



History of St. Louis Air Pollution

December 2015



EAST-WEST GATEWAY
Council of Governments

Creating Solutions Across Jurisdictional Boundaries

Oxygen in the air

strong
sunlight

hydrocarbon
emissions

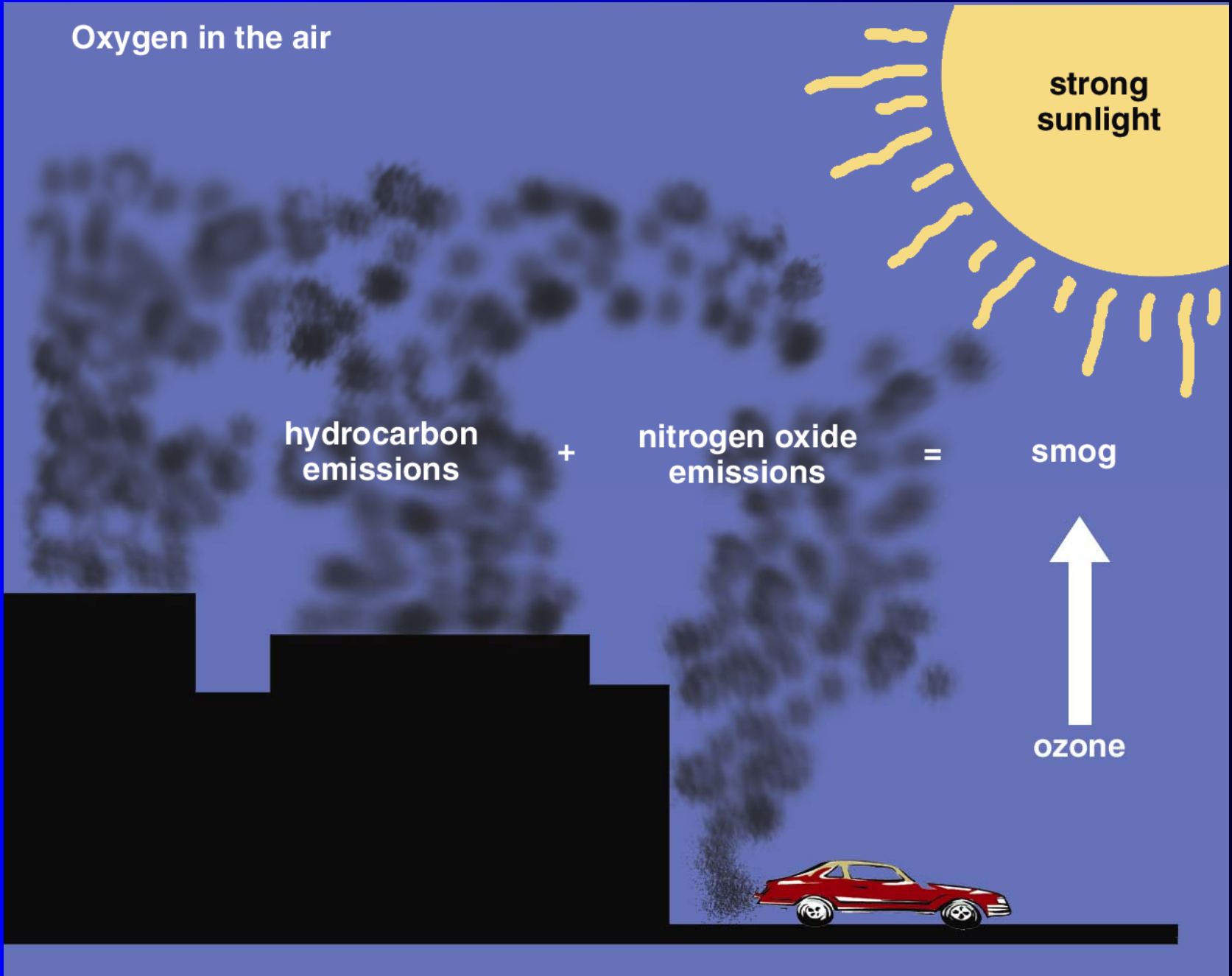
+

nitrogen oxide
emissions

=

smog

↑
ozone



Ground Level Ozone

- Formed when volatile organic compounds (VOCs) and oxides of nitrogen (NO_x) from car and truck exhaust and other industrial processes chemically react with oxygen in the lower atmosphere in the presence of strong sunshine, low wind speed and high temperatures.



