 70% of the NAAQS since 2009.




µg/m³ - micrograms per cubic meter

**Figure 52: 24-Hour and Annual Particulate Matter of 2.5 Micrometers or Less in Diameter ($PM_{2.5}$) Design Value Trends for Northeast Texas Monitors and Proximity to the National Ambient Air Quality Standard (NAAQS), 2007-2014**

## Network Evaluation

### *North Texas*

The existing North Texas $PM_{2.5}$ monitoring network is geographically distributed to provide valuable data for the evaluation of both local and transported sources of particulate matter. $PM_{2.5}$ monitors located upwind of the Dallas-Fort Worth-Arlington area (generally, Italy and Kaufman when winds are from the southeast or Denton Airport South when winds are from the north and northwest) provide information on incoming background and transported $PM_{2.5}$ concentrations. The Fort Worth Northwest, Haws Athletic Center, Fort Worth California Parkway, Dallas Hinton, Dallas Convention Center, and Midlothian OFW FRM monitors are all distributed throughout the populated urban core and continue to provide meaningful data on ambient $PM_{2.5}$ concentrations in areas frequented by the public, as well as $PM_{2.5}$ movement throughout the area.

Based on current $PM_{2.5}$ monitoring requirements, all of the FRM and several of the continuous $PM_{2.5}$ monitors are considered of high value. Based on population and proximity to the NAAQS, the Dallas-Fort Worth-Arlington MSA is required to have at least three FRMs and had five FRM monitors as of January 1, 2015. An additional FRM, Fort Worth California Parkway North, satisfies the requirement for monitoring near a major roadway. Because the Fort Worth California Parkway North monitor was deployed after January 1, 2015, the value of the monitor will be assessed during the next five-year assessment.

Continuous $PM_{2.5}$ measurements are collected at eight locations in the North Texas area. Although these monitors exceed federal requirements, they provide meaningful information on east-west $PM_{2.5}$ gradients across the Dallas-Fort Worth-Arlington MSA, as well as information on background and transported $PM_{2.5}$ concentrations.

Finally, chemical speciation monitoring at the Dallas Hinton site satisfies the area's STN requirements. Speciation is also conducted at Midlothian OFW. Speciation monitoring at both sites is highly valued as it provides information on the chemical composition of $PM_{2.5}$ measurements to assist in determining source contributions and regional background concentrations.

Figure 53 shows the correlation and relative difference between 24-hour averages from Dallas-Fort Worth-Arlington area FRM monitors, as well as the distance between the monitors. All of the $PM_{2.5}$ FRM monitors exhibit a moderate correlation between each other, though none of the monitor pairs are highly correlated. These moderate correlations, especially when monitors are as far as 45 to 50 kilometers apart, further suggest that ambient $PM_{2.5}$ in North Texas behaves as a regional pollutant, rather than a pollutant that is emitted from a large local source near a particular monitor. This regional behavior emphasizes the importance of a dispersed monitoring network to evaluate the effect of inter- and intra-regional transport on ambient North Texas $PM_{2.5}$ concentrations. This correlation analysis suggests that none of the North Texas $PM_{2.5}$ FRM monitors are redundant and that all $PM_{2.5}$ monitors provide unique, valuable data.

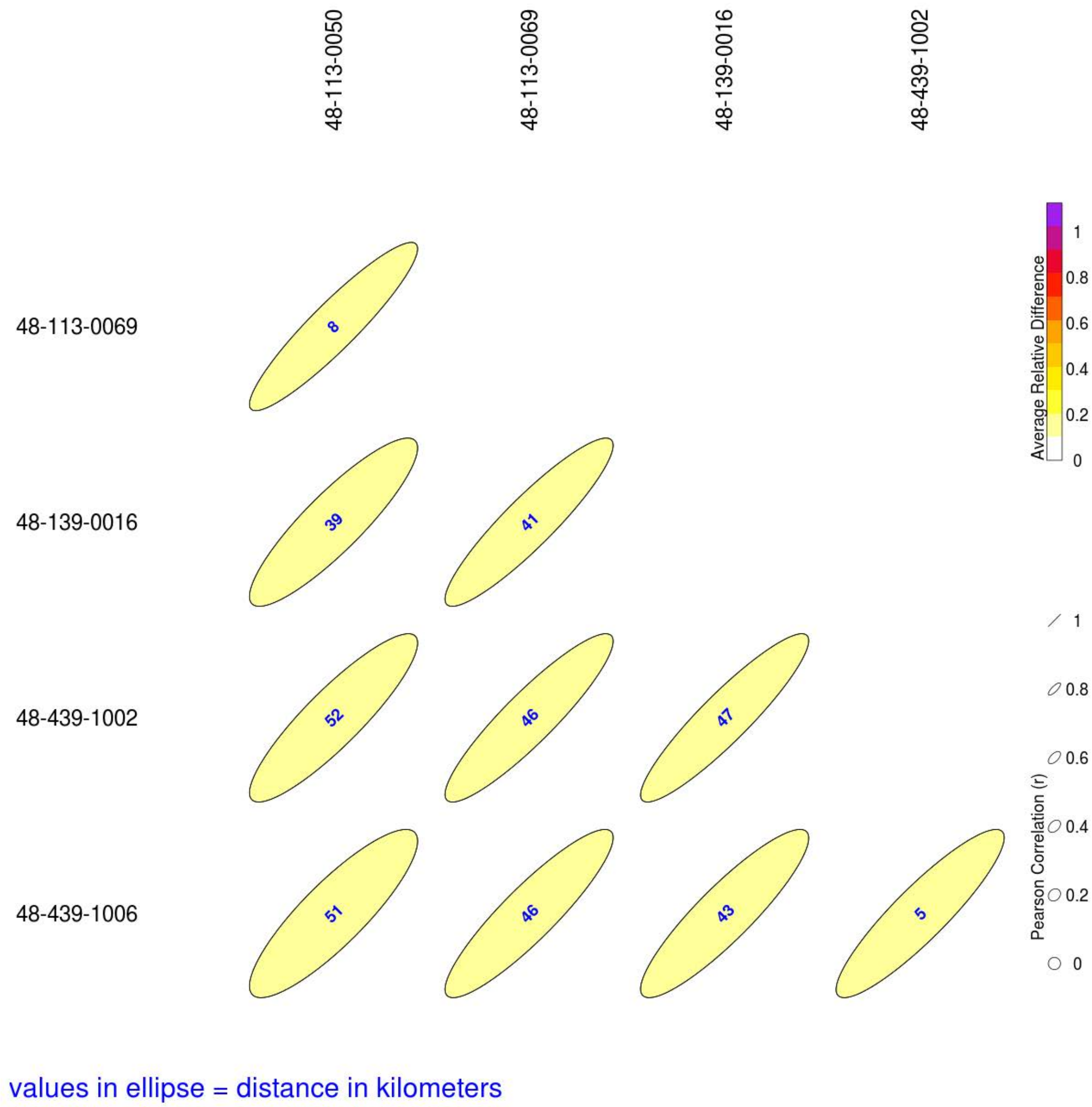



**Figure 53: Correlation Matrix for 24-hour Average Concentrations from Dallas-Fort Worth-Arlington Area Federal Reference or Federal Equivalent Method Monitors for Particulate Matter of 2.5 Micrometers or Less in Diameter, 2011-2013**

Similarly, continuous $PM_{2.5}$ monitors show only moderate correlations, as indicated in Figure 54. The highest correlation was between the Dallas Hinton (AQS48-113-0069) and Dallas Convention Center (AQS 48-113-0050) monitors (Pearson's coefficient=0.891, relative difference=0.139). The Dallas Convention Center speciation monitor that provided these measurements was decommissioned in December 2014. The moderate to weak correlation of all remaining continuous $PM_{2.5}$ monitors suggests the same regional $PM_{2.5}$ behavior noted with the non-continuous FRM data.

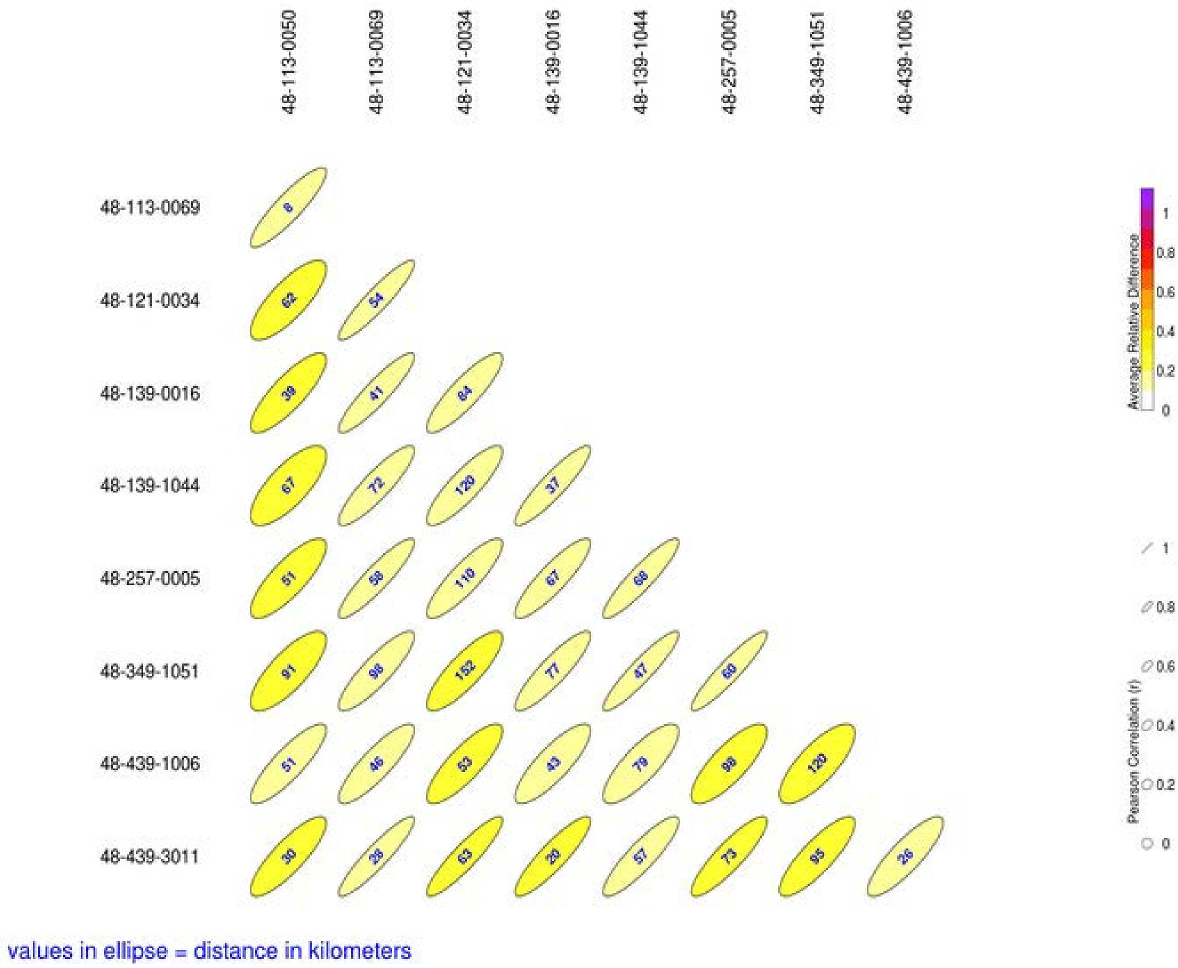



**Figure 54: Correlation Matrix for 24-hour Average Concentrations from Dallas-Fort Worth-Arlington Area Continuous (Non-Federal Equivalent) Monitors for Particulate Matter of 2.5 Micrometers or Less in Diameter, 2011-2013**

### *Northeast Texas*

The Northeast Texas area currently has two FRM monitors (Texarkana and Karnack). Based on proximity of design values from existing monitors, the Texarkana FRM is the only required monitor in the area. The TCEQ is working with local entities to deploy a continuous particulate matter monitor in the Texarkana area to meet federal collocation requirements. Although not required, the Karnack FRM and continuous $PM_{2.5}$ monitors provide meaningful long-term trends data in a rural environment. With annual design values from both Texarkana and Karnack currently within 88% of the NAAQS, continued data collection from these locations remains of high value both in terms of evaluating $PM_{2.5}$ trends and demonstrating continued attainment of the NAAQS. Additional speciation analysis at the Karnack site supports the National-Scale Air Toxics Assessment and is considered of high value.

The Texarkana and Karnack FRM $PM_{2.5}$ monitors are weakly correlated (Pearson's coefficient=0.391, relative difference=0.226) and they are 85 kilometers apart. This weak relationship is not surprising, since the Texarkana monitor is likely more impacted by transported pollution and urban sources. Conversely, the Karnack monitor is more representative of a rural environment and is likely only impacted by regionally transported pollution. The correlation analysis indicates that data from both sites are unique and valuable for understanding air quality in the Tyler and Texarkana areas.

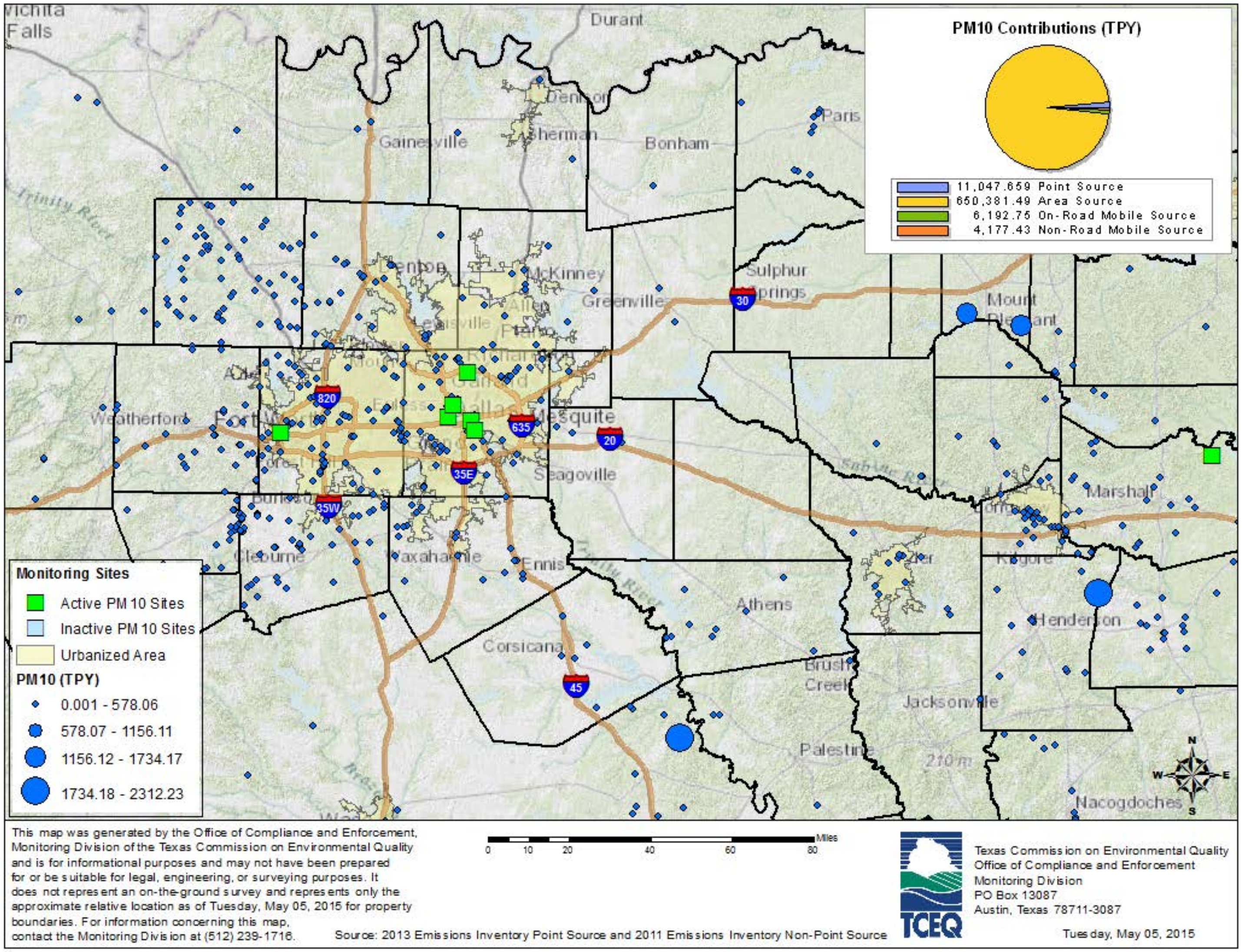
## Particulate Matter of 10 Micrometers or Less

### Network History

As of January 1, 2015, four $PM_{10}$ FRM monitors (Convention Center, Dallas North #2, Earhart, and Stage Coach) and one collocated QC monitor in the North and Northeast Texas areas evaluate regional air quality in the populated Dallas and Fort Worth city centers. In addition, one $PM_{10-2.5}$ monitor is operated at the Dallas Hinton site in compliance with NCore requirements and one $PM_{10}$ FRM monitor and one $PM_{10}$ speciation monitor are operated at the rural Karnack site to measure trends in background $PM_{10}$ concentrations. Finally, one $PM_{10}$ speciation monitor collects nickel and chromium data near a local pollutant source in central Dallas. The location of these monitors and 2013 point sources is provided in Figure 55.

Since the last five-year assessment, three $PM_{10}$ monitors have been deployed and one $PM_{10}$ monitor has been decommissioned. In August 2010, the Morrell $PM_{10}$ speciation monitor was deployed near an automotive chrome bumper recycling facility to evaluate ambient nickel and chromium concentrations. In January 2011, a second $PM_{10}$ FRM was deployed at the Convention Center site in the downtown Dallas area to comply with federal collocation requirements. In February 2011, the Dallas Hinton $PM_{10-2.5}$ monitor was deployed. Finally, the collocated QC Stage Coach $PM_{10}$ FRM monitor was decommissioned in September 2014 because it was in excess of federal requirements. Appendix A provides a full list of active and decommissioned $PM_{10}$ monitors, as well as their locations, monitoring objectives, and associated spatial scales.

Current federal minimum requirements specify $PM_{10}$ monitoring in metropolitan areas based on population and measured concentrations, if available. Based on 2014 concentration data and population estimates, the Dallas-Fort Worth-Arlington MSA is required to have between four and eight $PM_{10}$ FRM monitors, and the Tyler MSA is not required to have a $PM_{10}$ monitor. Those requirements are met or exceeded with existing monitors. No monitors are required for the Sherman-Denison, Longview, or Texarkana MSAs.




TPY – tons per year

**Figure 55: North and Northeast Texas Area Particulate Matter of 10 Micrometers or Less ($PM_{10}$) Point Sources and Monitors**

### Design Values and Trends

Compliance with the 24-hour $PM_{10}$ NAAQS is based on the number of measured exceedances of the 150 µg/m$^3$ standard per quarter averaged over a three year period. When daily sampling is not conducted, an estimated number of exceedances is derived for comparison to the NAAQS. The estimated number of exceedances for all $PM_{10}$ FRM monitors in the North and Northeast Texas areas has remained at zero since 2000. Looking at the highest daily maximum values from 2012–2014, $PM_{10}$ concentrations have remained below 33% of the level of the NAAQS. Only one value above 150 µg/m$^3$ has been recorded since 2008.

### Network Evaluation

The existing North and Northeast Texas area $PM_{10}$ monitoring network meets or exceeds federal monitoring requirements. The current location of $PM_{10}$ monitors continues to be sufficient to meet the established monitoring objective of measuring ambient $PM_{10}$ concentrations in populated urban and suburban environments (Convention Center, Dallas Hinton, Dallas North #2, Earhart, and Stage Coach) and rural background environments (Karnack). All North and Northeast Texas area $PM_{10}$ monitors are considered of high value based on their use in satisfying regulatory requirements and in providing a historical perspective on background $PM_{10}$ concentrations. The Morrell $PM_{10}$ speciation monitor is considered of medium value. Based on spatial coverage and monitoring objectives, no network changes are recommended at this time for the North and Northeast Texas area $PM_{10}$ network.

## Air Toxics

### Network History

#### *North Texas*

As of January 2015, federal funding supports the operation of two autoGCs (Dallas Hinton and Fort Worth Northwest) and six canister samplers (Dallas Hinton, Denton Airport South, Fort Worth Northwest, Grapevine Fairway, Italy, and Johnson County Luisa) in the Dallas-Fort Worth-Arlington- Area, as shown in Figure 56. The Dallas Hinton and Fort Worth Northwest autoGCs are collocated with canister samplers and appear as one square in the Figure 56.

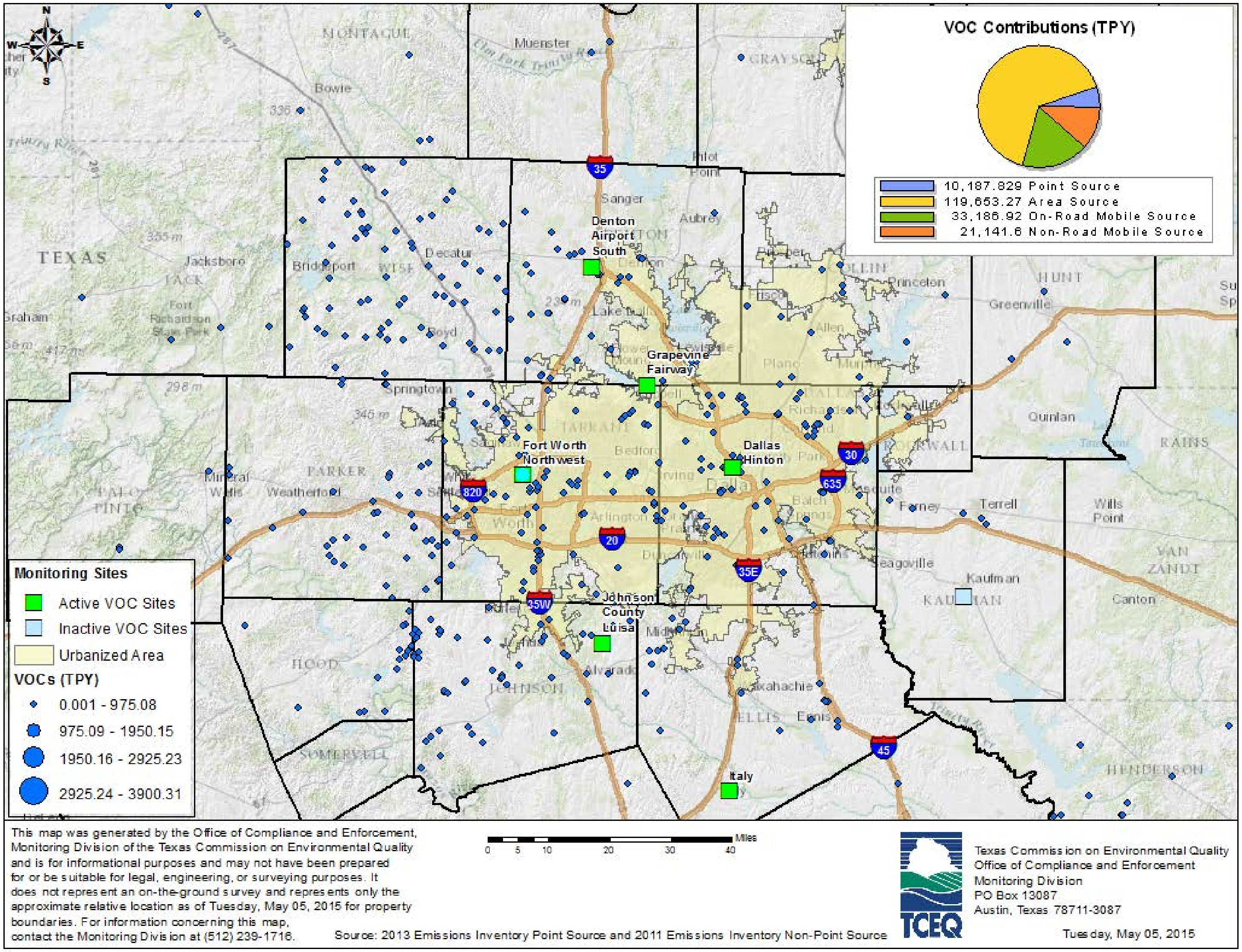
Since the last five-year assessment, one canister sampler was deployed and one canister sampler was deactivated. The Johnson County Luisa canister sampler was deployed to the Dallas-Fort Worth-Arlington area in 2010 and was sited to evaluate ambient VOC concentrations in populated areas. The Kaufman canister sampler was being operated in excess of minimum federal requirements and measured low VOC concentrations; therefore, it was decommissioned in May 2013.

Because the majority of VOC emissions are contributed by area and mobile sources, the Dallas-Fort Worth-Arlington VOC monitoring network is dispersed across the metropolitan area with an emphasis on densely populated areas within the urban core. The Italy and Johnson County Luisa canister samplers are located predominantly upwind of the Dallas-Fort Worth-Arlington area. Dallas Hinton and Fort Worth

Northwest VOC monitors are in the urban cores of the two respective cities. Grapevine Fairway and Denton Airport South are located on the northern edge of the metropolitan area.

Although not included in the scope of this assessment, there are 13 autoGCs and seven canister samplers in the North Texas area that supplement the federally funded VOC monitoring network. These state-funded monitors were deployed to evaluate ambient VOC concentrations in populated areas and areas likely impacted by oil and gas activities. Data from all samplers are publicly available on the TCEQ's webpage: http://www17.tceq.texas.gov/tamis/index.cfm?fuseaction=home.welcome.

Also as of January 2015, North Texas had two carbonyl, four $PM_{2.5}$ speciation, and one $PM_{10}$ speciation samplers. The Dallas Hinton and Fort Worth Northwest carbonyl monitors were deployed to assist in the study of ozone formation in the Dallas-Fort Worth-Arlington MSA. The Convention Center and Dallas Hinton $PM_{2.5}$ speciation samplers were deployed to evaluate metals concentrations in populated areas. The Midlothian OFW $PM_{2.5}$ speciation monitor and Morrell $PM_{2.5}$ and $PM_{10}$ speciation monitors were deployed to evaluate concentrations near point sources in the Midlothian and Dallas areas. Since the last five-year assessment, the Morrell and Convention Center $PM_{2.5}$ speciation samplers were decommissioned in 2010 and 2014, respectively, because the samplers were operated in excess of minimum federal monitoring requirements and measured low concentrations.

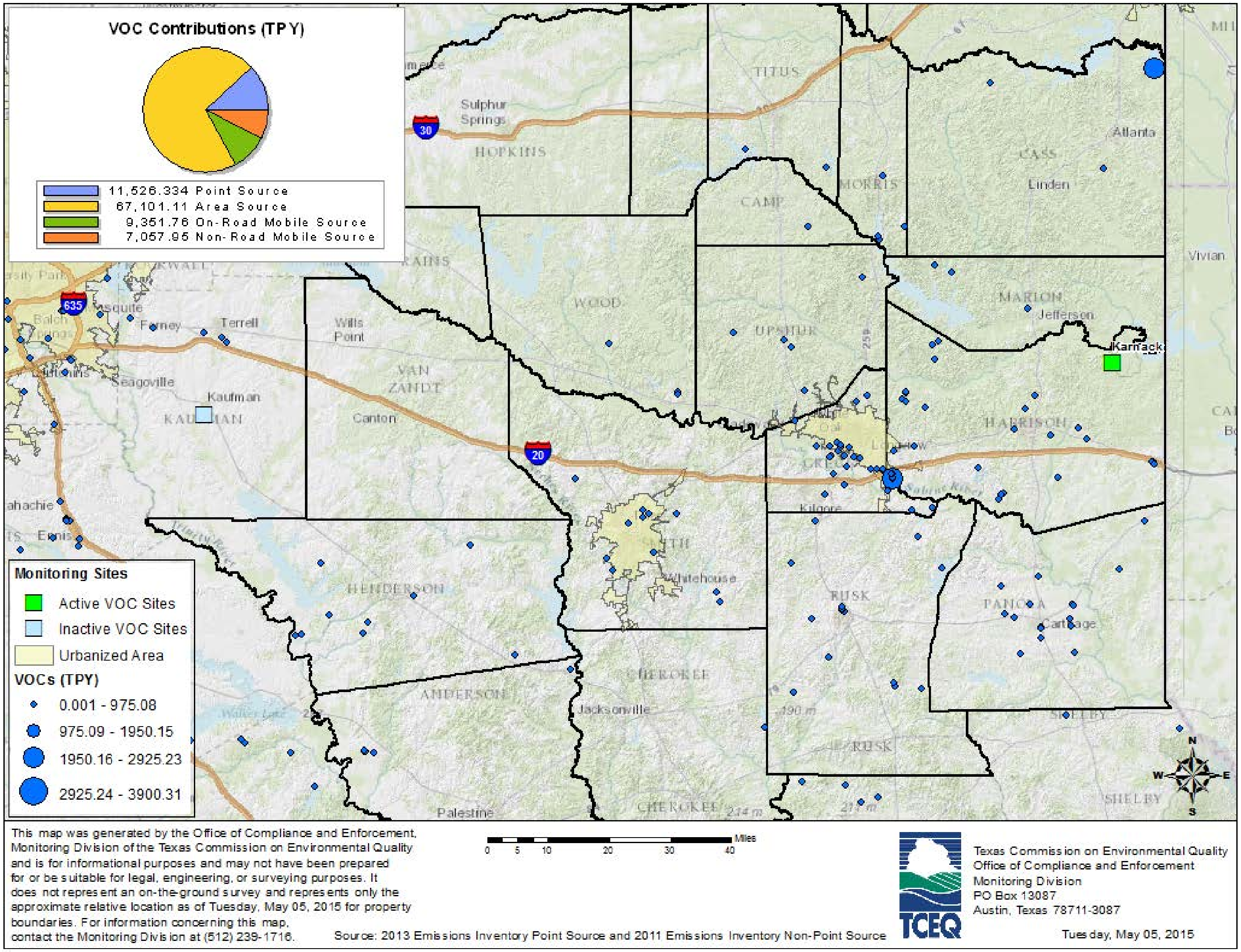



TPY – tons per year

**Figure 56: Dallas-Fort Worth-Arlington Volatile Organic Compound (VOC) Point Sources and Monitors**

### *Northeast Texas*

As of January 2015, the TCEQ was operating multiple air toxics samplers at Karnack in Northeast Texas, as shown in Figure 57. The Karnack $PM_{10}$ speciation, carbonyl, and canister samplers were deployed in 2004 as part of the EPA's National Air Toxics Trends network. In 2008 and 2009, the TCEQ added an SVOC sampler and $PM_{2.5}$ speciation sampler, respectively. The site is representative of background ambient conditions in a rural environment. No changes have been made since the last five-year assessment.

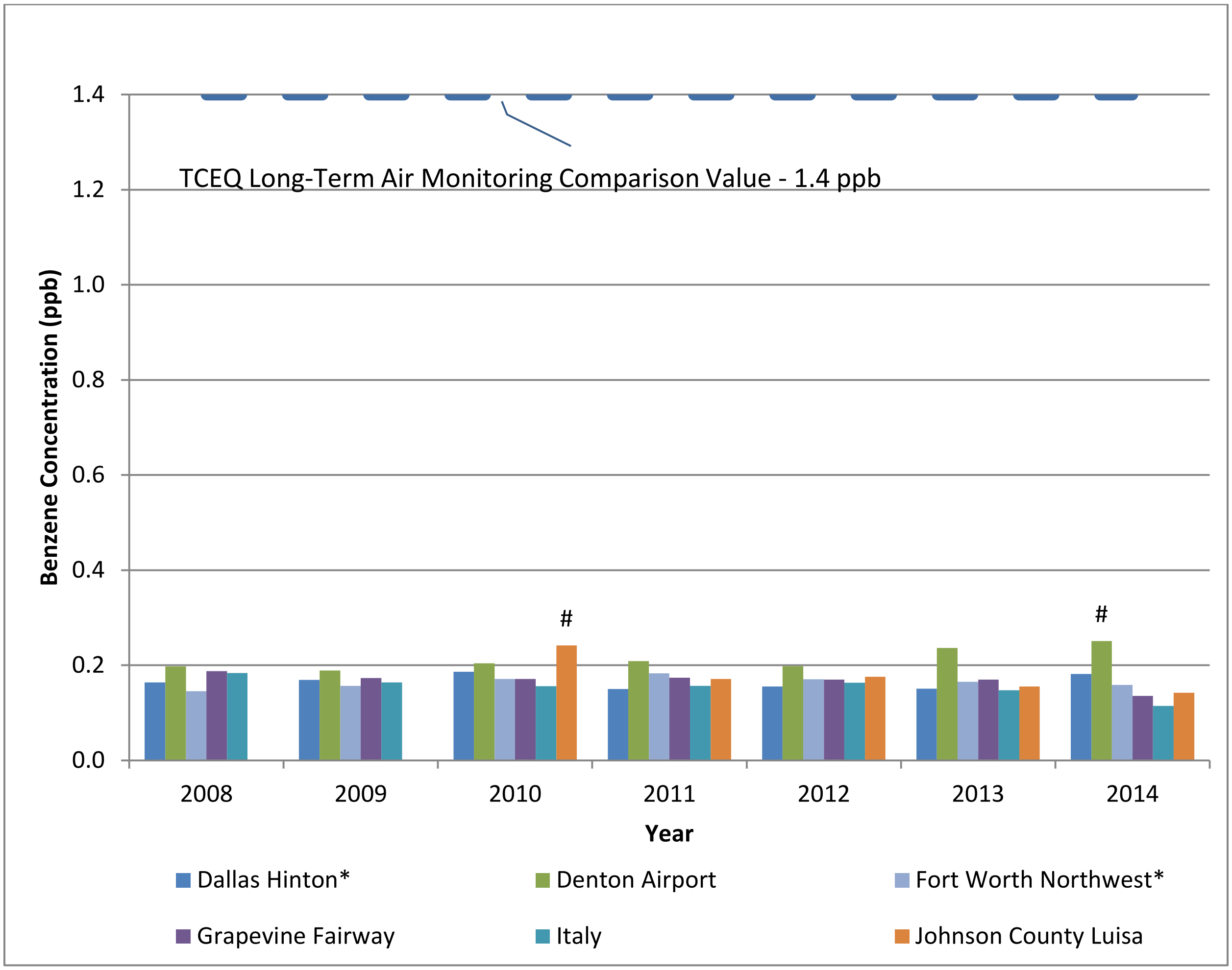



TPY – tons per year

**Figure 57: Tyler Area Volatile Organic Compound (VOC) Point Sources**

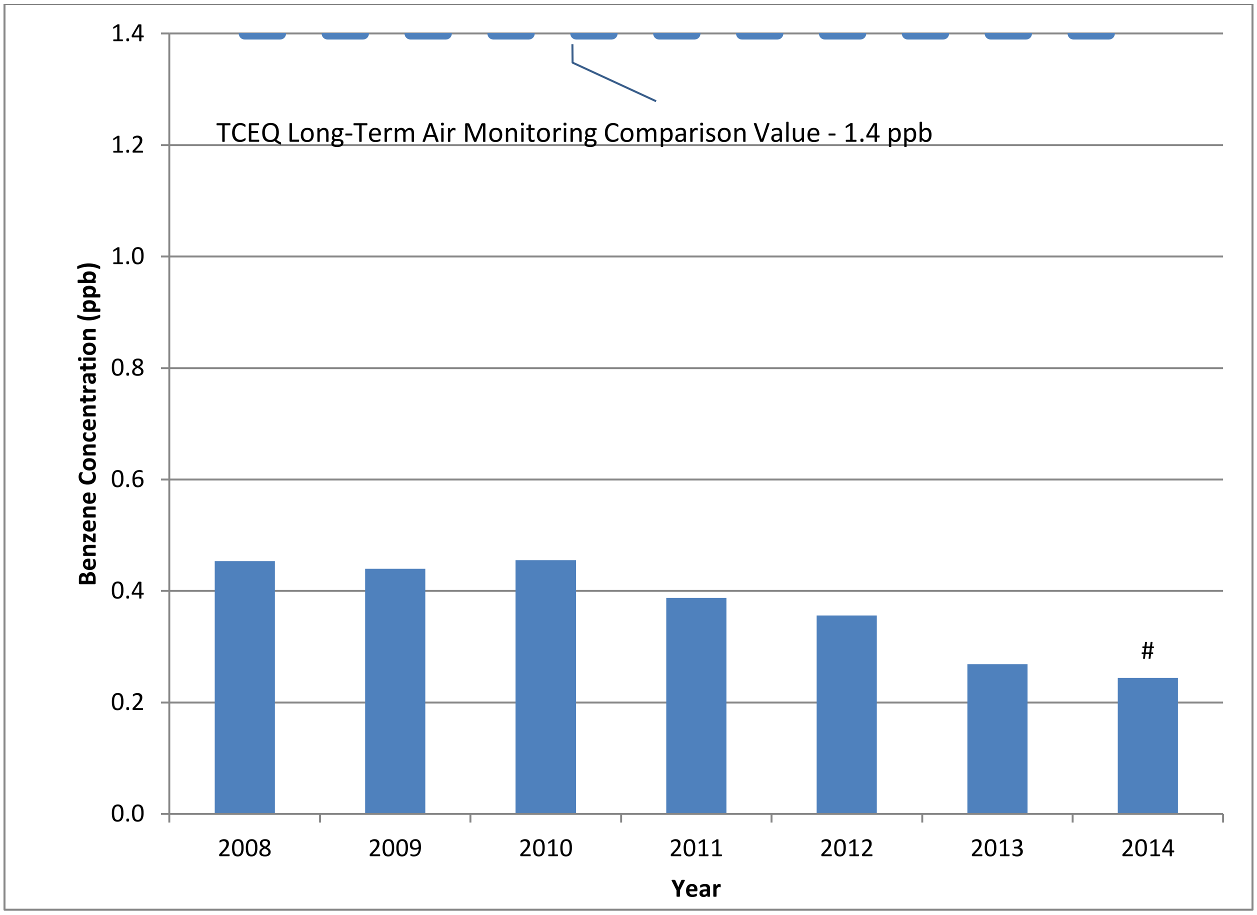
## Trends

Ambient concentrations of all air toxics in the North and Northeast Texas areas have remained well below a level of potential health concern, even in areas expected to have peak concentrations. Benzene, an ambient air risk driver for most urban settings, has remained well below the long-term AMCV over the last seven years in the North and Northeast Texas area, as shown in Figures 58 and 59.




ppb – parts per billion
*Indicates autoGC data
#Indicates incomplete year

**Figure 58: Dallas-Fort Worth-Arlington Area Annual Average Benzene Trends from Canister Samplers, 2008-2014**




ppb – parts per billion
# Indicates incomplete year

**Figure 59: Annual Average Benzene Trends from Karnack, 2008-2014**

## Network Evaluation

The air toxics monitoring network in the North and Northeast Texas area is sufficient for evaluating both direct (e.g., human health concerns) and indirect (e.g., ozone formation) air toxics effects. As discussed in the $PM_{10}$ section, the Morrell $PM_{10}$ speciation monitor is of medium value. All other air toxics monitors are of high value. The North Texas area VOC monitors are well sited for evaluating VOC concentrations moving into and within the area. Long-term air toxics monitoring at the Karnack site and VOC monitoring at the Longview site are also valuable in evaluating trends of these pollutants in Northeast Texas. Monitor locations in both North and Northeast Texas continue to be appropriate for meeting the original monitoring objectives. Because air toxics concentrations at federally funded air toxics monitors and supporting data from the expanded monitoring network available to the TCEQ have been consistently well below a level of concern for years, monitoring coverage is adequate for the area and no additional monitoring is anticipated at this time. Monitoring needs continue to be assessed in this area as new data and regulatory requirements are made available.

# Central Texas Area Evaluation

(Waco, Austin, and San Antonio Regions)

## Central Texas Area Characteristics

### Terrain

The Blackland Prairies lie along the eastern edge of the major Central Texas area cities from Waco to San Antonio. The terrain is characterized by flat to gently rolling hills, and grasses, forbs, and croplands are the dominant vegetation.

To the west of the Waco and Temple areas is the southern edge of the Cross Timbers region. The terrain is characterized by flat mesas with intervening valleys caused by erosion of the limestone layer. The area is a mixture of grasses and trees.

Most of the Central Texas area is considered part of the Edwards Plateau. In general, the Edwards Plateau region is flat, with some dissection of the plateau by springs and rivers. The region is predominantly a mixture of grass, croplands, and trees. Just west and southwest of Austin and Kerrville is the Balcones Canyonlands region, which is marked by more extreme erosion of the plateau by several streams and rivers intersecting the area. (Griffith et al. 2004)

Due to the general lack of geographical obstructions and thick elevated vegetation, wind patterns are highly consistent across the Central Texas area. Figure 60 illustrates typical area wind patterns. Outlined are the counties considered in this Central Texas area evaluation. Wind data, collected from ambient air monitoring stations, indicate the dominant flow is from the south and southeast.

### Climate

The Central Texas area generally has a humid subtropical climate. During winter, the area can be alternately influenced by continental wind flows out of the north and west or from the Gulf of Mexico to the south and southeast.

In general, average temperatures increase and precipitation decreases from the Waco area in the north to the San Antonio area in the south. From 2000 to 2014, annual average temperatures ranged from 66 to 70°F in Waco, 68 to 72°F in Austin, and 69 to 72°F in San Antonio. Annual average rainfall from 2000 to 2014 was 36 inches in Waco, 34 inches in Austin, and 32 inches in San Antonio. (NCDC 2015) Central Texas was also affected by an extended period of drought beginning in 2010 with a statewide rainfall average of only 14.8 inches in 2011. This was the driest year ever recorded for Texas.

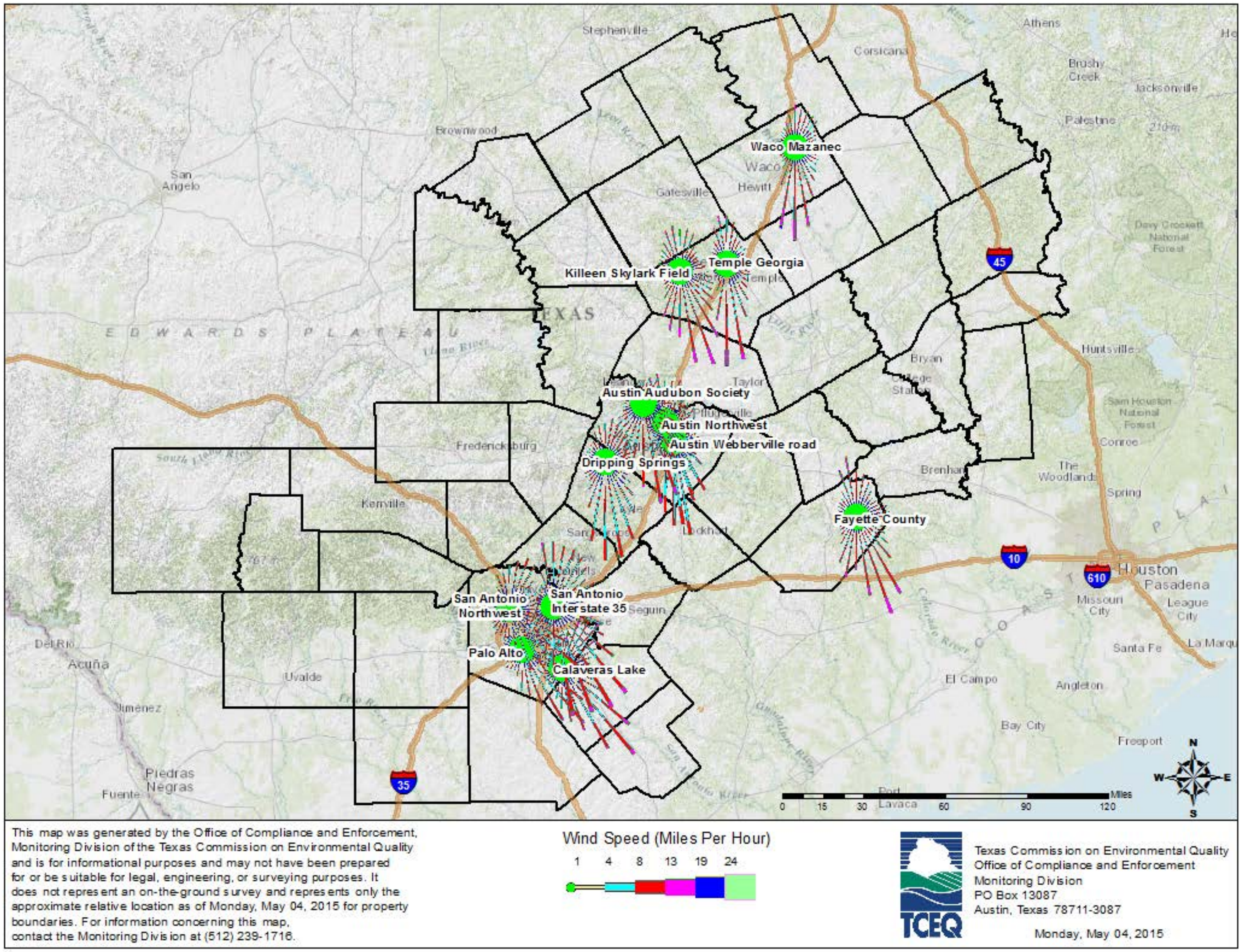



**Figure 60: Central Texas Area Counties, Terrain, and Wind Data from Ambient Air Quality Monitors**

## Population

There are five MSAs in the Central Texas area: College Station-Bryan (Brazos, Burleson, and Robertson Counties), Killeen-Temple (Bell, Coryell, and Lampasas Counties), Waco (McLennan and Falls Counties), Austin-Round Rock (Bastrop, Caldwell, Hays, Travis, and Williamson Counties), and San Antonio-New Braunfels (Atascosa, Bandera, Bexar, Comal, Guadalupe, Kendall, Medina, and Wilson Counties). The San Antonio-New Braunfels MSA is the largest population center with over 2.1 million people as of the 2010 decennial census and an estimated population of over 2.3 million in 2014. The Austin-Round Rock MSA is the second largest in the Central Texas area with 1.7 million people as of 2010 and an estimated 2014 population of 1.9 million. The Killeen-Temple MSA had 405,300 people in 2010, while both the Waco and College Station-Bryan MSAs had populations less than 300,000. The 2014 growth rates of all five MSAs were estimated at less than 5%. Figures 61 and 62 map the population densities across the Central Texas area based on 2010 United States Census Bureau data.

Minimum monitoring network design requirements in 40 CFR Part 58, Appendix D, Section 4, for ozone, CO, $NO_2$, $PM_{2.5}$, and $PM_{10}$ are partially based on MSA populations. Based on 2014 population estimates and 2014 design values, the Killeen-Temple and Waco MSAs are each required to have a minimum of one ozone monitor and up to one $PM_{10}$ monitor to comply with minimum monitoring network design criteria requirements. The Austin-Round Rock MSA is required to have a minimum of two ozone, one CO, two $NO_x$, and three $PM_{2.5}$ monitors and between two and four $PM_{10}$ monitors. The San Antonio-New Braunfels MSA is required to have a minimum of two ozone, one CO, two $NO_x$, and three $PM_{2.5}$ monitors and between two and four $PM_{10}$ monitors. Additional minimum monitoring requirements are provided in separate rules and are unrelated to population.

The Texas State Data Center projects the Austin-Round Rock MSA to experience the greatest growth of the five Central Texas area MSAs. According to estimates, the population of Austin-Round Rock may increase to 2.3 million by 2020, an increase of 26%. Populations in College Station-Bryan, San Antonio-New Braunfels, and Killeen-Temple are projected to increase between 18% and 20% by 2020. The Waco MSA population is expected to experience the slowest growth rate at 8%. If these population projections are accurate, the College Station-Bryan MSA would be required to have up to one $PM_{10}$ monitor by as early as 2015. In addition, the Killeen-Temple MSA would be required to have a minimum of one to two $PM_{10}$ monitors and one $PM_{2.5}$ monitor by 2020. No additional monitors would be required in the Waco, Austin-Round Rock, or San Antonio-New Braunfels MSAs based on population driven minimum monitoring requirements.

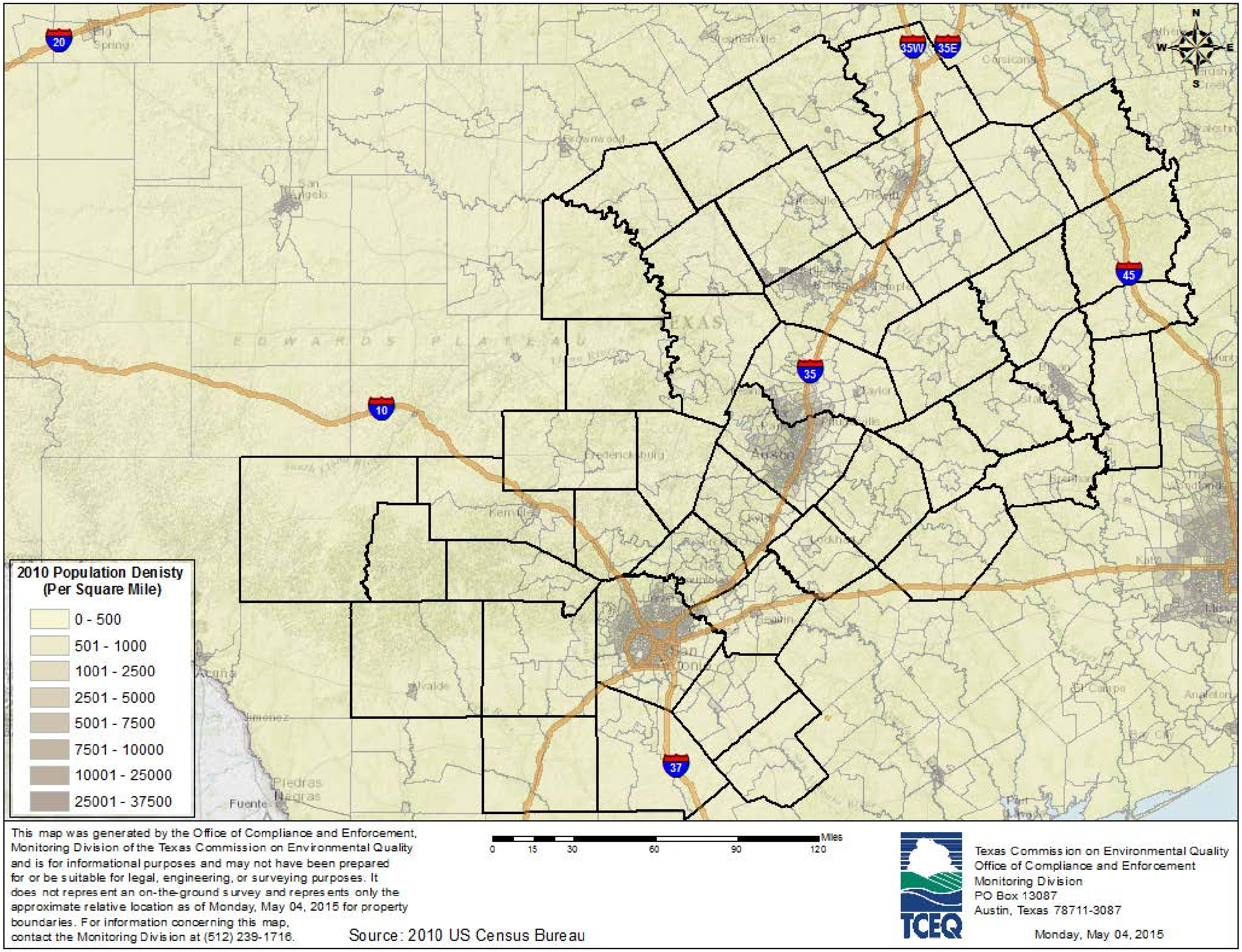



**Figure 61: Central Texas Area Population Density**

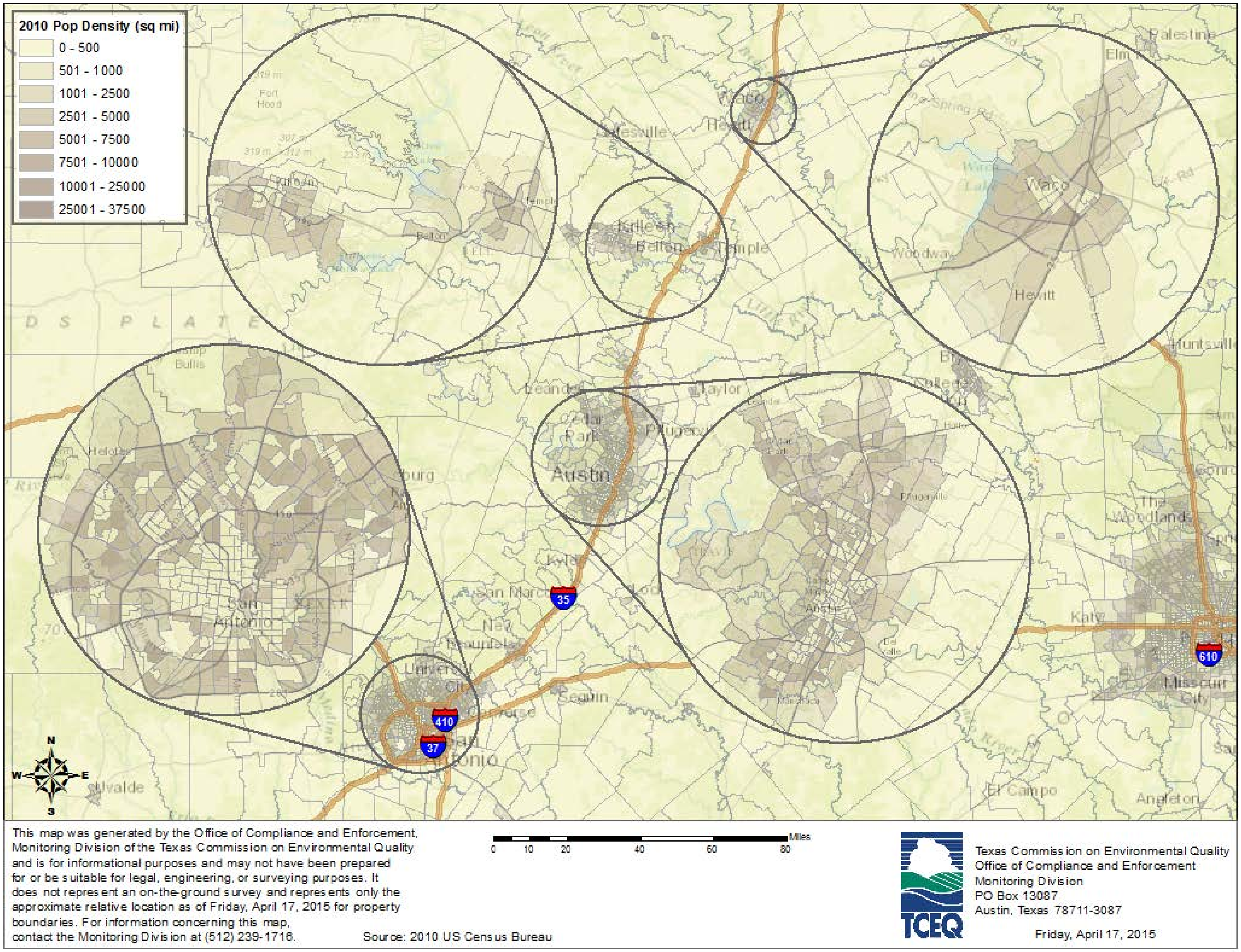



**Figure 62: Central Texas Area Metropolitan Statistical Area Population Density**

## Pollutant Sources

### Anthropogenic Sources

Mobile sources (on-road and non-road) are the dominant contributors of emissions across the Central Texas area, accounting for 82% of CO and 59% of the $NO_2$ emissions. Area sources are the largest contributor of $PM_{10}$ (97%), $PM_{2.5}$ (82%), and VOCs (72%), while point sources are responsible for the majority (over 90%) of $SO_2$ emissions.

The TCEQ reviewed issued and pending air permit actions within the Central Texas area. Thirty-one new facilities were indicated, with most facilities generally located along the Interstate 35 corridor. Locations of new facilities are provided in Appendix D. The review did not indicate any new dense clusters of point sources; therefore, no additional air quality monitors are considered necessary at this time.

### Natural Sources

The Central Texas area is impacted by the same seasonal pollutant transport that impacts the North and Coastal Texas areas. Smoke events, which can impact both $PM_{2.5}$ concentrations and ozone formation, are typically noted in the summer months. Accumulated smoke and haze from the eastern United States arrives in late spring through early fall, while smoke from agricultural burning in Mexico and Central America arrives in April and May. In addition, $PM_{2.5}$ concentrations can be elevated from June to August and during the spring months typically from African dust and dust storms in the western Great Plains and northern Mexico, respectively.

# *Regional Air Quality*

## Criteria Pollutants

As of January 2015, all Central Texas areas are classified as attainment/unclassifiable for all current NAAQS. Recent and historical design values for each of the criteria pollutants are provided in the Monitoring Network section below. In 2002, due to periodic exceedances of the 1997 eight-hour ozone NAAQS, the Austin-Round Rock (Williamson, Travis, Bastrop, Caldwell, and Hays Counties) and the San Antonio-New Braunfels (Bexar, Comal, Guadalupe, and Wilson Counties) areas each entered into a voluntary Early Action Compact agreement with the TCEQ and the EPA to ensure that the area remained in attainment of the standard. The agreement included both voluntary and enforceable emissions reduction strategies. In 2004, the TCEQ adopted a SIP revision, which consisted of a 1997 eight-hour ozone attainment demonstration based on the Early Action Compact agreements.

In June 2010, the primary $SO_2$ NAAQS was revised to a one-hour standard of 75 ppb. The Governor has recommended designating all Texas areas as attainment for the one-hour $SO_2$ NAAQS, but a final action has not been taken by the EPA. Prior to making final determinations on area designations for the revised $SO_2$ standard, the EPA proposed the $SO_2$ Data Requirements Rule. This rule, proposed in April 2014, could result in additional source-oriented $SO_2$ monitoring to characterize ambient air quality around larger $SO_2$ sources and inform area designations.

## Air Toxics

There are currently no APWL areas in the Central Texas area. In 2012, the TCEQ removed the Bastrop area from the APWL due to reductions in hydrogen sulfide near the Griffin Industries facility. Exposure to all other measured VOC, SVOC, $PM_{2.5}$ metals, and carbonyl concentrations in these areas over the past five years would not be expected to cause adverse health effects or odorous conditions.

# Monitoring Network Evaluation

## Ozone

### Network History

As of January 1, 2015, there were eight ozone monitors in the Central Texas area (shown in Figures 63, 64, and 65) providing ambient concentration data in areas that are frequented by the public, impacted by maximum ozone concentrations, or are representative of background concentrations. Appendix A provides a full list of both active and recently decommissioned ozone monitors, as well as their locations, monitoring objectives, and associated spatial scales.

Ozone monitoring in the Central Texas area meets minimum federal requirements based on population and design value. The current network focuses on two main monitoring objectives: measuring maximum concentrations in populated areas and measuring concentrations upwind of urban areas to evaluate regional transport. The Austin Northwest, Austin Audubon Society, Camp Bullis, and San Antonio Northwest monitors are located downwind of the urban core where maximum concentrations of ozone are expected. Waco Mazanec and Calaveras Lake ozone monitors provide upwind background and regional transport information about ozone for the Waco and San Antonio area, respectively. The Killeen Skylark Field and Temple Georgia monitors both measure ozone concentrations in highly populated urban areas. Since the last five-year assessment period, the only change to the Central Texas area ozone network was the deployment of the Temple Georgia site in 2013. This site was added to meet minimum federal monitoring requirements based on population and area design values.

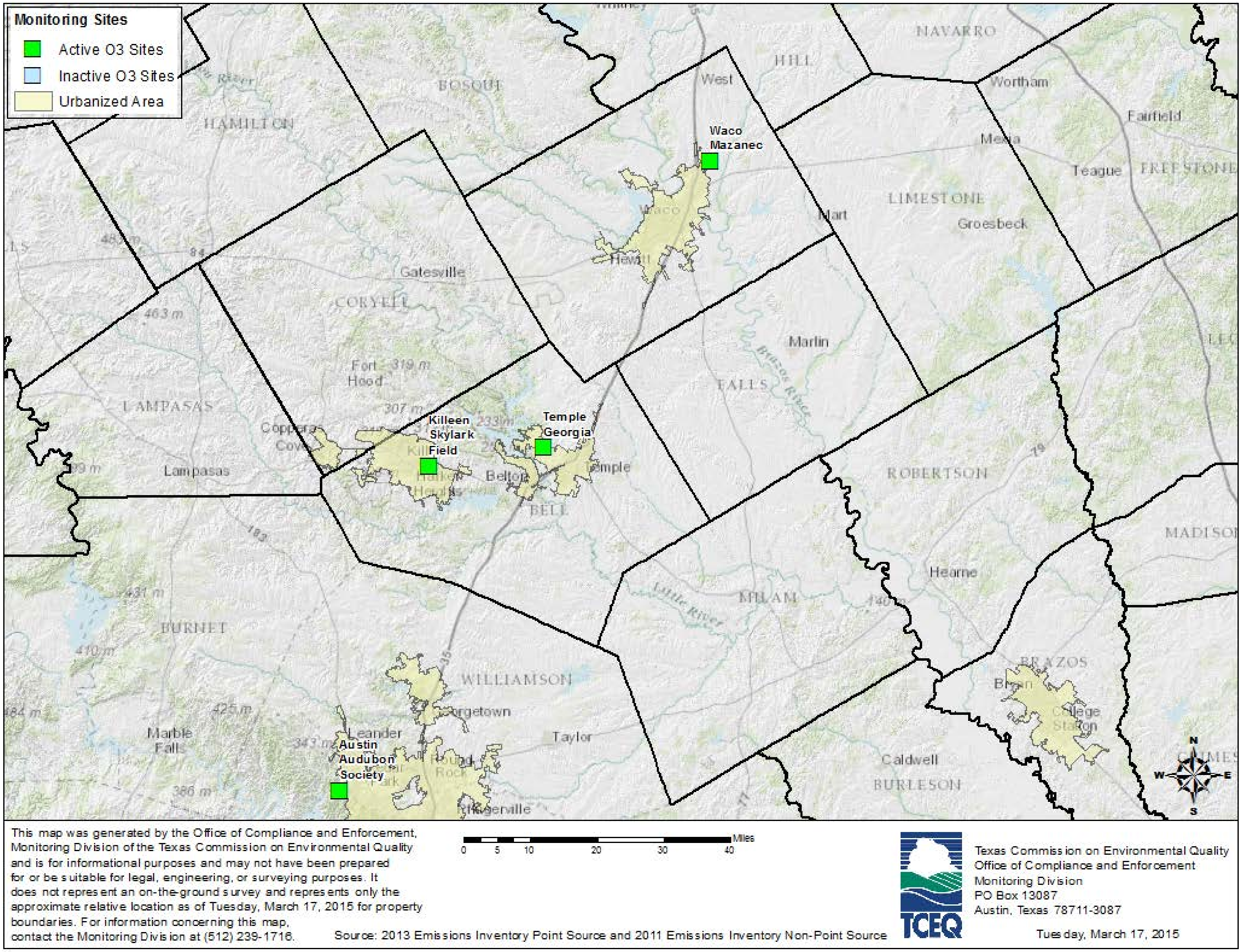



**Figure 63: Waco and Killeen-Temple Area Ozone ($O_3$) Monitors**

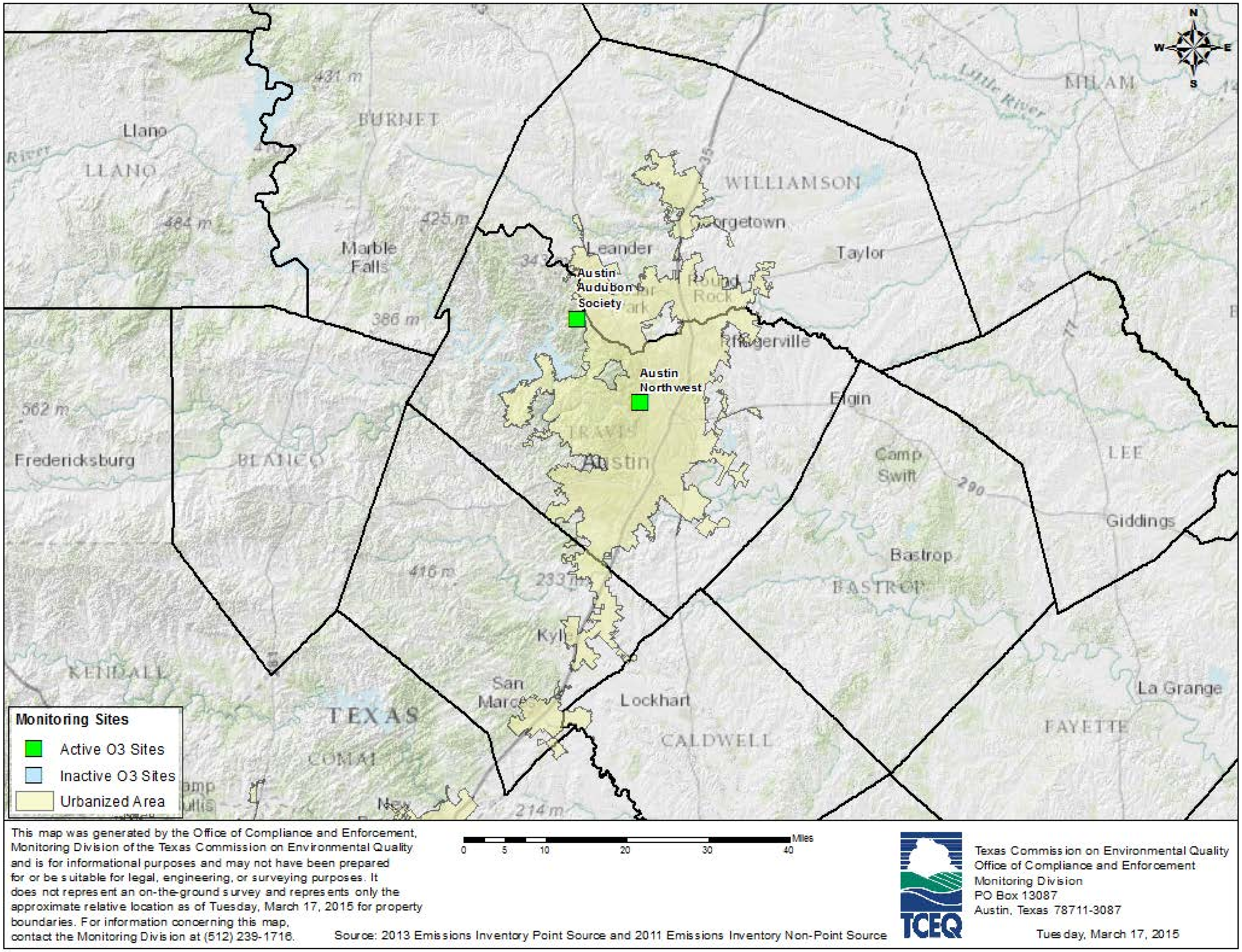



**Figure 64: Austin-Round Rock Area Ozone ($O_3$) Monitors**

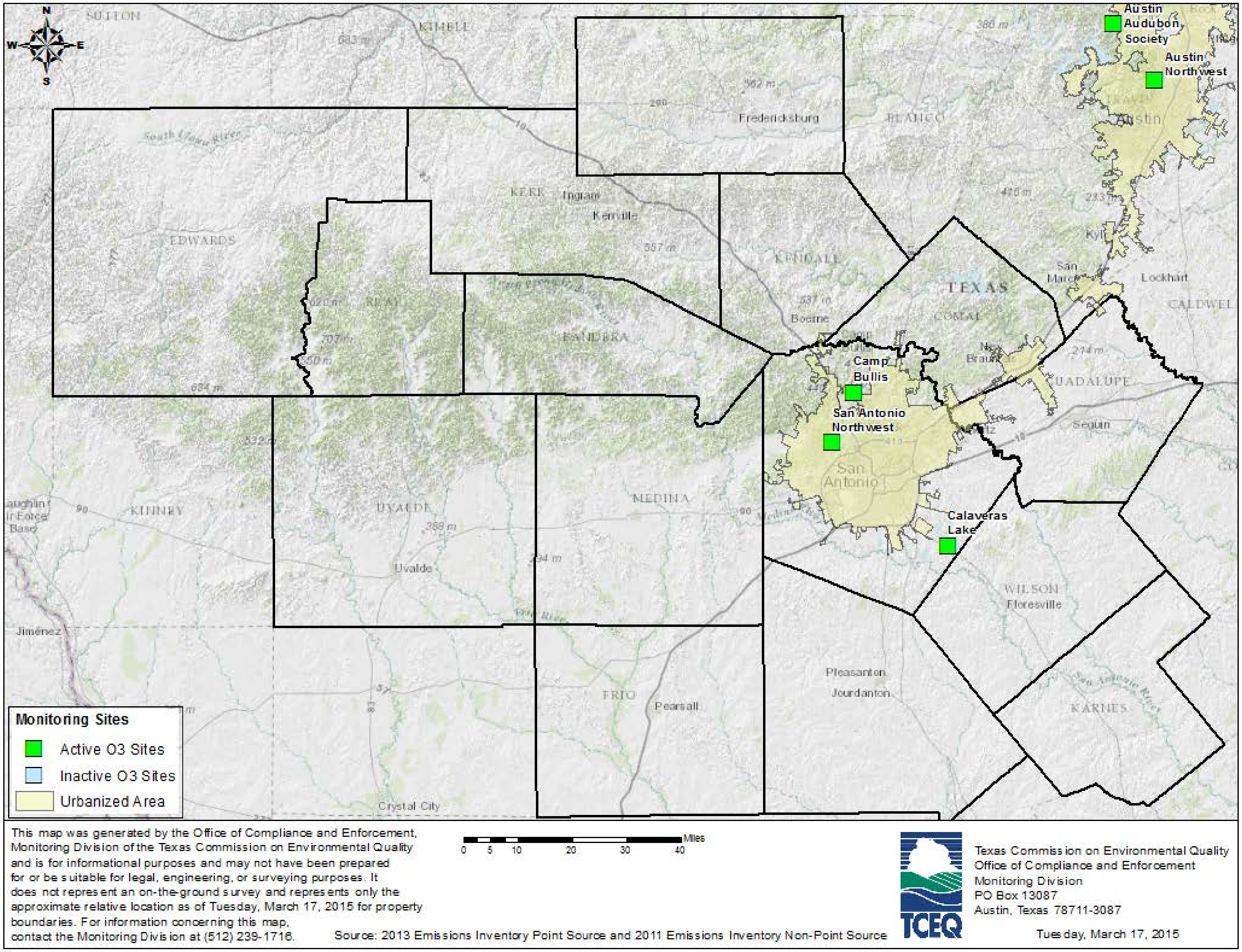
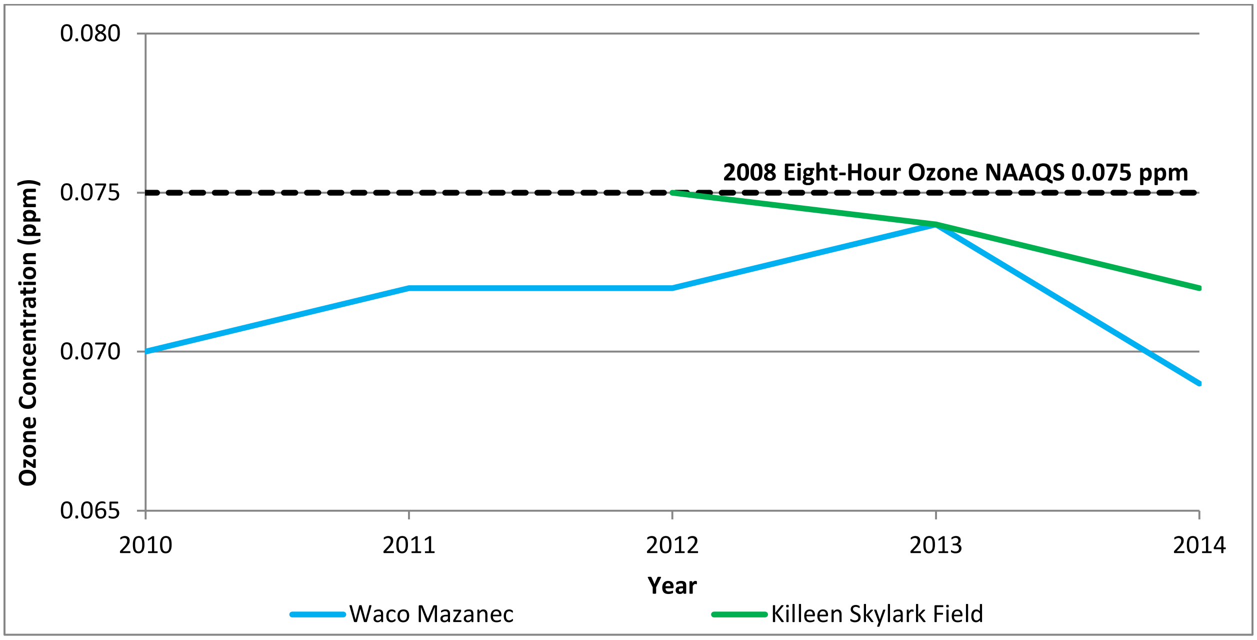



**Figure 65: San Antonio-New Braunfels Area Ozone ($O_3$) Monitors**

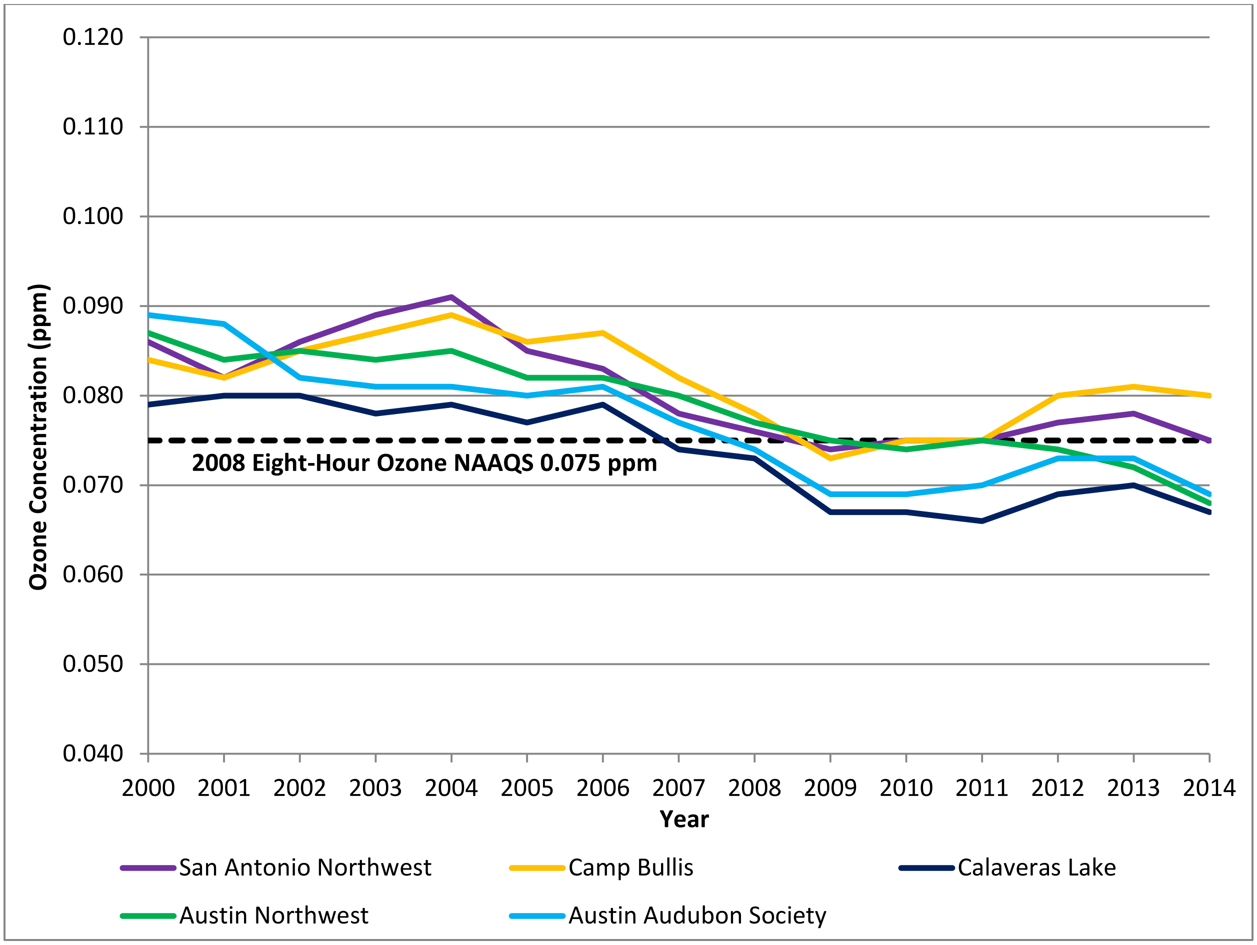
## Design Values and Trends

Eight-hour ozone design values in the Central Texas area have been at or just below the 2008 eight-hour ozone NAAQS of 0.075 ppm since 2010 (shown in Figures 66 and 67). The one exception is the San Antonio area, where all three monitors measured increases in ozone levels since 2011. The 2014 design value for the San Antonio-New Braunfels area is 0.080 ppm, observed at Camp Bullis.




Design values are not available for the Temple Georgia monitor because it was deployed in 2013.
ppm – parts per million
NAAQS - National Ambient Air Quality Standards

**Figure 66: Eight-Hour Ozone Design Value Trends in the Waco and Killeen-Temple Area, 2010-2014**




ppm – parts per million

NAAQS - National Ambient Air Quality Standards

**Figure 67: Eight-Hour Ozone Design Value Trends in the Austin-Round Rock and San Antonio Areas, 2000-2014**

## Network Evaluation

Based on current ozone monitoring requirements, all Central Texas area ozone monitors are considered of high value. Monitors in the Waco, Killeen-Temple, and Austin-Round Rock MSAs all fulfill minimum monitoring requirements and continue to meet established monitoring objectives. The Austin-Round Rock MSA contains two sites, Austin Audubon Society and Austin Northwest, to measure maximum concentrations in the area. The minimum ozone monitoring requirement is exceeded in the San Antonio-New Braunfels MSA with the Calaveras Lake, Camp Bullis, and San Antonio Northwest monitors; however, the locations of these monitors provides valuable information on ozone concentrations both upwind and downwind of the San Antonio area.

