



# 2020 Air Quality Report

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Air Pollution Control Program

Chief of the Air Quality Analysis Section

Missouri Air Conservation Commission

Meeting, May 28, 2020

# Presentation Overview

- AQA Section Staff
- Emissions Inventory and Trends
- Ambient Air Monitoring and Trends
- Ozone & NO<sub>2</sub> Observational Analysis
- Website Resources

# Air Quality Analysis Section

Stephen Hall, section chief

- Data Management Unit – Nathan O’Neil, chief

Jeanette Barnett

Jeanne Brown

Erin Henry

David Davison

Jeffrey Stevens

Terry Stock

Brenda Wansing

John Pelton

- Monitoring Unit – Patricia Maliro, chief

Jerry Downs

Eric Giroir

Michael Maddux

Brandi Prater

- Small Business Compliance Assistance

Bob Randolph

- File Room

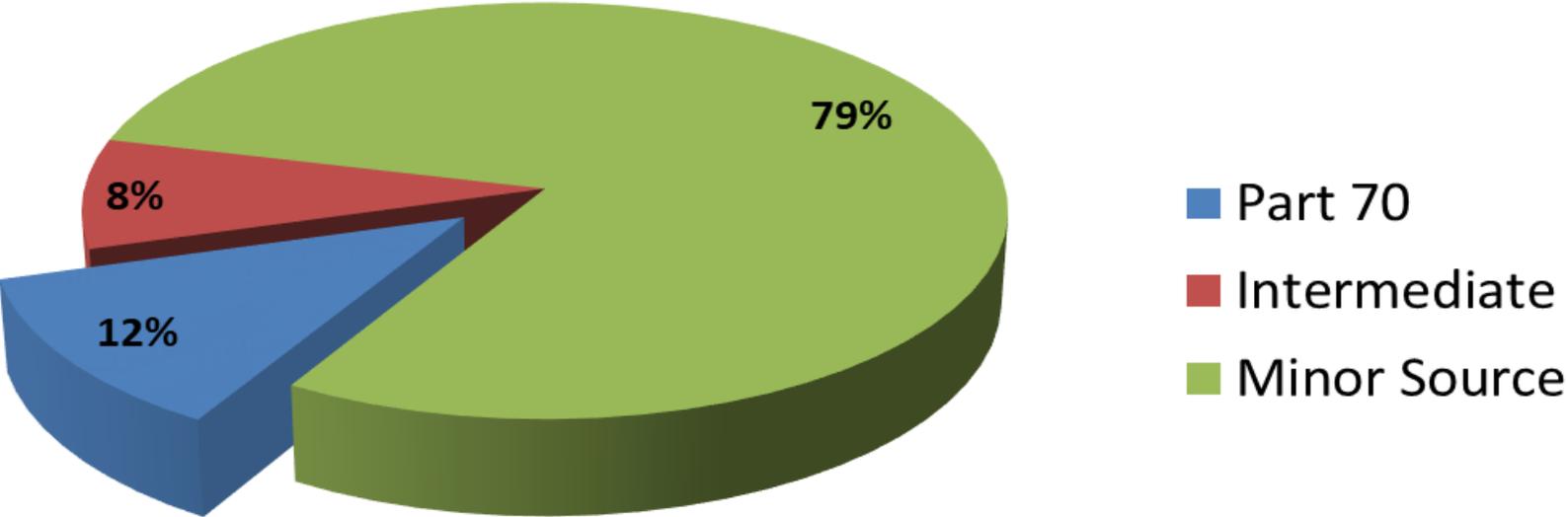
Amber Werdehausen

# Point Source Facilities

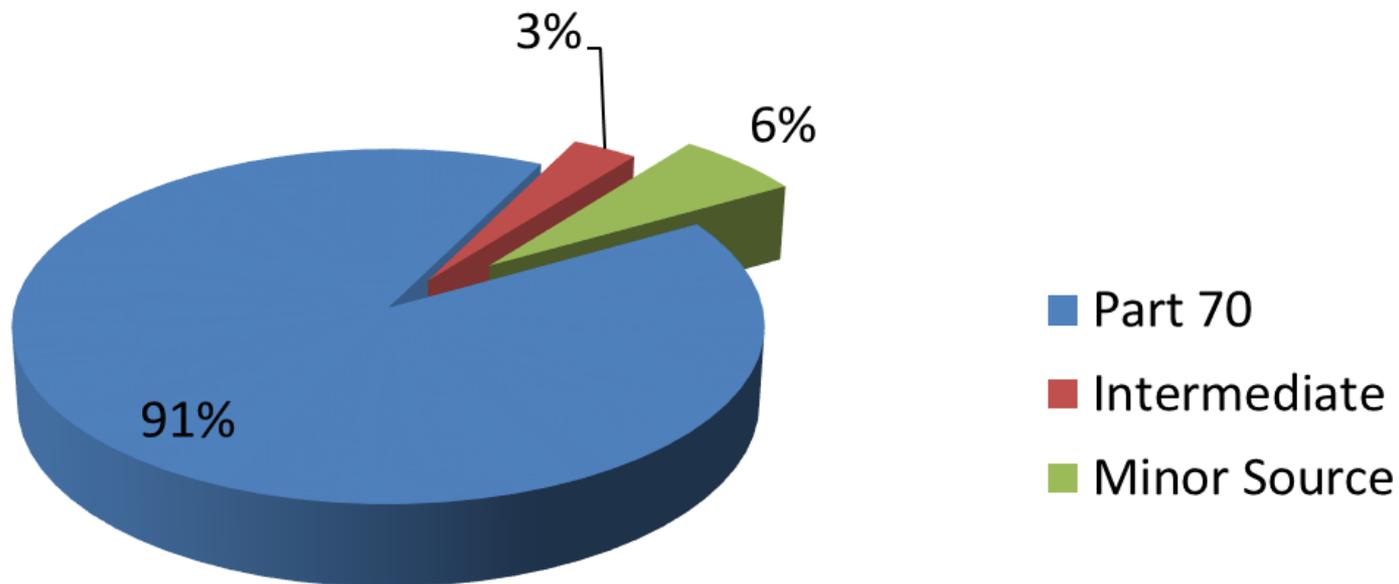
Permit Type	Type of 2018 EIQ		Total Number
	Full	Reduced	
Part 70	246	0	246
Intermediate	74	99	173
*Small Source	340	1,278	1,618
All permit types	660	1,377	2,037

\*Minor Source-Has a construction permit but no operating permit (CP-NOP)

