

# Business-Focused Ozone Precursor Monitoring Program

Shane Siebenaler  
Southwest Research Institute<sup>®</sup>

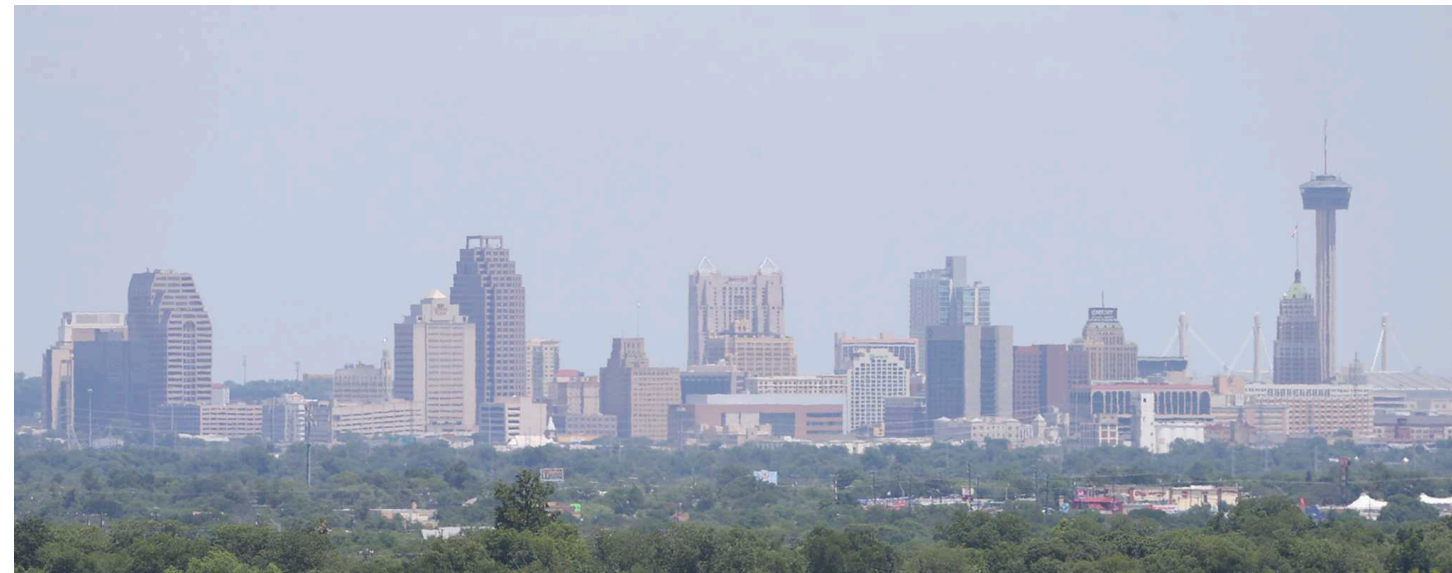
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# Motivation

- Businesses may inadvertently be contributing to emissions of ozone precursors
- Assisting them to identify and mitigate such emissions can move the needle in reducing surface-level ozone



# Project Scope

- Overall objective is to drive reductions in ozone levels through interfacing with businesses
- Activities
  - Conduct monitoring at various sites
  - Identify significant sources of non-biogenic ozone precursors to provide actionable data to site owners
  - Engage with local businesses

# Research Questions

- Is there a measurable, singular source of VOCs that could largely explain exceedances?
- Are there any lessons that could be applied across various segments of the business community?
- What can businesses do to help Bexar County “move the needle,” even if their business is not identified as a significant source of emissions?