To assess potential redundancy, Central Texas area ozone monitors were evaluated using the NetAssess correlation tool. The graphed correlation matrix in Figure 68 shows the correlation coefficient, relative difference, and distance between the San Antonio area ozone sites. Sites are identified by AQS numbers, which are referenced in Appendix A. The highest correlation in the San Antonio area was between Camp Bullis and San Antonio Northwest monitors. While this assessment indicates the Camp Bullis (AQS 48-

029-0052) and San Antonio Northwest (AQS 48-029-0032) monitors (Pearson's coefficient=0.955, relative difference=0.0773) are highly correlated, the distance between these monitors and their value in measuring ozone concentrations downwind of the urban core make these monitors independently valuable.

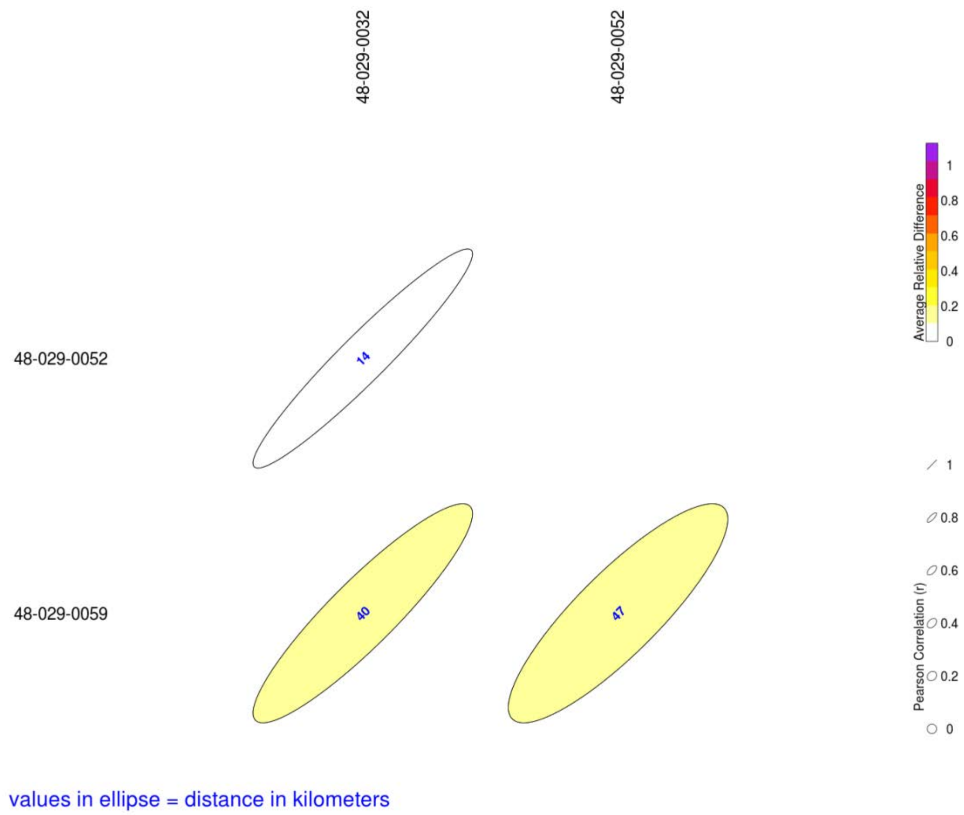



**Figure 68: Eight-Hour Daily Maximum Ozone Correlation Matrix in the San Antonio Area, 2011-2013**

The correlation evaluation also indicated that data from the Austin Audubon Society (AQS 48-453-0020) and Austin Northwest (AQS 48-453-0014) monitors (Pearson's coefficient=0.971, relative difference=0.0615) are highly correlated. While these two sites, located 18 kilometers apart, are both positioned to the northwest of the urban core, the distance between the monitors is too great for the monitors to be considered fully redundant. In addition, both monitors are located in densely populated areas of the city and provide valuable historical trends data. No ozone network changes are recommended for the Central Texas area at this time. Appendix C provides a detailed description of the value of each active monitor.

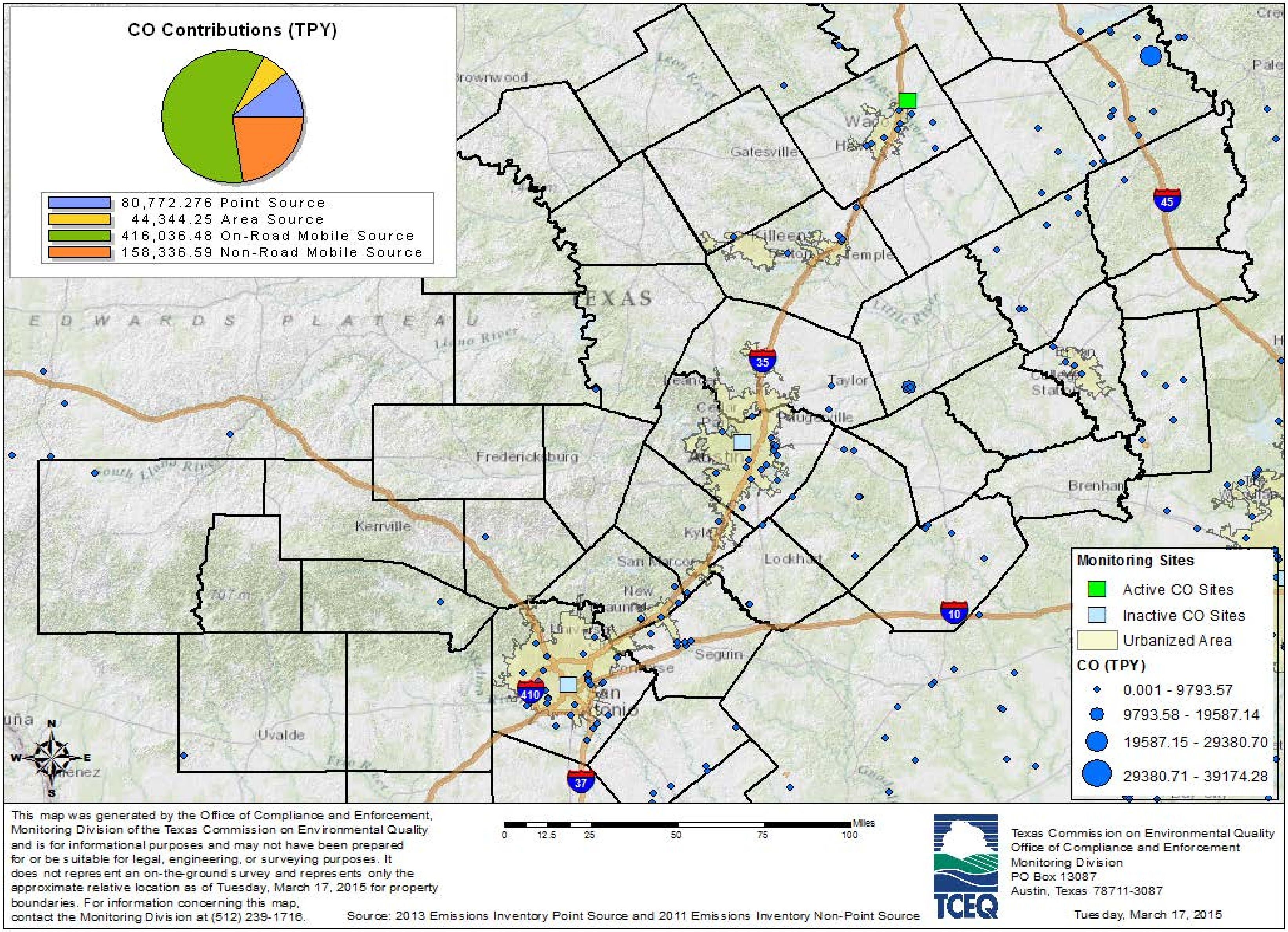
## Carbon Monoxide

### Network History

As of January 1, 2015, CO monitoring in the Central Texas area was being conducted at the Waco Mazanec site northeast of Waco. This site was established to provide upwind background measurements for the area. The only other Central Texas area CO monitoring was previously conducted at the San Antonio Downtown and Austin

Northwest sites. These monitors were decommissioned in 2010 and 2014, respectively, due to being operated in excess of minimum federal requirements and low historical design values. Appendix A provides a full list of both active and recently decommissioned CO monitors, as well as their location, monitoring objectives, and associated spatial scales. Locations of active and inactive CO monitors and CO point sources for the Central Texas area are shown in Figure 69.

Prior to 2010 there were no federal minimum CO monitoring requirements applicable to metropolitan areas with the exception of monitoring for CO concurrently with ozone precursors at PAMS sites and CO monitoring at NCore sites. In 2010, the EPA promulgated new rules requiring CO monitoring at near-road $NO_2$ sites in metropolitan areas with a population of a 1,000,000 or more persons. Based on these requirements, both the Austin-Round Rock and San Antonio-New Braunfels areas will be required to operate a CO monitor collocated with a near-road $NO_2$ monitor by January 1, 2017.




TPY – tons per year

**Figure 69: Central Texas Area Carbon Monoxide (CO) Point Sources and Monitors**

### Design Values and Trends

Since 2000, CO design values in the Central Texas area have remained well below both the one-hour NAAQS of 35 ppm and eight-hour NAAQS of 9 ppm. One-hour design values have consistently measured between 0.3 and 2.2 ppm, while eight hour design values have measured between 0.3 and 1.1 ppm at Waco Mazanec.

### Network Evaluation

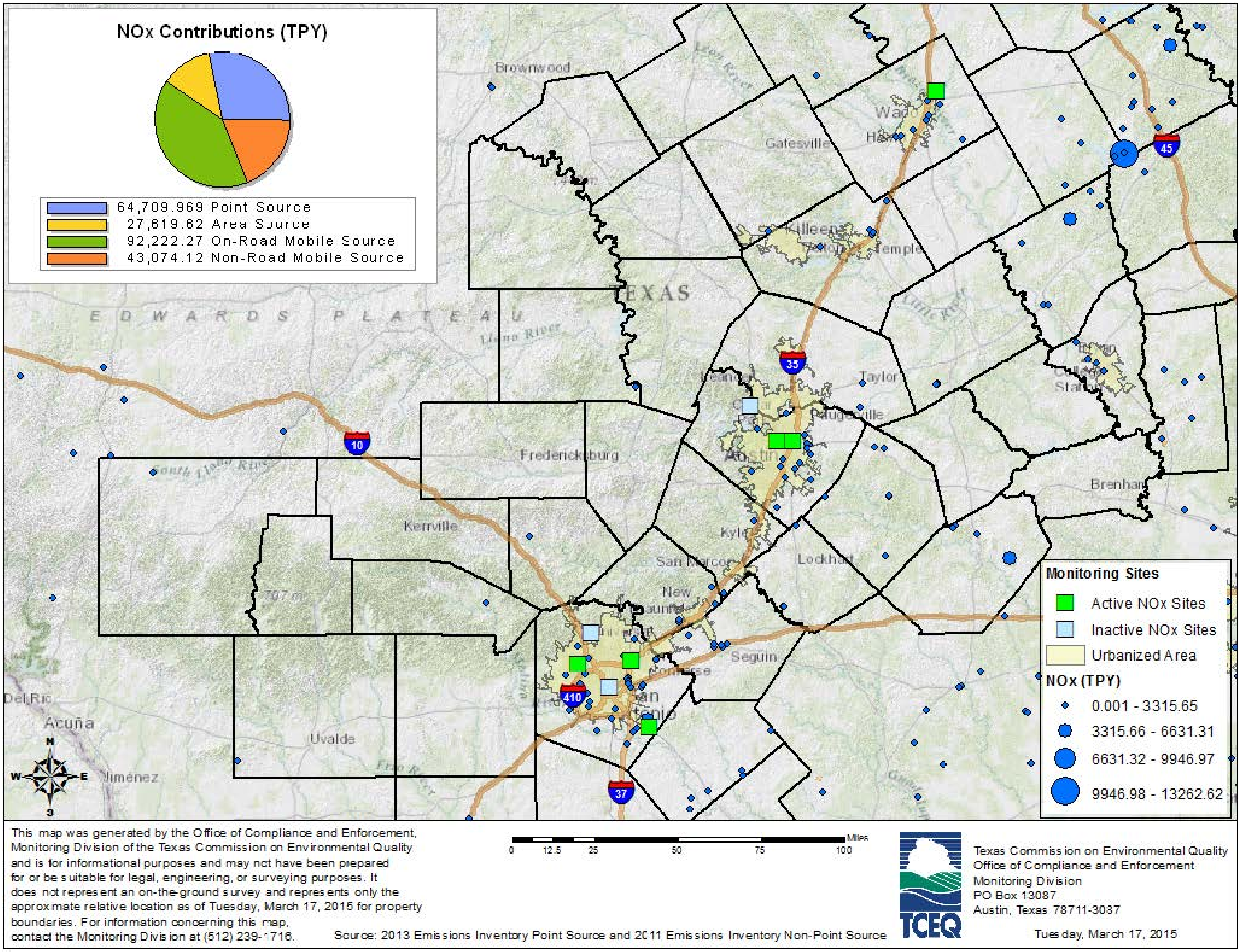
The existing CO monitor at the Waco Mazanec site is adequate for evaluating the minimal impact CO has on regional air quality and is of medium value. Given the design values for the area and the previous monitor decommissions, no additional area-wide CO monitors are recommended at this time. Additional CO monitors are planned for deployment at the Austin North Interstate 35 and San Antonio Interstate 35 near-road sites by January 1, 2017, to evaluate near-road CO concentrations as required by federal monitoring requirements.

## Oxides of Nitrogen

### Network History

Six $NO_x$ monitors were operating in the Central Texas area as of January 1, 2015, to evaluate concentrations in populated areas downwind of the urban core, near highly trafficked roadways, and downwind of specific sources. Of these six active $NO_x$ monitors, one is located in Waco, two in Austin, and three in San Antonio. Prior to 2010 there were no federal minimum $NO_2$ monitoring requirements applicable to metropolitan areas with the exception of $NO_2$ monitoring at PAMS and NCore sites. In 2010, the EPA promulgated new rules requiring area-wide $NO_2$ monitoring sites in metropolitan areas with populations of 1,000,000 or more and near-road $NO_2$ monitoring in metropolitan areas with populations of 500,000 or more. These population-based monitoring requirements currently apply to the Austin-Round Rock and San Antonio-New Braunfels areas.

Since the last five-year assessment in 2010, several network changes have been implemented in the Austin and San Antonio areas to meet the new area-wide and near-road monitoring requirements. In October 2010, the San Antonio Downtown site was decommissioned due to property renovations impacting the monitoring station. Since operation of this monitor was beyond minimum requirements and measured design values had remained well below the one-hour and annual $NO_2$ NAAQS, the TCEQ received approval from EPA to reallocate these resources to near-road monitoring. In October and November 2012, the $NO_x$ monitors located at the Camp Bullis and Austin Audubon sites were relocated to the San Antonio Northwest and Austin Northwest sites, respectively. These monitor relocations fulfilled federal requirements for area-wide $NO_2$ monitoring in the Austin and San Antonio areas. Finally, two new near-road $NO_2$ monitors were deployed to fulfill requirements for near-road $NO_2$ monitoring in the Austin and San Antonio areas. In January 2014, the San Antonio Interstate 35 monitor was deployed along Interstate Highway 35 north of the Interstate Loop 410 intersection on the north side of San Antonio. The Austin North Interstate 35 monitor was deployed north of the downtown Austin area in April 2014, along Interstate Highway 35 and just north of the intersection of United States Highway 183. Locations of all active and inactive $NO_x$ monitors, as well as emissions contribution point source locations, are provided in Figure 70. Appendix A provides a full list of both active and recently decommissioned $NO_x$ monitors, as well as their location, monitoring objectives, and associated spatial scales.




TPY – tons per year

**Figure 70: Central Texas Area Oxides of Nitrogen ($NO_x$) Point Sources and Monitors**

### Design Values and Trends

All monitors within the Central Texas area continue to measure below the current one-hour NAAQS of 100 ppb and the annual $NO_2$ NAAQS of 53 ppb. One-hour design values have consistently measured between 35 and 21 ppm, and annual design values have measured between 2.04 and 4.99 ppm in the Central Texas area.

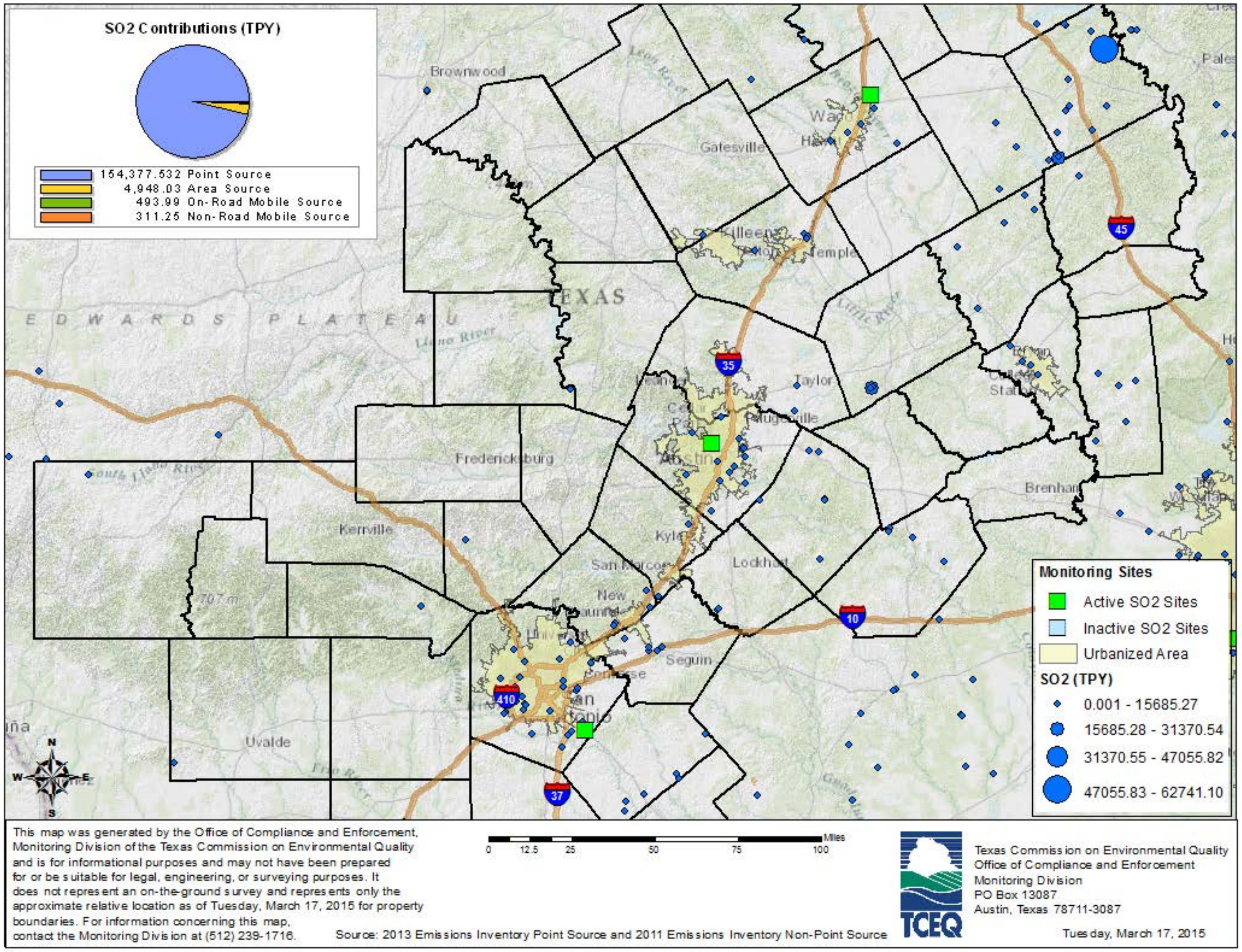
### Network Evaluation

The existing $NO_2$ monitoring network in the Central Texas area meets all current federal monitoring requirements and continues to achieve established monitoring objectives. Four monitors in the Central Texas area are considered of high value based on their regulatory importance. The Austin Northwest and San Antonio Northwest $NO_x$ monitors satisfy area-wide $NO_2$ monitoring requirements based on population and are well sited to monitor expected highest $NO_2$ concentrations downwind of the Austin and San Antonio urban cores. In addition, the Austin North Interstate 35 and San Antonio Interstate 35 monitors fulfill near-road $NO_2$ monitoring requirements for Austin and San Antonio. The Waco Mazanec and Calaveras Lake $NO_x$ monitors are considered of medium value to the network, but provide meaningful data pertaining to the characterization of background and transported ozone precursor concentrations. Based on current monitoring objectives, no additional network changes are recommended at this time. The TCEQ will reevaluate the network once the EPA finalizes its proposed ozone rule, as PAMS requirements and ozone nonattainment areas are likely to change.

## Sulfur Dioxide

### Network History

As of January 1, 2015, three $SO_2$ monitors were operating in the Central Texas area (shown in Figure 71) to measure ambient concentrations of $SO_2$ near populated areas or known $SO_2$ point sources. The monitor at Austin Northwest was deployed in 2012 to fulfill current federal $SO_2$ monitoring requirements in Austin-Round Rock based on the area's PWEI. Also in 2012, TCEQ deployed a source-oriented $SO_2$ monitor at the Calaveras Lake site, in close proximity to the City Public Service Calaveras Plant, the biggest $SO_2$ source in the area.  This monitor also fulfills the PWEI requirements for the San Antonio-New Braunfels' area. The Waco and Killeen-Temple areas meet or exceed minimum $SO_2$ monitoring requirements based on PWEI. The Waco Mazanec $SO_2$ monitor, located in a rural area northeast of Waco, was established to measure background concentrations coming into the area. Appendix A lists the area's $SO_2$ monitors, as well as their location, monitoring objectives, and associated spatial scales.




TPY – tons per year

**Figure 71: Central Texas Area Sulfur Dioxide ($SO_2$) Point Sources and Monitors**

### Design Values and Trends

Waco Mazanec $SO_2$ concentrations have consistently remained at 6 ppb since 2010. Although $SO_2$ has only been measured for two years at both the Austin Northwest and Calaveras Lake monitors, calculation of the 99$^{th}$ percentile of the one-hour daily maximum using the data available did not exceed 5 ppb at Austin Northwest and 22 ppb at Calaveras Lake.

### Network Evaluation

The current $SO_2$ monitoring network is sufficient to comply with existing federal requirements and continues to meet established monitoring objectives. The Austin Northwest and Calaveras Lake monitors are considered of high value based on regulatory requirements. The Waco Mazanec $SO_2$ monitor is in excess of current federal requirements and is considered of low value based on historical monitored values. Monitoring is currently not required in the areas outside these MSAs based on the PWEI criteria.

Due to proposed federal regulatory action and pending designations for the 2010 one-hour $SO_2$ standard, no network changes are currently recommended. Once the EPA's final $SO_2$ Data Requirements Rule is promulgated, the TCEQ will evaluate the existing $SO_2$ network for potential optimization that will provide for compliance with any associated $SO_2$ monitoring requirement changes.

## Lead

### Network History

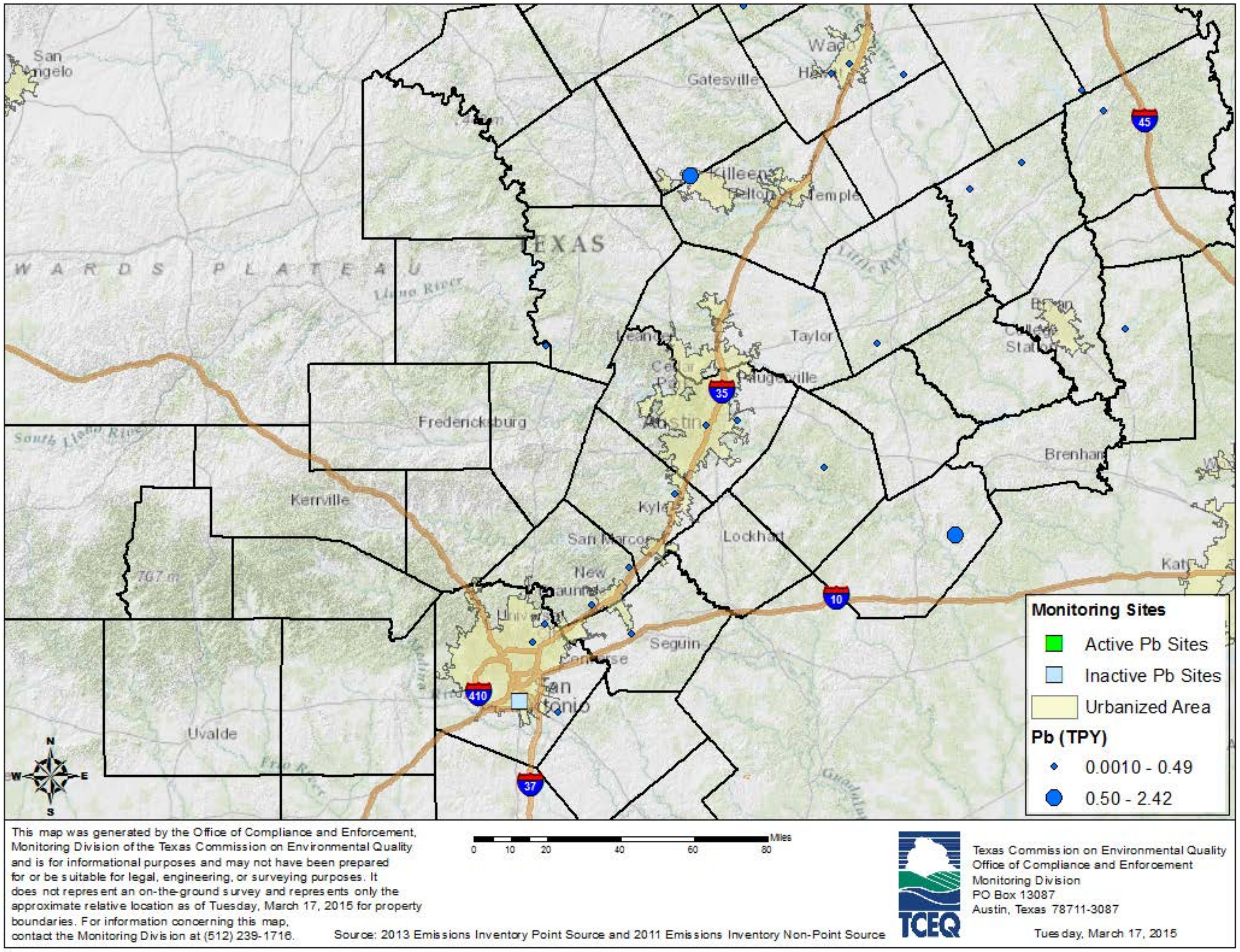
Current federal rules require source-oriented monitoring to measure maximum Pb concentrations near each point source emitting 0.50 tpy or more of Pb and each airport emitting 1.0 tpy or more of Pb based on the NEI or other justifiable methods. Based on historically reported Pb point source emissions, two sources within the Central Texas area have emitted greater than 0.50 tpy of Pb: the United States Department of the Army Fort Hood facility near Killeen and the Lower Colorado River Authority Fayette Power Plant in Fayette County. In 2010 and 2013, the TCEQ submitted waivers for the source-oriented Pb monitoring required at the Fort Hood and Fayette Power Plant facilities based on modeling data indicating the predicted maximum ground level concentration for a rolling three month average were less than half the NAAQS. Both waivers were approved by EPA Region 6.

In December 2010, the EPA implemented an airport monitoring study to determine the need for Pb monitoring at airports that emit less than 1.0 tpy. In the rule, the EPA required states to monitor Pb near 15 selected airports across the country for a period of one year. As part of this study, the TCEQ deployed the San Antonio 99$^{th}$ Street Pb monitor at Stinson Municipal Airport in Bexar County in July 2012. The maximum rolling three-month average for this site (0.028 $\mu g/m^3$) did not exceed 50% of the Pb

NAAQS of 0.15 µg/m$^3$. With EPA approval, the TCEQ decommissioned the monitor in December 2013.

### Network Evaluation

Currently, there is no active Pb monitoring in the Central Texas area. With two exceptions, all sources in the Central Texas area reported emissions less than 0.50 tpy of Pb, as shown in Figure 72. The TCEQ reviewed the 2013 reported Pb emissions and previously conducted modeling data from these sites as part of this five-year network assessment. According to 2013 point source emissions data, the Fort Hood facility emitted 0.74 tpy of Pb and the Fayette Power Plant emitted 0.59 tpy of Pb. Analysis of modeling data provided in Appendix E demonstrate that maximum ambient air Pb concentrations continue to remain below 50% of the NAAQS, as required by 40 CFR Part 58, Appendix D, Section 4.5(a)(ii). The TCEQ respectfully requests that both waivers be renewed.




TPY – tons per year

**Figure 72: Central Texas Area Lead (Pb) Point Sources and Monitors**

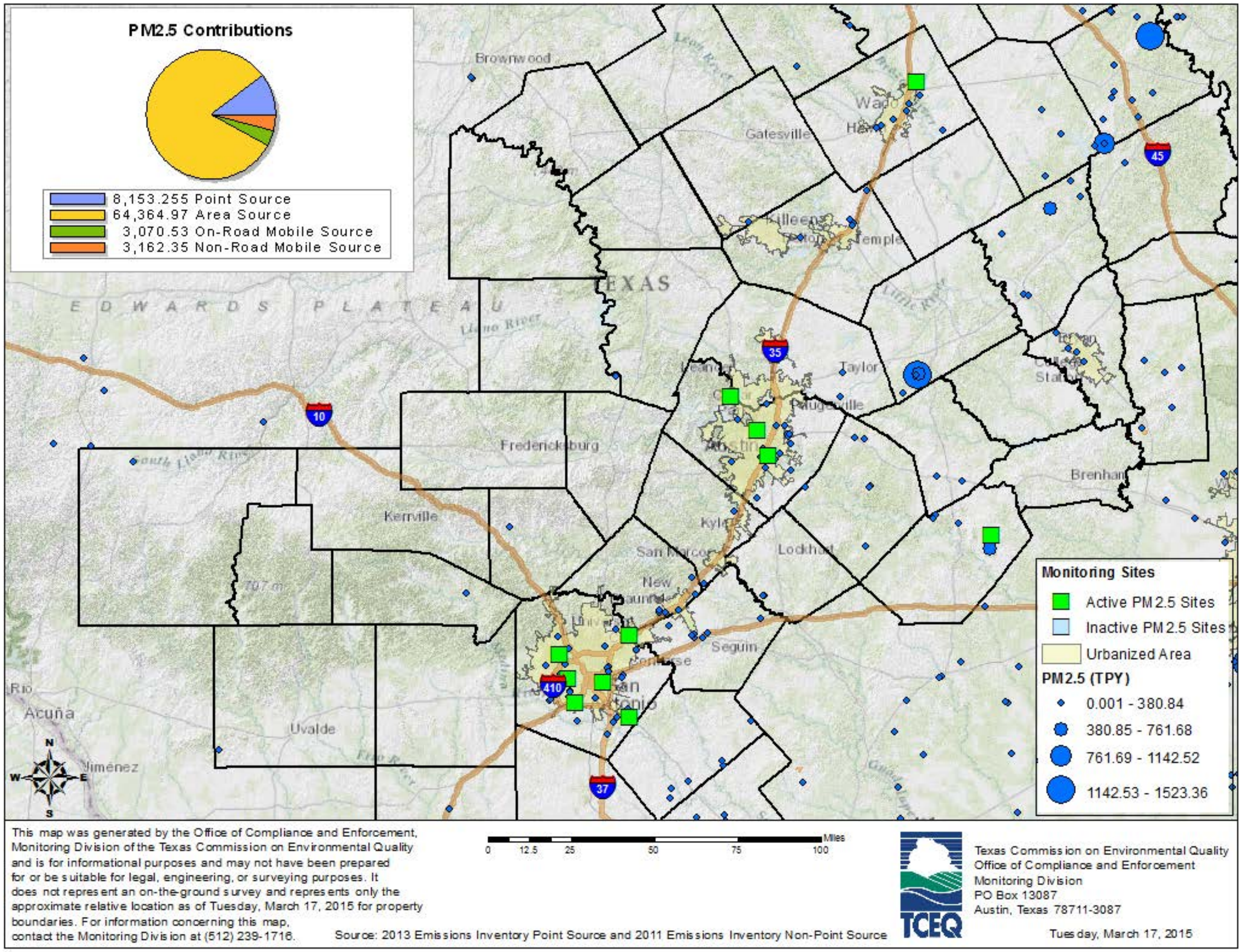
## Particulate Matter of 2.5 Micrometers or Less

### Network History

As of January 1, 2015, the Central Texas area had four FRM and 11 continuous $PM_{2.5}$ monitors, as shown in Figure 73, predominantly located in the Austin and San Antonio urban areas to evaluate ambient $PM_{2.5}$ concentrations in populated areas. Additional $PM_{2.5}$ monitors deployed in Waco, Fayette County (east of Austin), and Calaveras Lake (south of San Antonio) focus on regional transport of $PM_{2.5}$ into these downwind urban areas. A full site list of both active and decommissioned $PM_{2.5}$ monitors, as well as their location, monitoring objectives, and associated spatial scales is provided in Appendix A.

Since the last five-year network assessment, an additional $PM_{2.5}$ monitor was deployed and one speciation monitor was discontinued. In 2012, a new continuous monitor was collocated with the existing FRM monitor at the Austin Webberville Rd site. The addition of this continuous monitor allowed the required sampling frequency of the FRM at the Austin Webberville Rd site to be reduced from every third day to every sixth day. In 2013, speciation analysis of the FRM filters at the Austin Audubon Society site was discontinued after determining this analysis was being conducted above minimum requirements. The $PM_{2.5}$ FRM monitor was retained at the Austin Audubon Society site to continue monitoring of $PM_{2.5}$ concentrations in an area of high population density. No other changes have been made to the Central Texas area $PM_{2.5}$ network since 2010.

Based on population and design values, the only Central Texas areas that are required to meet minimum federal monitoring requirements are the Austin-Round Rock and San Antonio-New Braunfels MSAs. Both of these areas are required to operate at least two $PM_{2.5}$ FRM monitors with at least one of these collocated with a continuous monitor. In addition, both the Austin-Round Rock and San Antonio-New Braunfels areas will be required to operate a $PM_{2.5}$ FRM monitor collocated with a near-road $NO_2$ monitor by January 1, 2017.



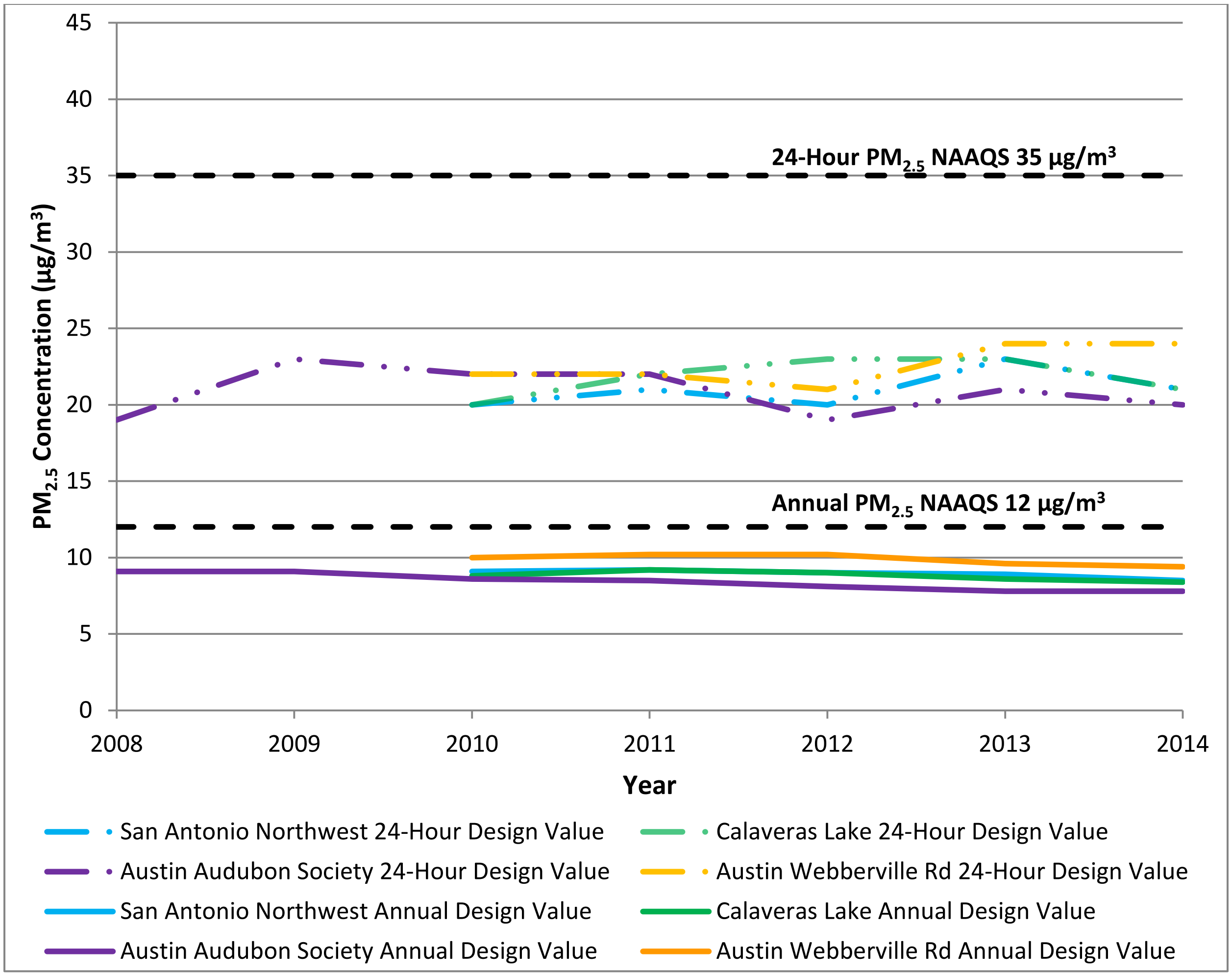

TPY – tons per year

**Figure 73: Central Area Particulate Matter of 2.5 Micrometers or Less in Diameter ($PM_{2.5}$) Point Sources and Monitors**

### Design Values and Trends

Four Central Texas area $PM_{2.5}$ monitors meet FRM requirements and are suitable for calculating a design value for comparison to the NAAQS. These monitors are the San Antonio Northwest and Calaveras Lake monitors in San Antonio and the Austin Audubon Society and Austin Webberville Rd monitors in Austin. Design values for these Central Texas area FRM monitors have remained consistently well below both the 24-hour $PM_{2.5}$ NAAQS of 35 $\mu g/m^3$ and annual $PM_{2.5}$ NAAQS of 12 $\mu g/m^3$, as shown in Figure 74. For 2014, annual $PM_{2.5}$ design values ranged from 7.8 to 9.4 $\mu g/m^3$ while the 24-hour average design values ranged from 20 to 24 $\mu g/m^3$.

Although the Waco area does not have an FRM monitor, analysis of the $PM_{2.5}$ continuous monitor data from Waco Mazanec demonstrate that concentrations in the area have been consistently well below the 24-hour and annual NAAQS. Using three-year averages of the 98$^{th}$ percentile of 24-hour average concentrations from 2009 to 2014 suggests that 24-hour $PM_{2.5}$ design values for the Waco Mazanec monitor would range from 17 to 22 $\mu g/m^3$, which is well below the 24-hour NAAQS of 35 $\mu g/m^3$. Similarly, using three-year averages of the $PM_{2.5}$ annual average concentrations from 2009 to 2014 indicates annual average design values would have been in the 8.5 to 9.0 $\mu g/m^3$ range, consistently below the 12 $\mu g/m^3$ annual $PM_{2.5}$ NAAQS.




$\mu g/m^3$ – micrograms per cubic meter
NAAQS - National Ambient Air Quality Standards

**Figure 74: Annual and 24-Hour Particulate Matter of 2.5 Micrometers or Less in Diameter ($PM_{2.5}$) Design Values for the Central Texas Area, 2008–2014**

## Network Evaluation

The existing $PM_{2.5}$ network in the Central Texas area is adequate to provide valuable data on ambient $PM_{2.5}$ concentrations in populated areas and regional transport of particulate matter. $PM_{2.5}$ monitors located upwind of the Waco, Austin, and San Antonio areas (generally, Waco Mazanec, Fayette County, and Calaveras Lake) provide information on regionally transported $PM_{2.5}$ concentrations from sources upwind of these urban areas. In addition, $PM_{2.5}$ monitors at the Austin Northwest, CPS Pecan Valley, Old Highway 90, Palo Alto, and Selma sites are located in populated urban core areas and continue to provide meaningful data on ambient $PM_{2.5}$ concentrations in areas frequented by the public, as well as $PM_{2.5}$ movement throughout the area.

Based on current $PM_{2.5}$ monitoring requirements, several Central Texas area $PM_{2.5}$ monitors are considered of high value. The Austin and San Antonio areas are each required to have at least two FRM monitors and one continuous $PM_{2.5}$ monitor. The Austin Audubon Society, Austin Webberville Rd, Calaveras Lake, and San Antonio Northwest monitors fulfill these requirements and are considered of high value. A correlation analysis of the FRM monitors in the Austin area indicates a moderate correlation between the Austin Audubon Society (AQS 48-453-0020) and Austin Webberville Rd (AQS 48-453-0021) monitors (Pearson's coefficient=0.901, relative difference=0.272). Likewise, the correlation analysis for the San Antonio FRM monitors indicates the San Antonio Northwest (AQS 48-029-0032) and Calaveras Lake (AQS 48-029-0059) are moderately correlated (Pearson's coefficient=0.96, relative difference=0.13). Although both of these monitor pairs showed a moderate correlation, the distance between each of these monitor pairs and geographical locations allow for better spatial coverage in the Austin and San Antonio areas, providing high valued data.

Although the number of continuous monitors in these areas exceeds minimum requirements, all of these monitors are considered of at least medium value because of the spatial coverage, historical trends, and unique data they provide. As shown in Figure 75, none of the monitor pairs showed a strong correlation (Pearson's coefficient >0.976, relative difference <0.1). The Austin Northwest (AQS 48-453-0014) and Austin Audubon Society (AQS 48-453-0020) monitors were moderately correlated (Pearson's coefficient=0.976, relative difference=0.128), but were located 18 kilometers apart. All four continuous $PM_{2.5}$ monitors allow for spatial coverage throughout the greater Austin area. The San Antonio area has six continuous $PM_{2.5}$ monitors that also show moderate to high correlations, as shown in Figure 76. The highest correlation was indicated between the Selma (AQS 48-029-0053) and Calaveras Lake (AQS 48-029-0059) monitors (Pearson's coefficient=0.967, relative difference=0.0975) located 35 kilometers apart. Even though some correlation is indicated between these continuous monitors, all $PM_{2.5}$ monitors in the San Antonio area provide meaningful data due to their dispersed locations throughout the city.

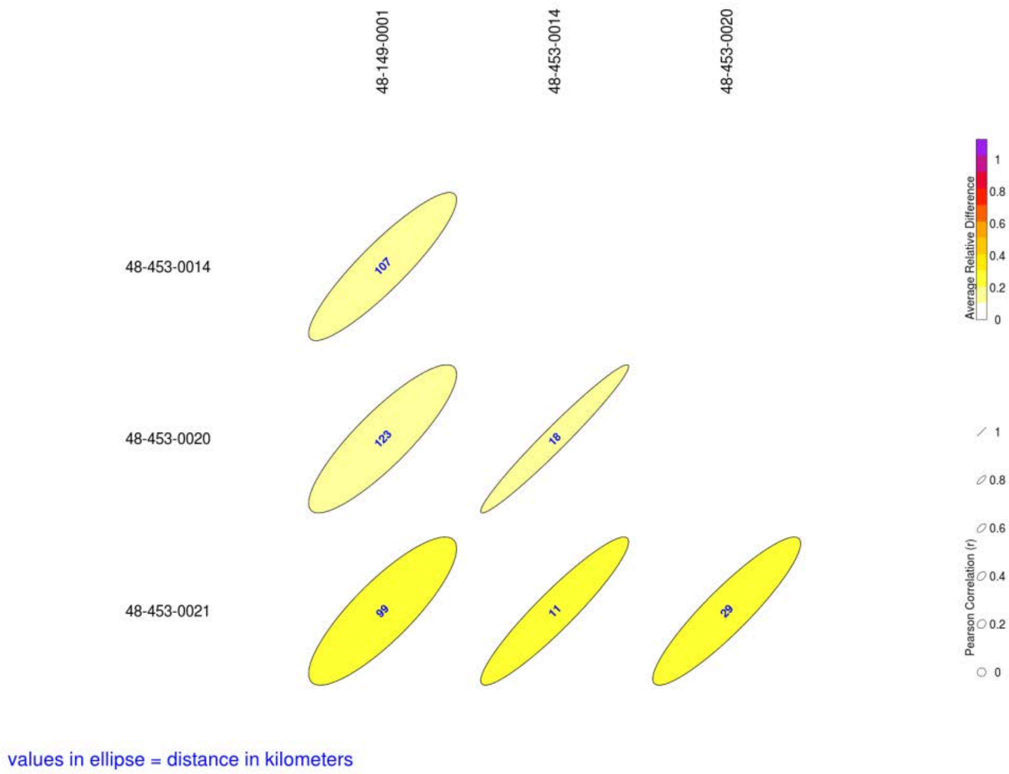



**Figure 75: Correlation Matrix for 24-hour Average Concentrations from Austin Area Continuous (Non-Federal Equivalent) Monitors for Particulate Matter of 2.5 Micrometers or Less in Diameter, 2011-2013**

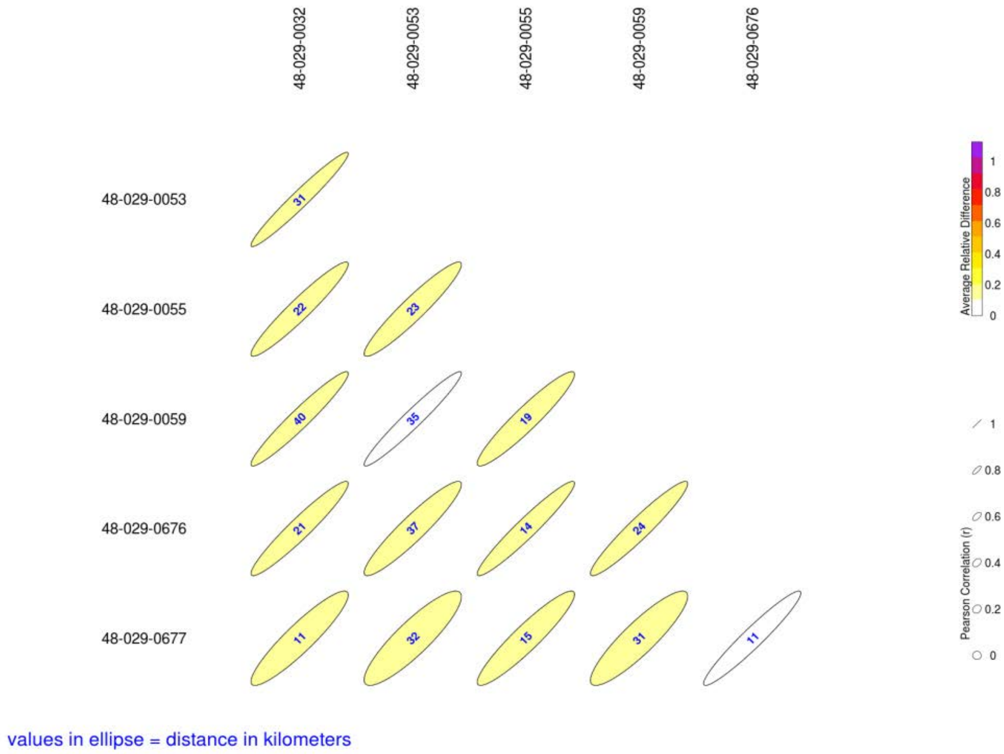


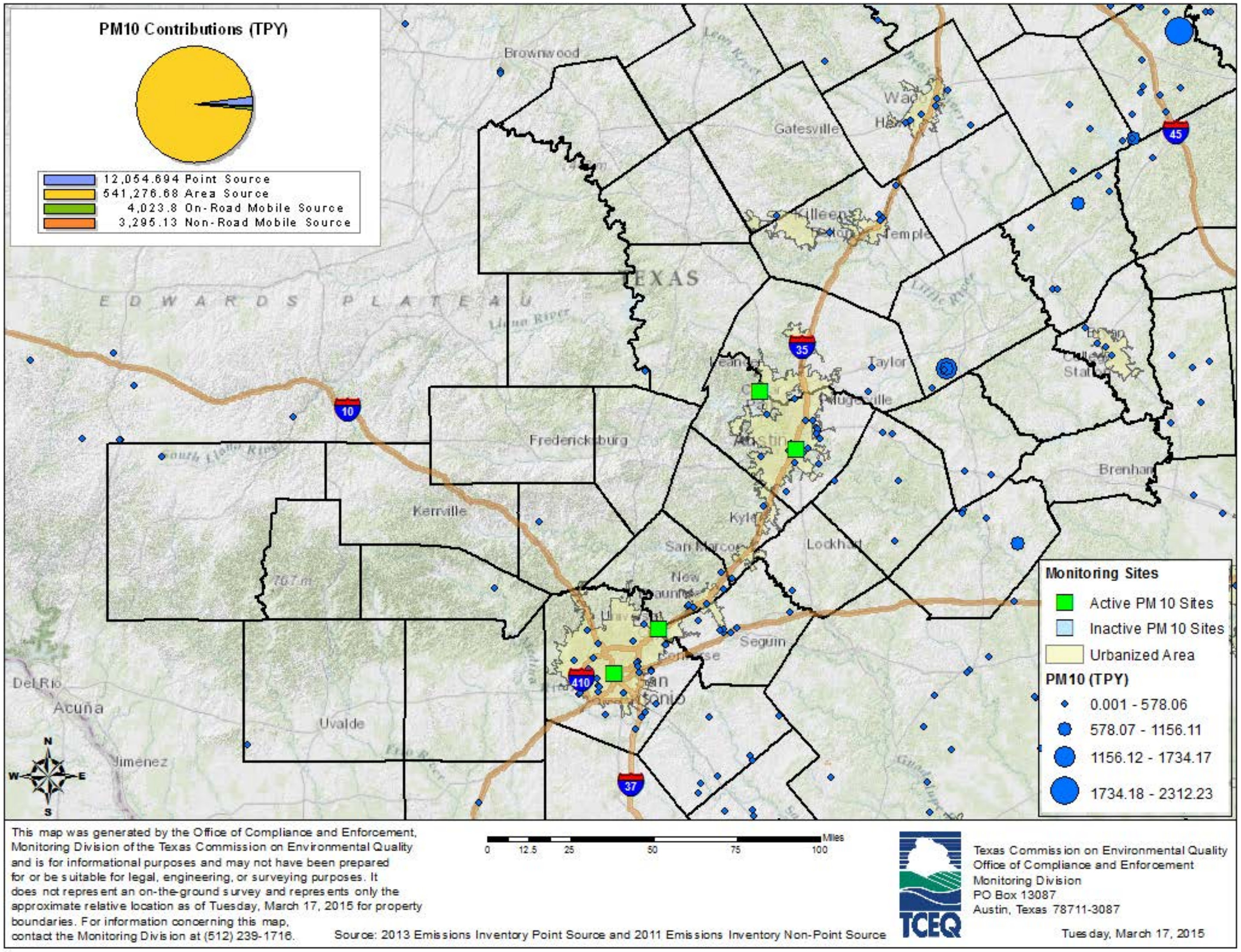

**Figure 76: Correlation Matrix for 24-hour Average Concentrations from San Antonio Area Continuous (Non-Federal Equivalent) Monitors for Particulate Matter of 2.5 Micrometers or Less in Diameter, 2011-2013**

## Particulate Matter of 10 Micrometers or Less

### Network History

As of January 1, 2015, there were four $PM_{10}$ monitors in the Central Texas area to evaluate regional air quality trends and concentrations in populated areas. Current regulations require $PM_{10}$ monitoring in metropolitan areas based on population and measured concentrations, if available. Based on the latest concentration and population data, the Austin-Round Rock and San Antonio-New Braunfels areas are each required to have between two to four $PM_{10}$ monitors, while the Killeen-Temple and Waco areas are required to have between zero and one $PM_{10}$ monitor. Currently, those requirements are met. Figure 77 provides monitor locations and relative emission amounts for point sources.

In the Austin area, the Austin Webberville Rd and the Austin Audubon Society $PM_{10}$ monitors were deployed in 1999 and 2008, respectively, upwind and downwind of the urban core in populated areas. The Frank Wing Municipal Court and Selma $PM_{10}$ monitors were deployed in 2000 and 2008, respectively, to evaluate $PM_{10}$ concentrations in populated areas of San Antonio. $PM_{10}$ monitoring is not currently conducted in the Killeen-Temple or Waco areas. Appendix A provides a full list of active and decommissioned $PM_{10}$ monitors, as well as their locations, monitoring objectives, and associated spatial scales.




TPY – tons per year

**Figure 77: Central Area Particulate Matter of 10 Micrometers or Less in Diameter ($PM_{10}$) Point Sources and Monitors**

### Design Values and Trends

The average estimated exceedance values are computed based on the 3-year period ending with the represented year. The estimated number of exceedances per year has remained consistently at zero in the Central Texas Area.

Maximum concentrations at the Austin Audubon Society, Austin Webberville Rd, and Selma monitors have remained below half of the NAAQS level of 150 µg/m$^3$. A maximum concentration of 111 µg/m$^3$ was recorded at Frank Wing Municipal Court in 2011; however, maximum concentrations measured in 2012 and 2013 decreased to below half the NAAQS level.

### Network Evaluation

The $PM_{10}$ monitoring network in the Central Texas area meets federal requirements based on population and monitored concentrations.

The current locations of active Central Texas area $PM_{10}$ monitors continue to be sufficient to meet established monitoring objectives. All four $PM_{10}$ monitors in the Austin and San Antonio areas fulfill minimum federal monitoring requirements and are located in areas of high population density, making them of high value.

Based on spatial coverage and monitoring objectives for these monitors, no network changes are recommended at this time for the Central Texas area $PM_{10}$ network. Given the historically low $PM_{10}$ concentrations, additional $PM_{10}$ monitoring in unmonitored areas of Central Texas, such as the Waco area, is not considered necessary at this time.

## Air Toxics

Federal requirements for air toxics monitoring are limited to ozone nonattainment areas and NCore sites. Because the area is designated to be in attainment with the current ozone standard and there are no NCore sites, no air toxics monitors are currently being operated under a federal obligation in the Central Texas area.

Other mechanisms fund the operation of two autoGCs and two canister samplers in Austin, San Antonio, and the area east of San Antonio. More information about these monitors is available online at http://www17.tceq.texas.gov/tamis/index.cfm?fuseaction=home.welcome. Although air toxics monitors are not available in every location throughout the Central Texas area, data from the existing monitors give some indication about general air quality, particularly with regard to impacts from area and mobile sources, which emit the majority of emissions in the area. Concentrations from these monitors are reviewed by TCEQ toxicologists, and results are available online at https://www.tceq.texas.gov/toxicology/regmemo/AirMain.html. As indicated in these annual evaluations, available VOC monitoring data indicate that concentrations have consistently remained below a level of health concern.

# Panhandle and West Texas Area Evaluation

(Amarillo, Lubbock, Abilene, Midland, and San Angelo Regions)

## *Panhandle and West Texas Area Characteristics*

### Terrain

The Panhandle and West Texas areas are primarily composed of the Central Great Plains, Southwestern Tablelands, High Plains, and the Edwards Plateau regions. The Central Great Plains, which extend from Wichita Falls in the east to the area just west of Abilene, are characterized by irregular topography and an elevation of approximately 1,000 to 1,500 feet. The Southwestern Tablelands form a north-south transitional zone between the Central Great Plains to the east and the High Plains to the north and west. More extreme weather events, such as thunderstorms and tornadoes, are common due to the climate and flat topography leading to the escarpments on the eastern edge of the area. The Southwestern Tablelands extend from eastern edge of Amarillo, Lubbock, and Big Spring to the Texas-Oklahoma border and the area west of Abilene and south to San Angelo. The High Plains make up the rest of the Panhandle and western portion of West Texas to the Midland-Odessa area. The area is characterized by flat, elevated terrain dotted with playa lakes. The western edge of the Edwards Plateau forms the southern edge of the West Texas area and is marked by gently rolling hills. Reeves and Pecos Counties, the counties on the western edge of this area, are part of the Trans-Pecos area and exhibit transitions from mountains to inter-mountain plains. (Griffith et al. 2004)

Regional terrain characteristics influence pollutant transport and area dispersion. The plains, tablelands, and plateaus of the Panhandle and West Texas area provide few wind breaks, allowing pollutant transport across the entire region with few areas of geographic concentration. Blowing dust and smoke from outside the area are often visible by satellite imagery and measured across multiple monitors, emphasizing the regional focus on particulate matter.

### Climate

The Panhandle and West Texas climates transition from sub-tropical in the east to semi-arid in the far west. Annual average temperatures range from 63°F to 68°F in the Wichita Falls and Abilene areas, to 65°F to 68°F in the Edwards Plateau region, to 59°F to 62°F in the High Plains region. Annual average precipitation follows a general east-west gradient, with highest precipitation (up to an average of 37 inches per year in Wichita Falls) occurring in the east, transitioning to the low precipitation in the High Plains (average of 19 inches per year) and the Midland-Odessa area (15 inches per year). As in other regions, the Panhandle and West Texas regions received uncharacteristically low precipitation during the recent extended drought period beginning in 2010, sometimes up to more than 20 inches per year less than the annual average. (NCDC 2015) As shown in Figure 78, wind patterns in the Lubbock and Odessa areas are dominated by south and southwesterly flows. In the Panhandle area, dominant wind flows are from the south and south-southwest.

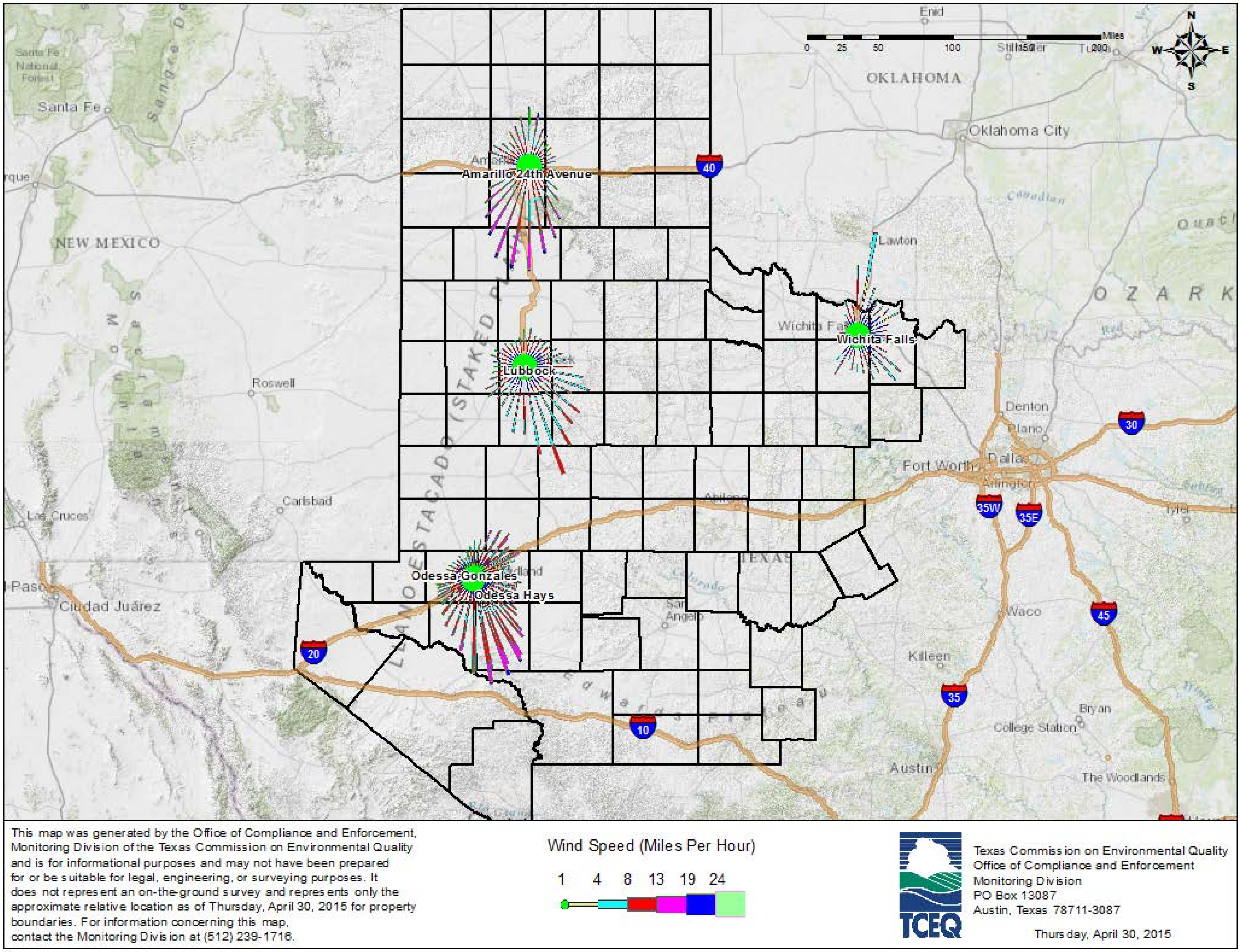



**Figure 78: Panhandle and West Texas Area Counties, Terrain, and Wind Data from Ambient Air Quality Monitors**

## Population

The Panhandle and West Texas area has seven major MSAs that include multiple counties.

- Abilene: Callahan, Jones, and Taylor Counties
- Amarillo: Armstrong, Carson, Oldham, Potter, and Randall Counties
- Lubbock: Crosby, Lubbock, and Lynn Counties
- Midland: Martin and Midland Counties
- Odessa: Ector County
- San Angelo: Irion and Tom Green Counties
- Wichita Falls: Archer, Clay, and Wichita Counties

In 2010, the combined population of these seven MSAs was almost 1.25 million people with the largest populations in Lubbock (290,805) and Amarillo (251,933). The 2014 population estimates indicate an overall 5% increase in the last four years, with the fastest growth of 12% in Midland. Figure 79 and Figure 80 map the population densities across the Panhandle and West Texas area based on 2010 United States Census Bureau data.

Minimum monitoring network design requirements in 40 CFR Part 58, Appendix D, Section 4, for ozone, CO, $NO_2$, $PM_{2.5}$, and $PM_{10}$ are partially based on MSA populations. With the 2014 area MSA population estimates and 2014 design values for these pollutants, no regulatory monitors are required in the Panhandle and West Texas area.

According to the Texas State Data Center, the Midland and Odessa MSAs are projected to have the highest population growth rates (14%) of the Panhandle and West Texas area from 2010 to 2020. The Amarillo and Lubbock MSAs are projected to grow 12% and 11% by 2020, respectively. The Abilene, San Angelo, and Wichita Falls MSA populations are projected to increase by less than 10%. If these projections are accurate, none of the Panhandle and West Texas MSAs would require the addition of regulatory monitors based on population alone.

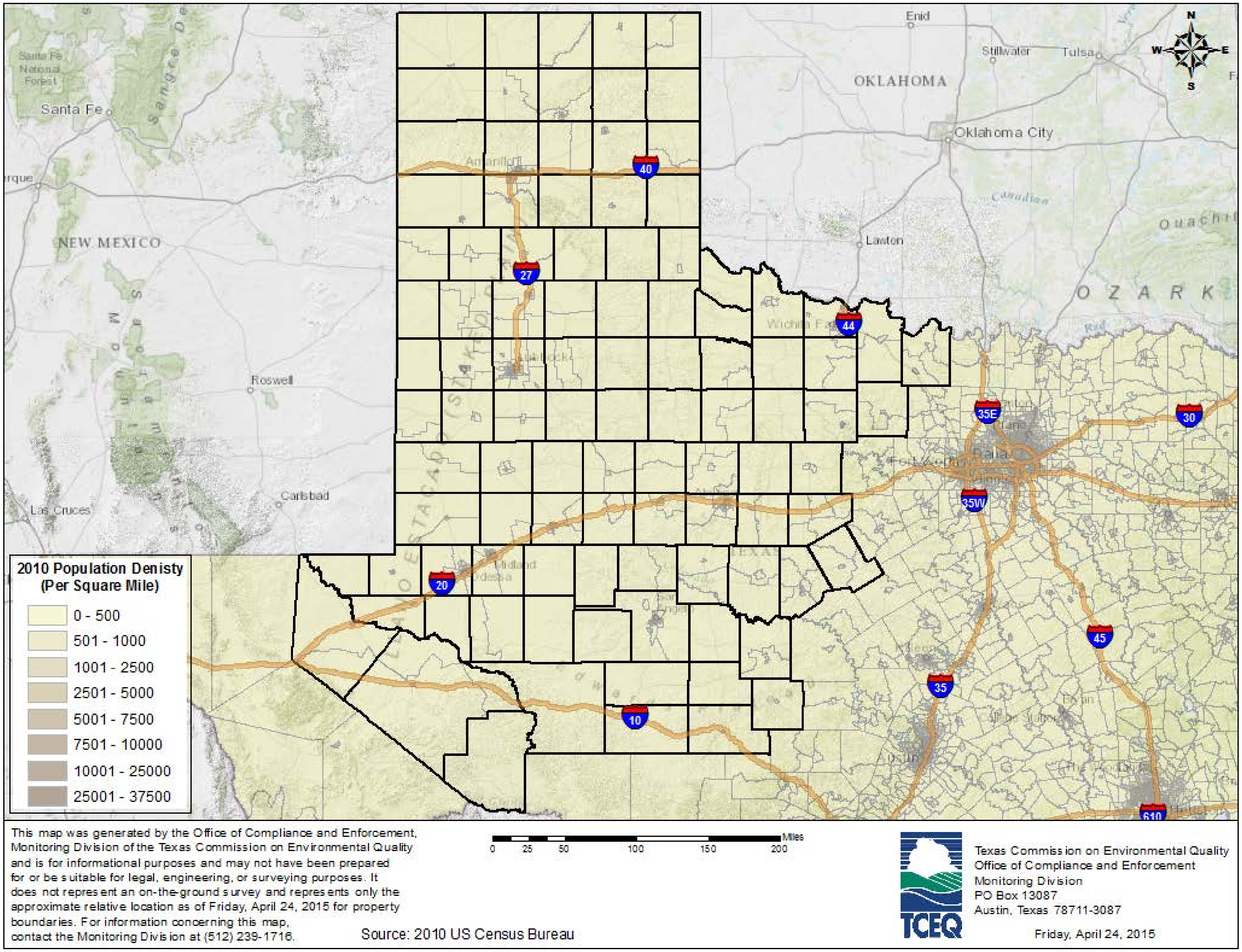



**Figure 79: Panhandle and West Texas Area Population Density**

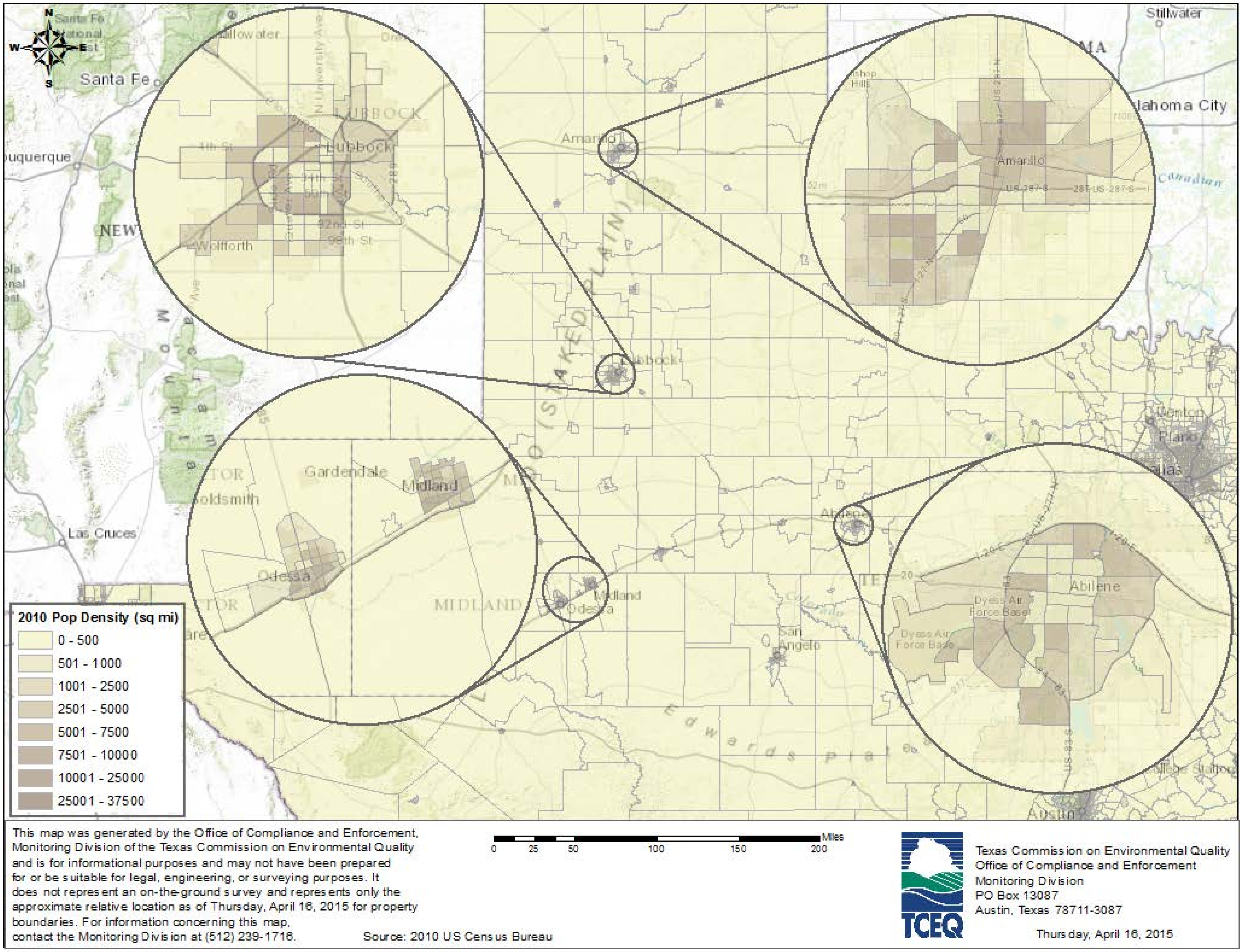



**Figure 80: Panhandle and West Texas Metropolitan Statistical Area Population Density**

# Pollutant Sources

## Anthropogenic Sources

Data from EI source categories show that mobile sources (on-road and non-road) are the dominant contributor of CO (70%), and $NO_x$ (49%) in the Panhandle and West Texas area. Area sources contributed the most $PM_{10}$ (97%), $PM_{2.5}$ (88%), and VOCs (93%). Point sources emitted the vast majority (over 90%) of $SO_2$. Non-road mobile sources (75%) and point sources (25%) accounted for all lead emissions in the Panhandle and West Texas area.

A review of pending and issued air permits within the Panhandle and West Texas area (detailed in Appendix D) indicated that new facilities were well dispersed between Amarillo and Midland and between Midland and Abilene. This review did not identify any new sources that would require additional air quality monitors.

## Natural Sources

The Panhandle and West Texas area is affected by the same seasonal pollutant transport that influences air quality in the North, Coastal, and Far West Texas areas. Regional blowing dust from the White Sands vicinity of New Mexico, eastern New Mexico, and local Texas Panhandle areas can be transported behind strong cold fronts. These regional-scale dust storms occur mainly in the spring, but can develop from late October through the winter and spring into early June. The origin and tracks of these storms can be characterized using satellite imagery and correlated with increased local $PM_{2.5}$ data during these events. Since 2010, the highest $PM_{2.5}$ daily average measured during a regional dust storm event was 40.5 $\mu g/m^3$ in Lubbock on January 22, 2012.

Smoke events that affect the Panhandle and West Texas area are typically prevalent in the summer months. Accumulated smoke and haze from the eastern United States generally arrive in late spring through early fall, while smoke from agricultural burning in Mexico and Central America arrives in April and May. Like dust storms, these events are also often visible on satellite imagery and can be associated with discernable increases in local $PM_{2.5}$. Since 2010, occasional high $PM_{2.5}$ events dominated by transported smoke have resulted in daily averages as high as 18.1 $\mu g/m^3$ as measured in Odessa on April 16, 2013.

# Regional Air Quality

## Criteria Pollutants

As of January 2015, all Panhandle and West Texas geographical areas were classified as attainment/unclassifiable for all the current NAAQS. In June 2010, the primary $SO_2$ NAAQS was revised to a one-hour standard of 75 ppb. The Governor has recommended designating all Texas areas as attainment for the one-hour $SO_2$ NAAQS, but a final action has not been taken by the EPA. Prior to making final determinations on area designations for the revised $SO_2$ standard, the EPA proposed the $SO_2$ Data Requirements Rule. This rule, proposed in April 2014, could result in additional source-oriented $SO_2$ monitoring to characterize ambient air quality around larger area $SO_2$ sources and inform area designations.

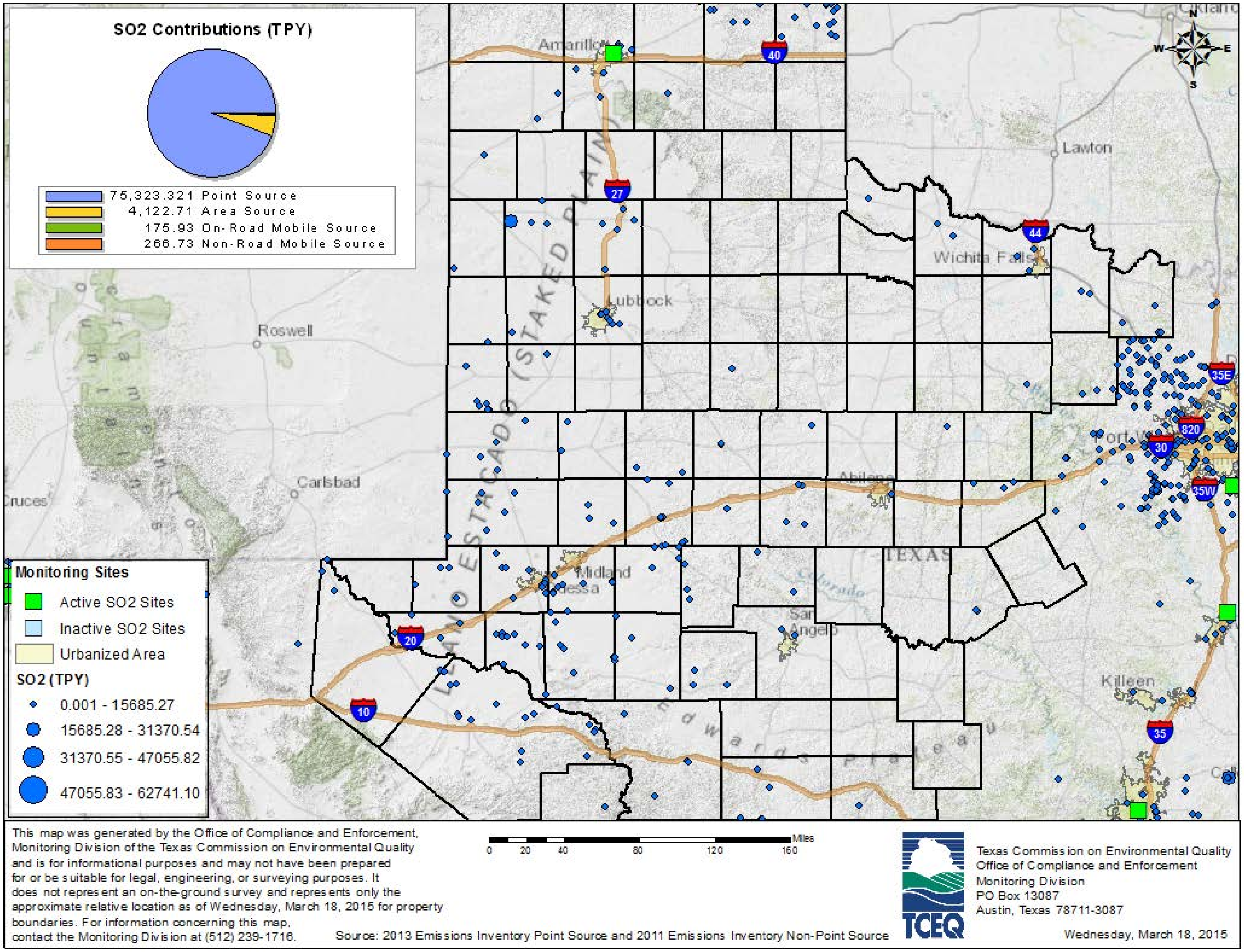
No areas within the Panhandle and West Texas area were listed on the APWL. Review of the area's ambient air data by the TCEQ Toxicology Division indicated that for the last five years annual average concentrations of all reported VOCs were below their long-term AMCVs and would not be expected to cause adverse health effects or odors. The 2014 review of Amarillo air quality data also concluded that with the exception of two samples, 24-hour concentrations of respirable $PM_{10}$ were below the comparison value of 150 $\mu g/m^3$, and the twenty-four hour concentrations of Pb, reported as TSP, were below the comparison value of 0.15 $\mu g/m^3$.

## Monitoring Network Evaluation

### Sulfur Dioxide

#### Network History

As of January 1, 2015, the TCEQ operated one $SO_2$ monitor in the Panhandle and West Texas area. The Amarillo 24th Avenue $SO_2$ monitor, located in northeast Amarillo near the edge of a residential area, was sited to measure $SO_2$ concentrations in a highly populated area. Deployed in 2013, this monitor fulfilled federal monitoring requirements related to the Amarillo MSA's PWEI. Based on PWEI, no other MSA in the Panhandle and West Texas area is required to conduct $SO_2$ monitoring at this time. Locations of point sources and the Amarillo 24th Avenue $SO_2$ monitor are shown in Figure 81. Appendix A lists the area's $SO_2$ monitors, as well as their location, monitoring objectives, and associated spatial scales.