# Permit Type as a Percent of Total Facilities 2018 Emissions Year

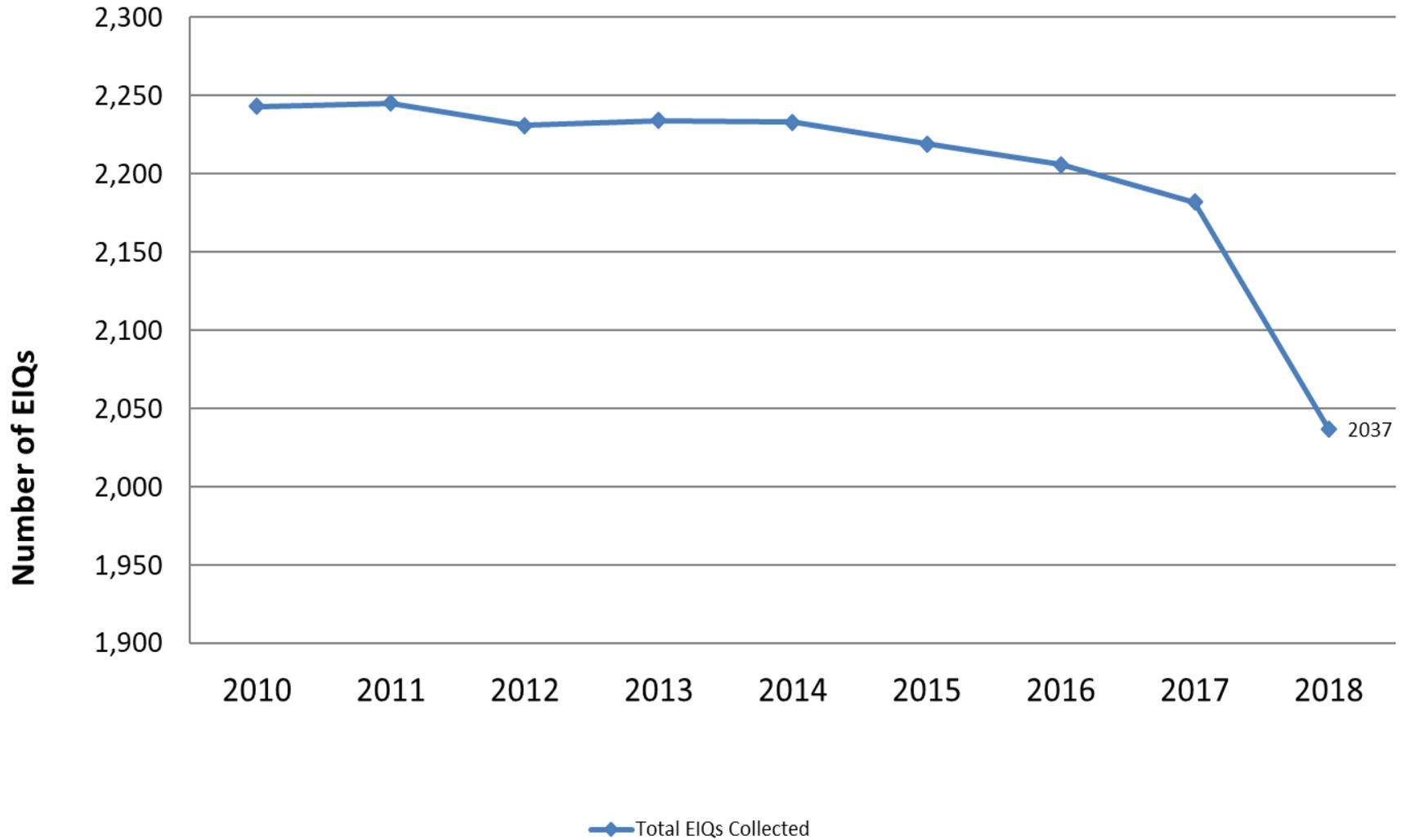


## Percentage of Emissions Fees Collected by Permit Type 2018 Emission Year

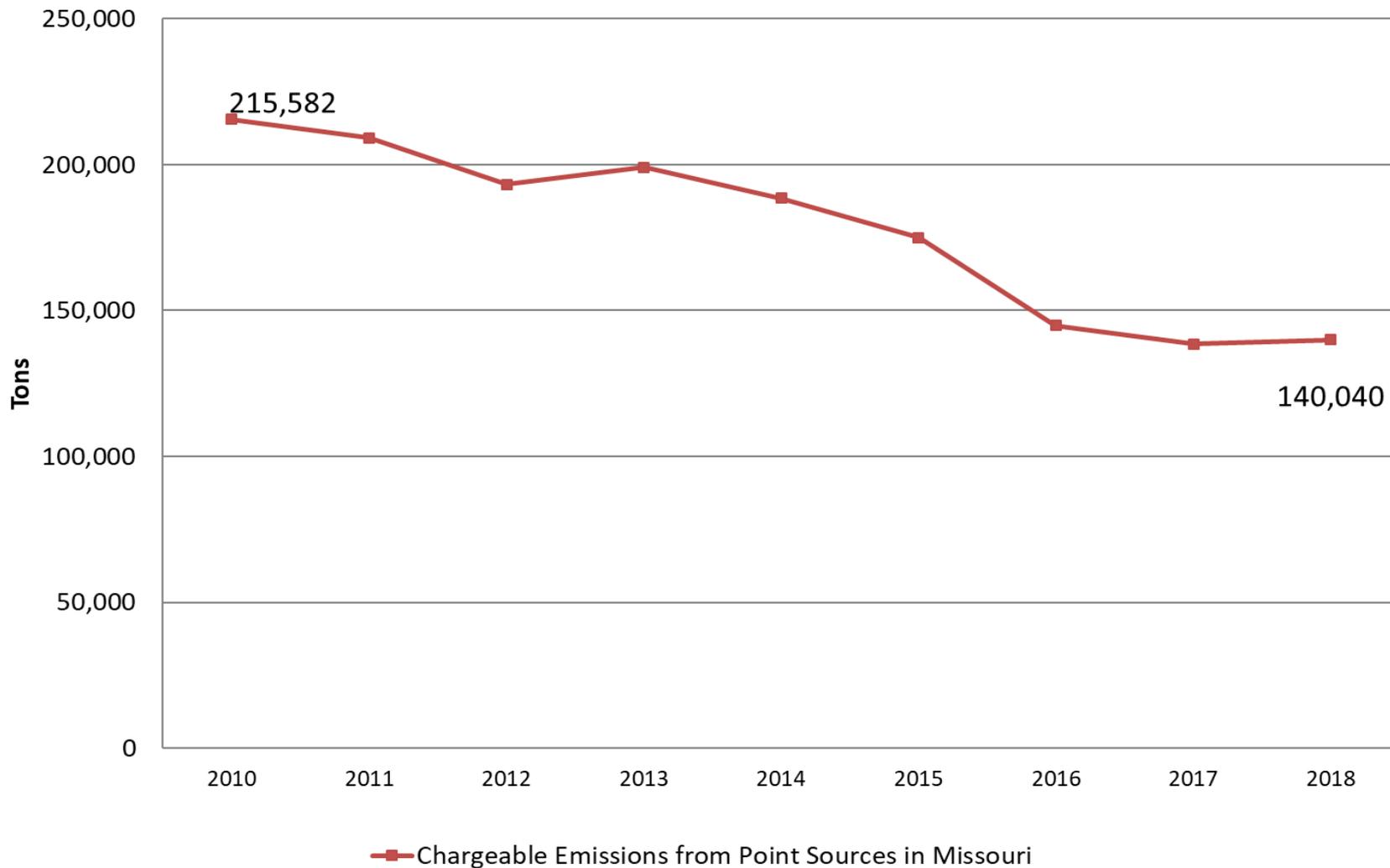


~ \$6.7 Million

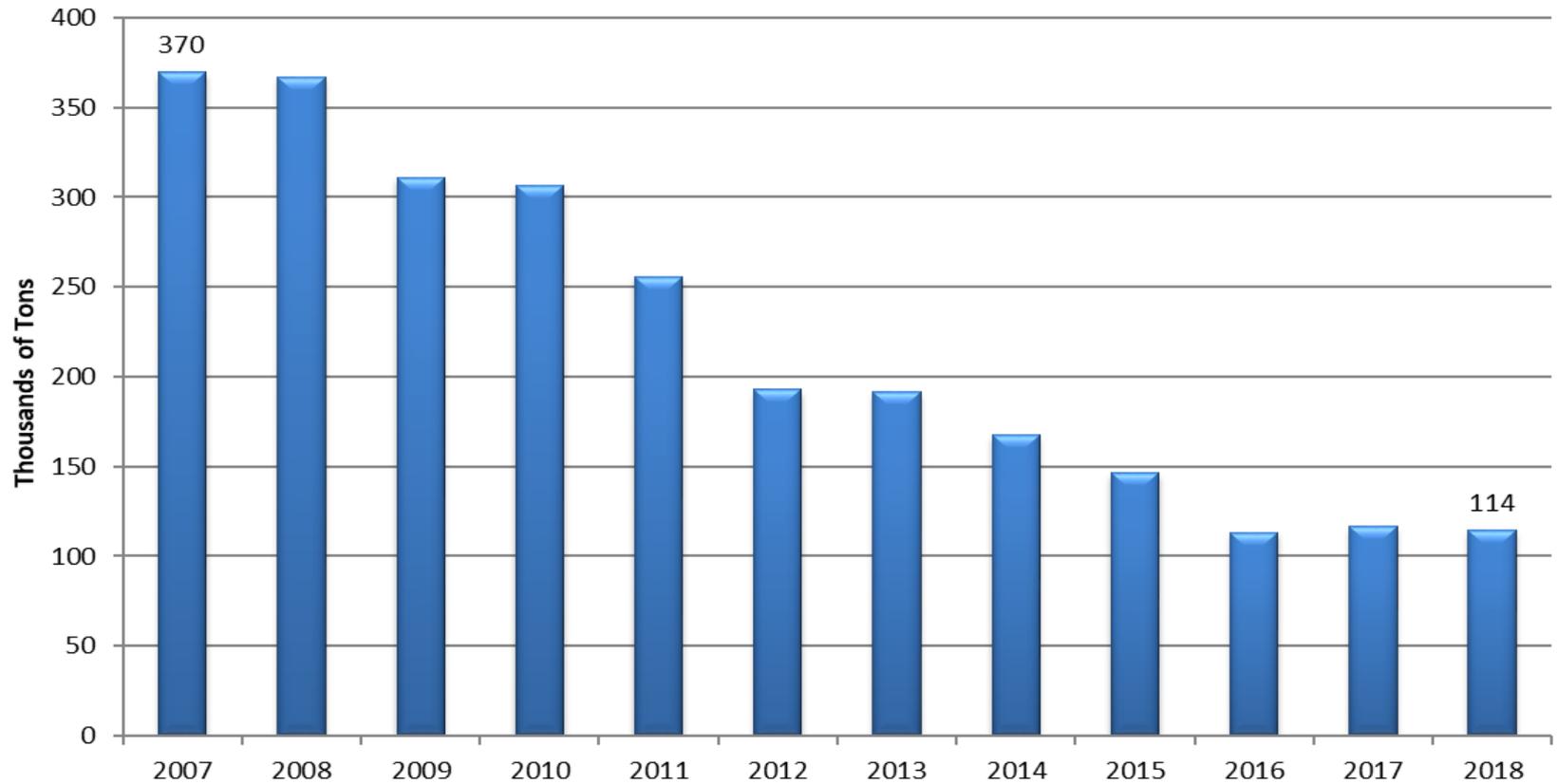
## Total EIQs Collected by Year



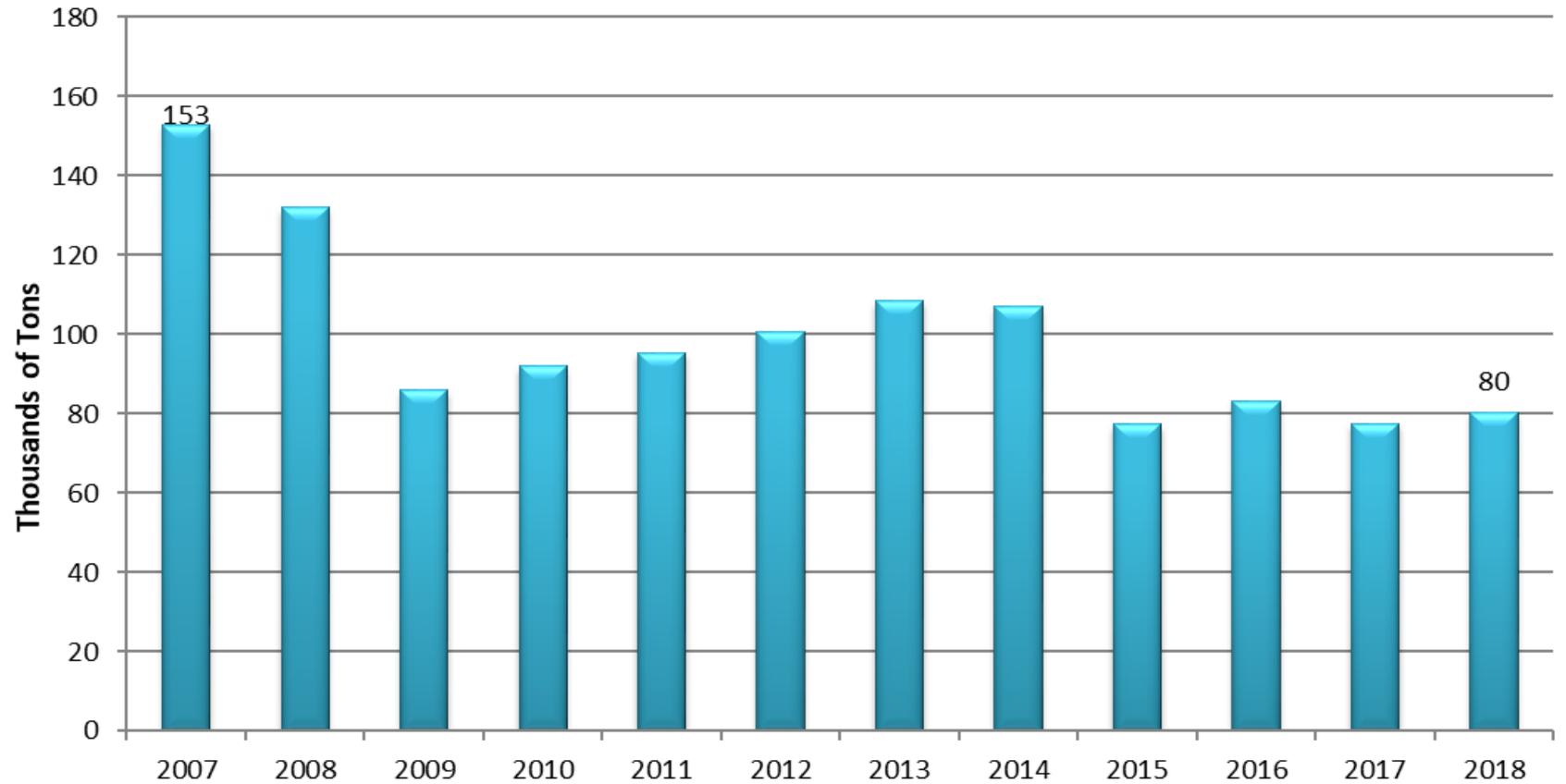
## Chargeable Emissions from Point Sources in Missouri



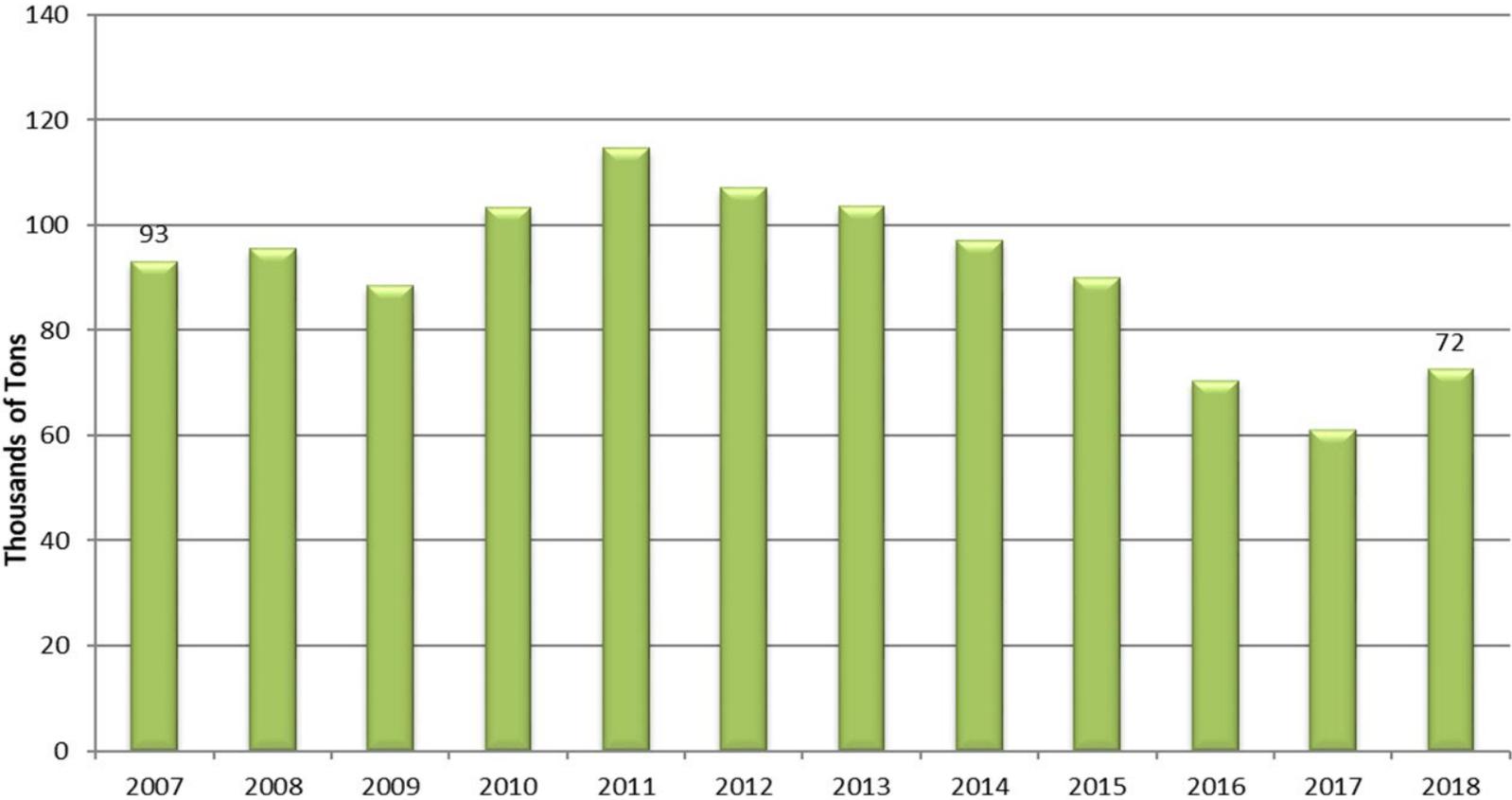
## Sulfur Dioxide (SO<sub>2</sub>) Emissions from Point Sources in Missouri



