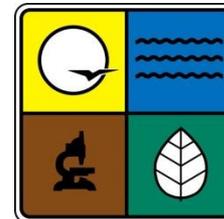


2014 Air Quality Report

Stephen Hall

Air Quality Analysis Section
Air Pollution Control Program

MACC Meeting, March 27, 2014
Springfield, MO



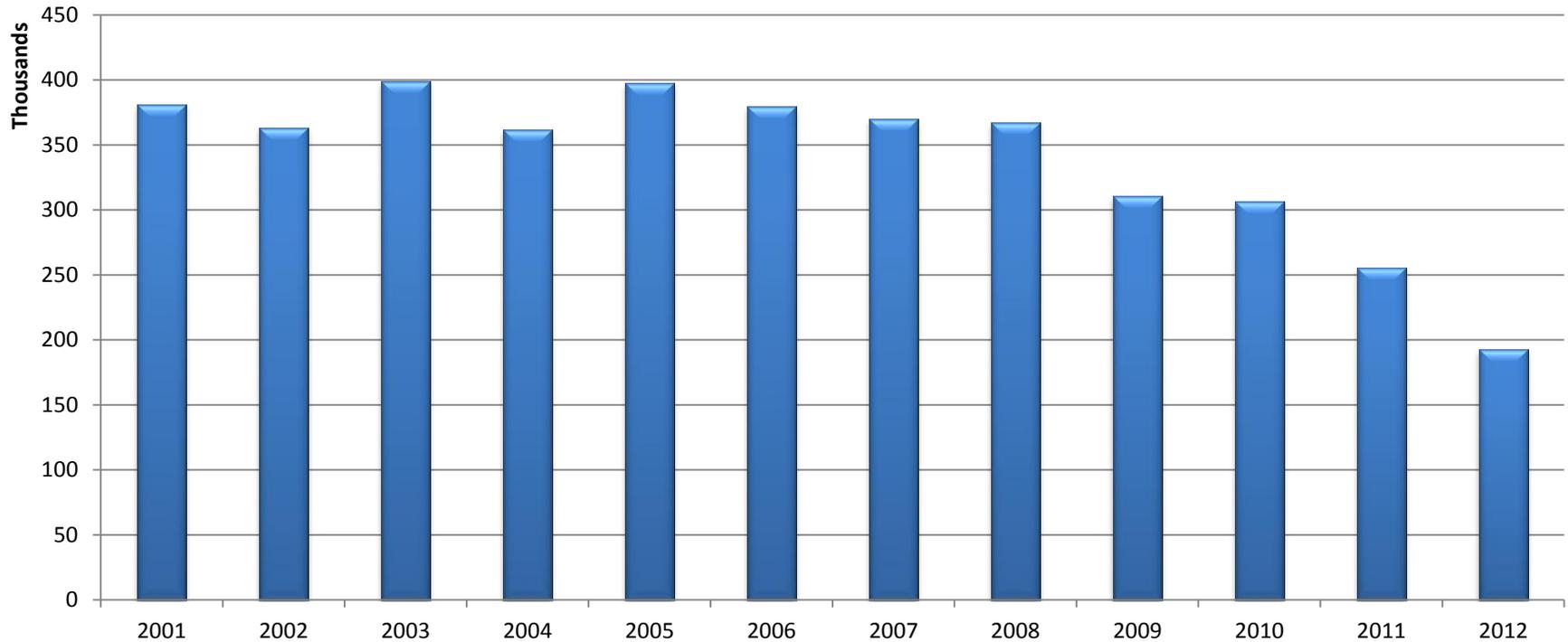
MISSOURI
DEPARTMENT OF
NATURAL RESOURCES

Presentation Overview

- Emissions Trends
- Ambient Air Monitoring Trends
- New Projects
- Website Resources

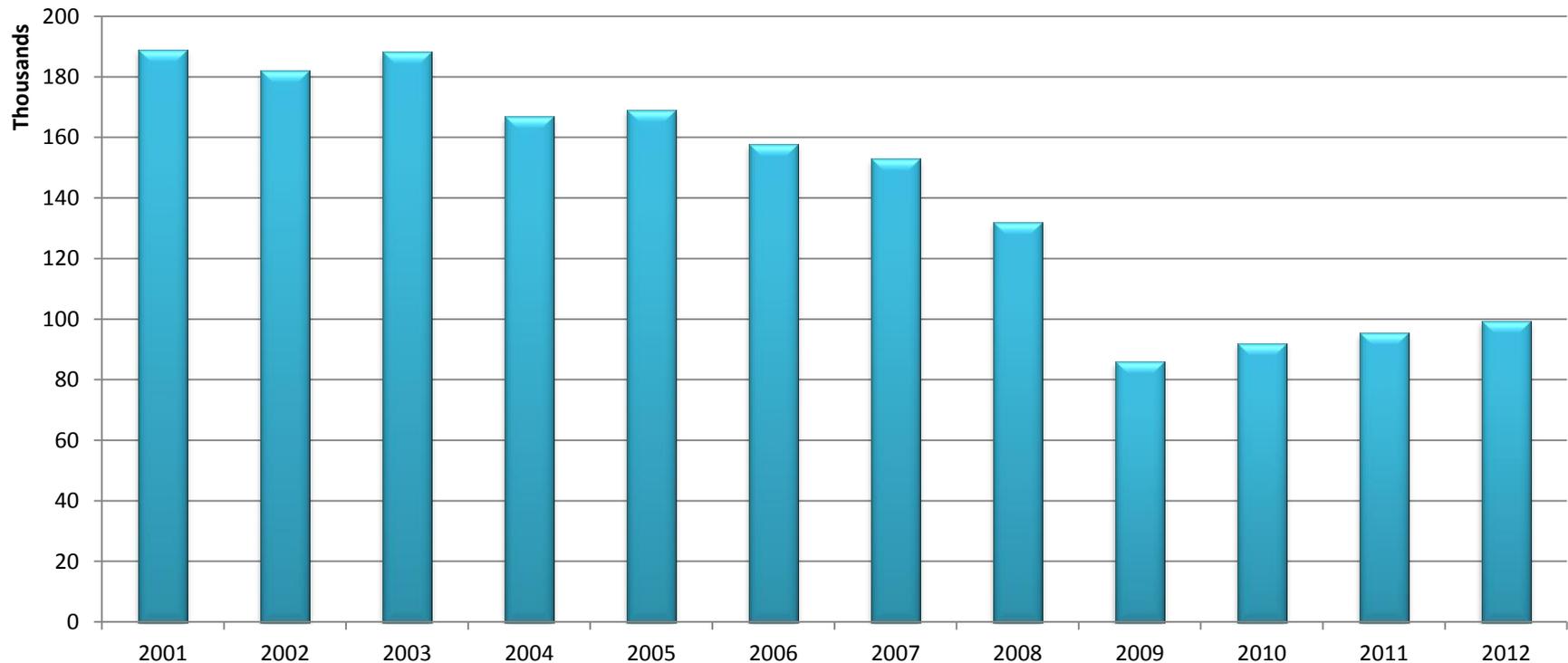
Sulfur Dioxide (SO₂) Point Source Emissions