TPY – tons per year

**Figure 81: Panhandle and West Texas Sulfur Dioxide ($SO_2$) Point Sources and Monitor**

### Design Values and Trends

Given the monitor's deployment in 2013, the Amarillo 24th Avenue site has yet to attain three complete years of data for the calculation of an official design value. As a substitute, the TCEQ calculated the 99th percentile of the one-hour daily maximum using the data available. The 99th percentile of daily maximums averaged over two years was 22 ppb, less than 30% of the level of the one-hour $SO_2$ NAAQS of 75 ppb.

### Network Evaluation

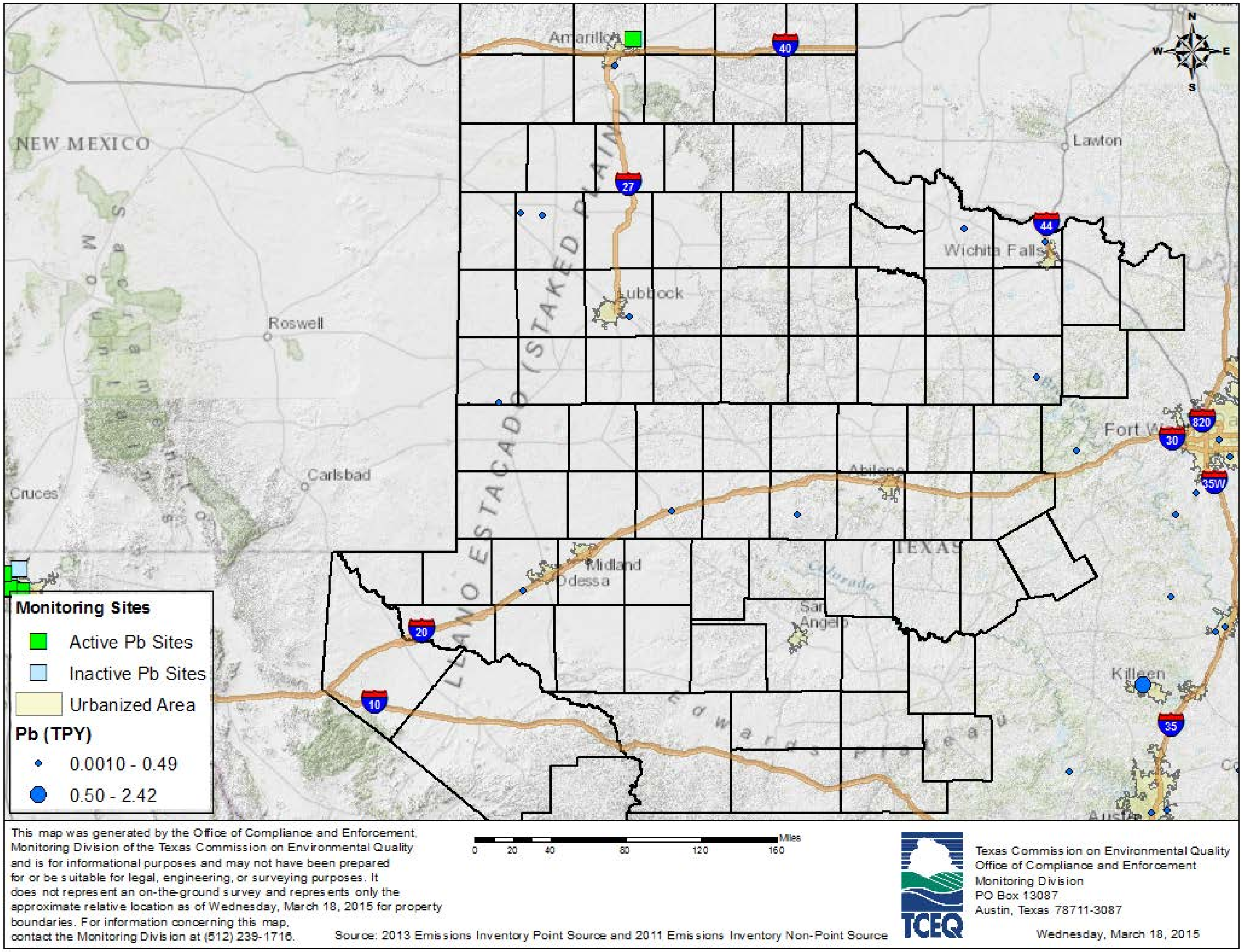
The existing Amarillo 24th Avenue $SO_2$ monitor in the Panhandle and West Texas area exceeds all current federal monitoring requirements, although it continues to meet the original monitoring objective of measuring population exposure. Given the updated EI using 2014 population, 2013 point source emissions, and 2011 non-point source emissions, this $SO_2$ monitor is no longer required for the Amarillo MSA. The $SO_2$ monitor, however, is of high value due to its placement near a major $SO_2$ source (the Xcel Energy Harrington Generation Station).

Due to proposed federal regulatory action and pending designations for the 2010 one-hour $SO_2$ standard, no network changes are currently recommended. Once the EPA's final $SO_2$ Data Requirements Rule is promulgated, the TCEQ will evaluate the existing $SO_2$ network for potential optimization that will provide for compliance with any associated $SO_2$ monitoring requirement changes. These network changes will be included in the *2016 Annual Monitoring Network Plan*.

## Lead

### Network History

As of January 1, 2015, Pb monitoring was only conducted at one monitoring site within the Panhandle and West Texas area as shown in Figure 82. Current federal rules require source-oriented monitoring to measure maximum Pb concentrations near each point source emitting 0.50 tpy or more of Pb and each airport emitting 1.0 tpy or more of Pb based on the NEI or other justifiable method. Based on historically reported Pb point source emissions, one source within the Panhandle and West Texas area has emitted greater than 0.50 tpy of Pb, the ASARCO Copper Refinery. The Amarillo SH 136 monitor was deployed in 2010 to monitor ambient lead concentrations downwind of the ASARCO copper refinery located approximately nine miles north of Amarillo along Texas Highway 136. Based on reported Pb point source emissions within the Panhandle and West Texas area, no additional source-oriented Pb monitoring is required. Appendix A lists the location, monitoring objective, and associated spatial scale for the Amarillo SH 136 Pb monitor.




TPY – tons per year

**Figure 82: Panhandle and West Texas Lead (Pb) Point Sources and Monitor**

### Design Values and Trends

Due to insufficient data, 2014 design values are not available for the Amarillo SH 136 Pb monitor; however, unofficial highest combined site summaries indicate consistently low ambient levels (0.01 µg/m$^3$ in 2011, 0.02 µg/m$^3$ in 2012, 0.00 µg/m$^3$ in 2013, and 0.00 µg/m$^3$ in 2014). Furthermore, 3-month rolling average Pb values collected since 2011 have remained well below the NAAQS level of 0.15 µg/m$^3$.

### Network Evaluation

The existing Pb monitoring network in the Panhandle and West Texas area meets all current federal monitoring requirements and continues to meet existing monitoring objectives. The Amarillo SH 136 Pb monitor, located near the ASARCO Copper Refinery, is considered of high value as it continues to provide valuable data sufficient to understand point source emissions from this facility. Given the reported Pb emissions from existing point sources in the area and low measured concentrations, no additional network changes are recommended at this time. Appendix C provides a detailed description of the assessed value for the Amarillo SH 136 Pb monitor.

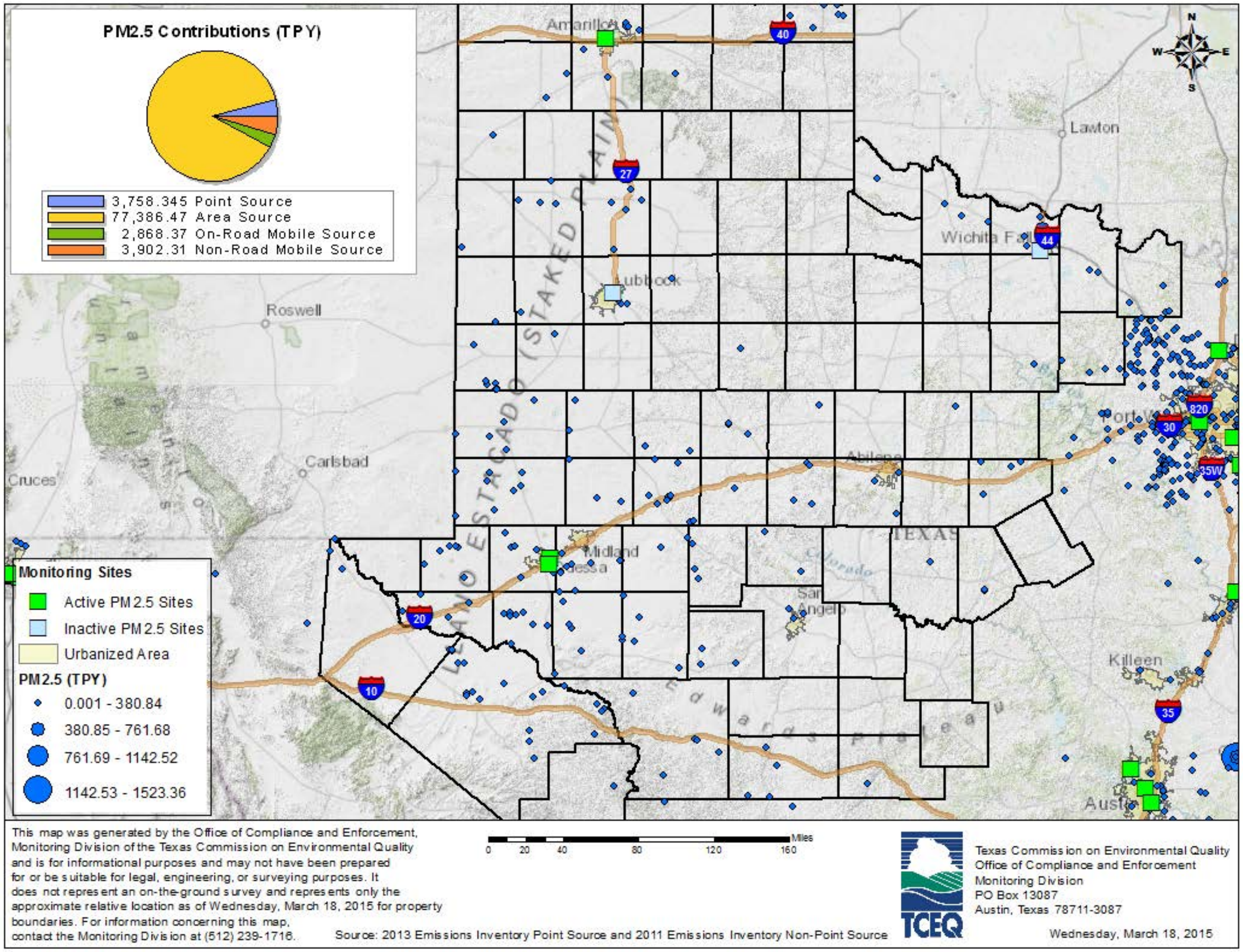
## Particulate Matter of 2.5 Micrometers or Less

### Network History

As of January 1, 2015, the Panhandle and West Texas area $PM_{2.5}$ network consisted of three continuous monitors located in Amarillo and Odessa, as shown in Figure 83. These monitors exceed current regulatory requirements. A continuous $PM_{2.5}$ monitor and $PM_{2.5}$ FRM monitor were deployed at the Amarillo A&M site from 2005 to 2010 to measure ambient concentrations in populated areas of Amarillo. The TCEQ decommissioned the FRM monitor in 2010 and retained the continuous $PM_{2.5}$ monitor due to its importance in evaluating the effect of regional dust storms in the Texas Panhandle. In addition, the Odessa-Hays Elementary School and Odessa Gonzales continuous $PM_{2.5}$ monitors were deployed in 2000 and 2002, respectively, to improve spatial coverage in West Texas and aid in exceptional event support. Both continuous $PM_{2.5}$ monitors provide data representative of ambient conditions in populated areas of Odessa. Since the last five-year assessment, an FRM monitor was decommissioned at the Odessa-Hays Elementary School site in 2010 because of historically low design values and adequate monitoring coverage by the continuous $PM_{2.5}$ monitors in the Odessa area.

The Lubbock area currently does not have any active monitors and two monitors have been decommissioned since the last five-year assessment. The Lubbock $PM_{2.5}$ speciation monitor was decommissioned in 2010 due to low ambient concentrations and low monitor value. The remaining Lubbock $PM_{2.5}$ continuous monitor was decommissioned in November 2014 at the property owner's request to vacate the site. Although not federally required, the continuous $PM_{2.5}$ monitor provided meaningful information about regional transport of $PM_{2.5}$ in the Lubbock area, as well as information on ambient $PM_{2.5}$ conditions in Lubbock's populated urban area. The TCEQ is evaluating potential locations within the MSA and plans to relocate the monitor in late 2015.

The Wichita Falls area currently does not have any active monitors. The continuous $PM_{2.5}$ monitor was decommissioned in 2014 at the property owner's request to vacate the location based on the sale of the property. The monitor was not relocated because it measured very low concentrations historically, was operated beyond minimum requirements, and was of low value.




TPY – tons per year

**Figure 83: Panhandle and West Texas Particulate Matter of 2.5 Micrometers or Less in Diameter ($PM_{2.5}$) Point Sources and Monitors**

## Design Values and Trends

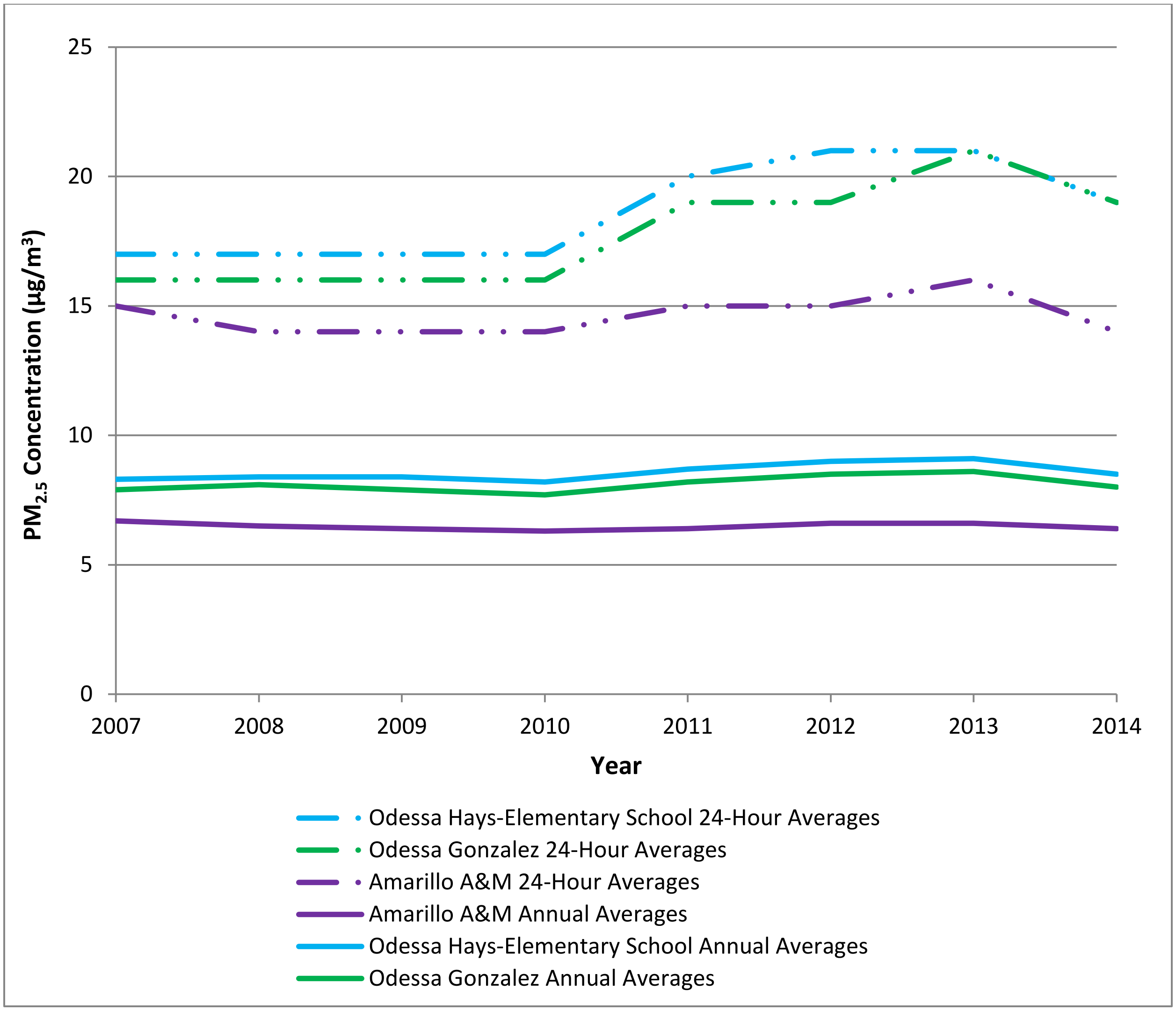
### *Amarillo Area*

Without FRM/FEM monitors to calculate a valid design value, the TCEQ calculated unofficial 24-hour design values for the Amarillo A&M continuous $PM_{2.5}$ monitor using the 98th percentile of 24-hour averages averaged over three year periods. From 2007 until 2014, these unofficial 24-hour design values ranged from 14 to 15 µg/$m^3$, with a peak value of 16 µg/$m^3$ in 2013. The data suggest that ambient concentrations have been stable over the review period and that design values would be less than 50% of the 24-hour NAAQS of 35 µg/$m^3$.

Similarly, the TCEQ calculated unofficial annual design values by averaging annual averages from the Amarillo A&M non-FRM continuous monitor over three year periods. Unofficial annual design values from 2007 through 2014 ranged from 6.3 to 6.7 µg/$m^3$ and indicate consistently low annual concentrations below the level of the annual $PM_{2.5}$ NAAQS of 12 µg/$m^3$.

### *Odessa Area*

Unofficial design values were also calculated for the two continuous $PM_{2.5}$ monitors in the Odessa area. As shown in Figure 84, the 98th percentile of 24-hour measurements that were averaged over three years, as well as annual averages, have consistently remained low. Both data trends indicate an increase in ambient $PM_{2.5}$ concentrations from 2011 through 2013, with a subsequent decrease in 2014.




$PM_{2.5}$ – Particulate Matter of 2.5 Micrometers or Less
µg/m$^3$ - micrograms per cubic meter

**Figure 84: Trends of 98th Percentile of 24-hour and Annual Averages of Particulate Matter of 2.5 Micrometers or Less in Diameter ($PM_{2.5}$) Averages from the Odessa and Amarillo Area Continuous Monitors, 2007-2014**

## Network Evaluation

Area sources are the primary $PM_{2.5}$ contributor in the Panhandle and West Texas areas. Therefore, it is appropriate for the Panhandle and West Texas $PM_{2.5}$ monitoring network to continue to be focused on monitoring concentrations of incoming transported $PM_{2.5}$, rather than evaluating downwind concentrations near smaller, local point sources. As discussed below, the TCEQ has deemed each monitor valuable and does not have plans to decommission any of the current $PM_{2.5}$ monitoring network.

Due to MSA populations, there are no current federal requirements for $PM_{2.5}$ monitors in the Panhandle and West Texas area; however, continuous $PM_{2.5}$ measurements provide meaningful data regarding regional $PM_{2.5}$ transport and exceptional events in areas that have historically been impacted by dust events. For these reasons, the

Amarillo A&M and previous Lubbock $PM_{2.5}$ continuous monitors are considered of high value in understanding ambient conditions in the Texas Panhandle. Monitoring data from the Lubbock area is particularly important because historical concentrations had been as high as 67% of the 24-hour NAAQS. The TCEQ expects to redeploy a continuous $PM_{2.5}$ monitor in the Lubbock area in late 2015.

Similarly, the two existing continuous $PM_{2.5}$ monitors in the Odessa area are considered of medium value because of their locations at elementary schools and the spatial coverage they provide for the West Texas area. Analysis of data from the Odessa-Hays Elementary School and Odessa Gonzales continuous $PM_{2.5}$ monitors indicates the monitors are moderately correlated (Pearson's coefficient=0.939, relative difference=0.111). This correlation is expected due to the close proximity of these two monitors (approximately 4 kilometers apart). With these close data trends, one monitor could provide good coverage to the Odessa network. The TCEQ does not currently have any plans to decommission either monitor, but continues to evaluate the effectiveness of these two closely located monitors.

# Lower Rio Grande Valley Area Evaluation

(Laredo and Harlingen Regions)

## *Lower Rio Grande Valley Area Characteristics*

### Terrain

The Lower Rio Grande Valley area terrain consists of the Southern Texas Plains to the northwest and the Western Gulf Coast Plains near the cities of McAllen and Brownsville. The Southern Texas Plains form a transition zone from the semi-arid area near Del Rio, to the alluvial plains south of the Edwards Plateau area, and the Rio Grande River basin to the south. The landscape decreases in elevation from approximately 2,000 feet near Del Rio in the west to approximately 400 feet near Rio Grande City in the east with periodic topographic variations due to the presence of numerous streams. The Western Gulf Coast Plains extend along the Gulf Coast to just west of McAllen. The terrain is mostly flat nearest the coastline and highly vegetated. (Griffith et al. 2004)

Figure 85 is a topographic map of the area and wind roses from meteorological sensors from ambient air monitoring stations show the pronounced terrain effects of the Rio Grande River basin. Annual wind patterns are dominated by southeast to northwest wind flows from the Gulf of Mexico.

### Climate

The Lower Rio Grande Valley area has a similar sub-tropical climate to the other areas near the coastline. Annual average temperatures have ranged from 71°F to 77°F from 2000 to 2014. Annual precipitation averages between 15 and 30 inches with irregular rainfall patterns often coming in the form of torrential rains from tropical storms. Rainfall has ranged from a low of just over 11 inches per year in 2011 to a high of over 30 inches in 2003 and 2007. (NCDC 2015)

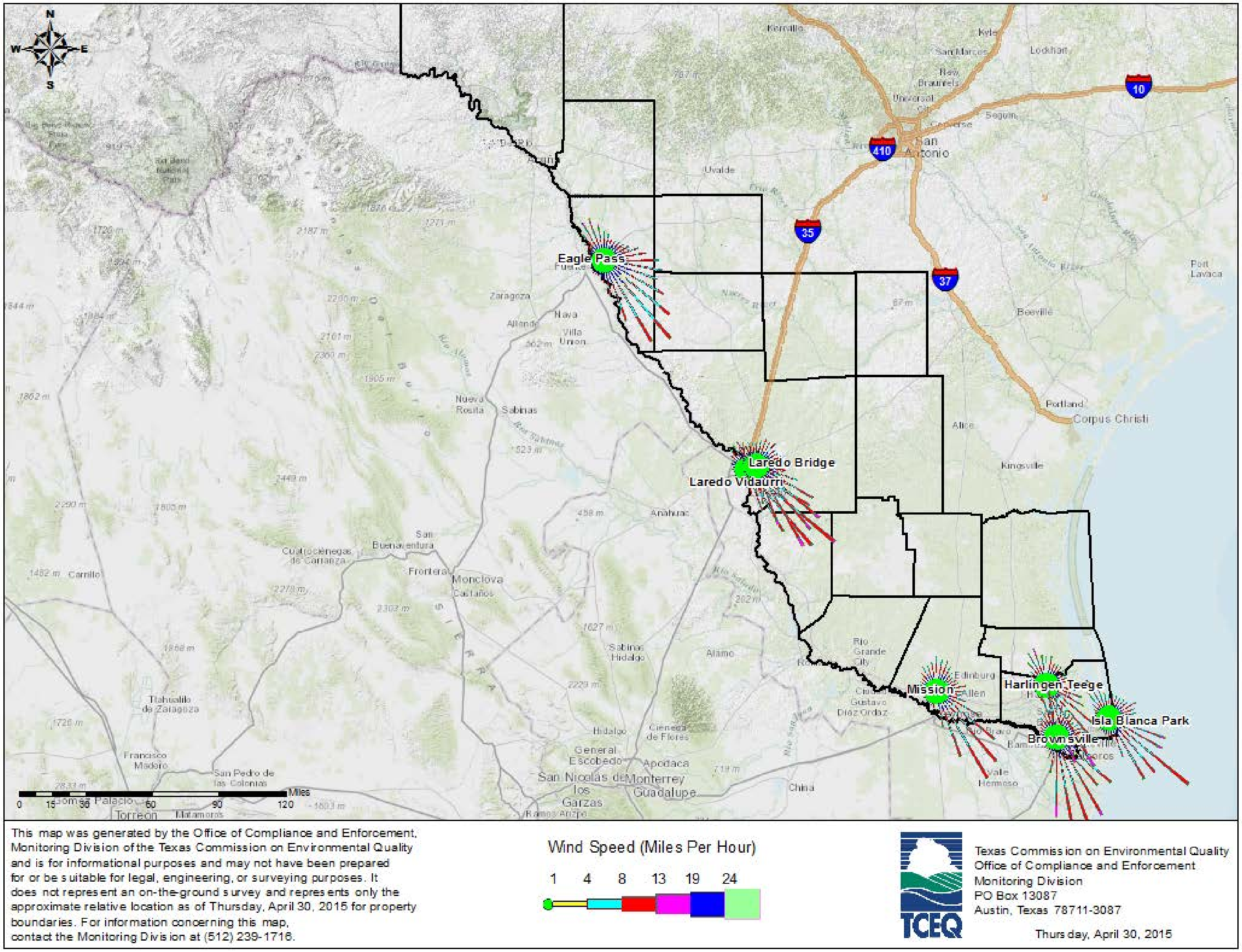



**Figure 85: Lower Rio Grande Valley Area Counties, Population Density, and Wind Data from Ambient Air Quality Monitors**

## Population

As of 2010, there are three MSAs in the Lower Rio Grande Valley area: Brownsville-Harlingen (population 406,000 in Cameron County), McAllen-Edinburg-Mission (population 775,000 in Hidalgo County), and Laredo (population 250,000 in Webb County). Figures 86 and 87 map the population densities across the Lower Rio Grande Valley area based on 2010 United States Census Bureau data. According to 2014 estimates, the McAllen-Edinburg-Mission MSA is the largest population center with over 831,000 people. The Brownsville-Harlingen MSA had approximately 420,000 people and the Laredo MSA had approximately 267,000 people.

Based on these 2014 population estimates and 2014 design values, a minimum of one ozone, one $NO_2$, two $PM_{2.5}$, and between two and four $PM_{10}$ monitors are required in the McAllen-Edinburg-Mission MSA to comply with monitoring network design criteria requirements in 40 CFR Part 58, Appendix D, Section 4. In addition, one ozone monitor and up to one $PM_{10}$ monitor are required in the Brownsville-Harlingen MSA, and one ozone monitor and up to one $PM_{10}$ monitors are required in the Laredo MSA.

According to the Texas State Data Center, the McAllen-Edinburg-Mission MSA will experience the state's second highest population growth (23%) by 2020. Populations in this MSA are projected to reach over 1 million by 2020, which would impact the numbers and types of federally required air quality monitors in the area. If these population projections are accurate, the minimum monitoring requirements for the McAllen-Edinburg-Mission MSA would increase to include one near-road CO, one area wide $NO_2$, two to three $PM_{2.5}$, and between four and eight $PM_{10}$ monitors by 2020. The Laredo MSA population is projected to reach 317,000 people by 2020, a growth rate of approximately 21%. The Brownsville-Harlingen MSA is projected to have a slightly slower growth rate (18%), but the population is not expected to exceed 500,000 people by 2020. No additional monitors would be required in the Brownsville-Harlingen or Laredo MSAs.

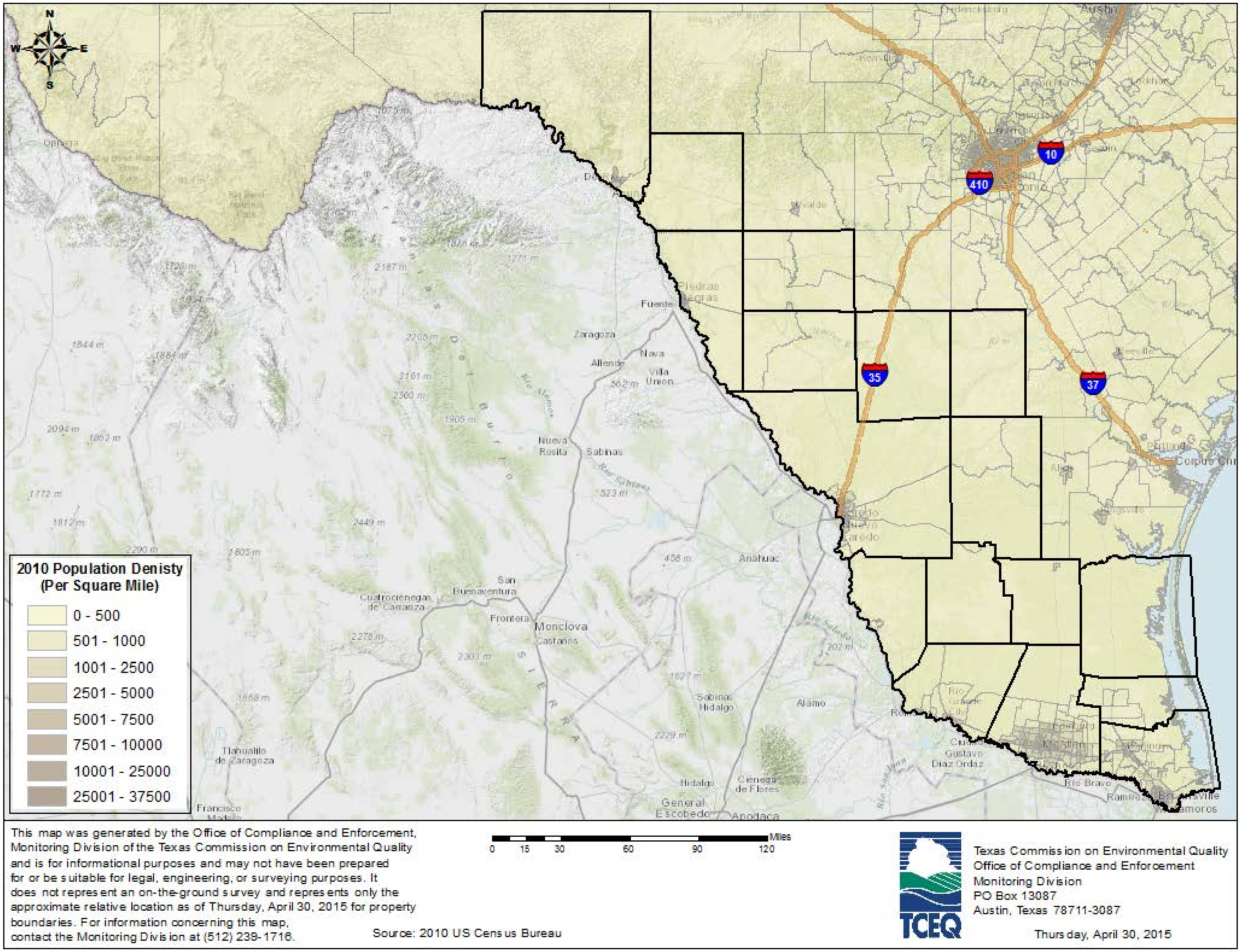



**Figure 86: Lower Rio Grande Valley Area Population Density**

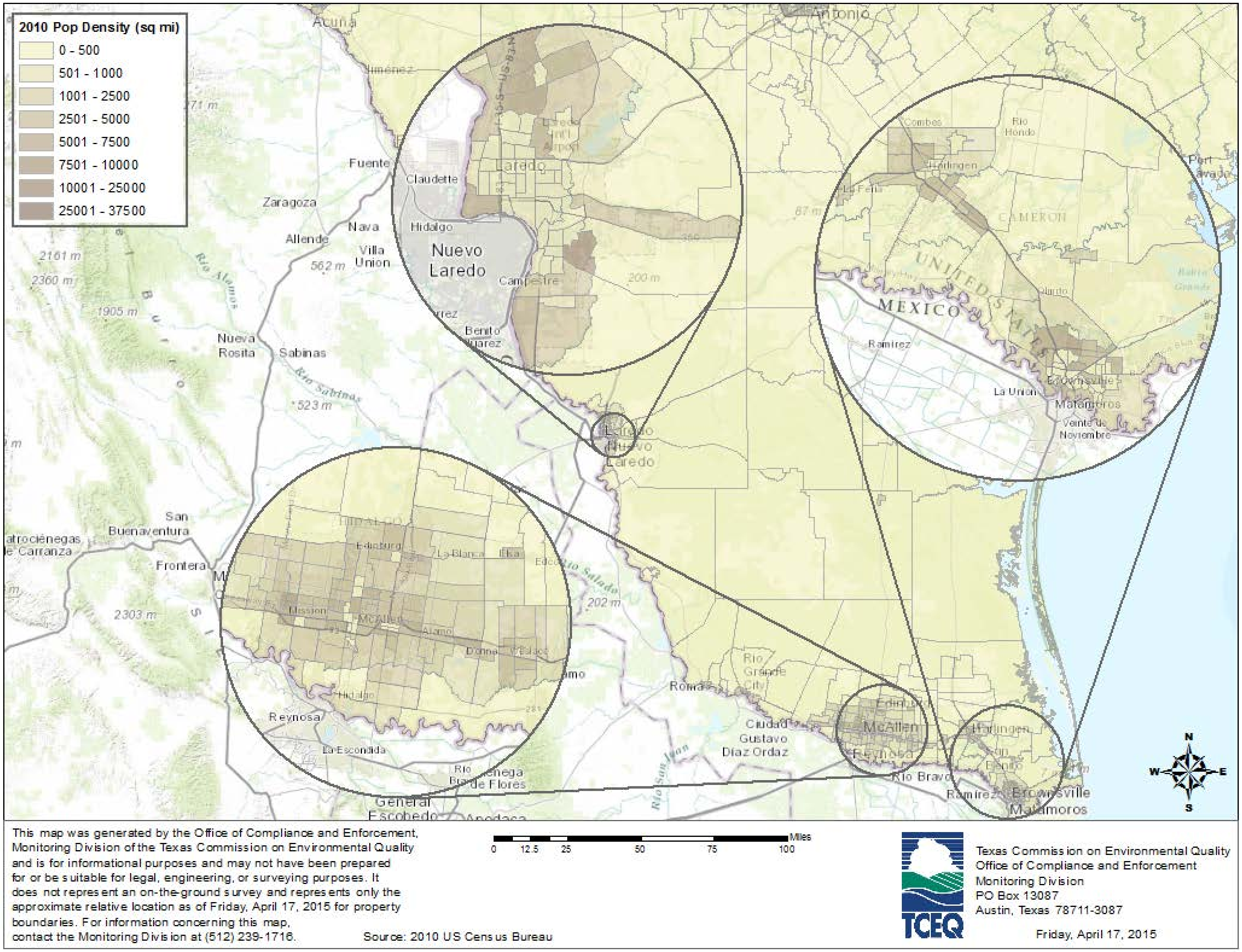



**Figure 87: Lower Rio Grande Valley Metropolitan Statistical Area Population Density**

## Pollutant Sources

### Anthropogenic Sources

Mobile sources (on-road and non-road) are the dominant contributor of CO (88%) in the Lower Rio Grande Valley area. $NO_x$ is primarily emitted by area (38%) and on-road mobile (37%) sources. Area sources contribute the most $PM_{10}$ (97%), $PM_{2.5}$ (85%), and VOCs (85%). Area sources emitted the majority (55%) of $SO_2$, followed by point sources (34%). Finally, non-road mobile sources accounted for all Pb emissions in the Lower Rio Grande Valley area.

The TCEQ reviewed pending and issued air permits within the Lower Rio Grande Valley area (detailed in Appendix D). Three new facilities were located to the northwest and northeast of the Eagle Pass monitor, but the other eight new facilities were located near Mission and along Interstate 69E between Harlingen and Brownsville. Existing monitoring locations in the Mission, Harlingen, and Brownsville areas and the upcoming Edinburg monitor are near these new facilities and are sufficient to evaluate air quality in this area. No additional monitors are considered necessary.

### Natural Sources

Monitors near the coastline, particularly Isla Blanca Park, have historically been impacted by elevated incoming $PM_{2.5}$ concentrations as a result of long-range transport, as evidenced by speciation data, satellite imagery, wind flow patterns, and back trajectories. African dust from the Saharan Desert typically impacts the coastal area three to six times each summer. Daily average $PM_{2.5}$ concentrations can reach as high as 23 $\mu g/m^3$ or more during these transported dust events. Smoke is generally associated with abnormally high organic carbon concentrations. Smoke from agricultural burning in Mexico and Central America typically affects the Lower Rio Grande Valley area from April to early June each year when the winds bring in air from eastern Mexico and Central America. More detailed information about these natural events is available in the TCEQ's Houston $PM_{2.5}$ exceptional events demonstration packages for 2010, 2011, and 2012.

## *Regional Air Quality*

### Criteria Pollutants

As of January 2015, all Lower Rio Grande Valley geographical areas were classified as attainment/unclassifiable for the current NAAQS. In addition, there are no current or historical APWL areas based on air toxics monitoring.

In June 2010, the primary $SO_2$ NAAQS was revised to a one-hour standard of 75 ppb. The Governor has recommended designating all Texas areas as attainment for the one-hour $SO_2$ NAAQS, but a final action has not been taken by the EPA. Prior to making final determinations on area designations for the revised $SO_2$ standard, the EPA proposed the $SO_2$ Data Requirements Rule. This rule, proposed in April 2014, could result in additional source-oriented $SO_2$ monitoring to characterize ambient air quality around larger area $SO_2$ sources and inform area designations.

# *Monitoring Network Evaluation*

## Ozone

### Network History

As of January 1, 2015, four ozone monitors were operating in the Lower Rio Grande Valley area. Ozone monitoring in the area began in the 1990s with deployment of the Brownsville monitor. In the late 1990s, the ozone monitoring network expanded in other urban areas to include ozone monitoring in the Laredo and Mission areas to evaluate ozone concentrations in populated areas. Appendix A provides a full list of both active and recently decommissioned ozone monitors, as well as their locations, monitoring objectives, and associated spatial scales.

Since the last five-year assessment period, two ozone network changes occurred in the Lower Rio Grande Valley area. In 2011, the Brownsville ozone design value resulted in the need for an additional ozone monitor in the Brownsville-Harlingen MSA. To meet this requirement, the Mercedes ozone monitor in the McAllen-Edinburg-Mission MSA was moved to the Harlingen Teege site in 2012. Figure 88 provides a map illustrating the active and inactive ozone monitors across the Brownsville-Harlingen and McAllen-Edinburg-Mission MSA. In addition, in 2011, construction in the vicinity of the Laredo Vidaurri site prompted a relocation of the site, including the ozone monitor. The new Laredo Vidaurri site, deployed in 2012, is within one kilometer of the old site, and the AQS number did not change. Figure 89 provides a map illustrating the active ozone monitors across the Laredo MSA.

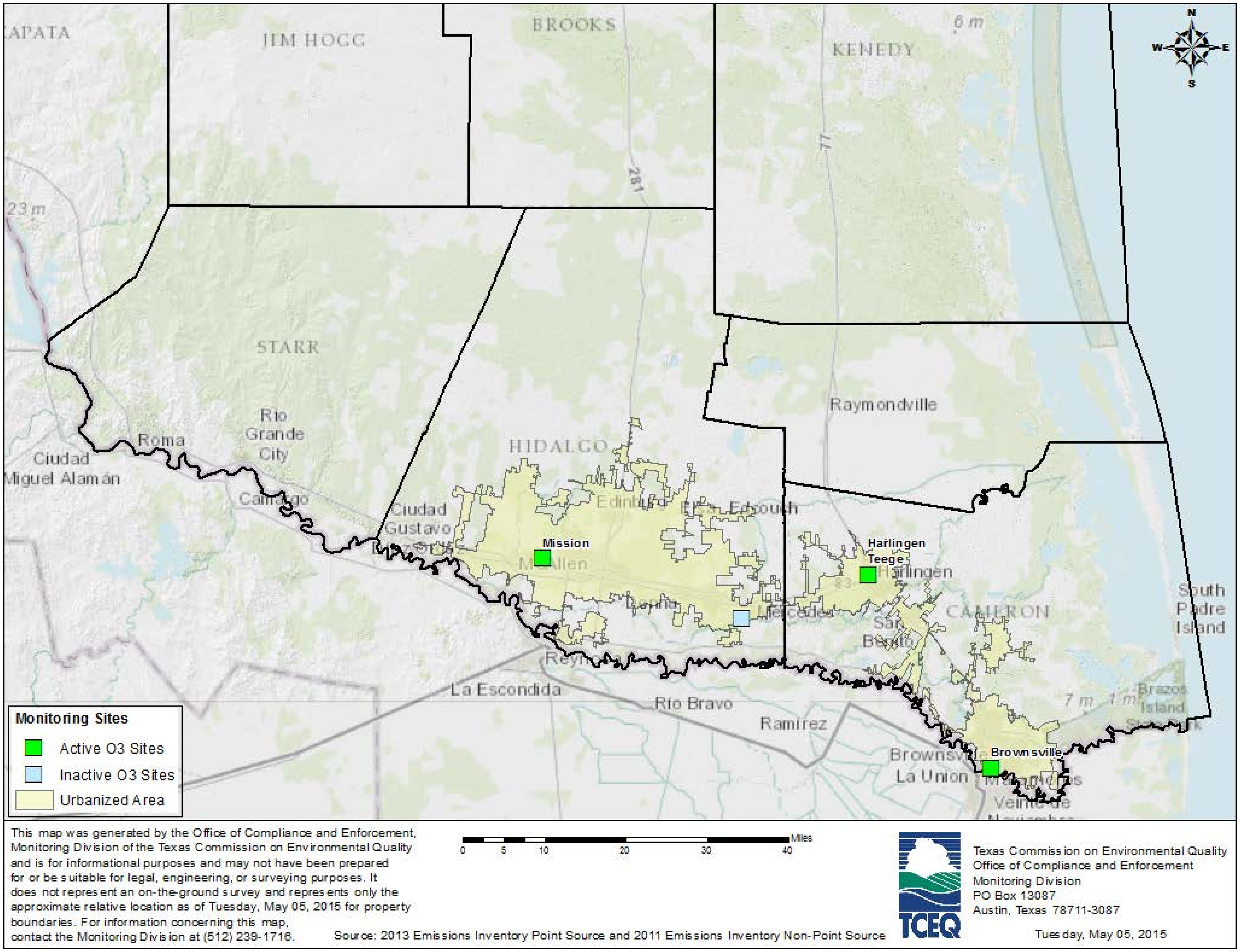



**Figure 88: McAllen-Edinburg-Mission and Brownsville-Harlingen Area Ozone ($O_3$) Monitors**

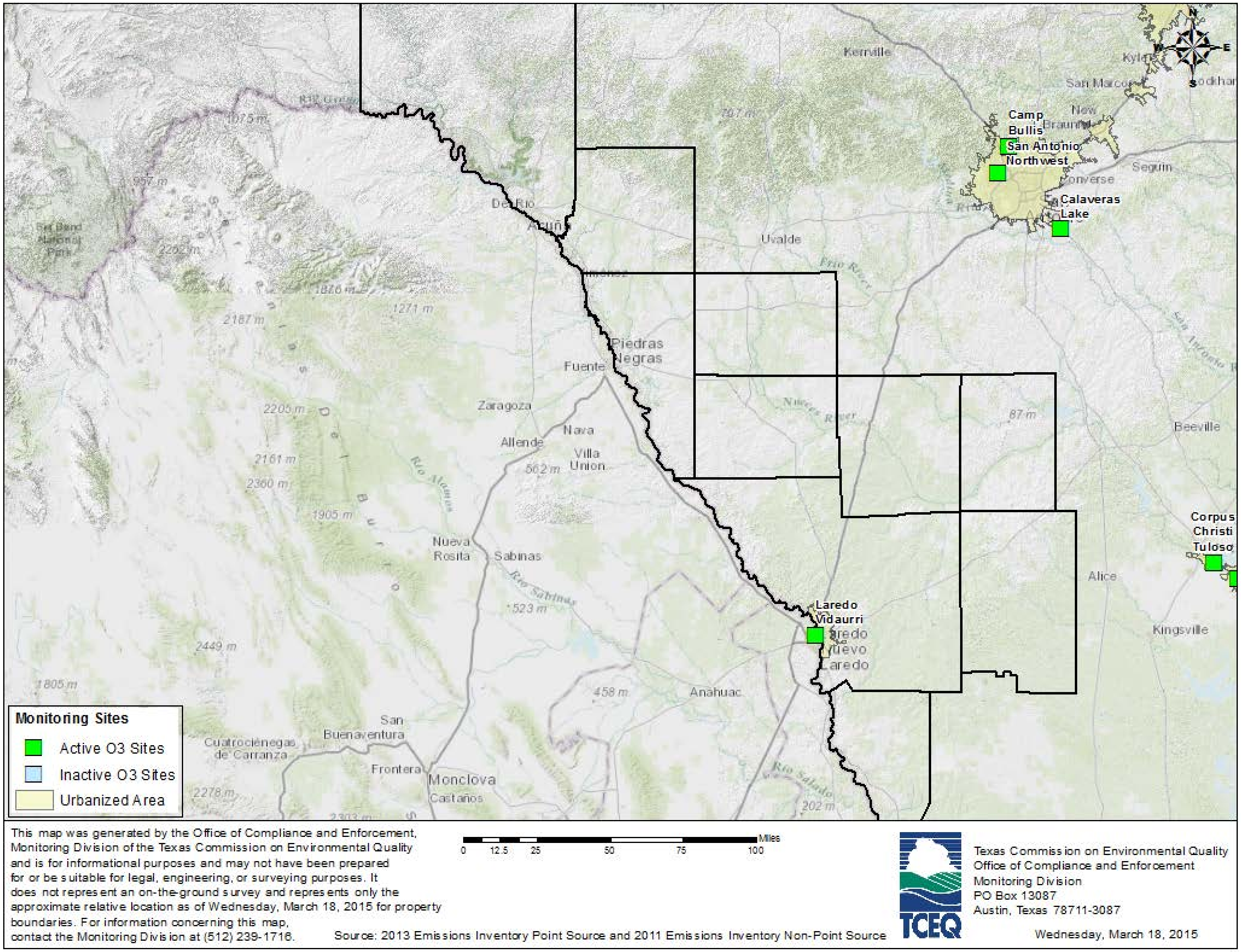



**Figure 89: Laredo Area Ozone ($O_3$) Monitors**

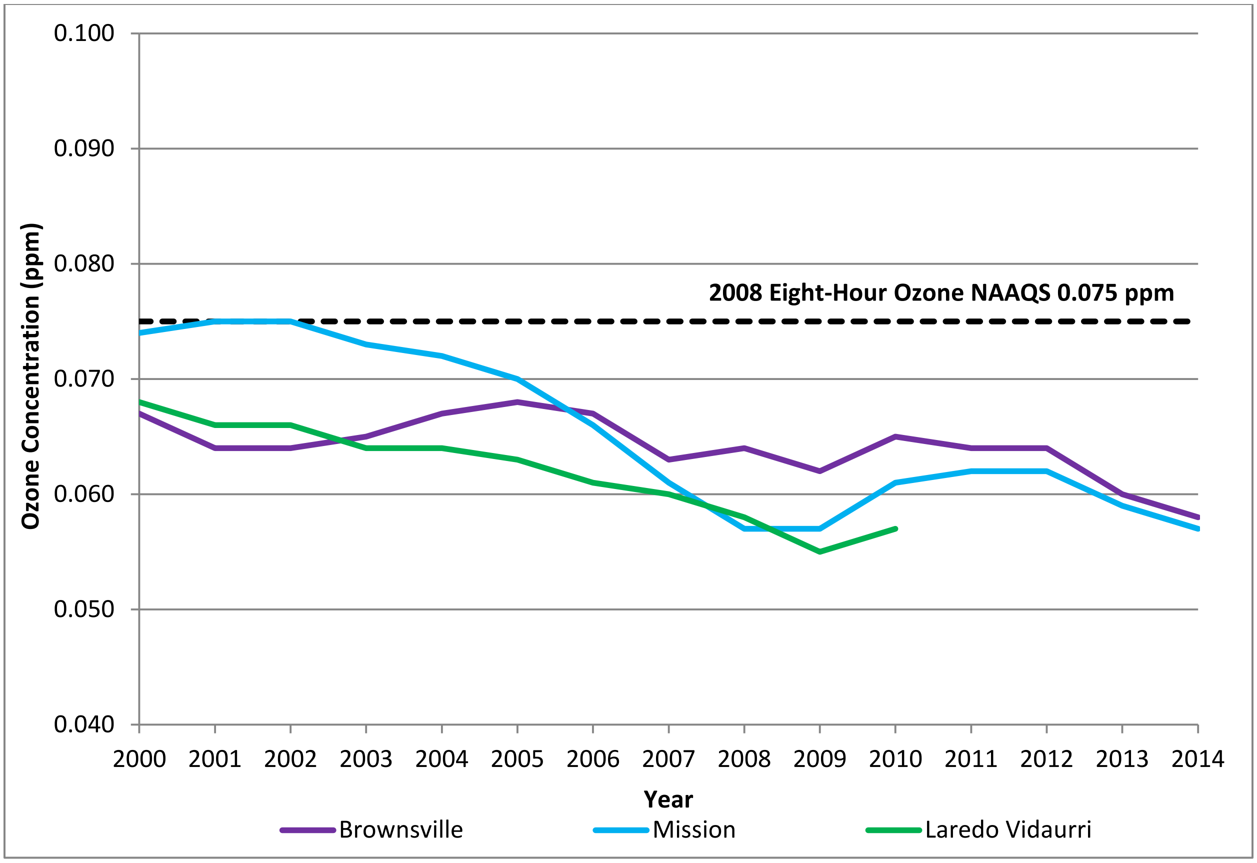
### Design Values and Trends

Eight-hour ozone design value trends have exhibited an overall decline in the Lower Rio Grande Valley area since 2000 and remain below the 2008 eight-hour ozone NAAQS as shown in Figure 90.

The fourth highest daily maximum ozone value for Laredo Vidaurri, 0.057 ppm, was evaluated since ozone design values are not available for this monitor from 2012 to 2014 due to the site relocation during that period. Laredo Vidaurri had the second lowest 2014 fourth highest daily maximum ozone concentration in the state; the lowest occurred at Mission.

Brownsville-Harlingen area eight-hour ozone design values have declined overall since the early 2000s and are also among the lowest in the state. The 2014 ozone design value for the Brownsville monitor is 0.058 ppm. The Harlingen Teege monitor design values will be available in 2015 when the monitor has three complete years of data however, the 2014 fourth highest daily maximum ozone concentration was 0.059 ppm.

Consistent with the rest of the Lower Rio Grande Valley area, eight-hour ozone design values show an overall decline in Mission. Ozone levels in Mission have decreased from levels of 0.075 ppm in 2000 to 0.057 ppm in 2014. The Mission eight-hour ozone design value and the 2014 fourth highest daily maximum ozone concentration are both the lowest in the state.




ppm – parts per million

NAAQS – National Ambient Air Quality Standards

Laredo Vidaurri monitor design values for 2011-2014 are unavailable due to incomplete data.

**Figure 90: Eight-Hour Ozone Design Value Trends in the Lower Rio Grande Valley Area, 2000-2014**

## Network Evaluation

The Brownsville, Harlingen Teege, and Mission ozone monitors fulfill federal monitoring requirements based on each area's population and design values, and continue to meet established monitoring objectives. The Brownsville ozone monitor provides data on ozone transport into the populated Brownsville area downwind of Matamoros, Mexico. Ozone data from the Harlingen Teege monitor supports understanding of ambient ozone concentrations in a growing, populated area, air quality mapping, and air quality forecasting. Each Lower Rio Grande Valley area ozone monitor is located to be representative of an urban core environment and densely populated areas and can be impacted from international emissions. All three monitors are considered of high value.

Based on population and monitoring data, there are no requirements for ozone monitoring in Laredo. However, the Laredo Vidaurri ozone data supports evaluation of ambient ozone trends in a growing area and provides meaningful data about international transport of ozone into South Texas and is thus considered high value.

Figure 91 shows the correlation analysis to assess redundancy between the Lower Rio Grande Valley area ozone sites. Monitors are identified by AQS numbers, which can be referenced in Appendix A. The Brownsville (AQS 48-061-0006) and Harlingen Teege (AQS 48-061-1023) monitors appear to be highly correlated (Pearson's coefficient=0.949, relative difference=0.145). However, the distance between the monitors is too great for the monitors to be considered redundant, and each site is independently valuable.

Given the historical ozone concentrations, prevailing winds, and increased population in these areas, the ozone monitor placement along and near the international border continues to be appropriate. The four active ozone monitors in the Lower Rio Grande Valley area are considered of high value. These monitors cover multiple monitoring objectives including measuring maximum concentrations and upwind/downwind concentrations in populated locations. Appendix C provides a detailed description of the value of each active ozone monitor.

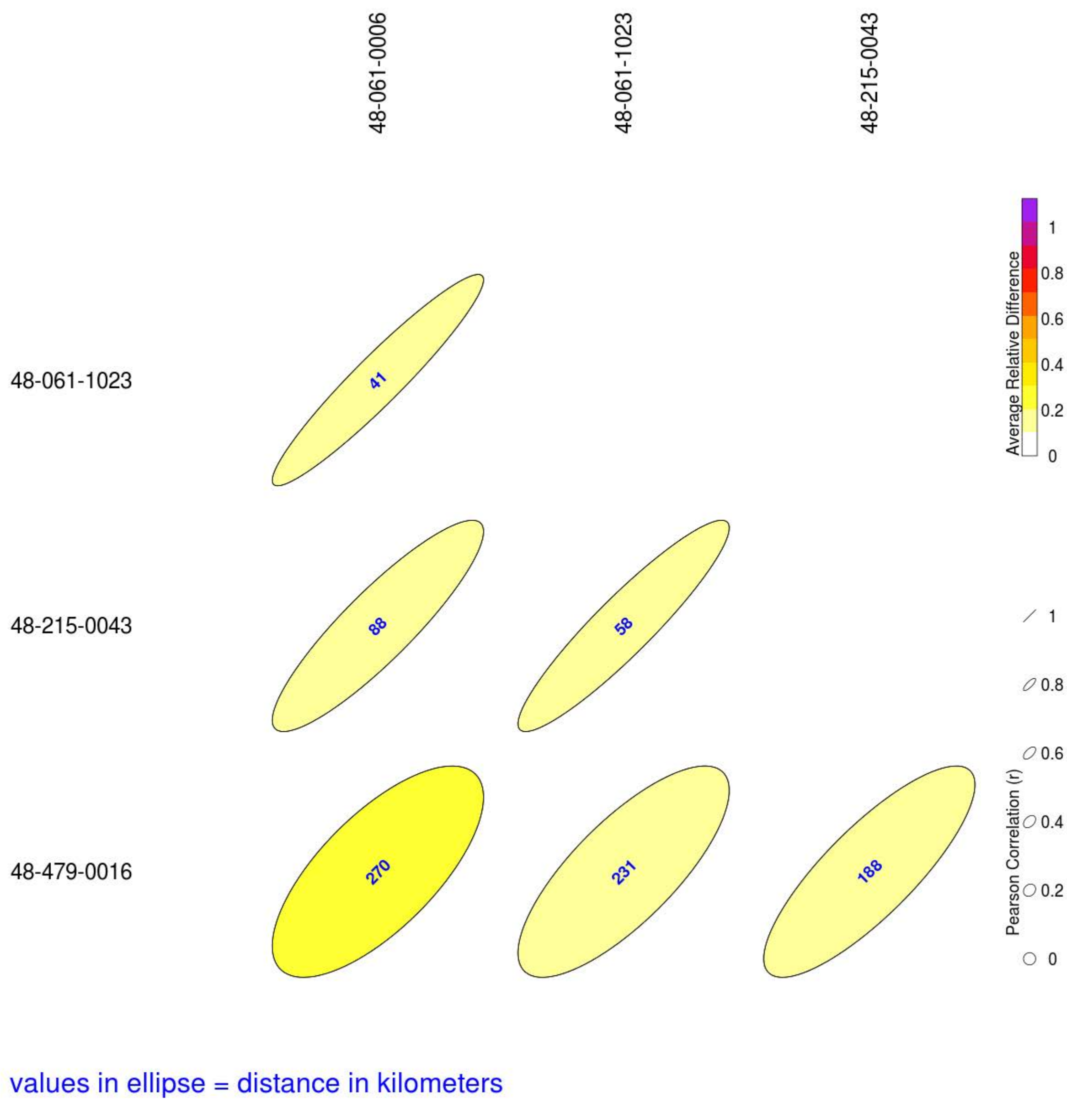



**Figure 91: Eight-Hour Daily Maximum Ozone Correlation Matrix in the Lower Rio Grande Valley Area, 2011-2013**

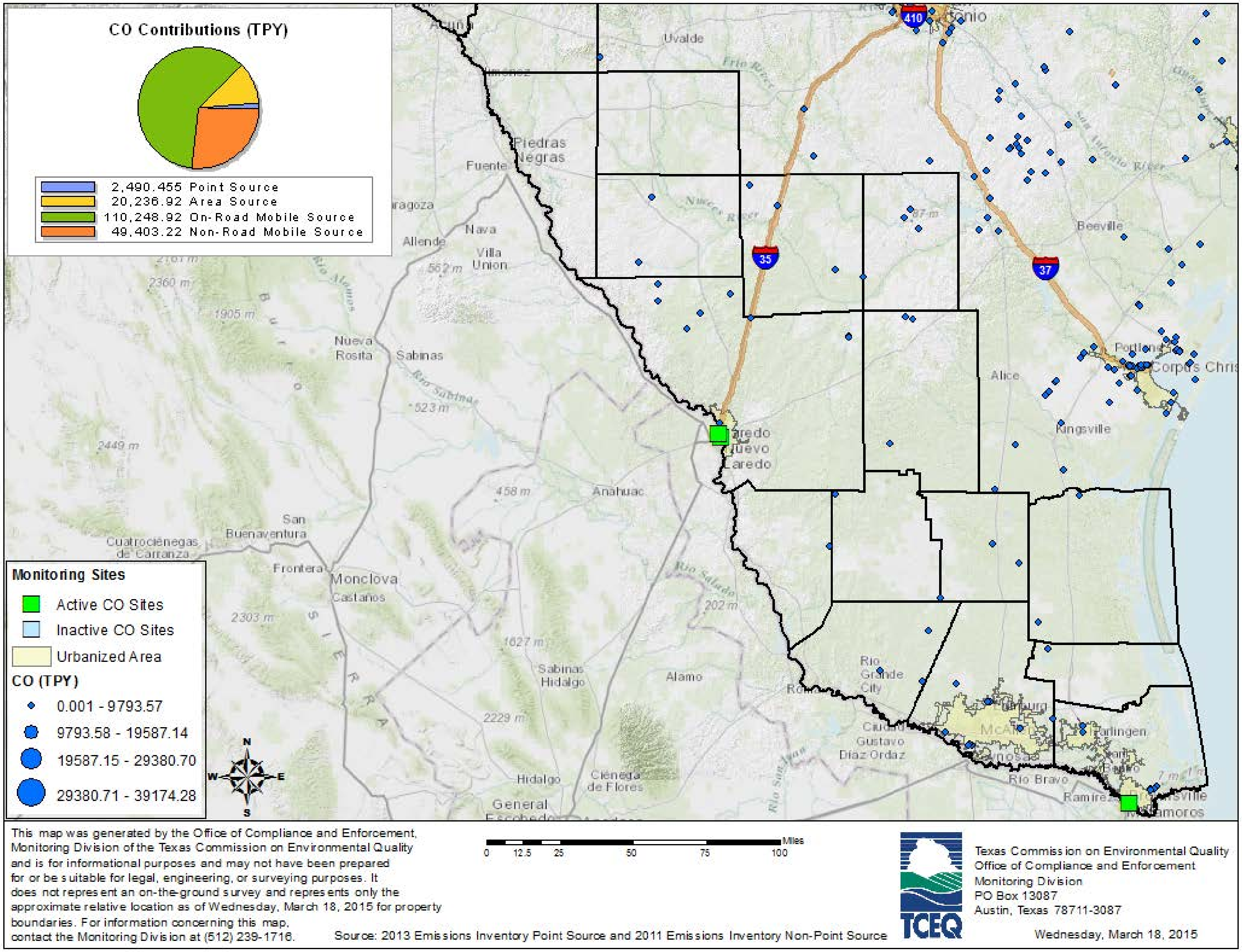
# Carbon Monoxide

## Network History

Three CO monitors are operating across the Lower Rio Grande Valley area at the Brownsville, Laredo Vidaurri, and Laredo Bridge sites. Each of these three monitors provide more than 10 years of data history. The CO monitors were deployed in populated areas likely to have maximum concentrations and near areas of concentrated mobile source activities. Currently there are no federal minimum CO monitoring requirements applicable to the Lower Rio Grande Valley areas.

In 2011, construction near the Laredo Vidaurri site prompted a relocation of the site, including the CO monitor. The new Laredo Vidaurri site, deployed in 2012, is within one kilometer of the old site and the AQS number remained the same.

Appendix A provides a full list of active CO monitors, as well as their location, monitoring objectives, and associated special scales. Monitoring locations and CO point sources for the Lower Rio Grande Valley area are shown in Figure 92.




TPY – tons per year

**Figure 92: Lower Rio Grande Valley Area Carbon Monoxide (CO) Point Sources and Monitors**

### Design Values and Trends

Since 2000, CO design values in the Lower Rio Grande Valley area have remained well below the one-hour CO NAAQS of 35 ppm and the eight-hour CO NAAQS of 9 ppm. Based on 2014 data, CO one-hour design values ranged from 1.3 to 2.9 ppm, and CO eight-hour design values ranged from 0.7 to 1.4 ppm for the Brownsville, Laredo Vidaurri, and Laredo Bridge sites.

### Network Evaluation

The existing Lower Rio Grande Valley area CO monitoring network meets all current federal monitoring requirements and is adequate to evaluate existing monitoring objectives and the minimal impact CO has on regional air quality. Each of the three monitors is considered of medium value. Except for mobile sources that account for 88% of CO emissions in the region, there are no other significant CO sources in the area. Given the historical CO design values in both the Brownsville and Laredo areas, no additional network changes are recommended at this time.

## Oxides of Nitrogen

As of January 2015, the Lower Rio Grande Valley geographical area was designated attainment/unclassifiable with the current ozone standard and does not trigger ozone precursor monitoring associated with PAMS requirements. Area populations are not large enough to trigger current near-road monitoring requirements. Therefore, no $NO_x$ monitors are currently being operated under federal obligation in the Lower Rio Grande Valley area.

$NO_2$ concentrations have generally been on a downward trend across the state, and concentrations in heavily populated areas - those likely to have the highest traffic congestion and, therefore, higher mobile source contributions and elevated ambient concentrations - have remained well below the NAAQS. Further, there are no significant $NO_2$ point sources in the Lower Rio Grande Valley area. No new $NO_x$ monitors are considered necessary at this time. The TCEQ will reevaluate the network once the EPA finalizes its proposed ozone rule, as PAMS requirements and ozone nonattainment areas are likely to change.

The McAllen-Edinburg-Mission area will be required to have one near-road $NO_x$ monitor by January 1, 2017. The analysis and selection process for this site will be detailed in the *2016 Annual Monitoring Network Plan* released for public comment.

## Sulfur Dioxide

Federal requirements for $SO_2$ monitoring are determined by the area's PWEI. Because of smaller MSA populations and lack of major $SO_2$ point sources in the Lower Rio Grande Valley area, $SO_2$ monitors are not required or operated by the TCEQ. Even with thresholds in the EPA's proposed Data Requirements Rule, monitors would not be considered necessary in this area. The TCEQ will continue to evaluate population and point source emission trends to determine future monitoring needs.

# Lead

## Network History

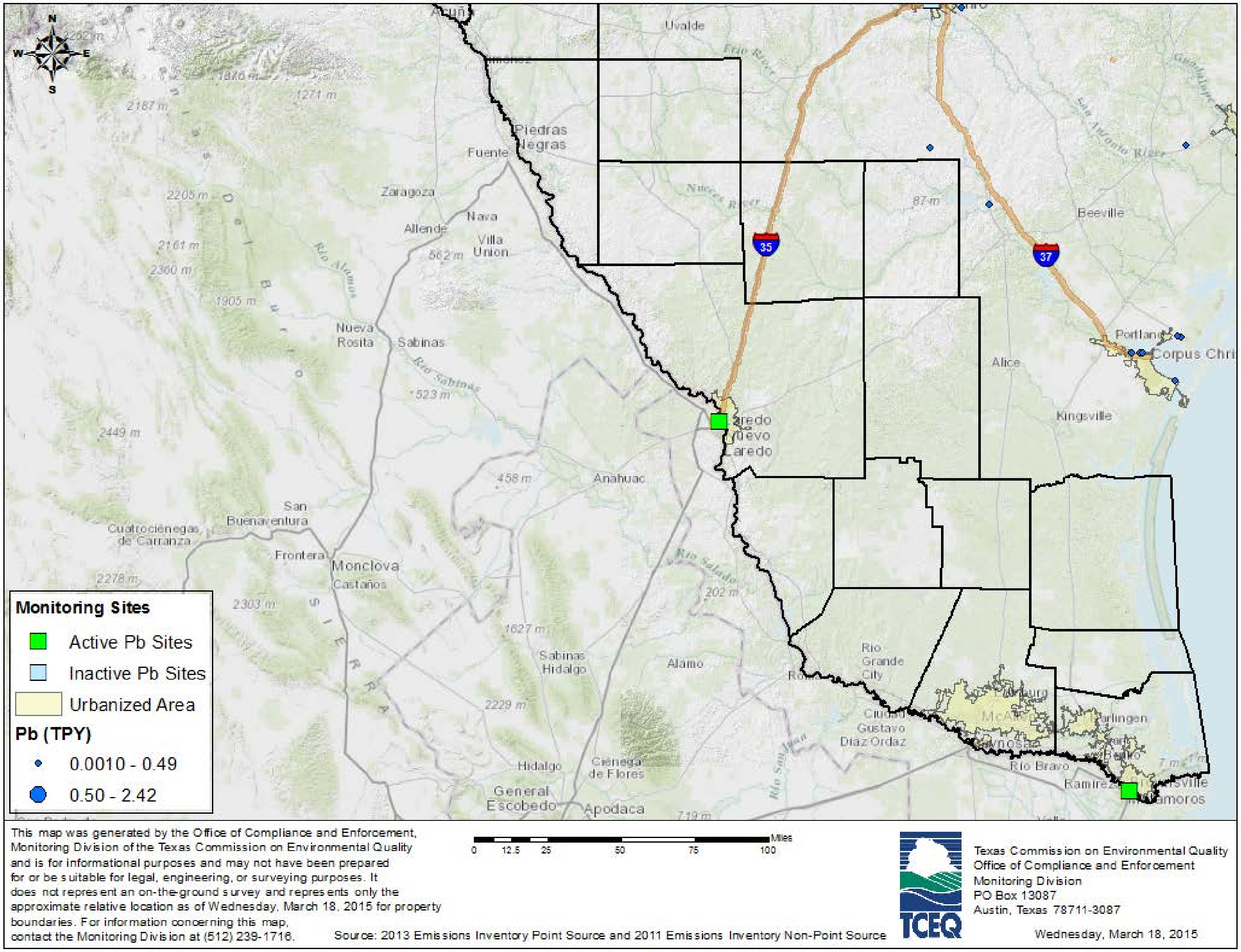
As of January 1, 2015, Pb monitoring was conducted at two locations within the Lower Rio Grande Valley area, as shown in Figure 93. The Brownsville Pb monitor was deployed in 1995, and the Laredo Vidaurri Pb monitor was deployed in 1996, but was temporarily shut down for relocation in 2011. Pb monitors are not federally required in the Lower Rio Grande Valley area due to the lack of major Pb sources. However, both Pb monitors were sited to evaluate ambient Pb concentrations in populated areas downwind of a grouping of industrial sources in Mexico.

## Design Values and Trends

No valid 2014 design values are available for the Laredo Vidaurri and Brownsville Pb monitors due to incomplete data. Unofficial highest combined site summaries for Laredo Vidaurri (0.01 $\mu g/m^3$ in 2012, 0.01 $\mu g/m^3$ in 2013, and 0.00 $\mu g/m^3$ in 2014) and for Brownsville (0.01 $\mu g/m^3$ in 2012, 0.00 $\mu g/m^3$ in 2013, and 0.01 $\mu g/m^3$ in 2014) indicate consistently low ambient levels. Furthermore, three-month rolling average Pb values at both sites collected since 2012 have remained well below the NAAQS level of 0.15 $\mu g/m^3$.

## Network Evaluation

The existing Pb monitoring network in the Lower Rio Grande Valley area exceeds all current federal monitoring requirements and continues to meet existing monitoring objectives. However, the ambient Pb data from these two locations is considered of medium value as it continues to provide valuable data regarding international Pb transport into border areas. No additional Pb network changes are recommended for the Lower Rio Grande Valley area at this time. Appendix C provides a detailed description of the assessed values for the Brownsville and Laredo Vidaurri Pb monitors.




TPY – tons per year

**Figure 93: Lower Rio Grande Valley Area Lead (Pb) Point Sources and Monitors**

## Particulate Matter of 2.5 Micrometers or Less

### Network History

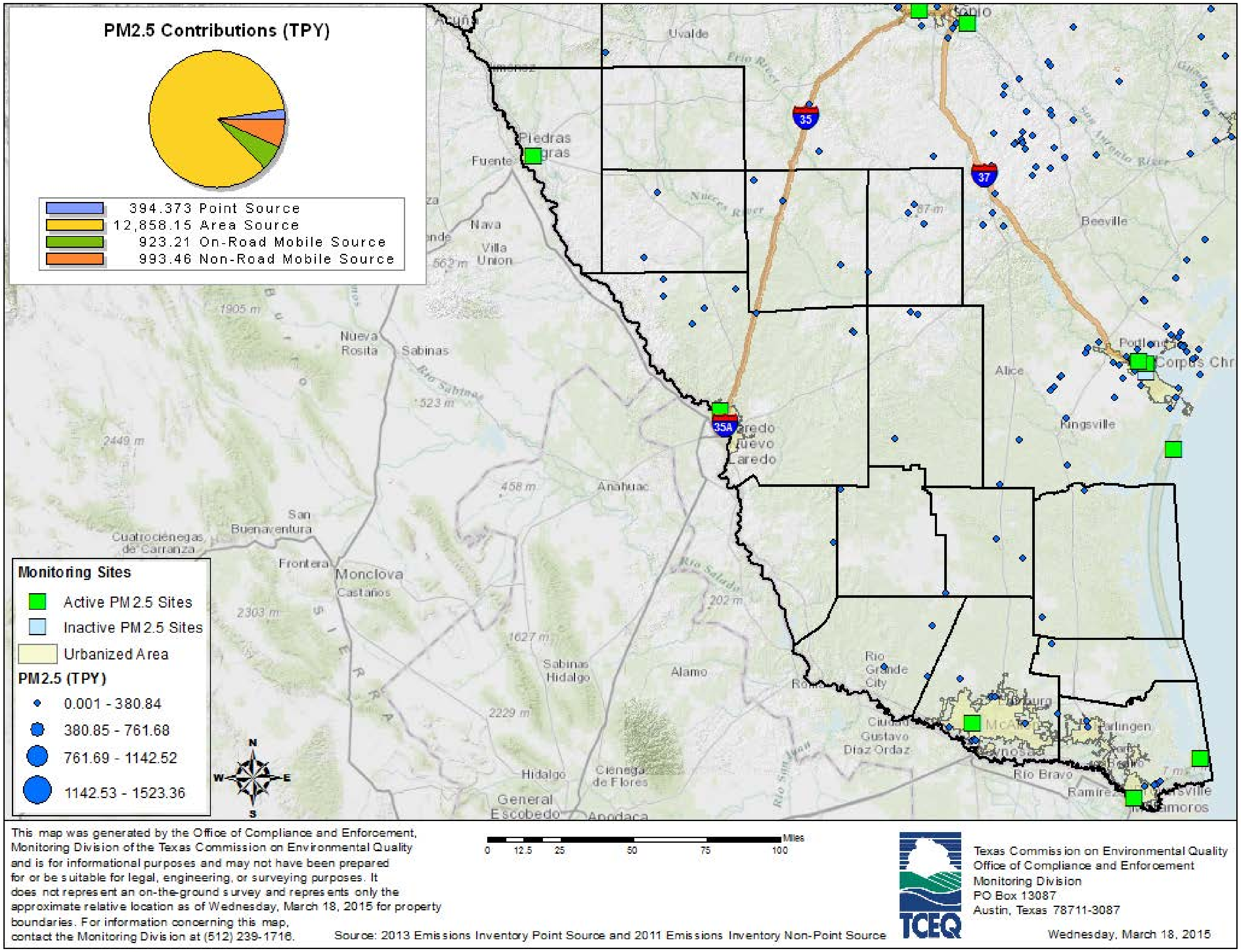
$PM_{2.5}$ is measured at five sites in the Lower Rio Grande Valley area providing data relevant to the evaluation of concentrations in areas frequented by the public and impacted by $PM_{2.5}$ transport. $PM_{2.5}$ monitoring began in 1999 with the deployment of a $PM_{2.5}$ FRM monitor at the Mission site. In the early 2000s, $PM_{2.5}$ monitoring expanded in other urban areas to include continuous $PM_{2.5}$ monitoring in the Mission, Brownsville, Laredo, and Eagle Pass areas. Figure 94 provides a map of the active $PM_{2.5}$ monitors in the Lower Rio Grande Valley area.

Based on area population and design values, the Brownsville-Harlingen MSA is required to have one FRM and one continuous $PM_{2.5}$ monitor. A $PM_{2.5}$ continuous monitor is currently operated at the Brownsville and Isla Blanca Park sites. The only significant $PM_{2.5}$ network change since the last five-year network assessment was the relocation of the FRM and supplemental speciation monitors from Isla Blanca Park to the Galveston 99th Street site. This change was implemented to evaluate regional transport of $PM_{2.5}$ in support of exceptional event analyses. A continuous $PM_{2.5}$ monitor was added to Isla Blanca Park to continue the support of regional and international transport of $PM_{2.5}$ into the area. The TCEQ plans to deploy an FRM at the Brownsville site in 2015.

$PM_{2.5}$ is measured at one site in the McAllen-Edinburg-Mission MSA and provides data relevant to the evaluation of concentrations in areas frequented by the public and impacted by $PM_{2.5}$ transport. Based on area population and design values, the McAllen-Edinburg-Mission MSA is required to have two $PM_{2.5}$ FRM monitors and one continuous $PM_{2.5}$ monitor. One $PM_{2.5}$ FRM and one continuous monitor are operated at the Mission site, and the TCEQ plans to deploy an FRM monitor at the new Edinburg East Freddy Gonzalez Drive site in Edinburg by summer 2015 in fulfillment of these requirements.

Continuous $PM_{2.5}$ monitoring is conducted at one site in the Laredo area and one site in the Eagle Pass area. Based on each area's population, no federal $PM_{2.5}$ monitoring requirements apply to Laredo or Eagle Pass; however, these two monitors provide valuable data related to internationally transported $PM_{2.5}$ concentrations and concentrations in areas frequented by the public. Additionally, the World Trade Bridge monitor in Laredo is located at one of two main international border crossing locations and is considered a source-oriented monitor because of the large volume of heavy-duty vehicle traffic at this location. Since the 2010 five-year network assessment, no changes in the Laredo and Eagle Pass area $PM_{2.5}$ network have been made.

Appendix A provides a full site list of both active and decommissioned $PM_{2.5}$ monitors, as well as their location, monitoring objectives, and associated spatial scales.



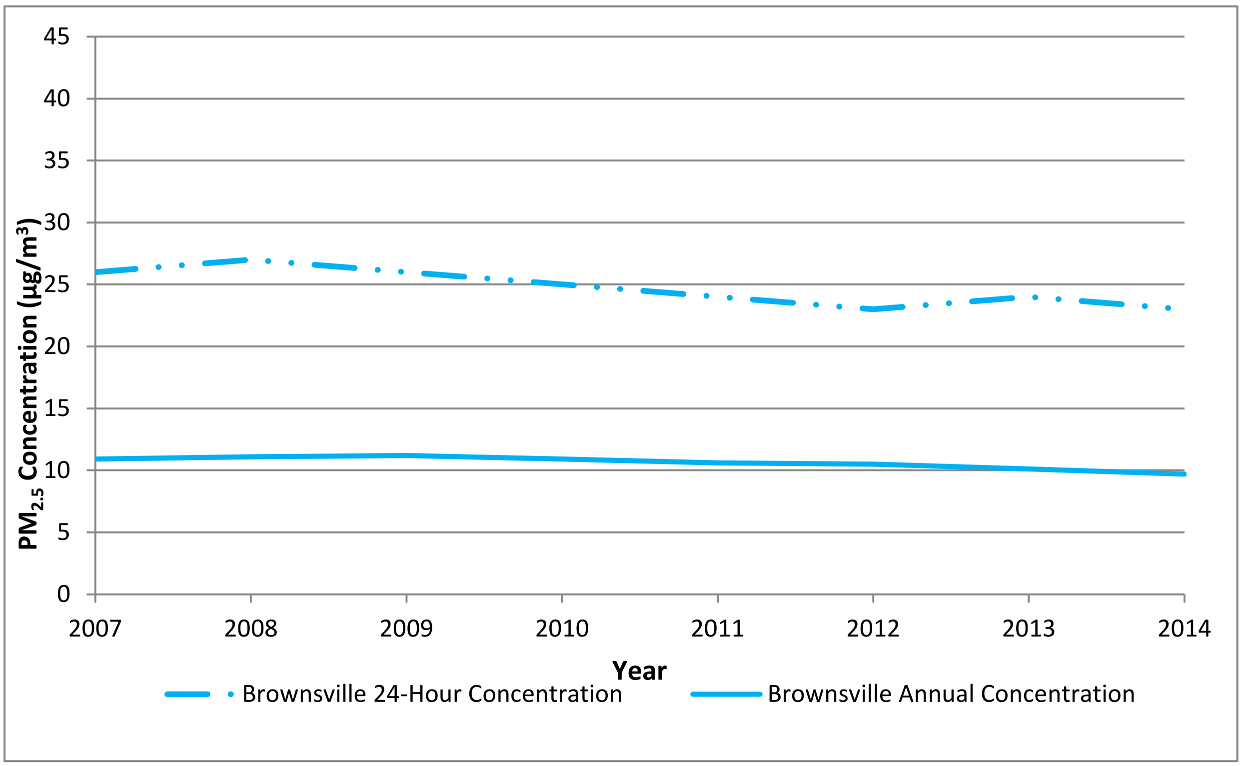

TPY – tons per year

**Figure 94: Lower Rio Grande Valley Area Particulate Matter of 2.5 Micrometers or Less in Diameter ($PM_{2.5}$) Point Sources and Monitors**

## Design Values and Trends

### *Brownsville-Harlingen Area*

Although no regulatory monitors are currently operated in the Brownsville-Harlingen area to calculate a valid design value, the TCEQ calculated an annual average over three years and a 98th percentile of 24-hour averages over 3 years concentrations for comparison across the network. As shown in Figure 95, the Brownsville monitor has an annual average concentration hovering around 85% of the NAAQS, although concentrations have been declining since 2009. Figure 95 also shows the 98th percentile of the 24-hour average concentrations have followed this same downward trend and have remained below 70% of the NAAQS since 2008. The $PM_{2.5}$ continuous monitor at Isla Blanca Park does not have enough data to be included in this analysis.