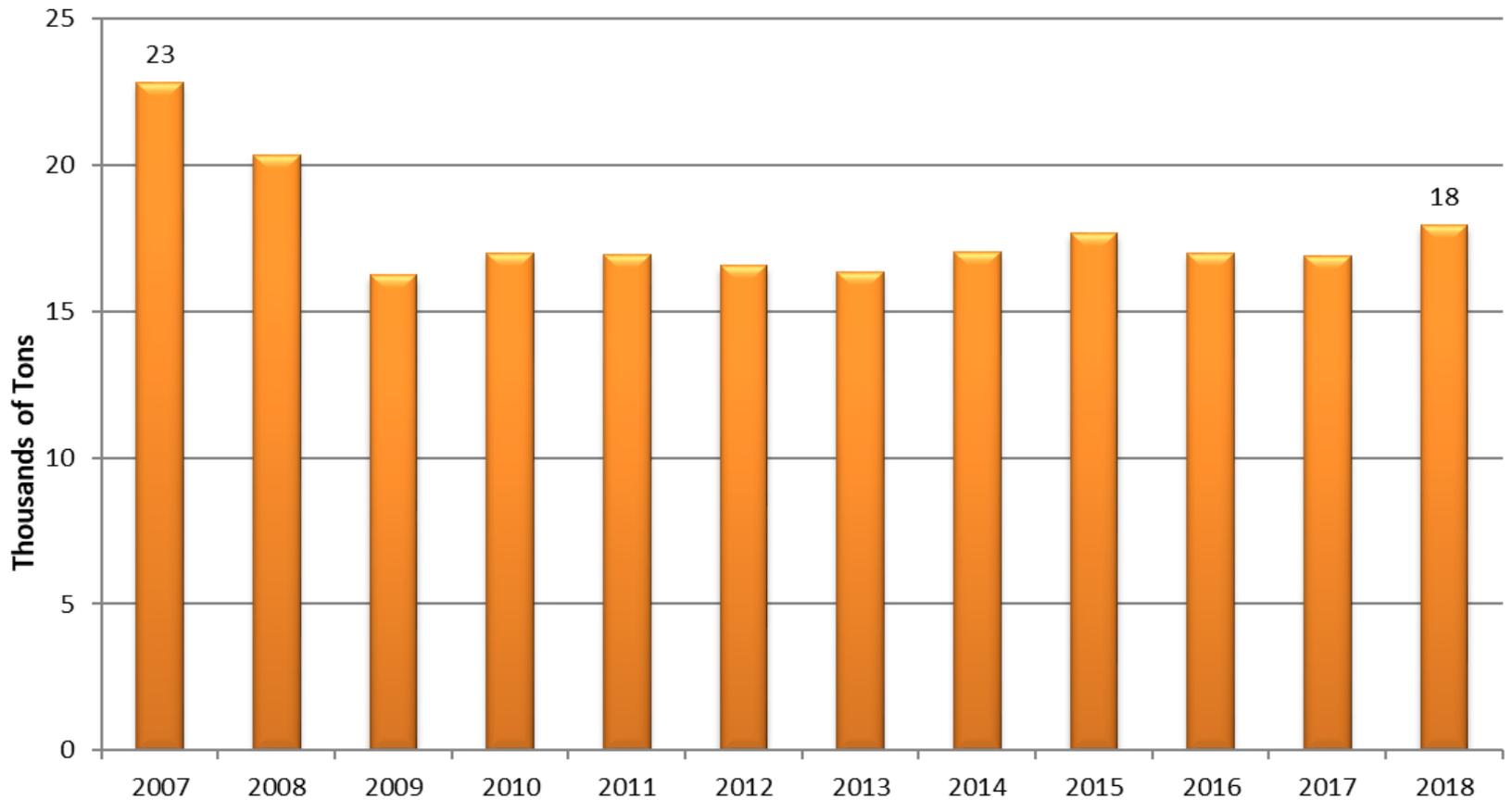
# Nitrogen Oxides (NO<sub>x</sub>) Emissions from Point Sources in Missouri



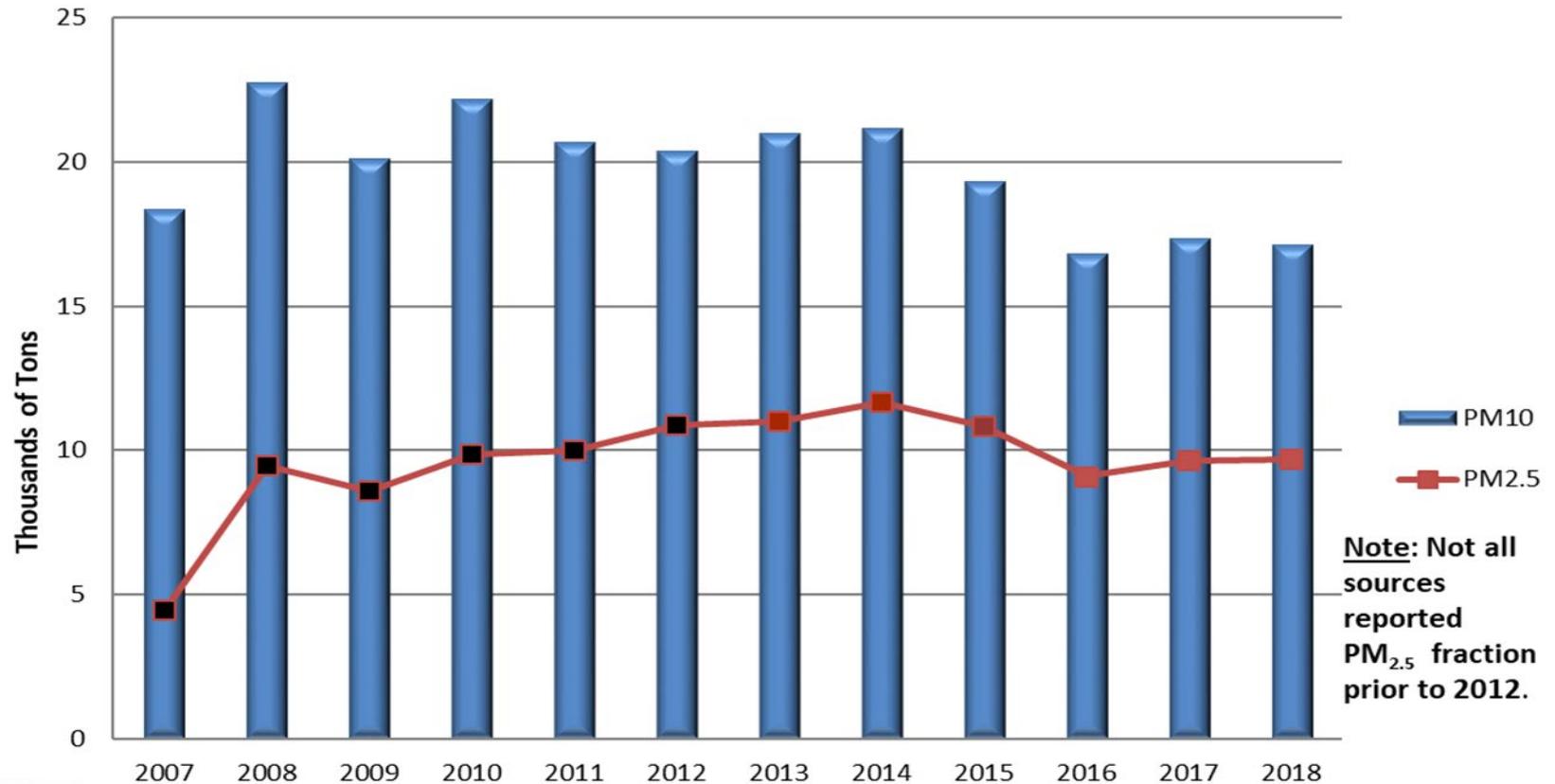
# Carbon Monoxide (CO) Emissions from Point Sources in Missouri



## Volatile Organic Compounds Emissions from Point Sources in Missouri

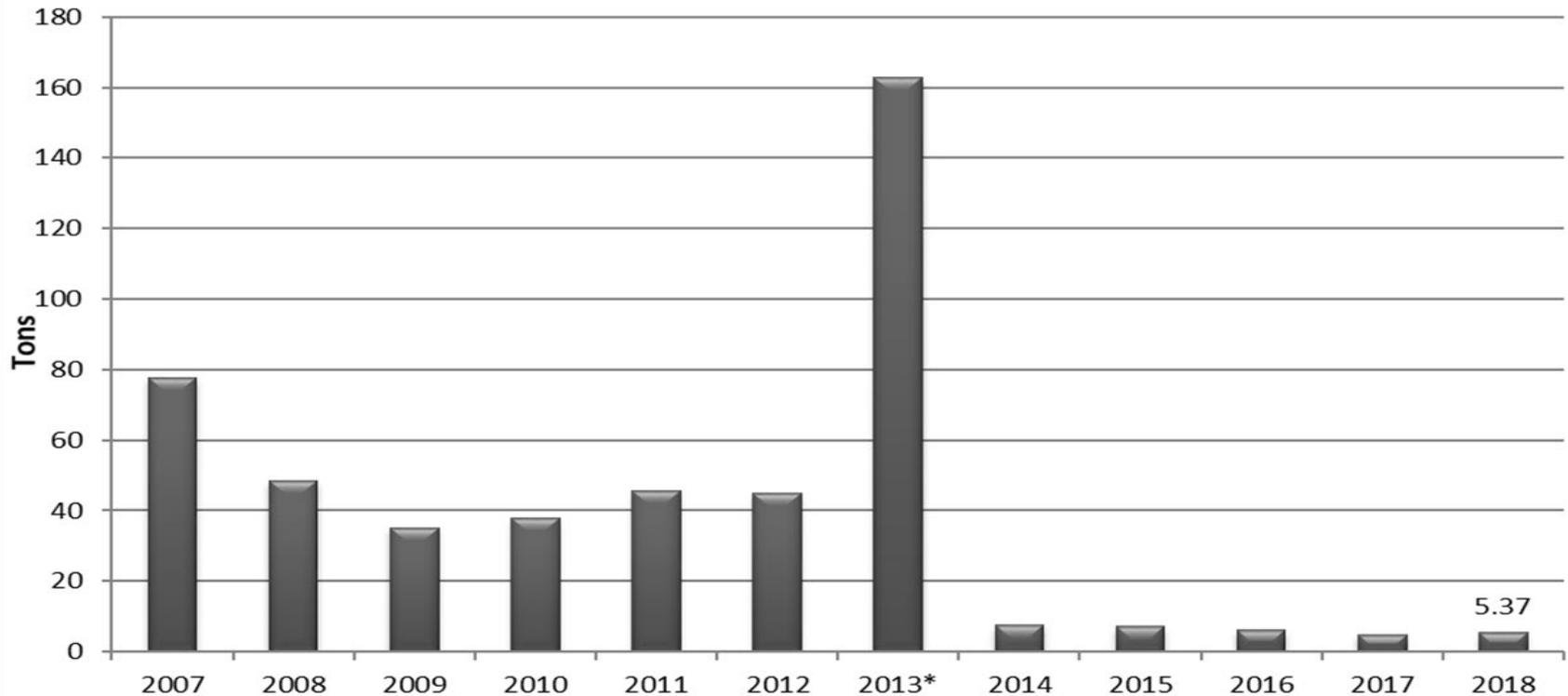


# Particulate Matter (PM<sub>10</sub>) Emissions from Point Sources in Missouri (With PM<sub>2.5</sub> Fraction)



**Note:** Not all sources reported PM<sub>2.5</sub> fraction prior to 2012.

## Airborne Lead Emissions from Point Sources in Missouri



\* Increased lead emissions for 2013 is the result of stack testing at a single facility. The facility shut down the processes that release emissions through the tested stacks at the end of the 2013 emission year, and the increased emissions are the result of the shut down activities.

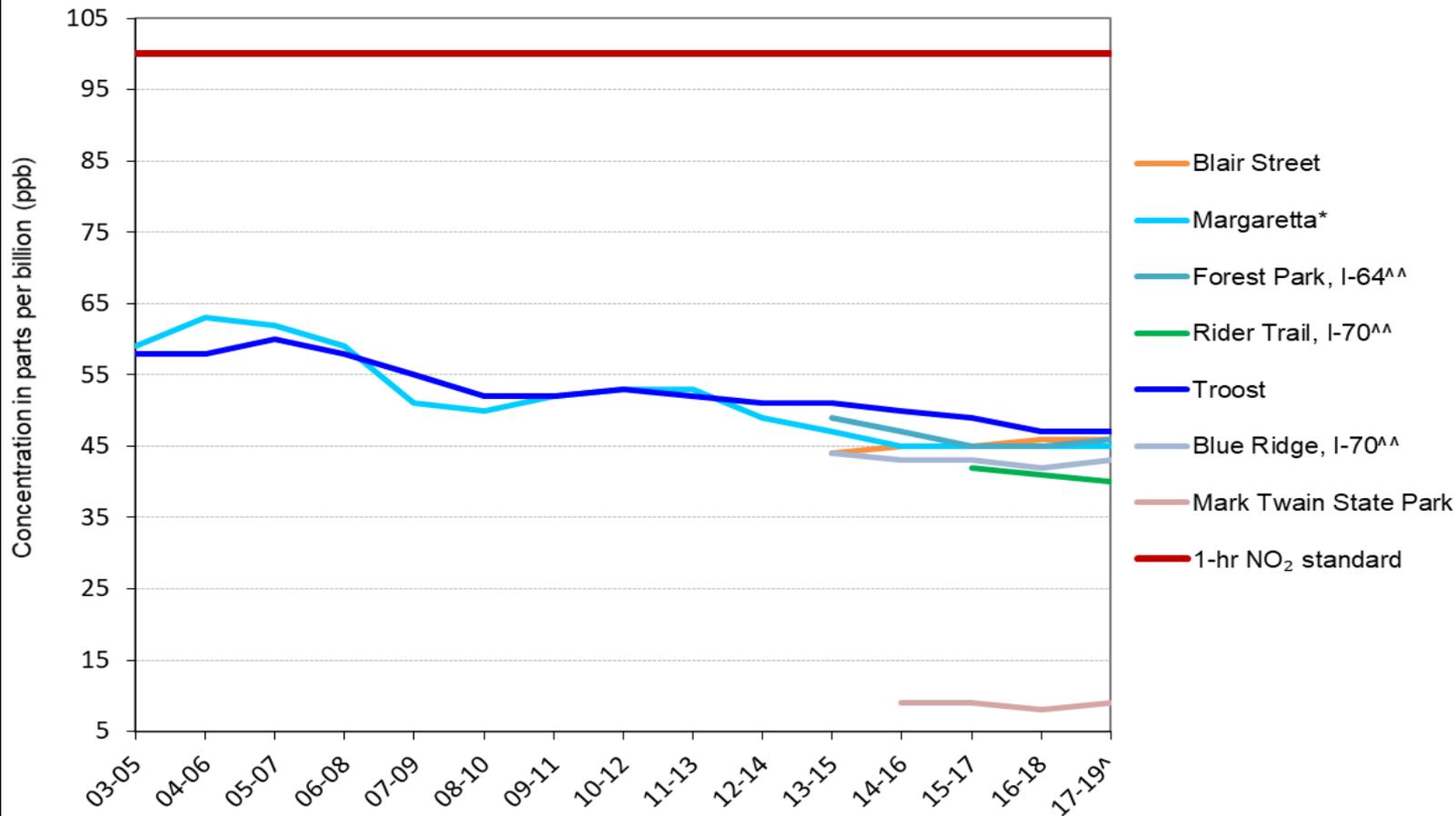
# Ambient Air Monitoring Trends

- Area wide criteria pollutant long term monitoring trends are decreasing.
- Some single source and area specific National Ambient Air Quality Standards violations are being addressed.