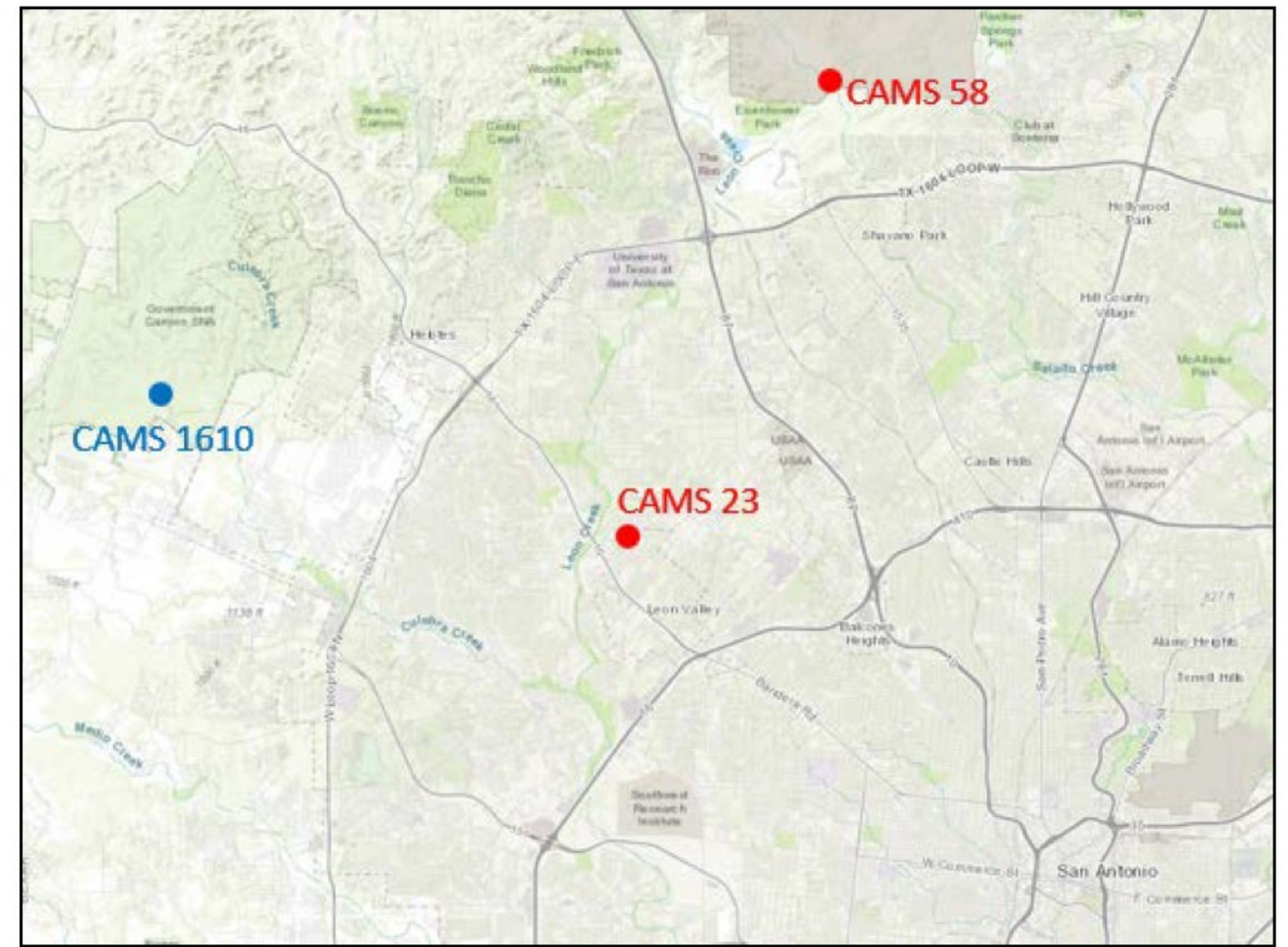