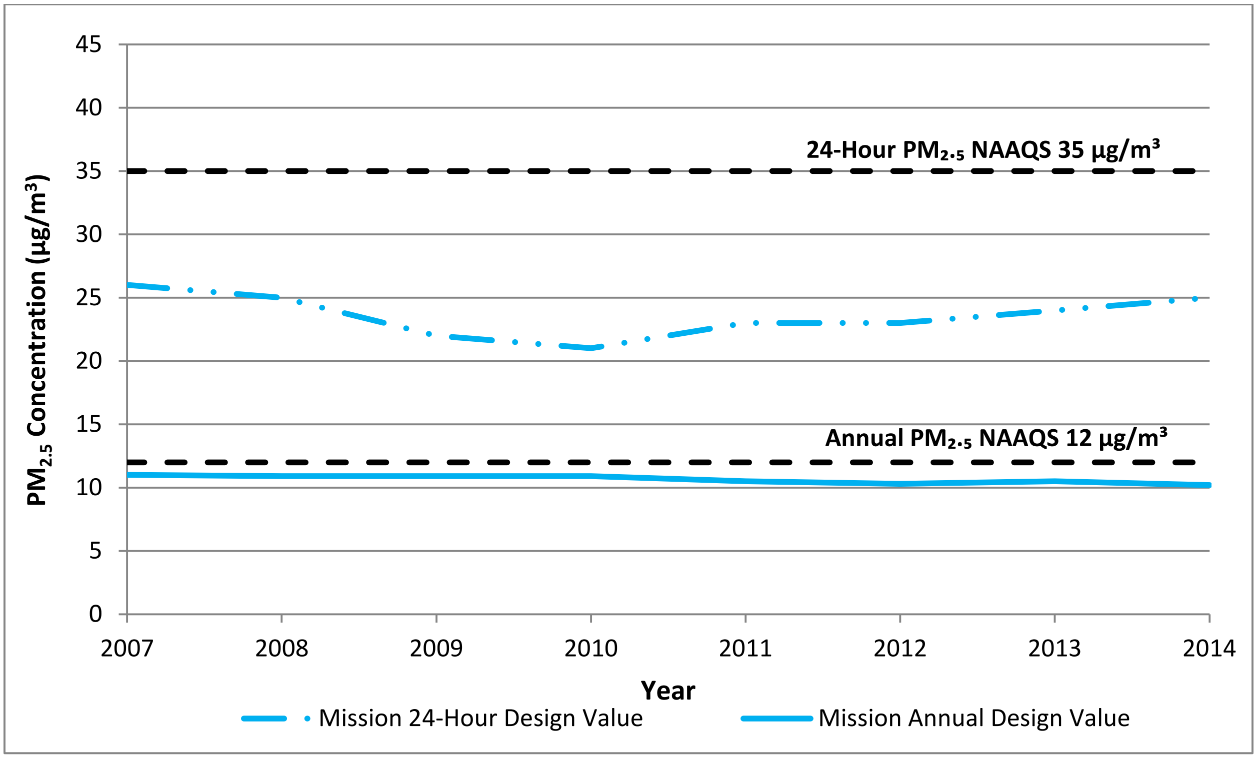

µg/m³ - microgram per cubic meter

**Figure 95: Trends in 98th Percentile of 24-Hour Averages and Annual Averages Over Three Years from the Brownsville Continuous Particulate Matter of 2.5 Micrometers or Less in Diameter ($PM_{2.5}$) Monitor, 2007-2014**

### *McAllen-Edinburg-Mission Area*

Design values in the McAllen-Edinburg-Mission MSA have consistently remained below both the 24-hour and annual $PM_{2.5}$ NAAQS, as shown in Figure 96. The annual $PM_{2.5}$ design value concentrations from Mission have shown a gradual decreasing trend since 2007 and have consistently remained below 12 µg/m³, the level of the annual NAAQS.

$PM_{2.5}$ 24-hour concentrations at Mission have shown a slight increase since 2010, but are still well below the 24-hour NAAQS of 35 µg/m3.



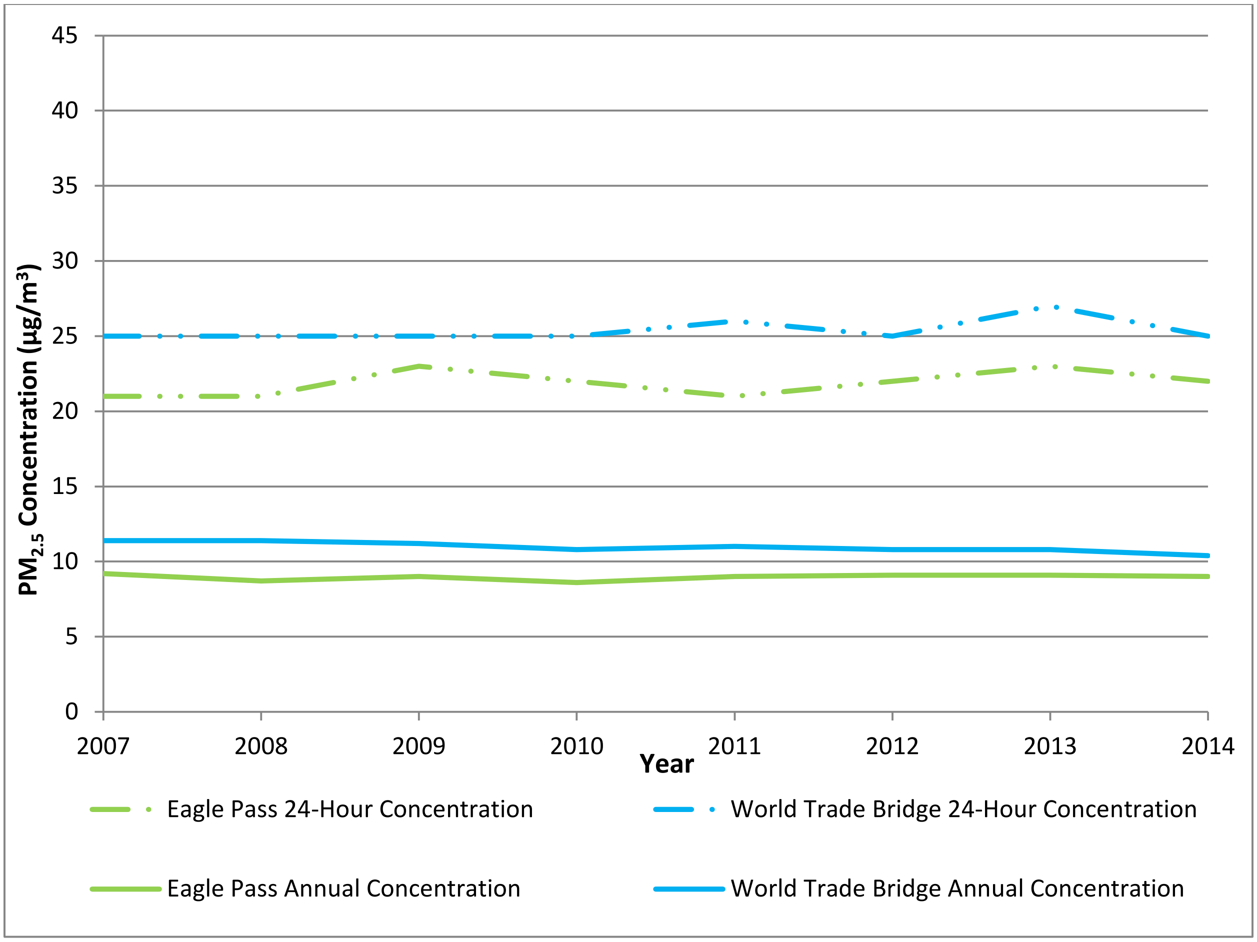

µg/m3 - microgram per cubic meter

**Figure 96: 24-Hour and Annual Particulate Matter of 2.5 Micrometers or Less in Diameter ($PM_{2.5}$) Design Values for the Mission Monitor, 2007-2014**

### *Laredo and Eagle Pass Areas*

Although no regulatory monitors are operated in the Laredo and Eagle Pass areas to calculate a valid design value, the TCEQ calculated an annual average over three years and a 98th percentile of 24-hour averages over three years for comparison. This data suggests that $PM_{2.5}$ design values would be less than 76% of the annual NAAQS at the Eagle Pass monitor and 90% of the annual NAAQS at the World Trade Bridge monitor. Concentrations show annual $PM_{2.5}$ trends at Eagle Pass are stable while showing a downward trend at the World Trade Bridge monitor.

The 24-hour average concentrations of the non-FRM continuous measurements at the Eagle Pass and World Trade Bridge monitors have been slightly variable since 2007. Eagle Pass data has ranged from 21 to 23 µg/m3, while World Trade Bridge data has ranged from 25 to 27 µg/m3. Figure 97 shows annual averages and the 98th percentile of 24-hour averages that were averaged over the three-year period ending with the noted year.




µg/m[3] - microgram per cubic meter
NAAQS – National Ambient Air Quality Standards

**Figure 97: Trends in 98th Percentile of 24-Hour Averages and Annual Averages Over Three Years from Lower Rio Grande Valley area Continuous Particulate Matter of 2.5 Micrometers or Less in Diameter ($PM_{2.5}$) Monitors, 2007-2014**

## Network Evaluation

Area sources are the primary contributor to inventoried $PM_{2.5}$ emissions in the Lower Rio Grande Valley area. Only one point source contributor in this area exceeds 33 tpy according to the 2013 point source emissions data. Therefore, it is appropriate that the Lower Rio Grande Valley area $PM_{2.5}$ monitoring network continues to be designed to monitor concentrations of incoming transported $PM_{2.5}$. The TCEQ has deemed each $PM_{2.5}$ monitor valuable and does not plan to decommission any of the current $PM_{2.5}$ monitors.

### *Brownsville-Harlingen Area*

The Brownsville-Harlingen area is required to have at least one FRM monitor and one continuous $PM_{2.5}$ monitor based on population and measured design values. The TCEQ plans to deploy an FRM monitor at the existing Brownsville site in 2015 to meet this requirement. The existing Brownsville continuous monitor is considered of high value because it meets federal requirements and provides useful data for evaluating ambient levels in populated areas along the international border. The Isla Blanca Park continuous monitor, located on the south side of South Padre Island, provides valuable data on internationally transported $PM_{2.5}$ concentrations into the border and coastal areas. Analysis of data from the Brownsville and Isla Blanca Park continuous $PM_{2.5}$ monitors indicates the monitors are moderately correlated (Pearson's coefficient=0.931, relative difference=0.17) based on data from 2011-2013. Even with this moderate correlation, both monitors provide valuable spatial coverage for the area.

### *McAllen-Edinburg-Mission Area*

The McAllen-Edinburg-Mission MSA is required to have at least two FRM monitors and one continuous $PM_{2.5}$ monitor. The Mission $PM_{2.5}$ FRM monitor and continuous monitor meet part of this requirement and are, therefore, considered of high value. The TCEQ is deploying a new site in the Edinburg area to meet the remaining federal requirement. This new site at East Freddy Gonzalez Drive in Edinburg, Texas, will have one FRM $PM_{2.5}$ monitor, operated on a one in three day schedule. The monitor is scheduled to be deployed in summer 2015.

The Mission site and the new Edinburg East Freddy Gonzalez Drive site will provide spatial coverage to monitor contributions from local sources and transported particulate matter from the neighboring Mexico area. Both monitors are also located in populated residential areas. No other changes are planned for the $PM_{2.5}$ monitoring network in the McAllen-Edinburg-Mission area.

### *Laredo and Eagle Pass Areas*

The Laredo and Eagle Pass areas are not currently required to have $PM_{2.5}$ monitors due to population size. Continuous $PM_{2.5}$ monitors are located at the Eagle Pass site and at the World Trade Bridge site. These two monitors are considered of medium value for evaluating regional and international transport of $PM_{2.5}$ emissions. Analysis of data from the Eagle Pass and the World Trade Bridge continuous $PM_{2.5}$ monitors indicates the monitors have low correlation (Pearson's coefficient=0.863, relative difference=0.252). These two monitors are located 152 kilometers apart and the weak correlation suggests that the provided data is unique and important to providing spatial coverage to evaluate international and regional transport along the border. The TCEQ is not recommending any changes for the $PM_{2.5}$ network in the Laredo area.

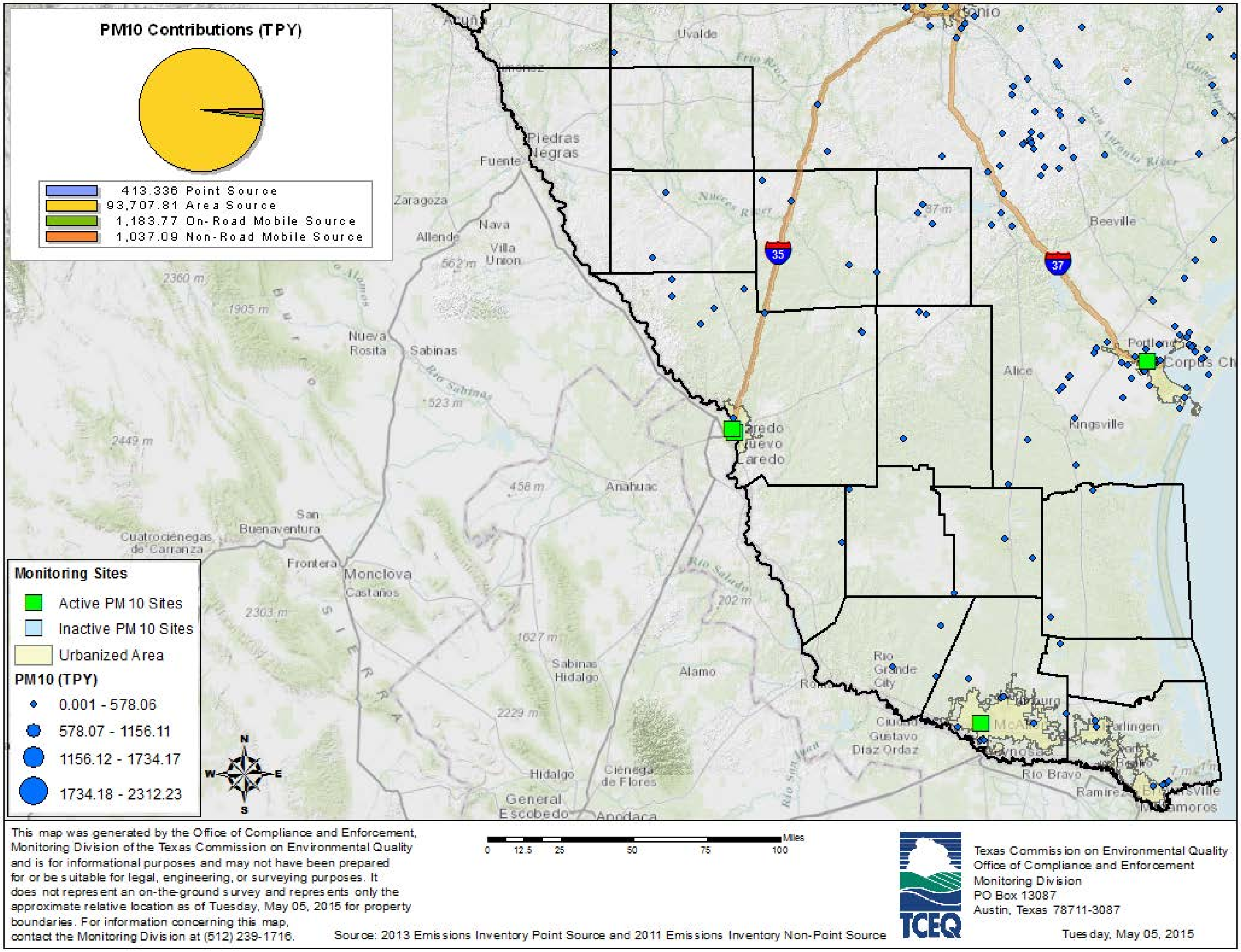
## Particulate Matter of 10 Micrometers or Less

### Network History

As of January 1, 2015, $PM_{10}$ concentrations in the Lower Rio Grande Valley area are monitored at three sites to evaluate regional air quality trends in populated areas. $PM_{10}$ monitoring in the Lower Rio Grande Valley area began in the late 1990s at the Laredo Bridge site. A map illustrating the current monitor locations and point sources is shown in Figure 98.

The Laredo Bridge $PM_{10}$ monitor, activated in 1999, and the Laredo Vidaurri $PM_{10}$ monitor, activated in 2004, are located within about 1.3 miles of each other. The Laredo Bridge monitor was deployed to monitor ambient air in populated areas and to understand microscale air quality in proximity to a large international border crossing between the United States and Mexico. A microscale defines the concentrations in air volumes associated with area dimensions ranging from several meters up to about 100 meters. The Mission $PM_{10}$ monitor was activated in 2008 to monitor ambient concentrations in populated areas. The Laredo Bridge and Mission $PM_{10}$ monitors are also useful in assessing pollutant transport across the international border.

Current federal minimum requirements specify $PM_{10}$ monitoring in metropolitan areas based on population and measured concentrations, if available. Based on the latest concentration and population data, the Laredo and Brownsville-Harlingen areas are required to have between zero and one $PM_{10}$ monitors, and the McAllen-Edinburg-Mission area is required to have between two and four $PM_{10}$ monitors. Currently, those requirements are met, except for the requirement of one additional $PM_{10}$ monitor in the McAllen-Edinburg-Mission area, discussed further below. Appendix A provides a full list of $PM_{10}$ monitors, as well as their locations, monitoring objectives, and associated spatial scales.




TPY – tons per year

**Figure 98: Lower Rio Grande Valley Area Particulate Matter of 10 Micrometers or Less ($PM_{10}$) Point Sources and Monitors**

## Design Values and Trends

Compliance with the 24-hour $PM_{10}$ NAAQS is based on the number of measured exceedances of the 150 µg/m³ standard on average over a three year period. The Lower Rio Grande Valley area $PM_{10}$ monitoring sites had zero estimated number of exceedances per year from 2011 to 2014.

Maximum $PM_{10}$ monitor concentrations at the Laredo Bridge site have remained below one third of the NAAQS level of 150 µg/m³ since 2011. The maximum concentration at the Laredo Vidaurri $PM_{10}$ monitor has remained below 53% of the NAAQS since 2012.

The Mission $PM_{10}$ monitor has measured maximum concentrations of 94 µg/m³ in 2012, 138 µg/m³ in 2013, and 64 µg/m³ in 2014. Satellite imagery verifies that on March 5, 2013, a regional dust storm carrying particulate matter from Far West Texas and Mexico heavily impacted the McAllen-Edinburg-Mission area contributing to the 138 µg/m³ level. The next highest concentration in 2013 was 88 µg/m³ and was collected on a day impacted by transported African dust. The maximum concentration for 2014 was 64 µg/m³ suggesting that the concentration collected on March 5, 2013, was due to an exceptional event. Maximum concentrations have remained below the NAAQS level of 150 µg/m³ from 2011 through 2014 and are heavily affected by regional transport of $PM_{10}$.

## Network Evaluation

$PM_{10}$ monitoring requirements in MSAs are based on population and monitored design values, if available. The current locations of Lower Rio Grande Valley area $PM_{10}$ monitors continue to be sufficient to meet established monitoring objectives.

The McAllen-Mission-Edinburg MSA is required to have between two and four $PM_{10}$ monitors. The Mission $PM_{10}$ monitor meets part of this requirement and is located in an area of high population density, making it of high value. The TCEQ is deploying a new $PM_{10}$ monitor at the Edinburg East Freddy Gonzalez Drive site to meet the remaining federal requirement. Information regarding site selection is located in the TCEQ *2014 Annual Monitoring Network Plan*. The $PM_{10}$ monitor is scheduled to be deployed in summer 2015.

The Mission site and the new Edinburg East Freddy Gonzalez Drive site will provide spatial coverage to monitor local source and transported contributions from the neighboring Mexico area. Both monitors are also located in populated residential areas and provide ambient air quality data that is representative of concentrations to which the population could be exposed.

The Laredo Vidaurri $PM_{10}$ monitor is located to monitor maximum concentrations in the area, making it of high value. The Laredo Bridge $PM_{10}$ monitor is located to monitor ambient air in populated areas and to understand microscale air quality in proximity to a large international border crossing; however, it is not federally required and has historically low averages, making it of medium value.

More than 95% of inventoried $PM_{10}$ emissions in the Lower Rio Grande Valley were from area sources, including road construction, unpaved roads, and regional and international transport including African dust and dust originating from the

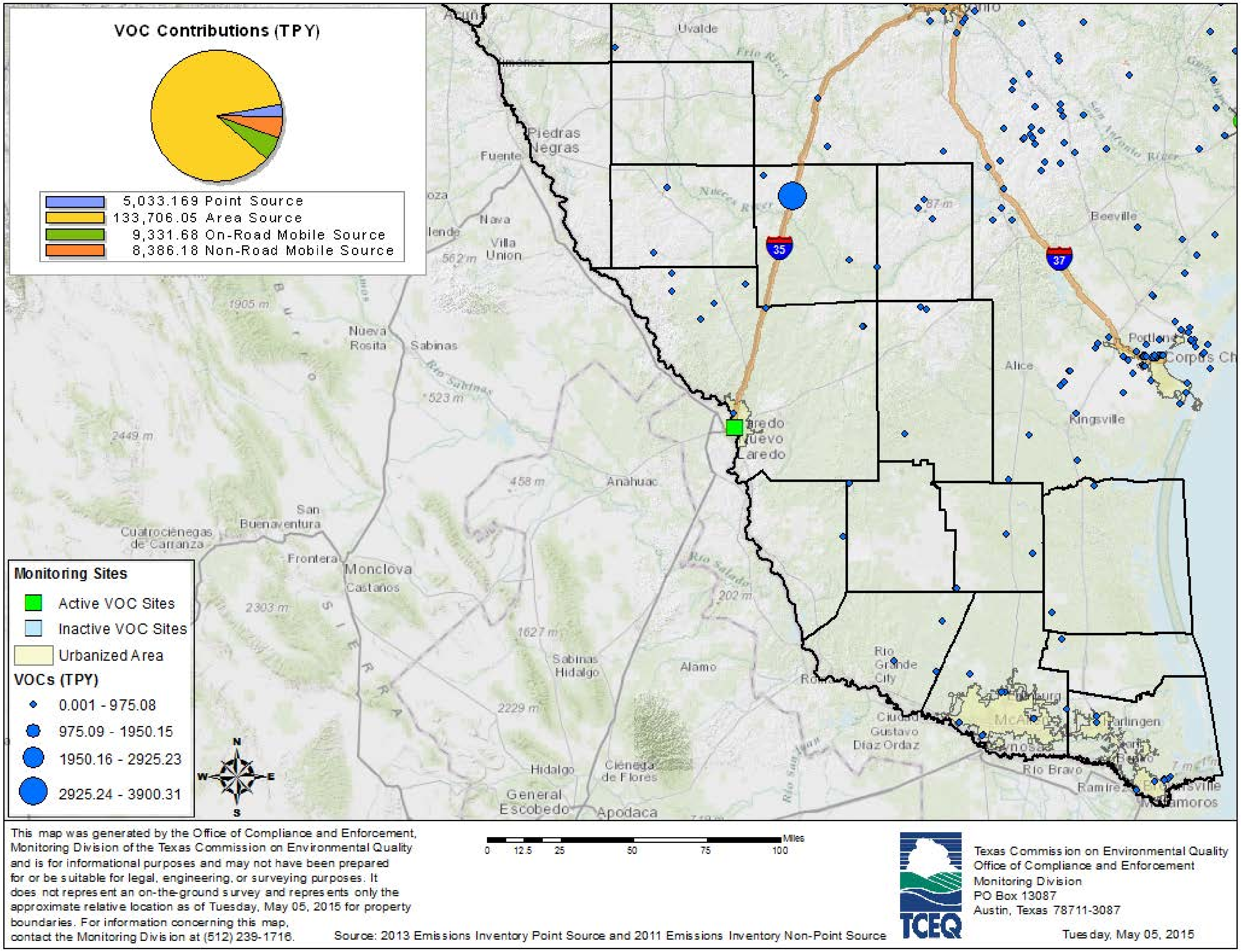
Chihuahuan Desert during high wind events. Based on the prevalence of area sources, the concentration of point and area sources in the urban and suburban areas, prevailing wind conditions, and the planned deployment of an additional $PM_{10}$ monitor in the McAllen-Edinburg-Mission MSA, no further changes to the $PM_{10}$ monitoring network in this area are recommended at this.

## Air Toxics

### Network History

As of January 2015, federal funding supports the operation of one VOC canister sampler in the Lower Rio Grande Valley area. VOC monitoring in the Laredo area began in the early 2000s at the Laredo Bridge site. Locations of the VOC sampler and point sources are shown in Figure 99.

Federal funding also supports the operation of SVOC samplers at the Brownsville and Mission sites. Due to low ambient concentrations and the low value of the samplers, the Laredo Vidaurri SVOC and Mercedes SVOC samplers were decommissioned in 2011 and 2012, respectively.




TPY – tons per year

**Figure 99: Lower Rio Grande Valley Area Volatile Organic Compound (VOC) Point Sources and Monitor**

### Trends

VOC and SVOC concentrations have remained below levels of health and welfare concern throughout the five-year assessment period. Benzene, an ambient air risk driver for most urban settings, has remained well below the AMCV over the last seven years, as shown in Figure 100.

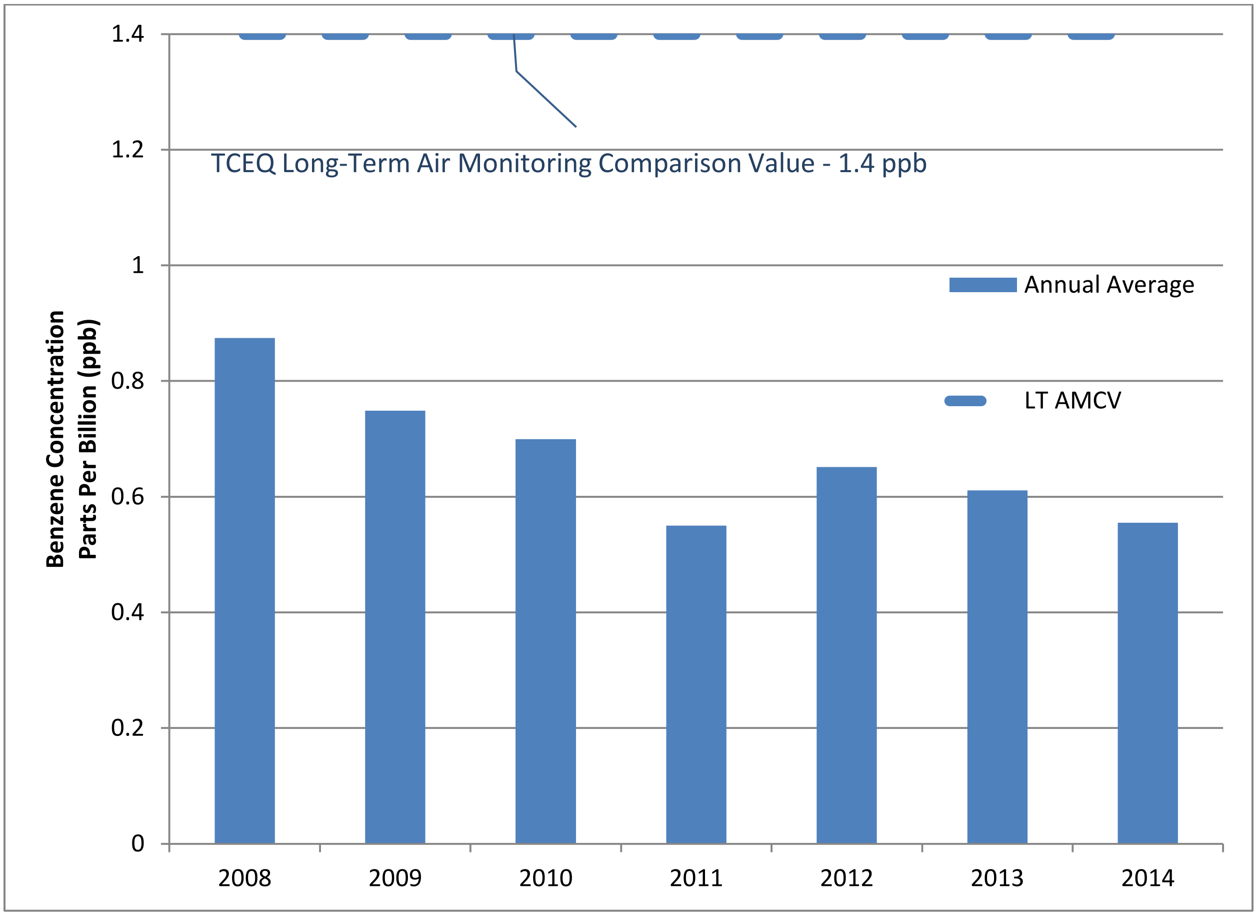



**Figure 100: Annual Average Benzene Concentrations at the Laredo Bridge Canister Monitor, 2008-2014**

### Network Evaluation

There are no current federal requirements for air toxics monitoring in the Lower Rio Grande Valley area. Federal funds are used to operate the Laredo Bridge VOC, Brownsville SVOC, and Mission SVOC samplers as special purpose. All of these samplers are well-placed to evaluate international transport of these pollutants into populated areas in the Lower Rio Grande Valley area. Given the long-term historical value of these samplers and the value of the data, the samplers are considered of medium value.

Other mechanisms fund the Brownsville and Mission VOC sampler operations. More information about these samplers is available online at [http://www17.tceq.texas.gov/tamis/index.cfm?fuseaction=home.welcome](http://www17.tceq.texas.gov/tamis/index.cfm?fuseaction=home.welcome).

Concentrations from all available ambient air monitors and samplers are reviewed by TCEQ toxicologists and results are available online at https://www.tceq.texas.gov/toxicology/regmemo/AirMain.html. As indicated in these annual evaluations, available monitoring data indicate that VOC and SVOC concentrations have consistently remained below a level of health and welfare concern.

# Far West Texas Area Evaluation

(El Paso Region)

## *Far West Texas Area Characteristics*

### Terrain

The Far West Texas area lies in the northwestern portion of the Trans-Pecos area of Texas and can be described by topographic transitions from mountains to inter-mountain plains. The Franklin Mountains (southern edge of the Rocky Mountains) extend into the City of El Paso from the north, dividing west El Paso in the Upper Valley and east El Paso in the Lower Valley. The Lower Valley extends to the Hueco and Diablo Mountains on the eastern edge of Hudspeth County. The Texas Rio Grande River basin forms the southern border of the area. The region ranges from approximately 3,800 to 4,000 feet in elevation, with individual mountains reaching elevations of over 7,000 feet. A topographic map of the region is provided in Figure 101, along with wind roses showing annual average wind speed and direction from meteorological sensors at ambient air monitoring stations. The length of each wind rose bar corresponds to the frequency of the wind coming from the indicated direction. The wind roses from monitors closest to the international border highlight the impact of the Rio Grande River basin in the dominant northwest/southeast wind pattern. Wind roses from sites further removed from the basin, such as Ojo De Agua and Skyline Park, highlight differing wind patterns due to the influence of the Franklin Mountains. (Griffith et al. 2004)

Regional terrain is important when considering typical wind patterns in this area. High winds can occur near the Skyline Park monitor due to funneling effects of the Franklin Mountains. The most pronounced terrain effects are seen in the Rio Grande River basin, where yearlong wind patterns are dominated by a west-northwest to southeast flow due to channeling in the pass between the Franklin Mountains to the north and Juarez Mountains to the south. The Far West Texas area shares this river basin and its airshed with Ciudad Juarez, Mexico, as shown in Figure 101. More information on the modeling of international emissions on El Paso area air quality can be found at the TCEQ webpage http://www.tceq.texas.gov/airquality/sip/elp/sip-elp. Regional terrain characteristics impact how pollutants are transported into and out of areas and how pollutants are dispersed throughout an area.

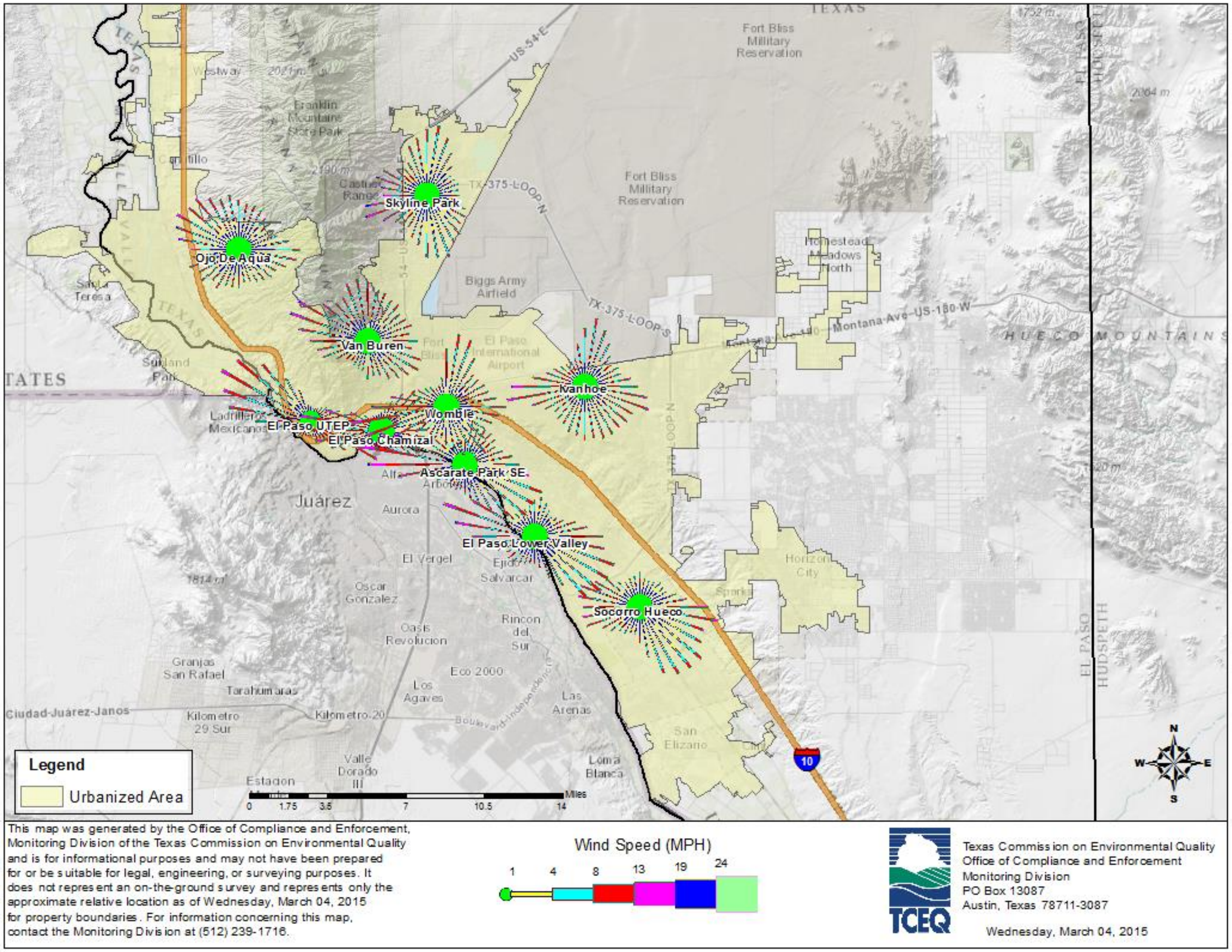



**Figure 101: Far West Texas Area Terrain and Wind Data from Ambient Air Quality Monitors**

## Climate

The Far West Texas area is part of the Chihuahuan Desert, which extends from the Mexican state of Chihuahua into Arizona and New Mexico. Average daily maximum temperatures range from 66°F to 95°F. Ambient temperatures play a key role in regional air quality, as nighttime cooling, particularly during winter months, can form intense temperature inversions that trap pollutants near the surface in the Far West Texas Rio Grande River basin area. In addition, the low humidity and limited rainfall (an average of 8.53 inches of rain per year, though highly variable) paired with the dry lakebeds and playas composed of loose, fine soils of this scarcely vegetated desert make the region prone to dust storms during natural high wind events. More detail on the impact of these high wind events can be found in the TCEQ's *El Paso 2010-2012 Particulate Matter Exceptional Events Demonstration* located on the TCEQ webpage http://www.tceq.state.tx.us/assets/public/compliance/monops/air/pm-event-2010-2012-elpaso.pdf. The local climate makes the area more susceptible to increased pollutant concentrations during regional dust storms and temperature inversions. The high temperatures and lengthy sunny weather also increases the number of days ozone can be formed, as evidenced by El Paso's year-round ozone season.

## Population

El Paso is the only major MSA in the Far West Texas area. According to the 2010 United States Census, the El Paso MSA had a population of 804,123 people. The El Paso area is smaller than and downwind of Ciudad Juarez, Mexico, which had a 2010 population of 1,422,863. The 2014 United States Census Bureau population estimate indicates an El Paso MSA population of 836,698 people, which is a 4% increase in the last four years. Figure 102 indicates the regional population is concentrated in central El Paso and areas west of State Highway 375. The 2010 United States Census estimated the Fort Bliss military installation population at 8,591 people. In 2010, Hudspeth County, the county nearest and East of El Paso County, was completely rural, with a total population of 3,476 people.

Based on 2014 population estimates, the Far West Texas area is required to have a minimum of three ozone monitors, one $NO_x$ monitor, one Pb monitor, three $PM_{2.5}$ monitors, and between four and eight $PM_{10}$ monitors. The Texas State Data Center projects the El Paso MSA to grow to 956,347 by 2020, roughly a 16% increase from the 2010 population. If these projections are accurate, the El Paso MSA would not be required to have additional monitoring based on population-driven minimum monitoring requirements.

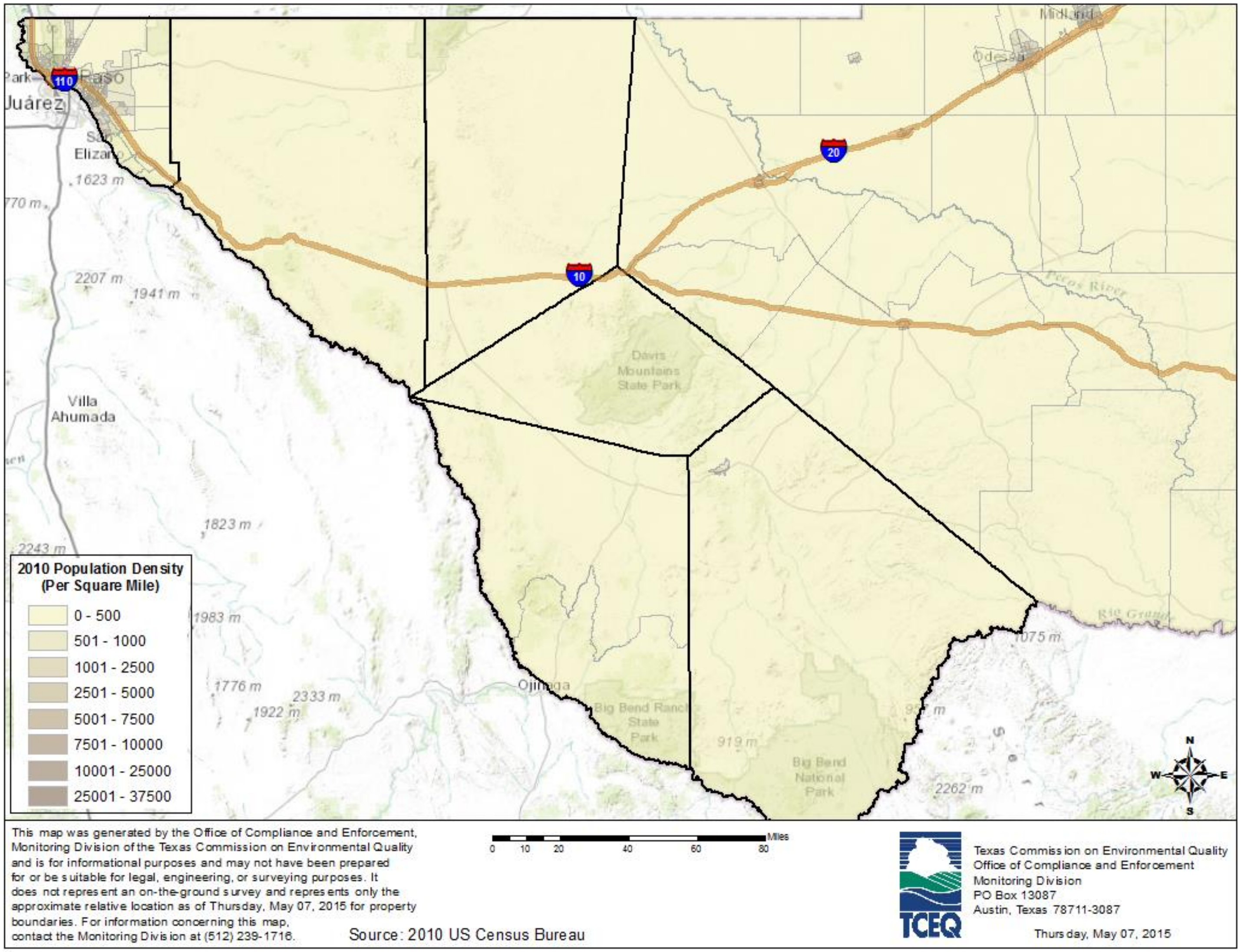



**Figure 102: Far West Texas Area Counties and Population Density**

## Pollutant Sources

### Anthropogenic Sources

As expected, on-road mobile sources emitted the most CO and $NO_x$ out of the sectors represented in the EI. Area sources contributed the most $PM_{2.5}$, $PM_{10}$, and VOCs. Point sources, closely followed by area sources, emitted the most $SO_2$. Finally, Pb emissions remained low for all sources in the El Paso area.

Evaluation of pending and issued air permits within the Far West Texas area revealed the authorization of only seven new point source sites in El Paso County, as detailed in Appendix D. These new facilities are evenly distributed from northwest of El Paso (within three miles of the Ojo De Agua monitoring site), central El Paso, and to the east of El Paso (within approximately five miles of State Highway 375 from north of State Highway 62 to south of Farm-to-Market Road 1281). This review of permitting actions did not reveal any dense clusters of new sources that would necessitate the addition of air quality monitors. The TCEQ continues to evaluate the need for ambient air quality monitors as changes in industrial activity and populations occur.

### Natural Sources

Blowing dust generated by regional high wind events outside of the Far West Texas area has historically had a heavy impact on $PM_{2.5}$ and $PM_{10}$ levels in the area. The overall dust storm frequency and intensity is highly dependent on weather conditions and soil moisture content, but daily average concentrations have reached as high as 130 $\mu g/m^3$ for $PM_{2.5}$ and 249 $\mu g/m^3$ for $PM_{10}$. These dust storms are most commonly caused by regional high winds associated with large low pressure systems.

Less frequently, regional blowing dust can be transported into the Far West Texas area from the White Sands area in New Mexico, eastern New Mexico, and the Texas Panhandle behind strong cold fronts. These large regional-scale dust storms occur mainly in the spring, but can occur from late October through the winter and spring into early June. On a local scale, high winds from nearby thunderstorms can generate dust that is transported into the El Paso area. These local-scale thunderstorm high wind dust events are most common in June and July.

Long-range transport from other types of events also impact particulate matter measurements in the Far West Texas area, including smoke from forest fires in the Rocky Mountains and haze and smoke accumulated from man-made emissions in the United States and Mexico (also known as continental haze). These other smoke and haze transport events affect $PM_{2.5}$ levels more than $PM_{10}$ levels because of the inherent particle sizes, but are less frequent overall.

Gill et al. (2007) investigated dust source hot spots for multiple dust storm events from 2002 to 2006. Their research found that a huge playa complex within the Lake Palomas region of northern Chihuahua, Mexico, frequently contributed concentrated plumes of particulate matter that spread into the El Paso/Ciudad Juarez area. Surface sediment particle size analyses from these playas revealed very fine clays and silts with grain sizes in the $PM_{2.5}$ and $PM_{10}$ ranges, including particles as small as 0.2 micrometers.

# *Regional Air Quality*

## Criteria Pollutants

As of January 2015, the El Paso area is designated attainment for current ozone, Pb, CO, $NO_2$, and $PM_{2.5}$ NAAQS. The City of El Paso is in moderate nonattainment of the $PM_{10}$ NAAQS. The Governor has recommended designating El Paso in attainment of the one-hour $SO_2$ NAAQS, but a final action has not been taken by the EPA. Additionally, the updated data requirements rule for the one-hour $SO_2$ NAAQS is currently pending from the EPA.

## Current Nonattainment Designations

The November 15, 1990, FCAA amendments specified that all former Particulate Matter Group I areas, including El Paso, were to be designated nonattainment for Particulate Matter. In November 1991, Texas adopted a $PM_{10}$ attainment demonstration for El Paso. This attainment demonstration included air quality and meteorological analyses, including data from a special December 1990 study that demonstrated the international scope of the air quality problem in El Paso. Section 179B of the FCAA contains special provisions for nonattainment areas like El Paso that are affected by emissions coming from outside the United States. Modeling of United States emissions indicated that El Paso would have attained the $PM_{10}$ NAAQS in 1991 and by the 1994 attainment deadline, if not for emissions transported from Mexico. Texas also adopted control measures to minimize impacts from United States sources, including fugitive dust controls. The EPA approved the El Paso $PM_{10}$ attainment demonstration on January 18, 1994. (59 FR 2532)

On January 25, 2012, the TCEQ adopted a $PM_{10}$ SIP revision that updated the particulate matter controls for streets and alleys, and incorporated a revised Memorandum of Agreement between the TCEQ and the City of El Paso based on those updated controls. More information about the SIP to improve air quality in the El Paso area is available online at (http://www.tceq.texas.gov/airquality/sip/elp/sip-elp).

## Prior Nonattainment Designations

### Carbon Monoxide

A portion of El Paso was designated moderate nonattainment for CO upon enactment of the 1990 FCAA amendments. A CO attainment demonstration SIP revision was adopted by the TCEQ's predecessor agency in September 1992 to address CO nonattainment in El Paso. This SIP revision included a comprehensive 1990 base year inventory, an oxygenated fuel program effective throughout El Paso County, new source review provisions for major CO sources, and a commitment to make corrections to an existing vehicle inspection and maintenance (I/M) program.

In January 2006, the TCEQ submitted a CO Redesignation Request and Maintenance Plan SIP Revision for El Paso to the EPA. El Paso was eligible for redesignation to attainment of the eight-hour CO NAAQS because there had been no monitored violations of the standard since 2001. The EPA published a direct final approval on January 23, 2007. However, before the comment period closed, the EPA received adverse comments and withdrew its final approval on March 26, 2007.

On January 30, 2008, the TCEQ adopted a revision to the SIP modifying the existing maintenance plan for CO in El Paso. This revised maintenance plan replaced the maintenance plan submitted in January 2006, amending the previously submitted CO redesignation request. The EPA proposed approval of the redesignation request and maintenance plan and the associated motor vehicle emissions budget in the *Federal Register* (73 FR 45162) on August 4, 2008, and it became effective on October 3, 2008.

### *One-Hour Ozone Standard*

As a result of the 1990 FCAA amendments, El Paso County was designated nonattainment of the one-hour ozone NAAQS of 0.12 ppm. El Paso County was classified as a serious nonattainment area with an attainment deadline of November 15, 1999. Plans to reduce VOC emissions by 15% in El Paso County were submitted in 1993 and 1994.

In September 1994, the TCEQ's predecessor agency adopted a demonstration for the El Paso area that included modeling showing that El Paso could attain the NAAQS with the planned 15% reduction in emissions from the United States side of the border alone. In December 2002, the TCEQ adopted changes to the El Paso vehicle I/M program to make onboard diagnostic testing a contingency measure. This action was based on the El Paso area having experienced five years with no monitored ozone standard violations.

In 1997, the one-hour ozone standard was replaced by the more protective eight-hour ozone standard. The one-hour standard has been revoked in all areas, although some former one-hour ozone nonattainment areas have continuing obligations to comply with the anti-backsliding requirements described in 40 CFR §51.905(a).

### *1997 Eight-Hour Ozone Standard (1997 to Present)*

On April 15, 2004, the EPA designated El Paso County attainment (effective June 15, 2004) for the 1997 eight-hour ozone NAAQS of 0.080 ppm. El Paso County monitors at that time showed attainment of both the one-hour and eight-hour ozone NAAQS. The EPA's Phase I Implementation Rule for the eight-hour ozone standard directed that areas designated nonattainment for the one-hour ozone standard but attainment for the eight-hour ozone standard submit a maintenance plan for the 1997 eight-hour ozone standard by June 15, 2007. The TCEQ submitted this maintenance plan to the EPA on January 20, 2006. On January 15, 2009, the EPA proposed approval of the El Paso ozone maintenance SIP revision. (74 FR 2387) The EPA did not receive any adverse comments regarding the maintenance plan approval, and the plan became effective on March 16, 2009.

### *2008 Eight-Hour Ozone Standard (2008 to Present)*

On March 10, 2009, the Governor recommended to the EPA that El Paso County be designated nonattainment for the 2008 ozone standard. In September 2009, the EPA announced it would reconsider the 2008 NAAQS. On January 19, 2010, the EPA proposed to lower the primary ozone standard to a range of 0.060 to 0.070 ppm and proposed a separate secondary standard based on cumulative seasonal average ozone concentrations. On September 2, 2011, President Obama announced that he had requested the EPA withdraw the proposed reconsidered ozone standard.

In a memo dated September 22, 2011, from EPA Assistant Administrator Gina McCarthy, the EPA announced that it would proceed with initial area designations under the 2008 eight-hour ozone standard, starting with the recommendations states made in 2009 and updating them with the most current, certified air quality data (2008 through 2010). On May 21, 2012, the EPA published final designations for the 2008 eight-hour ozone standard in the *Federal Register*. (77 FR 30088) The updated air quality data indicated that air quality had improved and that a nonattainment designation was no longer appropriate. El Paso County was designated attainment/unclassifiable under the 2008 eight-hour ozone NAAQS, effective July 20, 2012.

## Air Toxics

Over the past five years exposure to all measured VOC, SVOC, $PM_{2.5}$ metals, and carbonyl concentrations in Far West Texas area would not be expected to cause adverse health effects or odorous conditions. In 2004, hydrogen sulfide in the area near a non-regulatory monitor in southeast El Paso was added to the APWL due to exceedances of the 30-minute state standard. More information about this APWL area is publicly available online at http://www.tceq.texas.gov/permitting/air/apwl/apwl-index.html.

## *Monitoring Network Evaluation*

## Ozone

### Network History

As of January 1, 2015, there were six ozone monitors in the Far West Texas area as listed in Appendix A and shown in Figure 103. El Paso Chamizal and El Paso UTEP were deployed in 1998. The El Paso Chamizal ozone monitor was deployed in central El Paso to evaluate ambient concentrations in populated areas likely impacted by maximum ozone precursor concentrations. Ozone monitors at El Paso UTEP and Ascarate Park SE, deployed soon after, were intended to provide ozone concentration data upwind and downwind of the City of El Paso core, depending on the wind flow. The Socorro Hueco ozone monitor was added in 1999 to provide data on background ozone concentrations in a populated area further removed from the city. Skyline Park and Ivanhoe ozone monitors were added in 2000 to improve spatial coverage in the populated area to the north and east of the downtown city core. Since the last five-year assessment period, no significant ozone network changes have occurred in the Far West Texas area.

Ozone monitoring in the Far West Texas area exceeds current minimum federal monitoring requirements. Two federal ozone monitoring requirements (related to NCore and the area's population and ozone design value) currently apply to the El Paso area, resulting in a minimum of three required ozone monitors. Additional ozone monitoring sites also continue to be operated in the El Paso area under former PAMS requirements due to El Paso's prior designation as an ozone nonattainment area. Monitoring objectives related to these federal requirements include collection of ambient data in areas frequented by the public, likely impacted by maximum ozone concentrations, and representative of upwind and/or downwind concentrations.

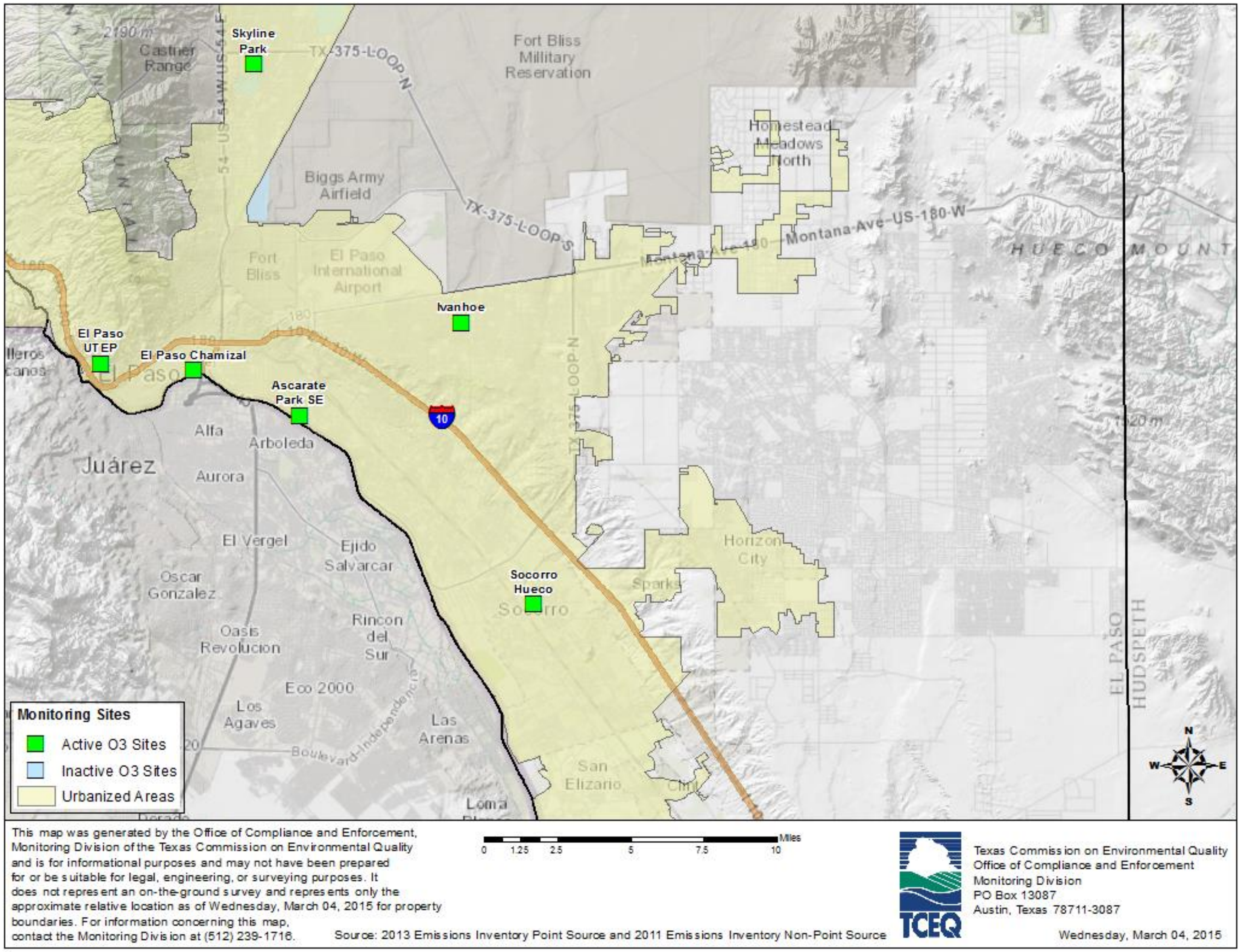
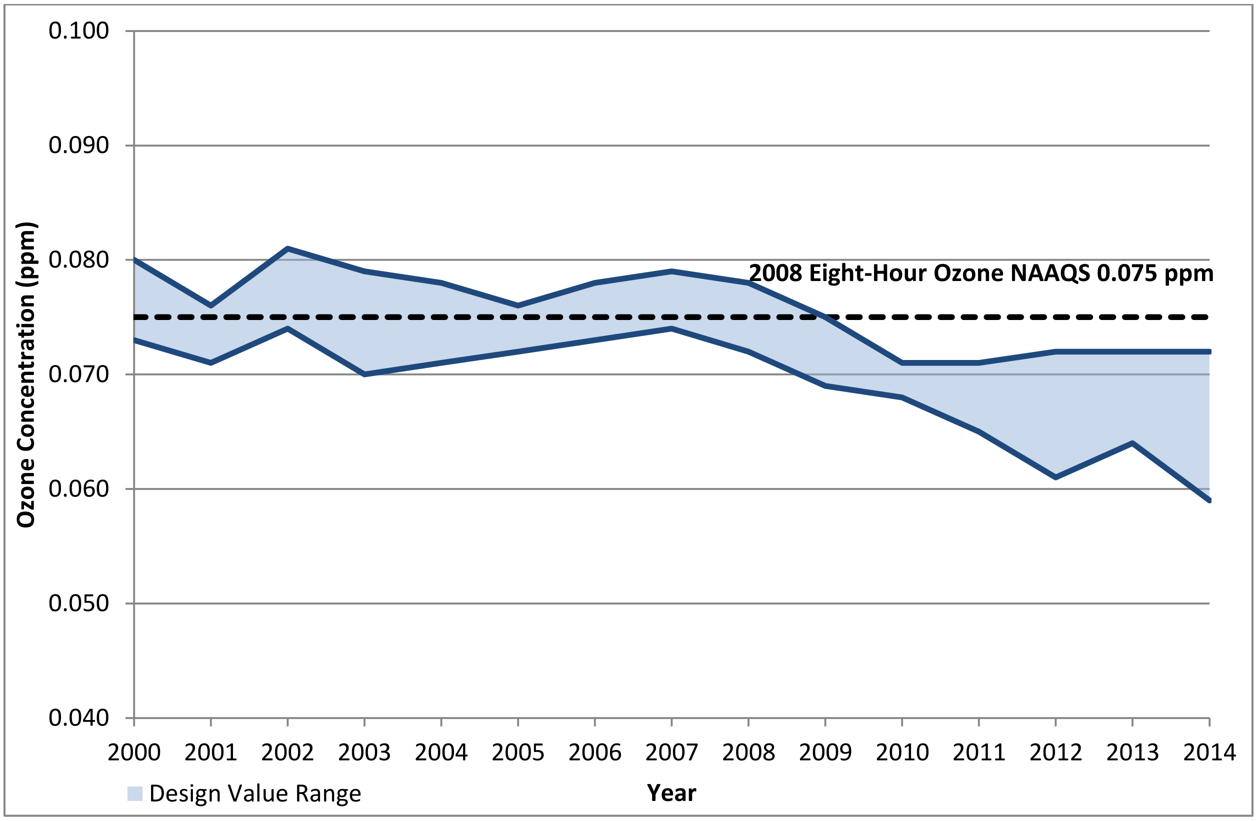



**Figure 103: Far West Texas Area Ozone ($O_3$) Monitors**

## Design Values and Trends

Eight-hour ozone design values in the Far West Texas area have continually declined since 2002 as shown in Figure 104. At 0.072 ppm, the area's 2014 design value is below the 2008 eight-hour NAAQS of 0.075 ppm, and ambient concentrations decreased 10% overall from 2000 to 2014. The highest ozone concentrations continue to be measured by the El Paso UTEP and El Paso Chamizal monitors, which are located closest to the city's urban core and the international border. The lowest ozone concentrations have been recorded on the east side of the City of El Paso's urban core at the Socorro Hueco and Ivanhoe monitors.




NAAQS – National Ambient Air Quality Standards
ppm – parts per million

**Figure 104: Eight-Hour Ozone Design Value Trends in the Far West Texas Area, 2000-2014**

## Network Evaluation

Based on current ozone monitoring requirements and proximity of design values to the eight-hour NAAQS, all El Paso area ozone monitors are considered of high value. Peak ozone concentrations have continued to be measured in the City of El Paso's urban core and near the international border. The El Paso UTEP monitor continues to have the highest ozone concentrations in the El Paso area. The greatest reductions in ozone concentrations have been noted at the Ivanhoe monitor (21% decrease since 2002) and the Ascarate Park SE monitor (23% decrease since 2002). These two monitors have also measured the lowest ozone concentrations in the area.

Figure 105 shows the correlation, relative difference, and distance between the Far West Texas area ozone sites. Sites are identified by AQS numbers, which can be referenced in Appendix A. The closest ozone correlations are between El Paso Chamizal (AQS 48-141-0044) and El Paso UTEP (AQS 48-141-0037) (Pearson's coefficient=0.954, relative difference=0.092). The two sites are 4 kilometers apart. Even though these sites are close together, they provide spatial gradient information that aids in understanding area ozone formation and transport.

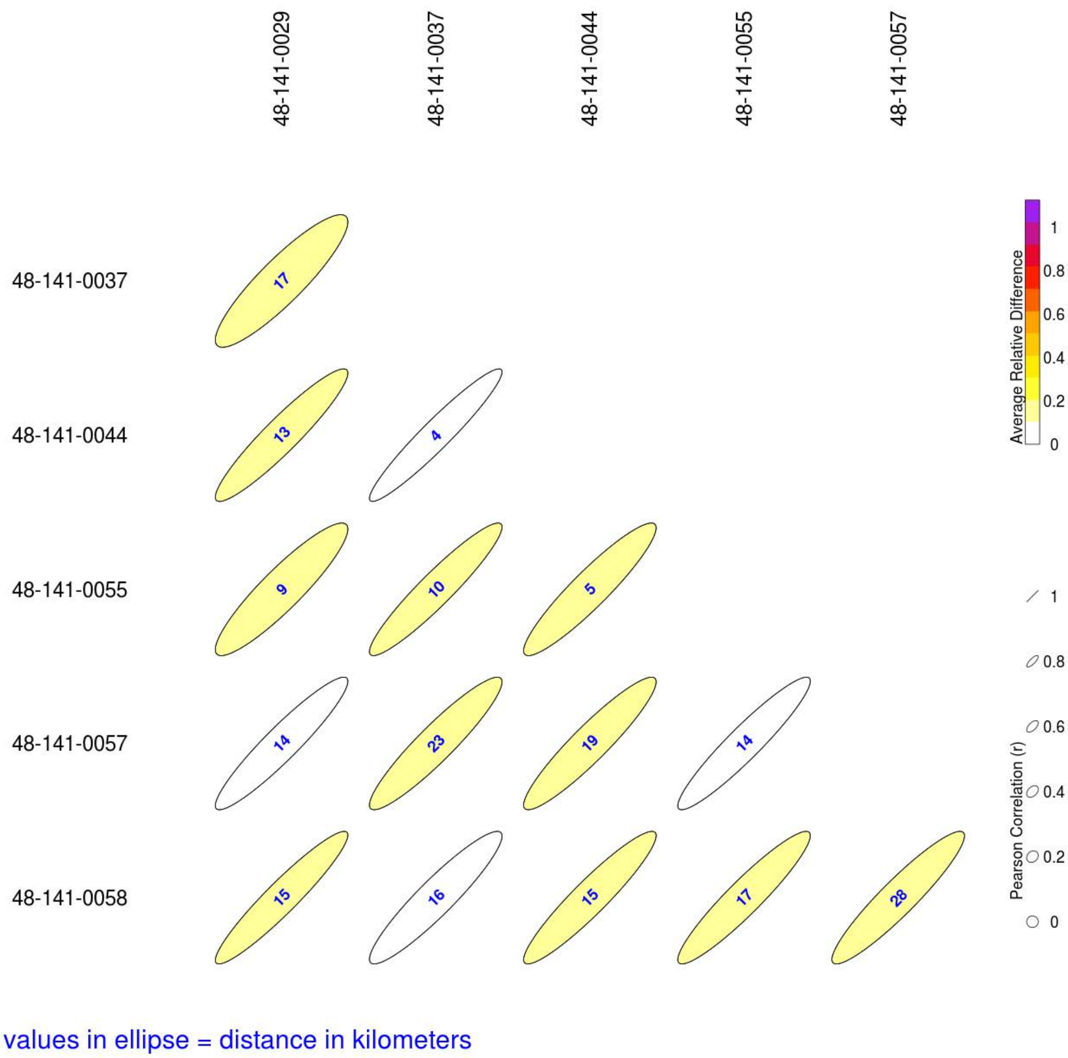



**Figure 105: Eight-Hour Daily Maximum Ozone Concentration Correlations in the Far West Texas Area, 2011-2013**

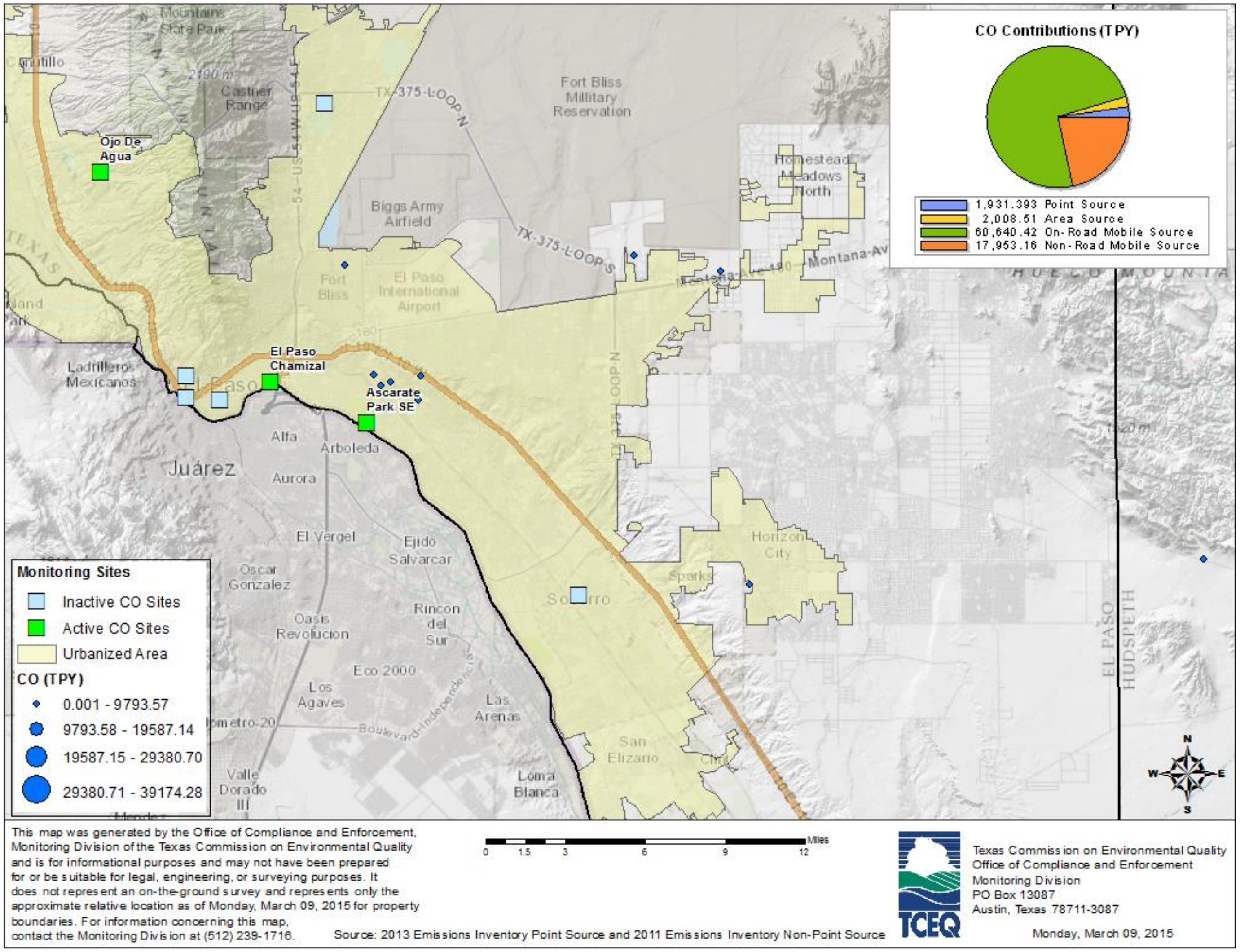
Given current and historical ozone concentrations, prevailing winds, and increased population in these areas, the ozone monitor placement along and near the international border continues to be appropriate. All six active ozone monitors in the El Paso area are considered of high value. These monitors cover multiple monitoring objectives including measuring maximum concentrations and upwind/downwind concentrations in populated locations. Details on each monitor's value are provided in Appendix C.

# Carbon Monoxide

## Network History

Three CO monitors are active in the Far West Texas area as of January 1, 2015: El Paso Chamizal, Ascarate Park SE, and Ojo De Agua. The Ascarate Park SE CO monitor was deployed in 1999 in an area that modeling projected could have the highest CO concentrations in the area. In 2010, a high sensitivity CO monitor was placed at El Paso Chamizal to monitor CO concentrations concurrently with ozone precursors in an area where maximum ozone precursor emissions were expected. The El Paso Chamizal CO monitor also serves as a federally required NCore monitor. In 2013, the Tillman monitor property was sold, and the CO monitor was relocated to Ojo De Agua. The Ojo De Agua CO monitor provides data that is representative of populated residential areas in Northwest El Paso. Design values are not yet available for the Ojo De Agua monitor.

Prior to 2010, CO monitoring requirements were limited to monitoring at PAMS sites and NCore sites; however, based on the El Paso area's previous CO nonattainment designation, as many as seven sites included CO monitoring as of the last five-year network assessment. Since that 2010 assessment, four CO monitors were decommissioned because of low historical value (design values well below both the one-hour and eight-hour CO NAAQS) and the operation of the monitors exceeded minimum federal requirements. The Socorro Hueco and Sun Metro CO monitors were decommissioned in 2012, while the Skyline Park and El Paso UTEP CO monitors were decommissioned in 2014. Appendix A provides a full list of both active and recently decommissioned ozone monitors, as well as their location, monitoring objectives, and associated spatial scales. Locations of CO monitors and point sources are shown in Figure 106.



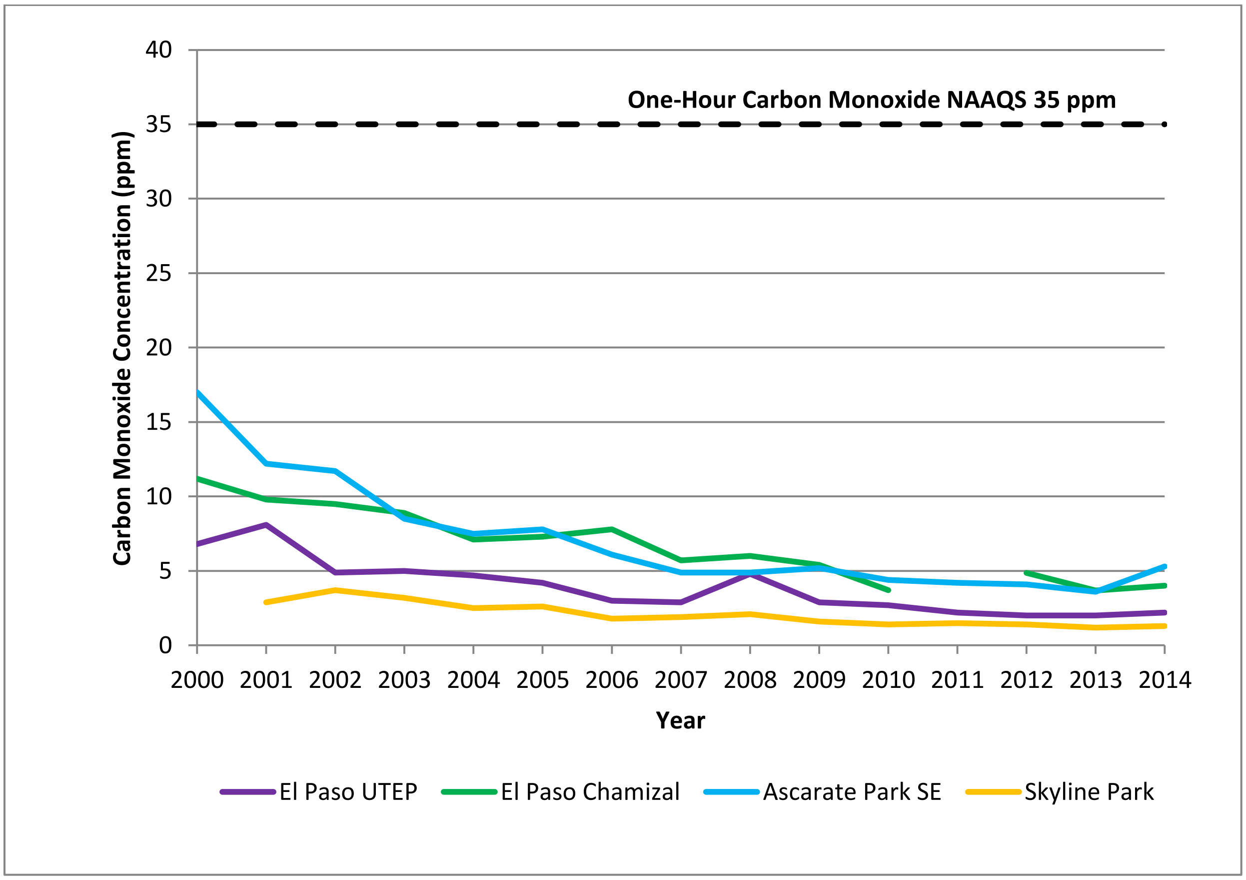

TPY- tons per year

**Figure 106: Far West Texas Area Carbon Monoxide (CO) Point Sources and Monitors**

## Design Values and Trends

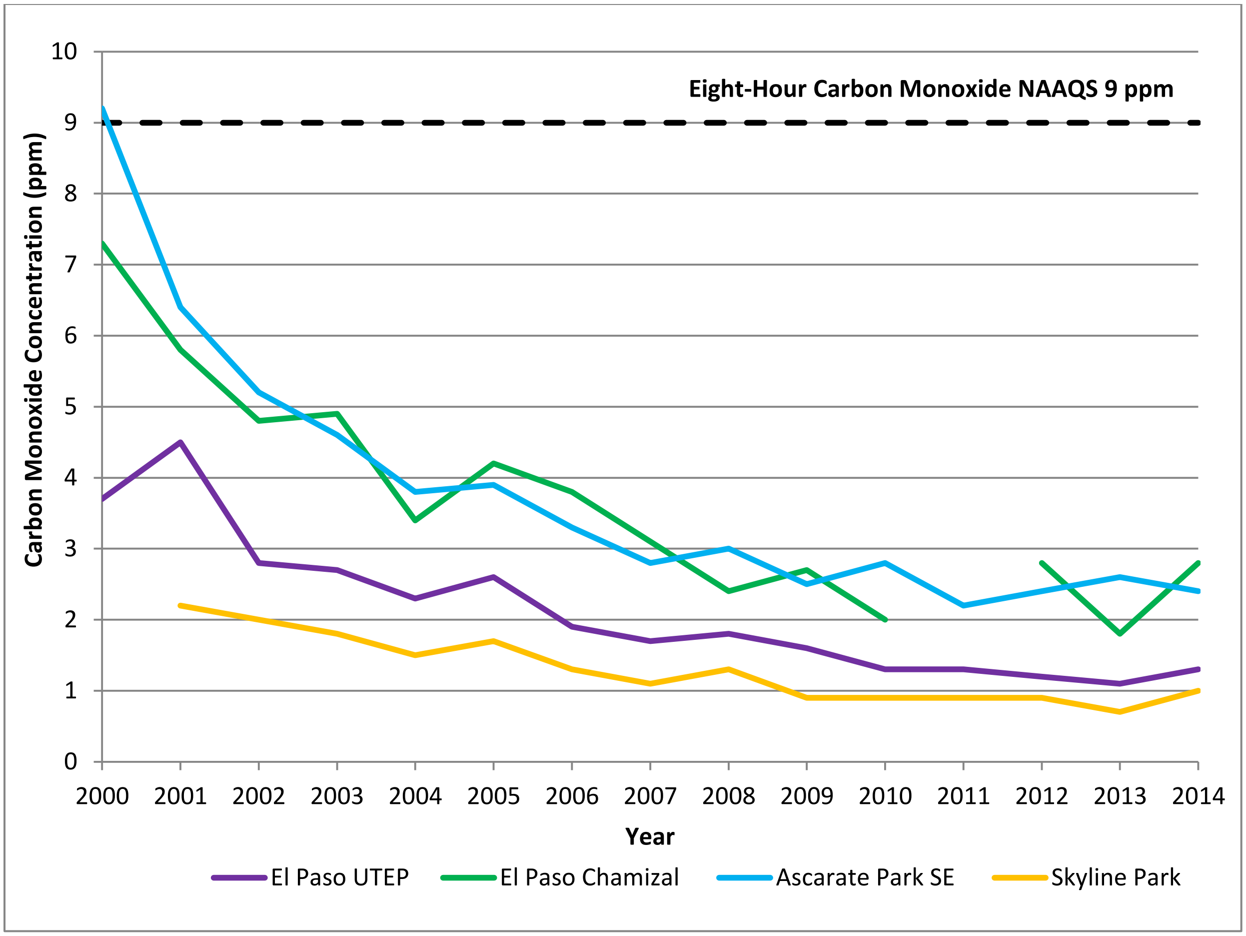
The El Paso area has an extensive CO monitoring history due to previous federal monitoring requirements and nonattainment status. Most of the elevated CO concentrations measured in the El Paso area have occurred at night in conjunction with temperature inversions, characterized by light winds, cold temperatures, and clear or partly cloudy skies. With these conditions, atmospheric mixing and transport is limited and pollutants emitted near ground level are quickly accumulated in a shallow layer adjacent to the ground. The greatest frequency of inversion episodes occurs in November and December, with occasional episodes in October and January.