# Areas Monitoring Compliance

- $\text{NO}_2$ : 1-hour (100 ppb) & annual (53 ppb) 2010 standard
- $\text{PM}_{2.5}$ : Annual ( $12 \mu\text{g}/\text{m}^3$ ) and 24-hour ( $35 \mu\text{g}/\text{m}^3$ ) 2012 standards
- $\text{PM}_{10}$ : 24-hour ( $150 \mu\text{g}/\text{m}^3$ ) 1987 standard
- $\text{CO}$ : 1-hour (35 ppm) or 8-hour (9 ppm) 1971 standard

# Missouri Trends in Nitrogen Dioxide (NO<sub>2</sub>) Design Values, 2003-2019

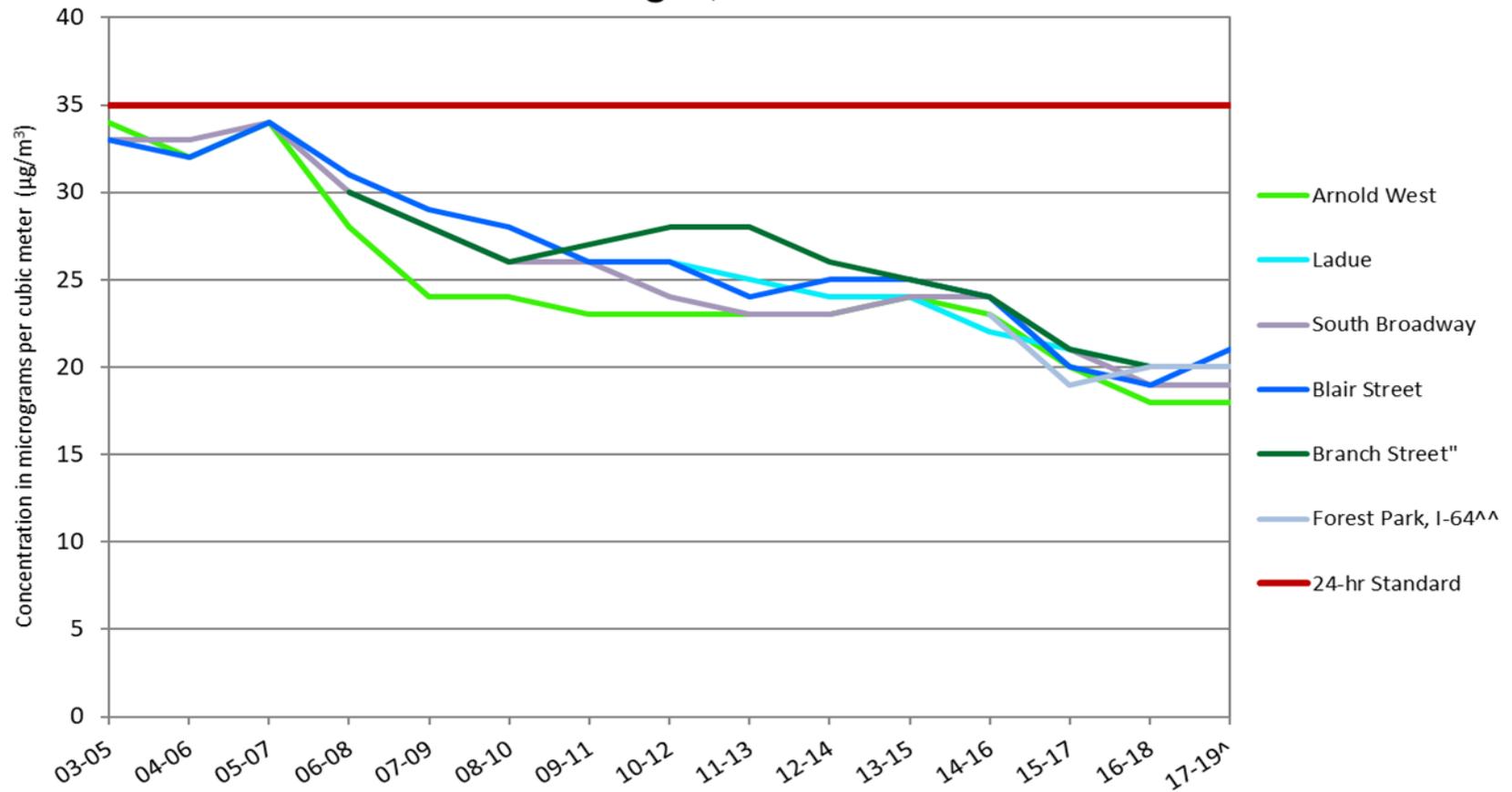


^Quality assured data through December 31, 2019.

^^Near roadway monitor

\*Margaretta was discontinued on 12/31/2018

## St. Louis Area, Mo. Trends in PM<sub>2.5</sub> Design Values Based on 24-Hour Averages, 2003-2019

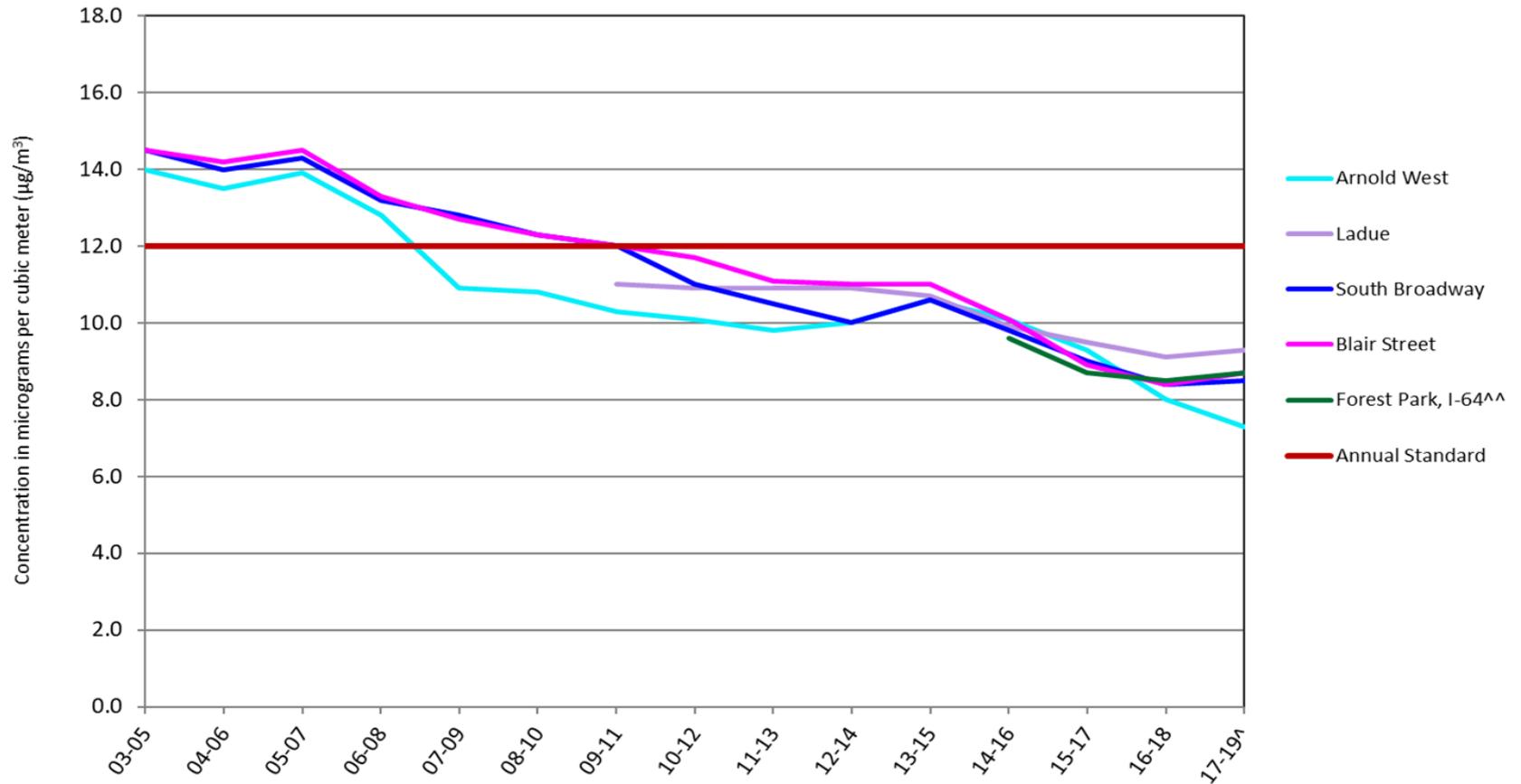


^Quality assured data through December 31, 2019.

^^Near roadway monitor

"Branch Street is a middle scale (100 meters to 0.5 kilometers) monitor and therefore cannot be compared to the standard.

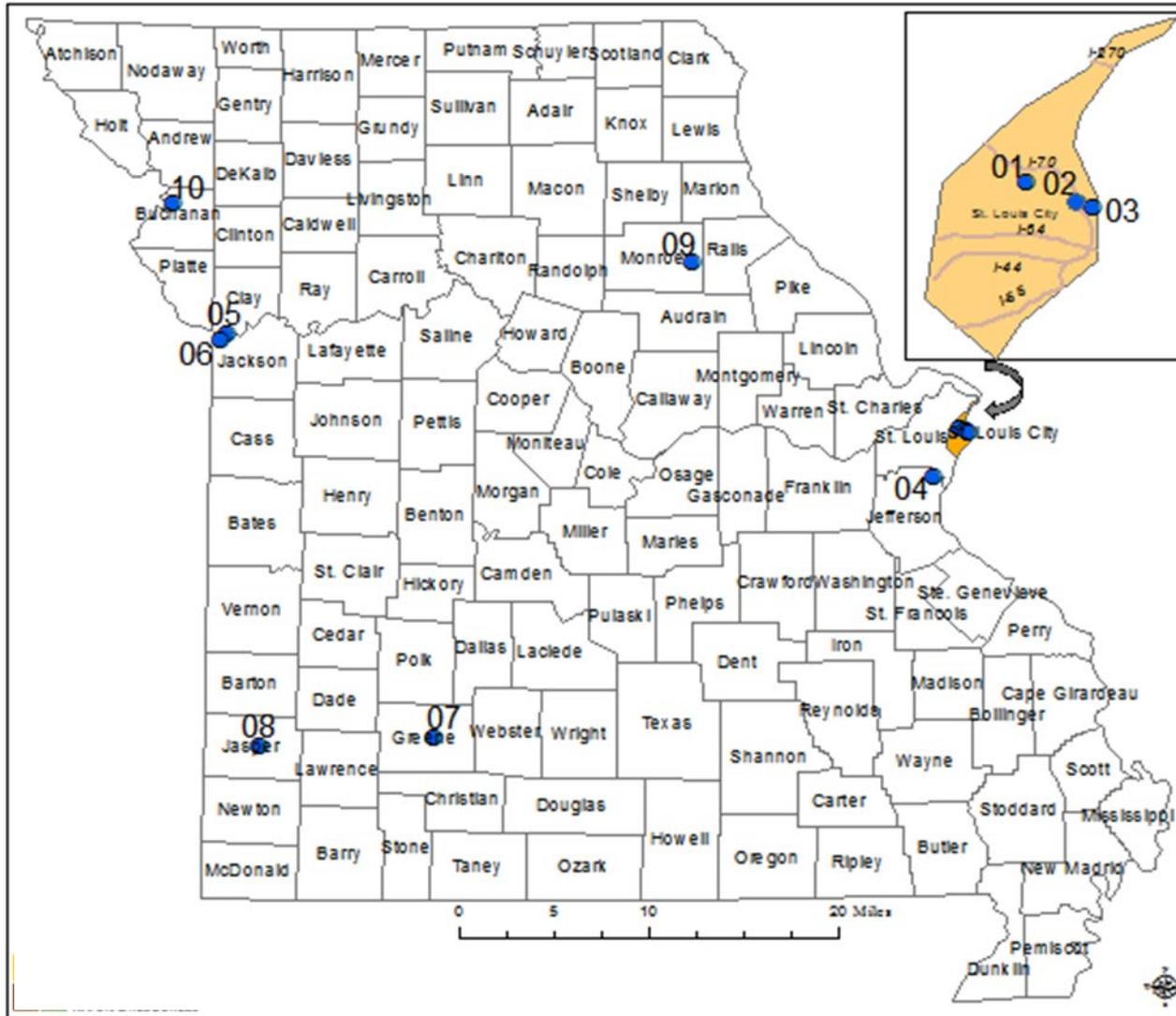
## St. Louis, Area Mo. Trends in PM<sub>2.5</sub> Design Values Based on Annual Averages, 2003-2019



<sup>^</sup>Quality assured data through December 31, 2019.