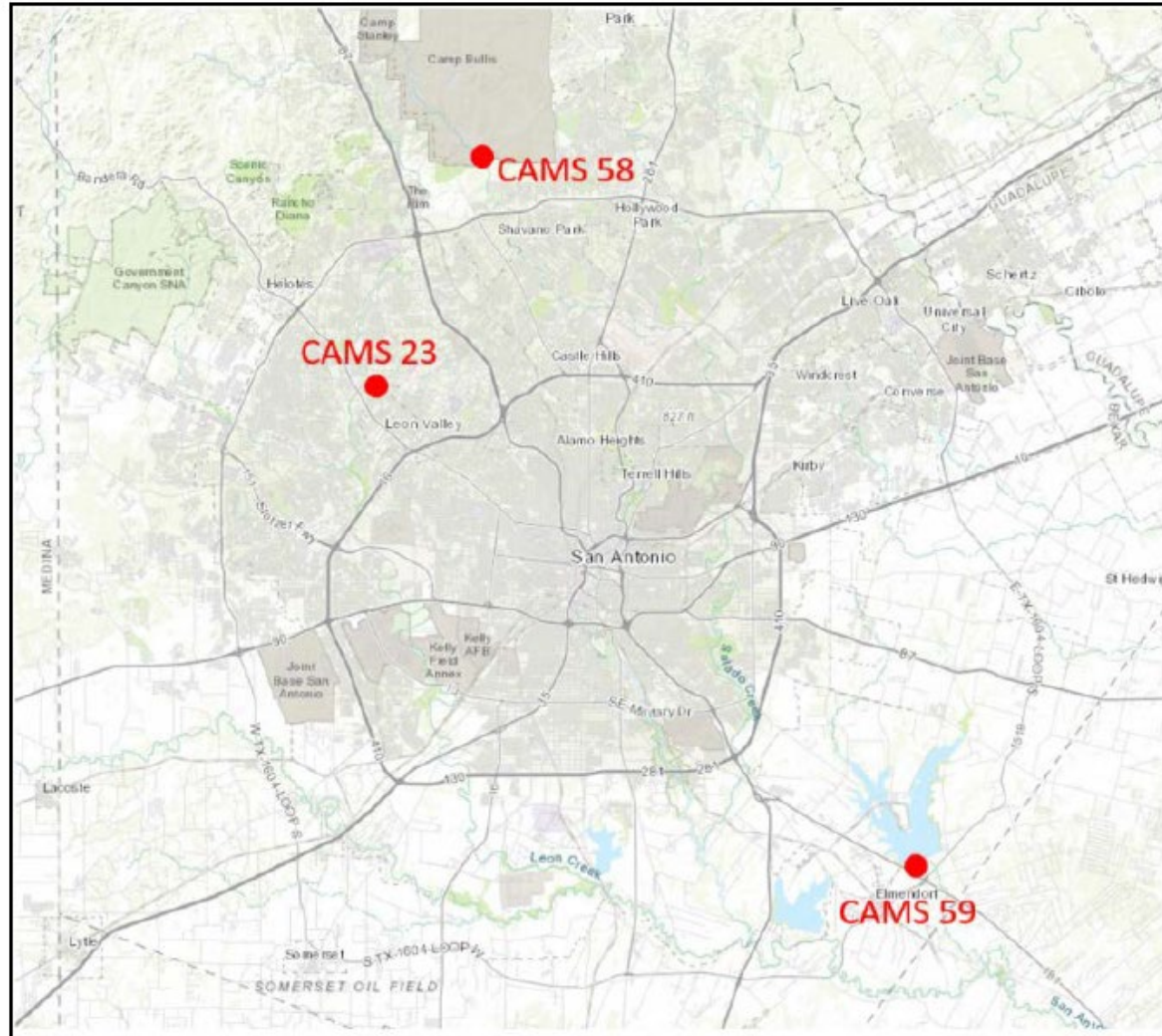
# Monitoring Overview