El Paso area one-hour and eight-hour CO design values are shown in Figure 107 and Figure 108 respectively. As shown, design values at the El Paso Chamizal and Ascarate Park SE CO monitors have remained nearly identical since 2003. These two monitors are located only 3.34 miles apart, and data from both sites have remained well below the NAAQS at 3.6-17 ppm between 2000 and 2014.  Insufficient data return in 2011 at El Paso Chamizal resulted in the lack of a design value for the one-hour and eight-hour CO standard for that year.




ppm – parts per million
NAAQS - National Ambient Air Quality Standards

**Figure 107: One-Hour Carbon Monoxide Design Value Trends at Far West Texas Area Monitors, 2000-2014**




ppm – parts per million
NAAQS - National Ambient Air Quality Standards

**Figure 108: Eight-Hour Carbon Monoxide Design Value Trends at Far West Texas Area Monitors, 2000-2014**

## Network Evaluation

All CO monitors in the El Paso area have maintained design values well below the one-hour and eight-hour CO NAAQS since 2001. The steady decrease in CO levels throughout the El Paso area can be attributed to El Paso's naturally arid climate combined with several emissions reduction programs, including:

- enhanced vehicle emissions inspections;
- increased use of fuel efficient and mixed fuel vehicles;
- gasoline vapor recovery programs;
- the Texas Low Emission Diesel (TxLED) Program; and
- the El Paso Oxygenated Fuel Program.

Under existing regulations, only the El Paso Chamizal CO monitor is required to meet federal monitoring requirements. This monitor is a good indicator of the highest CO levels in the El Paso MSA, as shown in Figure 107 and Figure 108. Although eight-hour CO concentrations can be slightly higher at Ascarate Park SE than El Paso Chamizal, concentrations at both locations are well below the level of the NAAQS and have remained within 1 ppb of each other since 2001. The El Paso Chamizal CO monitor is likely impacted by on-road emissions from downtown El Paso located less than a mile away, a major highway, and a heavily trafficked border crossing located less than a quarter mile away.

Because CO concentrations have consistently remained well below the NAAQS and no new significant CO sources have been identified, the Ascarate Park SE and Ojo De Agua CO monitors are considered of low value. The TCEQ may consider further evaluation of low value, redundant CO monitors in future assessments. Details on each monitor's value are provided in Appendix C.

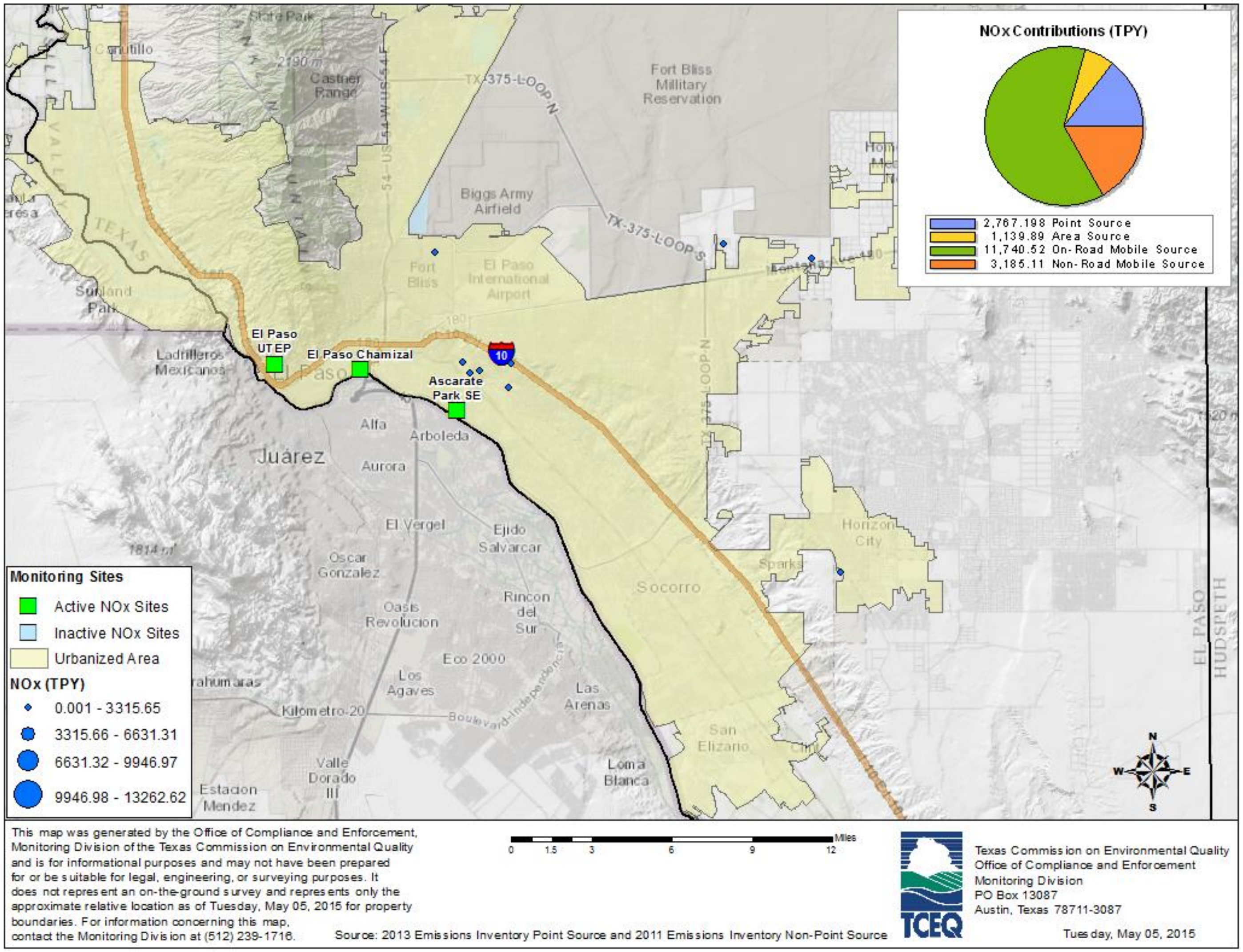
# Oxides of Nitrogen

## Network History

As of January 1, 2015, $NO_x$ monitoring occurred at three locations (shown in Figure 109) in Far West Texas: El Paso UTEP, El Paso Chamizal, and Ascarate Park SE. Three federal monitoring requirements for $NO_2$ currently apply to the El Paso MSA: $NO_2$ monitoring at NCore sites, at PAMS sites, and at a site located to protect susceptible and vulnerable populations. In addition, the EPA promulgated new rules in 2010 requiring near-road $NO_2$ monitoring in metropolitan areas with populations of 500,000 or more by January 1, 2017.

The $NO_x$ monitors at El Paso UTEP and El Paso Chamizal were deployed in 1998 to evaluate ozone precursor concentrations in populated areas where modeling projected the highest ozone concentrations in the El Paso MSA. Since deployment, the El Paso UTEP $NO_x$ monitor has provided valuable information about ambient $NO_2$ concentrations around the heavily populated UTEP campus and is situated in a prime location to monitor $NO_2$ emissions coming across the border and from downtown El Paso. The El Paso Chamizal site is located less than one mile from downtown El Paso and less than a mile from a major highway and a heavily trafficked border crossing, both of which are considered major on-road sources of $NO_2$. In 2010, a monitor measuring $NO_y$ was added at the El Paso Chamizal site to comply with NCore monitoring requirements. $NO_y$ compounds are considered ozone and $PM_{2.5}$ precursors. The $NO_x$ monitor at Ascarate Park SE was deployed in 1999 to meet PAMS requirements and is located in a densely populated area, surrounded by schools. This monitor is well-sited to measure $NO_2$ emissions without interference from emissions generated in downtown El Paso due to its predominately upwind location.

Appendix A lists the active $NO_x$ monitors, their location, monitoring objectives, and associated spatial scales.




TPY – tons per year

**Figure 109: Far West Texas Area Oxides of Nitrogen ($NO_x$) Point Sources and Monitors**

### Design Values and Trends

All three active $NO_x$ monitors in the Far West Texas area have consistently measured $NO_2$ design values well below both the one-hour NAAQS of 100 ppb and the annual NAAQS of 53 ppb. In 2014, measured one-hour $NO_2$ design values ranged from 53 to 57 ppb, while annual design values ranged from 12 to 14 ppb.

### Network Evaluation

Design values from all three sites have also been on a downward trend since 2008 due to increased emissions control measures such as:

- enhanced vehicle emissions inspection;
- increased use of fuel efficient and mixed fuel vehicles;
- gasoline vapor recovery programs;
- the TxLED Program; and,
- the El Paso Oxygenated Fuel Program.

The existing $NO_2$ monitoring network in the Far West Texas area meets all current federal monitoring requirements and achieves established monitoring objectives. The $NO_x$ and $NO_y$ monitors at El Paso Chamizal satisfy both PAMS and NCore requirements and are considered of high value. In addition, the Ascarate Park SE $NO_x$ monitor fulfills requirements for monitoring in areas with susceptible and vulnerable populations. This location was chosen to satisfy this requirement because three elementary schools and a juvenile detention center are located within a mile and a half of the monitor. For these reasons, the Ascarate Park SE site is also considered of high value for $NO_2$.

The $NO_x$ monitor at the El Paso UTEP site is beyond minimum federal monitoring requirements. While El Paso UTEP has traditionally provided valuable information regarding $NO_2$ concentrations around UTEP, the site is located 2.69 miles from El Paso Chamizal and has consistently produced $NO_2$ values lower than Ascarate Park SE and El Paso Chamizal since mid-2006. Although the El Paso UTEP $NO_x$ monitor is not of high regulatory value, the monitor is considered of medium value for the historical information it provides on ozone formation. Details on each monitor's value are provided in Appendix C. The TCEQ will reevaluate the network once the EPA finalizes its proposed ozone rule, as PAMS requirements and ozone nonattainment areas are likely to change.

## Sulfur Dioxide

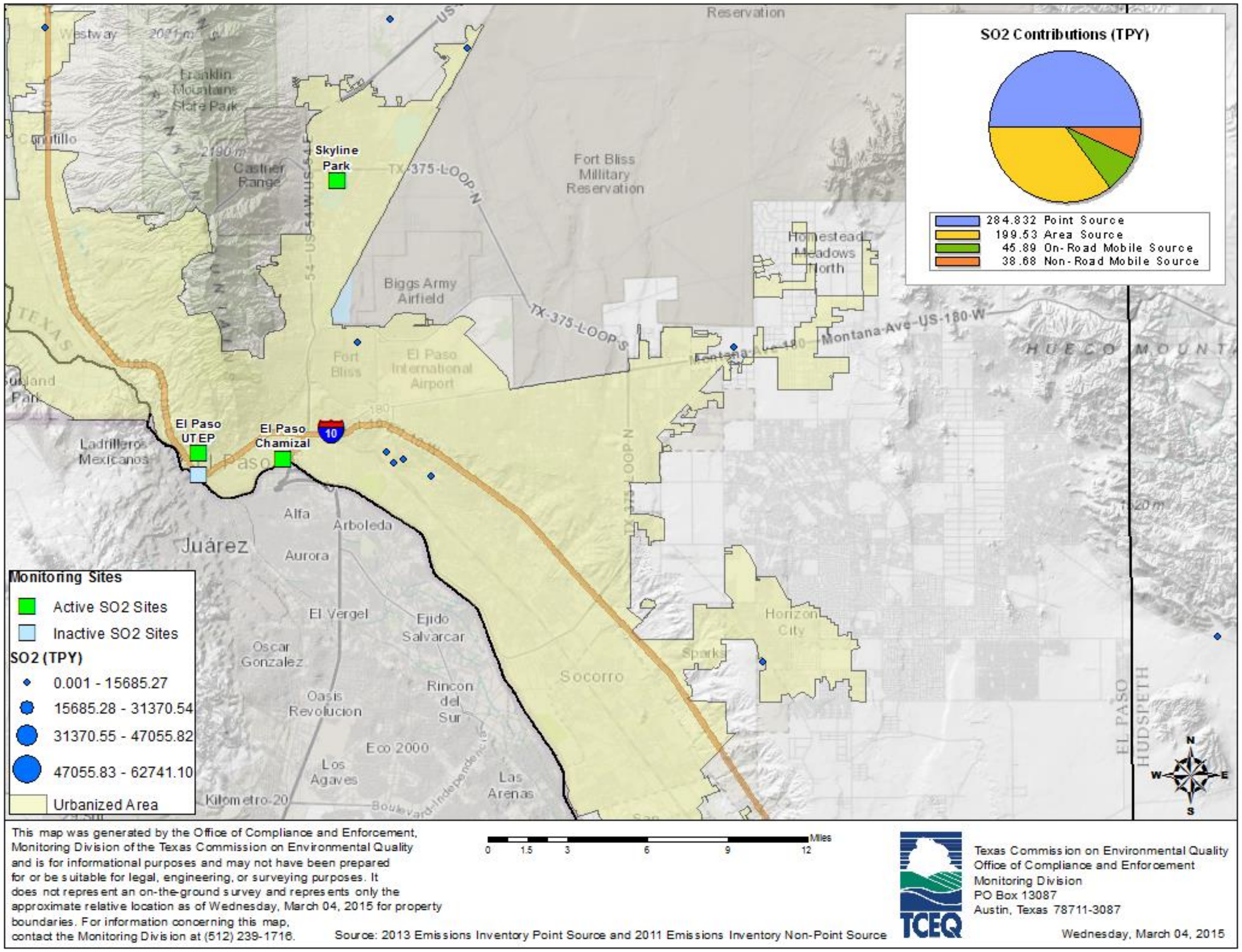
### Network History

As of January 1, 2015, three active $SO_2$ monitors (shown in Figure 110) operated in the Far West Texas area to measure ambient $SO_2$ concentrations near populated areas or downwind of known $SO_2$ point sources. The El Paso UTEP monitor was originally deployed to measure $SO_2$ concentrations in a populated area downwind of the American Refining and Smelting Company (ASARCO), LLC smelter, located east of downtown. In

1998, an $SO_2$ monitor was deployed at the El Paso Sun Metro site. The site was located near the United States-Mexico border, just west of multiple railroad tracks and Interstate 10 and was located in an area likely to measure the highest area $SO_2$ concentrations, as well as emissions coming across the international border. Skyline Park was deployed in 2000.

Since the last five-year network assessment, two $SO_2$ network changes have occurred. In late 2010, a trace level $SO_2$ monitor was deployed at the El Paso Chamizal site to comply with NCore monitoring requirements. Additionally, the El Paso Sun Metro site was decommissioned in 2012 due to the sale of the property where the monitoring station was located. Although the El Paso Sun Metro site had the highest design value in the El Paso area, $SO_2$ concentrations had historically remained less than 20% of the NAAQS.

Appendix A provides a full list of both active and recently decommissioned $SO_2$ monitors, as well as their location, monitoring objectives, and associated spatial scales.




TPY – tons per year

**Figure 110: Far West Texas Area Sulfur Dioxide ($SO_2$) Point Sources and Monitors**

### Design Values and Trends

Design values for the three $SO_2$ monitors in El Paso County have shown a decreasing trend since 2008. In 2014, the measured one-hour $SO_2$ design values for these monitors ranged from 2 to 10 ppb, well below the one-hour $SO_2$ NAAQS of 75 ppb.

### Network Evaluation

The current $SO_2$ monitoring network in the Far West Texas area exceeds minimum federal monitoring requirements and continues to satisfy established monitoring objectives. Monitoring is currently not required in any of the Far West Texas area counties based on population and reported emissions from existing sources, and ambient $SO_2$ levels from existing monitors remain well below a level of concern. Because emissions and monitored concentrations are so low, two of the existing $SO_2$ monitors (El Paso UTEP and Skyline Park) that exceed current $SO_2$ monitoring requirements are considered of medium value. The $SO_2$ monitor at the El Paso Chamizal site fulfills NCore requirements and therefore is considered of high value. Details on each monitor's value are provided in Appendix C.

Due to proposed federal regulatory action and pending designations for the 2010 one-hour $SO_2$ standard, no network changes are currently recommended. Once the EPA's final $SO_2$ Data Requirements Rule is promulgated, the TCEQ will evaluate the existing $SO_2$ network for potential optimization that will provide for compliance with any associated $SO_2$ monitoring requirement changes. These network changes will be included in the *2016 Annual Monitoring Network Plan*.

## Lead

### Network History

As of January 1, 2015, the TCEQ monitored Pb at three locations in the El Paso area as shown in Figure 111. Current federal rules require monitoring in locations likely to measure maximum Pb concentrations near each point source emitting 0.50 tpy or more of Pb and each airport emitting 1.0 tpy or more of Pb based on the National Emissions Inventory or other justifiable method. In addition, Pb monitoring is required at all NCore monitoring sites. As indicated in Figure 111, five sources in the El Paso area reported Pb emissions in 2013. None of these sources reported emissions greater than 0.06 tons of Pb per year. Based on 2013 Pb point source emissions and 2011 area source emissions, no source-oriented Pb monitoring is required in the Far West Texas area.

The largest historical source of Pb in the Far West Texas area was the ASARCO smelter, which operated from 1887 to 1999. Site-wide demolition was completed in 2013, and remedial activities are projected to be complete by early 2016. Air monitoring performed by the ASARCO site trustee indicates that possible Pb emissions from the site are minimal during the site remediation process. More information about the site and its remediation can be found online at http://www.recastingthesmelter.com.

Historically, Pb monitoring in the El Paso area has been conducted in populated areas downwind of the ASARCO facility. Prior to 2000, the TCEQ monitored ambient Pb concentrations at the Tillman and Kern sites, which were located in the populated downtown El Paso area. These monitors were later relocated to the Ojo de Agua and UTEP sites, respectively. In 2005, a Pb monitor was deployed at Skyline Park to measure background ambient Pb concentrations in a populated area on the north side of the city.

Since the last five-year assessment in 2010, the El Paso area Pb monitoring network has seen several changes. In 2011, a new Pb monitor was deployed at Ascarate Park SE to fulfill NCore requirements. Although the El Paso Chamizal site is the designated NCore site in the area, space limitations at that site precluded deployment of additional monitoring equipment and Ascarate Park was selected as an alternative site for meeting this requirement. In 2012, the Pb monitor at the Kern site was relocated to El Paso UTEP for logistical reasons. In 2013, the Tillman monitor property was sold, and the monitors were relocated to the new Ojo De Agua site, located in a populated residential area in Northwest El Paso. Finally, the Pb monitor at Skyline Park was decommissioned in 2014 based on historical measured design values well below the Pb NAAQS of 0.15 $\mu g/m^3$. Appendix A provides a list of active and decommissioned Pb monitors, as well as their location, monitoring objectives, and associated spatial scales.

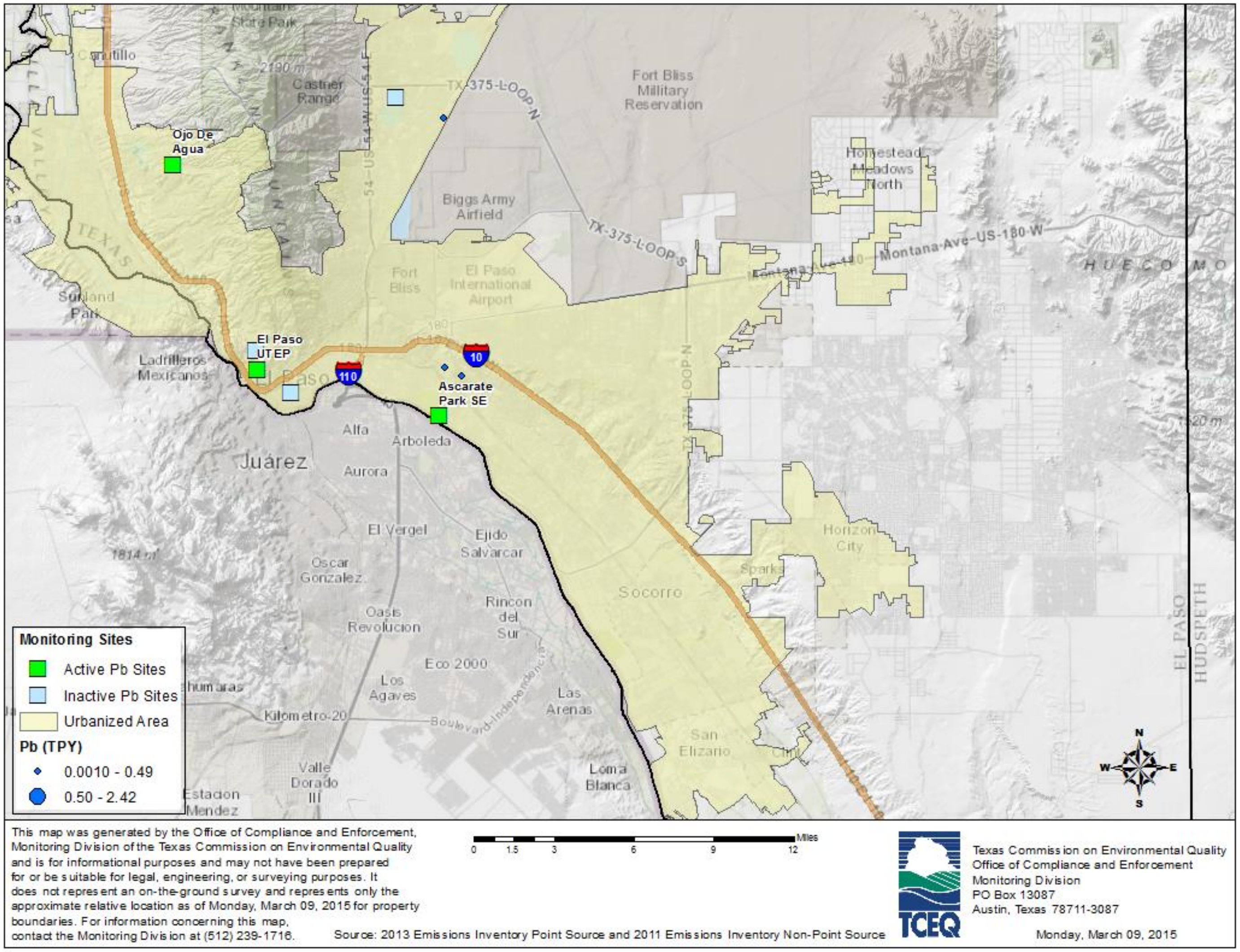
## Design Values and Trends

Due to their recent deployments, active El Paso Pb monitors have not yet achieved the required 38 months of data to calculate an official design value. Table 5 below provides the highest 3-month rolling averages for the former Tillman, Kern, and Skyline Park monitors and three current monitors in El Paso County. Note these maximum values from these former and current monitors are well below the Pb NAAQS of 0.15 $\mu g/m^3$.

**Table 5: Highest Three-Month Rolling Averages at Current and Historical Lead Monitors in the Far West Texas Area**

| Site Name | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|
| Tillman | 0.03 | 0.03 | 0.03 | * |
| Kern | 0.02 | 0.02 | * | * |
| El Paso UTEP | * | 0.03 | 0.03 | 0.02 |
| Ascarate Park SE | 0.01 | 0.02 | 0.01 | 0.01 |
| Skyline Park | 0.02 | 0.02 | 0.03 | 0.02 |
| Ojo De Agua | * | * | 0.02 | 0.02 |

Concentrations are provided in micrograms per cubic meter.
*Values are not available for these years.




TPY – tons per year

**Figure 111: Far West Texas Area Lead (Pb) Point Sources and Monitors**

## Network Evaluation

The existing Pb monitoring network in the Far West Texas area currently exceeds federal monitoring requirements and continues to meet existing monitoring objectives. Due to space limitations at El Paso Chamizal, the Ascarate Park SE Pb monitor is fulfilling NCore requirements and is considered of high value.

No source in the Far West Texas area emitted more than 0.50 tpy of Pb based on the 2013 point source emissions reported to the TCEQ. In addition, Pb has been monitored at five locations across the City of El Paso since 2005. Ambient concentrations at all of these locations were measured well below the level of the NAAQS. For these reasons, El Paso UTEP and Ojo De Agua Pb monitors are considered of low value.

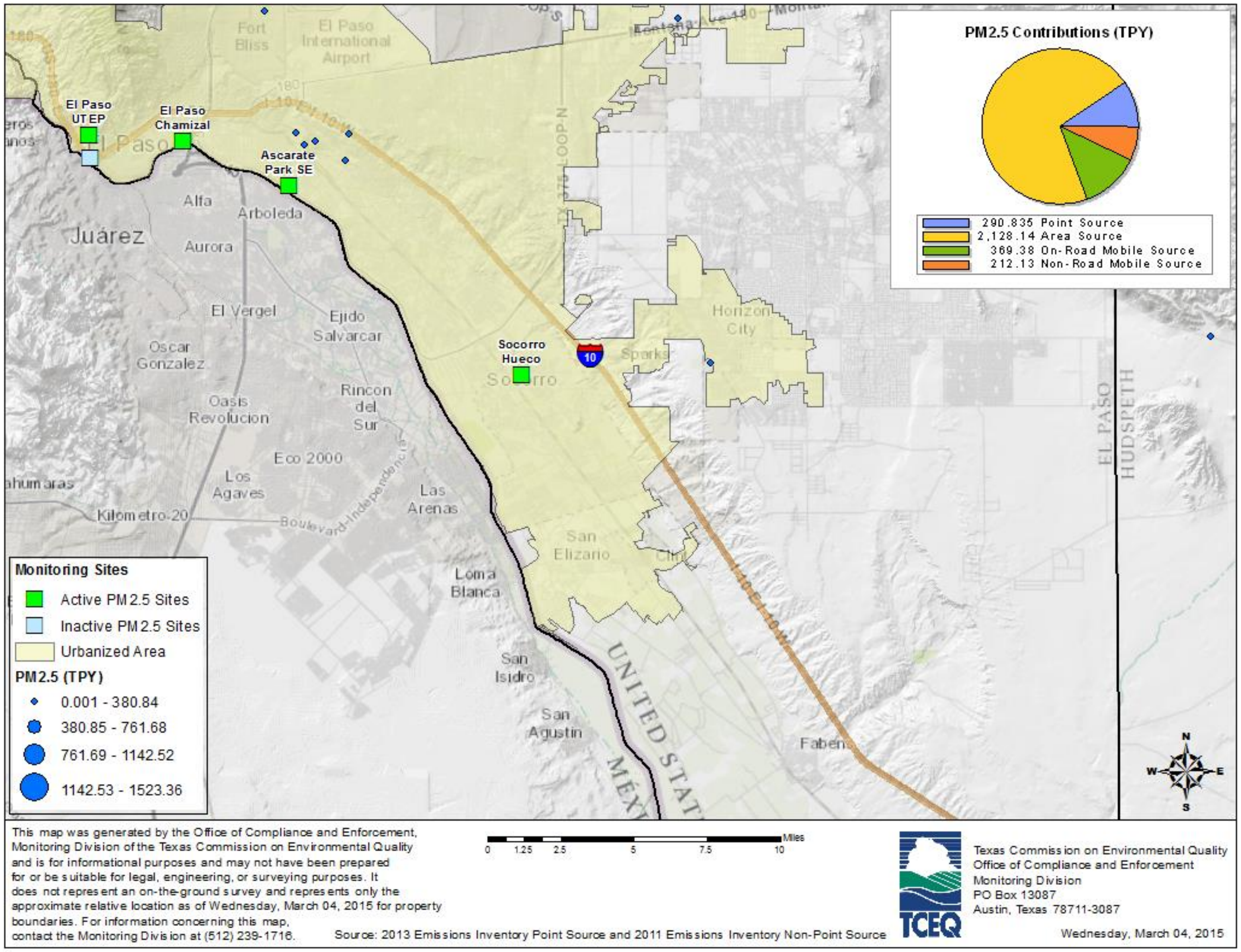
# Particulate Matter of 2.5 Micrometers or Less

## Network History

As of January 1, 2015, there were two $PM_{2.5}$ FRMs, four continuous $PM_{2.5}$ monitors, and one speciation monitor in the Far West Texas area, as shown in Figure 112. A variety of $PM_{2.5}$ samplers are located at El Paso area sites distributed along the international border with Mexico to evaluate regional transport, $PM_{2.5}$ background levels, and ambient $PM_{2.5}$ concentrations in populated areas. Additional $PM_{2.5}$ monitoring is deployed in Big Bend National Park to further assess regional transport across the United States and Mexico border. A full site list of both active and decommissioned $PM_{2.5}$ monitors, as well as their location, monitoring objectives, and associated spatial scales is provided in Appendix A.

Since the last five-year network assessment, two monitors have been relocated and two monitors have been decommissioned within the El Paso area. In November 2010, the TCEQ relocated a continuous $PM_{2.5}$ sampler from El Paso Chamizal to Ascarate Park SE to monitor concentrations in the populated area on the east side of downtown El Paso. At the same time, the TCEQ decommissioned the El Paso Chamizal $PM_{2.5}$ speciation sampler and a collocated speciation sampler at the El Paso Sun Metro site to create efficiencies within the $PM_{2.5}$ network. Following the sale of the property in 2012, the TCEQ relocated a continuous $PM_{2.5}$ sampler from El Paso Sun Metro to Socorro Hueco to monitor $PM_{2.5}$ background concentrations to the southeast of El Paso.

Multiple federal $PM_{2.5}$ monitoring requirements with unique monitoring objectives currently apply to the Far West Texas area. Based on population and ambient concentrations, the El Paso MSA is required to have a minimum of two $PM_{2.5}$ FRM monitors to measure concentrations representative of area-wide air quality with at least one sited in an area of expected maximum concentrations. In addition, continuous measurements of $PM_{2.5}$ are required at half of the required FRM sites and $PM_{2.5}$ FRM and continuous monitors are required at all NCore sites. These monitoring requirements are met with the monitors at the El Paso UTEP and El Paso Chamizal sites. Finally, $PM_{2.5}$ speciation monitoring is required at designated $PM_{2.5}$ STN sites to evaluate elemental constituents, selected anions and cations, and carbon. The speciation monitor at the El Paso Chamizal site fulfills this requirement.

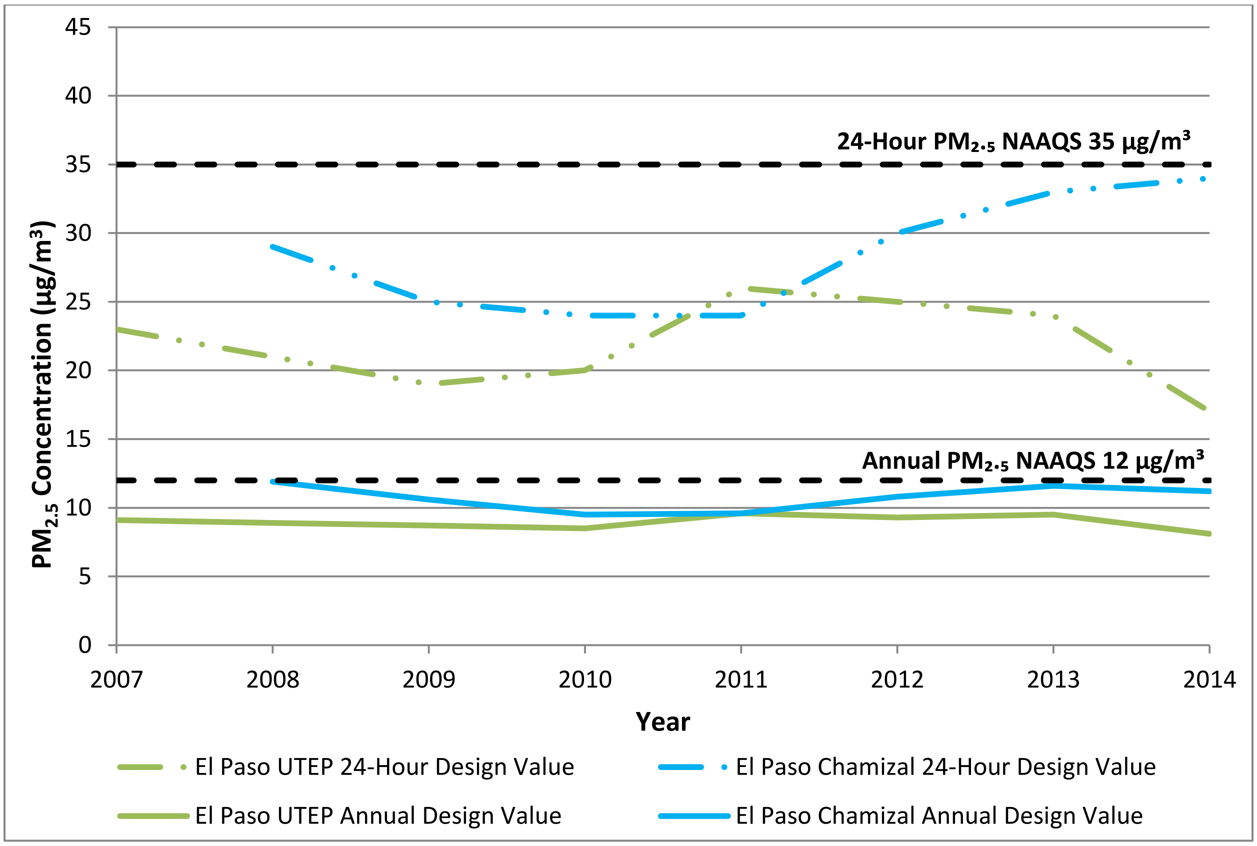



TPY – tons per year

**Figure 112: Far West Texas Area Particulate Matter of 2.5 Micrometers or Less in Diameter ($PM_{2.5}$) Point Sources and Monitors**

## Design Values and Trends

The annual $PM_{2.5}$ design values in the Far West Texas area have been stable since 2000, while the 24-hour average $PM_{2.5}$ measurements have shown more variability from year to year. Since the 98th percentile of the 24-hour average (the form of the standard) represents the highest two percent of all 24-hour measurements, the presence or absence of dust events on sampling days can greatly influence trend variability. Figure 113 depicts the trends in both the annual and 98th percentile of the 24-hour average using FRM data collected on a one in six day frequency from the El Paso Chamizal and El Paso UTEP monitors.




NAAQS - National Ambient Air Quality Standards
µg/m$^{3}$ - microgram per cubic meter

**Figure 113: Trends of 98th Percentiles of 24-Hour and Annual Averages Particulate Matter of 2.5 Micrometers or Less in Diameter ($PM_{2.5}$) Monitoring Sites in the Far West Texas Area Including Exceptional Event Days**

Prior to 2011, El Paso Chamizal only had regulatory data from a filter-based monitor, which sampled every sixth day. In 2011, a regulatory continuous monitor was installed at El Paso Chamizal. Data handling procedures require regulatory continuous data be used when data from the filter-based monitor are unavailable for calculation of design values. The increased monitoring captured more high $PM_{2.5}$ days, causing an increase in the annual average $PM_{2.5}$. Some of those high days are proposed exceptional events (typically dust events). More information about these exceptional event packages is publicly available online at https://www.tceq.texas.gov/airquality/monops/pm_flags.html.

Additionally, the continuous $PM_{2.5}$ monitor at Bravo Big Bend has reported concentrations well below the NAAQS. The annual average data remains below 6.5 $\mu g/m^3$ and the 24-hour average below 16 $\mu g/m^3$.

## Network Evaluation

The existing Far West Texas $PM_{2.5}$ monitoring network provides valuable data for the evaluation of both local and transported sources of particulate matter. The current placement of monitors in the Far West Texas area allows for the evaluation of $PM_{2.5}$ concentrations in populated areas of El Paso as well as in areas impacted by background and transported particulate from across the international border.

Based on current $PM_{2.5}$ monitoring requirements, all of the $PM_{2.5}$ monitors at the El Paso Chamizal and El Paso UTEP sites are considered of high value. Both of these sites are located in highly populated areas of the city that are in close proximity to the international border making the location of these sites valuable in evaluating data relevant to regional $PM_{2.5}$ transport and concentrations that impact populated areas. In addition, 24-hour data from the El Paso UTEP and El Paso Chamizal FRM monitors are not well correlated (Pearson's coefficient=0.768; relative difference=0.291), indicating that both of these monitors offer valuable, unique data.

Although the continuous $PM_{2.5}$ monitoring conducted in Far West Texas is in excess of federal monitoring requirements, the data it provides is valuable in understanding $PM_{2.5}$ movement across the area. As shown in Figure 114, 24-hour continuous data are, at best, moderately correlated. The closest correlation is between Ascarate Park SE (AQS 48-141-0055) and Socorro Hueco (AQS 48-141-0057) monitors (Pearson's coefficient=0.888, relative difference=0.287). The moderate correlation and high relative difference of the El Paso area $PM_{2.5}$ data indicate the existing $PM_{2.5}$ monitors are not redundant and provide valuable, unique data. All of the continuous $PM_{2.5}$ monitors are valuable because of the spatial coverage and hourly data points they provide, which are critical for evaluating the impact of dust events.

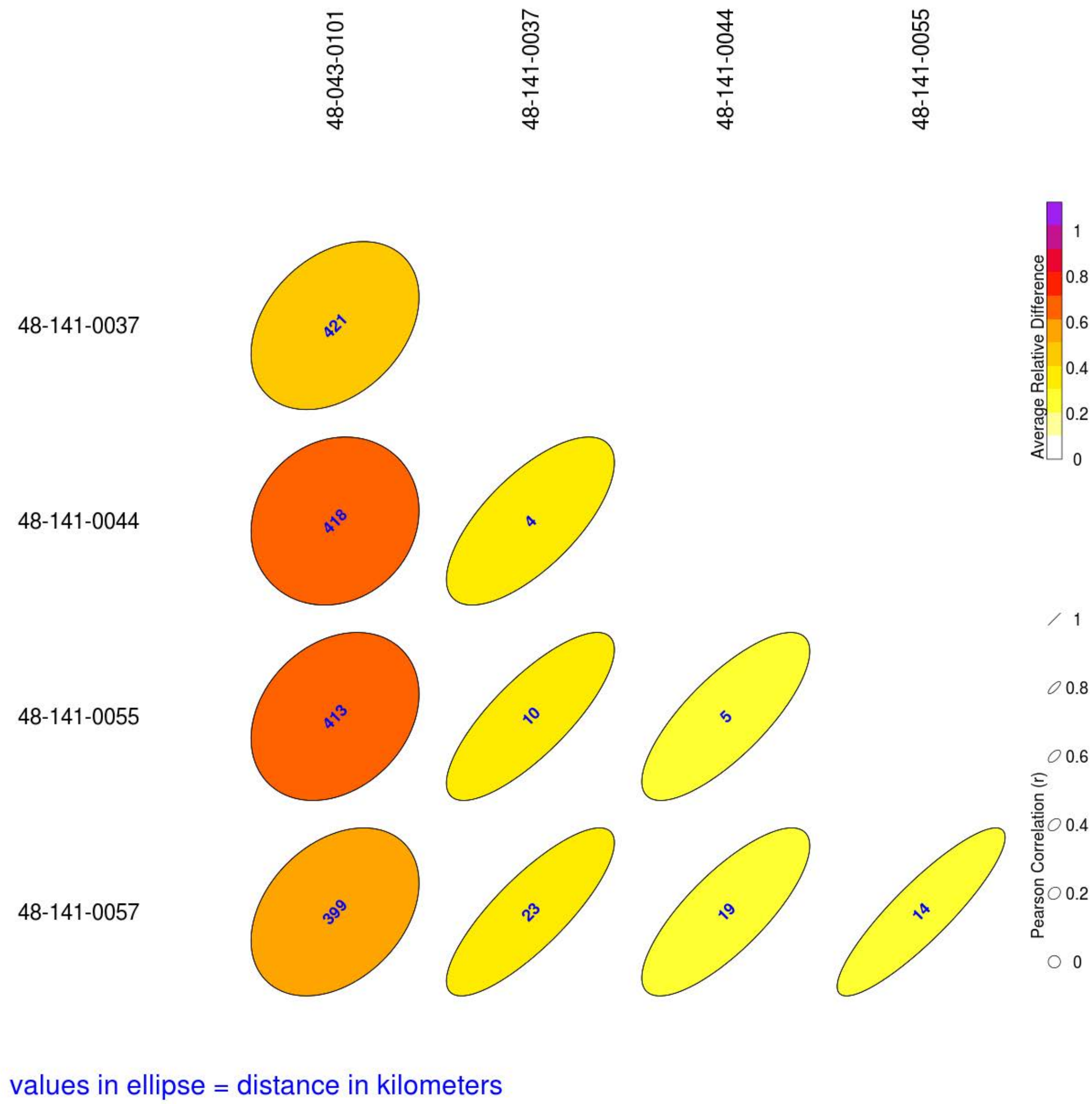



**Figure 114: Correlation Matrix for 24-Hour Particulate Matter of 2.5 Micrometers or Less in Diameter ($PM_{2.5}$) Monitors in the Far West Texas Area, 2011-2013**

Given that current $PM_{2.5}$ design values in the Far West Texas area are in excess of 90% of the NAAQS, all current $PM_{2.5}$ monitors are considered of high value. Details on each monitor's value are provided in Appendix C. Since the highest $PM_{2.5}$ concentrations in the area have demonstrated an association to natural events and international sources, the TCEQ will continue to evaluate monitoring opportunities near the border to better understand the impact of dust transported into the Far West Texas area and its effect on ambient $PM_{2.5}$ concentrations.

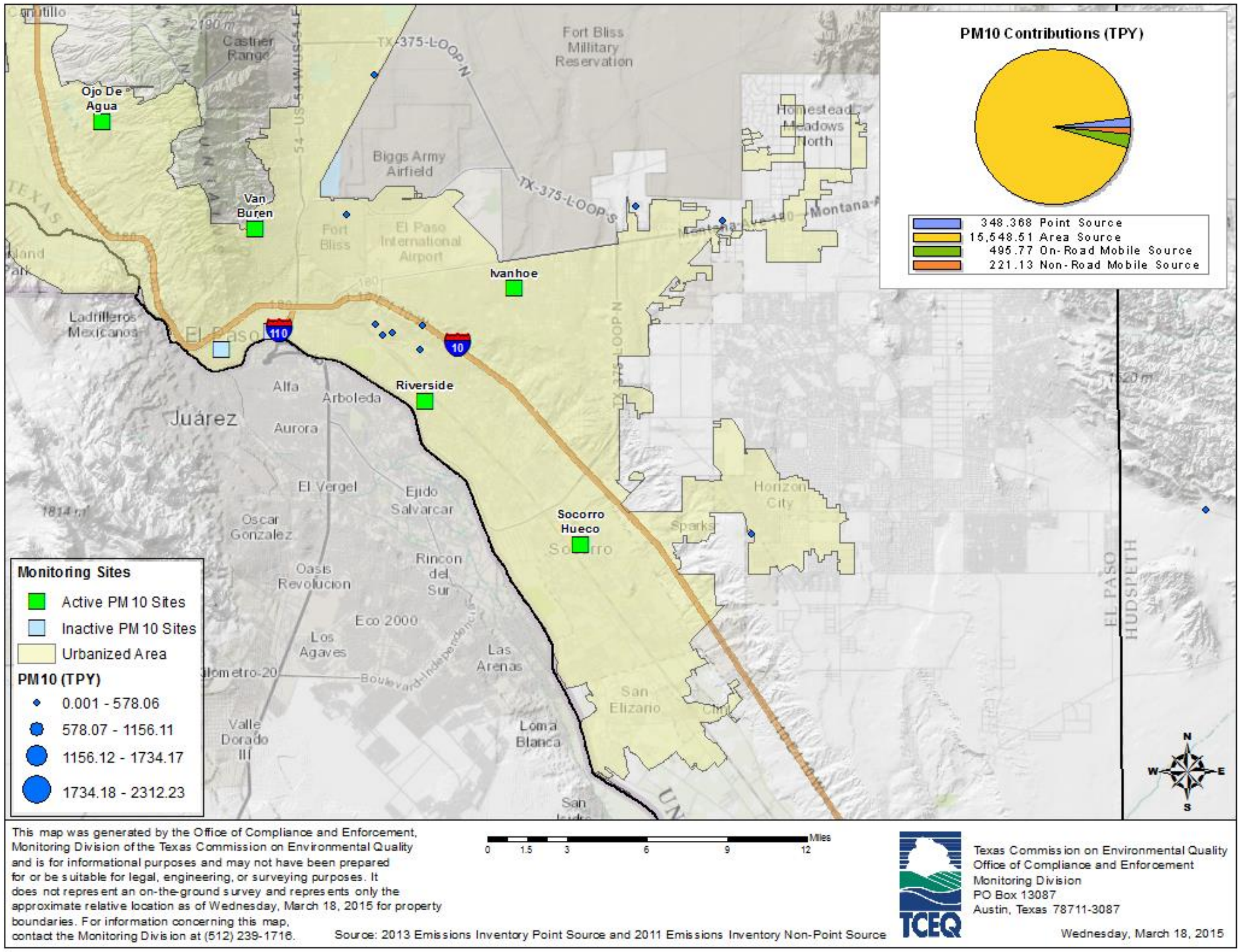
## Particulate Matter of 10 Micrometers or Less

### Network History

As of January 1, 2015, five $PM_{10}$ FRM monitors (Ivanhoe, Ojo De Agua, Riverside, Socorro Hueco, and Van Buren) and two collocated $PM_{10}$ samplers operated in the Far West Texas area to evaluate regional air quality in the populated El Paso area. In addition, one $PM_{10-2.5}$ monitor is operated at the El Paso Chamizal site to assess the variation in coarse particle concentrations as required for NCore sites. The TCEQ began monitoring $PM_{10}$ in the El Paso area in the mid-1980s at sites such as Ivanhoe and Riverside, to measure particulate concentrations in populated neighborhoods throughout the urban area. In 2000, a $PM_{10}$ monitor was added to the Socorro Hueco site to evaluate background concentrations in the populated area to the southeast of El Paso. Another $PM_{10}$ monitor was deployed a year later at the Clendenin School site to evaluate maximum ambient concentrations. The location of these monitors and 2013 point sources is provided in Figure 115.

Since the last five-year assessment in 2010, the Clendenin School site was relocated across the street to the Van Buren site. The $PM_{10-2.5}$ monitor was deployed in 2011 at the El Paso Chamizal site to fulfill NCore monitoring requirements for course particulate. Finally, in 2013 the $PM_{10}$ monitor was moved from the Tillman site to the new Ojo De Agua site due to sale of the Tillman site property. Appendix A provides a full list of active and decommissioned $PM_{10}$ monitors, as well as their locations, monitoring objectives, and associated spatial scales.

Current federal minimum requirements specify $PM_{10}$ monitoring in metropolitan areas based on population and measured concentrations, if available. Based on 2014 concentration data and population estimates, the El Paso MSA is required to have between four and eight $PM_{10}$ FRM monitors. Those requirements are met with existing monitors.




TPY – tons per year

**Figure 115: Far West Texas Area Particulate Matter of 10 Micrometers or Less in Diameter ($PM_{10}$) Point Sources and Monitors**

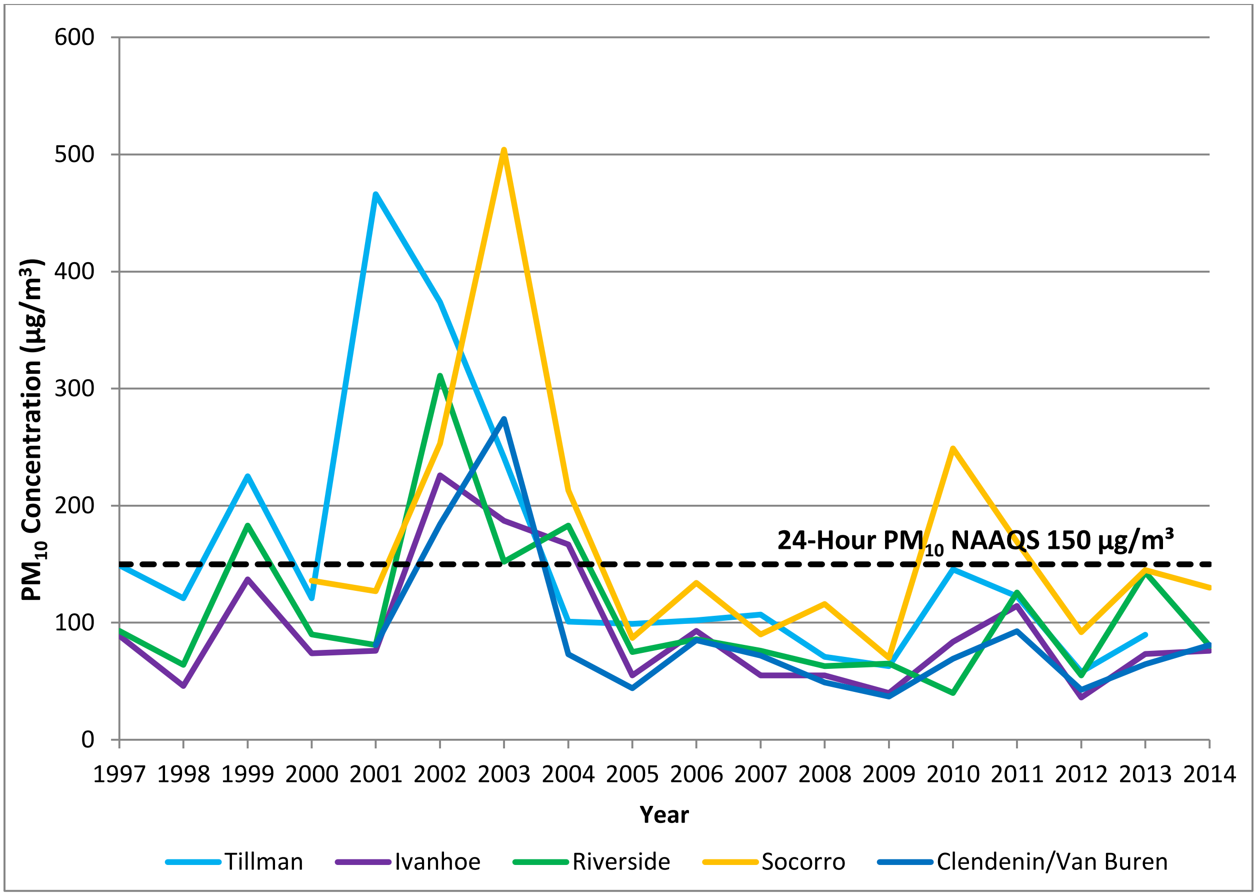
## Design Values and Trends

The El Paso area has been classified as nonattainment for the 24-hour $PM_{10}$ NAAQS since November 15, 1990. As shown in Table 6, the estimated number of exceedances per year has hovered between 2 and 6.7 since 2005. Socorro Hueco exceedances have been variable due to the impact of regional blowing dust, and remain heavily impacted by exceptional events. Similarly, as shown in Figure 116, trends in the $PM_{10}$ annual maximum 24-hour averages for El Paso show an overall decline from 2000 to 2014, but are influenced by exceptional dust events coinciding with sampling days.

**Table 6: Far West Texas Area Estimated Number of Exceedances Days of the National Ambient Air Quality Standard for Particulate Matter of 10 Micrometers or Less in Diameter**

| Site Name | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|---|---|---|
| Ivanhoe | 6.1 | 2 | 0 | * | * | * | 0 | 0 | 0 | 0 |
| Riverside | 2 | 2 | 0 | * | * | * | * | 0 | 0 | 0 |
| Vilas^ | 4.1 | * | * | * | * | * | * | * | * | * |
| Lindbergh^ | 4 | * | * | * | * | * | * | * | * | * |
| Socorro Hueco | 6.2 | 2.2 | 0 | 0 | 0 | 2 | 6.1 | 6.1 | 4 | 6.7 |
| Skyline Park | 3.8 | * | * | * | * | * | * | * | * | |
| Clendenin School^ | 0 | * | * | * | * | * | * | * | * | * |
| Van Buren | * | * | * | * | * | * | * | * | 0 | 0 |

The average estimated exceedance values are computed based on the 3-year period ending with the represented year.
*Data were unavailable for design value calculation.
^Deactivated sites




µg/m3 - micrograms per cubic meter.

**Figure 116: Trends of Far West Texas Area Particulate Matter of 10 Micrometers or Less in Diameter ($PM_{10}$) Annual Maximum 24-Hour Averages Including Exceptional Event Days, 1997-2014**

## Network Evaluation

The existing Far West Texas area $PM_{10}$ monitoring network meets federal monitoring requirements. The current location of $PM_{10}$ monitors continues to be sufficient to meet the established monitoring objective of measuring ambient $PM_{10}$ concentrations in populated urban and suburban environments. Based on their regulatory obligation and monitoring objectives, all of the current monitors are of high value. While no network changes are recommended at this time, the TCEQ continues to evaluate monitoring opportunities near the border to better understand the impact of dust transported into the El Paso area and its effect on ambient $PM_{10}$ concentrations.

# Air Toxics

## Network History

### *VOCs*

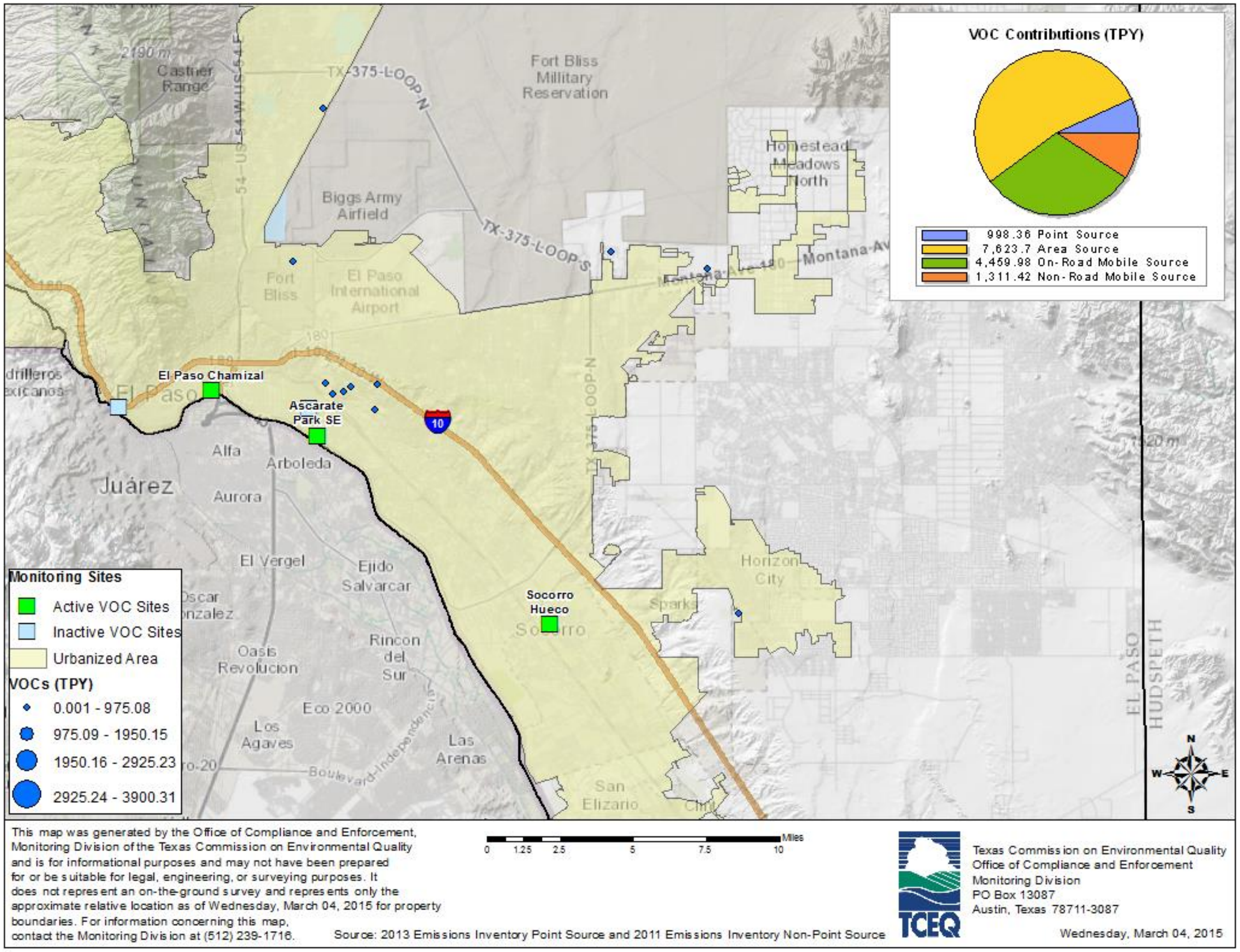
Figure 117 shows the locations of sources reporting VOC emissions in 2013. The Far West Texas area currently has one autoGC measuring VOCs. The El Paso Chamizal autoGC was deployed in 1995 to meet the PAMS network requirement and characterize short-term changes in regional and local ambient air conditions in the El Paso area. A canister sampler was deployed at the Ascarate Park SE site in 2010 to monitor concentrations in populated areas and better understand background VOC concentrations. Under the United States/Mexico Border grant, an additional autoGC was deployed at the El Paso Delta site as part of a short-term study to characterize ozone precursor emissions. The El Paso Delta site was decommissioned in August 2013 when the study was completed. Also in 2013, the canister sampler at the Ascarate Park SE site was deactivated due to low historical VOC concentrations and adequate monitoring coverage by the El Paso Chamizal autoGC and other non-regulatory El Paso area VOC monitors.

### *Other Air Toxics*

As of January 1, 2015, the Far West Texas area had one $PM_{2.5}$ speciation sampler, one carbonyl monitor, and one SVOC sampler. Since 2000, the TCEQ has collected $PM_{2.5}$ samples every third day the El Paso Chamizal site and analyzed then for a set of 40 speciated compounds. The speciation data are representative of ambient concentrations in a populated, urban area and provide meaningful information about the composition of area windblown dust.

In 2010, the carbonyl sampler was relocated from El Paso Chamizal to Ascarate Park SE to address logistical issues. Every sixth day, this sampler collects a 24-hour sample that is analyzed for 17 carbonyl compounds. Data are used to characterize ozone precursor concentrations and assess ambient concentrations in populated areas.

In 2012, the SVOC sampler was relocated from Sun Metro to Socorro Hueco after the sale of the Sun Metro property. As with carbonyls, a 24-hour sample is collected every sixth day for subsequent laboratory analysis. SVOC data provide information about ambient concentrations of certain combustion products, as well as provide concentration trends in an urban environment that are useful for direct toxicological evaluations.



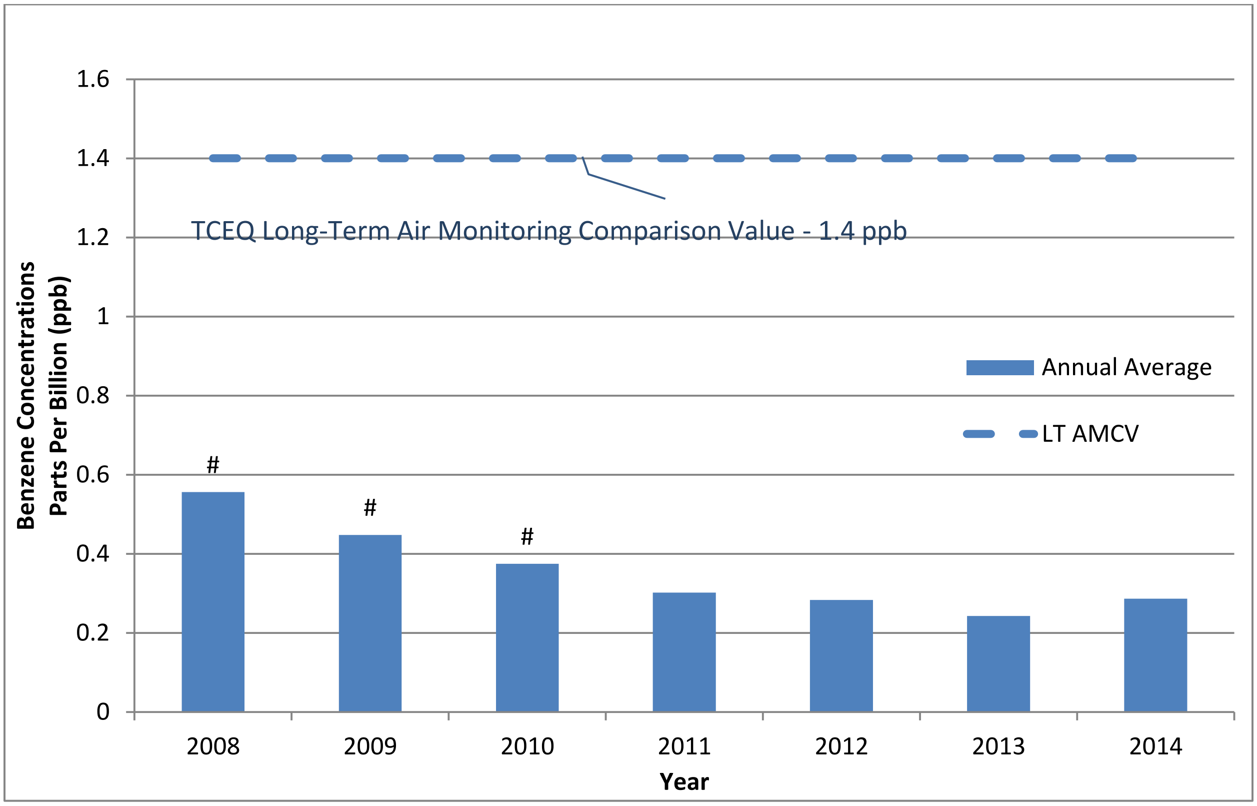

TPY – tons per year

**Figure 117: Far West Texas Area Volatile Organic Compound (VOC) Point Sources and Monitors**

## Network Evaluation

Although most air toxics monitors in the El Paso area were deployed to evaluate regional air quality and trends in ozone precursors in populated areas, the Toxicology Division also evaluates all air toxics monitoring data annually for their potential to cause health or welfare concerns. According to the annual monitoring data evaluations, exposure to measured VOC, SVOC, metals, and carbonyl concentrations in the El Paso area over the past five years would not be expected to cause adverse health effects or odorous conditions. Full Toxicology Division evaluations of ambient air data are available online at http://www.tceq.state.tx.us/toxicology/regmemo/AirMain.html.

Ambient air toxics concentrations in the El Paso area have remained below a level of potential health concern for over five years, even in areas that are closest to sources and expected to have the highest concentrations. Benzene is a common air pollutant in ambient air, particularly in urban areas impacted by mobile sources. Benzene is also frequently the VOC measured at concentrations closest to its AMCV. Therefore, benzene is a good surrogate for evaluating trends in air quality, particularly in urban settings. As shown in Figure 118, rolling annual average benzene concentrations have decreased since the mid-1990s in the El Paso area. This decreasing trend is consistent with the statewide decrease in benzene over the past five years.




ppb – parts per billion

#Indicates an incomplete data set

**Figure 118: Rolling Annual Average Benzene Trends at El Paso Chamizal, 1996-2014**

Each of the air toxics monitors is considered of high value because of continued federal PAMS monitoring requirements or because of the value in the continued evaluation of air toxics trends in the El Paso area. In addition, the existing air toxics network is adequately sited to evaluate air toxics trends in populated El Paso areas. El Paso Chamizal and Ascarate Park SE provide representative air quality data in the populated urban core, as well as information on air toxics emissions from the international border.

Because air toxics concentrations have remained below a level of concern, and monitors are appropriately sited for both health effects evaluations and ozone precursor emission evaluations, additional monitoring is not anticipated at this time. The TCEQ will continue to assess the monitoring needs in this area as new data and regulatory requirements are made available.

# Conclusions

Overall, the existing TCEQ monitoring network is sufficient to adequately characterize and evaluate air quality under current standards. With the additional monitors that the TCEQ has committed to deploy in the El Paso and McAllen-Mission-Edinburg areas, Texas complies with all current regulatory monitoring requirements. The analysis presented in this review indicates that monitors originally sited to evaluate ambient concentrations in populated areas are still located in areas of dense population. A summary of factors considered in this evaluation is provided in Appendix C. Additionally, the current monitor locations are well suited to evaluate the largest pollutant sources.

The TCEQ continues to evaluate the need for additional monitoring as pending federal monitoring requirements are finalized, and further air quality evaluations are conducted. A detailed impact review of the current proposed rules is provided below. The TCEQ may consider additional network changes for lower valued monitors to absorb the costs associated with meeting these rules if they are implemented as proposed.

## *Anticipated Changes Based on Monitoring Regulations*

### Potential Changes Due to Current Regulatory Requirements

The TCEQ is planning to deploy monitors to meet currently effective particulate matter and $NO_2$ monitoring requirements. As described in the Lower Rio Grande Valley section, the TCEQ will deploy a new monitoring site in Edinburg on East Freddy Gonzales Drive in summer 2015 as discussed in the *2014 Annual Monitoring Network Plan*. The new site will include one $PM_{2.5}$ FRM monitor, one $PM_{10}$ FRM monitor, and one continuous $PM_{2.5}$ monitor to meet requirements based on the MSA's increased population. In addition, by January 2017, the TCEQ will deploy near-road $NO_2$ monitors in the El Paso and McAllen-Mission-Edinburg areas in accordance with 40 CFR Part 58, Appendix D, Section 4.3.2. Proposed locations for the near-road sites will be provided in the *2016 Annual Monitoring Network Plan*.

In the next five years, conservative population projections predict three MSAs likely to have population growth that will trigger additional monitoring requirements under 40 CFR Part 58: McAllen-Mission-Edinburg, Killeen-Temple, and College Station-Bryan. The McAllen-Mission-Edinburg MSA population may exceed 1 million in 2020. If this projection is correct, the TCEQ would be required to deploy one near-road CO monitor, one area-wide $NO_2$ monitor, one $PM_{2.5}$ monitor, and possibly two additional $PM_{10}$ monitors in this MSA, depending on the design values measured at that time. The Killeen-Temple MSA population may exceed 500,000 in 2020, requiring the TCEQ to deploy one $PM_{2.5}$ monitor and at least one $PM_{10}$ monitor. Although the College Station-

Bryan MSA population may exceed 250,000 in 2015, the area would still comply with the $PM_{10}$ monitoring requirements in the current rule (between zero and one $PM_{10}$ monitor). The TCEQ will continue to evaluate population changes annually based on the most recent United States Census Bureau population estimates. Any deployments as a result of population changes will be detailed in the associated Annual Monitoring Network Plans.

As discussed in the area reviews, no additional changes to the monitoring network are necessary under existing regulatory requirements. Design values either meet the level of the current standards or are consistent. Further, there are no anticipated monitoring changes due to the Texas SIP or maintenance plan. The TCEQ will continue to assess compliance with all federal monitoring requirements on an annual basis and will recommend changes through the associated Annual Monitoring Network Plans.

## Potential Changes Due to Future Regulatory Actions

### Sulfur Dioxide

On April 17, 2014, the EPA proposed the Data Requirements Rule to establish emission thresholds and deployment deadlines for source-oriented monitoring and/or modeling to characterize ambient air quality impacts from larger $SO_2$ sources. The proposed rule provided three options for emission threshold levels based on actual $SO_2$ emissions from sources in areas with a population of 1 million or more and in less populated areas. By January 1, 2017, states would need to submit to the EPA either modeled or monitored off-site $SO_2$ concentrations downwind of large $SO_2$ sources.

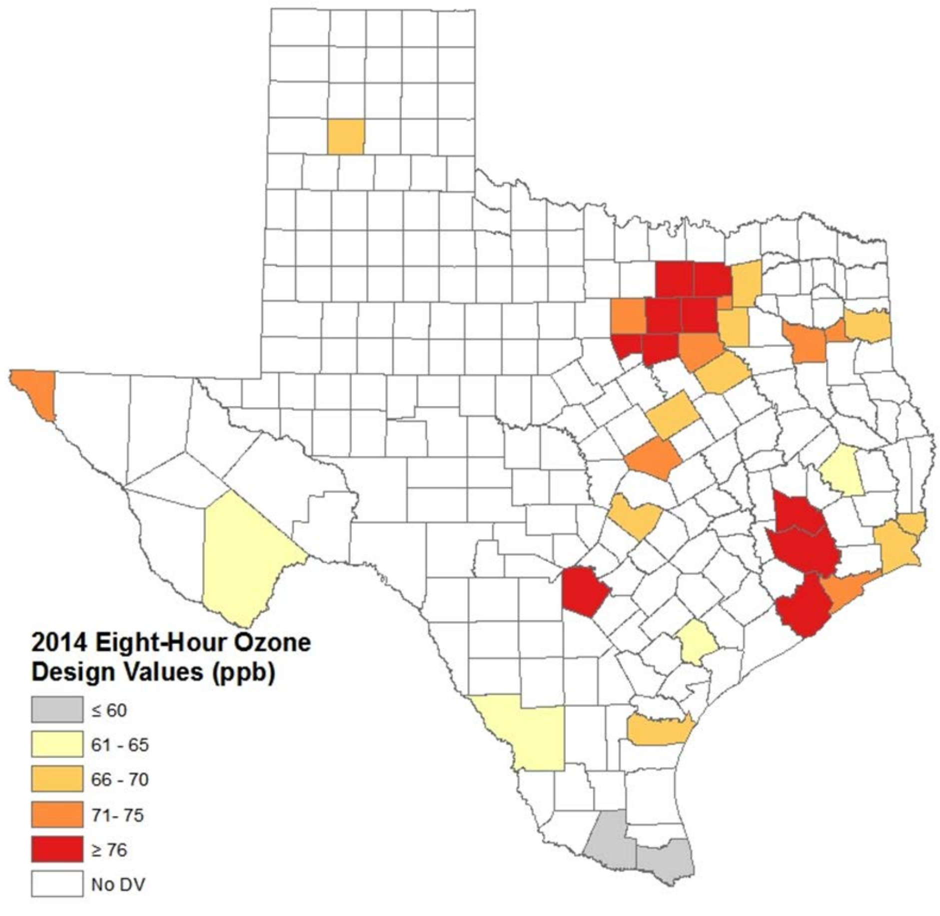
In addition, on March 2, 2015, the District Court for the Northern District of California entered a consent decree between EPA and environmental groups related to litigation over EPA's failure to designate all areas for the 2010 $SO_2$ NAAQS. Under the consent decree, the EPA must complete designations by July 2, 2016, for areas that have monitored violations of the NAAQS or contain sources that have not been announced for retirement and that emitted greater than 16,000 tons of $SO_2$ in 2012 or that had more than 2,600 tons of $SO_2$ and an annual average emission rate of greater than or equal to 0.45 pounds $SO_2$ per million British thermal units in 2012.

Based on the 2013 point source EI data and the proposed Data Requirements Rule, Texas may need to monitor or model emissions near 31 point sources across Texas. Twelve of these sources fall under the consent decree and may require monitors based on the EPA's final designation. The TCEQ will further evaluate the need for $SO_2$ monitors once the final Data Requirements Rule is promulgated, both in terms of monitors required under the final rule and the potential reallocation of monitors in areas where monitors are no longer required. The spring 2015 edition of the *Unified Agenda of Federal Regulatory and Deregulatory Actions* estimates final rule publication for the Data Requirements Rule in October 2015.

### Ozone

On December 17, 2014, the EPA published a notice of proposed rulemaking regarding the NAAQS for ozone in the *Federal Register*. (79 FR 75234) The EPA accepted public comments on the proposed rule until March 17, 2015. The two main points of this proposed rule that affect the TCEQ monitoring network are the range of potential standards and the redesign of the ozone and PAMS networks.

The EPA accepted comments on a proposed standard in the range of 0.065 to 0.070 ppm. If the EPA finalizes a standard below 0.075 ppm, several additional areas could be designated nonattainment. Figure 119 highlights Texas counties with 2014 ozone monitoring data at or near the levels of the proposed standard.




ppb – parts per billion
*2014 design values are calculated as of 4/1/2015. The monitors in Polk and Webb county do not have enough complete data under the 2008 National Ambient Air Quality Standard (NAAQS); however, the design values at those monitors could become valid depending on the level of the new NAAQS.

**Figure 119: Texas Counties with Ozone Monitoring Data at or Near the Levels of the Proposed Ozone Standard**

In addition to lowering the NAAQS, the EPA is taking comment on redesigning the ozone and PAMS monitoring requirements. The proposed rule would only require PAMS monitoring at existing NCore sites in nonattainment areas. The rule would likely impact the 22 PAMS stations operating under current requirements. If the proposed rule was implemented as written, all PAMS monitoring conducted at sites other than Dallas Hinton, Houston Deer Park #2, and El Paso Chamizal would no longer be required.

The EPA is under a consent decree obligation to publish the final rule by October 2015. Once the rule is final, the TCEQ will reevaluate the network of ozone and ozone precursor monitors throughout the state as part of the proposed enhanced monitoring plan. Adjustments in monitoring conducted beyond minimum requirements may be necessary depending on the level of the standard and the extent of revisions to the monitoring network design rules. Any changes would be proposed through the Annual Monitoring Network Plan.

### Lead

On September 11, 2014, the EPA proposed revisions to ambient monitoring quality assurance requirements for Pb. (79 FR 54356) As part of this proposed rule, the EPA proposed removing the requirement for Pb monitoring at NCore sites. If the final rule includes this removal, Pb monitors at Dallas Hinton, Houston Deer Park #2, and Ascarate Park SE will no longer be required. The TCEQ will reevaluate the need for these monitors when the final rule is published. The spring 2015 edition of the *Unified Agenda of Federal Regulatory and Deregulatory Actions* estimated final rule publication in April 2016.

# References


Gill, Thomas E., Miguel Domínguez Acosta, Nancy I. Rivera Rivera, and Adriana E. Perez. 2007. *Investigation of Dust Emission Hotspots in Chihuahuan Desert Playa Basins*, Project Number: A-05-03.

Environmental Protection Agency, *Ecoregions of Texas (color poster with map, descriptive text, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:2,500,000)*, Griffith, G.E., Bryce, S.A., Omernik, J.M., Comstock, J.A., Rogers, A.C., Harrison, B., Hatch, S.L., and Bezanson, D., 2004.

Lake Michigan Air Directors Consortium, *NetAssess Application-Ambient Air Monitoring Network Assessment Tools*, v.0.6b, 2015. http://ladco.github.io/NetAssessApp/index.html

National Atmospheric and Atmospheric Administration-National Climatic Data Center, *Climate at a Glance: United States Time Series*, 2015. http://www.ncdc.noaa.gov/cag/time-series/us (accessed March 18, 2015).

Office of Information and Regulatory Affairs, *Spring 2015 Unified Agenda of Regulatory and Deregulatory Actions*, 2015. http://www.reginfo.gov/public/do/eAgendaMain

Roberto Puga, *Recasting the Smelter RSS*, 2015. http://www.recastingthesmelter.com/ (accessed February 2, 2015).

Texas Commission on Environmental Quality, *2014 Annual Monitoring Network Plan*, 2014.

Texas Commission on Environmental Quality, *El Paso 2010-2012 Particulate Matter Exceptional Events Demonstration*, 2013.

Texas Commission on Environmental Quality. *Houston-Galveston-Brazoria Eight-Hour Ozone Nonattainment Area SIP Revision*. Project No. 2006-027-SIP-NR, 2007.

Texas Commission on Environmental Quality. *2010 HGB Attainment Demonstration SIP Revision for the 1997 Eight-Hour Ozone Standard*. Project No. 2009-017-SIP-NR, 2010.

Texas Commission on Environmental Quality, *Houston 2010 $PM_{2.5}$ Exceptional Events Demonstration*, 2013.

Texas Commission on Environmental Quality, *Houston 2011 $PM_{2.5}$ Exceptional Events Demonstration*, 2013.

Texas Commission on Environmental Quality, *Houston 2012 $PM_{2.5}$ Exceptional Events Demonstration*, 2013.

Texas Commission on Environmental Quality, *Texas SIP Revisions*, 2014. http://www.tceq.state.tx.us/airquality/sip/sipplans.html (accessed February 19, 2015).

Texas Commission on Environmental Quality, *The El Paso County Area Natural Events Action Plan (NEAP)*, 2007.

Texas State Data Center, *Projections of the Population of Texas and Counties in Texas by Age, Sex, and Race/Ethnicity for 2010-2050*, The Office of the State Demographer, 2014. http://txsdc.utsa.edu/ Data/TPEPP/Projections/Methodology.pdf (accessed January 30, 2015).

The Borderplex Alliance, *Population Cd. Juárez, México*. http://www.borderplexalliance.org/regional-data/ciudad-juarez/market-overview/juarez-population (accessed February 3, 2015).

United States Census Bureau, *2010 Census Data*, 2010. http://www.census.gov/2010census/data/ (accessed March 8, 2015).

United States Census Bureau, *2014 National Population Projections*, 2014. http://www.census.gov/2010census/data/ (accessed March 8, 2015).

United States Geological Survey, *Description of the El Paso District*, Richardson, G. B. http://pubs.usgs.gov/gf/166/text.pdf (accessed January 30, 2015).

Wermund, E.G., *Physiographic Map of Texas*, The University of Texas at Austin Bureau of Economic Geology, 1996.