Sulfur Dioxide
Thousand Tons per Year

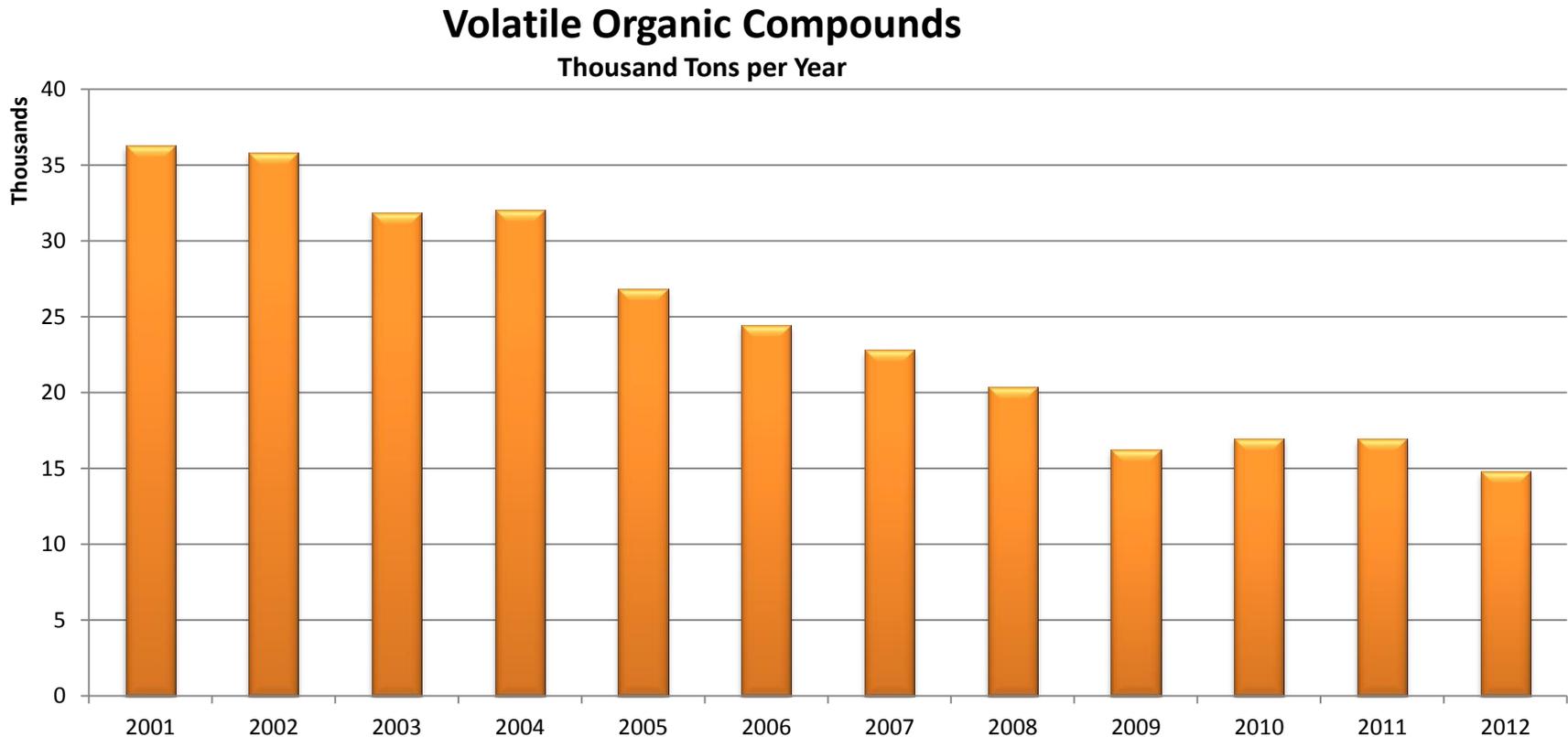


Nitrogen Dioxide (NO₂) Emissions

Nitrogen Dioxide
Thousand Tons per Year

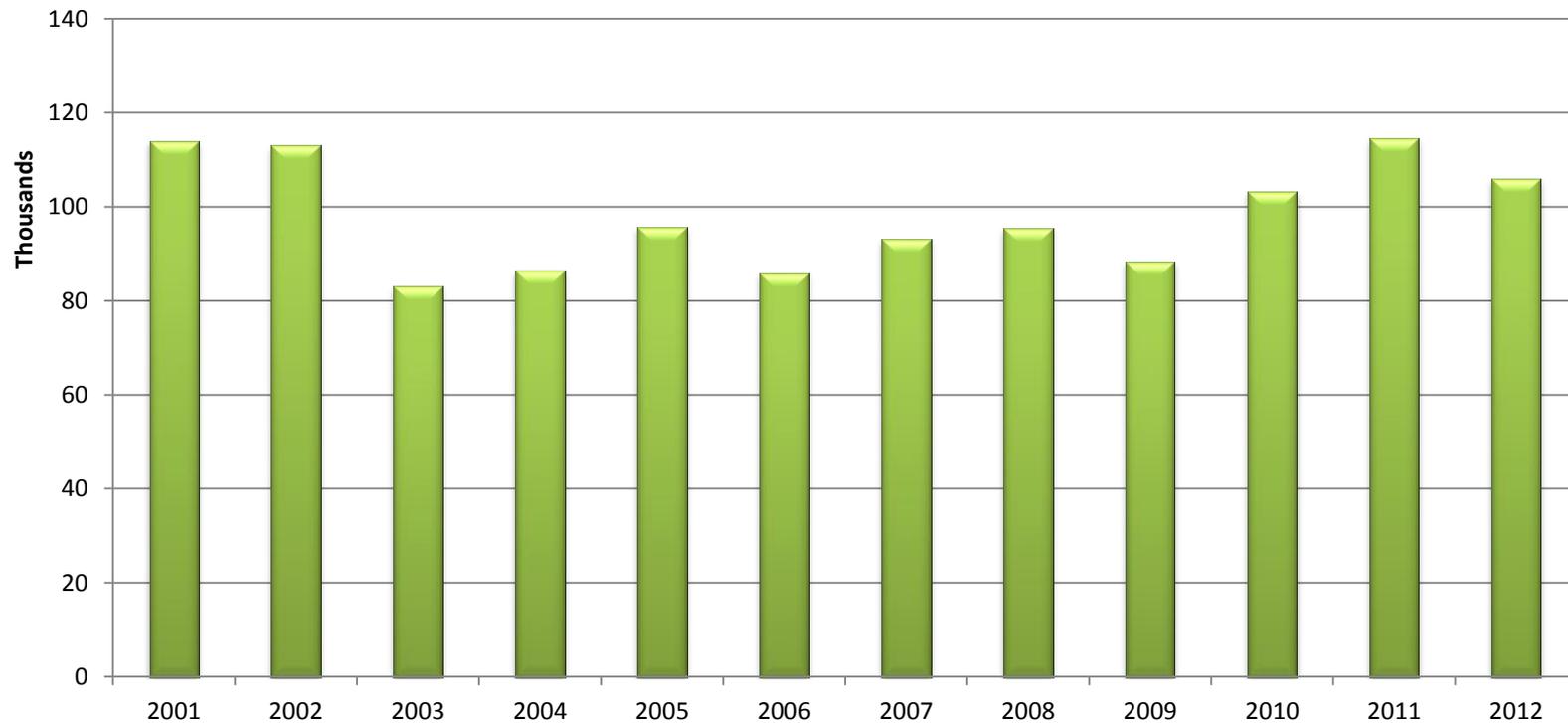


Volatile Organic Compounds (VOC)