<sup>^^</sup>Near roadway monitor

# PM<sub>10</sub> Monitoring Network, 2019



## Number of Expected Exceedances<sup>^</sup>

### St. Louis Area, MO

- 01 Margaretta+ (0.0)
- 02 Blair Street (0.0)
- 03 Branch Street (0.3)
- 04 Arnold West (0.0)

### Kansas City, MO

- 05 Front Street (0.0)
- 06 Troost (0.0)

### Springfield Area, MO

- 07 Hillcrest High School (0.0)

### Outstate Area, MO

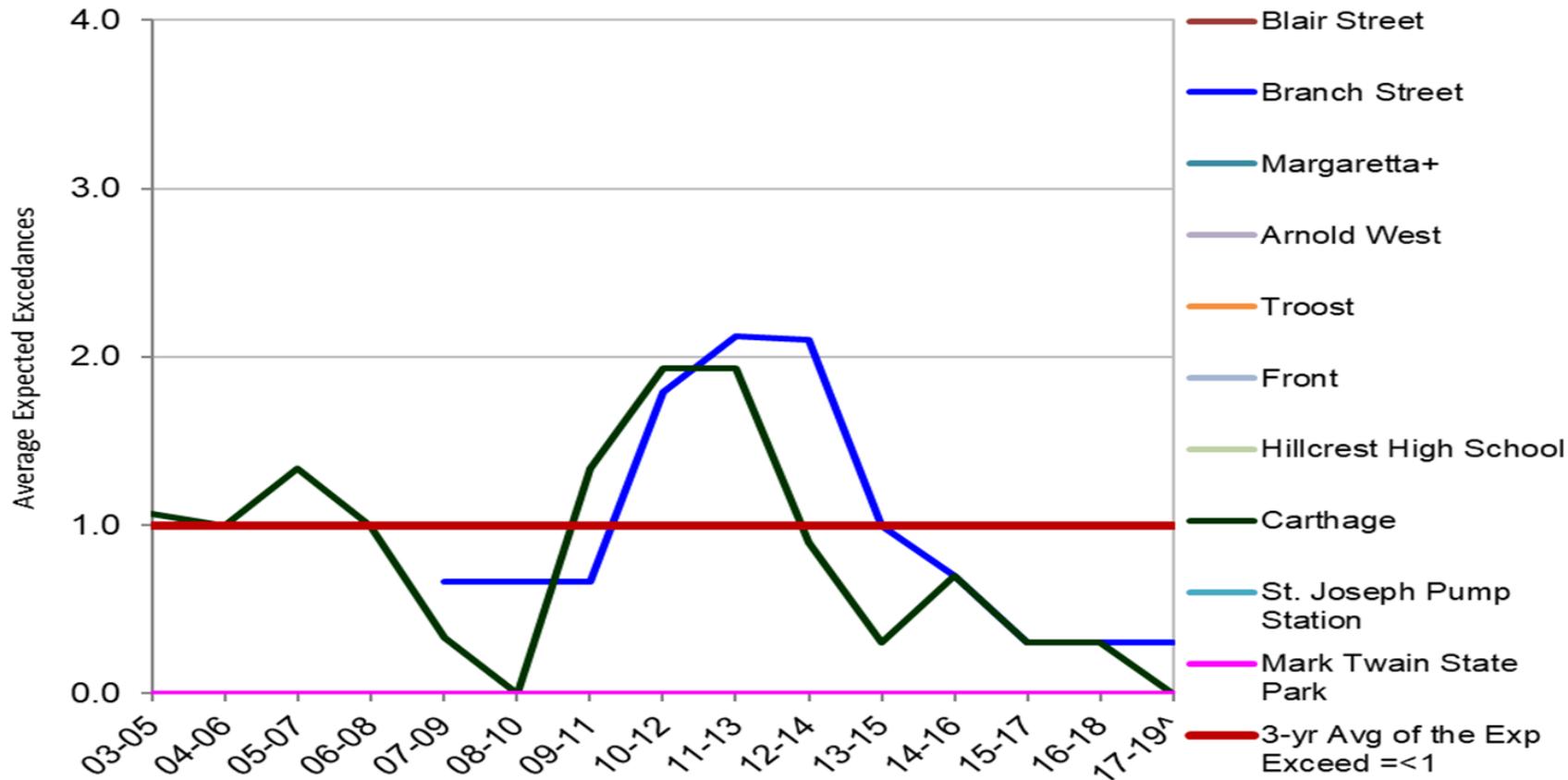
- 08 Carthage (0.0)
- 09 Mark Twain State Park (0.0)
- 10 St. Joseph Pump Station (0.0)

<sup>^</sup>Quality assured data through December 31, 2019

+Monitor has been discontinued as of 12/31/2018

The 24-hour standard is attained when the expected number of exceedances is less than or equal to one (1) when averaged over three (3) calendar years.

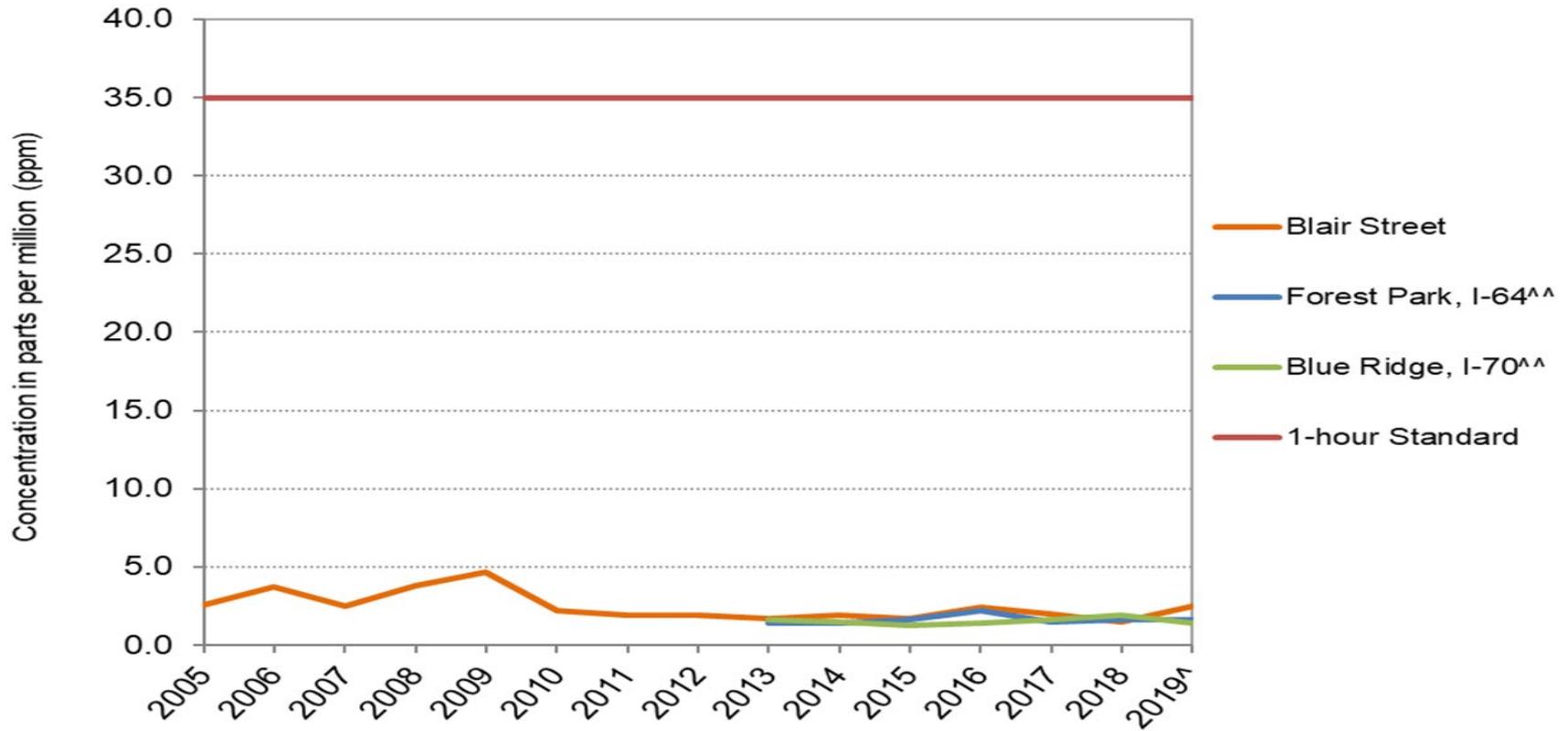
## Trends of the 3-year Averages of the Expected Exceedance of the PM<sub>10</sub> 24-hour Standard



<sup>^</sup>Quality assured data through December 31, 2019.  
<sup>+</sup>Monitor has been discontinued as of 12/31/2018.

# Missouri Trends in Carbon Monoxide (CO) Design Values Based on 1-Hour Averages, 2005-2019

1-Hour Average Concentrations (the 2<sup>nd</sup> 1-hr Max)

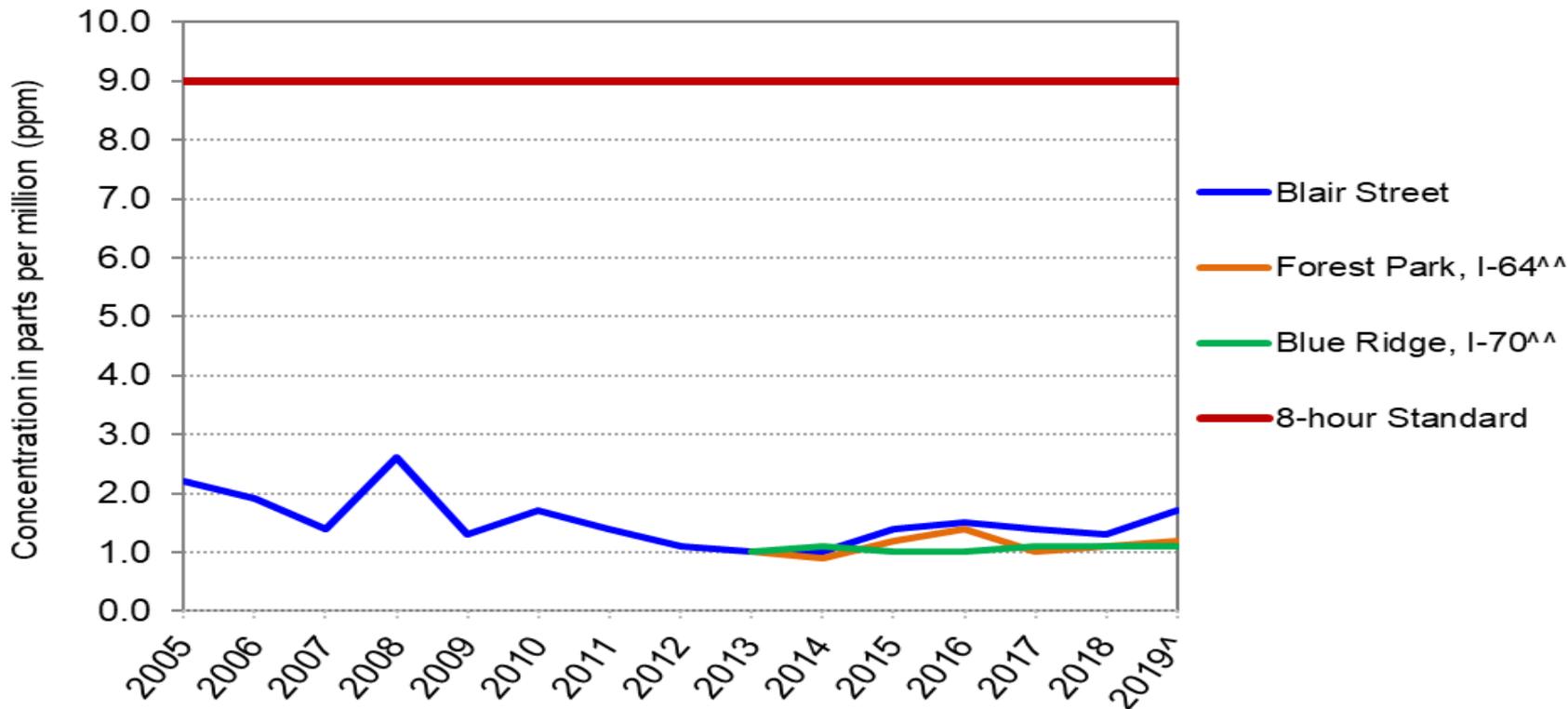


^Quality assured data through December 31, 2019.