# Appendix A

## TCEQ Ambient Monitoring Site List

Texas Commission on Environmental Quality
Texas Five-Year Ambient Monitoring Network Assessment

| AQS Site ID | TCEQ Region | Site Name | Address/ Location | Sampler Type | AQS Network & Monitor Type | Operating Schedule | Monitoring Objective | Location Setting | Spatial Scale | Sampler Status | Sampler Status Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 483751025 | 01-Amarillo | Amarillo 24th Avenue | 4205 NE 24th Avenue, Amarillo | $SO_2$ | SLAMS/SPM | Continuous | Population Exposure | Suburban | Neighborhood | Active | 10/16/2013 |
| 483750320 | 01-Amarillo | Amarillo A&M | 6500 Amarillo Blvd West, Amarillo | $PM_{2.5}$ (FRM) | SLAMS | 24 Hours; 1/6 Days | Population Exposure | Urban and Center City | Urban Scale | Inactive | 11/1/2010 |
| 483750320 | 01-Amarillo | Amarillo A&M | 6500 Amarillo Blvd West, Amarillo | $PM_{2.5}$ (TEOM) | SPM | Continuous | Population Exposure | Urban and Center City | Urban Scale | Active | 4/12/2005 |
| 483750024 | 01-Amarillo | Amarillo SH 136 | 7100 State Highway 136, Amarillo | TSP (Pb) | SLAMS | 24 Hours; 1/6 Days | Population Exposure; Source Oriented | Rural | Middle Scale | Active | 4/25/2010 |
| 483030325 | 02-Lubbock | Lubbock-$PM_{2.5}$ | 1502 Mac Davis Drive, Lubbock | $PM_{2.5}$ (Speciation) | Supplemental Speciation | 24 Hours; 1/6 Days | Population Exposure | Urban and Center City | Neighborhood | Inactive | 11/1/2010 |
| 483030325 | 02-Lubbock | Lubbock-$PM_{2.5}$ | 1502 Mac Davis Drive, Lubbock | $PM_{2.5}$ (TEOM) | SPM | Continuous | Population Exposure | Urban and Center City | Neighborhood | Inactive | 11/17/2014 |
| 484850315 | 03-Abilene | Wichita Falls | 4612 Spanish Trace (Rear), Wichita Falls | $PM_{2.5}$ (TEOM) | SPM | Continuous | Population Exposure | Urban and Center City | Urban Scale | Inactive | 2/24/2014 |
| 484393011 | 04-Dallas/Fort Worth | Arlington Municipal Airport | 5504 South Collins Street, Arlington | $NO/NO_2/NO_x$ | SLAMS | Continuous | Population Exposure | Suburban | Neighborhood | Active | 1/17/2002 |
| 484393011 | 04-Dallas/Fort Worth | Arlington Municipal Airport | 5504 South Collins Street, Arlington | CO | SLAMS | Continuous | Population Exposure | Suburban | Neighborhood | Inactive | 6/30/2014 |
| 484393011 | 04-Dallas/Fort Worth | Arlington Municipal Airport | 5504 South Collins Street, Arlington | $O_3$ | SLAMS | Continuous | Population Exposure | Suburban | Neighborhood | Active | 1/17/2002 |
| 484393011 | 04-Dallas/Fort Worth | Arlington Municipal Airport | 5504 South Collins Street, Arlington | $PM_{2.5}$ (TEOM) | SPM | Continuous | Highest Concentration | Suburban | Neighborhood | Active | 1/17/2002 |
| 482510003 | 04-Dallas/Fort Worth | Cleburne Airport | 1650 Airport Drive, Cleburne | $O_3$ | SLAMS | Continuous | Population Exposure | Suburban | Urban Scale | Active | 5/10/2000 |
| 481130050 | 04-Dallas/Fort Worth | Convention Center | 717 South Akard, Dallas | $PM_{2.5}$ (FRM) | SLAMS | 24 Hours; 1/3 Days | Highest Concentration; Population Exposure | Urban and Center City | Neighborhood | Active | 6/28/2002 |
| 481130050 | 04-Dallas/Fort Worth | Convention Center | 717 South Akard, Dallas | $PM_{2.5}$ (Speciation) | Supplemental Speciation | 24 Hours; 1/6 Days, 24 Hours; 1/3 Days | Highest Concentration; Population Exposure | Urban and Center City | Neighborhood | Inactive | 12/31/2014 |

| AQS Site ID | TCEQ Region | Site Name | Address/ Location | Sampler Type | AQS Network & Monitor Type | Operating Schedule | Monitoring Objective | Location Setting | Spatial Scale | Sampler Status | Sampler Status Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 481130050 | 04-Dallas/Fort Worth | Convention Center | 717 South Akard, Dallas | $PM_{10}$ (FRM) | SLAMS | 24 Hours; 1/6 Days | Population Exposure | Urban and Center City | Neighborhood | Active | 8/1/1988 |
| 481130050 | 04-Dallas/Fort Worth | Convention Center | 717 South Akard, Dallas | $PM_{10}$ (FRM) | QA Collocated/ SLAMS | 24 Hours; 1/6 Days | Population Exposure | Urban and Center City | Neighborhood | Active | 1/1/2011 |
| 483491051 | 04-Dallas/Fort Worth | Corsicana Airport | Corsicana Airport, Corsicana | $PM_{2.5}$ (TEOM) | SPM | Continuous | Source Oriented | Rural | Neighborhood | Active | 6/16/2009 |
| 481130069 | 04-Dallas/Fort Worth | Dallas Hinton | 1415 Hinton Street, Dallas | $NO/NO_2/NO_x$ | SLAMS/PAMS | Continuous | Max Precursor Emissions Impact; Population Exposure | Urban and Center City | Neighborhood | Active | 4/4/1995 |
| 481130069 | 04-Dallas/Fort Worth | Dallas Hinton | 1415 Hinton Street, Dallas | $NO_y$* | NCore/SLAMS /SPM | Continuous | Highest Concentration | Urban and Center City | Neighborhood | Active | 3/2/2011 |
| 481130069 | 04-Dallas/Fort Worth | Dallas Hinton | 1415 Hinton Street, Dallas | $PM_{10-2.5}$ | NCore/SPM | Continuous | Population Exposure | Urban and Center City | Neighborhood | Active | 2/22/2011 |
| 481130069 | 04-Dallas/Fort Worth | Dallas Hinton | 1415 Hinton Street, Dallas | $PM_{2.5}$ (FRM) | NCore/SLAMS | 24 Hours; 1/3 Days, 24 Hours; 1/6 Days, 24 Hours; 1/1 Days | Population Exposure | Urban and Center City | Neighborhood | Active | 1/1/1999 |
| 481130069 | 04-Dallas/Fort Worth | Dallas Hinton | 1415 Hinton Street, Dallas | $PM_{2.5}$ (FRM) | QA Collocated/ SLAMS/SPM | 24 Hours; 1/6 Days | Population Exposure | Urban and Center City | Neighborhood | Active | 3/31/1999 |
| 481130069 | 04-Dallas/Fort Worth | Dallas Hinton | 1415 Hinton Street, Dallas | Speciated VOC (Canister) | PAMS/ Unknown | 24 Hours; 1/6 Days | Max Precursor Emissions Impact | Urban and Center City | Neighborhood | Active | 7/29/2000 |
| 481130069 | 04-Dallas/Fort Worth | Dallas Hinton | 1415 Hinton Street, Dallas | Carbonyl | PAMS | 3 Hours; Seasonal, 24 Hours; Seasonal, 24 Hours; 1/6 Days | Max Precursor Emissions Impact | Urban and Center City | Neighborhood | Active | 6/29/1999 |
| 481130069 | 04-Dallas/Fort Worth | Dallas Hinton | 1415 Hinton Street, Dallas | CO | NCore/Non-Regulatory/ Other/SPM | Continuous | Max Precursor Emissions Impact; Population Exposure | Urban and Center City | Neighborhood | Inactive | 12/31/2010 |

| AQS Site ID | TCEQ Region | Site Name | Address/ Location | Sampler Type | AQS Network & Monitor Type | Operating Schedule | Monitoring Objective | Location Setting | Spatial Scale | Sampler Status | Sampler Status Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 481130069 | 04-Dallas/Fort Worth | Dallas Hinton | 1415 Hinton Street, Dallas | $O_3$ | NCore/PAMS/ SLAMS | Continuous | Max Precursor Emissions Impact; Population Exposure | Urban and Center City | Neighborhood | Active | 4/4/1995 |
| 481130069 | 04-Dallas/Fort Worth | Dallas Hinton | 1415 Hinton Street, Dallas | $SO_2$ | SLAMS | Continuous | Highest Concentration; Max Precursor Emissions Impact | Urban and Center City | Neighborhood | Inactive | 12/31/2010 |
| 481130069 | 04-Dallas/Fort Worth | Dallas Hinton | 1415 Hinton Street, Dallas | Speciated VOC (AutoGC) | PAMS | Continuous | Highest Concentration; Max Precursor Emissions Impact | Urban and Center City | Neighborhood | Active | 6/4/1996 |
| 481130069 | 04-Dallas/Fort Worth | Dallas Hinton | 1415 Hinton Street, Dallas | $PM_{2.5}$ (Speciation) | Trends Speciation | 24 Hours; 1/3 Days | Population Exposure | Urban and Center City | Neighborhood | Active | 10/1/2000 |
| 481130069 | 04-Dallas/Fort Worth | Dallas Hinton | 1415 Hinton Street, Dallas | $PM_{2.5}$ (TEOM) | SPM | Continuous | Highest Concentration | Urban and Center City | Neighborhood | Active | 7/28/2000 |
| 481130069 | 04-Dallas/Fort Worth | Dallas Hinton | 1415 Hinton Street, Dallas | TSP (Pb) | NCore | 24 Hours; 1/6 Days | Population Exposure | Urban and Center City | Neighborhood | Active | 8/12/2011 |
| 481130069 | 04-Dallas/Fort Worth | Dallas Hinton | 1415 Hinton Street, Dallas | CO* | NCore/PAMS | Continuous | Max Precursor Emissions Impact; Population Exposure | Urban and Center City | Neighborhood | Active | 1/1/2011 |
| 481130069 | 04-Dallas/Fort Worth | Dallas Hinton | 1415 Hinton Street, Dallas | $SO_2$* | NCore | Continuous | Population Exposure | Urban and Center City | Neighborhood | Active | 1/1/2011 |
| 481131067 | 04-Dallas/Fort Worth | Dallas LBJ Freeway | 8652 LBJ Freeway, Dallas | $NO/NO_2/NO_x$ | Near-road/ SLAMS | Continuous | Max Precursor Emissions Impact | Urban and Center City | Microscale | Active | 4/2/2014 |
| 481130075 | 04-Dallas/Fort Worth | Dallas North #2 | 12532 1/2 Nuestra Drive, Dallas | $NO/NO_2/NO_x$ | SLAMS | Continuous | Population Exposure | Suburban | Neighborhood | Active | 11/3/1998 |
| 481130075 | 04-Dallas/Fort Worth | Dallas North #2 | 12532 1/2 Nuestra Drive, Dallas | $O_3$ | SLAMS | Continuous | Population Exposure | Suburban | Urban Scale | Active | 11/3/1998 |
| 481130075 | 04-Dallas/Fort Worth | Dallas North #2 | 12532 1/2 Nuestra Drive, Dallas | $PM_{10}$ (FRM) | SLAMS | 24 Hours; 1/6 Days | Population Exposure | Suburban | Urban Scale | Active | 1/1/2009 |
| 481130087 | 04-Dallas/Fort Worth | Dallas Redbird Airport Executive | 3277 W Redbird Lane, Dallas | $NO/NO_2/NO_x$ | SLAMS | Continuous | Population Exposure | Suburban | Neighborhood | Active | 4/1/1995 |

| AQS Site ID | TCEQ Region | Site Name | Address/ Location | Sampler Type | AQS Network & Monitor Type | Operating Schedule | Monitoring Objective | Location Setting | Spatial Scale | Sampler Status | Sampler Status Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 481130087 | 04-Dallas/Fort Worth | Dallas Redbird Airport Executive | 3277 W Redbird Lane, Dallas | $PM_{2.5}$ (FRM) | SLAMS | 24 Hours; 1/1 Days, 24 Hours; 1/3 Days, 24 Hours; 1/6 Days | Population Exposure | Suburban | Neighborhood | Inactive | 11/1/2010 |
| 481130087 | 04-Dallas/Fort Worth | Dallas Redbird Airport Executive | 3277 W Redbird Lane, Dallas | $O_3$ | SLAMS | Continuous | Population Exposure | Suburban | Urban Scale | Active | 12/13/1999 |
| 481210034 | 04-Dallas/Fort Worth | Denton Airport South | Denton Airport South, Denton | $NO/NO_2/NO_x$ | PAMS | Continuous | Max Ozone Concentration; Population Exposure | Rural | Urban Scale | Active | 3/20/1998 |
| 481210034 | 04-Dallas/Fort Worth | Denton Airport South | Denton Airport South, Denton | $NO_y$* | PAMS/SPM | Continuous | Max Ozone Concentration; Population Exposure | Rural | Urban Scale | Active | 5/9/2008 |
| 481210034 | 04-Dallas/Fort Worth | Denton Airport South | Denton Airport South, Denton | Speciated VOC (Canister) | PAMS | 24 Hours; 1/6 Days | Max Ozone Concentration; Population Exposure | Rural | Urban Scale | Active | 6/11/2000 |
| 481210034 | 04-Dallas/Fort Worth | Denton Airport South | Denton Airport South, Denton | $O_3$ | PAMS/SLAMS | Continuous | Max Ozone Concentration; Population Exposure | Rural | Urban Scale | Active | 3/20/1998 |
| 481210034 | 04-Dallas/Fort Worth | Denton Airport South | Denton Airport South, Denton | $PM_{2.5}$ (TEOM) | SPM | Continuous | Population Exposure | Rural | Urban Scale | Active | 2/1/2000 |
| 484390075 | 04-Dallas/Fort Worth | Eagle Mountain Lake | 14290 Morris Dido Newark Rd, Eagle Mountain | $O_3$ | SLAMS | Continuous | Max Ozone Concentration | Rural | Neighborhood | Active | 6/1/2000 |
| 481130061 | 04-Dallas/Fort Worth | Earhart | 3434 Bickers (Earhart Elem School), Dallas | $PM_{10}$ (FRM) | SLAMS | 24 Hours; 1/6 Days | Population Exposure | Urban and Center City | Neighborhood | Active | 4/1/2009 |
| 484391002 | 04-Dallas/Fort Worth | Fort Worth Northwest | 3317 Ross Ave, Fort Worth | $PM_{2.5}$ (FRM) | SLAMS | 24 Hours; 1/3 Days, 24 Hours; 1/1 Days | Population Exposure | Urban and Center City | Neighborhood | Active | 1/1/1999 |
| 484391002 | 04-Dallas/Fort Worth | Fort Worth Northwest | 3317 Ross Ave, Fort Worth | $NO/NO_2/NO_x$ | PAMS | Continuous | Max Precursor Emissions Impact; Population Exposure | Urban and Center City | Neighborhood | Active | 1/1/1976 |
| 484391002 | 04-Dallas/Fort Worth | Fort Worth Northwest | 3317 Ross Ave, Fort Worth | Speciated VOC (Canister) | PAMS | 24 Hours; 1/6 Days | Max Precursor Emissions Impact; Population Exposure | Urban and Center City | Neighborhood | Active | 11/5/2003 |

| AQS Site ID | TCEQ Region | Site Name | Address/ Location | Sampler Type | AQS Network & Monitor Type | Operating Schedule | Monitoring Objective | Location Setting | Spatial Scale | Sampler Status | Sampler Status Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 484391002 | 04-Dallas/Fort Worth | Fort Worth Northwest | 3317 Ross Ave, Fort Worth | Carbonyl | PAMS/SLAMS/ SPM | 24 Hours; 1/6 Days | Max Precursor Emissions Impact | Urban and Center City | Neighborhood | Active | 5/27/2003 |
| 484391002 | 04-Dallas/Fort Worth | Fort Worth Northwest | 3317 Ross Ave, Fort Worth | CO | SLAMS | Continuous | Population Exposure | Urban and Center City | Neighborhood | Inactive | 10/31/2014 |
| 484391002 | 04-Dallas/Fort Worth | Fort Worth Northwest | 3317 Ross Ave, Fort Worth | $O_3$ | PAMS/SLAMS | Continuous | Max Precursor Emissions Impact; Population Exposure | Urban and Center City | Neighborhood | Active | 8/12/1997 |
| 484391002 | 04-Dallas/Fort Worth | Fort Worth Northwest | 3317 Ross Ave, Fort Worth | Speciated VOC (AutoGC) | PAMS | Continuous | Max Precursor Emissions Impact; Population Exposure | Urban and Center City | Neighborhood | Active | 5/6/2003 |
| 480850005 | 04-Dallas/Fort Worth | Frisco | 6590 Hillcrest Road, Frisco | $O_3$ | SLAMS | Continuous | Population Exposure | Suburban | Urban Scale | Active | 7/29/1997 |
| 480850003 | 04-Dallas/Fort Worth | Frisco 5th St | 7471 South 5th Street, Frisco | TSP (Pb) | SLAMS | 24 Hours; 1/6 Days | Population Exposure; Source Oriented | Suburban | Middle Scale | Active | 1/1/1984 |
| 480850007 | 04-Dallas/Fort Worth | Frisco 7 | 6931 Ash Street, Frisco | TSP (Pb) | SLAMS | 24 Hours; 1/6 Days | Population Exposure; Source Oriented | Suburban | Neighborhood | Active | 7/17/1999 |
| 480850007 | 04-Dallas/Fort Worth | Frisco 7 | 6931 Ash Street, Frisco | TSP (Pb) | QA Collocated/ SLAMS | 24 Hours; 1/6 Days | Population Exposure; Source Oriented | Suburban | Neighborhood | Active | 7/17/1999 |
| 480850009 | 04-Dallas/Fort Worth | Frisco Eubanks | 6601 Eubanks, Frisco | TSP (Pb) | SLAMS | 24 Hours; 1/6 Days | Population Exposure; Source Oriented | Suburban | Middle Scale / Neighborhood | Active | 1/15/1995 |
| 480850009 | 04-Dallas/Fort Worth | Frisco Eubanks | 6601 Eubanks, Frisco | TSP (Pb) | QA Collocated/ SLAMS | 24 Hours; 1/6 Days | Population Exposure; Source Oriented | Suburban | Neighborhood | Active | 11/17/2011 |
| 480850029 | 04-Dallas/Fort Worth | Frisco Stonebrook | 7202 Stonebrook Parkway, Frisco | TSP (Pb) | SPM | 24 Hours; 1/6 Days | Population Exposure | Urban and Center City | Neighborhood | Active | 1/7/2011 |
| 482210001 | 04-Dallas/Fort Worth | Granbury | 200 N Gordon Street, Granbury | $O_3$ | SLAMS | Continuous | Population Exposure | Suburban | Neighborhood | Active | 5/9/2000 |
| 484393009 | 04-Dallas/Fort Worth | Grapevine Fairway | 4100 Fairway Dr, Grapevine | $NO/NO_2/NO_x$ | PAMS | Continuous | Max Ozone Concentration; Population Exposure | Suburban | Neighborhood | Active | 9/12/2000 |

| AQS Site ID | TCEQ Region | Site Name | Address/ Location | Sampler Type | AQS Network & Monitor Type | Operating Schedule | Monitoring Objective | Location Setting | Spatial Scale | Sampler Status | Sampler Status Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 484393009 | 04-Dallas/Fort Worth | Grapevine Fairway | 4100 Fairway Dr, Grapevine | Speciated VOC (Canister) | PAMS | 24 Hours; 1/6 Days | Max Ozone Concentration; Population Exposure | Suburban | Neighborhood | Active | 10/30/2003 |
| 484393009 | 04-Dallas/Fort Worth | Grapevine Fairway | 4100 Fairway Dr, Grapevine | $O_3$ | PAMS | Continuous | Max Ozone Concentration; Population Exposure | Suburban | Neighborhood | Active | 8/4/2000 |
| 482311006 | 04-Dallas/Fort Worth | Greenville | 824 Sayle Street, Greenville | $NO/NO_2/NO_x$ | SLAMS | Continuous | Population Exposure; Upwind Background | Suburban | Neighborhood | Active | 3/20/2003 |
| 482311006 | 04-Dallas/Fort Worth | Greenville | 824 Sayle Street, Greenville | $O_3$ | SLAMS | Continuous | Population Exposure; Upwind Background | Suburban | Neighborhood | Active | 3/20/2003 |
| 484391006 | 04-Dallas/Fort Worth | Haws Athletic Center | 600 1/2 Congress St, Fort Worth | $PM_{2.5}$ (FRM) | SLAMS | 24 Hours; 1/3 Days, 24 Hours; 1/6 Days, 24 Hours; 1/1 Days | Highest Concentration; Population Exposure | Urban and Center City | Neighborhood | Active | 4/1/2001 |
| 484391006 | 04-Dallas/Fort Worth | Haws Athletic Center | 600 1/2 Congress St, Fort Worth | $PM_{2.5}$ (TEOM) | SPM | Continuous | Highest Concentration | Urban and Center City | Neighborhood | Active | 4/11/2001 |
| 481391044 | 04-Dallas/Fort Worth | Italy | 900 FM 667 Ellis County, Italy | $NO/NO_2/NO_x$ | PAMS | Continuous | Upwind Background | Rural | Urban Scale | Active | 8/31/2007 |
| 481391044 | 04-Dallas/Fort Worth | Italy | 900 FM 667 Ellis County, Italy | Speciated VOC (Canister) | PAMS | 24 Hours; 1/6 Days | Upwind Background | Rural | Urban Scale | Active | 9/3/2007 |
| 481391044 | 04-Dallas/Fort Worth | Italy | 900 FM 667 Ellis County, Italy | $O_3$ | PAMS | Continuous | Upwind Background | Rural | Urban Scale | Active | 8/31/2007 |
| 481391044 | 04-Dallas/Fort Worth | Italy | 900 FM 667 Ellis County, Italy | $SO_2$ | SPM | Continuous | Upwind Background | Rural | Urban Scale | Active | 8/31/2007 |
| 481391044 | 04-Dallas/Fort Worth | Italy | 900 FM 667 Ellis County, Italy | $PM_{2.5}$ (TEOM) | SPM | Continuous | Upwind Background | Rural | Regional Scale | Active | 8/31/2007 |
| 482511008 | 04-Dallas/Fort Worth | Johnson County Luisa | 2420 Luisa Ln, Alvarado | Speciated VOC (Canister) | SPM | 24 Hours; 1/6 Days | Population Exposure | Suburban | Neighborhood | Active | 11/23/2010 |
| 482570005 | 04-Dallas/Fort Worth | Kaufman | 3790 S Houston St, Kaufman | $NO/NO_2/NO_x$ | PAMS | Continuous | Population Exposure; Upwind Background | Suburban | Urban Scale | Active | 10/2/2000 |
| 482570005 | 04-Dallas/Fort Worth | Kaufman | 3790 S Houston St, Kaufman | Speciated VOC (Canister) | PAMS | 24 Hours; 1/6 Days | Population Exposure; Upwind Background | Suburban | Urban Scale | Inactive | 5/31/2013 |

| AQS Site ID | TCEQ Region | Site Name | Address/ Location | Sampler Type | AQS Network & Monitor Type | Operating Schedule | Monitoring Objective | Location Setting | Spatial Scale | Sampler Status | Sampler Status Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 482570005 | 04-Dallas/Fort Worth | Kaufman | 3790 S Houston St, Kaufman | $O_3$ | PAMS | Continuous | Population Exposure; Upwind Background | Suburban | Urban Scale | Active | 9/10/2000 |
| 482570005 | 04-Dallas/Fort Worth | Kaufman | 3790 S Houston St, Kaufman | $SO_2$ | SLAMS/SPM | Continuous | Population Exposure; Upwind Background | Suburban | Urban Scale | Active | 9/10/2000 |
| 482570005 | 04-Dallas/Fort Worth | Kaufman | 3790 S Houston St, Kaufman | $PM_{2.5}$ (TEOM) | SPM | Continuous | Upwind Background | Suburban | Regional Scale | Active | 10/4/2000 |
| 484392003 | 04-Dallas/Fort Worth | Keller | FAA Site off Alta Vista Road, Fort Worth | $O_3$ | SLAMS | Continuous | Max Ozone Concentration; Population Exposure | Suburban | Neighborhood | Active | 7/16/1997 |
| 481390016 | 04-Dallas/Fort Worth | Midlothian OFW | 2725 Old Fort Worth Road, Midlothian | $NO/NO_2/NO_x$ | SLAMS | Continuous | Source Oriented | Suburban | Neighborhood | Active | 3/18/2003 |
| 481390016 | 04-Dallas/Fort Worth | Midlothian OFW | 2725 Old Fort Worth Road, Midlothian | $PM_{2.5}$ (FRM) (Speciation) *** | SPM | 24 Hours; 1/6 Days | Population Exposure; Source Oriented | Suburban | Neighborhood | Active | 9/1/2005 |
| 481390016 | 04-Dallas/Fort Worth | Midlothian OFW | 2725 Old Fort Worth Road, Midlothian | $O_3$ | SLAMS | Continuous | Population Exposure | Suburban | Urban Scale | Active | 4/1/2006 |
| 481390016 | 04-Dallas/Fort Worth | Midlothian OFW | 2725 Old Fort Worth Road, Midlothian | $SO_2$ | SLAMS/SPM | Continuous | Source Oriented | Suburban | Neighborhood | Active | 8/27/1997 |
| 481390016 | 04-Dallas/Fort Worth | Midlothian OFW | 2725 Old Fort Worth Road, Midlothian | $PM_{2.5}$ (TEOM) | SPM | Continuous | Regional Transport | Suburban | Regional Scale | Active | 4/3/2006 |
| 481130018 | 04-Dallas/Fort Worth | Morrell | 3049 Morrell, Dallas | $PM_{2.5}$ (FRM) (Speciation) | SPM | 24 Hours; 1/6 Days | Source Oriented | Urban and Center City | Neighborhood | Inactive | 8/11/2010 |
| 481130018 | 04-Dallas/Fort Worth | Morrell | 3049 Morrell, Dallas | TSP | Other/SPM | 24 Hours; 1/6 Days | Highest Concentration | Urban and Center City | Middle Scale | Inactive | 8/16/2010 |
| 481130018 | 04-Dallas/Fort Worth | Morrell | 3049 Morrell, Dallas | $PM_{10}$ (Speciation) | SPM | 24 Hours; 1/6 Days | Source Oriented | Urban and Center City | Neighborhood | Active | 8/17/2010 |
| 483670081 | 04-Dallas/Fort Worth | Parker County | 3033 New Authon Rd, Weatherford | $O_3$ | SLAMS | Continuous | Population Exposure | Rural | Urban Scale | Active | 7/26/2000 |
| 481211032 | 04-Dallas/Fort Worth | Pilot Point | 792 E Northside Dr, Pilot Point | $O_3$ | SLAMS/SPM | Continuous | Population Exposure | Suburban | Urban Scale | Active | 5/3/2006 |
| 483970001 | 04-Dallas/Fort Worth | Rockwall Heath | 100 E Heath St, Rockwall | $O_3$ | SLAMS | Continuous | Population Exposure | Suburban | Neighborhood | Active | 8/8/2000 |

| AQS Site ID | TCEQ Region | Site Name | Address/ Location | Sampler Type | AQS Network & Monitor Type | Operating Schedule | Monitoring Objective | Location Setting | Spatial Scale | Sampler Status | Sampler Status Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 484393010 | 04-Dallas/Fort Worth | Stage Coach | 8900 West Freeway, White Settlement | $PM_{10}$ (FRM) | Other/SLAMS | 24 Hours; 1/6 Days | Population Exposure | Suburban | Neighborhood | Active | 1/2/2002 |
| 484393010 | 04-Dallas/Fort Worth | Stage Coach | 8900 West Freeway, White Settlement | PM10 (FRM) | QA Collocated/ SLAMS | 24 Hours; 1/6 Days | Population Exposure | Suburban | Neighborhood | Inactive | 9/30/2014 |
| 482570020 | 04-Dallas/Fort Worth | Terrell Temtex | 2988 Temtex Blvd, Terrell | TSP (Pb) | SLAMS | 24 Hours; 1/6 Days | Population Exposure; Source Oriented | Rural | Neighborhood | Active | 1/1/2011 |
| 482030002 | 05-Tyler | Karnack | Hwy 134 & Spur 449, Not In A City | $PM_{2.5}$ (FRM) | SPM | 24 Hours; 1/3 Days, 24 Hours; 1/6 Days | General/ Background | Rural | Regional Scale | Active | 9/6/2001 |
| 482030002 | 05-Tyler | Karnack | Hwy 134 & Spur 449, Not In A City | $NO/NO_2/NO_x$ | SLAMS | Continuous | General/ Background | Rural | Regional Scale | Active | 8/28/2001 |
| 482030002 | 05-Tyler | Karnack | Hwy 134 & Spur 449, Not In A City | $PM_{2.5}$ (Speciation) | Trends Speciation | 24 Hours; 1/3 Days | General/ Background; Regional Transport | Rural | Regional Scale | Active | 8/17/2009 |
| 482030002 | 05-Tyler | Karnack | Hwy 134 & Spur 449, Not In A City | Speciated VOC (Canister) | NATTS | 24 Hours; 1/6 Days | General/ Background | Rural | Regional Scale | Active | 1/20/2004 |
| 482030002 | 05-Tyler | Karnack | Hwy 134 & Spur 449, Not In A City | SVOC | NATTS | 24 Hours; 1/6 Days | General/ Background | Rural | Regional Scale | Active | 1/1/2008 |
| 482030002 | 05-Tyler | Karnack | Hwy 134 & Spur 449, Not In A City | Carbonyl | NATTS | 24 Hours; 1/6 Days | General/ Background | Rural | Regional Scale | Active | 1/3/2004 |
| 482030002 | 05-Tyler | Karnack | Hwy 134 & Spur 449, Not In A City | $O_3$ | SLAMS | Continuous | General/ Background | Rural | Regional Scale | Active | 8/28/2001 |
| 482030002 | 05-Tyler | Karnack | Hwy 134 & Spur 449, Not In A City | $PM_{2.5}$ (TEOM) | SPM | Continuous | General/ Background | Rural | Regional Scale | Active | 1/1/2007 |
| 482030002 | 05-Tyler | Karnack | Hwy 134 & Spur 449, Not In A City | TSP (Cr6+) | NATTS | 24 Hours; 1/6 Days | General/ Background; Highest Concentration | Rural | Regional Scale | Inactive | 6/30/2013 |
| 482030002 | 05-Tyler | Karnack | Hwy 134 & Spur 449, Not In A City | $PM_{10}$ (FRM) | SPM | 24 Hours; 1/6 Days | General/ Background; Other | Rural | Neighborhood/ Regional Scale | Active | 2/9/2004 |
| 482030002 | 05-Tyler | Karnack | Hwy 134 & Spur 449, Not In A City | $PM_{10}$ (Speciation) | NATTS | 24 Hours; 1/6 Days | General/ Background; Other | Rural | Neighborhood/ Regional Scale | Active | 2/9/2004 |
| 481830001 | 05-Tyler | Longview | Gregg Co Airport near Longview, Longview | $NO/NO_2/NO_x$ | SPM | Continuous | Population Exposure | Rural | Neighborhood | Active | 6/17/1998 |
| 481830001 | 05-Tyler | Longview | Gregg Co Airport near Longview, Longview | $O_3$ | SLAMS | Continuous | Population Exposure | Rural | Neighborhood | Active | 1/1/1983 |
| 481830001 | 05-Tyler | Longview | Gregg Co Airport near Longview, Longview | $SO_2$ | SLAMS | Continuous | General/ Background; Population Exposure | Rural | Neighborhood | Active | 5/26/1999 |

| AQS Site ID | TCEQ Region | Site Name | Address/ Location | Sampler Type | AQS Network & Monitor Type | Operating Schedule | Monitoring Objective | Location Setting | Spatial Scale | Sampler Status | Sampler Status Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 480370004 | 05-Tyler | Texarkana | 2315 W 10th Street, Texarkana | $PM_{2.5}$ (FRM) | SLAMS/SPM | 24 Hours; 1/1 Days, 24 Hours; 1/3 Days, 24 Hours; 1/6 Days | Population Exposure | Urban and Center City | Urban Scale | Active | 1/6/1999 |
| 484230007 | 05-Tyler | Tyler Airport Relocated | 14790 County Road 1145, Tyler | $NO/NO_2/NO_x$ | SPM | Continuous | General/ Background | Rural | Urban Scale | Active | 5/25/2000 |
| 484230007 | 05-Tyler | Tyler Airport Relocated | 14790 County Road 1145, Tyler | $O_3$ | SLAMS | Continuous | General/ Background | Rural | Urban Scale | Active | 5/25/2000 |
| 481410055 | 06-El Paso | Ascarate Park SE | 650 R E Thomason Loop, El Paso | Speciated VOC (Canister) | PAMS | 24 Hours; 1/6 Days | Max Ozone Concentration; Upwind Background | Suburban | Neighborhood | Inactive | 5/31/2013 |
| 481410055 | 06-El Paso | Ascarate Park SE | 650 R E Thomason Loop, El Paso | Carbonyl | PAMS/SPM | 24 Hours; 1/6 Days | Max Ozone Concentration; Upwind Background | Suburban | Neighborhood | Active | 10/29/2010 |
| 481410055 | 06-El Paso | Ascarate Park SE | 650 R E Thomason Loop, El Paso | CO | SLAMS | Continuous | Highest Concentration | Suburban | Neighborhood | Active | 9/1/1999 |
| 481410055 | 06-El Paso | Ascarate Park SE | 650 R E Thomason Loop, El Paso | $O_3$ | PAMS | Continuous | Max Ozone Concentration; Upwind Background | Suburban | Neighborhood | Active | 9/24/1999 |
| 481410055 | 06-El Paso | Ascarate Park SE | 650 R E Thomason Loop, El Paso | $PM_{2.5}$ (TEOM) | SPM | Continuous | Population Exposure | Suburban | Neighborhood | Active | 11/19/2010 |
| 481410055 | 06-El Paso | Ascarate Park SE | 650 R E Thomason Loop, El Paso | TSP (Pb) | NCore/SLAMS | 24 Hours; 1/6 Days | Population Exposure | Suburban | Neighborhood | Active | 1/27/2011 |
| 481410055 | 06-El Paso | Ascarate Park SE | 650 R E Thomason Loop, El Paso | $NO/NO_2/NO_x$ | PAMS | Continuous | Highest Concentration; Upwind Background | Suburban | Neighborhood | Active | 9/24/1999 |
| 480430101 | 06-El Paso | Bravo Big Bend | Big Bend National Park, Big Bend Nat Park | $PM_{2.5}$ (TEOM) | SPM | Continuous | Regional Transport | Rural | Regional Scale | Active | 2/5/2008 |
| 480430101 | 06-El Paso | Bravo Big Bend | Big Bend National Park, Big Bend Nat Park | $PM_{2.5}$ (FRM) (Speciation) | Supplemental Speciation | 24 Hours; 1/6 Days | General/ Background | Rural | Regional Scale | Inactive | 11/9/2010 |
| 481410059 | 06-El Paso | Clendenin School | 2701 Harrison Ave, El Paso | $PM_{10}$ (FRM) | SPM | 24 Hours; 1/6 Days | Highest Concentration | Urban and Center City | Neighborhood | Inactive | 7/31/2010 |
| 481410044 | 06-El Paso | El Paso Chamizal | 800 S San Marcial Street, El Paso | Carbonyl | Unofficial PAMS | 24 Hours; 1/6 Days | Highest Concentration; Max Precursor Emissions Impact | Urban and Center City | Neighborhood | Inactive | 10/25/2010 |

| AQS Site ID | TCEQ Region | Site Name | Address/ Location | Sampler Type | AQS Network & Monitor Type | Operating Schedule | Monitoring Objective | Location Setting | Spatial Scale | Sampler Status | Sampler Status Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 481410044 | 06-El Paso | El Paso Chamizal | 800 S San Marcial Street, El Paso | CO | SLAMS | Continuous | Highest Concentration; Max Precursor Emissions Impact | Urban and Center City | Neighborhood | Inactive | 11/16/2010 |
| 481410044 | 06-El Paso | El Paso Chamizal | 800 S San Marcial Street, El Paso | $O_3$ | NCore/PAMS/ SLAMS | Continuous | Max Precursor Emissions Impact; Population Exposure | Urban and Center City | Neighborhood | Active | 6/24/1998 |
| 481410044 | 06-El Paso | El Paso Chamizal | 800 S San Marcial Street, El Paso | Speciated VOC (AutoGC) | PAMS | Continuous | Highest Concentration; Max Precursor Emissions Impact | Urban and Center City | Neighborhood | Active | 7/1/1995 |
| 481410044 | 06-El Paso | El Paso Chamizal | 800 S San Marcial Street, El Paso | $PM_{10-2.5}$ | NCore/SPM | Continuous | Highest Concentration; Population Exposure | Urban and Center City | Neighborhood | Active | 1/25/2011 |
| 481410044 | 06-El Paso | El Paso Chamizal | 800 S San Marcial Street, El Paso | $PM_{2.5}$ (TEOM) | SPM | Continuous | Highest Concentration; Population Exposure | Urban and Center City | Neighborhood | Inactive | 11/16/2010 |
| 481410044 | 06-El Paso | El Paso Chamizal | 800 S San Marcial Street, El Paso | $PM_{10}$ (TEOM) | SPM | Continuous | General/ Background | Urban and Center City | Neighborhood | Inactive | 11/16/2010 |
| 481410044 | 06-El Paso | El Paso Chamizal | 800 S San Marcial Street, El Paso | CO* | NCore | Continuous | Highest Concentration | Urban and Center City | Neighborhood | Active | 11/16/2010 |
| 481410044 | 06-El Paso | El Paso Chamizal | 800 S San Marcial Street, El Paso | $SO_2$* | NCore | Continuous | Highest Concentration | Urban and Center City | Neighborhood | Active | 11/18/2010 |
| 481410044 | 06-El Paso | El Paso Chamizal | 800 S San Marcial Street, El Paso | $PM_{2.5}$ (FRM) | SLAMS/SPM | 24 Hours; 1/3 Days, 24 Hours; 1/1 Days, 24 Hours; 1/6 Days | Highest Concentration; Population Exposure | Urban and Center City | Neighborhood | Active | 1/1/1999 |
| 481410044 | 06-El Paso | El Paso Chamizal | 800 S San Marcial Street, El Paso | $NO/NO_2/NO_x$ | PAMS | Continuous | Highest Concentration; Max Precursor Emissions Impact | Urban and Center City | Neighborhood | Active | 6/24/1998 |
| 481410044 | 06-El Paso | El Paso Chamizal | 800 S San Marcial Street, El Paso | $NO_y$* | NCore/SPM | Continuous | Highest Concentration | Urban and Center City | Neighborhood | Active | 11/18/2010 |

| AQS Site ID | TCEQ Region | Site Name | Address/ Location | Sampler Type | AQS Network & Monitor Type | Operating Schedule | Monitoring Objective | Location Setting | Spatial Scale | Sampler Status | Sampler Status Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 481410044 | 06-El Paso | El Paso Chamizal | 800 S San Marcial Street, El Paso | $PM_{2.5}$ (Speciation) | Trends Speciation | 24 Hours; 1/3 Days | Highest Concentration | Urban and Center City | Neighborhood | Active | 10/1/2000 |
| 481411011 | 06-El Paso | El Paso Delta | 6700 Delta Drive, El Paso | Speciated VOC (AutoGC) | SPM | Continuous | Max Precursor Emissions Impact | Urban and Center City | Neighborhood | Inactive | 8/13/2013 |
| 481410053 | 06-El Paso | El Paso Sun Metro | 700 West San Francisco Ave, El Paso | SVOC | SPM | 24 Hours; 1/6 Days | Highest Concentration | Urban and Center City | Neighborhood | Inactive | 12/4/2012 |
| 481410053 | 06-El Paso | El Paso Sun Metro | 700 West San Francisco Ave, El Paso | CO | SLAMS | Continuous | Highest Concentration | Urban and Center City | Neighborhood | Inactive | 12/4/2012 |
| 481410053 | 06-El Paso | El Paso Sun Metro | 700 West San Francisco Ave, El Paso | $SO_2$ | SPM | Continuous | Highest Concentration | Urban and Center City | Neighborhood | Inactive | 12/4/2012 |
| 481410053 | 06-El Paso | El Paso Sun Metro | 700 West San Francisco Ave, El Paso | $PM_{2.5}$ (TEOM) | SPM | Continuous | Highest Concentration | Urban and Center City | Microscale | Inactive | 12/4/2012 |
| 481410053 | 06-El Paso | El Paso Sun Metro | 700 West San Francisco Ave, El Paso | $PM_{2.5}$ (FRM) (Speciation) | Supplemental Speciation | 24 Hours; 1/6 Days | Highest Concentration | Urban and Center City | Microscale | Inactive | 11/1/2010 |
| 481410037 | 06-El Paso | El Paso UTEP | 250 Rim Rd, El Paso | CO | SLAMS | Continuous | Population Exposure | Urban and Center City | Neighborhood | Inactive | 12/31/2014 |
| 481410037 | 06-El Paso | El Paso UTEP | 250 Rim Rd, El Paso | $O_3$ | PAMS | Continuous | Max Ozone Concentration; Population Exposure | Urban and Center City | Neighborhood | Active | 6/3/1998 |
| 481410037 | 06-El Paso | El Paso UTEP | 250 Rim Rd, El Paso | $SO_2$ | SLAMS | Continuous | Population Exposure | Urban and Center City | Neighborhood | Active | 6/3/1998 |
| 481410037 | 06-El Paso | El Paso UTEP | 250 Rim Rd, El Paso | $PM_{2.5}$ (TEOM) | SPM | Continuous | Population Exposure | Urban and Center City | Neighborhood | Active | 2/1/2000 |
| 481410037 | 06-El Paso | El Paso UTEP | 250 Rim Rd, El Paso | TSP (Pb) | SLAMS | 24 Hours; 1/6 Days | Population Exposure | Urban and Center City | Neighborhood | Active | 4/25/2012 |

| AQS Site ID | TCEQ Region | Site Name | Address/ Location | Sampler Type | AQS Network & Monitor Type | Operating Schedule | Monitoring Objective | Location Setting | Spatial Scale | Sampler Status | Sampler Status Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 481410037 | 06-El Paso | El Paso UTEP | 250 Rim Rd, El Paso | $NO/NO_2/NO_x$ | PAMS | Continuous | Max Ozone Concentration; Population Exposure | Urban and Center City | Neighborhood | Active | 6/3/1998 |
| 481410037 | 06-El Paso | El Paso UTEP | 250 Rim Rd, El Paso | $PM_{2.5}$ (FRM) | SLAMS/SPM | 24 Hours; 1/3 Days, 24 Hours; 1/1 Days, 24 Hours; 1/6 Days | Population Exposure | Urban and Center City | Neighborhood | Active | 1/1/2005 |
| 481410029 | 06-El Paso | Ivanhoe | 10834 Ivanhoe (Ivanhoe Fire Station), El Paso | $O_3$ | Other/SPM | Continuous | Population Exposure | Suburban | Neighborhood | Active | 3/29/2000 |
| 481410029 | 06-El Paso | Ivanhoe | 10834 Ivanhoe (Ivanhoe Fire Station), El Paso | $PM_{10}$ (FRM) | SLAMS | 24 Hours; 1/6 Days | Population Exposure | Suburban | Neighborhood | Active | 10/1/1988 |
| 481410033 | 06-El Paso | Kern | 301 East Robinson, El Paso | TSP (Pb) | Other/SLAMS | 24 Hours; 1/6 Days | Population Exposure | Urban and Center City | Neighborhood | Inactive | 5/22/2012 |
| 481411021 | 06-El Paso | Ojo De Agua | 6767 Ojo De Agua, El Paso | CO | SLAMS | Continuous | Population Exposure | Suburban | Neighborhood | Active | 6/6/2013 |
| 481411021 | 06-El Paso | Ojo De Agua | 6767 Ojo De Agua, El Paso | $PM_{10}$ (FRM) | SLAMS | 24 Hours; 1/6 Days | Population Exposure | Suburban | Neighborhood | Active | 4/15/2013 |
| 481411021 | 06-El Paso | Ojo De Agua | 6767 Ojo De Agua, El Paso | $PM_{10}$ (FRM) | QA Collocated | 24 Hours; 1/12 Days | Population Exposure | Suburban | Neighborhood | Active | 4/15/2013 |
| 481411021 | 06-El Paso | Ojo De Agua | 6767 Ojo De Agua, El Paso | TSP (Pb) | SLAMS/SPM | 24 Hours; 1/6 Days | Population Exposure | Suburban | Neighborhood | Active | 4/15/2013 |
| 481411021 | 06-El Paso | Ojo De Agua | 6767 Ojo De Agua, El Paso | TSP (Pb) | QA Collocated/ SLAMS | 24 Hours; 1/6 Days, 24 Hours; 1/12 Days | Population Exposure | Suburban | Neighborhood | Active | 4/15/2013 |
| 481410038 | 06-El Paso | Riverside | 301 Midway Dr (Riverside High School), El Paso | $PM_{10}$ (FRM) | SLAMS | 24 Hours; 1/6 Days | Population Exposure | Suburban | Neighborhood | Active | 10/12/1988 |
| 481410058 | 06-El Paso | Skyline Park | 5050A Yvette Drive, El Paso | CO | SLAMS | Continuous | Population Exposure | Suburban | Neighborhood | Inactive | 12/31/2014 |
| 481410058 | 06-El Paso | Skyline Park | 5050A Yvette Drive, El Paso | $O_3$ | SLAMS | Continuous | Population Exposure | Suburban | Neighborhood | Active | 7/11/2000 |
| 481410058 | 06-El Paso | Skyline Park | 5050A Yvette Drive, El Paso | $SO_2$ | SLAMS/SPM | Continuous | Population Exposure | Suburban | Neighborhood | Active | 7/11/2000 |
| 481410058 | 06-El Paso | Skyline Park | 5050A Yvette Drive, El Paso | TSP (Pb) | SLAMS/SPM | 24 Hours; 1/6 Days | Population Exposure | Suburban | Neighborhood | Inactive | 12/31/2014 |
| 481410057 | 06-El Paso | Socorro Hueco | 320 Old Hueco Tanks Road, El Paso | SVOC | SPM | 24 Hours; 1/6 Days | Population Exposure | Suburban | Neighborhood | Active | 12/5/2012 |
| 481410057 | 06-El Paso | Socorro Hueco | 320 Old Hueco Tanks Road, El Paso | CO | SLAMS | Continuous | N/A | Suburban | Neighborhood | Inactive | 2/8/2012 |

| AQS Site ID | TCEQ Region | Site Name | Address/ Location | Sampler Type | AQS Network & Monitor Type | Operating Schedule | Monitoring Objective | Location Setting | Spatial Scale | Sampler Status | Sampler Status Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 481410057 | 06-El Paso | Socorro Hueco | 320 Old Hueco Tanks Road, El Paso | $O_3$ | SLAMS | Continuous | Population Exposure | Suburban | Neighborhood | Active | 12/5/2012 |
| 481410057 | 06-El Paso | Socorro Hueco | 320 Old Hueco Tanks Road, El Paso | $PM_{2.5}$ (TEOM) | SPM | Continuous | Population Exposure | Suburban | Neighborhood | Active | 12/5/2012 |
| 481410057 | 06-El Paso | Socorro Hueco | 320 Old Hueco Tanks Road, El Paso | $PM_{10}$ (FRM) | SLAMS/SPM | 24 Hours; 1/6 Days | General/ Background; Population Exposure | Suburban | Neighborhood | Active | 12/5/2012 |
| 481410057 | 06-El Paso | Socorro Hueco | 320 Old Hueco Tanks Road, El Paso | $PM_{10}$ (FRM) | QA Collocated/ SLAMS | 24 Hours; 1/6 Days | Population Exposure | Suburban | Neighborhood | Active | 12/5/2012 |
| 481410002 | 06-El Paso | Tillman | J Harold Tillman Hlt Ct 222 S Campbell S, El Paso | CO | SLAMS | Continuous | Population Exposure | Urban and Center City | Neighborhood | Inactive | 5/21/2013 |
| 481410002 | 06-El Paso | Tillman | J Harold Tillman Hlt Ct 222 S Campbell S, El Paso | $PM_{10}$ (FRM) | SLAMS | 24 Hours; 1/6 Days | Highest Concentration | Urban and Center City | Neighborhood | Inactive | 4/11/2013 |
| 481410002 | 06-El Paso | Tillman | J Harold Tillman Hlt Ct 222 S Campbell S, El Paso | $PM_{10}$ (FRM) | QA Collocated/ SLAMS | 24 Hours; 1/12 Days | Highest Concentration | Urban and Center City | Neighborhood | Inactive | 4/11/2013 |
| 481410002 | 06-El Paso | Tillman | J Harold Tillman Hlt Ct 222 S Campbell S, El Paso | TSP (Pb) | Other/SPM | 24 Hours; 1/6 Days | Population Exposure | Urban and Center City | Neighborhood | Inactive | 4/11/2013 |
| 481410002 | 06-El Paso | Tillman | J Harold Tillman Hlt Ct 222 S Campbell S, El Paso | TSP (Pb) | QA Collocated/ SPM | 24 Hours; 1/12 Days | Population Exposure | Urban and Center City | Neighborhood | Inactive | 4/11/2013 |
| 481410693 | 06-El Paso | Van Buren | 2700 Harrison Avenue, El Paso | $PM_{10}$ (FRM) | SPM | 24 Hours; 1/6 Days | Population Exposure | Urban and Center City | Neighborhood | Active | 8/6/2010 |
| 481351014 | 07-Midland | Odessa Gonzales | 2700 Disney, Odessa | $PM_{2.5}$ (TEOM) | SPM | Continuous | Highest Concentration | Suburban | Neighborhood | Active | 6/6/2002 |
| 481350003 | 07-Midland | Odessa-Hays Elementary School | Barrett & Monahans Streets, Odessa | $PM_{2.5}$ (TEOM) | SPM | Continuous | Population Exposure | Suburban | Urban Scale | Active | 2/1/2000 |
| 481350003 | 07-Midland | Odessa-Hays Elementary School | Barrett & Monahans Streets, Odessa | $PM_{2.5}$ (FRM) | SPM | 24 Hours; 1/1 Days, 24 Hours; 1/6 Days | Population Exposure | Suburban | Urban Scale | Inactive | 11/1/2010 |
| 480271047 | 09-Waco | Killeen Skylark Field | 1605 Stone Tree Drive, Killeen | $O_3$ | SLAMS | Continuous | Population Exposure | Urban and Center City | Urban Scale | Active | 6/11/2009 |
| 480271045 | 09-Waco | Temple Georgia | 8406 Georgia Avenue, Temple | $O_3$ | SLAMS | Continuous | Population Exposure | Suburban | Urban Scale | Active | 10/4/2013 |

| AQS Site ID | TCEQ Region | Site Name | Address/ Location | Sampler Type | AQS Network & Monitor Type | Operating Schedule | Monitoring Objective | Location Setting | Spatial Scale | Sampler Status | Sampler Status Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 483091037 | 09-Waco | Waco Mazanec | 4472 Mazanec Rd, Waco | $NO/NO_2/NO_x$ | SLAMS | Continuous | Upwind Background | Rural | Urban Scale | Active | 4/16/2007 |
| 483091037 | 09-Waco | Waco Mazanec | 4472 Mazanec Rd, Waco | CO | SLAMS | Continuous | Upwind Background | Rural | Urban Scale | Active | 4/16/2007 |
| 483091037 | 09-Waco | Waco Mazanec | 4472 Mazanec Rd, Waco | $O_3$ | SLAMS | Continuous | Upwind Background | Rural | Regional Scale | Active | 4/16/2007 |
| 483091037 | 09-Waco | Waco Mazanec | 4472 Mazanec Rd, Waco | $SO_2$ | SLAMS | Continuous | Upwind Background | Rural | Urban Scale | Active | 4/16/2007 |
| 483091037 | 09-Waco | Waco Mazanec | 4472 Mazanec Rd, Waco | $PM_{2.5}$ (TEOM) | SPM | Continuous | Regional Transport | Rural | Regional Scale | Active | 4/16/2007 |
| 482450009 | 10-Beaumont | Beaumont Downtown | 1086 Vermont Avenue, Beaumont | $NO/NO_2/NO_x$ | PAMS | Continuous | Population Exposure | Suburban | Neighborhood | Active | 1/1/1980 |
| 482450009 | 10-Beaumont | Beaumont Downtown | 1086 Vermont Avenue, Beaumont | $O_3$ | PAMS/SLAMS | Continuous | Max Precursor Emissions Impact; Population Exposure | Suburban | Neighborhood | Active | 1/1/1980 |
| 482450009 | 10-Beaumont | Beaumont Downtown | 1086 Vermont Avenue, Beaumont | $SO_2$ | SLAMS | Continuous | Population Exposure | Suburban | Neighborhood | Active | 1/1/1980 |
| 482450009 | 10-Beaumont | Beaumont Downtown | 1086 Vermont Avenue, Beaumont | Speciated VOC (AutoGC) | PAMS | Continuous | Max Precursor Emissions Impact; Population Exposure | Suburban | Neighborhood | Active | 8/29/2006 |
| 482450022 | 10-Beaumont | Hamshire | 12552 Second St, Not In A City | $NO/NO_2/NO_x$ | SLAMS | Continuous | General/ Background; Regional Transport | Suburban | Urban Scale | Active | 2/16/2000 |
| 482450022 | 10-Beaumont | Hamshire | 12552 Second St, Not In A City | $O_3$ | SLAMS | Continuous | General/ Background; Regional Transport | Suburban | Urban Scale | Active | 2/16/2000 |
| 482450022 | 10-Beaumont | Hamshire | 12552 Second St, Not In A City | $PM_{2.5}$ (TEOM) | SPM | Continuous | Population Exposure | Suburban | Neighborhood | Active | 2/24/2000 |
| 482451035 | 10-Beaumont | Nederland High School | 571 State Park Rd. 56, Nederland | $NO/NO_2/NO_x$ | PAMS | Continuous | Max Precursor Emissions Impact; Population Exposure | Suburban | Neighborhood | Active | 8/30/2006 |
| 482451035 | 10-Beaumont | Nederland High School | 1800 N. 18th Street, Nederland | $O_3$ | PAMS | Continuous | Max Precursor Emissions Impact; Population Exposure | Suburban | Neighborhood | Active | 9/1/2006 |
| 482451035 | 10-Beaumont | Nederland High School | 571 State Park Rd. 56, Nederland | Speciated VOC (AutoGC) | PAMS | Continuous | Max Precursor Emissions Impact; Population Exposure | Suburban | Neighborhood | Active | 9/1/2006 |

| AQS Site ID | TCEQ Region | Site Name | Address/ Location | Sampler Type | AQS Network & Monitor Type | Operating Schedule | Monitoring Objective | Location Setting | Spatial Scale | Sampler Status | Sampler Status Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 482451035 | 10-Beaumont | Nederland High School | 1800 N. 18th Street, Nederland | CO* | PAMS | Continuous | Max Precursor Emissions Impact; Population Exposure | Suburban | Neighborhood | Active | 8/30/2006 |
| 482450021 | 10-Beaumont | Port Arthur Memorial School | 2200 Jefferson Drive, Port Arthur | $PM_{2.5}$ (FRM) (Speciation) | SLAMS Speciation/ SPM/Supplemental Speciation | 24 Hours; 1/3 Days, 24 Hours; 1/6 Days | Population Exposure | Urban and Center City | Neighborhood | Inactive | 11/1/2010 |
| 482450021 | 10-Beaumont | Port Arthur Memorial School | 2200 Jefferson Drive, Port Arthur | $PM_{2.5}$ (TEOM) | SPM | Continuous | Population Exposure | Urban and Center City | Neighborhood | Active | 3/19/2002 |
| 482450011 | 10-Beaumont | Port Arthur West | 623 Ellias Street, Port Arthur | $O_3$ | SLAMS | Continuous | Population Exposure | Urban and Center City | Neighborhood | Active | 7/24/2012 |
| 482450011 | 10-Beaumont | Port Arthur West | PR 1225, Port Arthur | $SO_2$ | SLAMS | Continuous | Source Oriented | Urban and Center City | Neighborhood | Active | 7/24/2012 |
| 482450101 | 10-Beaumont | SETRPC 40 Sabine Pass | 5200 Mechanic, Not In A City | $O_3$ | PAMS | Continuous | Max Ozone Concentration | Rural | Neighborhood | Active | 9/22/1999 |
| 482450101 | 10-Beaumont | SETRPC 40 Sabine Pass | 5200 Mechanic, Not In A City | $NO_y$* | PAMS | Continuous | Max Ozone Concentration | Rural | Neighborhood | Inactive | 12/31/2014 |
| 483611100 | 10-Beaumont | SETRPC 42 Mauriceville | Intersection of TX Hwys 62 & 12, Port Arthur | $PM_{2.5}$ (TEOM) | SPM | Continuous | Upwind Background | Suburban | Regional Scale | Active | 3/19/2002 |
| 482450102 | 10-Beaumont | SETRPC 43 Jefferson Co Airport | Jefferson County Airport, Port Arthur | $O_3$ | SPM | Continuous | Max Precursor Emissions Impact | Suburban | Middle Scale | Active | 7/7/1999 |
| 483611001 | 10-Beaumont | West Orange | 2700 Austin Ave, West Orange | $NO/NO_2/NO_x$ | SLAMS | Continuous | Population Exposure | Urban and Center City | Neighborhood | Active | 12/10/1997 |
| 483611001 | 10-Beaumont | West Orange | 2700 Austin Ave, West Orange | $PM_{2.5}$ (FRM) | Other/SLAMS | 24 Hours; 1/1 Days, 24 Hours; 1/6 Days | Population Exposure | Urban and Center City | Urban Scale | Inactive | 11/1/2010 |
| 483611001 | 10-Beaumont | West Orange | 2700 Austin Ave, West Orange | $O_3$ | SLAMS | Continuous | Population Exposure | Urban and Center City | Neighborhood | Active | 12/10/1997 |
| 483611001 | 10-Beaumont | West Orange | 2700 Austin Ave, West Orange | $NO_y$* | SPM | Continuous | Population Exposure | Urban and Center City | Neighborhood | Inactive | 8/14/2012 |
| 484530020 | 11-Austin | Austin Audubon Society | 12200 Lime Creek Rd, Leander | $PM_{2.5}$ (FRM) | SLAMS/SPM/ Supplemental Speciation | 24 Hours; 1/6 Days | Population Exposure | Rural | Neighborhood | Active | 6/1/2013 |

| AQS Site ID | TCEQ Region | Site Name | Address/ Location | Sampler Type | AQS Network & Monitor Type | Operating Schedule | Monitoring Objective | Location Setting | Spatial Scale | Sampler Status | Sampler Status Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 484530020 | 11-Austin | Austin Audubon Society | 12200 Lime Creek Rd, Leander | $PM_{2.5}$ (FRM) (Speciation) | Supplemental Speciation | 24 Hours; 1/3 Days, 24 Hours; 1/6 Days | Population Exposure | Rural | Neighborhood | Inactive | 5/31/2013 |
| 484530020 | 11-Austin | Austin Audubon Society | 12200 Lime Creek Rd, Leander | $O_3$ | SLAMS | Continuous | Population Exposure | Rural | Neighborhood | Active | 3/10/1997 |
| 484530020 | 11-Austin | Austin Audubon Society | 12200 Lime Creek Rd, Leander | $NO/NO_2/NO_x$ | SLAMS | Continuous | Population Exposure | Rural | Neighborhood | Inactive | 4/4/2012 |
| 484530020 | 11-Austin | Austin Audubon Society | 12200 Lime Creek Rd, Leander | $PM_{2.5}$ (TEOM) | SPM | Continuous | Population Exposure | Rural | Neighborhood | Active | 10/31/2000 |
| 484530020 | 11-Austin | Austin Audubon Society | 12200 Lime Creek Rd, Leander | $PM_{10}$ (FRM) | SLAMS | 24 Hours; 1/6 Days, 12 Hour; 1/6 Days | Population Exposure | Rural | Neighborhood | Active | 1/1/2008 |
| 484531068 | 11-Austin | Austin North Interstate 35 | 8912 N IH 35 SVRD SB, Austin | $NO/NO_2/NO_x$ | Near-road/SLAMS | Continuous | Max Precursor Emissions Impact | Urban and Center City | Microscale | Active | 4/16/2014 |
| 484530014 | 11-Austin | Austin Northwest | 3724 North Hills Dr, Austin | $NO/NO_2/NO_x$ | SLAMS | Continuous | Population Exposure | Suburban | Urban Scale | Active | 3/28/2012 |
| 484530014 | 11-Austin | Austin Northwest | 3724 North Hills Dr, Austin | CO | SPM | Continuous | Population Exposure | Suburban | Neighborhood | Inactive | 6/30/2014 |
| 484530014 | 11-Austin | Austin Northwest | 3724 North Hills Dr, Austin | $O_3$ | SLAMS | Continuous | Population Exposure | Suburban | Neighborhood | Active | 9/20/1979 |
| 484530014 | 11-Austin | Austin Northwest | 3724 North Hills Dr, Austin | $SO_2$ | SLAMS | Continuous | Population Exposure | Suburban | Urban Scale | Active | 11/28/2012 |
| 484530014 | 11-Austin | Austin Northwest | 3724 North Hills Dr, Austin | $PM_{2.5}$ (TEOM) | SPM | Continuous | Population Exposure | Suburban | Neighborhood | Active | 4/1/2001 |
| 484530021 | 11-Austin | Austin Webberville Rd | 2600B Webberville Rd, Austin | $PM_{2.5}$ (FRM) | SLAMS | 24 Hours; 1/1 Days, 24 Hours; 1/6 Days | Population Exposure | Urban and Center City | Neighborhood | Active | 1/1/2008 |
| 484530021 | 11-Austin | Austin Webberville Rd | 2600B Webberville Rd, Austin | $PM_{2.5}$ (TEOM) | SPM | Continuous | Population Exposure | Urban and Center City | Neighborhood | Active | 10/5/2012 |
| 484530021 | 11-Austin | Austin Webberville Rd | 2600B Webberville Rd, Austin | $PM_{10}$ (FRM) | SLAMS | 24 Hours; 1/6 Days | Population Exposure | Urban and Center City | Neighborhood | Active | 10/21/1999 |
| 481490001 | 11-Austin | Fayette County | 636 Roznov Rd, Round Top | $PM_{2.5}$ (TEOM) | SPM | Continuous | Regional Transport; Source Oriented | Rural | Regional Scale | Active | 3/28/2004 |
| 482010058 | 12-Houston | Baytown | 7210 1/2 Bayway Drive, Baytown | $PM_{2.5}$ (TEOM) | SPM | Continuous | Regional Transport | Suburban | Neighborhood | Active | 7/30/2013 |
| 482010058 | 12-Houston | Baytown | 7210 1/2 Bayway Drive, Baytown | $PM_{2.5}$ (FRM) | SLAMS/SPM | 24 Hours; 1/3 Days, 24 Hours; 1/6 Days | Population Exposure | Suburban | Neighborhood | Active | 1/6/1999 |
| 482011017 | 12-Houston | Baytown Garth | 8622 Garth Road Unit A, Baytown | $O_3$ | SLAMS | Continuous | Max Ozone Concentration | Suburban | Neighborhood | Active | 2/20/2014 |

| AQS Site ID | TCEQ Region | Site Name | Address/ Location | Sampler Type | AQS Network & Monitor Type | Operating Schedule | Monitoring Objective | Location Setting | Spatial Scale | Sampler Status | Sampler Status Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 482011017 | 12-Houston | Baytown Garth | 8622 Garth Road Unit A, Baytown | $SO_2$ | SLAMS | Continuous | Population Exposure | Suburban | Neighborhood | Active | 2/20/2014 |
| 482010026 | 12-Houston | Channelview | 1405 Sheldon Road, Channelview | $O_3$ | PAMS | Continuous | Max Precursor Emissions Impact; Population Exposure | Suburban | Neighborhood | Active | 1/1/1980 |
| 482010026 | 12-Houston | Channelview | 1405 Sheldon Road, Channelview | Speciated VOC (AutoGC) | PAMS | Continuous | Population Exposure | Suburban | Neighborhood | Active | 8/4/2001 |
| 482010026 | 12-Houston | Channelview | 1405 Sheldon Road, Channelview | $PM_{2.5}$ (TEOM) | SPM | Continuous | Population Exposure | Suburban | Neighborhood | Inactive | 7/25/2013 |
| 482010026 | 12-Houston | Channelview | 1405 Sheldon Road, Channelview | $NO/NO_2/NO_x$ | PAMS | Continuous | Population Exposure | Suburban | Neighborhood | Active | 7/15/2010 |
| 482011035 | 12-Houston | Clinton | 9525 1/2 Clinton Dr, Houston | Carbonyl | PAMS | 24 Hours; Seasonal, 3 Hours; Seasonal, 3 Hours; 1/6 Days, 1 Hour; Episodic, 24 Hours; 1/6 Days, 3 Hours; 8/3 Days | Max Precursor Emissions Impact | Urban and Center City | Neighborhood | Active | 5/16/1996 |
| 482011035 | 12-Houston | Clinton | 9525 1/2 Clinton Dr, Houston | $O_3$ | PAMS | Continuous | Max Precursor Emissions Impact; Population Exposure | Urban and Center City | Neighborhood | Active | 1/18/2000 |
| 482011035 | 12-Houston | Clinton | 9525 1/2 Clinton Dr, Houston | $SO_2$ | SLAMS | Continuous | Population Exposure | Urban and Center City | Neighborhood | Active | 4/28/1982 |
| 482011035 | 12-Houston | Clinton | 9525 1/2 Clinton Dr, Houston | Speciated VOC (AutoGC) | PAMS | Continuous | Highest Concentration; Population Exposure; Source Oriented | Urban and Center City | Neighborhood | Active | 7/1/1995 |
| 482011035 | 12-Houston | Clinton | 9525 1/2 Clinton Dr, Houston | $PM_{2.5}$ (TEOM) | SPM | Continuous | Population Exposure | Urban and Center City | Neighborhood | Active | 10/16/2001 |
| 482011035 | 12-Houston | Clinton | 9525 1/2 Clinton Dr, Houston | $PM_{10}$ (FRM) | SLAMS | 24 Hours; 1/6 Days | Highest Concentration; Population Exposure | Urban and Center City | Neighborhood | Active | 10/01/1988 |

| AQS Site ID | TCEQ Region | Site Name | Address/ Location | Sampler Type | AQS Network & Monitor Type | Operating Schedule | Monitoring Objective | Location Setting | Spatial Scale | Sampler Status | Sampler Status Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 482011035 | 12-Houston | Clinton | 9525 1/2 Clinton Dr, Houston | $PM_{10}$ (FRM) | QA Collocated/ SLAMS | 24 Hours; 1/6 Days | Highest Concentration; Population Exposure | Urban and Center City | Neighborhood | Active | 1/1/2011 |
| 482011035 | 12-Houston | Clinton | 9525 1/2 Clinton Dr, Houston | $PM_{10}$ (Speciation) | SPM | 24 Hours; 1/3 Days | Population Exposure; Source Oriented | Urban and Center City | Neighborhood | Active | 10/1/1988 |
| 482011035 | 12-Houston | Clinton | 9525 1/2 Clinton Dr, Houston | CO* | Other/PAMS | Continuous | Max Precursor Emissions Impact; Population Exposure | Urban and Center City | Neighborhood | Active | 1/1/1978 |
| 482011035 | 12-Houston | Clinton | 9525 1/2 Clinton Dr, Houston | $PM_{2.5}$ (FRM) | SLAMS | 24 Hours; 1/6 Days, 24 Hours; 1/3 Days, 24 Hours; 1/1 Days | Highest Concentration; Population Exposure; Source Oriented | Urban and Center City | Neighborhood | Active | 1/1/1999 |
| 482011035 | 12-Houston | Clinton | 9525 1/2 Clinton Dr, Houston | $PM_{2.5}$ (FRM) | QA Collocated/ SLAMS | 24 Hours; 1/6 Days | Highest Concentration; Population Exposure | Urban and Center City | Neighborhood | Active | 4/6/1999 |
| 482011035 | 12-Houston | Clinton | 9525 1/2 Clinton Dr, Houston | $NO/NO_2/NO_x$ | PAMS | Continuous | Max Precursor Emissions Impact; Population Exposure | Urban and Center City | Neighborhood | Active | 1/18/2000 |
| 483390078 | 12-Houston | Conroe Relocated | 9472A Hwy 1484, Conroe | Speciated VOC (Canister) | Unofficial PAMS | 24 Hours; 1/6 Days | Extreme Downwind; Population Exposure | Suburban | Urban Scale | Inactive | 5/31/2013 |
| 483390078 | 12-Houston | Conroe Relocated | 9472A Hwy 1484, Conroe | $O_3$ | PAMS/SLAMS | Continuous | General/ Background; Population Exposure | Suburban | Urban Scale | Active | 10/26/2001 |
| 483390078 | 12-Houston | Conroe Relocated | 9472A Hwy 1484, Conroe | $PM_{2.5}$ (TEOM) | SPM | Continuous | General/ Background | Suburban | Neighborhood | Active | 11/8/2001 |
| 483390078 | 12-Houston | Conroe Relocated | 9472A Hwy 1484, Conroe | $NO/NO_2/NO_x$ | SLAMS | Continuous | General/ Background; Population Exposure | Suburban | Urban Scale | Active | 10/26/2001 |
| 481671034 | 12-Houston | Galveston 99th Street | 9511 Avenue V 1/2, Galveston | Speciated VOC (Canister) | Unofficial PAMS | 24 Hours; 1/6 Days | Max Ozone Concentration; Upwind Background | Suburban | Urban Scale | Inactive | 5/31/2013 |
| 481671034 | 12-Houston | Galveston 99th Street | 9511 Avenue V 1/2, Galveston | $O_3$ | PAMS | Continuous | Max Ozone Concentration; Upwind Background | Suburban | Urban Scale | Active | 3/20/2007 |
| 481671034 | 12-Houston | Galveston 99th Street | 9511 Avenue V 1/2, Galveston | $NO_y$* | SPM | Continuous | General/ Background | Suburban | Middle Scale | Inactive | 5/12/2012 |

| AQS Site ID | TCEQ Region | Site Name | Address/ Location | Sampler Type | AQS Network & Monitor Type | Operating Schedule | Monitoring Objective | Location Setting | Spatial Scale | Sampler Status | Sampler Status Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 481671034 | 12-Houston | Galveston 99th Street | 9511 Avenue V 1/2, Galveston | $PM_{2.5}$ (TEOM) | SPM | Continuous | Regional Transport | Suburban | Regional Scale | Active | 3/20/2007 |
| 481671034 | 12-Houston | Galveston 99th Street | 9511 Avenue V 1/2, Galveston | $NO/NO_2/NO_x$ | PAMS | Continuous | General/ Background; Upwind Background | Suburban | Urban Scale | Active | 3/20/2007 |
| 481671034 | 12-Houston | Galveston 99th Street | 9511 Avenue V 1/2, Galveston | $PM_{2.5}$ (FRM) | SPM | 24 Hours; Seasonal | Regional Transport | Suburban | Regional Scale | Active | 3/1/2013 |
| 482010024 | 12-Houston | Houston Aldine | 4510 1/2 Aldine Mail Rd, Houston | Speciated VOC (Canister) | PAMS/ Unofficial PAMS | 24 Hours; 1/6 Days | Max Ozone Concentration; Population Exposure | Suburban | Neighborhood | Inactive | 5/31/2013 |
| 482010024 | 12-Houston | Houston Aldine | 4510 1/2 Aldine Mail Rd, Houston | CO | SLAMS | Continuous | Population Exposure | Suburban | Neighborhood | Inactive | 6/30/2014 |
| 482010024 | 12-Houston | Houston Aldine | 4510 1/2 Aldine Mail Rd, Houston | $O_3$ | PAMS | Continuous | Max Ozone Concentration; Population Exposure | Suburban | Neighborhood | Active | 4/2/1997 |
| 482010024 | 12-Houston | Houston Aldine | 4510 1/2 Aldine Mail Rd, Houston | $PM_{2.5}$ (TEOM) | SPM | Continuous | Population Exposure | Suburban | Neighborhood | Active | 8/3/2001 |
| 482010024 | 12-Houston | Houston Aldine | 4510 1/2 Aldine Mail Rd, Houston | $PM_{10}$ (FRM) | SLAMS | 24 Hours; 1/6 Days | Population Exposure | Suburban | Neighborhood | Active | 7/26/1988 |
| 482010024 | 12-Houston | Houston Aldine | 4510 1/2 Aldine Mail Rd, Houston | $NO/NO_2/NO_x$ | PAMS | Continuous | Max Ozone Concentration; Population Exposure | Suburban | Neighborhood | Active | 4/2/1997 |
| 482010024 | 12-Houston | Houston Aldine | 4510 1/2 Aldine Mail Rd, Houston | $NO_y$* | PAMS | Continuous | Max Ozone Concentration; Population Exposure | Suburban | Neighborhood | Active | 6/7/2000 |
| 482010024 | 12-Houston | Houston Aldine | 4510 1/2 Aldine Mail Rd, Houston | $PM_{2.5}$ (FRM) (Speciation) *** | SPM | 24 Hours; 1/6 Days | Population Exposure | Suburban | Neighborhood | Active | 8/14/2000 |
| 482010055 | 12-Houston | Houston Bayland Park | 6400 Bissonnet Street, Houston | $O_3$ | SLAMS | Continuous | Population Exposure | Suburban | Neighborhood | Active | 3/24/1998 |
| 482010055 | 12-Houston | Houston Bayland Park | 6400 Bissonnet Street, Houston | $NO/NO_2/NO_x$ | SLAMS | Continuous | Population Exposure | Suburban | Neighborhood | Active | 3/24/1998 |
| 482010051 | 12-Houston | Houston Croquet | 13826 1/2 Croquet, Houston | $O_3$ | SLAMS | Continuous | Population Exposure | Suburban | Neighborhood | Active | 2/8/2000 |
| 482010051 | 12-Houston | Houston Croquet | 13826 1/2 Croquet, Houston | $SO_2$ | Other/SPM | Continuous | Population Exposure | Suburban | Neighborhood | Active | 2/8/2000 |
| 482011039 | 12-Houston | Houston Deer Park #2 | 4514 1/2 Durant St, Deer Park | Speciated VOC (Canister) | PAMS/NATTS | 24 Hours; 1/6 Days | Max Precursor Emissions Impact; Population Exposure | Urban and Center City | Neighborhood | Active | 11/5/1996 |
| 482011039 | 12-Houston | Houston Deer Park #2 | 4514 1/2 Durant St, Deer Park | Speciated VOC (Canister) | QA Collocated/ NATTS | 24 Hours; 1/6 Days | Max Precursor Emissions Impact; Population Exposure | Urban and Center City | Neighborhood | Active | 12/25/2006 |

| AQS Site ID | TCEQ Region | Site Name | Address/ Location | Sampler Type | AQS Network & Monitor Type | Operating Schedule | Monitoring Objective | Location Setting | Spatial Scale | Sampler Status | Sampler Status Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 482011039 | 12-Houston | Houston Deer Park #2 | 4514 1/2 Durant St, Deer Park | SVOC | NATTS | 24 Hours; 1/6 Days | Max Precursor Emissions Impact; Population Exposure | Urban and Center City | Neighborhood | Active | 4/6/2007 |
| 482011039 | 12-Houston | Houston Deer Park #2 | 4514 1/2 Durant St, Deer Park | SVOC | QA Collocated/ SPM | 24 Hours; 1/6 Days | Max Precursor Emissions Impact; Population Exposure | Urban and Center City | Neighborhood | Active | 1/1/2008 |
| 482011039 | 12-Houston | Houston Deer Park #2 | 4514 1/2 Durant St, Deer Park | Carbonyl | PAMS | 24 Hours; 1/6 Days, 1 Hour; Episodic | Max Precursor Emissions Impact; Population Exposure | Urban and Center City | Neighborhood | Active | 6/3/1998 |
| 482011039 | 12-Houston | Houston Deer Park #2 | 4514 1/2 Durant St, Deer Park | CO | SLAMS | Continuous | Max Precursor Emissions Impact; Population Exposure | Urban and Center City | Neighborhood | Inactive | 12/14/2010 |
| 482011039 | 12-Houston | Houston Deer Park #2 | 4514 1/2 Durant St, Deer Park | $O_3$ | NCore/PAMS | Continuous | Max Precursor Emissions Impact; Population Exposure | Urban and Center City | Neighborhood | Active | 3/20/1997 |
| 482011039 | 12-Houston | Houston Deer Park #2 | 4514 1/2 Durant St, Deer Park | Speciated VOC (AutoGC) | PAMS | Continuous | Max Precursor Emissions Impact; Population Exposure | Urban and Center City | Neighborhood | Active | 1/16/1997 |
| 482011039 | 12-Houston | Houston Deer Park #2 | 4514 1/2 Durant St, Deer Park | $PM_{2.5}$ (TEOM) | SPM | Continuous | Population Exposure | Urban and Center City | Neighborhood | Active | 3/1/2000 |
| 482011039 | 12-Houston | Houston Deer Park #2 | 4514 1/2 Durant St, Deer Park | TSP (Cr6+) | NATTS | 24 Hours; 1/6 Days | Population Exposure | Urban and Center City | Neighborhood | Inactive | 6/30/2013 |
| 482011039 | 12-Houston | Houston Deer Park #2 | 4514 1/2 Durant St, Deer Park | TSP (Cr6+) | QA Collocated | 24 Hours; 1/6 Days | Population Exposure | Urban and Center City | Neighborhood | Inactive | 6/30/2013 |
| 482011039 | 12-Houston | Houston Deer Park #2 | 4514 1/2 Durant St, Deer Park | TSP (Pb) | NCore | 24 Hours; 1/6 Days | Population Exposure | Urban and Center City | Neighborhood | Active | 11/23/2011 |

| AQS Site ID | TCEQ Region | Site Name | Address/ Location | Sampler Type | AQS Network & Monitor Type | Operating Schedule | Monitoring Objective | Location Setting | Spatial Scale | Sampler Status | Sampler Status Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 482011039 | 12-Houston | Houston Deer Park #2 | 4514 1/2 Durant St, Deer Park | $PM_{10}$ (FRM) | SLAMS | 24 Hours; 1/6 Days | Max Precursor Emissions Impact; Population Exposure; Source Oriented | Urban and Center City | Neighborhood | Active | 1/30/1999 |
| 482011039 | 12-Houston | Houston Deer Park #2 | 4514 1/2 Durant St, Deer Park | $PM_{10}$ (FRM) | QA Collocated/ SLAMS | 24 Hours; 1/6 Days | Population Exposure | Urban and Center City | Neighborhood | Active | 1/30/1999 |
| 482011039 | 12-Houston | Houston Deer Park #2 | 4514 1/2 Durant St, Deer Park | $PM_{10}$ (Speciation) | NATTS/Other | 24 Hours; 1/6 Days | Max Precursor Emissions Impact; Population Exposure; Source Oriented | Urban and Center City | Neighborhood | Active | 1/30/1999 |
| 482011039 | 12-Houston | Houston Deer Park #2 | 4514 1/2 Durant St, Deer Park | $PM_{10}$ (Speciation) | QA Collocated/ NATTS | 24 Hours; 1/6 Days | Population Exposure | Urban and Center City | Neighborhood | Active | 1/30/1999 |
| 482011039 | 12-Houston | Houston Deer Park #2 | 4514 1/2 Durant St, Deer Park | CO* | NCore | Continuous | Population Exposure | Urban and Center City | Neighborhood | Active | 12/14/2010 |
| 482011039 | 12-Houston | Houston Deer Park #2 | 4514 1/2 Durant St, Deer Park | $SO_2$* | NCore | Continuous | Population Exposure | Urban and Center City | Neighborhood | Active | 12/13/2010 |
| 482011039 | 12-Houston | Houston Deer Park #2 | 4514 1/2 Durant St, Deer Park | $PM_{10-2.5}$ | NCore/SPM | Continuous | Population Exposure | Urban and Center City | Neighborhood | Active | 1/5/2011 |
| 482011039 | 12-Houston | Houston Deer Park #2 | 4514 1/2 Durant St, Deer Park | $PM_{2.5}$ (Carbon) | SPM | Continuous | N/A | Urban and Center City | Neighborhood | Inactive | 1/24/2012 |
| 482011039 | 12-Houston | Houston Deer Park #2 | 4514 1/2 Durant St, Deer Park | $PM_{2.5}$ (Carbon) Black | SPM | Continuous | Population Exposure | Urban and Center City | Neighborhood | Active | 4/16/2003 |
| 482011039 | 12-Houston | Houston Deer Park #2 | 4514 1/2 Durant St, Deer Park | $PM_{2.5}$ (Carbon) | SPM | Continuous | General/ Background | Urban and Center City | Neighborhood | Inactive | 8/1/2013 |
| 482011039 | 12-Houston | Houston Deer Park #2 | 4514 1/2 Durant St, Deer Park | $PM_{2.5}$ (Carbon) Sunset | SPM | Continuous | General/ Background | Urban and Center City | Neighborhood | Active | 8/1/2013 |