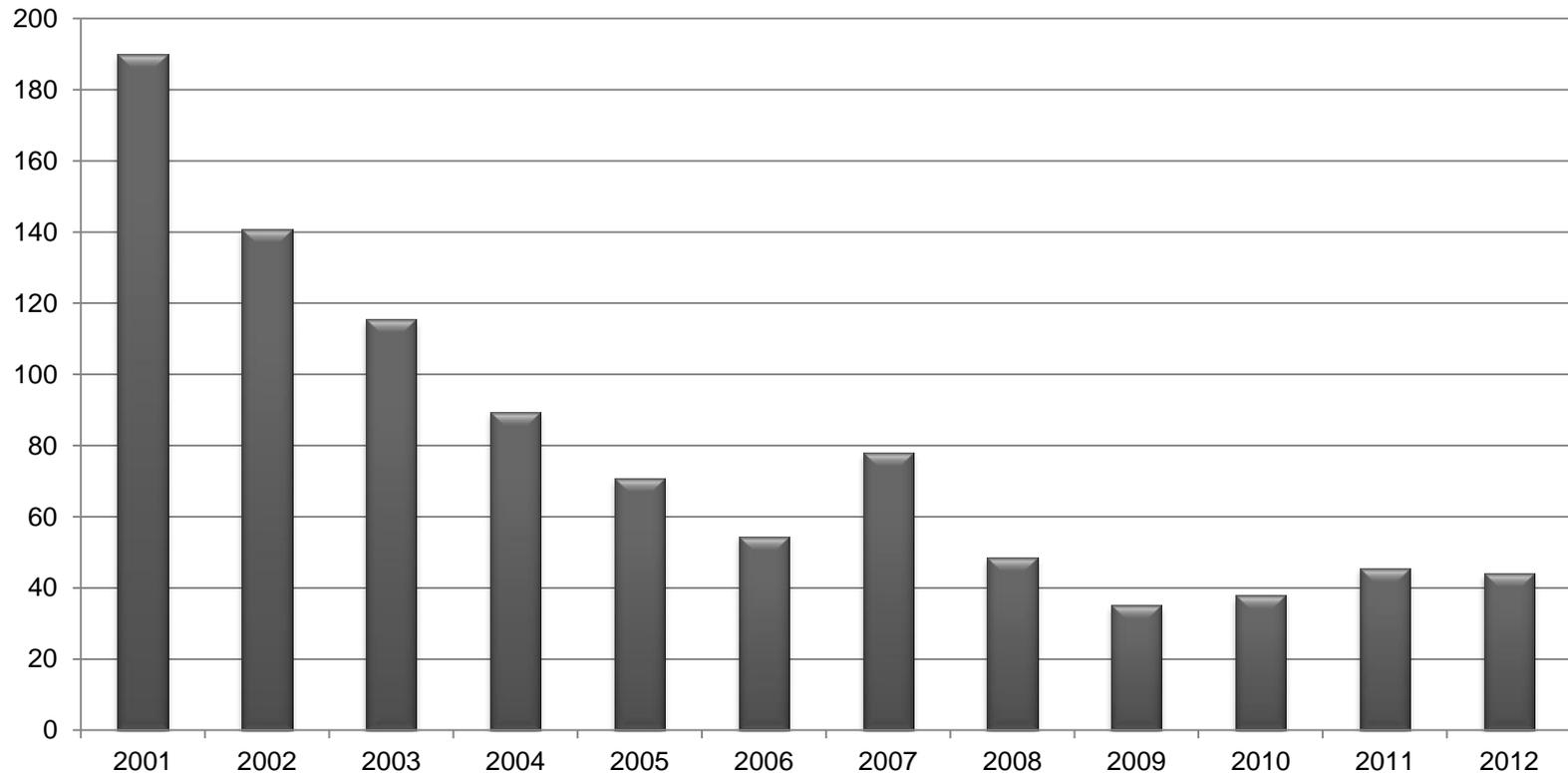
Carbon Monoxide (CO) Emissions

Carbon Monoxide
Thousand Tons per Year



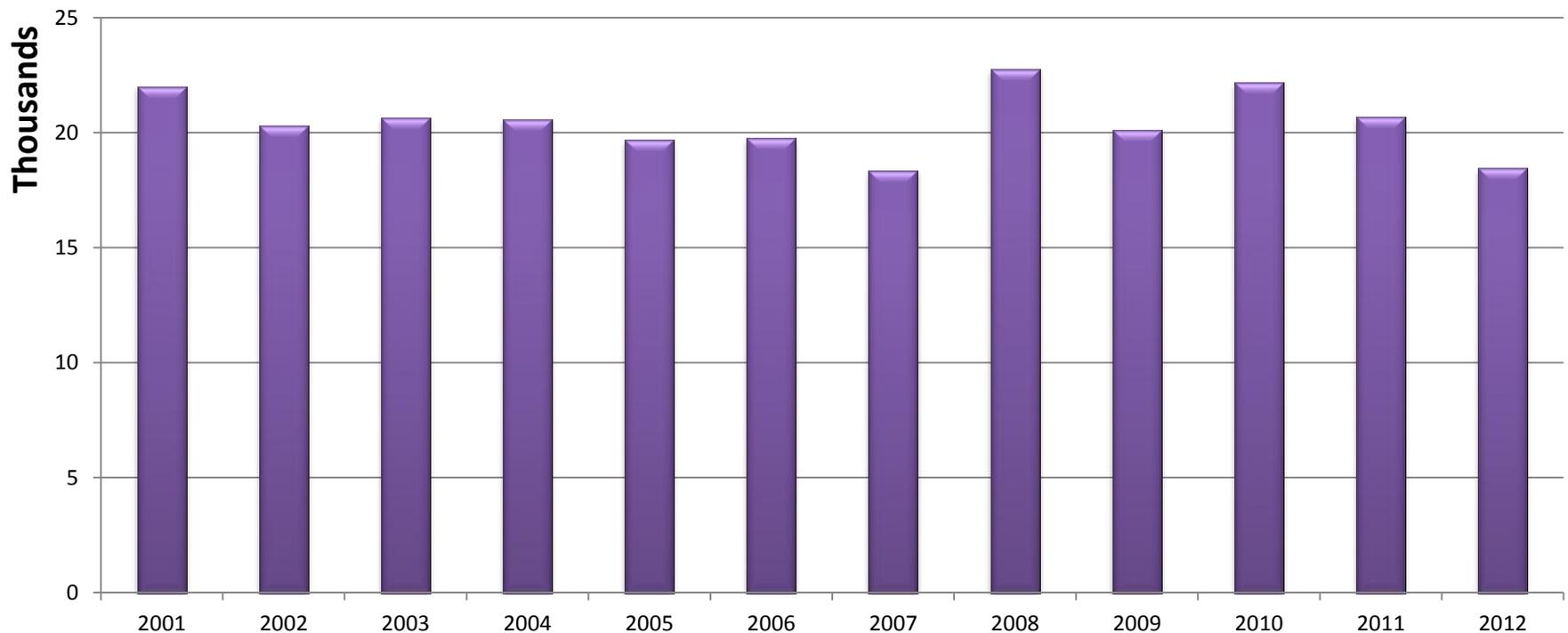
Airborne Lead (Pb) Emissions

Airborne Lead
Tons per Year



Particulate Matter (PM₁₀)

Particulate Matter (PM₁₀)
Thousand Tons per Year



Ambient Air Monitoring Trends

- Area wide criteria pollutant monitoring indicates decreasing trends over time.
- Revisions to the SO₂, NO₂, Lead, and Ozone NAAQS and revised monitoring network requirements has 'lowered the bar' for some areas.
- Some single source and area specific NAAQS violations are being addressed.

NAAQS Being Met

- **NO₂**: No Missouri sites violate the 2010 1-hour (100 ppb) standard or annual standard (53 ppb)
– Near roadway NO₂ sites – two sites deployed in 2013. No issues yet...
- **PM_{2.5}**: No Missouri sites violate the 1997 annual standard, 2006 24-hour PM_{2.5} standard, or the 2012 Annual (12 µg/m³) and 24-hour (35 µg/m³) standard.
– Near roadway PM_{2.5} sites- two monitors deployed in 2013. No issues yet...
- **CO**: No Missouri sites violate the 1-hour (35 ppm) or 8-hour (9 ppm) standard.
– Near roadway CO sites- two monitors deployed in 2013. No issues yet...