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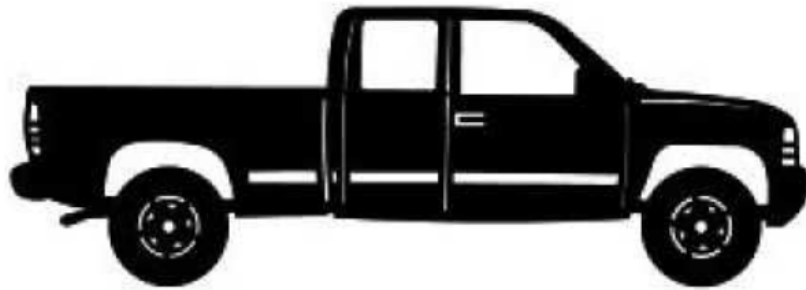


# CAMS



# Modes of Monitoring

## Mobile Monitoring (Public ROW)



Obstructed Views  
Stationary Monitoring Not Practical

## Aerial Monitoring



Great Canvassing  
Cannot Determine Compound

## Onsite Monitoring



Identify Specific Compounds  
Locate Specific Sources  
Requires Cooperation From Business

# Instruments



FLIR G300a



Syft Voice 200 SIFT-MS





# Monitoring Campaign

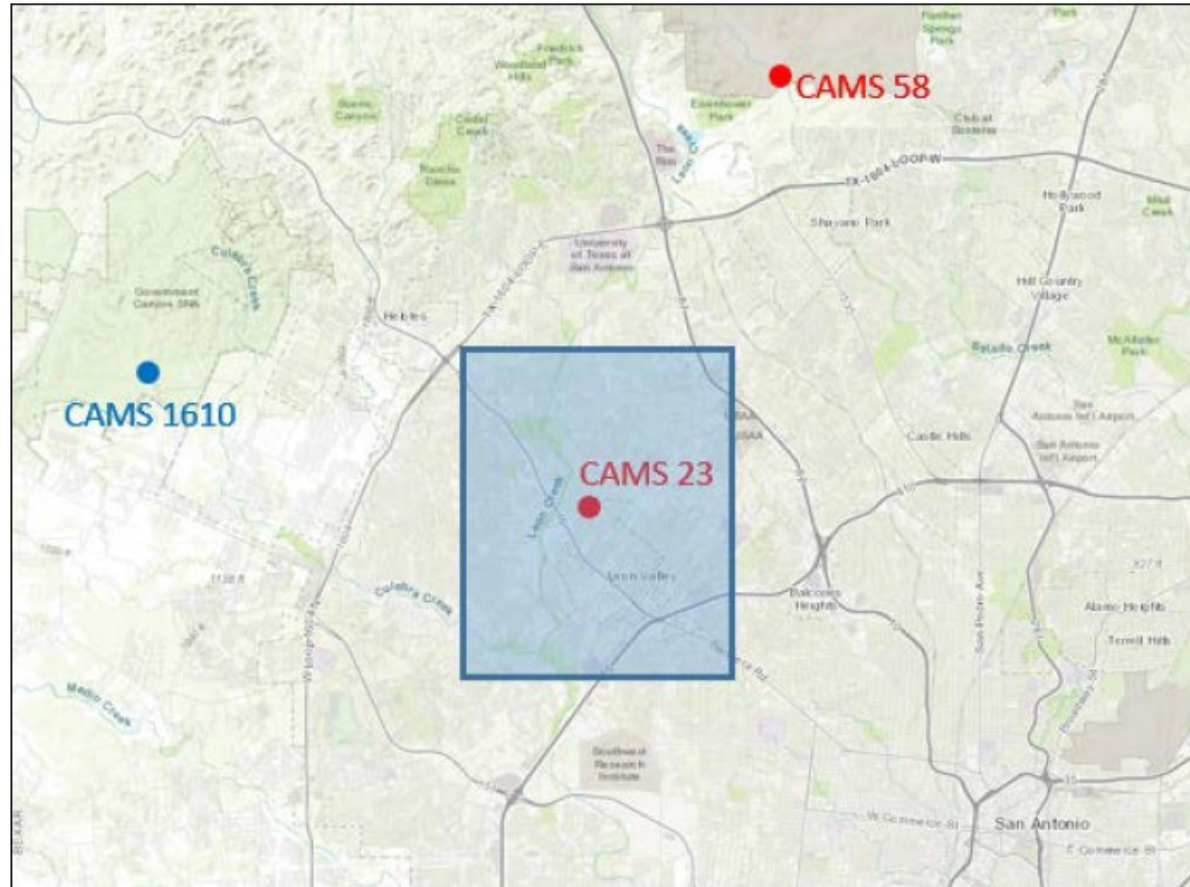


10 Large Industrial Sites  
3 CAMS

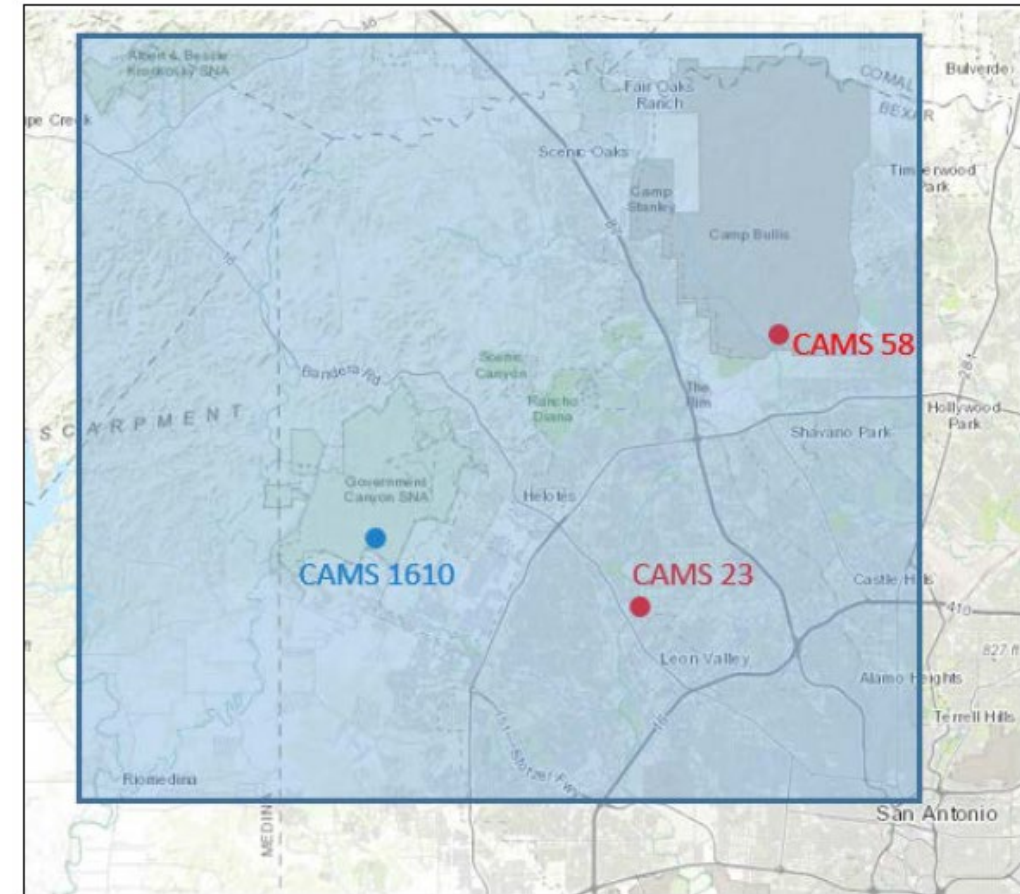


3 CAMS  
5 Large Industrial Sites  
15 Retail Refueling Stations  
10 Small Businesses

# Monitoring Campaign – Cont'd



Small Businesses



Larger Sites

# Results



# Ozone Formation Potential

- VOCs differ in effects they have on ozone formation and accumulation
- Terms used include:
  - Ozone formation potential
  - Photoreactivity
  - Maximum incremental reactivity
- Example: toluene is 285 times as reactive as methane

# Some Results

- Emissions from stacks observed with IR at three large sites
- Liquid fuel tank leak at one site
- No leaks found at 15 retail gas stations
- Methane leaks found at two large sites and near two smaller sites



# Results – Cont'd

- Multiple paint and body shops with emissions
  - Ethylbenzene, toluene, propane, styrene, and benzene
- Low levels of propane, propene, and butane at all CAMS
  - Non-trivial amounts of isoprene and terpenes of likely biogenic origin measured
- VOCs observed during paving operations

# Revisiting of Research Questions

- Is there an obvious, singular source of VOCs that could largely explain exceedances?
- Are there any lessons that could be applied across various segments of the business community?
- What can businesses do to help Bexar County “move the needle,” even if their business is not identified as a significant source of emissions?