| AQS Site ID | TCEQ Region | Site Name | Address/ Location | Sampler Type | AQS Network & Monitor Type | Operating Schedule | Monitoring Objective | Location Setting | Spatial Scale | Sampler Status | Sampler Status Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 482011039 | 12-Houston | Houston Deer Park #2 | 4514 1/2 Durant St, Deer Park | $NO/NO_2/NO_x$ | PAMS/NCore | Continuous | Population Exposure; Source Oriented | Urban and Center City | Neighborhood | Active | 3/20/1997 |
| 482011039 | 12-Houston | Houston Deer Park #2 | 4514 1/2 Durant St, Deer Park | $NO_y$* | NCore/SPM | Continuous | Population Exposure | Urban and Center City | Neighborhood | Active | 12/14/2010 |
| 482011039 | 12-Houston | Houston Deer Park #2 | 4514 1/2 Durant St, Deer Park | $PM_{2.5}$ (FRM) | NCore | 24 Hours; 1/3 Days | Population Exposure | Urban and Center City | Neighborhood | Active | 8/10/2013 |
| 482011039 | 12-Houston | Houston Deer Park #2 | 4514 1/2 Durant St, Deer Park | $PM_{2.5}$ (Speciation) | Trends Speciation | 24 Hours; 1/3 Days, 24 Hours; 1/6 Days | Population Exposure | Urban and Center City | Neighborhood | Active | 1/1/2000 |
| 482011039 | 12-Houston | Houston Deer Park #2 | 4514 1/2 Durant St, Deer Park | $PM_{2.5}$ (Speciation) | QA Collocated | 24 Hours; 1/6 Days, 24 Hours; 1/3 Days | Population Exposure | Urban and Center City | Neighborhood | Active | 1/1/2000 |
| 482011034 | 12-Houston | Houston East | 1262 1/2 Mae Drive, Houston | $O_3$ | SLAMS | Continuous | Population Exposure | Suburban | Neighborhood | Active | 5/7/1997 |
| 482011034 | 12-Houston | Houston East | 1262 1/2 Mae Drive, Houston | $PM_{2.5}$ (TEOM) | SPM | Continuous | Population Exposure | Suburban | Neighborhood | Active | 2/5/2000 |
| 482011034 | 12-Houston | Houston East | 1262 1/2 Mae Drive, Houston | TSP (Pb) | SLAMS | 24 Hours; 1/6 Days | Population Exposure | Suburban | Urban Scale | Inactive | 12/31/2014 |
| 482011034 | 12-Houston | Houston East | 1262 1/2 Mae Drive, Houston | $NO/NO_2/NO_x$ | SLAMS/SPM | Continuous | Highest Concentration; Population Exposure | Suburban | Middle Scale | Active | 5/7/1997 |
| 482010062 | 12-Houston | Houston Monroe | 9726 1/2 Monroe, Houston | $O_3$ | SLAMS | Continuous | Population Exposure | Suburban | Neighborhood | Active | 2/9/2000 |
| 482010062 | 12-Houston | Houston Monroe | 9726 1/2 Monroe, Houston | $SO_2$ | Other/SPM | Continuous | Population Exposure | Suburban | Neighborhood | Active | 2/9/2000 |
| 482010062 | 12-Houston | Houston Monroe | 9726 1/2 Monroe, Houston | $PM_{10}$ (FRM) | SLAMS | 24 Hours; 1/6 Days | Population Exposure | Suburban | Neighborhood | Active | 10/1/1989 |
| 482010046 | 12-Houston | Houston North Wayside | 7330 1/2 North Wayside, Houston | $O_3$ | SLAMS | Continuous | Population Exposure | Suburban | Neighborhood | Active | 2/22/2000 |
| 482010046 | 12-Houston | Houston North Wayside | 7330 1/2 North Wayside, Houston | $SO_2$ | SPM | Continuous | Population Exposure | Suburban | Neighborhood | Active | 2/22/2000 |
| 482010070 | 12-Houston | Houston Regional Office | 5425 Polk Ave Suite H, Houston | $O_3$ | SLAMS | Continuous | General/ Background | Urban and Center City | Neighborhood | Inactive | 6/15/2012 |
| 482010070 | 12-Houston | Houston Regional Office | 5425 Polk Ave Suite H, Houston | $SO_2$ | SLAMS | Continuous | General/ Background | Urban and Center City | Neighborhood | Inactive | 6/15/2012 |
| 482011066 | 12-Houston | Houston Southwest Freeway | 5617 Westward Avenue, Houston | $NO/NO_2/NO_x$ | Near-road/ SLAMS | Continuous | Max Precursor Emissions Impact | Urban and Center City | Microscale | Active | 1/22/2014 |

| AQS Site ID | TCEQ Region | Site Name | Address/ Location | Sampler Type | AQS Network & Monitor Type | Operating Schedule | Monitoring Objective | Location Setting | Spatial Scale | Sampler Status | Sampler Status Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 482010075 | 12-Houston | Houston Texas Avenue | 2311 Texas Ave, Houston | CO | SLAMS | Continuous | Population Exposure | Urban and Center City | Middle Scale | Inactive | 12/31/2014 |
| 482010075 | 12-Houston | Houston Texas Avenue | 2311 Texas Ave, Houston | $O_3$ | SPM | Continuous | Population Exposure | Urban and Center City | Neighborhood | Active | 3/29/2001 |
| 482010075 | 12-Houston | Houston Texas Avenue | 2311 Texas Ave, Houston | $NO/NO_2/NO_x$ | SPM | Continuous | Population Exposure | Urban and Center City | Neighborhood | Active | 3/29/2001 |
| 482010066 | 12-Houston | Houston Westhollow | 3333 1/2 Hwy 6 South, Houston | $O_3$ | Other/SLAMS | Continuous | Population Exposure | Suburban | Neighborhood | Active | 3/7/2000 |
| 482010066 | 12-Houston | Houston Westhollow | 3333 1/2 Hwy 6 South, Houston | $PM_{10}$ (FRM) | SLAMS | 24 Hours; 1/3 Days, 24 Hours; 1/6 Days | Population Exposure | Suburban | Neighborhood | Active | 4/1/1997 |
| 482011042 | 12-Houston | Kingwood | 3603 1/2 West Lake Houston Pkwy, Houston | $PM_{2.5}$ (TEOM) | SPM | Continuous | Population Exposure | Suburban | Neighborhood | Active | 2/15/2001 |
| 480391016 | 12-Houston | Lake Jackson | 109B Brazoria Hwy 332 West, Lake Jackson | $O_3$ | SLAMS | Continuous | Population Exposure; Source Oriented | Suburban | Neighborhood | Active | 6/10/2003 |
| 480391016 | 12-Houston | Lake Jackson | 109B Brazoria Hwy 332 West, Lake Jackson | $NO/NO_2/NO_x$ | SLAMS | Continuous | Population Exposure; Source Oriented | Suburban | Neighborhood | Active | 6/10/2003 |
| 482010047 | 12-Houston | Lang | 4401 1/2 Lang Rd, Houston | CO | SLAMS | Continuous | Population Exposure | Suburban | Middle Scale | Inactive | 12/31/2014 |
| 482010047 | 12-Houston | Lang | 4401 1/2 Lang Rd, Houston | $O_3$ | SLAMS | Continuous | Population Exposure | Suburban | Middle Scale | Active | 3/8/2000 |
| 482010047 | 12-Houston | Lang | 4401 1/2 Lang Rd, Houston | $PM_{10}$ (FRM) | SLAMS | 24 Hours; 1/6 Days | Population Exposure | Suburban | Neighborhood | Active | 10/2/1998 |
| 482010047 | 12-Houston | Lang | 4401 1/2 Lang Rd, Houston | $NO/NO_2/NO_x$ | SLAMS | Continuous | Population Exposure | Suburban | Middle Scale | Active | 3/8/2000 |
| 482011015 | 12-Houston | Lynchburg Ferry | 4407 Independence Parkway South, Baytown | $O_3$ | SLAMS | Continuous | Source Oriented | Suburban | Neighborhood | Active | 4/24/2003 |
| 482011015 | 12-Houston | Lynchburg Ferry | 4407 Independence Parkway South, Baytown | $NO/NO_2/NO_x$ | SLAMS | Continuous | Source Oriented | Suburban | Neighborhood | Active | 4/24/2003 |
| 480391004 | 12-Houston | Manvel Croix Park | 4503 Croix Pkwy, Manvel | $O_3$ | SLAMS | Continuous | Population Exposure | Suburban | Urban Scale | Active | 8/23/2001 |
| 480391004 | 12-Houston | Manvel Croix Park | 4503 Croix Pkwy, Manvel | $NO/NO_2/NO_x$ | SLAMS | Continuous | Population Exposure | Suburban | Urban Scale | Active | 8/23/2001 |

| AQS Site ID | TCEQ Region | Site Name | Address/ Location | Sampler Type | AQS Network & Monitor Type | Operating Schedule | Monitoring Objective | Location Setting | Spatial Scale | Sampler Status | Sampler Status Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 482010029 | 12-Houston | Northwest Harris County | 16822 Kitzman, Tomball | Speciated VOC (Canister) | PAMS/ Unofficial PAMS | 24 Hours; 1/6 Days | Extreme Downwind; Population Exposure; Upwind Background | Rural | Urban Scale | Inactive | 5/31/2013 |
| 482010029 | 12-Houston | Northwest Harris County | 16822 Kitzman, Tomball | $O_3$ | PAMS | Continuous | Extreme Downwind; Population Exposure; Upwind Background | Rural | Urban Scale | Active | 4/1/1997 |
| 482010029 | 12-Houston | Northwest Harris County | 16822 Kitzman, Tomball | $NO/NO_2/NO_x$ | PAMS | Continuous | Extreme Downwind; Population Exposure; Upwind Background | Rural | Urban Scale | Active | 4/1/1997 |
| 482010416 | 12-Houston | Park Place | 7421 Park Place Blvd, Houston | CO | SPM | Continuous | Population Exposure | Urban and Center City | Neighborhood | Inactive | 12/31/2014 |
| 482010416 | 12-Houston | Park Place | 7421 Park Place Blvd, Houston | $O_3$ | SPM | Continuous | Population Exposure | Urban and Center City | Neighborhood | Active | 2/22/2006 |
| 482010416 | 12-Houston | Park Place | 7421 Park Place Blvd, Houston | $SO_2$ | SPM | Continuous | Population Exposure | Urban and Center City | Neighborhood | Active | 2/22/2006 |
| 482010416 | 12-Houston | Park Place | 7421 Park Place Blvd, Houston | $NO/NO_2/NO_x$ | SPM | Continuous | Population Exposure | Urban and Center City | Neighborhood | Active | 2/22/2006 |
| 482010071 | 12-Houston | Pasadena HL&P | 1001 1/2 Red Bluff, Pasadena | $PM_{10}$ (FRM) | SLAMS | 24 Hours; 1/6 Days | Population Exposure | Urban and Center City | Neighborhood | Active | 7/17/2000 |
| 482011050 | 12-Houston | Seabrook Friendship Park | 4522 Park Rd, Seabrook | $O_3$ | SLAMS | Continuous | Population Exposure | Suburban | Neighborhood | Active | 7/29/2001 |
| 482011050 | 12-Houston | Seabrook Friendship Park | 4522 Park Rd, Seabrook | $SO_2$ | SPM | Continuous | Population Exposure; Source Oriented | Suburban | Neighborhood | Active | 7/29/2001 |
| 482011050 | 12-Houston | Seabrook Friendship Park | 4522 Park Rd, Seabrook | $PM_{2.5}$ (TEOM) | SPM | Continuous | Highest Concentration | Suburban | Middle Scale | Active | 8/17/2001 |
| 482011050 | 12-Houston | Seabrook Friendship Park | 4522 Park Rd, Seabrook | $NO/NO_2/NO_x$ | SLAMS | Continuous | Population Exposure | Suburban | Neighborhood | Active | 7/29/2001 |
| 481670004 | 12-Houston | Texas City Fire Station | 2516 Texas Avenue, Texas City | $PM_{10}$ (FRM) | SLAMS | 24 Hours; 1/6 Days | Highest Concentration | Urban and Center City | Neighborhood | Active | 11/24/1989 |

| AQS Site ID | TCEQ Region | Site Name | Address/ Location | Sampler Type | AQS Network & Monitor Type | Operating Schedule | Monitoring Objective | Location Setting | Spatial Scale | Sampler Status | Sampler Status Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 481670004 | 12-Houston | Texas City Fire Station | 2516 Texas Avenue, Texas City | $PM_{10}$ (FRM) | QA Collocated/ SLAMS | 24 Hours; 1/6 Days | Highest Concentration | Urban and Center City | Neighborhood | Active | 1/1/2011 |
| 480290059 | 13-San Antonio | Calaveras Lake | 14620 Laguna Rd, San Antonio | $O_3$ | SLAMS | Continuous | Source Oriented; Upwind Background | Rural | Urban Scale | Active | 5/13/1998 |
| 480290059 | 13-San Antonio | Calaveras Lake | 14620 Laguna Rd, San Antonio | $SO_2$ | SLAMS | Continuous | Population Exposure; Source Oriented | Rural | Neighborhood | Active | 12/17/2012 |
| 480290059 | 13-San Antonio | Calaveras Lake | 14620 Laguna Rd, San Antonio | $PM_{2.5}$ (TEOM) | SPM | Continuous | Regional Transport | Rural | Regional Scale | Active | 2/1/2000 |
| 480290059 | 13-San Antonio | Calaveras Lake | 14620 Laguna Rd, San Antonio | $PM_{2.5}$ (FRM) | SLAMS/SPM | 24 Hours; 1/6 Days | Population Exposure; Upwind Background | Rural | Urban Scale | Active | 1/1/2008 |
| 480290059 | 13-San Antonio | Calaveras Lake | 14620 Laguna Rd, San Antonio | $NO/NO_2/NO_x$ | SLAMS | Continuous | Source Oriented; Upwind Background | Rural | Urban Scale | Active | 5/13/1998 |
| 480290052 | 13-San Antonio | Camp Bullis | F Range (1000Yd marker off Wilderness Trail), Near Wilderness Rd, San Antonio | $O_3$ | SLAMS | Continuous | Max Ozone Concentration; Population Exposure | Rural | Urban Scale | Active | 8/12/1998 |
| 480290052 | 13-San Antonio | Camp Bullis | F Range (1000Yd marker off Wilderness Trail), Near Wilderness Rd, San Antonio | $NO/NO_2/NO_x$ | SLAMS | Continuous | Extreme Downwind; Population Exposure | Rural | Urban Scale | Inactive | 10/18/2012 |
| 480290055 | 13-San Antonio | CPS Pecan Valley | 802 Pecan Valley Drive, San Antonio | $PM_{2.5}$ (TEOM) | SPM | Continuous | Population Exposure | Suburban | Neighborhood | Active | 3/25/2002 |
| 480290060 | 13-San Antonio | Frank Wing Municipal Court | 401 South Frio St, San Antonio | $PM_{10}$ (FRM) | SLAMS | 24 Hours; 1/6 Days | Population Exposure | Urban and Center City | Neighborhood | Active | 5/18/2000 |
| 480290677 | 13-San Antonio | Old Hwy 90 | 911 Old Hwy 90 West, San Antonio | $PM_{2.5}$ (TEOM) | SPM | Continuous | Population Exposure | Urban and Center City | Neighborhood | Active | 10/9/2006 |
| 480290676 | 13-San Antonio | Palo Alto | 9011 Poteet Jourdanton Hwy, San Antonio | $PM_{2.5}$ (TEOM) | SPM | Continuous | Population Exposure | Urban and Center City | Neighborhood | Active | 8/1/2006 |
| 480291052 | 13-San Antonio | San Antonio 99th Street | 1441 99th Street, San Antonio | TSP (Pb) | SPM | 24 Hours; 1/6 Days | Source Oriented | Suburban | Neighborhood | Inactive | 12/18/2013 |

| AQS Site ID | TCEQ Region | Site Name | Address/ Location | Sampler Type | AQS Network & Monitor Type | Operating Schedule | Monitoring Objective | Location Setting | Spatial Scale | Sampler Status | Sampler Status Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 480290046 | 13-San Antonio | San Antonio Downtown | 615 East Houston Street, San Antonio | CO | NAMS | Continuous | Population Exposure | Urban and Center City | Microscale | Inactive | 10/6/2010 |
| 480290046 | 13-San Antonio | San Antonio Downtown | 615 East Houston Street, San Antonio | $NO/NO_2/NO_x$ | SLAMS | Continuous | Population Exposure | Urban and Center City | Microscale | Inactive | 10/6/2010 |
| 480291069 | 13-San Antonio | San Antonio Interstate 35 | 9904 IH 35 N, San Antonio | $NO/NO_2/NO_x$ | Near-road/ SLAMS | Continuous | Max Precursor Emissions Impact | Urban and Center City | Microscale | Active | 1/8/2014 |
| 480290032 | 13-San Antonio | San Antonio Northwest | 6655 Bluebird Lane, San Antonio | $O_3$ | SLAMS | Continuous | Max Ozone Concentration; Population Exposure | Suburban | Urban Scale | Active | 1/1/2000 |
| 480290032 | 13-San Antonio | San Antonio Northwest | 6655 Bluebird Lane, San Antonio | $PM_{2.5}$ (TEOM) | SPM | Continuous | Population Exposure | Suburban | Urban Scale | Active | 1/4/2007 |
| 480290032 | 13-San Antonio | San Antonio Northwest | 6655 Bluebird Lane, San Antonio | $PM_{2.5}$ (FRM) | SLAMS/SPM | 24 Hours; 1/6 Days | Population Exposure | Suburban | Urban Scale | Active | 1/1/2008 |
| 480290032 | 13-San Antonio | San Antonio Northwest | 6655 Bluebird Lane, San Antonio | $NO/NO_2/NO_x$ | SLAMS | Continuous | Population Exposure | Suburban | Neighborhood | Active | 10/17/2012 |
| 480290053 | 13-San Antonio | Selma | 16289 North Evans Rd #2, Selma | $PM_{2.5}$ (TEOM) | SPM | Continuous | Population Exposure | Suburban | Neighborhood | Active | 2/15/2000 |
| 480290053 | 13-San Antonio | Selma | 16289 North Evans Rd #2, Selma | $PM_{10}$ (FRM) | SLAMS | 24 Hours; 1/6 Days | Population Exposure | Suburban | Neighborhood | Active | 4/1/2008 |
| 483550032 | 14-Corpus Christi | Corpus Christi Huisache | 3810 Huisache Street, Corpus Christi | $SO_2$ | SLAMS/SPM | Continuous | Highest Concentration; Population Exposure | Urban and Center City | Neighborhood | Active | 8/6/1997 |
| 483550032 | 14-Corpus Christi | Corpus Christi Huisache | 3810 Huisache Street, Corpus Christi | $PM_{2.5}$ (FRM) | SLAMS | 24 Hours; 1/1 Days, 24 Hours; 1/3 Days, 24 Hours; 1/6 Days | Population Exposure | Urban and Center City | Neighborhood | Active | 1/6/1999 |
| 483550032 | 14-Corpus Christi | Corpus Christi Huisache | 3810 Huisache Street, Corpus Christi | $PM_{2.5}$ (FRM) | QA Collocated/ SLAMS/SPM | 24 Hours; 1/6 Days | Population Exposure | Urban and Center City | Neighborhood | Active | 1/19/2000 |
| 483550026 | 14-Corpus Christi | Corpus Christi Tuloso | 9860 La Branch, Corpus Christi | $O_3$ | SLAMS | Continuous | Population Exposure | Suburban | Neighborhood | Active | 7/26/1984 |
| 483550026 | 14-Corpus Christi | Corpus Christi Tuloso | 9860 La Branch, Corpus Christi | $SO_2$ | SLAMS | Continuous | Population Exposure | Suburban | Neighborhood | Active | 10/31/1987 |
| 483550025 | 14-Corpus Christi | Corpus Christi West | Corpus Christi State School (Airport Rd), 902 AIRPORT BLVD, Corpus Christi | $O_3$ | SLAMS | Continuous | Population Exposure | Suburban | Neighborhood | Active | 3/18/1998 |

| AQS Site ID | TCEQ Region | Site Name | Address/ Location | Sampler Type | AQS Network & Monitor Type | Operating Schedule | Monitoring Objective | Location Setting | Spatial Scale | Sampler Status | Sampler Status Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 483550025 | 14-Corpus Christi | Corpus Christi West | Corpus Christi State School (Airport Rd), 902 AIRPORT BLVD, Corpus Christi | $SO_2$ | SLAMS | Continuous | Population Exposure | Suburban | Neighborhood | Active | 3/18/1998 |
| 483550025 | 14-Corpus Christi | Corpus Christi West | Corpus Christi State School (Airport Rd), 902 AIRPORT BLVD, Corpus Christi | $PM_{2.5}$ (TEOM) | SPM | Continuous | Population Exposure | Suburban | Neighborhood | Inactive | 6/11/2013 |
| 483550034 | 14-Corpus Christi | Dona Park | 5707 Up River Rd, Corpus Christi | $PM_{2.5}$ (TEOM) | SPM | Continuous | Regional Transport | Urban and Center City | Urban Scale | Active | 6/11/2013 |
| 483550034 | 14-Corpus Christi | Dona Park | 5707 Up River Rd, Corpus Christi | $PM_{10}$ (FRM) | SLAMS/SPM | 24 Hours; 1/6 Days | Population Exposure | Urban and Center City | Neighborhood | Active | 10/5/2002 |
| 483550034 | 14-Corpus Christi | Dona Park | 5707 Up River Rd, Corpus Christi | $PM_{10}$ (FRM) | QA Collocated/ SLAMS/SPM | 24 Hours; 1/6 Days | Population Exposure | Urban and Center City | Neighborhood | Active | 10/5/2002 |
| 483550034 | 14-Corpus Christi | Dona Park | 5707 Up River Rd, Corpus Christi | $PM_{2.5}$ (FRM) (Speciation) *** | Supplemental Speciation | 24 Hours; 1/6 Days | Population Exposure | Urban and Center City | Neighborhood | Active | 1/31/2001 |
| 482730314 | 14-Corpus Christi | National Seashore | 20420 Park Road, Corpus Christi | $PM_{2.5}$ (TEOM) | SPM | Continuous | Regional Transport | Rural | Regional Scale | Active | 12/11/2002 |
| 484690003 | 14-Corpus Christi | Victoria | 106 Mockingbird Lane, Victoria | $O_3$ | SLAMS | Continuous | Population Exposure | Urban and Center City | Neighborhood | Active | 1/21/1998 |
| 480610006 | 15-Harlingen | Brownsville | 344 Porter Drive, Brownsville | SVOC | SPM | 24 Hours; 1/6 Days | Population Exposure; Upwind Background | Urban and Center City | Middle Scale | Active | 3/22/1996 |
| 480610006 | 15-Harlingen | Brownsville | 344 Porter Drive, Brownsville | CO | SPM | Continuous | Highest Concentration | Urban and Center City | Neighborhood | Active | 8/26/1993 |
| 480610006 | 15-Harlingen | Brownsville | 344 Porter Drive, Brownsville | $O_3$ | SLAMS | Continuous | Population Exposure | Urban and Center City | Neighborhood | Active | 12/14/1993 |
| 480610006 | 15-Harlingen | Brownsville | 344 Porter Drive, Brownsville | $PM_{2.5}$ (TEOM) | SPM | Continuous | Population Exposure | Urban and Center City | Urban Scale | Active | 2/1/2000 |
| 480610006 | 15-Harlingen | Brownsville | 344 Porter Drive, Brownsville | TSP (Pb) | SLAMS | 24 Hours; 1/6 Days | Population Exposure | Urban and Center City | Neighborhood / Urban Scale | Active | 11/11/1995 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 480611023 | 15-Harlingen | Harlingen Teege | 1602 W Teege Avenue, Harlingen | $O_3$ | SLAMS | Continuous | Population Exposure | Suburban | Neighborhood | Active | 10/9/2012 |
| 480612004 | 15-Harlingen | Isla Blanca Park | Lot B 69 1/2, South Padre Island | $PM_{2.5}$ (TEOM) | SPM | Continuous | Regional Transport | Rural | Urban Scale | Active | 6/24/2013 |
| 480612004 | 15-Harlingen | Isla Blanca Park | Lot B 69 1/2, South Padre Island | $PM_{2.5}$ (FRM) | SLAMS | 24 Hours; 1/6 Days | Population Exposure; Regional Transport | Rural | Urban Scale | Inactive | 6/16/2013 |
| 480612004 | 15-Harlingen | Isla Blanca Park | Lot B 69 1/2, South Padre Island | $PM_{2.5}$ (FRM) (Speciation) | SLAMS Speciation/ Supplemental Speciation | 24 Hours; 1/6 Days | Population Exposure; Regional Transport | Rural | Urban Scale | Inactive | 6/16/2013 |
| 482151048 | 15-Harlingen | Mercedes | 325 Golf Course Road, Mercedes | SVOC | SPM | 24 Hours; 1/6 Days | Highest Concentration; Population Exposure | Suburban | Urban Scale | Inactive | 10/10/2012 |
| 482151048 | 15-Harlingen | Mercedes | 325 Golf Course Road, Mercedes | $O_3$ | SLAMS | Continuous | Population Exposure | Suburban | Urban Scale | Inactive | 10/10/2012 |
| 482150043 | 15-Harlingen | Mission | 2300 North Glasscock, Mission | SVOC | SPM | 24 Hours; 1/6 Days | Population Exposure | Suburban | Microscale | Active | 3/22/1996 |
| 482150043 | 15-Harlingen | Mission | 2300 North Glasscock, Mission | $O_3$ | SLAMS | Continuous | Population Exposure | Suburban | Neighborhood | Active | 4/6/1998 |
| 482150043 | 15-Harlingen | Mission | 2300 North Glasscock, Mission | $PM_{2.5}$ (TEOM) | SPM | Continuous | Population Exposure | Suburban | Urban Scale | Active | 4/26/2001 |
| 482150043 | 15-Harlingen | Mission | 2300 North Glasscock, Mission | $PM_{10}$ (FRM) | SLAMS | 24 Hours; 1/6 Days | Population Exposure | Suburban | Urban Scale | Active | 1/18/2008 |
| 482150043 | 15-Harlingen | Mission | 2300 North Glasscock, Mission | $PM_{2.5}$ (FRM) | SLAMS | 24 Hours; 1/3 Days, 24 Hours; 1/6 Days | Population Exposure | Suburban | Urban Scale | Active | 1/3/1999 |
| 483230004 | 16-Laredo | Eagle Pass | 265 Foster Maldonado, Eagle Pass | $PM_{2.5}$ (TEOM) | SPM | Continuous | Regional Transport | Urban and Center City | Regional Scale | Active | 8/23/2005 |
| 484790017 | 16-Laredo | Laredo Bridge | 700 Zaragosa St, Laredo | Speciated VOC (Canister) | SPM | 24 Hours; 1/6 Days | Highest Concentration | Urban and Center City | Neighborhood | Active | 12/20/2000 |
| 484790017 | 16-Laredo | Laredo Bridge | 700 Zaragosa St, Laredo | CO | SPM | Continuous | Population Exposure; Source Oriented | Urban and Center City | Microscale | Active | 9/21/1999 |
| 484790017 | 16-Laredo | Laredo Bridge | 700 Zaragosa St, Laredo | $PM_{10}$ (FRM) | SPM | 24 Hours; 1/6 Days | Highest Concentration | Urban and Center City | Microscale | Active | 10/3/1999 |

| AQS Site ID | TCEQ Region | Site Name | Address/ Location | Sampler Type | AQS Network & Monitor Type | Operating Schedule | Monitoring Objective | Location Setting | Spatial Scale | Sampler Status | Sampler Status Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 484790016 | 16-Laredo | Laredo Vidaurri | 2020 Vidaurri Ave, Laredo | SVOC | SPM | 24 Hours; 1/6 Days | Population Exposure | Suburban | Neighborhood | Inactive | 7/13/2011 |
| 484790016 | 16-Laredo | Laredo Vidaurri | 2020 Vidaurri Ave, Laredo | SVOC | SPM | 24 Hours; 1/6 Days | N/A | Suburban | Neighborhood | Inactive | 7/13/2011 |
| 484790016 | 16-Laredo | Laredo Vidaurri | 2020 Vidaurri Ave, Laredo | CO | SPM | Continuous | Population Exposure | Suburban | Neighborhood | Active | 8/15/2012 |
| 484790016 | 16-Laredo | Laredo Vidaurri | 2020 Vidaurri Ave, Laredo | $O_3$ | SLAMS | Continuous | Population Exposure | Suburban | Neighborhood | Active | 8/15/2012 |
| 484790016 | 16-Laredo | Laredo Vidaurri | 2020 Vidaurri Ave, Laredo | $PM_{10}$ (FRM) | SLAMS | 24 Hours; 1/6 Days | Population Exposure | Suburban | Neighborhood | Active | 8/17/2012 |
| 484790016 | 16-Laredo | Laredo Vidaurri | 2020 Vidaurri Ave, Laredo | $PM_{10}$ (FRM) | QA Collocated/ SLAMS | 24 Hours; 1/6 Days | Population Exposure | Suburban | Neighborhood | Active | 12/27/2012 |
| 484790016 | 16-Laredo | Laredo Vidaurri | 2020 Vidaurri Ave, Laredo | TSP (Pb) | SPM | 24 Hours; 1/6 Days | Population Exposure | Suburban | Neighborhood | Active | 8/17/2012 |
| 484790313 | 16-Laredo | World Trade Bridge | Mines Road 11601 FM 1472, Laredo | $PM_{2.5}$ (TEOM) | SPM | Continuous | Source Oriented | Suburban | Microscale | Active | 8/13/2002 |

Notes

The monitoring objectives listed in this appendix are based off of the monitoring site types defined in 40 Code of Federal Regulations §58, Appendix D, Section 1.1.1 and descriptions of spatial scales provided in the pollutant-specific monitoring network design criteria in Appendix D. The "population exposure" monitoring objective does not suggest that the monitoring data is an appropriate surrogate for an individual's exposure to the pollutant, but rather represents ambient concentrations to which members of the public could be exposed.

AQS – air quality system

CO – carbon monoxide

$O_3$ - ozone

$SO_2$ – sulfur dioxide

TSP – chromium and nickel in total suspended particles

TSP (Cr6+) – chromium VI in total suspended particles

TSP (Pb) – lead in total suspended particles

$PM_{10}$ - particulate matter of 10 micrometers or less in diameter

$PM_{2.5}$ (FRM) - particulate matter of 2.5 micrometers or less in diameter

FRM - federal reference method; a filter-based gravimetric sampler

$NO/NO_2/NO_x$ - oxides of nitrogen; includes nitric oxide (NO) and nitrogen dioxide ($NO_2$)

TEOM - tapered element oscillating microbalance

$NO_y$ - highly reactive nitrogen oxide species

$PM_{10-2.5}$ - coarse particulate matter between 2.5 and 10 micrometers in diameter

VOC - volatile organic compound

SVOC – semivolatile organic compounds

AutoGC - automated gas chromatograph

QA Collocated – quality assurance collocated

NAMS – National Air Monitoring Stations (this term is a historical term and is no longer used)

SLAMS - state and local air monitoring station

PAMS - photochemical air monitoring station

SPM - special purpose monitor

NCore - National Core, as defined by 40 Code of Federal Regulations §58, Appendix D, Section 3

* - high sensitivity monitor

*** - speciation data is obtained from an FRM monitor combination

# Appendix B

## Air Toxics Target Analyte List

Texas Commission on Environmental Quality
Texas Five-Year Ambient Monitoring Network Assessment

## Volatile Organic Compounds

### *Target Analytes for Canisters (84 compounds)*

- 1,1,2,2-Tetrachloroethane
- 1,1,2-Trichloroethane
- 1,1-Dichloroethane
- 1,1-Dichloroethylene
- 1,2,3-Trimethylbenzene
- 1,2,4-Trimethylbenzene
- 1,2-Dichloropropane
- 1,3,5-Trimethylbenzene
- 1,3-Butadiene
- 1-Butene
- 1-Hexene & 2-Methyl-1-Pentene
- 1-Pentene
- 2,2,4-Trimethylpentane
- 2,2-Dimethylbutane
- 2,3,4-Trimethylpentane
- 2,3-Dimethylbutane
- 2,3-Dimethylpentane
- 2,4-Dimethylpentane
- 2-Chloropentane
- 2-Methyl-2-Butene
- 2-Methylheptane
- 2-Methylhexane
- 2-Methylpentane
- 3-Methyl-1-Butene
- 3-Methylheptane
- 3-Methylhexane
- 3-Methylpentane
- 4-Methyl-1-Pentene
- Acetylene
- Benzene
- Bromomethane
- Carbon Tetrachloride
- Chlorobenzene
- Chloroform
- Chloromethane
- cis-1,3-Dichloropropene
- cis-2-Butene
- cis-2-Hexene
- cis-2-Pentene
- Cyclohexane
- Cyclopentane
- Cyclopentene
- Dichlorodifluoromethane
- Dichloromethane
- Ethane
- Ethylbenzene
- Ethylene
- Ethylene Dibromide
- Ethylene Dichloride
- Isobutane
- Isopentane
- Isoprene
- Isopropylbenzene
- m/p Xylene
- m-Diethylbenzene
- Methyl Chloroform
- Methylcyclohexane

- Methylcyclopentane
- m-Ethyltoluene
- n-Butane
- n-Decane
- n-Heptane
- n-Hexane
- n-Nonane
- n-Octane
- n-Pentane
- n-Propylbenzene
- n-Undecane
- o-Ethyltoluene
- o-Xylene
- p-Diethylbenzene
- p-Ethyltoluene
- Propane
- Propylene
- Styrene
- Tetrachloroethylene
- Toluene
- trans-1,3-Dichloropropene
- trans-2-Butene
- trans-2-Hexene
- trans-2-Pentene
- Trichloroethylene
- Trichlorofluoromethane
- Vinyl Chloride

## *Target Analytes for AutoGCs (46 compounds)*

- 1-Butene
- 1-Pentene
- 1,2,3-Trimethylbenzene
- 1,2,4-Trimethylbenzene
- 1,3-Butadiene
- 1,3,5-Trimethylbenzene
- 2-Methylheptane
- 2-Methylhexane
- 2,2-Dimethylbutane
- 2,2,4-Trimethylpentane
- 2,3-Dimethylpentane
- 2,3,4-Trimethylpentane
- 2,4-Dimethylpentane
- 3-Methylheptane
- 3-Methylhexane
- Acetylene
- Benzene
- c-2-Butene
- c-2-Pentene
- Cyclohexane
- Cyclopentane
- Ethane
- Ethylbenzene
- Ethylene
- Isobutane
- Isopentane
- Isoprene
- Isopropylbenzene - Cumene
- Methylcyclohexane
- Methylcyclopentane
- n-Butane
- n-Decane

- n-Heptane
- n-Hexane
- n-Nonane
- n-Octane
- n-Pentane
- n-Propylbenzene
- o-Xylene
- p-Xylene + m-Xylene
- Propane
- Propylene
- Styrene
- t-2-Butene
- t-2-Pentene
- Toluene

## Carbonyls (17 compounds)

- 2,5-Dimethylbenzaldehyde
- Acetaldehyde
- Acetone
- Acrolein - Unverified
- Benzaldehyde
- Butyraldehyde
- Crotonaldehyde
- Formaldehyde
- Heptanal
- Hexanaldehyde
- Isovaleraldehyde
- Methacrolein
- Methyl Ethyl Ketone
- Propionaldehyde
- Valeraldehyde
- m & p-Tolualdehyde
- o-Tolualdehyde

## Semivolatile Organic Compounds (16 compounds)

- Acenaphthene
- Acenaphthylene
- Anthracene
- Benzo(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Benzo(g,h,i)perylene
- Benzo(k)fluoranthene
- Chrysene
- Dibenzo(a,h)anthracene
- Fluoranthene
- Fluorene
- Indeno(1,2,3-cd)pyrene
- Naphthalene
- Phenanthrene
- Pyrene

## $PM_{2.5}$ Metals (33 elements)

- Aluminum
- Antimony
- Arsenic
- Barium
- Bromine
- Cadmium
- Calcium
- Cerium
- Cesium
- Chlorine
- Chromium
- Cobalt
- Copper
- Indium
- Iron
- Lead
- Magnesium
- Manganese
- Nickel
- Phosphorus
- Potassium
- Rubidium
- Selenium
- Silicon
- Silver
- Sodium
- Strontium
- Sulfur
- Tin
- Titanium
- Vanadium
- Zinc
- Zirconium

# Appendix C

## Network Evaluation Summary Table

Texas Commission on Environmental Quality
Texas Five-Year Ambient Monitoring Network Assessment

| TCEQ Region | Site Name | Sampler Type | Used to Meet Minimum Requirement? | Percent of NAAQS | Design Value Trend | Historical Value | Regulatory Value | Data Value | Monitor Uniqueness Value | Source Impact Value | Overall Monitor Value |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10-Beaumont | Nederland High School | Carbon Monoxide* | Yes (PAMS) | 2% (1-hour); 4% (annual) | Stable | Medium | High | Medium | -- | Medium | High |
| 10-Beaumont | Beaumont Downtown | $NO_x$ | Yes (PAMS) | 33% (1-hour); 11% (annual) | Decrease | High | High | High | -- | Medium | High |
| 10-Beaumont | Hamshire | $NO_x$ | No (SLAMS) | 23% (1-hour); 5% (annual) | Decrease | Medium | Medium | Medium | -- | Medium | Medium |
| 10-Beaumont | Nederland High School | $NO_x$ | Yes (PAMS) | 25% (1-hour); 8% (annual) | Decrease | Medium | High | Medium | -- | Medium | High |
| 10-Beaumont | West Orange | $NO_x$ | No (SLAMS) | 29% (1-hour); 9% (annual) | Decrease | High | Medium | Medium | -- | Medium | Medium |
| 10-Beaumont | Beaumont Downtown | Ozone | Yes (PAMS/SLAMS) | 91% (8-hour) | Decrease | High | High | High | Low | N/A | High |
| 10-Beaumont | Hamshire | Ozone | Yes (SLAMS) | 95% (8-hour) | Decrease | Medium | High | High | Medium | N/A | High |
| 10-Beaumont | Nederland High School | Ozone | Yes (PAMS) | 89% (8-hour) | Decrease | Medium | High | High | Low | N/A | High |
| 10-Beaumont | Port Arthur West | Ozone | Yes (SLAMS) | ** | N/A | Low | High | High | Low | N/A | High |
| 10-Beaumont | SETRPC 40 Sabine Pass | Ozone | Yes (PAMS) | 93% (8-hour) | Decrease | Medium | High | High | Medium | N/A | High |
| 10-Beaumont | SETRPC 43 Jefferson Co Airport | Ozone | No (SPM) | 84% (8-hour) | Decrease | Medium | Low | High | Low | N/A | Medium |
| 10-Beaumont | West Orange | Ozone | No (SLAMS) | 87% (8-hour) | Decrease | High | Medium | High | Medium | N/A | High |
| 10-Beaumont | Hamshire | $PM_{2.5}$ (TEOM) | No (SPM) | N/A | N/A | High | Low | High | Medium | Medium | High |
| 10-Beaumont | Port Arthur Memorial School | $PM_{2.5}$ (TEOM) | No (SPM) | N/A | N/A | Medium | Low | High | Medium | Medium | High |
| 10-Beaumont | SETRPC 42 Mauriceville | $PM_{2.5}$ (TEOM) | No (SPM) | N/A | N/A | Medium | Low | High | Medium | Medium | High |
| 10-Beaumont | Beaumont Downtown | Speciated VOC (AutoGC) | Yes (PAMS) | N/A | N/A | Medium | High | Medium | -- | Medium | High |
| 10-Beaumont | Nederland High School | Speciated VOC (AutoGC) | Yes (PAMS) | N/A | N/A | Medium | High | Medium | -- | Medium | High |
| 10-Beaumont | Beaumont Downtown | Sulfur Dioxide | Yes (SLAMS) | 35% (1-hour) | Decrease | High | Medium | High | -- | Medium | High |
| 10-Beaumont | Port Arthur West | Sulfur Dioxide | Yes (SLAMS) | ** | N/A | High | High | High | -- | High | High |
| 12-Houston | Clinton | Carbon Monoxide* | Yes (PAMS) | 5% (1-hour); 15% (8-hour) | Decrease | High | High | Medium | -- | Medium | High |
| 12-Houston | Houston Deer Park #2 | Carbon Monoxide* | Yes (NCore/PAMS) | 5% (1-hour); 12% (8-hour) | Stable | Low | High | Medium | -- | Medium | High |
| 12-Houston | Clinton | Carbonyl | Yes (PAMS) | N/A | N/A | High | Medium | Medium | -- | Medium | High |

| TCEQ Region | Site Name | Sampler Type | Used to Meet Minimum Requirement? | Percent of NAAQS | Design Value Trend | Historical Value | Regulatory Value | Data Value | Monitor Uniqueness Value | Source Impact Value | Overall Monitor Value |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12-Houston | Houston Deer Park #2 | Carbonyl | Yes (PAMS) | N/A | N/A | High | Medium | Medium | -- | Medium | High |
| 12-Houston | Channelview | $NO_x$ | Yes (PAMS) | 46% (1-hour); 19% (annual) | Stable | Low | High | Medium | -- | Medium | High |
| 12-Houston | Clinton | $NO_x$ | Yes (SLAMS/PAMS) | 54% (1-hour); 25% (annual) | Decrease | Medium | High | Medium | -- | Medium | High |
| 12-Houston | Conroe Relocated | $NO_x$ | No (SLAMS) | 26% (1-hour); 6% (annual) | N/A (1-hour); Decrease (annual) | Medium | Medium | Medium | -- | Medium | Medium |
| 12-Houston | Galveston 99th Street | $NO_x$ | No (PAMS) | N/A (1-hour); 6% (annual) | Decrease | Low | Medium | Medium | -- | Medium | Medium |
| 12-Houston | Houston Aldine | $NO_x$ | Yes (PAMS) | 43% (1-hour); 13% (annual) | Decrease | High | High | Medium | -- | Medium | High |
| 12-Houston | Houston Bayland Park | $NO_x$ | No (SLAMS) | 42% (1-hour); 11% (annual) | Decrease | High | Medium | Medium | -- | Medium | Medium |
| 12-Houston | Houston Deer Park #2 | $NO_x$ | Yes (PAMS/NCore) | 36% (1-hour); 13% (annual) | Decrease | High | High | Medium | -- | Medium | High |
| 12-Houston | Houston East | $NO_x$ | No (SLAMS) | 50% (1-hour); 19% (annual) | Decrease | High | Medium | Medium | -- | Medium | Medium |
| 12-Houston | Houston Southwest Freeway | $NO_x$ | Yes (Near-Road) | ** | N/A | Low | High | Medium | -- | High | High |
| 12-Houston | Houston Texas Avenue | $NO_x$ | No (SPM) | ** | N/A | Medium | Low | Medium | -- | Medium | Medium |
| 12-Houston | Lake Jackson | $NO_x$ | No (SLAMS) | 19% (1-hour); 2% (annual) | Decrease | Medium | Medium | Medium | -- | Medium | Medium |
| 12-Houston | Lang | $NO_x$ | No (SLAMS) | 49% (1-hour); 21% (annual) | Decrease | Medium | Medium | Medium | -- | Medium | Medium |
| 12-Houston | Lynchburg Ferry | $NO_x$ | No (SLAMS) | N/A (1-hour); 18% (annual) | N/A (1-hour); Slight Increase (annual) | Medium | Medium | Medium | -- | Medium | Medium |
| 12-Houston | Manvel Croix Park | $NO_x$ | No (SLAMS) | 32% (1-hour); 8% (annual) | Decrease | Medium | Medium | Medium | -- | Medium | Medium |
| 12-Houston | Northwest Harris County | $NO_x$ | No (PAMS) | 30% (1-hour); 10% (annual) | Slight Decrease | High | Medium | Medium | -- | Medium | Medium |
| 12-Houston | Park Place | $NO_x$ | No (SPM) | 53% (1-hour); 21% (annual) | Stable (1-hour); Decrease (annual) | Medium | Medium | Medium | -- | Medium | Medium |
| 12-Houston | Seabrook Friendship | $NO_x$ | No (SLAMS) | 30% (1-hour); 9% (annual) | Decrease | Medium | Medium | Medium | -- | Medium | Medium |

| TCEQ Region | Site Name | Sampler Type | Used to Meet Minimum Requirement? | Percent of NAAQS | Design Value Trend | Historical Value | Regulatory Value | Data Value | Monitor Uniqueness Value | Source Impact Value | Overall Monitor Value |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Park | | | | | | | | | | |
| 12-Houston | Houston Aldine | $NO_y$* | Yes (PAMS) | N/A | N/A | Low | High | Medium | -- | Medium | High |
| 12-Houston | Houston Deer Park #2 | $NO_y$* | Yes (NCore) | N/A | N/A | Low | High | Medium | -- | Medium | High |
| 12-Houston | Baytown Garth | Ozone | Yes (SLAMS) | ** | N/A | Low | High | High | Medium | N/A | High |
| 12-Houston | Channelview | Ozone | Yes (PAMS) | 89% (8-hour) | Decrease | High | High | High | Medium | N/A | High |
| 12-Houston | Clinton | Ozone | Yes (PAMS) | 91% (8-hour) | Decrease | Medium | High | High | Low | N/A | High |
| 12-Houston | Conroe Relocated | Ozone | Yes (PAMS/SLAMS) | 101% (8-hour) | Decrease | Medium | High | High | Medium | N/A | High |
| 12-Houston | Galveston 99th Street | Ozone | Yes (PAMS) | 96% (8-hour) | Decrease | Medium | High | High | Medium | N/A | High |
| 12-Houston | Houston Aldine | Ozone | Yes (PAMS) | 96% (8-hour) | Decrease | High | High | High | Medium | N/A | High |
| 12-Houston | Houston Bayland Park | Ozone | Yes (SLAMS) | 100% (8-hour) | Decrease | High | High | High | Low | N/A | High |
| 12-Houston | Houston Croquet | Ozone | Yes (SLAMS) | 100% (8-hour) | Decrease | Medium | High | High | Low | N/A | High |
| 12-Houston | Houston Deer Park #2 | Ozone | Yes (NCore/PAMS) | 96% (8-hour) | Decrease | High | High | High | Low | N/A | High |
| 12-Houston | Houston East | Ozone | Yes (SLAMS) | 96% (8-hour) | Decrease | High | High | High | Medium | N/A | High |
| 12-Houston | Houston Monroe | Ozone | Yes (SLAMS) | 99% (8-hour) | Decrease | Medium | High | High | Low | N/A | High |
| 12-Houston | Houston North Wayside | Ozone | Yes (SLAMS) | 92% (8-hour) | Decrease | Medium | High | High | Medium | N/A | High |
| 12-Houston | Houston Texas Avenue | Ozone | No (SPM) | ** | N/A | Medium | Low | Medium | Medium | N/A | Medium |
| 12-Houston | Houston Westhollow | Ozone | No (SLAMS) | 101% (8-hour) | Decrease | Medium | Medium | High | Low | N/A | Medium |
| 12-Houston | Lake Jackson | Ozone | No (SLAMS) | 88% (8-hour) | Decrease | Medium | Medium | High | Medium | N/A | Medium |
| 12-Houston | Lang | Ozone | No (SLAMS) | 96% (8-hour) | Decrease | Medium | Medium | High | Medium | N/A | Medium |
| 12-Houston | Lynchburg Ferry | Ozone | No (SLAMS) | 88% (8-hour) | Decrease | Medium | Medium | High | Medium | N/A | Medium |
| 12-Houston | Manvel Croix Park | Ozone | Yes (SLAMS) | 107% (8-hour) | Decrease | Medium | Medium | High | Medium | N/A | Medium |
| 12-Houston | Northwest Harris County | Ozone | Yes (PAMS) | 100% (8-hour) | Decrease | High | High | High | Medium | N/A | High |

| TCEQ Region | Site Name | Sampler Type | Used to Meet Minimum Requirement? | Percent of NAAQS | Design Value Trend | Historical Value | Regulatory Value | Data Value | Monitor Uniqueness Value | Source Impact Value | Overall Monitor Value |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12-Houston | Park Place | Ozone | No (SPM) | 99% (8-hour) | Decrease | Medium | Low | High | Low | N/A | Medium |
| 12-Houston | Seabrook Friendship Park | Ozone | No (SLAMS) | 96% (8-hour) | Decrease | Medium | Medium | High | Medium | N/A | Medium |
| 12-Houston | Aldine | $PM_{10}$ (FRM) | Yes (SLAMS) | 0 | Stable | High | High | Medium | -- | Medium | Medium |
| 12-Houston | Houston Monroe | $PM_{10}$ (FRM) | Yes (SLAMS) | 0 | Stable | High | High | Medium | -- | Medium | Medium |
| 12-Houston | Houston Westhollow | $PM_{10}$ (FRM) | Yes (SLAMS) | 0 | Stable | High | Medium | Medium | -- | Medium | Medium |
| 12-Houston | Lang | $PM_{10}$ (FRM) | Yes (SLAMS) | 0 | Stable | High | Medium | Medium | -- | Medium | Medium |
| 12-Houston | Pasadena HL&P | $PM_{10}$ (FRM) | Yes (SLAMS) | ** | N/A | Medium | Medium | Medium | -- | Medium | Medium |
| 12-Houston | Texas City Fire Station | $PM_{10}$ (FRM) | Yes (SLAMS) | 0 | Stable | High | Medium | Medium | -- | Medium | Medium |
| 12-Houston | Texas City Fire Station | $PM_{10}$ (FRM) | Yes (QA) | N/A | N/A | Low | Medium | Medium | -- | Medium | Medium |
| 12-Houston | Clinton | $PM_{10}$ (FRM) | Yes (SLAMS) | 0 | Stable | High | High | High | -- | High | High |
| 12-Houston | Houston Deer Park #2 | $PM_{10}$ (FRM) | Yes (SLAMS) | 0 | Stable | High | High | High | -- | Medium | High |
| 12-Houston | Houston Deer Park #2 | $PM_{10}$ (FRM) | Yes (QA) | N/A | N/A | High | Medium | High | -- | Medium | High |
| 12-Houston | Houston Deer Park #2 | $PM_{10}$ (Speciation) | Yes (NATTS) | N/A | N/A | High | High | High | -- | Medium | High |
| 12-Houston | Houston Deer Park #2 | $PM_{10}$ (Speciation) | Yes (QA) | N/A | N/A | High | Medium | Medium | -- | Medium | High |
| 12-Houston | Clinton | $PM_{10}$ (Speciation) | No (SPM) | N/A | N/A | High | Medium | High | -- | Medium | High |
| 12-Houston | Houston Deer Park #2 | $PM_{10-2.5}$ | Yes (NCore) | N/A | N/A | Low | High | Medium | -- | Medium | High |
| 12-Houston | Houston Deer Park #2 | $PM_{2.5}$ (Carbon) Black | No (SPM) | N/A | N/A | Medium | Low | Medium | -- | Low | Medium |
| 12-Houston | Houston Deer Park #2 | $PM_{2.5}$ (Carbon) Sunset | No (SPM) | N/A | N/A | Low | Low | Medium | -- | Low | Medium |
| 12-Houston | Baytown | $PM_{2.5}$ (FRM) | Yes (SLAMS) | 63% (24-hour); 85% (annual) | Slight Decrease | High | High | Medium | High | Medium | High |
| 12-Houston | Clinton | $PM_{2.5}$ (FRM) | Yes (SLAMS) | 69% (24-hour); 97% (annual) | Decrease | High | High | High | High | Medium | High |

| TCEQ Region | Site Name | Sampler Type | Used to Meet Minimum Requirement? | Percent of NAAQS | Design Value Trend | Historical Value | Regulatory Value | Data Value | Monitor Uniqueness Value | Source Impact Value | Overall Monitor Value |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12-Houston | Clinton | $PM_{2.5}$ (FRM) | Yes (QA) | N/A | N/A | High | High | High | High | Medium | High |
| 12-Houston | Houston Deer Park #2 | $PM_{2.5}$ (FRM) | Yes (NCore) | 63% (24-hour); 80% (annual) | N/A | Low | High | High | High | Medium | High |
| 12-Houston | Houston Aldine | $PM_{2.5}$ (FRM) | Yes (SLAMS) | 69% (24-hour); 92% (annual) | Decrease | Medium | High | High | -- | Medium | High |
| 12-Houston | Galveston 99th Street | $PM_{2.5}$ (FRM) | No (SPM) | N/A | N/A | Low | Low | High | -- | Medium | High |
| 12-Houston | Houston Deer Park #2 | $PM_{2.5}$ (Speciation) | Yes (Trends Speciation) | N/A | N/A | Medium | High | High | -- | Medium | High |
| 12-Houston | Houston Deer Park #2 | $PM_{2.5}$ (Speciation) | Yes (QA) | N/A | N/A | Medium | Medium | High | -- | Medium | High |
| 12-Houston | Houston Aldine | $PM_{2.5}$ (Speciation) *** | No (SPM) | N/A | N/A | Medium | Low | High | -- | Medium | High |
| 12-Houston | Baytown | $PM_{2.5}$ (TEOM) | No (SPM) | N/A | N/A | Low | Medium | High | High | Medium | High |
| 12-Houston | Clinton | $PM_{2.5}$ (TEOM) | Yes (SPM) | N/A | N/A | Medium | High | High | Medium | High | High |
| 12-Houston | Conroe Relocated | $PM_{2.5}$ (TEOM) | No (SPM) | N/A | N/A | Medium | Low | High | High | Medium | High |
| 12-Houston | Galveston 99th Street | $PM_{2.5}$ (TEOM) | No (SPM) | N/A | N/A | Medium | Low | High | High | Medium | High |
| 12-Houston | Houston Aldine | $PM_{2.5}$ (TEOM) | No (SPM) | N/A | N/A | Medium | Low | High | High | Medium | High |
| 12-Houston | Houston Deer Park #2 | $PM_{2.5}$ (TEOM) | No (SPM) | N/A | N/A | Medium | Low | Medium | Low | Medium | Medium |
| 12-Houston | Houston East | $PM_{2.5}$ (TEOM) | No (SPM) | N/A | N/A | Medium | Low | High | Medium | Medium | High |
| 12-Houston | Kingwood | $PM_{2.5}$ (TEOM) | No (SPM) | N/A | N/A | Medium | Low | High | High | Medium | High |
| 12-Houston | Seabrook Friendship Park | $PM_{2.5}$ (TEOM) | No (SPM) | N/A | N/A | Medium | Low | High | High | Medium | High |
| 12-Houston | Channelview | Speciated VOC (AutoGC) | Yes (PAMS) | N/A | N/A | Medium | Medium | High | -- | Medium | High |
| 12-Houston | Clinton | Speciated VOC (AutoGC) | Yes (PAMS) | N/A | N/A | High | Medium | High | -- | Medium | High |
| 12-Houston | Houston Deer Park #2 | Speciated VOC (AutoGC) | Yes (PAMS) | N/A | N/A | High | Medium | High | -- | Medium | High |

| TCEQ Region | Site Name | Sampler Type | Used to Meet Minimum Requirement? | Percent of NAAQS | Design Value Trend | Historical Value | Regulatory Value | Data Value | Monitor Uniqueness Value | Source Impact Value | Overall Monitor Value |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12-Houston | Houston Deer Park #2 | Speciated VOC (Canister) | Yes (PAMS/NATTS) | N/A | N/A | High | High | Medium | -- | Medium | High |
| 12-Houston | Houston Deer Park #2 | Speciated VOC (Canister) | Yes (QA/NATTS) | N/A | N/A | Medium | Medium | Medium | -- | Medium | Medium |
| 12-Houston | Baytown Garth | Sulfur Dioxide | Yes (SLAMS) | ** | N/A | Low | High | Medium | -- | Medium | High |
| 12-Houston | Clinton | Sulfur Dioxide | Yes (SLAMS) | 31% (1-hour) | Decrease | High | High | High | -- | Medium | High |
| 12-Houston | Houston Croquet | Sulfur Dioxide | No (SPM) | 25% (1-hour) | Decrease | Medium | Low | Low | -- | Medium | Low |
| 12-Houston | Houston Monroe | Sulfur Dioxide | No (SPM) | 17% (1-hour) | Decrease | Medium | Low | Low | -- | Medium | Low |
| 12-Houston | Houston North Wayside | Sulfur Dioxide | No (SPM) | 11% (1-hour) | Decrease | Medium | Low | Low | -- | Medium | Low |
| 12-Houston | Park Place | Sulfur Dioxide | No (SPM) | 32% (1-hour) | Decrease | Medium | Low | Low | -- | Medium | Low |
| 12-Houston | Seabrook Friendship Park | Sulfur Dioxide | No (SPM) | 13% (1-hour) | Slight Decrease | Medium | Low | Low | -- | Medium | Low |
| 12-Houston | Houston Deer Park #2 | Sulfur Dioxide* | Yes (NCore) | N/A | N/A | Low | High | Medium | -- | Medium | High |
| 12-Houston | Houston Deer Park #2 | SVOC | Yes (NATTS) | N/A | N/A | Medium | Medium | Medium | -- | Medium | Medium |
| 12-Houston | Houston Deer Park #2 | SVOC | Yes (QA) | N/A | N/A | Medium | Medium | Medium | -- | Medium | Medium |
| 12-Houston | Houston Deer Park #2 | TSP (Pb) | Yes (NCore) | ** | N/A | Low | High | Low | -- | Low | High |
| 14-Corpus Christi | Corpus Christi Tuloso | Ozone | Yes (SLAMS) | 87% (8-hour) | Decrease | High | High | High | Low | N/A | High |
| 14-Corpus Christi | Corpus Christi West | Ozone | Yes (SLAMS) | 88% (8-hour) | Slight Decrease | High | High | High | Low | N/A | High |
| 14-Corpus Christi | Victoria | Ozone | Yes (SLAMS) | 84% (8-hour) | Slight Decrease | High | High | High | High | N/A | High |
| 14-Corpus Christi | Dona Park | $PM_{10}$ (FRM) | Yes (SLAMS) | 0 | Stable | High | High | High | Low | Medium | High |
| 14-Corpus Christi | Dona Park | $PM_{10}$ (FRM) | Yes (QA) | N/A | N/A | Medium | High | High | Low | Medium | High |

| TCEQ Region | Site Name | Sampler Type | Used to Meet Minimum Requirement? | Percent of NAAQS | Design Value Trend | Historical Value | Regulatory Value | Data Value | Monitor Uniqueness Value | Source Impact Value | Overall Monitor Value |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 14-Corpus Christi | Corpus Christi Huisache | $PM_{2.5}$ (FRM) | Yes (SLAMS) | 89% (24-hour); 84% (annual) | Increase (24-hour); Slight Decrease (annual) | High | High | High | Low | Medium | High |
| 14-Corpus Christi | Corpus Christi Huisache | $PM_{2.5}$ (FRM) | Yes (QA) | N/A | N/A | Medium | Medium | High | Low | Medium | High |
| 14-Corpus Christi | Dona Park | $PM_{2.5}$ (FRM) | Yes (SLAMS) | 74% (24-hour); 78% (annual) | Slight Increase (24-hour); Stable (annual) | Medium | High | Medium | -- | Medium | High |
| 14-Corpus Christi | Dona Park | $PM_{2.5}$ (Speciation) *** | Yes (Supplemental Speciation) | N/A | N/A | Medium | Low | Medium | -- | Medium | Medium |
| 14-Corpus Christi | Dona Park | $PM_{2.5}$ (TEOM) | Yes (SPM) | N/A | N/A | Low | High | High | -- | Medium | High |
| 14-Corpus Christi | National Seashore | $PM_{2.5}$ (TEOM) | No (SPM) | N/A | N/A | Low | Low | High | -- | Medium | High |
| 14-Corpus Christi | Corpus Christi Huisache | Sulfur Dioxide | No (SLAMS) | 9% (1-hour) | Decrease | High | High | High | -- | Medium | High |
| 14-Corpus Christi | Corpus Christi Tuloso | Sulfur Dioxide | No (SLAMS) | 5% (1-hour) | Slight Decrease | High | Low | High | -- | Low | Medium |
| 14-Corpus Christi | Corpus Christi West | Sulfur Dioxide | No (SLAMS) | ** | Decrease | High | Low | High | -- | Low | Medium |
| 04-Dallas/Fort Worth | Dallas Hinton | Carbon monoxide* | Yes (NCore/PAMS) | 5% (1-hour); 4% (8-hour) | Stable | Low | High | Medium | -- | Medium | High |
| 04-Dallas/Fort Worth | Dallas Hinton | Carbonyl | Yes (PAMS) | N/A | N/A | Medium | Medium | High | -- | Medium | High |
| 04-Dallas/Fort Worth | Fort Worth Northwest | Carbonyl | Yes (SPM) | N/A | N/A | Medium | Medium | High | -- | Medium | High |
| 04-Dallas/Fort Worth | Dallas Hinton | $NO_x$ | Yes (PAMS/NCore) | 42% (1-hour); 20% (annual) | Decrease | High | High | High | -- | High | High |
| 04-Dallas/Fort Worth | Dallas North #2 | $NO_x$ | No (SLAMS) | 41% (1-hour); 11% (annual) | Decrease | High | High | Medium | -- | Medium | Medium |
| 04-Dallas/Fort Worth | Dallas Redbird Airport Executive | $NO_x$ | No (SLAMS) | 42% (1-hour); 12% (annual) | Decrease | High | High | Medium | -- | Medium | Medium |

| TCEQ Region | Site Name | Sampler Type | Used to Meet Minimum Requirement? | Percent of NAAQS | Design Value Trend | Historical Value | Regulatory Value | Data Value | Monitor Uniqueness Value | Source Impact Value | Overall Monitor Value |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 04-Dallas/Fort Worth | Dallas LBJ Freeway | $NO_x$ | Yes (Near-Road/SLAMS) | N/A (1-hour); 18% (annual) | Decrease | Low | High | Medium | -- | High | High |
| 04-Dallas/Fort Worth | Denton Airport South | $NO_x$ | No (PAMS) | 38% (1-hour); 12% (annual) | Decrease (1-hour); Slight Increase (annual) | High | Medium | High | -- | Medium | Medium |
| 04-Dallas/Fort Worth | Midlothian OFW | $NO_x$ | No (SLAMS) | 36% (1-hour); 7% (annual) | Decrease | Medium | Medium | High | -- | Medium | Medium |
| 04-Dallas/Fort Worth | Italy | $NO_x$ | No (PAMS) | 29% (1-hour); 6% (annual) | Decrease | Medium | Medium | High | -- | Medium | Medium |
| 04-Dallas/Fort Worth | Greenville | $NO_x$ | No (SLAMS) | 27% (1-hour); 8% (annual) | Decrease | Medium | Medium | High | -- | Medium | Medium |
| 04-Dallas/Fort Worth | Kaufman | $NO_x$ | No (PAMS) | 26% (1-hour); 8% (annual) | Decrease | Medium | Medium | High | -- | Medium | Medium |
| 04-Dallas/Fort Worth | Fort Worth Northwest | $NO_x$ | Yes (PAMS/SLAMS) | 49% (1-hour); 14% (annual) | Stable | High | High | High | -- | Medium | High |
| 04-Dallas/Fort Worth | Grapevine Fairway | $NO_x$ | No (PAMS) | 43% (1-hour); 11% (annual) | Decrease | Medium | Medium | High | -- | Medium | Medium |
| 04-Dallas/Fort Worth | Arlington Municipal Airport | $NO_x$ | Yes (SLAMS) | 37% (1-hour); 13% (annual) | Stable | Medium | High | High | -- | Medium | High |
| 04-Dallas/Fort Worth | Dallas Hinton | $NO_y$* | Yes (NCORE/ SLAMS) | N/A | N/A | Low | High | Medium | -- | Medium | High |
| 04-Dallas/Fort Worth | Denton Airport South | $NO_y$* | Yes (PAMS/SPM) | N/A | N/A | Medium | High | Medium | -- | Medium | High |
| 04-Dallas/Fort Worth | Arlington Municipal Airport | Ozone | Yes (SLAMS) | 100% (8-hour) | Decrease | Medium | High | High | High | N/A | High |
| 04-Dallas/Fort Worth | Cleburne Airport | Ozone | Yes (SLAMS) | 101% (8-hour) | Decrease | Medium | High | High | High | N/A | High |
| 04-Dallas/Fort Worth | Dallas Hinton | Ozone | Yes (NCORE/PAMS/ SLAMS) | 104% (8-hour) | Variable | High | High | High | Medium | N/A | High |
| 04-Dallas/Fort Worth | Dallas North #2 | Ozone | No (SLAMS) | 103% (8-hour) | Decrease | High | Medium | High | Medium | N/A | High |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 04-Dallas/Fort Worth | Dallas Redbird Airport Executive | Ozone | No (SLAMS) | 97% (8-hour) | Decrease | Medium | Medium | High | Medium | N/A | High |
| 04-Dallas/Fort Worth | Denton Airport South | Ozone | Yes (PAMS/SLAMS) | 108% (8-hour) | Decrease | High | High | High | High | N/A | High |
| 04-Dallas/Fort Worth | Eagle Mountain Lake | Ozone | No (SLAMS) | 105% (8-hour) | Decrease | Medium | Medium | High | High | N/A | High |
| 04-Dallas/Fort Worth | Fort Worth Northwest | Ozone | Yes (PAMS/SLAMS) | 107% (8-hour) | Decrease | High | High | High | High | N/A | High |
| 04-Dallas/Fort Worth | Frisco | Ozone | No (SLAMS) | 104% (8-hour) | Variable | High | Medium | High | High | N/A | High |
| 04-Dallas/Fort Worth | Grapevine Fairway | Ozone | Yes (PAMS) | 107% (8-hour) | Variable | Medium | High | High | High | N/A | High |
| 04-Dallas/Fort Worth | Greenville | Ozone | No (SLAMS) | 92% (8-hour) | Variable | Medium | Medium | High | High | N/A | High |
| 04-Dallas/Fort Worth | Italy | Ozone | Yes (PAMS) | 89% (8-hour) | Stable | Medium | High | High | High | N/A | High |
| 04-Dallas/Fort Worth | Kaufman | Ozone | Yes (PAMS) | 93% (8-hour) | Variable | Medium | High | High | High | N/A | High |
| 04-Dallas/Fort Worth | Keller | Ozone | No (SLAMS) | 103% (8-hour) | Decrease | High | Medium | High | High | N/A | High |
| 04-Dallas/Fort Worth | Midlothian OFW | Ozone | No (SLAMS) | 95% (8-hour) | Stable | Medium | Medium | High | High | N/A | High |
| 04-Dallas/Fort Worth | Parker County | Ozone | No (SLAMS) | 99% (8-hour) | Decrease | Medium | Medium | High | High | N/A | High |
| 04-Dallas/Fort Worth | Pilot Point | Ozone | Yes (SLAMS/SPM) | 105% (8-hour) | Variable | Medium | High | High | High | N/A | High |
| 04-Dallas/Fort Worth | Rockwall Heath | Ozone | No (SLAMS) | 97% (8-hour) | Decrease | Medium | Medium | High | High | N/A | High |
| 04-Dallas/Fort Worth | Granbury | Ozone | No (SLAMS) | 101% (8-hour) | Stable | Medium | Medium | High | High | N/A | High |
| 04-Dallas/Fort Worth | Convention Center | $PM_{10}$ (FRM) | Yes (SLAMS) | 0 | Stable | High | High | High | -- | Medium | High |

| TCEQ Region | Site Name | Sampler Type | Used to Meet Minimum Requirement? | Percent of NAAQS | Design Value Trend | Historical Value | Regulatory Value | Data Value | Monitor Uniqueness Value | Source Impact Value | Overall Monitor Value |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 04-Dallas/Fort Worth | Convention Center | $PM_{10}$ (FRM) | Yes (QA/SLAMS) | 0 | Stable | High | High | High | -- | Medium | High |
| 04-Dallas/Fort Worth | Earhart | $PM_{10}$ (FRM) | Yes (SLAMS) | 0 | Stable | High | High | High | -- | Medium | High |
| 04-Dallas/Fort Worth | Dallas North #2 | $PM_{10}$ (FRM) | Yes (SLAMS) | 0 | Stable | High | High | High | -- | Medium | High |
| 04-Dallas/Fort Worth | Stage Coach | $PM_{10}$ (FRM) | Yes (SLAMS) | 0 | Stable | High | High | High | -- | Medium | High |
| 04-Dallas/Fort Worth | Morrell | $PM_{10}$ (Speciation) | Yes (SPM) | N/A | N/A | Low | High | Medium | -- | High | Medium |
| 04-Dallas/Fort Worth | Dallas Hinton | $PM_{10-2.5}$ | Yes (NCORE/SPM) | N/A | Stable | Medium | High | High | -- | Medium | High |
| 04-Dallas/Fort Worth | Convention Center | $PM_{2.5}$ (FRM) | Yes (SLAMS) | 69% (24-hour); 89% (annual) | Stable | Medium | High | High | High | Medium | High |
| 04-Dallas/Fort Worth | Dallas Hinton | $PM_{2.5}$ (FRM) | Yes (NCORE) | 60% (24-hour); 81% (annual) | Stable | High | High | High | High | Medium | High |
| 04-Dallas/Fort Worth | Dallas Hinton | $PM_{2.5}$ (FRM) | Yes (QA) | N/A | N/A | High | High | High | -- | Medium | High |
| 04-Dallas/Fort Worth | Fort Worth Northwest | $PM_{2.5}$ (FRM) | Yes (SLAMS) | 66% (24-hour); 86% (annual) | Stable | High | High | High | High | Medium | High |
| 04-Dallas/Fort Worth | Haws Athletic Center | $PM_{2.5}$ (FRM) | Yes (SLAMS) | 66% (24-hour); 86% (annual) | Increase (24-hour); Slight Decrease (annual) | Medium | High | High | High | Medium | High |
| 04-Dallas/Fort Worth | Midlothian OFW | $PM_{2.5}$ (FRM) | No (SPM) | 63% (24-hour); 80% (annual) | Slight Decrease (24-hour); Stable (annual) | Medium | Low | High | -- | High | High |
| 04-Dallas/Fort Worth | Dallas Hinton | $PM_{2.5}$ (Speciation) | Yes (Trends Speciation) | N/A | N/A | Medium | High | High | -- | Medium | High |
| 04-Dallas/Fort Worth | Midlothian OFW | $PM_{2.5}$ (Speciation) *** | No (SPM) | N/A | N/A | Medium | Low | High | -- | Medium | High |
| 04-Dallas/Fort Worth | Arlington Municipal Airport | $PM_{2.5}$ (TEOM) | No (SPM) | N/A | N/A | Medium | Low | High | High | Medium | High |

| TCEQ Region | Site Name | Sampler Type | Used to Meet Minimum Requirement? | Percent of NAAQS | Design Value Trend | Historical Value | Regulatory Value | Data Value | Monitor Uniqueness Value | Source Impact Value | Overall Monitor Value |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 04-Dallas/Fort Worth | Corsicana Airport | $PM_{2.5}$ (TEOM) | No (SPM) | N/A | N/A | Medium | Low | High | High | Medium | High |
| 04-Dallas/Fort Worth | Dallas Hinton | $PM_{2.5}$ (TEOM) | No (SPM) | N/A | N/A | Medium | Medium | Medium | High | Medium | Medium |
| 04-Dallas/Fort Worth | Denton Airport South | $PM_{2.5}$ (TEOM) | No (SPM) | N/A | N/A | Medium | Low | High | High | Medium | High |
| 04-Dallas/Fort Worth | Haws Athletic Center | $PM_{2.5}$ (TEOM) | Yes (SPM) | N/A | N/A | Medium | High | High | High | Medium | High |
| 04-Dallas/Fort Worth | Italy | $PM_{2.5}$ (TEOM) | No (SPM) | N/A | N/A | Medium | Low | High | High | Medium | Medium |
| 04-Dallas/Fort Worth | Kaufman | $PM_{2.5}$ (TEOM) | No (SPM) | N/A | N/A | Medium | Low | High | High | Medium | Medium |
| 04-Dallas/Fort Worth | Midlothian OFW | $PM_{2.5}$ (TEOM) | No (SPM) | N/A | N/A | Medium | Low | High | High | Medium | High |
| 04-Dallas/Fort Worth | Dallas Hinton | Speciated VOC (autoGC) | Yes (PAMS) | N/A | N/A | High | High | High | -- | Medium | High |
| 04-Dallas/Fort Worth | Fort Worth Northwest | Speciated VOC (autoGC) | Yes (PAMS) | N/A | N/A | Medium | High | High | -- | Medium | High |
| 04-Dallas/Fort Worth | Dallas Hinton | Speciated VOC (Canister) | No (PAMS) | N/A | N/A | Medium | Medium | High | -- | Medium | High |
| 04-Dallas/Fort Worth | Denton Airport South | Speciated VOC (Canister) | No (PAMS) | N/A | N/A | Medium | Medium | High | -- | Medium | High |
| 04-Dallas/Fort Worth | Italy | Speciated VOC (Canister) | No (PAMS) | N/A | N/A | Medium | Medium | High | -- | Medium | High |
| 04-Dallas/Fort Worth | Johnson County Luisa | Speciated VOC (Canister) | No (SPM) | N/A | N/A | Low | Low | High | -- | Medium | High |
| 04-Dallas/Fort Worth | Fort Worth Northwest | Speciated VOC (Canister) | No (PAMS) | N/A | N/A | Medium | Medium | High | -- | Medium | High |
| 04-Dallas/Fort Worth | Grapevine Fairway | Speciated VOC (Canister) | No (PAMS) | N/A | N/A | Medium | Medium | High | -- | Medium | High |
| 04-Dallas/Fort Worth | Midlothian OFW | Sulfur dioxide | Yes (SLAMS/SPM) | 17% (1-hour) | Decrease | High | High | High | -- | High | High |