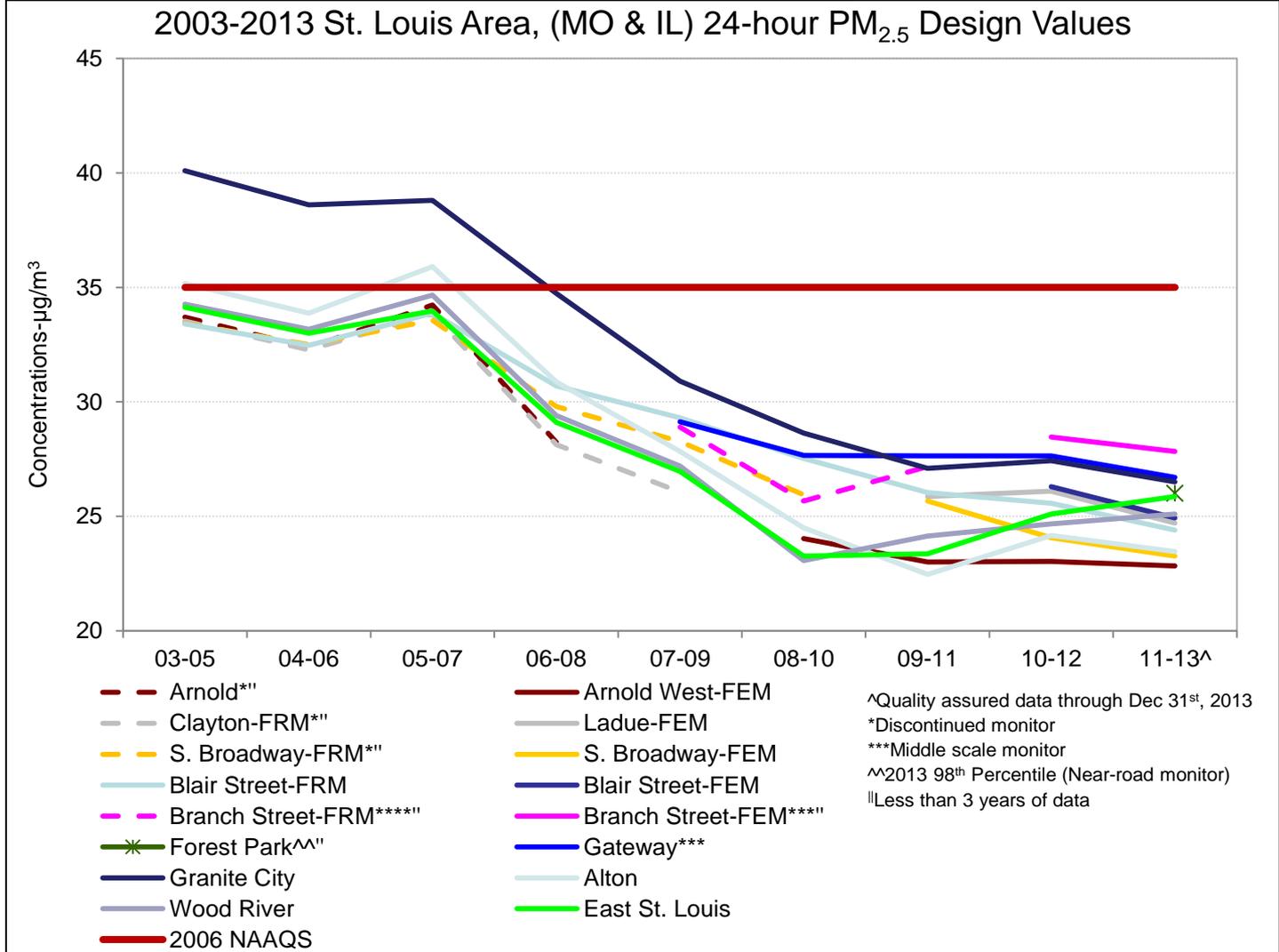
PM_{2.5}

- All Missouri monitors are in compliance of the Annual and 24-hour PM_{2.5} NAAQS.
- The Illinois side of the St. Louis CBSA has monitors violating the annual NAAQS.
(EPA determines if MO sources contribute significantly to Illinois' violating monitors)
- PM_{2.5} long term trends are downward.



PM_{2.5} 24-hour
 Average
 Ambient Air
 Monitoring
 Trends

➤ MO and IL
 Sites in
 Compliance

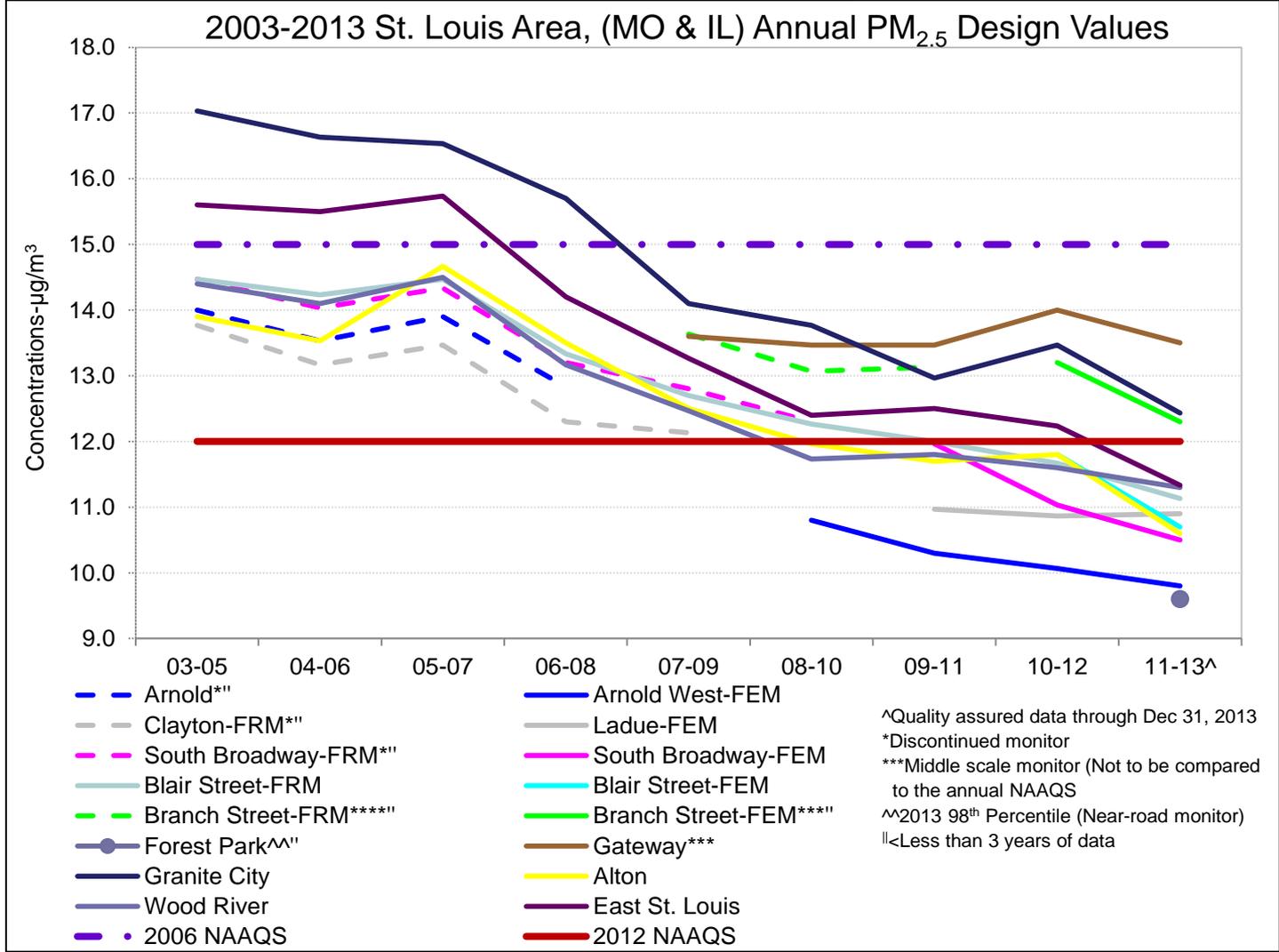


Data Source: Environmental Protection Agency Air Quality System (EPA AQS), AMP480 Report and AMP450 Report



PM_{2.5} Annual
 Average
 Ambient Air
 Monitoring
 Trends

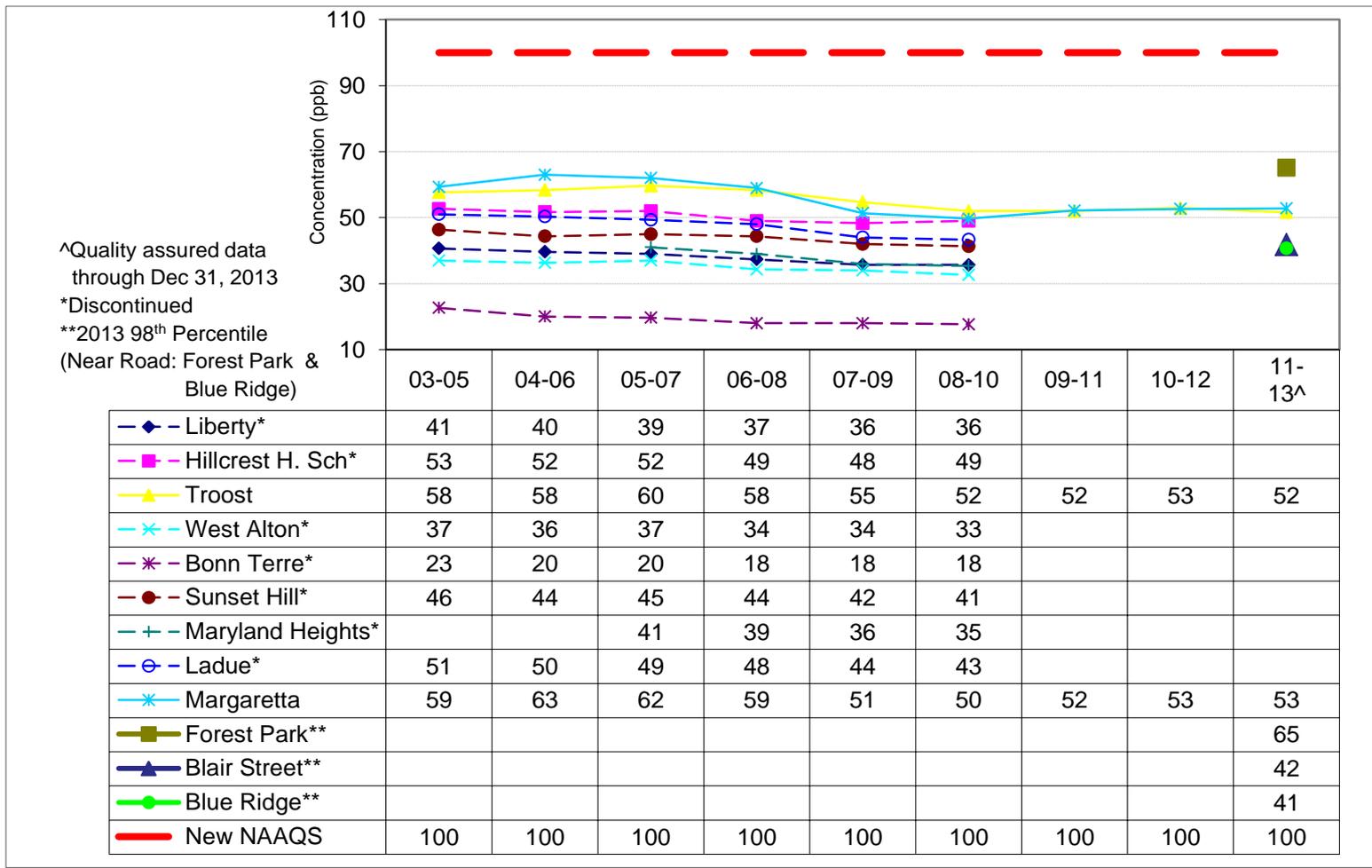
- MO Sites in Compliance
- One Illinois Site not Meeting Annual NAAQS