# Singular Source?

- No single sites were significant emitters
- A large percentage of all sites had emissions

# Lessons That Could Be Applied

- Even well-managed sites had leaks
- Use of complimentary approaches was beneficial
  - Only one of the three non-stack emissions from larger sites would have been detected from aerial monitoring
- Methane leaks seems prevalent
  - Methane is a powerful greenhouse gas



# Actions By Businesses

- Shift production
- Inspect equipment
- Substituting chemicals
- Abatement controls for VOCs
- Training and maintenance of equipment
- Fleet vehicle improvements

**Practical Ozone Mitigation  
and Control Strategies**

SOUTHWEST RESEARCH INSTITUTE®

SAMHD Ozone Mitigation Workshop  
June 18, 2020  
Michael Lewis, PhD, PE, PG

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# Mitigation


- Visits with individual businesses
- Workshop
- Creation of flyer

## The Business of Air Quality





**What's happening with our air?**  
Currently, Bexar County and San Antonio are not meeting the National Ambient Air Quality Standards enforced by the US Environmental Protection Agency. Bexar County and San Antonio air pollutant problems are mostly associated with high concentrations of ground-level ozone. While ozone in the upper layers of the atmosphere helps by blocking harmful ultraviolet rays from reaching the earth, high concentrations of ozone at ground level can negatively impact our health.

**Why should my business and I care?**  
Poor air quality isn't "just another statistic," it negatively impacts:  
- Your health: it can lead to asthma attacks, lung damage, heart attacks, and strokes.  
- Your business and the economy: if Bexar County does not meet ambient air quality standards, more regulations are enacted for businesses that wish to expand, modify operations, or relocate to San Antonio. This can impact economic growth in our area.

**How is Ozone formed?**  
Ground-level ozone pollution is formed when nitrogen oxides (NO<sub>x</sub>) and Volatile Organic Compounds (VOCs) react on hot, sunny days. Because of San Antonio's extended summer-like weather, our "ozone season" lasts from March 1 through November 30, but we should be mindful of good practices year-round.




**How do San Antonio businesses contribute to air quality problems?**  
Businesses and industry are an important part of our economy, but some common industry operations and manufacturing processes produce emissions that contribute to poor air quality.  
- Many combustion processes produce NO<sub>x</sub>.  
- Gasoline and many solvents, paints, and cleaning products generate VOCs.  
- Vehicles, including commuters and delivery vehicles, produce both NO<sub>x</sub> and VOC emissions from driving, idling, and refueling.  
- Gas-powered equipment can also contribute NO<sub>x</sub> and VOC.

Waste/Fuel Storage & Loading Operations	Solvent Application/Cleaning	Chemical Process Reactors	Combustion Devices
 Petroleum Product Fuel Tanks Fueling Terminals Waste/Intermediate Material Storage	 Degreasing Surface Coating & Refinishing	 Material Recovery/Drying Process Venting for Turnarounds	 Boilers/Furnaces Cement Kilns Combustion Engines & Gas Turbines

**10 ways your business can make a difference**  
Join the efforts to improve San Antonio air quality! Everyone's efforts matter, and it may even help the bottom line of your business.

- 1 Evaluate your business processes to identify where pollutants are being produced.
- 2 Inspect your equipment, including emissions control hardware, to ensure it is properly working. Train your staff on how to properly use such equipment.
- 3 Look for fixable leaks, or open sources that can be better contained (for example, covering solvent baths to reduce emissions).
- 4 Consider substituting "greener" chemicals (non-VOC solvents), adding pollution abatement equipment, or upgrading existing equipment (including switching to electric vehicles and engines, where possible).
- 5 Consider process changes that reduce emissions (for example, fueling vehicles or using volatile chemicals late in the day).
- 6 Energy is produced by the combustion of fossil fuels such as oil, coal, and gas that release air pollutants. Whenever you save energy, or use it efficiently, you save money and help keep the air clean.
- 7 Encourage your employees to use similar practices in their personal lives.
- 8 Check for available grants from the State of Texas or other agencies to replace outdated equipment.
- 9 Be Ozone Aware! Subscribe to and look out for Ozone Action Day alerts and take recommended measures.
- 10 Reach out for help! The San Antonio Metropolitan Health District can provide additional resources to assist with improving San Antonio's Air Quality.