^^Near roadway monitor

# Missouri Trends for Carbon Monoxide (CO) Design Values Based on 8-hour Averages, 2005-2019

8-hour Average Concentrations (the second 8-hour Max)



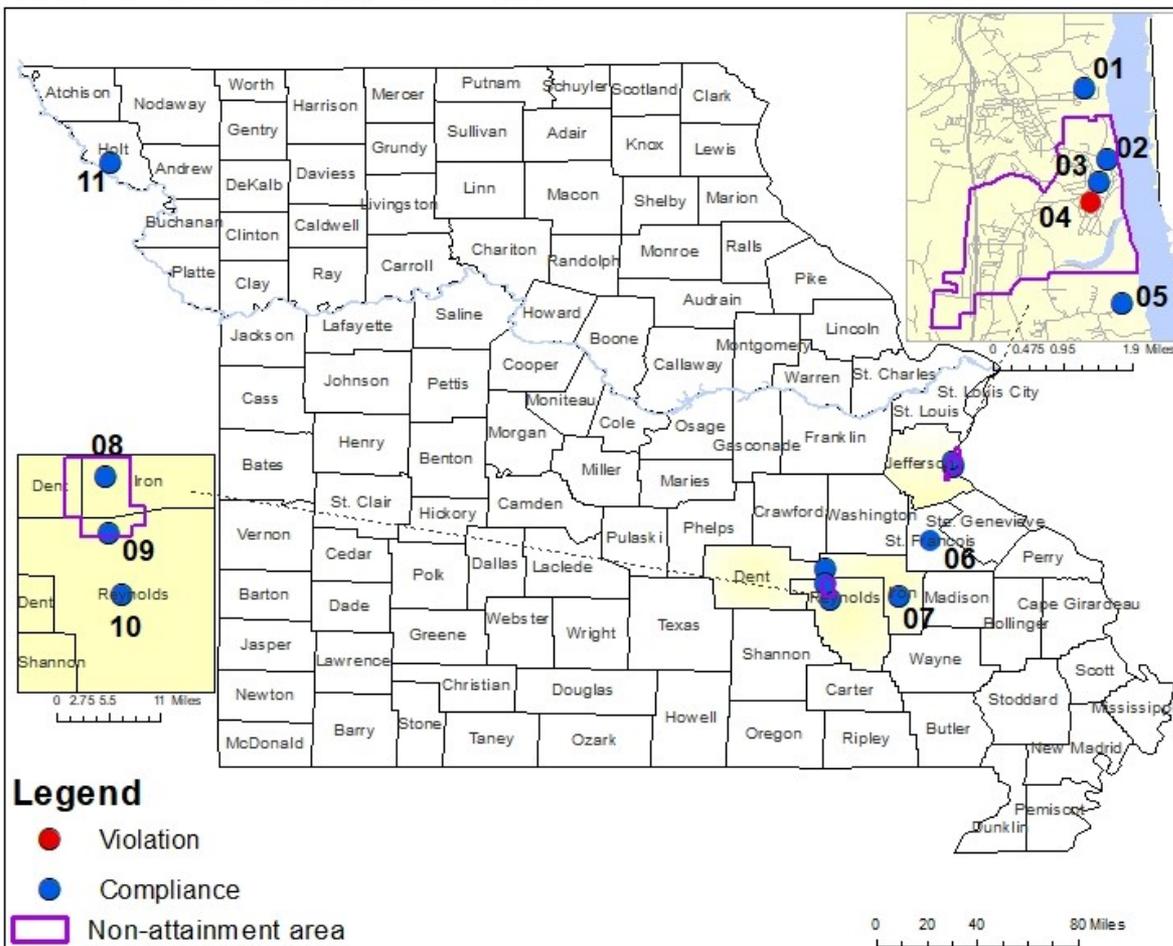
<sup>a</sup>Quality assured data through December 31, 2019.  
<sup>^^</sup>Near roadway monitor

# Areas Not Monitoring Compliance

- **Ozone:** 8-hour (70 ppb) 2015 standard
  - One Area, St. Louis, 1 monitor
- **SO<sub>2</sub>:** 1-hour (75 ppb) 2010 standard (One area)
- **Lead:** 3-month avg. (0.15 µg/m<sup>3</sup>) 2008 standard
  - One Area- Herculaneum: Violation in 2017 due to non-recurring smelter demolition activity

# Missouri Statewide Lead (Pb) Monitoring Network, 2019

Rolling 3-Month Average NAAQS = 0.15 ug/m<sup>3</sup>



## 2017-2019 Design Values (µg/m<sup>3</sup>)<sup>^</sup>

### Herculaneum Area

- 01 Pevely\* (0.02)
- 02 Herculaneum, Sherman (0.05)
- 03 Herculaneum, Dunklin High School (0.11)
- 04 Herculaneum, Mott St. **(0.21)**
- 05 Ursuline North (0.01)

### Old Pb Belt Area

- 06 St. Joe State Park (0.03)

### New Pb Belt Area

- 07 Glover\* (0.02)
- 08 Buick NE (0.13)
- 09 Oates (0.04)
- 10 Fletcher (0.03)

### Outstate Area

- 11 Forest City, Exide Levee (0.02)

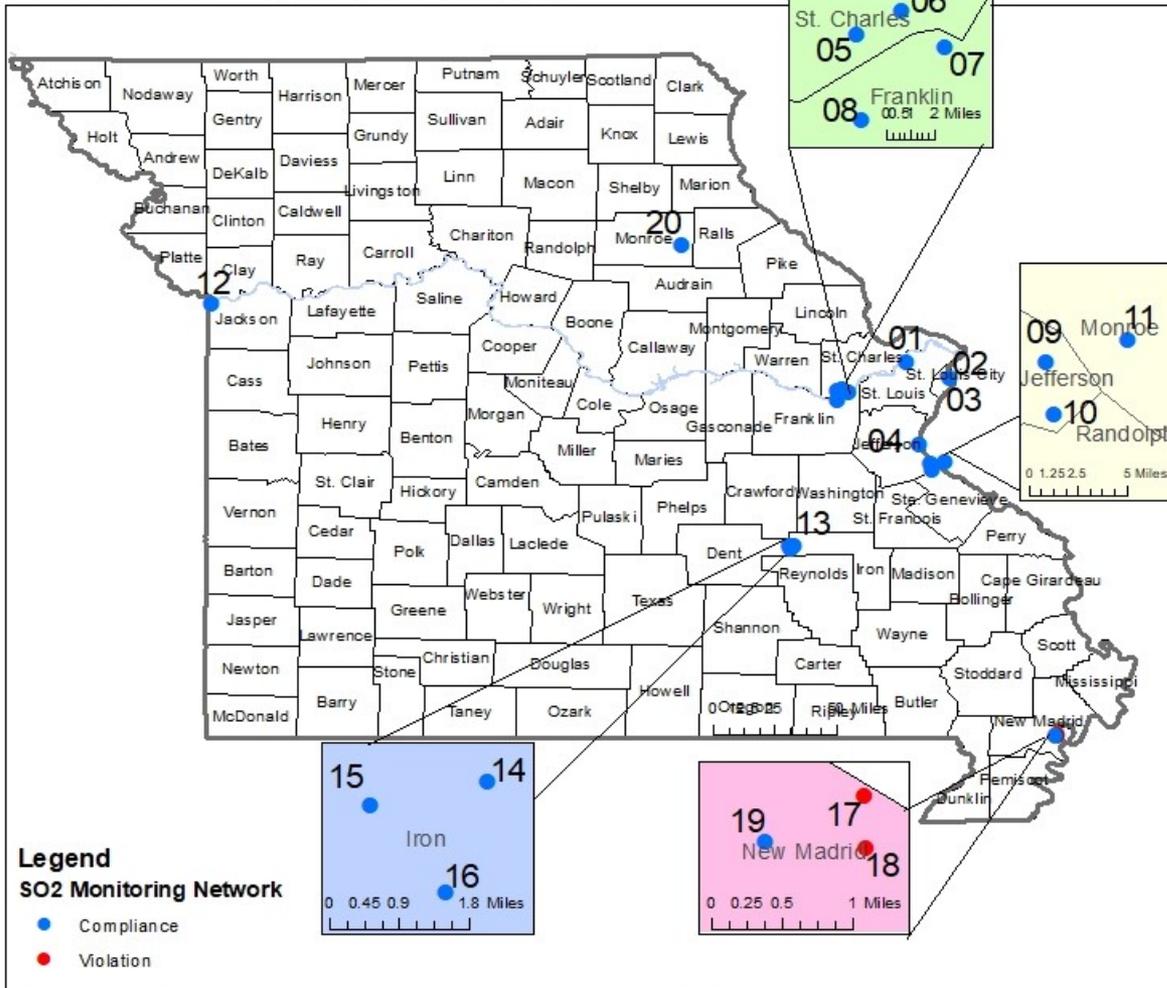
<sup>^</sup>Quality assured data through December 31, 2019

\*Monitor has been discontinued

Red and bold is violation of the standard

# Statewide Sulfur Dioxide (SO2) Monitoring Network, 2019

1-hour standard = 75 parts per billion (ppb)



## 2017-2019 Design Values (ppb)^

### St. Louis Area, MO

- 01 Rider Trail, I-70\* (14)
- 02 Margaretta+ (12)
- 03 Blair Street (10)
- 04 Herculaneum, Mott Street (14)
- 05 Ameren-Northwest\* (19)
- 06 Ameren-North\* (29)
- 07 Ameren-Valley\* (28)
- 08 Ameren-Southwest\* (24)
- 09 Ameren-Weaver & Hwy AA\* (21)
- 10 Ameren-Natchez\* (21)
- 11 Ameren-Fults, IL\* (19)

### Kansas City Area, MO

- 12 Troost (10)

### Outstate Area, MO

- 13 Buick NE (48)
- 14 Hwy 32 Northeast\* (50)
- 15 County Road 75\* (39)
- 16 West Entrance\* (42)

### Outstate Area, MO

- 17 M7M Site #1-AECI Water Tower\* (**202**)
- 18 M7M Site #2-East Graveyard\* (**268**)
- 19 M7M Site #3-West Entrance\*(47)
- 20 Mark Twain State Park (4)

<sup>^</sup>Quality assured data through December 31, 2019

\*Special Purpose Monitor

\*Industry Monitor

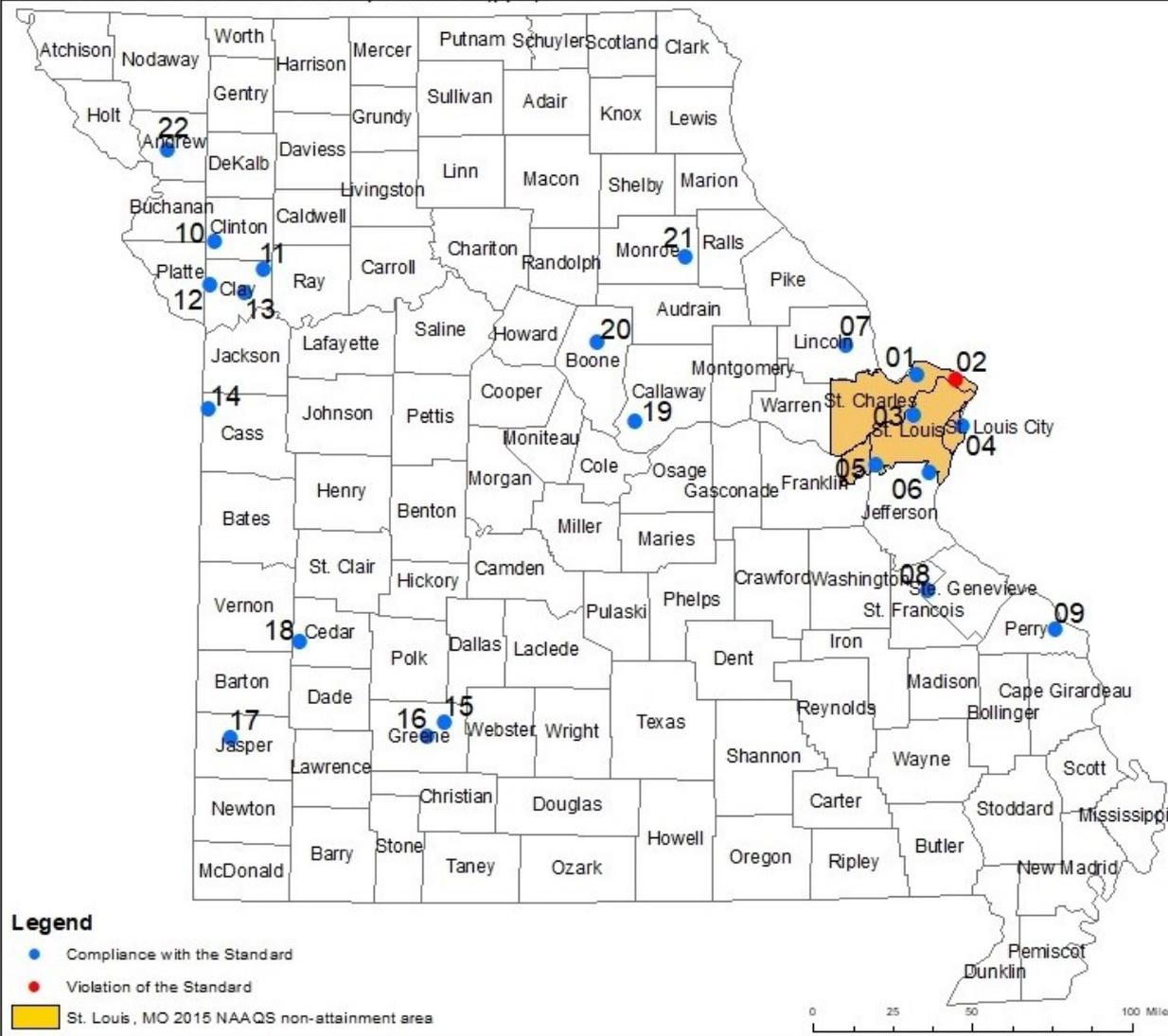
+Monitor was discontinued on 12/31/2018

Green: EPA's Data Requirements Rule Sites

M7M: Magnitude 7 Metals

# Missouri Statewide Ozone (O3) Monitoring Network, 2019

2015 8-hour NAAQS = 70 Parts per Billion (ppb)



## 2017-2019 Design Values (ppb)^

- St. Louis Area
- 01 Orchard Farm (69)
  - 02 West Alton+ (**71**)
  - 03 Maryland Heights (68)
  - 04 Blair Street\*\* (69)
  - 05 Pacific (65)
  - 06 Arnold West (67)
  - 07 Foley West (66)

- Ste. Genevieve Area
- 08 Bonne Terre (63)

- Southeast Area
- 09 Farrar (64)

- Kansas City Area
- 10 Trimble (65)
  - 11 Watkins Mill (68)
  - 12 Rocky Creek (68)
  - 13 Liberty (68)
  - 14 Richards Gebaur- South (64)

- Springfield Area
- 15 Fellows Lake (61)
  - 16 Hillcrest High School (61)