Data Source: Environmental Protection Agency Air Quality System (EPA AQS), AMP480 Report and AMP450 Report

NO₂

Missouri 3-year Average of the 98th Percentile of the Daily 1-hr Maximum NO₂ Concentrations
 (1-hr NAAQS = 100ppb)

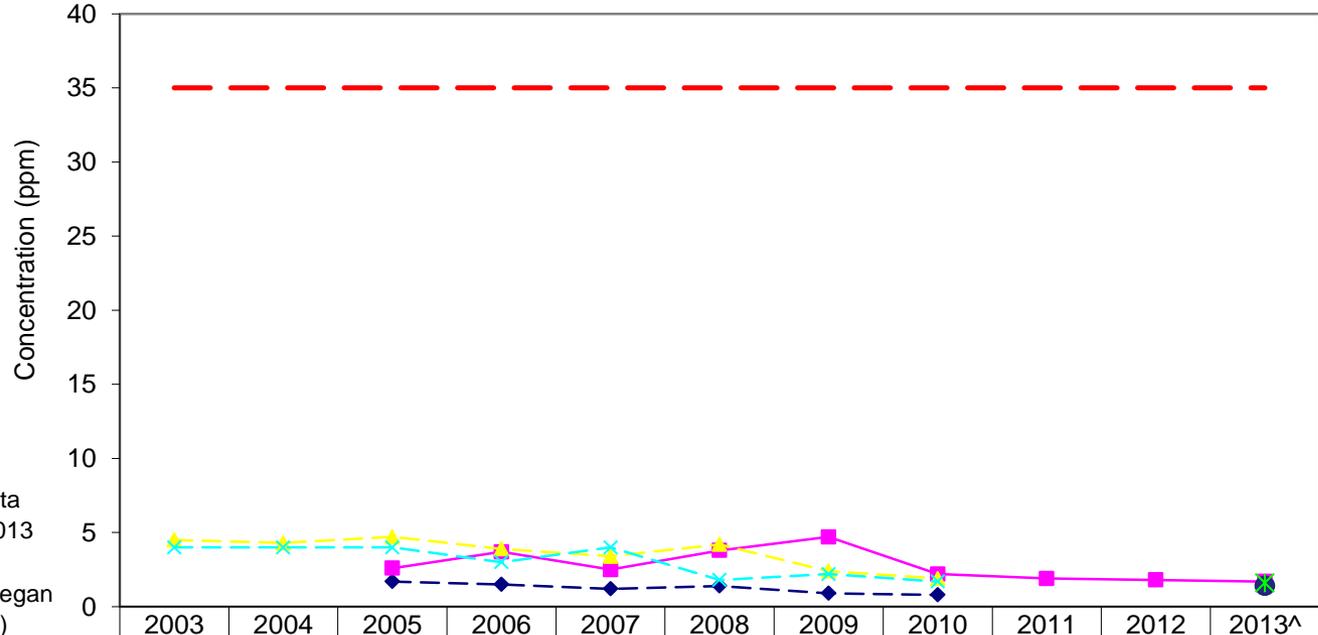


Data Source: Environmental Protection Agency Air Quality System (EPA AQS), AMP480 Report

CO

1-Hour 2nd Maximum Annual Averages of the Carbon Monoxide (CO) Concentrations

1-hr NAAQS = 35 Parts Per Million (ppm)



[^]Quality assured data through Dec 31, 2013

*Discontinued

**Near-Road site (Began monitoring in 2013)

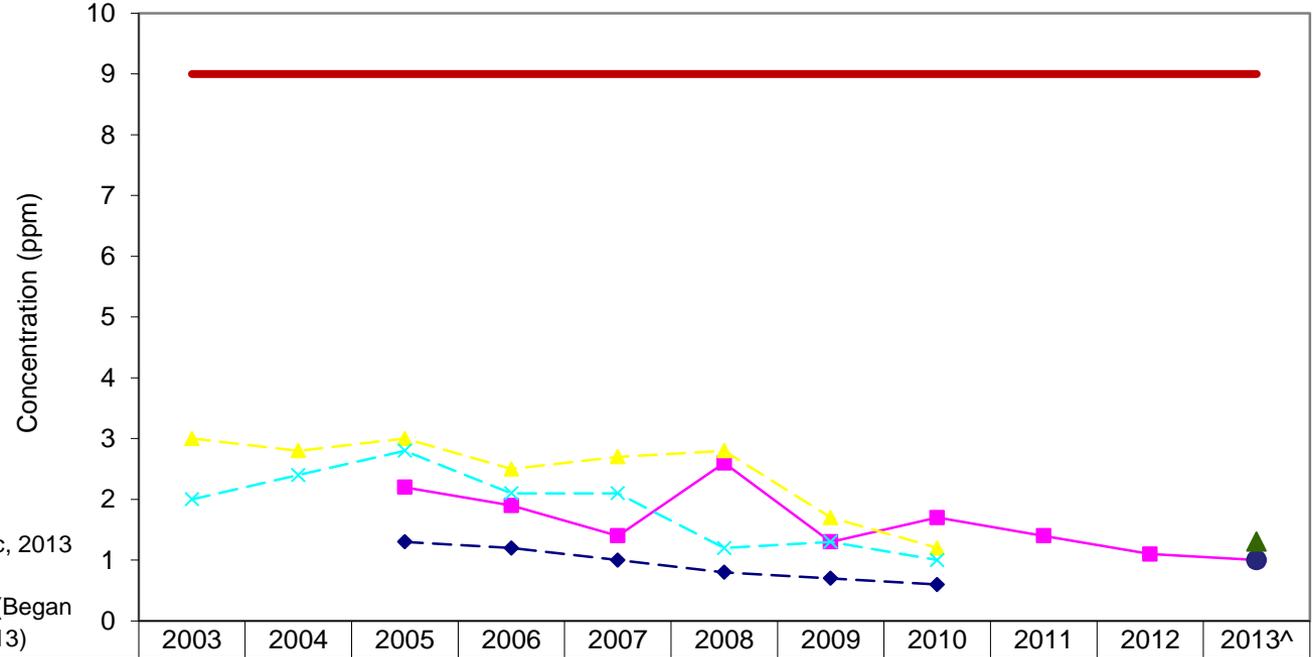
—◆— Sunset Hills*			1.7	1.5	1.2	1.4	0.9	0.8			
—■— Blair Street			2.6	3.7	2.5	3.8	4.7	2.2	1.9	1.8	1.7
—▲— Margaretta*	4.5	4.3	4.7	3.9	3.4	4.2	2.4	1.9			
—✧— MSU*	4.0	4.0	4.0	3.0	4.0	1.8	2.2	1.7			
—●— Forest Park**											1.4
—✱— Blue Ridge, I-70**											1.6
— — 1-hour NAAQS	35	35	35	35	35	35	35	35	35	35	35

Data Source: Environmental Protection Agency Air Quality System (EPA AQS), AMP450 Report



CO

8-Hour 2nd Maximum Annual Averages of the Carbon Monoxide (CO) Concentrations
 8-hr NAAQS = 9 Parts Per Million (ppm)



[^]Quality assured data through Dec, 2013
 *Discontinued
 **Near-Road site (Began monitoring in 2013)

◆ - Sunset Hills*			1.3	1.2	1.0	0.8	0.7	0.6			
■ - Blair Street			2.2	1.9	1.4	2.6	1.3	1.7	1.4	1.1	1.0
▲ - Margaretta*	3.0	2.8	3.0	2.5	2.7	2.8	1.7	1.2			
× - MSU*	2.0	2.4	2.8	2.1	2.1	1.2	1.3	1.0			
● - Forest Park**											1.0
▲ - Blue Ridge, I-70**											1.3
— 8-hour NAAQS	9	9	9	9	9	9	9	9	9	9	9