Ozone Health Effects

- Affects children and the elderly
- High levels can cause –
 - Headaches, fatigue and eye, nose and respiratory tract irritation
- Prolonged exposure can aggravate –
 - Chronic heart disease and chronic respiratory ailments



St. Louis Ozone History

Year	Action
1991	Moderate Non-Attainment for 1979 1-Hour Ozone Standard
2002	Designated Attainment for 1979 1-Hour Ozone Standard
2004	Moderate Non-Attainment for 1997 8-Hour Ozone Standard, including Jersey County IL
June 2012	Illinois Counties Designated Attainment for 1997 8-Hour Ozone Standard
July 2012	Marginal Non-Attainment for 2008 8-Hour Ozone Standard
February 2015	Missouri Counties Designated Attainment for 1997 8-Hour Ozone Standard



Fine Particulate Matter (PM_{2.5})

- PM_{2.5} is mix of solid particles and liquid droplets suspended in the atmosphere.
- PM_{2.5} is about 1/30 the width of a human hair.
- It can be emitted directly into the air from combustion or formed by the chemical reaction of gases in the atmosphere.



PM_{2.5} Health Effects

- People most at risk from exposure include those with asthma, heart or lung disease, those who are active outdoors and children and the elderly
- PM_{2.5} is able to penetrate and lodge in deep areas of the lungs.
- Effects include -
 - Eye irritation, sore throat, coughing, chest tightness and shortness of breath



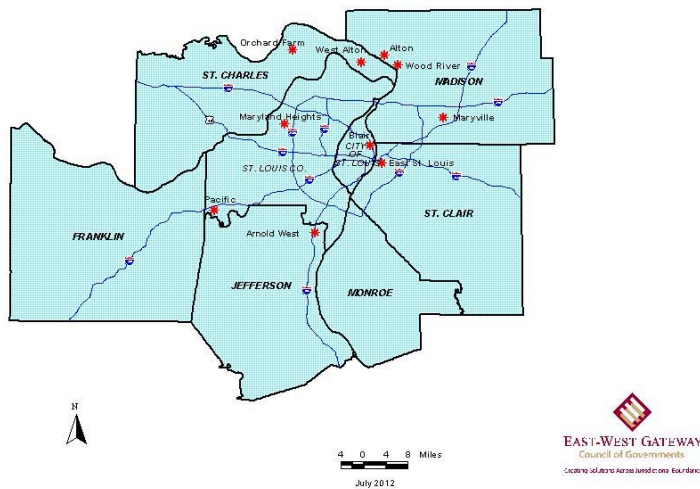
St. Louis PM_{2.5} History

Year	Action
2005	Non-Attainment for 1997 Annual PM _{2.5} Standard, including Baldwin Township, Randolph County IL (15 micrograms/cubic meter or ug/m ³ annual mean averaged over 3 years)
2009	Attainment 1997 24-Hour PM _{2.5} Standard (25 ug/m ³ , 98 th percentile averaged over 3 years)
2015	Unclassifiable for 2012 Annual PM _{2.5} Standard (12 ug/m ³ annual mean averaged over 3 years)



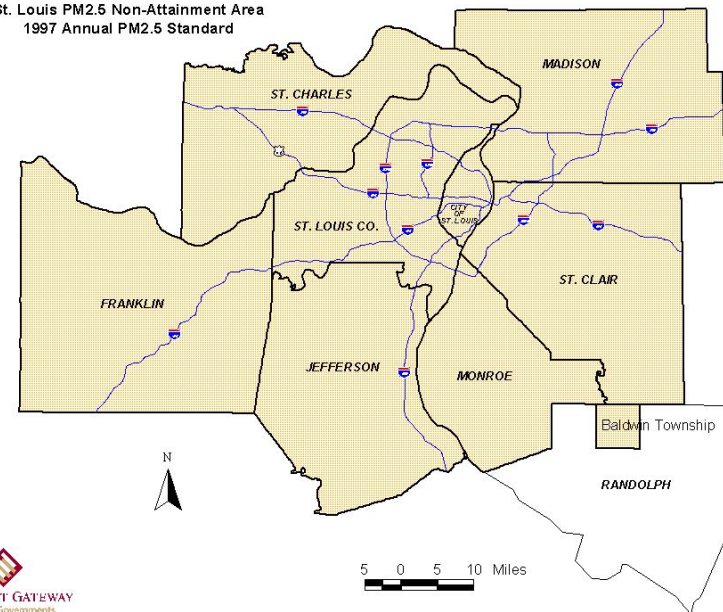
St. Louis (MO-IL) Non-Attainment Areas

Figure 1
St. Louis 2008 8-Hour Ozone Standard Non-Attainment Area
Monitor Network