| TCEQ Region | Site Name | Sampler Type | Used to Meet Minimum Requirement? | Percent of NAAQS | Design Value Trend | Historical Value | Regulatory Value | Data Value | Monitor Uniqueness Value | Source Impact Value | Overall Monitor Value |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 04-Dallas/Fort Worth | Italy | Sulfur dioxide | No (SPM) | 11% (1-hour) | Slight Increase | Medium | Low | High | -- | Low | Medium |
| 04-Dallas/Fort Worth | Kaufman | Sulfur dioxide | Yes (SLAMS/SPM) | 19% (1-hour) | Slight Increase | Medium | High | High | -- | Low | High |
| 04-Dallas/Fort Worth | Dallas Hinton | Sulfur dioxide* | Yes (NCORE) | 7% (1-hour) | Stable | Low | High | High | -- | Medium | High |
| 04-Dallas/Fort Worth | Frisco 5th St | TSP (Pb) | No (SLAMS) | 80% | Decrease | High | Medium | High | -- | Medium | Medium |
| 04-Dallas/Fort Worth | Frisco 7 | TSP (Pb) | No (SLAMS) | 47% | Stable | High | Medium | High | -- | Medium | Medium |
| 04-Dallas/Fort Worth | Frisco 7 | TSP (Pb) | No (QA/ SLAMS) | N/A | Stable | High | Medium | High | -- | Medium | Medium |
| 04-Dallas/Fort Worth | Frisco Eubanks | TSP (Pb) | Yes (SLAMS) | 207% | Decrease | High | Medium | High | -- | High | Medium |
| 04-Dallas/Fort Worth | Frisco Eubanks | TSP (Pb) | Yes (QA/ SLAMS) | N/A | Decrease | Low | High | High | -- | Medium | High |
| 04-Dallas/Fort Worth | Frisco Stonebrook | TSP (Pb) | No (SPM) | 47% | Stable | Low | High | High | -- | High | High |
| 04-Dallas/Fort Worth | Dallas Hinton | TSP (Pb) | Yes (NCORE) | N/A | N/A | Low | High | High | -- | High | High |
| 04-Dallas/Fort Worth | Terrell Temtex | TSP (Pb) | Yes (SLAMS) | 33% | N/A | Low | High | High | -- | High | High |
| 05-Tyler | Karnack | Carbonyl | Yes (NATTS) | N/A | N/A | Medium | Low | High | -- | Medium | High |
| 05-Tyler | Longview | $NO_x$ | No (SPM) | 24% (1-hour); 8% (annual) | Decrease | High | Medium | Medium | -- | Medium | Medium |
| 05-Tyler | Karnack | $NO_x$ | No (SLAMS) | 19% (1-hour); 5% (annual) | Decrease | Medium | Medium | High | -- | Medium | Medium |
| 05-Tyler | Tyler Airport Relocated | $NO_x$ | No (SPM) | 17% (1-hour); 5% (annual) | Decrease | Medium | Medium | Medium | -- | Medium | Medium |
| 05-Tyler | Longview | Ozone | Yes (SLAMS) | 95% (8-hour) | Decrease | High | High | High | High | N/A | High |
| 05-Tyler | Karnack | Ozone | Yes (SLAMS) | 92% (8-hour) | Stable | Medium | High | High | High | N/A | High |
| 05-Tyler | Tyler Airport Relocated | Ozone | Yes (SLAMS) | 95% (8-hour) | Decrease | Medium | High | High | High | N/A | High |
| 05-Tyler | Karnack | $PM_{10}$ (Speciation) | Yes (NATTS) | 0 | Stable | Medium | High | High | -- | Medium | High |
| 05-Tyler | Karnack | $PM_{10}$ (FRM) | Yes (SPM) | 0 | Stable | Medium | Medium | High | -- | Medium | High |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 05-Tyler | Karnack | $PM_{2.5}$ (FRM) | No (SPM) | 63% (24-hour); 79% (annual) | Slight Increase (24-hour); Stable (annual) | Medium | Low | High | High | Medium | High |
| 05-Tyler | Texarkana | $PM_{2.5}$ (FRM) | Yes (SLAMS) | 63% (24-hour); 85% (annual) | Stable (24-hour); Slight Decrease (annual) | High | High | High | Medium | Medium | High |
| 05-Tyler | Karnack | $PM_{2.5}$ (Speciation) | Yes (Supplemental Speciation) | N/A | N/A | Medium | High | High | -- | Medium | High |
| 05-Tyler | Karnack | $PM_{2.5}$ (TEOM) | No (SPM) | N/A | N/A | Medium | Low | High | High | Medium | High |
| 05-Tyler | Karnack | Speciated VOC (Canister) | No (NATTS) | N/A | N/A | Medium | Low | High | -- | Medium | High |
| 05-Tyler | Longview | Sulfur dioxide | Yes (SLAMS) | 66% (1-hour) | Decrease | High | High | High | -- | High | High |
| 05-Tyler | Karnack | SVOC | Yes (NATTS) | N/A | N/A | Medium | Low | High | -- | Medium | High |
| 9-Waco | Waco Mazanec | Carbon monoxide | No (SLAMS) | 3% (1-hour); 1% (8-hour) | Stable | Medium | Medium | Medium | -- | Medium | Medium |
| 9-Waco | Waco Mazanec | $NO_x$ | No (SLAMS) | 25% (1-hour); 4% (annual) | N/A (1-hour); Decrease (annual) | Medium | Medium | Medium | -- | Medium | Medium |
| 9-Waco | Killeen Skylark Field | Ozone | Yes (SLAMS) | 96% (8-hour) | Decrease | Low | High | High | Medium | N/A | High |
| 9-Waco | Temple Georgia | Ozone | Yes (SLAMS) | ** | ** | Low | High | High | Medium | N/A | High |
| 9-Waco | Waco Mazanec | Ozone | Yes (SLAMS) | 92% (8-hour) | Stable | Medium | High | High | High | N/A | High |
| 9-Waco | Waco Mazanec | $PM_{2.5}$ (TEOM) | No (SPM) | N/A | N/A | Medium | Low | High | Medium | Medium | Medium |
| 9-Waco | Waco Mazanec | Sulfur dioxide | No (SLAMS) | 8% (1-hour) | Stable | Medium | Low | Medium | -- | Low | Low |
| 11-Austin | Austin North Interstate 35 | $NO_x$ | Yes (Near-Road) | 26% (annual) | N/A | Low | High | Medium | -- | High | High |
| 11-Austin | Austin Northwest | $NO_x$ | Yes (SLAMS) | N/A (1-hour); 10% (annual) | N/A | Low | High | Medium | -- | Medium | High |
| 11-Austin | Austin Audubon Society | Ozone | Yes (SLAMS) | 92% (8-Hour) | Stable | High | High | High | Medium | N/A | High |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 11-Austin | Austin Northwest | Ozone | Yes (SLAMS) | 91% (8-Hour) | Decrease | High | High | High | Medium | N/A | High |
| 11-Austin | Austin Audubon Society | $PM_{10}$ (FRM) | Yes (SLAMS) | 0 | Stable | Medium | High | Low | -- | Medium | High |
| 11-Austin | Austin Webberville Rd | $PM_{10}$ (FRM) | Yes (SLAMS) | 0 | Stable | High | High | Low | -- | Medium | High |
| 11-Austin | Austin Audubon Society | $PM_{2.5}$ (FRM) | Yes (SLAMS) | 57% (24-hour); 65% (annual) | Slight Decrease | Low | High | High | Medium | Medium | High |
| 11-Austin | Austin Webberville Rd | $PM_{2.5}$ (FRM) | Yes (SLAMS) | 69% (24-hour); 78% (annual) | Increase (24-hour); Slight Decrease (annual) | Medium | High | High | Medium | Medium | High |
| 11-Austin | Austin Audubon Society | $PM_{2.5}$ (TEOM) | Yes (SPM) | N/A | N/A | Medium | High | Medium | Medium | Medium | High |
| 11-Austin | Austin Northwest | $PM_{2.5}$ (TEOM) | No (SPM) | N/A | N/A | Medium | Low | Medium | Medium | Medium | Medium |
| 11-Austin | Austin Webberville Rd | $PM_{2.5}$ (TEOM) | Yes (SPM) | N/A | N/A | Low | Medium | Medium | Medium | Medium | Medium |
| 11-Austin | Fayette County | $PM_{2.5}$ (TEOM) | No (SPM) | N/A | N/A | Medium | Low | Medium | Medium | Medium | Medium |
| 11-Austin | Austin Northwest | Sulfur dioxide | Yes (SLAMS) | 7% (1-hour) | N/A | Low | High | High | -- | Low | High |
| 13-San Antonio | Calaveras Lake | $NO_x$ | No (SLAMS) | 33% (1-hour); 9% (annual) | Decrease | High | Medium | Medium | -- | Medium | Medium |
| 13-San Antonio | San Antonio Interstate 35 | $NO_x$ | Yes (Near-Road) | N/A (1-hour); 20% (annual) | N/A | Low | High | Medium | -- | High | High |
| 13-San Antonio | San Antonio Northwest | $NO_x$ | Yes (SLAMS) | N/A (1-hour); 12% (annual) | N/A | Low | High | Medium | -- | Medium | High |
| 13-San Antonio | Calaveras Lake | Ozone | No (SLAMS) | 89% (8-hour) | Stable | High | Medium | High | Medium | N/A | High |
| 13-San Antonio | Camp Bullis | Ozone | Yes (SLAMS) | 107% (8-hour) | Increase | High | High | High | Medium | N/A | High |
| 13-San Antonio | San Antonio Northwest | Ozone | Yes (SLAMS) | 100% (8-hour) | Stable | Medium | High | High | Medium | N/A | High |
| 13-San Antonio | Frank Wing Municipal Court | $PM_{10}$ (FRM) | Yes (SLAMS) | 0 | Stable | Medium | High | Low | -- | Medium | High |
| 13-San Antonio | Selma | $PM_{10}$ (FRM) | Yes (SLAMS) | 0 | Stable | Low | High | Low | -- | Medium | High |

| TCEQ Region | Site Name | Sampler Type | Used to Meet Minimum Requirement? | Percent of NAAQS | Design Value Trend | Historical Value | Regulatory Value | Data Value | Monitor Uniqueness Value | Source Impact Value | Overall Monitor Value |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 13-San Antonio | Calaveras Lake | $PM_{2.5}$ (FRM) | Yes (SLAMS) | 60% (24-hour); 70% (annual) | Stable (24-hour); Slight Decrease (annual) | Medium | High | High | Medium | Medium | High |
| 13-San Antonio | San Antonio Northwest | $PM_{2.5}$ (FRM) | Yes (SLAMS) | 60% (24-hour); 71% (annual) | Slight Increase (24-hour); Slight Decrease (annual) | Medium | High | High | Medium | Medium | High |
| 13-San Antonio | Calaveras Lake | $PM_{2.5}$ (TEOM) | Yes (SPM) | N/A | N/A | Medium | High | Medium | Medium | Medium | High |
| 13-San Antonio | CPS Pecan Valley | $PM_{2.5}$ (TEOM) | No (SPM) | N/A | N/A | Medium | Low | Medium | Medium | Medium | Medium |
| 13-San Antonio | Old Hwy 90 | $PM_{2.5}$ (TEOM) | No (SPM) | N/A | N/A | Medium | Low | Medium | Medium | Medium | Medium |
| 13-San Antonio | Palo Alto | $PM_{2.5}$ (TEOM) | No (SPM) | N/A | N/A | Medium | Low | Medium | Medium | Medium | Medium |
| 13-San Antonio | San Antonio Northwest | $PM_{2.5}$ (TEOM) | Yes (SPM) | N/A | N/A | Medium | Medium | Medium | Medium | Medium | Medium |
| 13-San Antonio | Selma | $PM_{2.5}$ (TEOM) | No (SPM) | N/A | N/A | Medium | Low | Medium | Low | Medium | Medium |
| 13-San Antonio | Calaveras Lake | Sulfur dioxide | Yes (SLAMS) | 28% (1-hour) | N/A | Low | High | High | -- | High | High |
| 01-Amarillo | Amarillo A&M | $PM_{2.5}$ (TEOM) | No (SPM) | N/A | N/A | Medium | Low | High | High | Low | High |
| 01-Amarillo | Amarillo 24th Avenue | Sulfur dioxide | No (SLAMS) | ** | N/A | Low | Low | Medium | -- | High | Medium |
| 01-Amarillo | Amarillo SH 136 | TSP (Pb) | Yes (SLAMS) | ** | N/A | Low | High | High | -- | High | High |
| 07-Midland | Odessa-Hays Elementary School | $PM_{2.5}$ (TEOM) | No (SPM) | N/A | N/A | Medium | Low | Medium | Medium | Low | Medium |
| 07-Midland | Odessa Gonzales | $PM_{2.5}$ (TEOM) | No (SPM) | N/A | N/A | Medium | Low | Medium | Medium | Low | Medium |
| 15-Harlingen | Brownsville | Carbon monoxide | No (SPM) | 4% (1-hour); 8% (8-hour) | Decrease | High | Low | Medium | -- | Medium | Medium |
| 15-Harlingen | Brownsville | Ozone | Yes (SLAMS) | 77% (8-hour) | Decrease | High | High | High | Medium | N/A | High |
| 15-Harlingen | Harlingen Teege | Ozone | Yes (SLAMS) | ** | ** | Low | High | Medium | Medium | N/A | High |
| 15-Harlingen | Mission | Ozone | Yes (SLAMS) | 76% (8-hour) | Decrease | High | High | High | High | N/A | High |
| 15-Harlingen | Mission | $PM_{10}$ (FRM) | Yes (SLAMS) | 0 | Stable | Medium | High | Medium | -- | Medium | High |

| TCEQ Region | Site Name | Sampler Type | Used to Meet Minimum Requirement? | Percent of NAAQS | Design Value Trend | Historical Value | Regulatory Value | Data Value | Monitor Uniqueness Value | Source Impact Value | Overall Monitor Value |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 15-Harlingen | Mission | $PM_{2.5}$ (FRM) | Yes (SLAMS) | 71% (24-hour); 85% (annual) | Increase (24-hour); Slight Decrease (annual) | High | High | High | -- | Medium | High |
| 15-Harlingen | Brownsville | $PM_{2.5}$ (TEOM) | Yes (SPM) | N/A | N/A | Medium | High | Medium | Medium | Medium | High |
| 15-Harlingen | Isla Blanca Park | $PM_{2.5}$ (TEOM) | No (SPM) | N/A | N/A | Low | Low | High | Medium | Medium | High |
| 15-Harlingen | Mission | $PM_{2.5}$ (TEOM) | Yes (SPM) | N/A | N/A | Medium | High | High | Medium | Medium | High |
| 15-Harlingen | Brownsville | SVOC | No (SPM) | N/A | N/A | High | Low | Medium | -- | Medium | Medium |
| 15-Harlingen | Mission | SVOC | No (SPM) | N/A | N/A | High | Low | Medium | -- | Medium | Medium |
| 15-Harlingen | Brownsville | TSP (Pb) | No (SLAMS) | N/A | Stable | High | Low | Medium | -- | Medium | Medium |
| 16-Laredo | Laredo Vidaurri | Carbon monoxide | No (SPM) | 4% (1-hour); 15% (8-hour) | Decrease | High | Low | Medium | -- | Medium | Medium |
| 16-Laredo | Laredo Bridge | Carbon monoxide | No (SPM) | 6% (1-hour); 13% (8-hour) | Decrease | Medium | Low | Medium | -- | Medium | Medium |
| 16-Laredo | Laredo Vidaurri | Ozone | No (SLAMS) | ** | ** | High | Medium | High | High | N/A | High |
| 16-Laredo | Laredo Vidaurri | $PM_{10}$ (FRM) | No (SLAMS) | 0 | Stable | Low | Medium | High | -- | Medium | High |
| 16-Laredo | Laredo Vidaurri | $PM_{10}$ (FRM) | No (QA/ SLAMS) | N/A | N/A | Low | Medium | High | -- | Medium | Medium |
| 16-Laredo | Laredo Bridge | $PM_{10}$ (FRM) | No (SPM) | 0 | Stable | High | Low | Medium | -- | High | Medium |
| 16-Laredo | Eagle Pass | $PM_{2.5}$ (TEOM) | No (SPM) | N/A | N/A | Medium | Low | Medium | High | Medium | Medium |
| 16-Laredo | World Trade Bridge | $PM_{2.5}$ (TEOM) | No (SPM) | N/A | N/A | Medium | Low | Medium | High | High | Medium |
| 16-Laredo | Laredo Bridge | Speciated VOC (Canister) | No (SPM) | N/A | N/A | Medium | Low | Medium | -- | Medium | Medium |
| 16-Laredo | Laredo Vidaurri | TSP (Pb) | No (SPM) | N/A | N/A | Low | Low | Medium | -- | Medium | Medium |
| 06-El Paso | Ascarate Park SE | Carbon monoxide | No (SLAMS) | 15% (1-hour); 27% (8-hour) | Slight Decrease | Medium | Low | Low | -- | Low | Low |
| 06-El Paso | Ojo De Agua | Carbon monoxide | No (SLAMS) | 4% (1-hour); 9% (8-hour) | N/A | Low | Low | Low | -- | Low | Low |
| 06-El Paso | El Paso Chamizal | Carbon monoxide* | Yes (NCore) | 11% (1-hour); 31% (8-hour) | Decrease | Low | High | Medium | -- | Medium | High |
| 06-El Paso | Ascarate Park SE | Carbonyl | Yes (SPM) | N/A | N/A | Medium | High | High | -- | Medium | High |
| 06-El Paso | El Paso UTEP | TSP (Pb) | No (SLAMS) | ** | N/A | Low | Medium | Low | -- | Low | Low |

| TCEQ Region | Site Name | Sampler Type | Used to Meet Minimum Requirement? | Percent of NAAQS | Design Value Trend | Historical Value | Regulatory Value | Data Value | Monitor Uniqueness Value | Source Impact Value | Overall Monitor Value |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 06-El Paso | Ascarate Park SE | TSP (Pb) | Yes (NCore/ SLAMS) | ** | N/A | Low | High | Low | -- | Low | High |
| 06-El Paso | Ojo De Agua | TSP (Pb) | No (SLAMS) | ** | N/A | High | Medium | Low | -- | Low | Low |
| 06-El Paso | Ojo De Agua | TSP (Pb) | No (QA/SLAMS) | N/A | N/A | Medium | Medium | Low | -- | Low | Low |
| 06-El Paso | El Paso UTEP | $NO_x$ | No (PAMS) | 53% (1-hour); 22% (annual) | Slight Decrease (1-hour); Decrease (annual) | High | Medium | Medium | -- | Medium | Medium |
| 06-El Paso | El Paso Chamizal | $NO_x$ | Yes (PAMS) | 60% (1-hour); 26% (annual) | Slight Decrease (1-hour); Stable (annual) | High | High | Medium | -- | Medium | High |
| 06-El Paso | Ascarate Park SE | $NO_x$ | Yes (PAMS) | 57% (1-hour); 22% (annual) | Slight Decrease (1-hour); Stable (annual) | Medium | High | High | -- | Medium | High |
| 06-El Paso | El Paso Chamizal | $NO_y$* | Yes (NCore) | N/A | N/A | Low | High | Medium | -- | Medium | High |
| 06-El Paso | Ivanhoe | Ozone | No (SPM) | 79% (8-hour) | Decrease | Medium | Low | High | High | N/A | High |
| 06-El Paso | El Paso UTEP | Ozone | Yes (PAMS) | 96% (8-hour) | Stable | High | High | High | Medium | N/A | High |
| 06-El Paso | El Paso Chamizal | Ozone | Yes (NCore/ PAMS/ SLAMS) | 91% (8-hour) | Slight Decrease | High | High | High | Medium | N/A | High |
| 06-El Paso | Ascarate Park SE | Ozone | Yes (PAMS) | 83% (8-hour) | Decrease | Medium | Medium | High | High | N/A | High |
| 06-El Paso | Socorro Hueco | Ozone | Yes (SLAMS) | ** | ** | Medium | High | High | High | N/A | High |
| 06-El Paso | Skyline Park | Ozone | Yes (SLAMS) | 91% (8-hour) | Decrease | Medium | Medium | High | High | N/A | High |
| 06-El Paso | Ivanhoe | $PM_{10}$ (FRM) | Yes (SLAMS) | 0 | Decrease | Low | High | High | -- | High | High |
| 06-El Paso | Riverside | $PM_{10}$ (FRM) | Yes (SLAMS) | 0 | Decrease | Low | High | High | -- | High | High |
| 06-El Paso | Socorro Hueco | $PM_{10}$ (FRM) | Yes (SLAMS) | 4 | Variable | Low | High | High | -- | High | High |
| 06-El Paso | Socorro Hueco | $PM_{10}$ (FRM) | Yes (QA) | 4 | Variable | Low | High | High | -- | High | High |
| 06-El Paso | Van Buren | $PM_{10}$ (FRM) | No (SPM) | 0 | Stable | Low | Medium | High | -- | High | High |
| 06-El Paso | Ojo De Agua | $PM_{10}$ (FRM) | Yes (SLAMS) | ** | N/A | Low | High | High | -- | High | High |
| 06-El Paso | Ojo De Agua | $PM_{10}$ (FRM) | No (QA) | N/A | N/A | Low | Medium | High | -- | High | High |
| 06-El Paso | El Paso Chamizal | $PM_{10-2.5}$ | Yes (NCore) | N/A | N/A | Low | High | High | -- | High | High |

| TCEQ Region | Site Name | Sampler Type | Used to Meet Minimum Requirement? | Percent of NAAQS | Design Value Trend | Historical Value | Regulatory Value | Data Value | Monitor Uniqueness Value | Source Impact Value | Overall Monitor Value |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 06-El Paso | El Paso UTEP | $PM_{2.5}$ (FRM) | Yes (SLAMS) | 49% (24-hour); 68% (annual) | Decrease | Medium | High | High | High | High | High |
| 06-El Paso | El Paso Chamizal | $PM_{2.5}$ (FRM) | Yes (SLAMS) | 97% (24-hour); 93% (annual) | Increase | Low | High | High | High | High | High |
| 06-El Paso | El Paso Chamizal | $PM_{2.5}$ (Speciation) | Yes (Trends Speciation) | ** | N/A | Low | High | High | -- | High | High |
| 06-El Paso | El Paso UTEP | $PM_{2.5}$ (TEOM) | Yes (SPM) | ** | N/A | High | High | High | High | High | High |
| 06-El Paso | Ascarate Park SE | $PM_{2.5}$ (TEOM) | No (SPM) | N/A | N/A | High | Low | High | High | High | High |
| 06-El Paso | Socorro Hueco | $PM_{2.5}$ (TEOM) | No (SPM) | N/A | N/A | Low | Low | High | High | High | High |
| 06-El Paso | Bravo Big Bend | $PM_{2.5}$ (TEOM) | No (SPM) | N/A | N/A | Medium | Low | High | High | Low | High |
| 06-El Paso | El Paso Chamizal | Speciated VOC (autoGC) | Yes (PAMS) | N/A | N/A | Medium | High | High | -- | Low | High |
| 06-El Paso | El Paso UTEP | Sulfur dioxide | No (SLAMS) | 7% (1-hour) | Slight Decrease | High | Medium | High | -- | Medium | Medium |
| 06-El Paso | Skyline Park | Sulfur dioxide | No (SLAMS) | 3% (1-hour) | Decrease | Medium | Medium | High | -- | Low | Medium |
| 06-El Paso | El Paso Chamizal | Sulfur dioxide* | Yes (NCore) | 13% (1-hour) | N/A | Low | High | High | -- | Low | High |
| 06-El Paso | Socorro Hueco | SVOC | No (SPM) | N/A | N/A | Medium | Medium | High | -- | Medium | High |

Notes

$PM_{10}$ - particulate matter of 10 micrometers or less in diameter

FRM - federal reference method; a filter-based gravimetric sampler

$NO_x$ - oxides of nitrogen; includes nitric oxide (NO) and nitrogen dioxide ($NO_2$)

$PM_{2.5}$ - particulate matter of 2.5 micrometers or less in diameter

TEOM - tapered element oscillating microbalance

$NO_y$ - Highly reactive nitrogen oxide species

$PM_{10-2.5}$ - coarse particulate matter between 2.5 and 10 micrometers in diameter

VOC - volatile organic compound

SVOC – semi-volatile organic compounds

autoGC - automated gas chromatograph

SLAMS - state and local air monitoring station

PAMS - photochemical air monitoring station

SPM - special purpose monitor

NCore - National Core, as defined by 40 Code of Federal Regulations §58, Appendix D, Section 3

NAAQS - national ambient air quality standard

* - high sensitivity monitor

** - design value is not available

*** - speciation data is obtained from an FRM monitor combination

N/A - not applicable

-- - analysis not available

Percent of NAAQS - based on a percentage of the 2014 design value and the existing NAAQS as of January 1, 2015; averaging time is noted in parentheses where applicable; for $PM_{10}$, the three year average of the estimated number of exceedance days is provided

Design Value Trend - based on evaluation of the 2010 through 2014 design values

Historical Value - based on the length of time the monitor has provided air quality data as of January 1, 2015. High value monitors have provided more than 16 years of data. Medium value monitors have provided six to fifteen years of data. Low value monitors have provided five or less years of data.

Regulatory Value - based on the monitor's value to meeting federal monitoring requirements. High value monitors meet an explicit requirement (such as NCore requirements), Medium value monitors support the number of monitors required in an area (such as PAMS requirements), and Low value monitors may support monitoring efforts but do not satisfy an explicit requirement.

Data Value – based on subjective measure of the importance of the data to the network including proximity of design values to the NAAQS, representativeness of a particular area (such as sensitive populations or incoming background), or historical trends.

Monitor Uniqueness – based on monitor-by-monitor correlation; only available for ozone and $PM_{2.5}$. High value monitors provide unique data; Medium value monitors indicate some correlation with nearby monitors; Low value monitors have a higher potential for redundancy.

Source Impact Value – based on the monitor's value in evaluating source impact; High value monitors provide important data on the impact of sources (such as a monitor downwind of a point source); Medium value monitors help provide information about source contribution but are not specifically sited to measure source impacts (such as speciation monitors providing data on dust composition); Low value monitors are minimally impacted by sources.

The monitor appropriateness metric was not included in this table because all existing monitors met their intended objective and monitoring scale and were considered of High value.

# Appendix D

## New Permitted Sources 2010-2015

Texas Commission on Environmental Quality
Texas Five-Year Ambient Monitoring Network Assessment

| Customer Identification Number (CN) | Company | Reference Number (RN) | Address | Project Completion Date |
|---|---|---|---|---|
| CN603962549 | Southern Frac LLC | RN100574078 | 1805 Howard Rd., Waxahachie | 1/23/2013 |
| CN600384481 | Schlumberger Technology Corporation | RN100605450 | 555 Industrial Blvd., Sugar Land | 5/31/2011 |
| CN600322648 | Advanced Containment Systems Inc. | RN100613447 | 8720 Lambright Rd., Houston | 9/19/2014 |
| CN603596289 | Spirit Food Service Inc. | RN100644780 | 3809 Pipestone Rd., Dallas | 2/26/2010 |
| CN601377211 | CMC Steel Fabricators Inc. | RN100666262 | 2784 Old Dallas Rd., Waco | 3/18/2010 |
| CN600125157 | TXI Operations, LP | RN100670983 | 10610 Spangler Rd., Dallas | T0 Be Determined |
| CN603312059 | Al Tex Homes Inc. | RN100701697 | 8701 Harmon Rd., Fort Worth | 12/27/2010 |
| CN603339961 | Oakbend Medical Center | RN100888825 | 1705 Jackson St., Richmond | T0 Be Determined |
| CN600601975 | Solvchem Inc. | RN100934181 | 881 Dividend Rd., Midlothian | 4/28/2014 |
| CN603219627 | Midwest Wood Treating Inc. | RN101822401 | 2999 F.M. 2864, Nacogdoches | 7/30/2010 |
| CN601080229 | Patterson Wood Products, Inc. | RN101969202 | 1429 N.W. Stallings Dr., Nacogdoches | 9/15/2014 |
| CN600427074 | Helena Chemical Company | RN102006871 | 3467 F.M. 984 North, Bardwell | 2/9/2010 |
| CN600427074 | Helena Chemical Company | RN102049848 | 4718 Highway 84, Lubbock | 1/11/2013 |
| CN603704677 | Smith Industries, Inc. | RN102052230 | 3509 E. State Highway 158, Midland | T0 Be Determined |
| CN602944647 | Spa Pipe & Supply LP | RN102054392 | 7435 U.S. Highway 277 South, Abilene | 12/3/2010 |
| CN603679853 | Polymer Adhesive Sealant Systems, Inc. | RN102146255 | 501 Garrett Morris Pkwy., Palo Pinto | 2/27/2015 |
| CN600290134 | Baker Hughes Oilfield Operations Inc. | RN102256591 | 723 E. Schunior St., Edinburg | 9/28/2012 |
| CN600351415 | Western Pulp Products Co. | RN102312105 | 1577 N. Bolton St., Jacksonville | 3/10/2011 |
| CN600510739 | Land O Lakes Purina Feed LLC | RN102458338 | 100 S. Progressive Rd., Hereford | 1/28/2010 |
| CN600134761 | Phillips 66 Pipeline LLC | RN102545597 | One mile north of Whiteface on Highway 125 | T0 Be Determined |
| CN600875629 | Mid-Valley Pipeline Company | RN102591781 | 1010 Cox Dairy Rd., Longview | T0 Be Determined |
| CN600610976 | Texas Department of Public Safety | RN102699519 | 2405 S. Loop 250 West, Midland | 1/11/2010 |
| CN604528588 | American Rice Growers Cooperative Association, Anahuac Division | RN102705548 | 13367 U.S. Highway 9o, Raywood | 7/7/2014 |
| CN600427074 | Helena Chemical Company | RN103114203 | 100 St. Peter, Stanton | 3/1/2010 |
| CN601310154 | CLW Inc. | RN103174900 | 14055 Cox Rd., Splendora | 5/17/2010 |
| CN600290134 | Baker Hughes Oilfield Operations, Inc. | RN103209227 | 901 Beauregard St., Marshall | T0 Be Determined |
| CN601259443 | Earthgrains Baking Companies Inc. | RN103214136 | 737 N. Great Southwest Pkwy., Arlington | 9/10/2010 |
| CN604732933 | Republic Waste, Limited Partnership | RN103216768 | 5032 Split Trail Rd., Plano | T0 Be Determined |

| Customer Identification Number (CN) | Company | Reference Number (RN) | Address | Project Completion Date |
|---|---|---|---|---|
| CN603134693 | Metaltec Inc. | RN103795365 | 5515 U.S. Highway 90 East, San Antonio | 3/29/2010 |
| CN604388751 | Inhance Technologies LLC | RN104002530 | 9830 East Fwy., Harris | T0 Be Determined |
| CN603635897 | Western Gulf Terminal Partners LP | RN104025325 | 7002 Marvin L Berry Rd., Corpus Christi | 7/27/2012 |
| CN600766976 | Federal Bureau of Prisons | RN104706536 | 4001 Leopard Dr., Bowie | 4/8/2010 |
| CN602913634 | Midway Industrial Park LLC | RN104761606 | 2.5 M.W. of Nash, TX on U.S. Highway 82 @ intersection of F.M. 2148 South on F.M. 2148 across railroad tracks., Nash | 5/24/2011 |
| CN604038257 | FTS International Manufacturing LLC | RN104920103 | 119 Nu Energy Rd., Aledo | T0 Be Determined |
| CN604348235 | LPL Real Estate Holdings, LLC | RN105073993 | 3350 S. Central Expy.Collin County | 12/20/2013 |
| CN600654479 | Hillman Shrimp and Oyster Co. | RN105129274 | 10700 Hillman Dr., Dickinson | 1/18/2011 |
| CN600735161 | Megasand Enterprises Inc. | RN105275143 | 11501 Crosby Lynchburg Rd., Crosby | 3/12/2014 |
| CN600290134 | Baker Hughes Oilfield Operations, Inc. | RN105276042 | 100 Industrial Park Rd., Trinity | T0 Be Determined |
| CN603657586 | Best Transportation Service, Inc. | RN105286884 | 13225 Baypark Rd., Pasadena | 9/26/2014 |
| CN603220468 | Z-W Inc. | RN105292007 | 2930 Highway 152 West, Pampa | 2/26/2010 |
| CN603300625 | Aggregate Industries-Wcr Inc. | RN105431662 | 5900 F.M. 482, New Braunfels | 6/28/2011 |
| CN603330341 | Pondera Capital Management Gp Inc. | RN105473581 | Adjacent to and south of the King Substation at 13155 Lockwood Rd.,Houston | 8/5/2010 |
| CN603279985 | IPA Coleto Creek LLC | RN105487995 | 45 F.M. 2987, Fannin | 5/3/2010 |
| CN603339961 | Oakbend Medical Center | RN105489330 | 22003 Southwest Fwy., Fort Bend | T0 Be Determined |
| CN601241029 | Coal City Cob Company Inc. | RN105514145 | 4300 N. I-35 East, Waxahachie | 2/29/2012 |
| CN600323000 | Trinity Materials Inc. | RN105530091 | Located approximately 3.8 miles East of Elmo on Highway 80. Go South on CR 314 approximately 1000 ft. to plant entrance, Terrell | 4/16/2010 |
| CN603092826 | Liberty Pressure Pumping LP | RN105601884 | 4836 W. Loop 281 South, Longview | 2/11/2010 |
| CN603424987 | Lindale Renewable Energy LLC | RN105652093 | At the intersection of I-20 and Harvey Rd. near Lindale. Turn South on Harvey Rd (CR 433). The site is West of Harvey Rd across the street and south of the Target Distribution Center, Lindale | 1/8/2010 |
| CN603437898 | Panda Sherman Power LLC | RN105672687 | Take U.S. 75 North to Exit 56. Turn Left on F.M. 1417. Turn Left on Howe Dr. and follow Howe until it ends., Sherman | 2/3/2010 |
| CN603079401 | Southern Crushed Concrete LLC | RN105681530 | North of McAllister Rd. approximately 1.5 | 3/8/2010 |

| Customer Identification Number (CN) | Company | Reference Number (RN) | Address | Project Completion Date |
|---|---|---|---|---|
| | | | miles West of Shell Plant Rd., Brookshire | |
| CN602841389 | Anchor Drilling Fluids USA Inc. | RN105694723 | 4315 S. County Road 1290, Odessa | 11/12/2012 |
| CN601463409 | Conners Construction Inc. | RN105704472 | Site is located on the East and West side of CR 246 approximately 75 miles North of F.M. 413, Kosse | 7/29/2011 |
| CN601403199 | Sunoco Partners Marketing & Terminals LP | RN105718274 | From the intersection of W. Hardy Rd and Aldine Bender Rd Proceed West on Aldine Bender Rd for approximately .25 Mile to Entrance of Facility, Houston | 1/11/2010 |
| CN603487224 | Texas Lone Star Materials Inc. | RN105737035 | 9301 Southwest Dr., Fort Worth | T0 Be Determined |
| CN603492968 | PVM Systems LLC | RN105745996 | 714 County Road 722, Nacogdoches | 4/9/2010 |
| CN603495342 | NPL Construction Co | RN105749451 | 2638 Oakland Ave., Dallas | 3/9/2010 |
| CN602926701 | Associated Marine Services Inc. | RN105759922 | 2706 Gulfway Dr., Port Arthur | 1/21/2010 |
| CN603503863 | Lone Star Custom Coatings Inc. | RN105760961 | 428 N. 1st St., Garland | 1/15/2010 |
| CN603467309 | Chanas Aggregates, LLC | RN105760979 | 7850 E. State Highway 29, Llano | 11/13/2014 |
| CN600240188 | Ingram Readymix Inc. | RN105774681 | 307 Theo St., Gonzales | 2/11/2010 |
| CN603213315 | Martin Marietta Materials Southwest Inc. | RN105776306 | Approximately 10 miles North of Highway 90 on F.M. 462 from Hondo to Private Rd. 322. Take Private Rd. 322 West to Mine Lease Boundary, Hondo | 10/25/2010 |
| CN600492631 | Yarrington Road Materials LP | RN105793749 | 1401 Yarrington Rd., San Marcos | 1/20/2010 |
| CN602901027 | LFM Industries Inc. | RN105809008 | 117 N. Palmer St., Houston | 2/8/2010 |
| CN601492135 | Multi-Chem Group LLC | RN105810980 | 1656 County Road 390, Denver City | 5/27/2010 |
| CN600323000 | Trinity Materials Inc. | RN105819841 | Approximately 9 miles West of Wills Point at Highway 80/F.M. 2728 intersection, go North on F.M. 2728 approximately 4 miles. Go East on Cr 346. Go 2.5 miles to site, Willis Point | 3/23/2012 |
| CN603574989 | Hixson Lumber Sales of Gilmer Inc. | RN105824643 | 1215 S. Montgomery St., Gilmer | 8/20/2010 |
| CN603576364 | NA Industries Inc. | RN105826440 | Plant located at the Southeast corner of Port Road and Old Highway 146 In the Bayport 4631 Old Highway 146, Seabrook Industrial park within the plant boundaries of American Acryl in the City of Pasadena, Pasadena | 11/12/2010 |
| CN600497804 | CSA Materials Inc. | RN105830665 | Approximately 4 miles East of U.S. 87 at the N.W. corner of the intersection of Rr 1210 and Rr 2370, ODonnell | 1/26/2010 |

| Customer Identification Number (CN) | Company | Reference Number (RN) | Address | Project Completion Date |
|---|---|---|---|---|
| CN603658659 | Summit Texas Clean Energy LLC | RN105910707 | Approximately 1000 ft. North of the intersection of Ranch Road 1601 and I-20, 15 miles West of Odessa, Odessa | 12/28/2010 |
| CN603661281 | United Fiberglass Inc. | RN105915011 | 3625 S. F.M. 1258, Randall | 8/14/2012 |
| CN600418669 | JR Thompson Inc. | RN105927628 | Located Approximately 2 miles South of F.M. 1630 on the East side of Cr 343, Muenster | 2/21/2012 |
| CN603213315 | Martin Marietta Materials Southwest Inc. | RN105931877 | 18495 N.W. Military Highway, San Antonio | 10/19/2010 |
| CN603722877 | Z Ready Mix Inc. | RN105932255 | 5521 Breen Dr., Houston | 5/17/2011 |
| CN600958169 | West Texas Paving Inc. | RN105941355 | 4 miles West on F.M. 597 from intersection With F.M. 1490 In Hockley County, Whitharral | 1/12/2011 |
| CN603641549 | Anderson Columbia Co Inc. | RN105949960 | 6606 N. U.S. Highway 83, Zapata | 9/10/2010 |
| CN602636565 | BC Materials LLC | RN105950075 | Located on North side of F.M. 712 approximately 1.7 miles East of its intersection with F.M. 2027, Marlin | 9/20/2010 |
| CN601597735 | Custom Crushed Stone Inc. | RN105951396 | 8974 Cr 205, Tuleta | 4/2/2012 |
| CN603709148 | Edwards & Rose Cottonseed LP | RN105970214 | 1802 S. Loop Dr., Waco | 12/23/2010 |
| CN603712894 | Texas Chemoil Technologies Incorporated | RN105975981 | 8055 State Highway 60 South, Bay City | 8/4/2011 |
| CN600510838 | Caterpillar Inc. | RN105978092 | 7300 Lone Tree Rd., Victoria | 11/22/2010 |
| CN603716259 | Fred Weber Inc. | RN105982003 | 4483 Ranch Road 1022, Uvalde | 3/22/2011 |
| CN603723727 | PJ Metal Recycling Inc. | RN105993489 | 2707 Weir St., Dallas | 3/10/2011 |
| CN603732801 | Toshiba America Nuclear Energy Corporation | RN106009020 | From Bay City F.M. Road 2668 South for 13 miles. West on F.M. Road 521 for 5 miles. Site Will Be on the Left, Bay City | 6/2/2011 |
| CN600535538 | Cherry Crushed Concrete Inc. | RN106032675 | 5402 Highway 6, Hitchcock | 6/28/2011 |
| CN603126855 | Delta Petroleum Company Inc. | RN106038938 | 233 Delta Pkwy., Chambers Coounty | 12/1/2010 |
| CN603784075 | Falcon Technologies and Services Inc. | RN106046311 | 2242 E. Highway 380, Decatur | 6/17/2013 |
| CN603791047 | Battleground Oil Specialty Terminal Company LLC | RN106057516 | 1836 Miller Cut Off Rd., La Porte | 9/23/2011 |
| CN603716259 | Fred Weber Inc. | RN106065931 | 7329 S.W. County Road 30, Richland | 8/17/2012 |
| CN603798208 | Multisource Sand and Gravel Co Ltd | RN106067036 | 600 F.M. 3013, Eagle Lake | 12/20/2011 |
| CN600655344 | Lambert, Richard | RN106067754 | S.E. side of the intersection of F.M. 787 & F.M. 2610, Romayor | 7/10/2012 |
| CN603802059 | Ecology Minerals Inc. | RN106072721 | 51820 State Highway 118 Which Is Located 1 mile South of the intersection of Highway 118 | 2/28/2012 |

| Customer Identification Number (CN) | Company | Reference Number (RN) | Address | Project Completion Date |
|---|---|---|---|---|
| | | | & Agua Fria Rd. On the West side of Highway 118, Terlingua | |
| CN600427074 | Helena Chemical Company | RN106077746 | 504 E. Martin Luther King Jr Blvd., Taylor | 1/12/2012 |
| CN600564520 | EOG Resources Inc. | RN106078322 | 14596 N. F.M. 373, Saint Jo | 4/28/2014 |
| CN600130645 | Praxair Inc. | RN106078850 | From intersection of Highway 69 Memorial Blvd. and Highway 73, go 2.1 miles S.E. on Highway 69. Go Right on Gulfway Dr. Highway 87 for 4.1 miles S.W. to plant entrance on Highway 87, Port Arthur | 6/7/2011 |
| CN602803736 | 90 West Contractors Ltd | RN106079023 | From intersection of U.S. 277 & Highway 90 In Del Rio, take Highway 277 11 miles. Site is on West side, Del Rio | 8/22/2011 |
| CN600427074 | Helena Chemical Company | RN106086689 | 27204 U.S. 59 Rd., El Campo | 1/11/2012 |
| CN603814963 | Hydrochlor LLC | RN106090483 | 2301 N. Brazosport Blvd., Free Port | 9/14/2011 |
| CN603819129 | Louisiana Crane Company LLC | RN106097249 | 198 F.M. 190, Asherton | 2/8/2013 |
| CN600938310 | Lilly Construction Inc. | RN106102288 | 8 State Highway 163 South, Ozona | 11/14/2011 |
| CN603825027 | Honghua America LLC | RN106103500 | 8300 McHard Rd., Houston | 6/3/2013 |
| CN601470222 | Intercontinental Terminals Company LLC | RN106119175 | 1030 Ethyl Road, Pasadena | 8/24/2012 |
| CN600427074 | Helena Chemical Company | RN106130859 | 107 S. Border Rd., Alamo | 4/19/2012 |
| CN603854605 | Tri Element Incorporated | RN106145030 | 315 Hub, Alice | T0 Be Determined |
| CN603861691 | BDM Metal Coaters LLC | RN106152887 | 13855 Industrial Rd., Houston | 2/8/2012 |
| CN603315953 | Kuraray America Inc. | RN106155849 | 13100 Bay Area Blvd., La Porte | 9/17/2012 |
| CN602868291 | GSD Trading USA Inc. | RN106168180 | 16628 Market St., Channelview | 9/18/2012 |
| CN603924499 | Smith, Andrew G | RN106173578 | Located on the North side of Highway 71 approximately 16 miles East of U.S. 87, Brady | 4/5/2012 |
| CN603099409 | U.S. Ply Inc. | RN106182199 | 106 Industrial Park, Bridgeport | 5/23/2012 |
| CN601597735 | Custom Crushed Stone Inc. | RN106183973 | From I-37 & Loop 410, go South 42.0 miles. Exit F.M. 791 and take a Left on Follow Rd. for 10.0 miles, pass F.M. 2924. Go 2.5 miles. Entrance to plant will be on the Right, Falls City | 3/6/2012 |
| CN604371484 | FML Sand, LLC | RN106184195 | From Brady, head South on Highway 87 approximately 17 miles to Rr 1222. Take Rr 1222 East approximately 0.75 miles. Plant Is on North side of Rr 1222, Katemcy | 12/3/2014 |

| Customer Identification Number (CN) | Company | Reference Number (RN) | Address | Project Completion Date |
|---|---|---|---|---|
| CN602962334 | National Oilwell Varco LP | RN106201171 | Southeast of the intersection of Sheldon Road and Beaumont Highway Business 90, Houston | 1/10/2012 |
| CN603263328 | Hereford Concrete Inc. | RN106214927 | 200 South 4th Avenue, Hereford | 3/2/2012 |
| CN601587652 | ETC Texas Pipeline Ltd | RN106225436 | From Ganado Take F.M. 710 North for 4.5 miles to Galow Rd. Turn Left & go 1.25 miles to site on Right, Ganado | 5/25/2012 |
| CN603685082 | Pinnacle Companies Inc. | RN106227135 | Andrews | 8/28/2012 |
| CN600290134 | Baker Hughes Oilfield Operations Inc. | RN106237415 | 832 S. Grandview Ave., Odessa | 5/3/2012 |
| CN600427074 | Helena Chemical Company | RN106249717 | 6801 Highway 66, Greenville | 4/26/2012 |
| CN603976960 | P-L Jacintoport I LLC | RN106256951 | 3400 Penn City Road, Houston | 8/24/2012 |
| CN603987173 | Maintech International, L.L.C. | RN106275381 | 299 Gilliam St., Corpus Christi | 6/4/2014 |
| CN604009399 | Lamar Trailers Inc. | RN106301641 | 7271 Farm Road 38 North, Sumner | 11/18/2013 |
| CN604034868 | Mcallen Penguins LLC | RN106337462 | 3421 Durango Avenue, McAllen | 8/17/2012 |
| CN604094508 | Eagle Ford Pipeline LLC | RN106337934 | On Suntide Rd. 0.1 miles South of Carbon Plant Rd., Corpus Christi | 12/21/2012 |
| CN604292060 | Turbo Components & Engineering, Inc. | RN106341803 | 1800 W. 13th St., Deer Park | 1/15/2015 |
| CN603242645 | 900 Global LLC | RN106342611 | 1303 Rilling Rd., San Antonio | 12/6/2012 |
| CN601573462 | Calhoun Port Authority | RN106348337 | 1002 F.M. 1593 South, Point Comfort | 8/18/2014 |
| CN604053421 | La Paloma Energy Center LLC | RN106362262 | 24684 F.M. 1595, Harlingen | 2/7/2013 |
| CN604059071 | Alandro Resources LLC | RN106371974 | 84 Industrial Dr., Brownsville | 10/1/2012 |
| CN603079401 | Southern Crushed Concrete LLC | RN106383128 | Take I-45 North of Houston to F.M. 1488. Turn Right At F.M. 1488 and go 0.15 miles to end of F.M. 1488. the SCC Yard entrance is on Left., Conroe | 12/16/2013 |
| CN600347843 | Illinois Tool Works Inc. | RN106409980 | 12055 Cutten Rd., Houston | 4/29/2013 |
| CN603731613 | Port Corpus Terminal Inc. | RN106416514 | Take Highway 181 and Exit Burleson St. Go West to W. Causeway Blvd. Take a Left on W. Causeway Blvd. and go 0.5 miles. Take a Left on Avenue F. Take Avenue F until dead-end at Navigation Blvd. Located across Navigation Blvd., Corpus Christi | 10/24/2014 |
| CN604100644 | Pinecrest Energy Center LLC | RN106444755 | 1002 E. Park Ave., Lufkin | 11/12/2013 |
| CN604112664 | Power Depot Texas Group A LLC | RN106470461 | 1347 McKeever Rd., Arcola | 11/8/2012 |
| CN602881104 | Global Solutions & Innovations | RN106475007 | 6072 U.S. Highway 281 North, Alice | 9/4/2014 |

| Customer Identification Number (CN) | Company | Reference Number (RN) | Address | Project Completion Date |
|---|---|---|---|---|
| CN601720345 | Freeport Lng Development LP | RN106481500 | On Cr 690 approximately 0.25 miles North of the intersection of Cr 690 and Cr 891, Freeport | 7/16/2014 |
| CN603863424 | Precision Spray & Coatings LLC | RN106484082 | 16106 E. Hardy Rd., Houston | 1/30/2013 |
| CN604124099 | Pampa Fuels LLC | RN106487861 | 8201 F.M. 2300, Pampa | 1/15/2013 |
| CN603263773 | Luminant Mining Company LLC | RN106503279 | From Tatum go S.W. on State Highway 43 7.3 miles turn South on Cr 2138 go 0.6 miles, Tatum | 7/12/2013 |
| CN604134924 | Archer Well Company Inc. | RN106504731 | 2105 E. Murphy St., Odessa | 9/6/2013 |
| CN604135889 | Cheniere Corpus Christi Pipeline LP | RN106505720 | Proceed North on N. Vineyard Ave. Highway 77 starting at the intersection of Highway 188 and N. Vineyard Ave. Highway 77 in Sinton for approximately 3.7 miles turn left onto a private paved Rd. Then Proceed N.W. for approximately 1.2 miles Compressor Station will be on the left, Sinton | 12/20/2013 |
| CN601504392 | Don Nan Pump and Supply Co Inc. | RN106514011 | 2710 Lucius McCelvey Drive, Temple | 4/12/2013 |
| CN604147603 | WTG Sonora Gas Plant LLC | RN106522535 | Go 7.0 miles North of Rankin on Highway 349. Then go 12.0 miles East on F.M. 1555, Rankin | 6/14/2013 |
| CN600131254 | South Texas Electric Cooperative Inc. | RN106534407 | 3428 West F.M. 490, Edinburg | 12/20/2013 |
| CN604076984 | Premier Silica LLC | RN106545635 | From the intersection of F.M. 1851 and Cr 214 in Voca, travel 0.5 miles South on F.M. 1851 and then 0.8 miles East on Highway 71 to where the site is off the South side of the road, Voca | 11/20/2014 |
| CN602156713 | Lindon Manufacturing & Laboratory LLC | RN106546336 | 41095 Park 290 Dr., Waller | 9/20/2013 |
| CN604112664 | Power Depot Texas Group A LLC | RN106549199 | 29225 Katy Brookshire Rd., Katy | 5/2/2013 |
| CN604112664 | Power Depot Texas Group A LLC | RN106549652 | Approximately 750 ft. West of the intersection of Sequoia Bend Blvd. & Ola Dr., Houston | 6/24/2013 |
| CN600522452 | Colorado Materials Ltd | RN106552342 | Located on the North side of Highway 90 approximately 8 miles West of Uvalde, Uvalde | 8/5/2013 |
| CN604112664 | Power Depot Texas Group A LLC | RN106553118 | 5415 Clara Rd., Houston | 4/19/2013 |
| CN604112664 | Power Depot Texas Group A LLC | RN106553365 | 3422 S. Sam Houston Pkwy East, Houston | 6/21/2013 |
| CN604112664 | Power Depot Texas Group A LLC | RN106557192 | 12121 Cutten Rd., Houston | 4/1/2013 |
| CN603812488 | Gavilon LLC | RN106557606 | Located at the End of Gabriel Road on the Victoria Barge Canal, Seadrift | 3/25/2013 |

| Customer Identification Number (CN) | Company | Reference Number (RN) | Address | Project Completion Date |
|---|---|---|---|---|
| CN600125330 | Solvay USA Inc. | RN106563935 | 5761 Underwood Rd., Pasadena | 3/31/2014 |
| CN603180282 | West Texas Rock Resources LLC | RN106565682 | 4500 County Road 116, Roscoe | 12/9/2013 |
| CN604252627 | Tenaska Brownsville Partners LLC | RN106579600 | East of Old Alice Rd., approximately 500 ft. North of intersection of Old Alice Rd. and F.M. 511, Brownsville | 4/29/2014 |
| CN604256412 | NAT Gasoline LLC | RN106586795 | Approximately 0.3 miles due North of the interchange between TX 347 North Twin City Highway and U.S. 287/ S. U.S. 69/ S. U.S. 96 North at the intersection of Highway 380 Access Rd. and Sulphur Plant Rd., Beaumont | 5/16/2014 |
| CN604256487 | FRP Storage Solutions Co | RN106587009 | 13805 Industrial Rd., Houston | 3/24/2014 |
| CN604259192 | C3 Petrochemicals LLC | RN106592579 | Located on F.M. 2917 approximately 8 miles S of the intersection of Interstate Highway 35 and F.M. 2917, Alvin | 4/21/2014 |
| CN603921495 | NGL Crude Terminals, LLC | RN106596398 | 1603 N. State Highway 35, Aransas County | T0 Be Determined |
| CN604261545 | Voestalpine Texas LLC | RN106597875 | From Corpus Christi Take U.S. 181 North onto F.M. Rd. 136 and go approximately 1.0 mile. Go right onto La Quinta Rd. /Pvt Rd. 87a and the site is approximately 2.0 miles down on the Right. It is bounded on the East by La Quinta Rd. and the South by Corpus Christi Bay, Corpus Christi | 3/18/2014 |
| CN601178817 | Maverick Tube Corporation | RN106606841 | 7960 State Highway 35 North, Bay City | 7/12/2013 |
| CN603331794 | Airgas Carbonic Inc. | RN106614464 | 8870 County Road 128, Alvin | 7/10/2013 |
| CN604272328 | M & G Resins USA LLC | RN106615438 | In Corpus Christi, head East on I-37 toward Exit 10. Take Exit 10 for Carbon Plant Rd. Go 0.2 miles. Turn left on Carbon Rd. /E. Navingation Blvd./Joe Fulton Intl Trade Corridor go 5.0 miles. Turn Right into plant entrance, Corpus Christi | 12/1/2014 |
| CN604274548 | P & K Stone LLC | RN106618978 | 6030 F.M. 1810, Chico | 9/10/2014 |
| CN604278267 | Wespac Port Arthur LLC | RN106628167 | 498b W Lakeshore Dr., Port Arthur | 10/28/2013 |
| CN604278473 | GGS Austin LLC | RN106628548 | 316 State Highway 21 West, Cedar Creek | T0 Be Determined |
| CN604272328 | M&G Resins USA, LLC | RN106631427 | 7001 Joe Fulton International Trade Corridor Ste 200, Corpus Christi | 12/2/2014 |
| CN603213315 | Martin Marietta Materials Southwest Inc. | RN106636111 | From Hondo Drive approximately 4.5 miles North of U.S. Highway 90 on F.M. Rd. 462 to County Rd. 421/Koehler Ln take County Rd. | 1/3/2014 |

| Customer Identification Number (CN) | Company | Reference Number (RN) | Address | Project Completion Date |
|---|---|---|---|---|
| | | | 421 approximately 3.5 miles West entrance gate will be on right, Hondo | |
| CN604282954 | Zachry Odebrecht Parkway Builders | RN106679244 | Located on the East side of Cypress Rosehill Road approximately 0.6 Mile North of its intersection with Juergen Road, Houston | 9/18/2013 |
| CN604282954 | Zachry Odebrecht Parkway Builders | RN106680234 | Located on the North side of F.M. 2920. 0.7 miles East of its intersection with Boudreaux Road., Houston | 9/18/2013 |
| CN600510341 | Sanderson Farms Inc (Production Division) | RN106690621 | From the intersection of Loop 256 and Highway 79s in Palestine, drive 13.5 miles on Highway 79s to the site on the Left, Oakwood | 8/8/2013 |
| CN604311902 | Cimbar Performance Minerals Mv LLC | RN106710643 | 18511 Beaumont Highway, Houston | 9/26/2014 |
| CN604313361 | FGE Power LLC | RN106716632 | Located approximately 3.5 miles S.W. of the intersection of I-20 and Main Street, Westbrook | 3/24/2014 |
| CN604282954 | Zachry Odebrecht Parkway Builders | RN106721632 | Located on the West side of I-45 North of the Railroad at Spring Stuebner Road, Houston | 9/18/2013 |
| CN603204694 | Drilling Structures International Inc. | RN106754484 | 11704 Trickey Rd., Houston | 6/25/2014 |
| CN604326009 | Invenergy Thermal Development LLC | RN106754989 | Fr Goldsmith, go East on Highway 158. Turn North on Holt Rd. Turn West on S.W. 3601. Facility is 3 miles on right, Goldsmith | 8/1/2014 |
| CN602823882 | General Plastics & Composites LP | RN106834831 | 6910 E. Orem Dr., Houston | 10/31/2014 |
| CN604346171 | Texas Triumph Seed Co., Inc. | RN106835150 | 1111 State Highway 62 Aka 82 Bypass Rd., Ralls | 12/11/2014 |
| CN604347161 | Southern Power Company | RN106837263 | Fr Highway 31, head North on Forehand Rd. Site is located East of Highway 274 and West of Forehand Rd. approximately 0.75 miles North of Highway 31, Trinidad | 11/20/2014 |
| CN604350280 | Indeck Wharton, LLC | RN106844137 | West side of State Route 71 3350 ft. South of the intersection of Route 71 and County Road 424 In Danevang. About 0.50 miles South of the center of Danevang, Danevang | 2/2/2015 |
| CN603973793 | U.S. Galvanizing, LLC | RN106856578 | Northwest corner of Kiefer Road and F.M. 1346, San Antonio | 2/7/2014 |
| CN604361196 | IKO Southwest, Inc. | RN106869258 | From I-35 In Hillsboro, take Exit onto TX 579 Spur West. Go 0.2 miles and turn left toward Old Dallas Highway North. Go 0.3 miles and turn right onto Old Dallas Highway North. Site will Be on the Left, Hillsboro | 7/18/2014 |

| Customer Identification Number (CN) | Company | Reference Number (RN) | Address | Project Completion Date |
|---|---|---|---|---|
| CN604118901 | Enterprise Logistic Services LLC | RN106879075 | 4515 W. Baker Rd., Bay Town | 10/14/2014 |
| CN604376574 | Enchanted Rock Solutions, LLC | RN106898257 | 3630 Highway 1765, Texas City | 2/26/2014 |
| CN600125827 | Oxy USA Wtp LP | RN106902836 | From Ira go West on F.M. 1606 for 4.8 miles to F.M. 2085 for 2.5 miles to F.M. 1298. Go North on F.M. 1298 to F.M. 1610. Turn West on F.M. 1610 and proceed 3.0 miles. Turn Right to the Srcu Water Station. | T0 Be Determined |
| CN600240212 | Alamo Concrete Products Company | RN106942873 | 1.6 miles North on 16 miles Rd. From intersection of Highway 83 & 16 miles Rd. West of Sullivan City. Sullivan City | 1/22/2014 |
| CN600269427 | Slay Transportation Co., Inc. | RN106954704 | 6000 Block of West Bay Road. 0.6 miles North of intersection of West Bay Road and Highway 99, Bay Town | 6/6/2014 |
| CN600317473 | Apac-Texas, Inc. | RN106955495 | Portablese Corner Sh80 & Spur 557 in Terrell, Terrell | T0 Be Determined |
| CN604396259 | Tenaska Roan's Prairie Partners, LLC | RN106955545 | From College Station Head NE on F.M. Rd. 60 University Dr. toward Jane St. Turn right onto TX 6 Frontage South. Turn left onto Harvey Rd. Slight Right onto TX 10 East. Site Is 22.4 miles down TX 30 East on right side, Shiro | 9/22/2014 |
| CN604498675 | Nehemiah Elite Wall Systems, Inc. | RN107043630 | 2311 Lifehaus Industrial Dr., New Braunfels | 3/17/2015 |
| CN604502021 | Golden Pass Products LLC | RN107053530 | 3752 South Gulfway Dr., Sabine Pass | 1/16/2015 |
| CN604502252 | CCI Corpus Christi LLC | RN107054116 | From I-37 South, exit onto County Road 55b Carbon Plant Rd. Proceed on Carbon Plant Road 6.8 miles to site on right, Corpus Christi | T0 Be Determined |
| CN600535538 | Cherry Crushed Concrete, Inc. | RN107076002 | 9929 Katy Hockley Cut Off Road, Katy | 9/30/2014 |
| CN603802026 | Trinity Infrastructure, LLC | RN107088924 | 2401 E. Airport Fwy., Irving | 4/24/2014 |
| CN601176423 | Big City Crushed Concrete, L.P. | RN107106817 | 4600 Old Decatur Rd., Fort Worth | 9/16/2014 |
| CN604526749 | NTE Texas, LLC | RN107120339 | From Sweetwater, head South on Highway 70 for 16.0 miles to the site on the Left and South of the Enterprise Energy Transfer Compressor Station, Blackwell | 12/19/2014 |
| CN604526566 | Fox Creek Cedar Oil LLC | RN107122731 | On the West side of F.M. 100 0.25 Mile South of the intersection of F.M. 100 and County Road 2860, Honey Grove | 8/11/2014 |
| CN600497804 | CSA Materials, Inc. | RN107123572 | 6625 N. Burma Rd., Carlsbad | T0 Be Determined |
| CN604533083 | TPR-Tyler, LLC | RN107137804 | 11910 County Road 492, Tyler | T0 Be Determined |

| Customer Identification Number (CN) | Company | Reference Number (RN) | Address | Project Completion Date |
|---|---|---|---|---|
| CN604388751 | Inhance Technologies LLC | RN107142770 | 16223 Park Row Ste 100, Houston | 11/10/2014 |
| CN601221658 | Starrfoam Manufacturing, Inc. | RN107161960 | 3220 Avenue F, Arlington | 9/29/2014 |
| CN604549634 | Triangle Brick Company | RN107199929 | From Henrietta Travel S.E. on U.S. Highway 287 for approximately 10 miles to proposed site Which Is approximately 0.5 miles East of U.S. Highway 287, Henrietta | 10/17/2014 |
| CN604554121 | Ls Energy Fabrication, LLC | RN107210528 | 2050 F.M. 1405 Rd., Baytown | T0 Be Determined |
| CN604557975 | Eagle Railcar Services-Wichita Falls, Texas, LLC | RN107223562 | 4501 Allendale Rd., Wichita Falls | 10/9/2014 |
| CN604558387 | Rio Ammunition Inc. | RN107224529 | 7300 Regency Rd., Marshall | 12/12/2014 |
| CN601275134 | Plains Marketing, L.P. | RN107247298 | 5500 Up River Rd., Corpus Christi | T0 Be Determined |
| CN604576488 | Excelerate Liquefaction Operations (Port Lavaca), LLC | RN107273930 | On F.M. 1593 go 2.4 miles South of intersection with State Highway 35., Point Comfort | T0 Be Determined |
| CN600355465 | Vulcan Construction Materials, LP | RN107283764 | 3551 E. F.M. 1093 Rd., Wallis | T0 Be Determined |
| CN600520019 | Williams Brothers Construction Co., Inc. | RN107286395 | 25000 Jack Rd., Hockley | 3/16/2015 |
| CN604604140 | Navasota South Peakers Operating Company Ii LLC | RN107394942 | From I-10 in Seguin, turn North on State Rd. 123. Go 2.3 miles. Turn West on County Rd. 108. Go 2.1 miles. Turn North on County Rd. 107a. Go 1.4 miles. Go Left on 118 Link Rd. To site on North side of 118 Across from Electrical Substation, Seguin | T0 Be Determined |
| CN604607424 | Navasota South Peakers Operating Company I LLC | RN107418725 | Site is located 4.5 miles N.W. of Nixon off F.M. 1681. Take Cr 475 South 1 mile. The property is located on the East side of Cr 475 where Cr 475 turns back to the South, Nixon | T0 Be Determined |
| CN604608786 | Navasota North Country Peakers Operating Company I LLC | RN107425340 | Fr U.S. 75 in Van Alstyne turn East on Van Alstyne Pkwy. For 0.6 miles turn South on Waco St. For 0.1 miles turn East onto Jefferson St. For 0.2 miles, turn South on Sherman Rd. For 0.4 miles, turn East on Ballard Rd. for 1.6 miles, Van Alstyne | T0 Be Determined |
| CN604615724 | Long Industries Incorporated | RN107463739 | 105 Fcr 413, Freestone | T0 Be Determined |
| CN604620286 | Lone Star Milk Producers, Inc. | RN107486771 | Approximately 0.75 mile West of the intersection of U.S. Highway 60 and Soncy Road on the South side of U.S. Highway 60, Canyon | 2/18/2015 |
| CN604622621 | Texas Steel LLC | RN107503724 | 322 El Blanco Ln, Waco | 3/9/2015 |

| Customer Identification Number (CN) | Company | Reference Number (RN) | Address | Project Completion Date |
|---|---|---|---|---|
| CN604347161 | Southern Power Company | RN107551335 | Property Is South of Lundquist Road At the intersection of TX County Road 710 and Lundquist Rd., Granado | T0 Be Determined |
| CN604633974 | Rockwood Energy Center, LLC | RN107573610 | Southwest corner of the intersection of Cr 111 and Cr 116 approximately 5.0 miles Northwest of Garwood., Garwood | 2/9/2015 |
| CN603743030 | Flint Hills Resources Port Arthur, LLC | RN107591323 | 100 E. Port Neches Ave., Port Neches | 9/30/2014 |
| CN604090050 | RISC, LLC | RN107596140 | From Littlefield At the intersection of U.S. 54 and U.S. 84 go W on U.S. 54 for 4.86 miles Then South on Cr 141 for 0.5 miles Then go East on Ranch Land to Quarry, Littlefield | 3/5/2015 |
| CN604647123 | Apex Texas Power, LLC | RN107615544 | From Cuney go S.E. on Highway 175 0.9 miles go North on F.M. 855 for 0.5 miles East on Cr 3415 for 0.1 miles Facility on South side of Cr 3415, Cuney | T0 Be Determined |
| CN604656827 | Halyard Energy Henderson, LLC | RN107670341 | From the intersection of Texas Farm to Market 2588 and County Road 4402 Drive 0.3 miles West on County Road 4402 and the site Will Be on the Right, Larue | T0 Be Determined |
| CN600407431 | Whittlesey Landscape Supplies and Recycling, Inc. | RN107689341 | 822 County Road 321, Kingsland | T0 Be Determined |
| CN600535538 | Cherry Crushed Concrete, Inc. | RN107698995 | 5810 Riley Fuzzell Rd., Spring | T0 Be Determined |
| CN603207218 | NRG Texas Power LLC | RN107702789 | 2.0 miles South of the intersection of F.M. 2917 and F.M. 2004, Alvin | T0 Be Determined |
| CN600130645 | Praxair, Inc. | RN107737546 | Located on TX 332 East 1.3 miles NW of the intersection of TX 332 and F.M. 523 on the South side of TX 332 East, Freeport | T0 Be Determined |
| CN600127450 | Containment Solutions, Inc. | RN107742280 | 1949 American Legion Dr., Huntsville | T0 Be Determined |
| CN604688283 | Cheniere Liquids Terminal, LLC | RN107790131 | 0.5 miles S.W. of the intersection of 8th St. and Avenue B, Ingleside | T0 Be Determined |
| CN600135198 | City of Austin | RN107800245 | 3500 W. 35th St., Austin | T0 Be Determined |
| CN604697532 | Global Companies LLC | RN107816928 | 7200 Highway 87, Port Arthur | T0 Be Determined |
| CN604708735 | Taylor & Taylor Construction, Inc. | RN107856163 | 204 Preston Ave., Pasadena | T0 Be Determined |
| CN602881567 | Airgas Specialty Products, Inc. | RN107863789 | 6603a W Bay Rd., Baytown | T0 Be Determined |
| CN604358218 | Argos Ready Mix (South Central) Corp. | RN107866931 | 2900 W Commerce St., Dallas | T0 Be Determined |
| CN604688283 | Cheniere Liquids Terminal, LLC | RN107891970 | From Taft Head S.W. on Davis Rd. F.M. 631 for 2.0 miles Turn South on Cr 3161 Drive 2.7 miles to site, Taft | T0 Be Determined |

| Customer Identification Number (CN) | Company | Reference Number (RN) | Address | Project Completion Date |
|---|---|---|---|---|
| CN604697318 | Thalle Midlothian Partners LLC | RN107897126 | 9360 Baucum Rd., Midlothian | T0 Be Determined |
| CN604724831 | Corrigan OSB, LLC | RN107922510 | From Corrigan, head West on E. 2nd St. toward S. Home St. 39 ft., take the first Left onto U.S. 59 North/S. Home St. and go 1.4 miles to facility, Corrigan | T0 Be Determined |
| CN602898751 | Nalco Company | RN107939340 | 4424 S. Highway 87, Big Spring | T0 Be Determined |
| CN604731257 | Halyard: Energy Wharton, LLC | RN107948754 | From the intersection of TX F.M. 1160 and Cr 392, drive 0.4 miles North. The site will be on the Left, El Campo | T0 Be Determined |
| CN604523688 | Whole Foods Market Rocky Mountain/Southwest, L.P. | RN107950719 | 1407 S. Voss Rd., Houston | T0 Be Determined |
| CN600355465 | Vulcan Construction Materials, LP | RN107954042 | Located on the West side of Rr 1022 approximately 7.8 miles South of U.S. Highway 90, Uvalde | T0 Be Determined |
| CN604615724 | Long Industries Incorporated | RN107954984 | 10662 U.S. Highway 87 North, Carlsbad | T0 Be Determined |
| CN600310684 | Service Transport Company | RN107998726 | 5054 I-37, Corpus Christi | T0 Be Determined |
| CN600128821 | Brazos Electric Power Cooperative, Inc. | RN108005562 | 3750 F.M. 66, Grandview | T0 Be Determined |
| CN604754184 | Safina Materials, Inc. | RN108072729 | 100 Hilbig Rd., Conroe | T0 Be Determined |
| CN600396071 | Unifirst Corporation | RN108117524 | 9019 Railwood Dr., Houston | T0 Be Determined |
| CN600535538 | Cherry Crushed Concrete, Inc. | RN108151945 | 6400 Koeblen Rd., Richmond | T0 Be Determined |
| CN603500554 | Carefusion 213 LLC | RN102195153 | 1550 Northwestern Dr., El Paso | 05/27/2010 |
| CN603828427 | Air System Components Inc. | RN102316981 | 12504 Weaver Rd., El Paso | 12/19/2011 |
| CN601503253 | Cardinal Health 200 LLC | RN102958253 | 1 Butterfield Trail Blvd., El Paso | 09/17/2013 |
| CN603403973 | Cemex Construction Materials South LLC | RN104752621 | 2050 Cherrington St., El Paso | 01/11/2011 |
| CN603774274 | Aer Electronics Inc. | RN106030349 | 1790 Commerce Park Dr., El Paso | 09/28/2012 |
| CN600352819 | El Paso Electric Company | RN106392624 | Approximately 0.7 miles North of the intersection of United States Highway 62/180 and United States Highway 659/Zaragosa Road, El Paso | 10/02/2014 |
| CN600495840 | the Humane Society of El Paso, Inc. | RN106874878 | 4991 Fred Wilson Ave., El Paso | 11/15/2013 |

# Appendix E

## Lead Waiver Renewal

Texas Commission on Environmental Quality
Texas Five-Year Ambient Monitoring Network Assessment

## TCEQ Interoffice Memorandum

To: Lindsey Jones, Assistant Director
Monitoring Division
Office of Compliance and Enforcement

Thru: Daniel Menendez, Team Leader
Air Dispersion Modeling Team (ADMT)
Air Permits Division

From: Matthew Kovar
ADMT
Air Permits Division

Date: April 7, 2015

**Subject: Modeling Analysis of Lead for the Lower Colorado River Authority (LCRA) (RN100226844)**

### Project Identification Information

On November 12, 2008, the U.S. Environmental Protection Agency (EPA) finalized the new 0.15 microgram per cubic meter (μg/m$^3$) NAAQS for lead based on a rolling three-month average. On December 27, 2010 (75 Federal Register 81134), the EPA lowered the emission threshold from annual lead emissions of one ton or more to a half a ton or more in actual emissions that state agencies must use to determine if an air quality monitor should be placed near an industrial facility that emits lead. The rule further requires that this monitoring be conducted at or near the maximum off-site ambient air lead concentration, as predicted by modeling. The LCRA Fayette Power Project was identified as having emissions at or above the threshold based on the reported 2013 TCEQ Emissions Inventory.

The TCEQ conducted air dispersion modeling of lead emission sources at the site in 2012 in support of a lead monitoring waiver for the LCRA. The ADMT reviewed the 2012 modeling analysis and determined that additional modeling is not required for the renewal of the lead monitoring waiver.

### Report Summary

The predicted maximum ground level concentration (GLCmax) is 0.0036 µg/m$^3$ for a rolling three-month average. This concentration was determined by multiplying the 2012 modeling result to the ratio of the current permit allowable emission rates to the previously modeled permit allowable emission rates. Please refer to section 3 below for further details. The location of the GLCmax is approximately 1370 meters from EPN 3-1B to the north-northwest. Table 1 lists the location of the predicted GLCmax. The location is in the UTM Zone 14 North, North American Datum of 1983 (NAD83) coordinate system.

**Table 1. Modeling Results for Lead**

| Easting (meters) | Northing (meters) | Averaging Time | GLC (µg/m$^3$) | Standard (µg/m$^3$) |
|---|---|---|---|---|
| 716900 | 3312900 | rolling three-month | 0.0036 | 0.15 |

**Modeling Discussion**

The 2012 modeling analysis utilized the permit allowable emission rates for the three boiler stacks (EPNs 3-1B, FPP-1N, and FPP-2N) located at the site. The total short-term permit allowable emission rate for all three boiler stacks was modeled for each boiler stack. The maximum predicted concentration of the three boiler stacks was determined to be less than half the lead NAAQS (0.00145 µg/m$^3$). The 2012 modeling report is attached for reference.

In order to show that the 2012 modeling analysis is still valid, the ADMT reviewed recent permitting actions to determine if any changes have been made to the modeled sources since 2012. Based on the review, the ADMT determined that there have been no changes related to the modeled source parameters. However, the total short-term permit allowable emission rate for the three boiler stacks has increased since 2012. Table 2 shows what the change to the modeled emission rates would be for each source.

**Table 2. On-Property Source Modeled Emission Rates**

| EPN | Pollutant | 2012 Emission Rate (lb/hr) | 2015 Emission Rate (lb/hr) |
|---|---|---|---|
| 3-1B | Lead | 0.29 | 0.72 |
| FPP-1N | Lead | 0.29 | 0.72 |
| FPP-2N | Lead | 0.29 | 0.72 |

Since the model predicted concentrations are proportional to the modeled emission rates, the ADMT conducted a simple scaling exercise to demonstrate that the increased emissions would result in a maximum predicted concentration less than half the lead NAAQS.

The ADMT multiplied the 2012 maximum predicted concentration (0.00145 $\mu g/m^3$) by the ratio of the 2015 permit allowable emission rate to the modeled 2012 permit allowable emission rate (0.72 lb/hr/0.29 lb/hr) to derive a maximum predicted concentration that is less than half the lead NAAQS, as reported in Table 1. Given this demonstration, additional modeling is not required.

## TCEQ Interoffice Memorandum

To: Lindsey Jones, Assistant Director
Monitoring Division
Office of Compliance and Enforcement

Thru: Daniel Menendez, Team Leader
Air Dispersion Modeling Team (ADMT)
Air Permits Division

From: Matthew Kovar
ADMT
Air Permits Division

Date: April 23, 2015

**Subject: Modeling Analysis of Lead for U.S Army (Fort Hood) (RN101612083)**

### Project Identification Information

On November 12, 2008, the U.S. Environmental Protection Agency (EPA) finalized the new 0.15 microgram per cubic meter (µg/m$^3$) NAAQS for lead based on a rolling three-month average. On December 27, 2010 (75 Federal Register 81134), the EPA lowered the emission threshold from annual lead emissions of one ton or more to a half a ton or more in actual emissions that state agencies must use to determine if an air quality monitor should be placed near an industrial facility that emits lead. The rule further requires that this monitoring be conducted at or near the maximum off-site ambient air lead concentration, as predicted by modeling. U.S. Army (Fort Hood) was identified as having emissions at or above the threshold based on the reported 2013 TCEQ Emissions Inventory.

The TCEQ conducted air dispersion modeling of lead emission sources at the site in 2009 in support of a lead monitoring waiver for U.S. Army (Fort Hood). The ADMT reviewed the 2009 modeling analysis and determined that additional modeling is not required for the renewal of the lead monitoring waiver.

### Report Summary

The predicted maximum ground level concentration (GLCmax) is 0.02 µg/m$^3$ for a rolling three-month average. The location of the GLCmax is along the southern property line. Table 1 lists the location of the predicted GLCmax. The location coordinates are in the UTM Zone 14 North, North American Datum of 1927 (NAD27) coordinate system.

**Table 1. Modeling Results for Lead**

| Easting (meters) | Northing (meters) | Averaging Time | GLC (µg/m$^3$) | Standard (µg/m$^3$) |
|---|---|---|---|---|
| 618000 | 3446900 | rolling three-month | 0.02 | 0.15 |

## Modeling Discussion

The 2009 modeling analysis utilized the reported emissions for the 2007 Texas Emissions Inventory (1.0501 tpy). The lead emissions originate from the firing ranges at Fort Hood. In the modeling analysis, the reported emissions were divided amongst the various firing ranges based on the ratio of each firing range area to the total firing range area. The maximum predicted concentration from the firing ranges was determined to be less than half the lead NAAQS, as reported in Table 1. The 2009 modeling report is attached for reference.

In order to show that the 2009 modeling analysis is still valid, the ADMT reviewed recent permitting actions to determine if any changes have been made to the modeled sources since 2009. Based on the review, the ADMT determined that there have been no changes related to the modeled source parameters. In addition, the ADMT reviewed the reported emissions from the 2013 Texas Emissions Inventory (0.74 tpy). Since the reported emissions have decreased from 1.0501 tpy to 0.74 tpy, any additional modeling would utilize lower emission rates for the firing ranges compared to the 2009 modeling analysis. Table 2 shows what the change to the modeled emission rates would be for each source.

**Table 2. On-Property Source Modeled Emission Rates**

| Source ID | Pollutant | 2009 Emission Rate (lb/hr) | 2015 Emission Rate (lb/hr) |
|---|---|---|---|
| NFHS | Lead | 0.0056 | 0.004 |
| NFHR | Lead | 0.0079 | 0.0055 |
| OBJID_8 | Lead | 0.0105 | 0.0074 |
| OBJID_9 | Lead | 0.0062 | 0.0044 |
| IHSR | Lead | 0.0306 | 0.0215 |
| HGQ | Lead | 0.0026 | 0.0018 |
| PKGL | Lead | 0.0053 | 0.0037 |

| Source ID | Pollutant | 2009 Emission Rate (lb/hr) | 2015 Emission Rate (lb/hr) |
|---|---|---|---|
| BGRB | Lead | 0.0113 | 0.0079 |
| BGPQ | Lead | 0.0017 | 0.0012 |
| BGRC | Lead | 0.0255 | 0.018 |
| PKAT4 | Lead | 0.0054 | 0.0038 |
| BWPA | Lead | 0.0018 | 0.0013 |
| BWPB | Lead | 0.0017 | 0.0012 |
| HGC | Lead | 0.0025 | 0.0017 |
| NFHRB | Lead | 0.0128 | 0.009 |
| HGDA | Lead | 0.0023 | 0.0016 |
| BWGL | Lead | 0.0149 | 0.0105 |
| PKRZ | Lead | 0.0068 | 0.0048 |
| PKRA | Lead | 0.0066 | 0.0047 |
| BWMS | Lead | 0.0411 | 0.029 |
| PSR | Lead | 0.0367 | 0.0258 |

Modeling these lower emission rates would result in lower predicted lead concentrations than the reported lead concentrations associated with the 2009 modeling analysis. Therefore, the 2009 modeling analysis results are valid for the purposes of renewing the lead monitoring waiver for U.S. Army.

# Appendix F

## Acronym and Abbreviation List

Texas Commission on Environmental Quality
Texas Five-Year Ambient Monitoring Network Assessment

AD – attainment designation

AMCV – air monitoring comparison values

AMNP – Annual Monitoring Network Plan

APWL – Air Pollutant Watch List

AQS – air quality system

AutoGC - automated gas chromatograph

CFR – Code of Federal Regulations

CO – carbon monoxide

°C – degrees Celsius

°F – degrees Fahrenheit

E – East

EI – emissions inventory

EPA – Environmental Protection Agency

= – equal

FCAA – Federal Clean Air Act

FEM – federal equivalent method

FR – Federal Register

FRM - federal reference method

> – greater than

HGB – Houston-Galveston-Brazoria

HL&P – Houston Light and Power

I/M – inspection and maintenance

LADCO – Lake Michigan Air Directors Consortium

< – less than

LLC – Limited Liability Corporation

LP – Limited Partnership

LBJ – Lyndon Baines Johnson

MSA – Metropolitan Statistical Area

$\mu g/m^3$ –micrograms per cubic meter

NAAQS – national ambient air quality standards

NCore – National Core multipollutant monitoring stations, as defined by 40 Code of Federal Regulations Part 58

NEI – National Emissions Inventory

$NO/NO_2/NO_x$ – oxides of nitrogen; includes nitric oxide (NO) and nitrogen dioxide ($NO_2$)

$NO_y$ – highly reactive nitrogen oxide species

# – number

$O_3$ – ozone

PAMS – photochemical air monitoring station

Pb - lead

% – percent

$PM_{10}$ – particulate matter of 10 micrometers or less in diameter

$PM_{10-2.5}$ – coarse particulate matter between 2.5 and 10 micrometers in diameter

$PM_{2.5}$ - particulate matter of 2.5 micrometers or less in diameter

ppb – parts per billion

ppm – parts per million

PWEI – population weighted emissions index

QA Collocated – quality assurance collocated

RA-40 – regional administrator required monitoring

RACT – reasonably available control technology

Rd – road

RFP – reasonable further progress

SETRPC – South East Texas Regional Planning Committee

SH – state highway

SIP – State Implementation Plan

SLAMS – state and local air monitoring station

$SO_2$ – sulfur dioxide

SPM – special purpose monitor

STN – Speciation Trends Network

SVOC – semivolatile organic compounds

TAC – Texas Administrative Code

TAMIS – Texas Air Monitoring Information System

TCEQ – Texas Commission on Environmental Quality

TEOM - tapered element oscillating microbalance

tpy – tons per year

TSP (Pb) – lead in total suspended particles

U.S. – United States

VOC – volatile organic compound