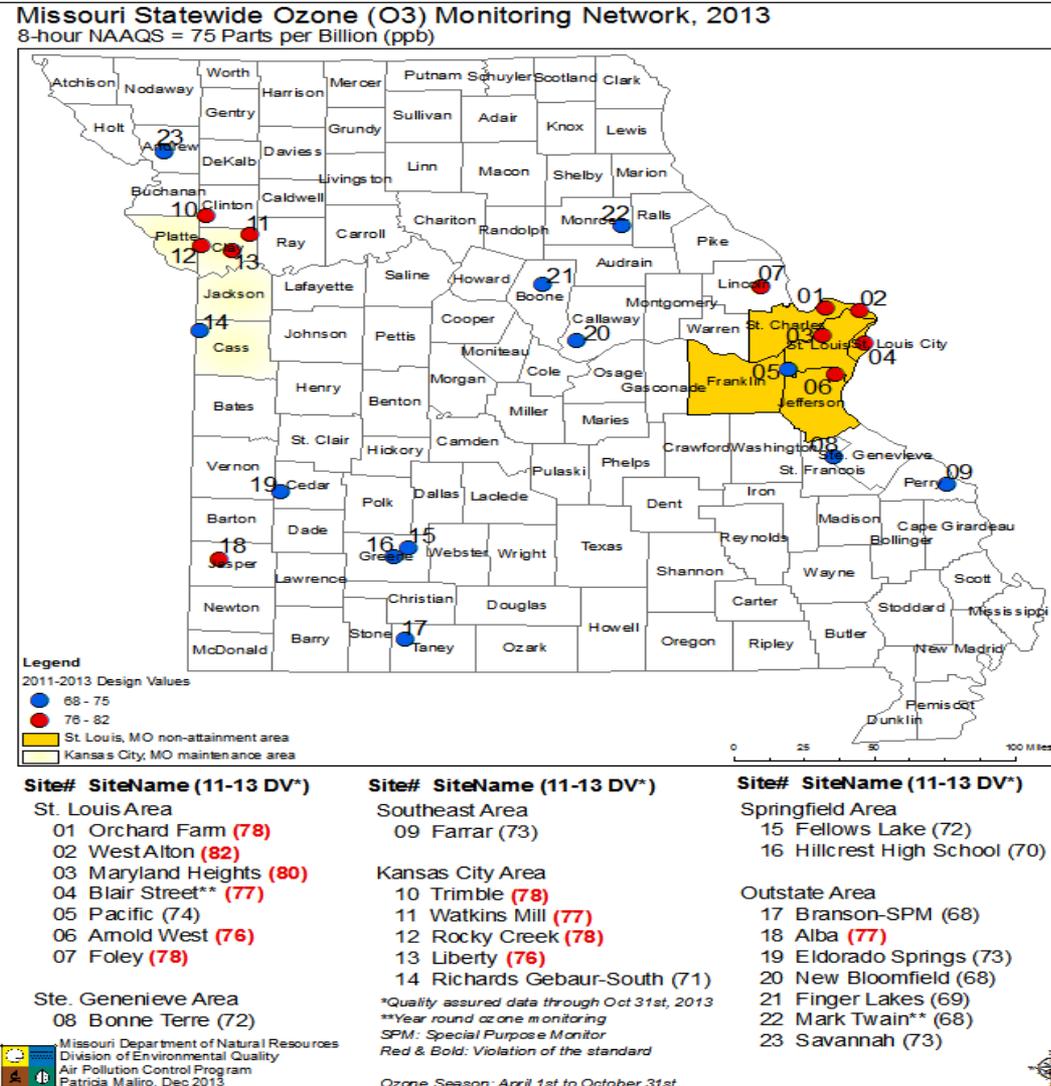
Data Source: Environmental Protection Agency Air Quality System (EPA AQS), AMP450 Report

Opportunities for Improvement

- **Ozone:** Six MO sites in the St. Louis area, four MO sites in Kansas City, and one site in Jasper Co. violate the 2008 standard of 75 ppb based on 2011-2013 data (2013 data is preliminary). The 2012 ozone season is driving design values.
 - Monitoring period over which EPA may designate areas determines path forward.
- **SO₂:** Two areas: Jackson (partial), and Jefferson counties (partial), violate the 2010 1-hr standard.
 - *Attainment Demonstrations are being developed*
- **Lead:** Three areas: Herculaneum, Iron/Dent/Reynolds (partial counties) (Buick), and Holt Co. (Exide) violate the 2008 3-month standard of 0.15 $\mu\text{g}/\text{m}^3$. One intermittent violation in the Glover MO area (not expected to be recurring).
 - *Attainment Demonstrations for each area (sans Glover) are being developed or have been submitted for SIP revisions.*
- **PM₁₀:** Two small areas in St. Louis City and Carthage violate the 24-hour of 150 $\mu\text{g}/\text{m}^3$
 - Small area of impact, single source or cluster of sources. *Compliance plans/strategy for each area are being developed or have been submitted for SIP revisions.*