Businesses located in the City of San Antonio that are a source of air pollution are required to register with Metro Health per City Ordinance 2015-11-19-0967. <https://www.sanantonio.gov/Portals/0/Files/health/HealthyEnvironment/Ordinance2015-11-19-0967AirPollution.pdf>  
Sign up for Ozone Action Day alerts here: <https://public.govdelivery.com/accounts/TXTCEQ/subscriber/new>  
**Contact the following for more information:**  
City of San Antonio Metro Health District - Air Quality Program  
Office: (210) 207-4052  
<https://www.sanantonio.gov/Health/HealthyEnvironment/AirQuality#266643446-resources>  
<https://www.tceq.texas.gov/assistance>



# What Now?



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# Businesses of All Sizes Have a Role

Observation:

*No singular significant source was observed*

Impact:

*It is going to take actions from a number of businesses to make a difference*



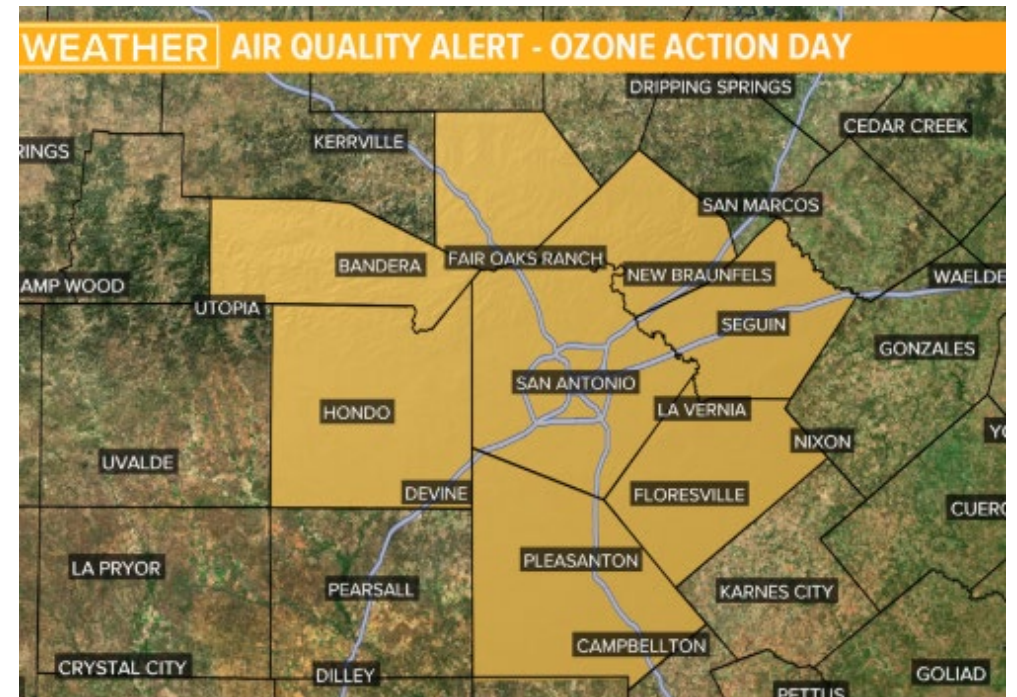
# Use Public Health Advisories to Drive Changes

## Observation:

*Only two days in 2019 and 2020 had an exceedance more than one day outside an Ozone Action Day*

## Impact:

*Businesses that can modify operations during these windows might bend the curve*



# There is still work to do...

## Observation:

*Exceedances still occurred, even during times of reduced activity driven by pandemic*

## Impact:

*Baseline of ozone precursors suggests more needs to be done*





# Questions?

Shane Siebenaler

Southwest Research Institute

shane.siebenaler@swri.org

(210) 522-5758



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