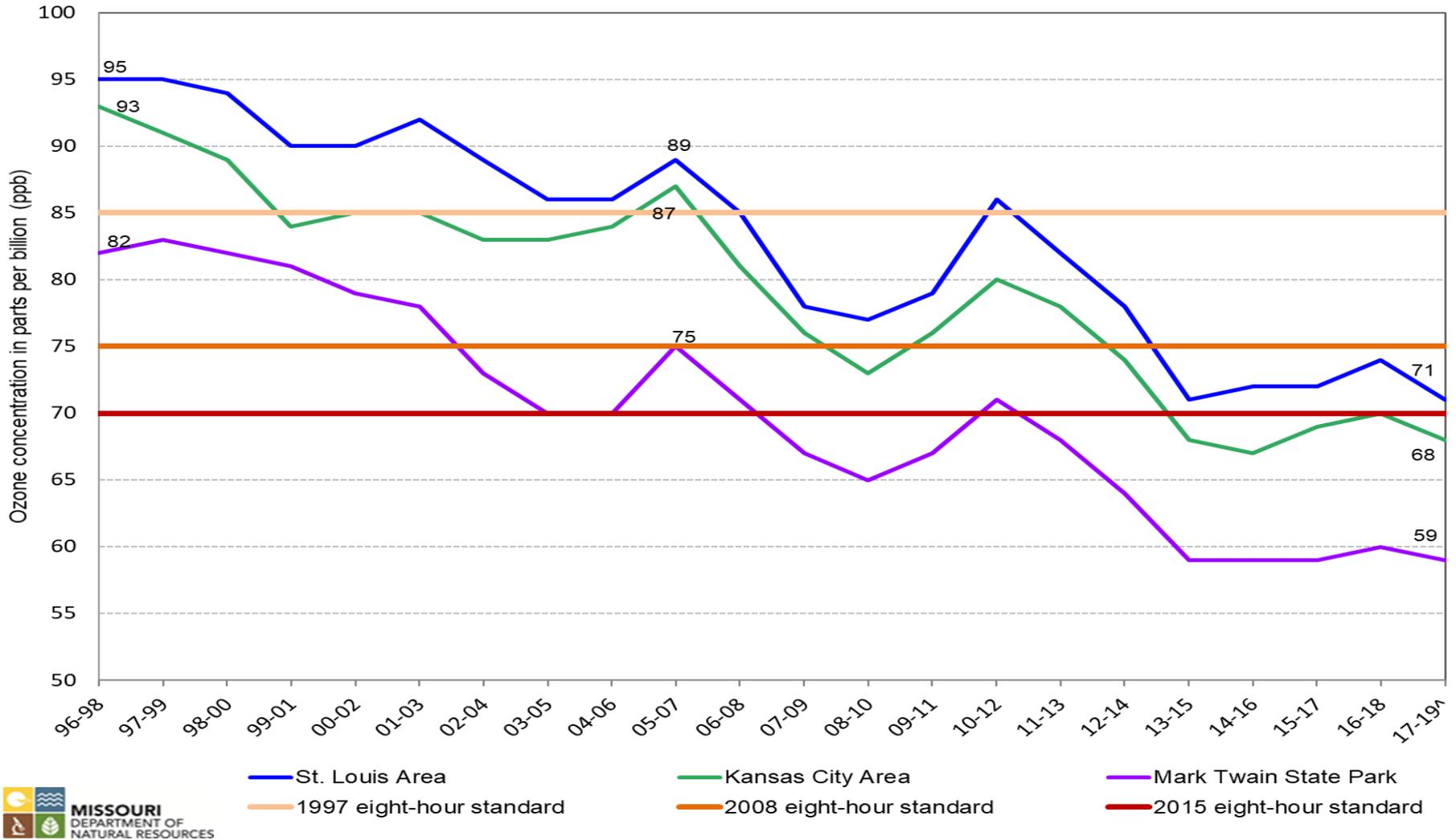
- Outstate Area
- 17 Alba (62)
  - 18 El Dorado Springs (60)
  - 19 New Bloomfield (60)
  - 20 Finger Lakes (60)
  - 21 Mark Twain\*\* (59)
  - 22 Savannah (63)

^Quality assured data through December 31, 2019  
 +West Alton data for 2019 is incomplete due to flooding  
 \*\*Year round monitoring  
 Ozone Season: March 1<sup>st</sup> to October 31<sup>st</sup>



# Trends in Eight-hour Ozone Design Values St. Louis and Kansas City Areas and Rural Site (Mark Twain)

(^EPA Quality assured data through October 2019)



# NO<sub>2</sub> Observational Analysis

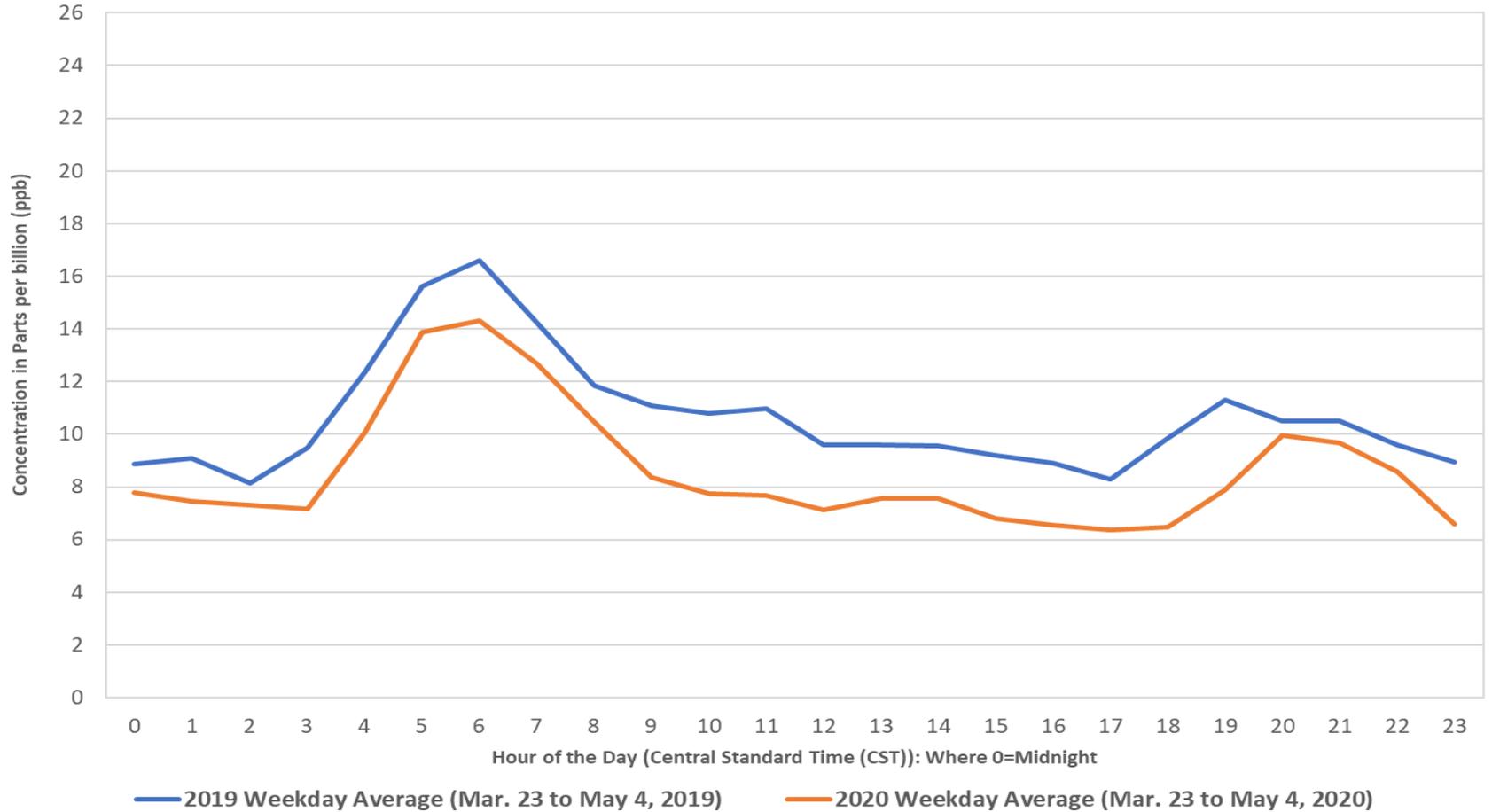
Rider Trail I-70 near-roadway  
air monitoring site, St. Louis  
area

Possible effects on air quality of  
the COVID-19 stay-at-home  
order, issued for St. Louis City  
and County beginning on March  
23, 2020 through May 4, 2020

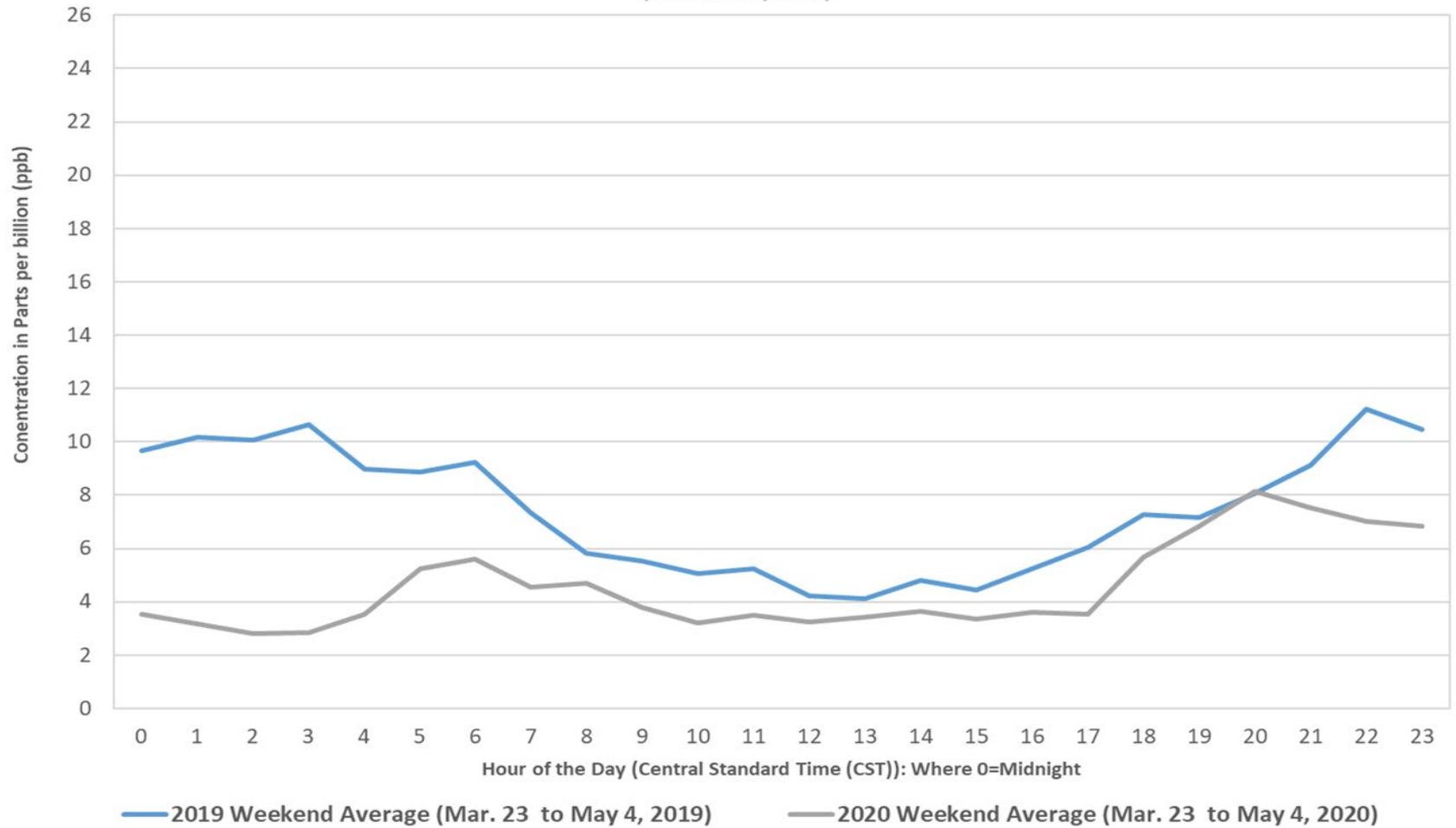


Reports posted at:  
<https://dnr.mo.gov/env/apcp/airpollutants.htm>

**Figure 4. Weekday Nitrogen Dioxide (NO<sub>2</sub>) Concentrations by Hour of the Day at Rider Trail I-70 (STL)  
Near-Roadway Site  
St. Louis Area Stay-At-Home Order Effective on Mar. 23, 2020  
Data is from Mar. 23 to May 4 of 2019 and 2020  
(Preliminary Data)**



**Figure 6. Weekend Nitrogen Dioxide (NO<sub>2</sub>) Concentrations by Hour of the Day at Rider Trail I-70 (STL)  
Near-Roadway Site  
St. Louis Area Stay-At-Home Order Effective on Mar. 23, 2020  
Data is from Mar. 23 to May 4 of 2019 and 2020  
(Preliminary Data)**



# Ozone Observational Analysis

**West Alton** air monitoring site, St. Charles Co.

Possible effects on air quality of the COVID-19 stay-at-home order, issued for St. Louis City and County beginning on March 23, 2020 through May 4, 2020