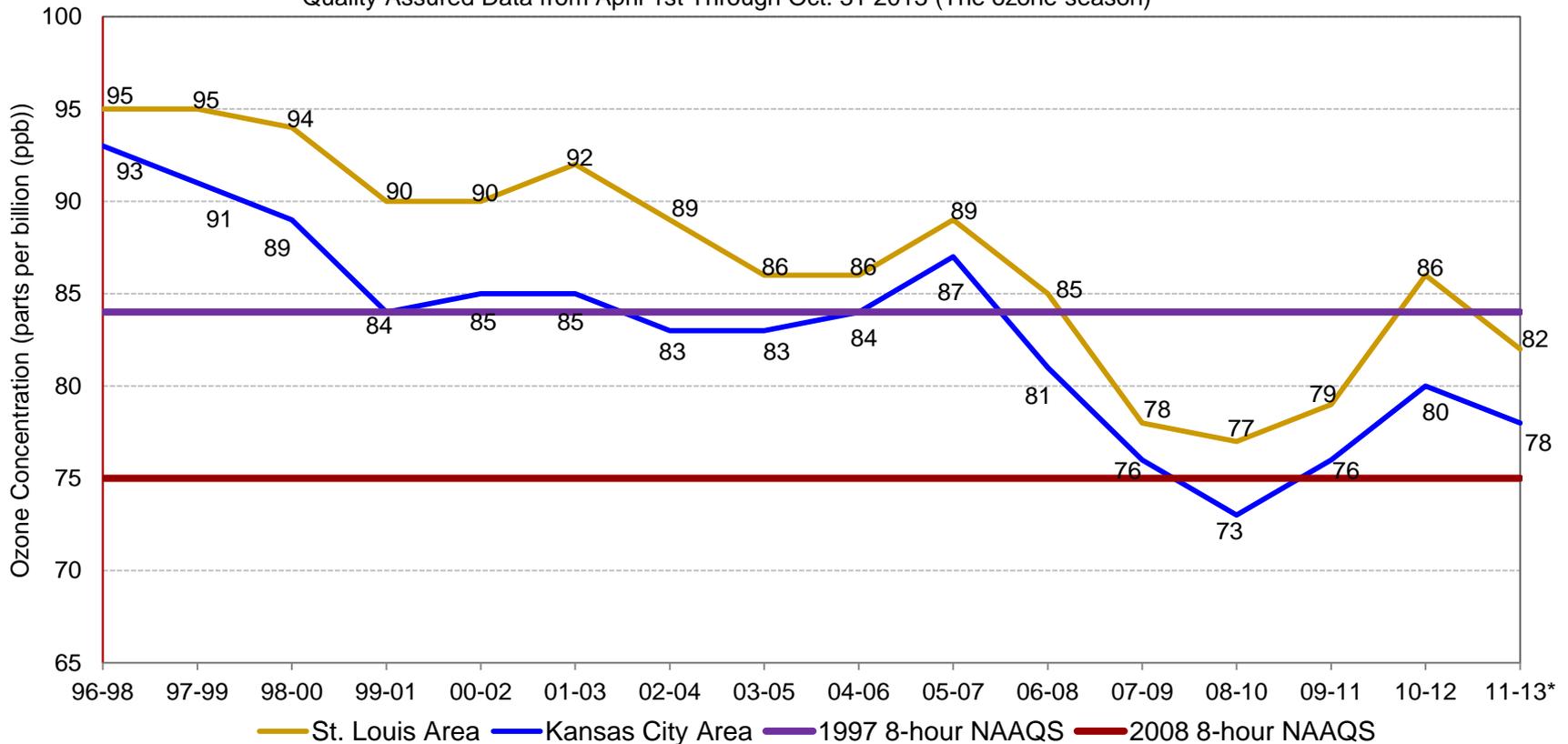
Ozone Monitoring Network



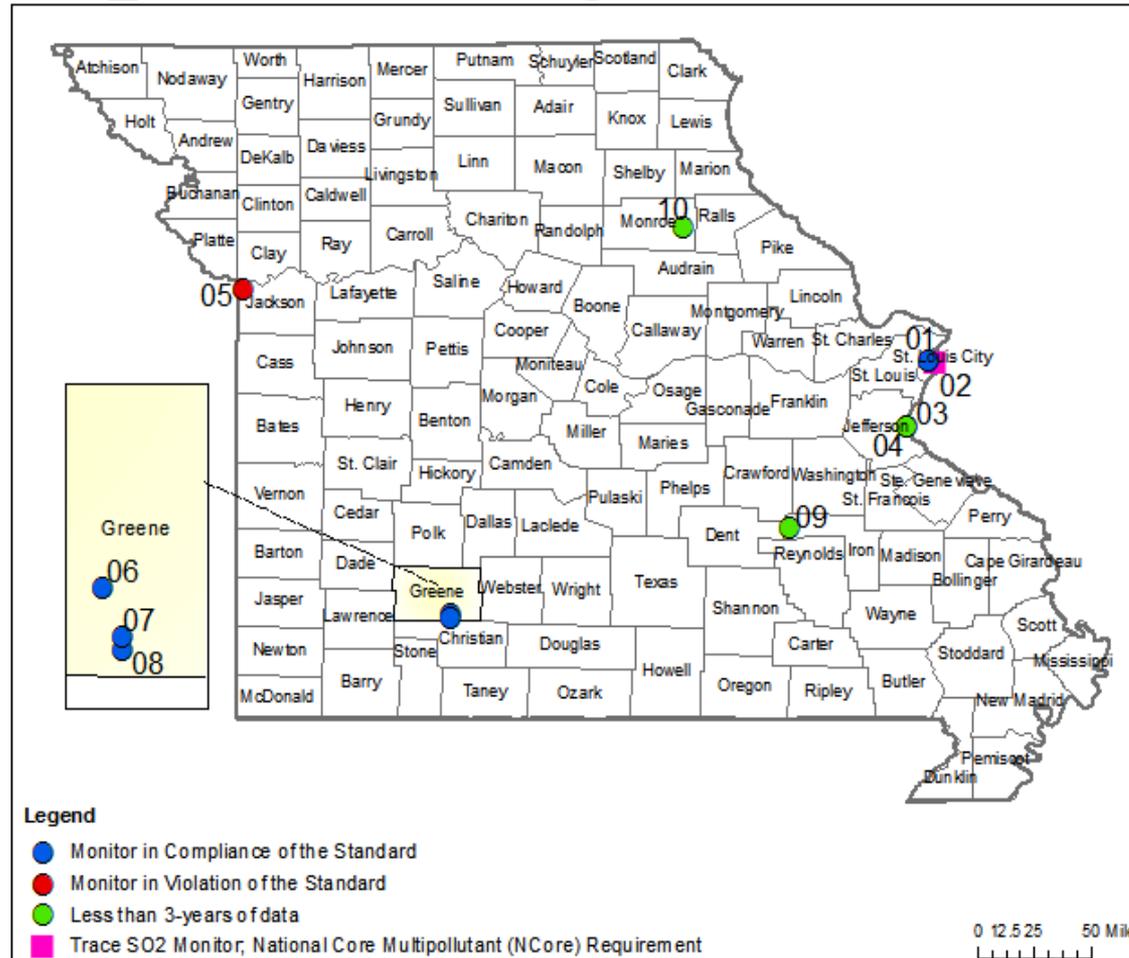
Ozone (O₃) Ambient Air Monitoring

1996-2013 8-hour O₃ Design Value Trends (ppb)
 St. Louis & Kansas City

*Quality Assured Data from April 1st Through Oct. 31 2013 (The ozone season)



SO₂ Monitoring Network, 2013



Site# Site Name (11-13 Design Values*(ppb))

St. Louis Area, MO

- 01 Margaretta (29)
- 02 Blair Street (47)
- 03 Herculaneum, Main Street** (172[^])
- 04 Herculaneum, Mott Street (192[^])

Kansas City, MO

- 05 Troost (162)

Springfield Area, MO

- 06 South Charleston (44)
- 07 Wildwood Lane[^]** (49)
- 08 James River-South[^] (44)

Outstate Area

- 09 Buick NE (90[^])
- 10 Mark Twain State Park (8[^])