2008 Ozone

Figure 2
St. Louis PM_{2.5} Non-Attainment Area
1977 Annual PM_{2.5} Standard



1997 PM_{2.5}

2008 Ozone Standard

- 75 parts per billion (ppb)
- Exceedance is when an 8-hour average of values at a monitor is calculated to be > 75 ppb on any given day
- Violation is when a 3-year average of the 4th highest annual average at a monitor is calculated to be > 75 ppb



Ozone Data Sharing Project

- Ozone Season - April 1 to October 31
- East-West Gateway acts as a clearinghouse for ozone data
- Initial quality assurance screening
- Prepare reports for partner agencies and EWG website
- 2015 – Only 1 exceedance
 - July 24 at Orchard Farm monitor (78 ppb)



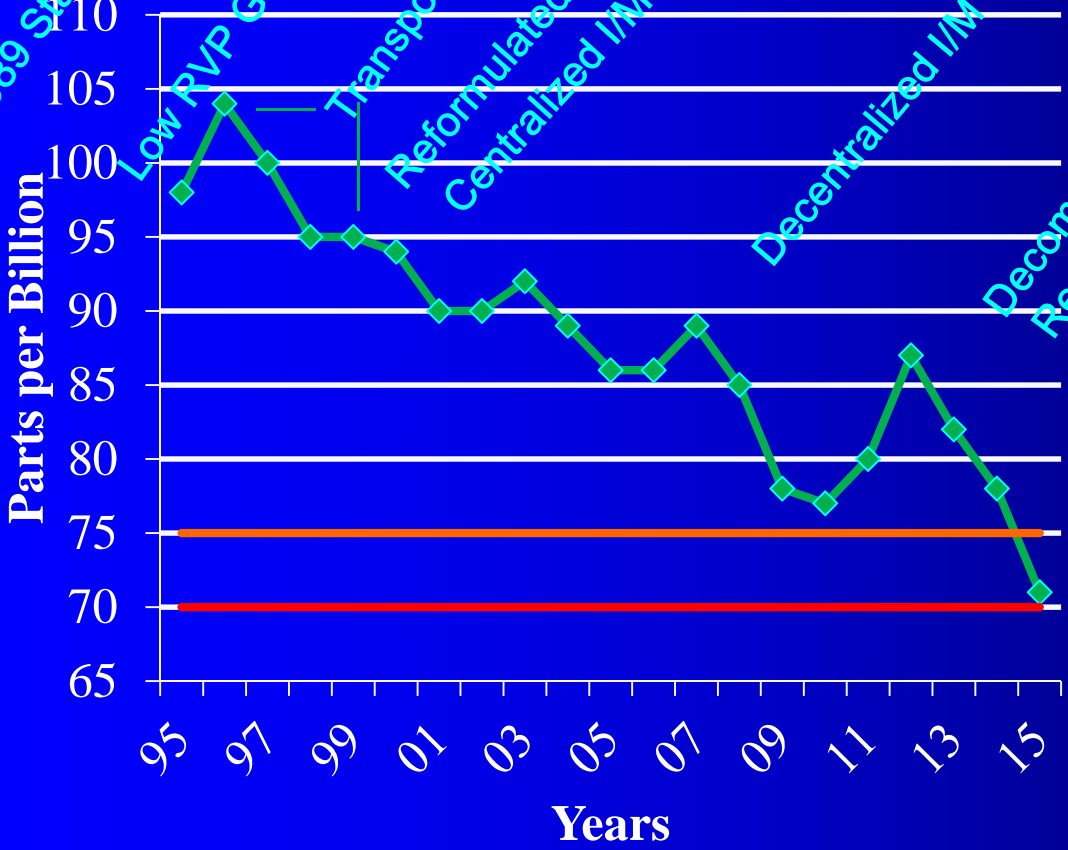
Summer Weather Facts

Days with Temperatures	Years				Average Number of Days per Year
	2012	2013	2014	2015	
90 ^o or greater	60	37	34	49	36
100 ^o or greater	21	2	1	1	2