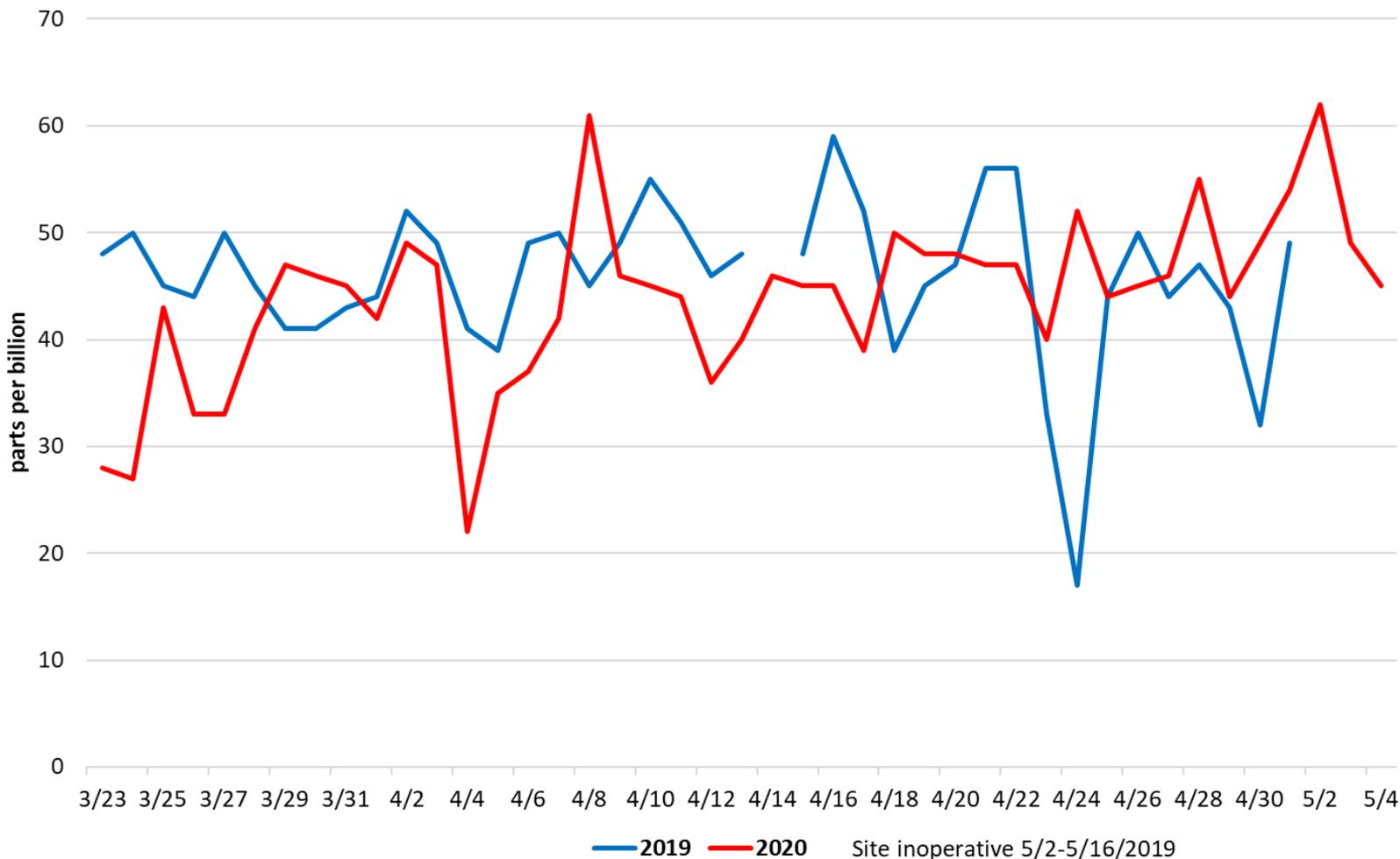
Many factors affect ozone formation:

- Precursor pollutant concentrations
- Solar radiation
- Ambient temperature
- Relative humidity
- Atmospheric stability...

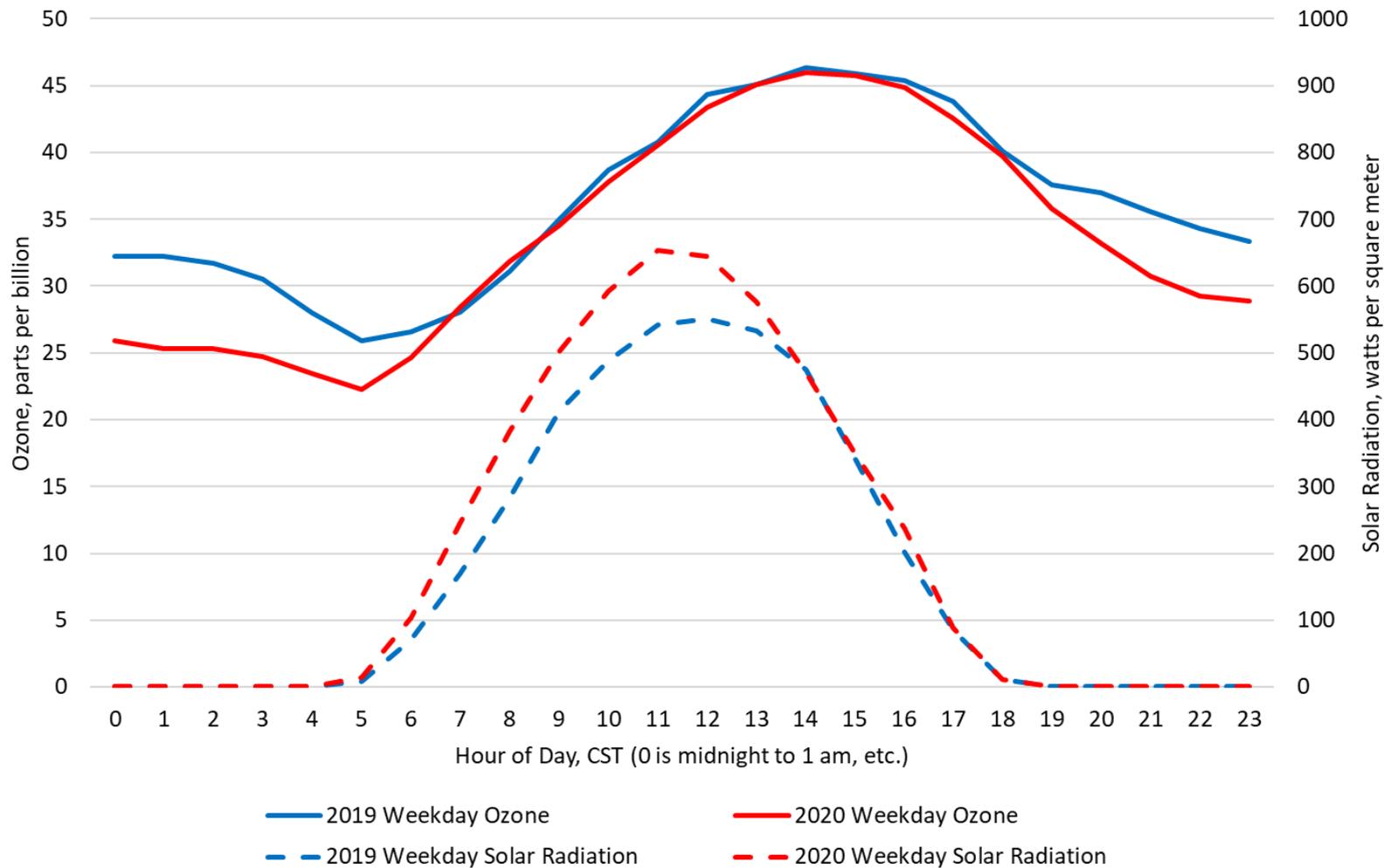


Site flooded- 2019

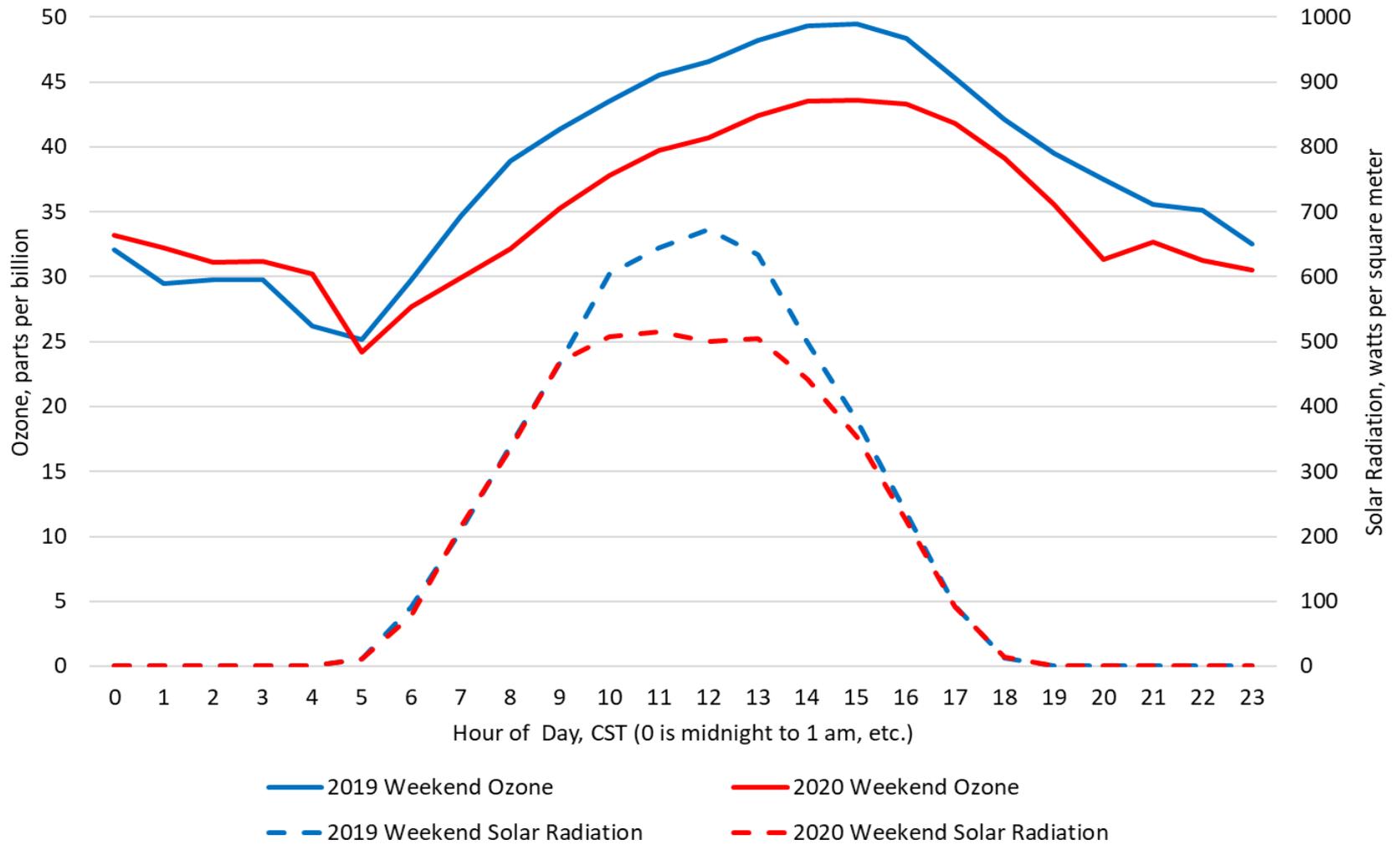
## West Alton Daily Maximum 8 Hour Ozone Concentration (St. Louis City & County Stay-at-home Order Effective 3/23/2020) Preliminary Data



### West Alton Weekday Average 1-Hour Ozone and Solar Radiation by Time of Day 3/23-5/4, 2019 & 2020 (St. Louis City and County Stay-at-home Order Effective 3/23/2020) Preliminary Data



# West Alton Weekend Average 1-Hour Ozone and Solar Radiation by Time of Day 3/23-5/4, 2019 & 2020 (St. Louis City and County Stay-at-home order Effective 3/23/2020) Preliminary Data



# Website Resources



## Air Pollution Control Program

Our mission is to maintain the purity of Missouri's air to protect the health, general welfare and property of the people. Whether urban citizen or rural resident, everyone in Missouri needs and deserves clean air. In other words, the 6 million residents of Missouri are our customers.



### What has Missouri done to improve our air?

For a study in contrasts, go to **Missouri Skies Now and Then.**



### Which pollutants do we monitor most closely?

Click **here** to learn about the six criteria pollutants and to access up-to-date information.



### What is today's forecast for air quality?

Using department data, the EPA issues daily forecasts for air quality. They range from green (good) to maroon (hazardous). **More...**



### How does Missouri track air pollution?

Missouri operates about 50 air monitors and oversees about two dozen air monitors maintained by industry. **Click on the interactive map.**



- Program Home Page
- Air Conservation Commission
- Air Pollutants
- Air Program Advisory Forum
- Air Quality
- Asbestos
- Forms and Applications
- Gateway Vehicle Inspection Program
- Laws and Regulations
- Ozone
- Permits
- Publications and Reports
- Public Notices-Comment Periods
- QAPP Template
- Air Pollution Compliance/Regulatory Assistance
- State Plans and Boundary Designations
- Vapor Recovery Information and Compliance Requirements
- Volkswagen Trust

### Contact Information

**Air Pollution Control Program**  
 P.O. Box 176  
 Jefferson City, MO 65102  
 800-361-4827  
 573-751-4817  
**Contact Us**

## Monitoring Information- 'Bookmark'

<https://dnr.mo.gov/env/apcp/>

- Design Value Reports
- Preliminary hourly data reports
- Monitoring Network Plans and More
- More improvements coming...
- New Drupal Website expected in October 2020



# Questions?

Stephen M. Hall

Air Quality Analysis Section Chief

Missouri Department of Natural Resources

Air Pollution Control Program

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Find us on the web at <https://dnr.mo.gov/env/apcp/>