*Quality assured data through December 31st, 2013

**Discontinued monitor

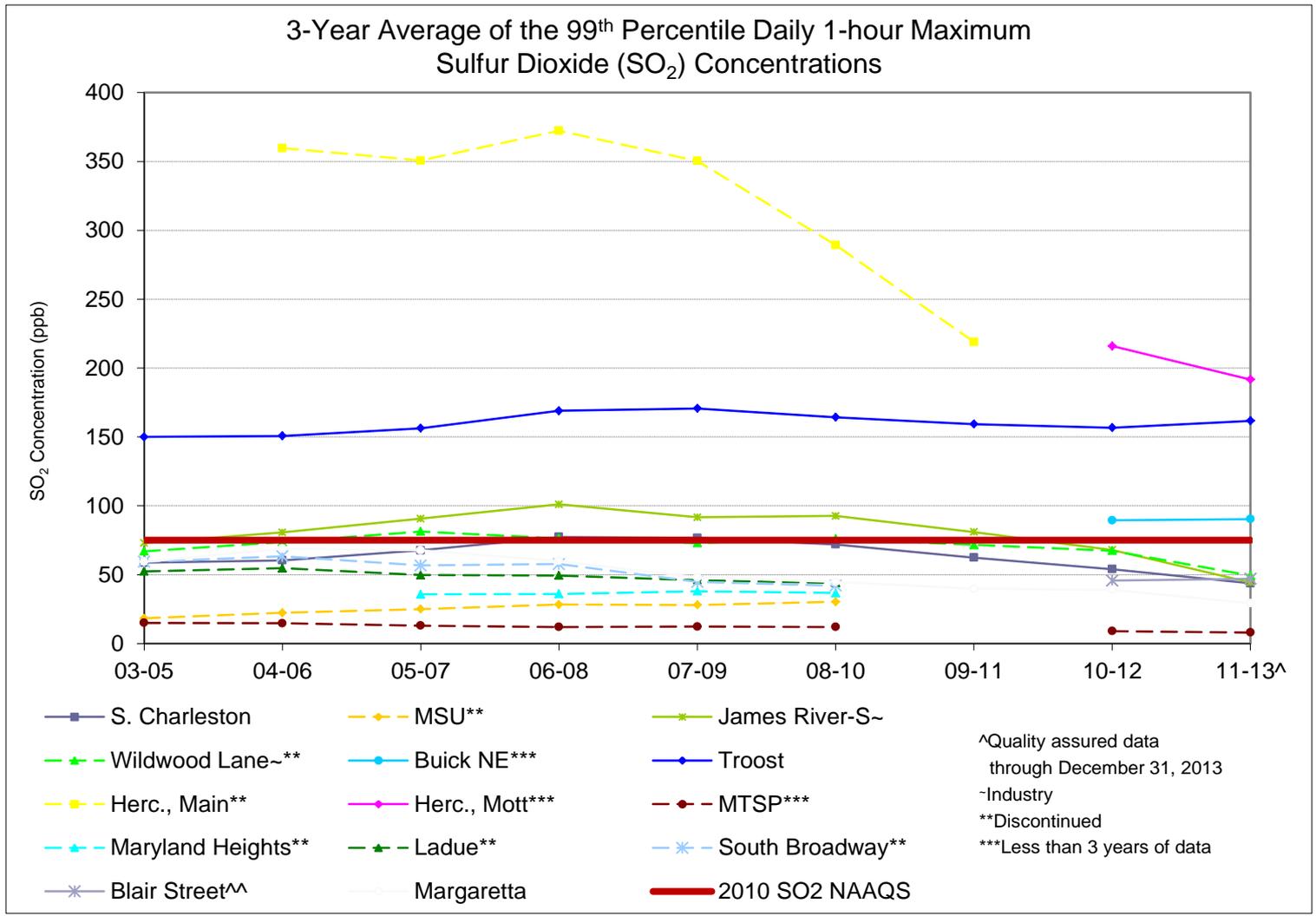
[^]Industry monitor

[^]Not a valid indicator due to data incompleteness

No violations of the 24-hour and annual NAAQS



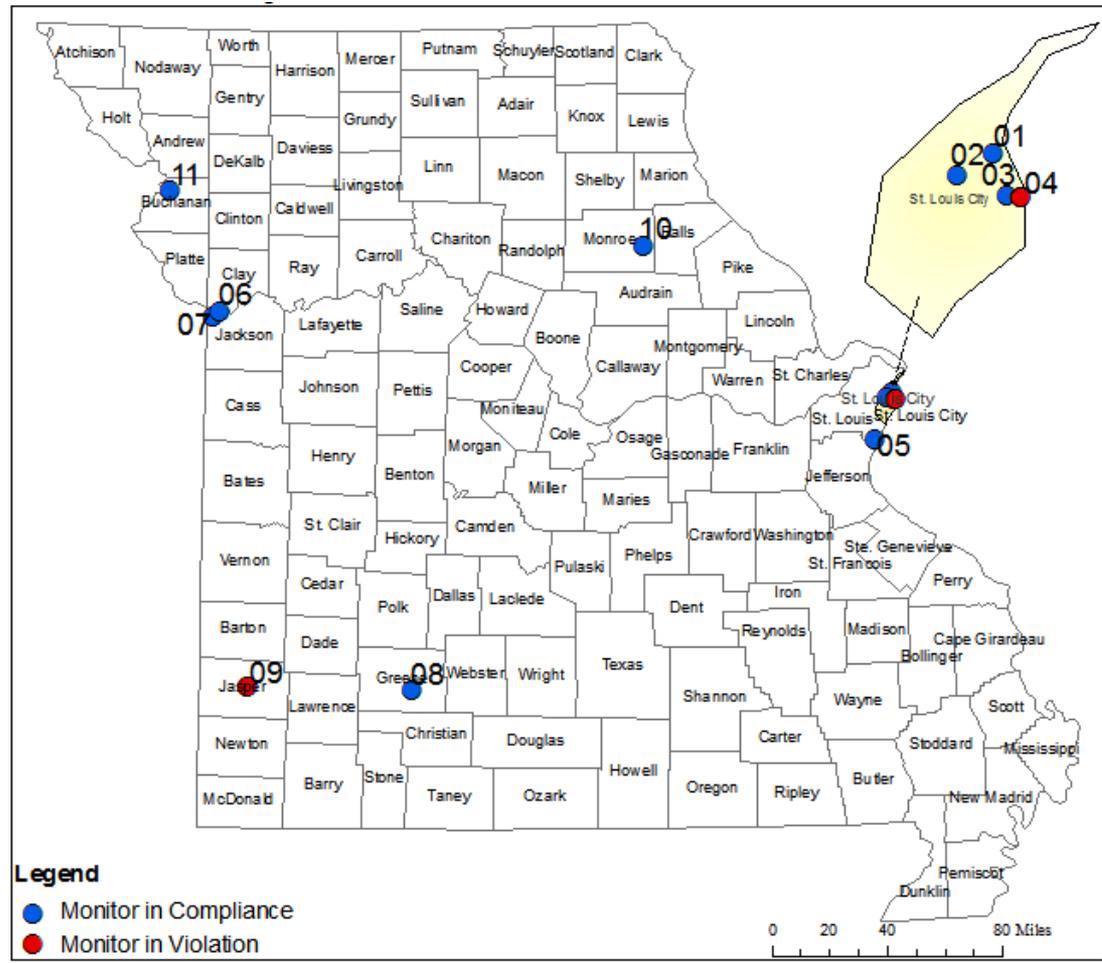
SO₂



Data Source: Environmental Protection Agency Air Quality System (EPA AQS), AMP480 Report



PM₁₀ Monitoring Network, 2013



Site# Site Name (11-13 # of Expected Exceedances*)

St. Louis Area, MO

- 01 Hall Street** (0.0)
- 02 Margaretta** (0.0)
- 03 Blair Street (0.0)
- 04 Branch Street** (**2.1**)
- 05 Oakville** (0.0)

Kansas City, MO

- 06 Troost (0.0)
- 07 Front Street** (0.0)

Springfield Area, MO

- 08 Missouri State University** (0.0)

Outstate Area

- 09 Carthage** (**1.9**)
- 10 Mark Twain State Park**^ (0.0)
- 11 St. Joseph Pump Station (0.0)

*Quality assured data through December 31st, 2013

**Continuous monitor.

^Resumed sampling on 06/01/2011 as a continuous monitor.

Red & Bold: Violation of the 24-hour standard.

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.

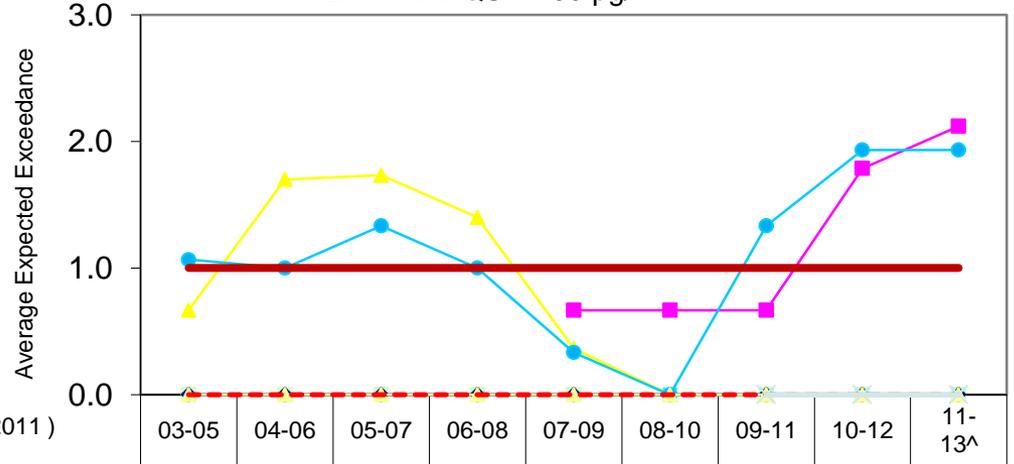
Legend

- Monitor in Compliance
- Monitor in Violation



PM₁₀

3-year Averages of the Expected Exceedance of the PM₁₀ 24-hour
 Standard
 24-hr NAAQS = 150 µg/m³



^Quality assured data through
 December 30, 2013

*Resumed monitoring (06/01/2011)
 as continuous monitoring

	03-05	04-06	05-07	06-08	07-09	08-10	09-11	10-12	11-13 [^]
—●— Blair Street	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
—■— Branch Street					0.7	0.7	0.7	1.8	2.1
—▲— Hall Street	0.7	1.7	1.7	1.4	0.4	0.0	0.0	0.0	0.0
—*— Margaretta	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
—●— Van Brunt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
—■— MSU	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
—◆— Mark Twain State Park*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
—×— Oakville						0.0	0.0	0.0	0.0
—●— Carthage-TEOM	1.1	1.0	1.3	1.0	0.3	0.0	1.3	1.9	1.9
—▲— St. Joseph Pump Station	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
— - - Troost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
—×— Front							0.0	0.0	0.0
— 3-yr Avg of the Exp Exceed =<1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Data Source: Environmental Protection Agency Air Quality System (EPA AQS), AMP480 Report, 03/17/2014

New Projects-Near-Roadway



Some key siting issues

- Less than 50 meters to nearest traffic lane- (achieved about 25 meters @ Forest Park & I-64, St. Louis)
- 180 deg. open path to roadway
- Located on the predominantly downwind side of roadway (north side of I-64)
- Consider locations of higher ranking traffic density using annual average daily traffic count (AADT) and fleet mix.
- Monitored Pollutants: NO₂, CO, PM_{2.5}, Special purpose: Black Carbon, PM₁₀, PM_{10-2.5}, meteorology

Website Resources

- Air Pollutants Page: Missouri Department of Natural Resources/Programs/Air Pollution Control Program/Program Links/Air Pollutants:
<http://dnr.mo.gov/env/apcp/airpollutants.htm>
- Design Value Reports
- Preliminary hourly data reports
- Monitoring Network Plans and More
- More improvements coming...

Division of Environmental Quality Director: Leanne Tippett Mosby

Date: March 27, 2014

Nothing in this document may be used to implement any enforcement action or levy any penalty unless promulgated by rule under chapter 536 or authorized by statute.