National Weather Service

3 Year Average 4th Highest 2008 8-Hr Ozone Average

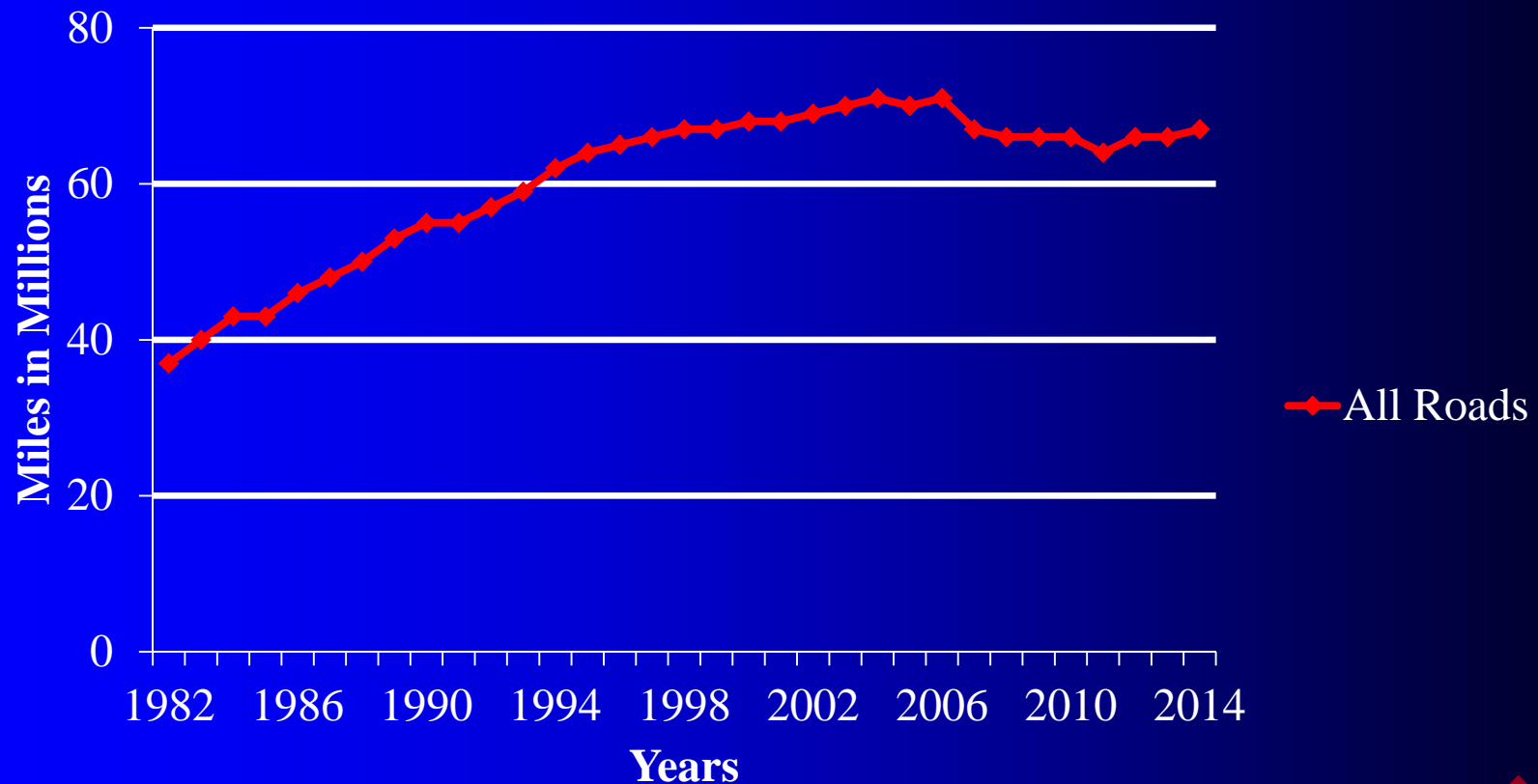
1984 Decentralized I/M tailpipe
 1989 Stage II Vapor Recovery
 Low PVP Gas
 Transportation Control Measures
 Reformulated Gas
 Centralized I/M IM240
 Decentralized I/M OBD
 Decommission Stage II Vapor Recovery



- ◆ 3 Year Average
- 2008 Standard
- 2015 Standard



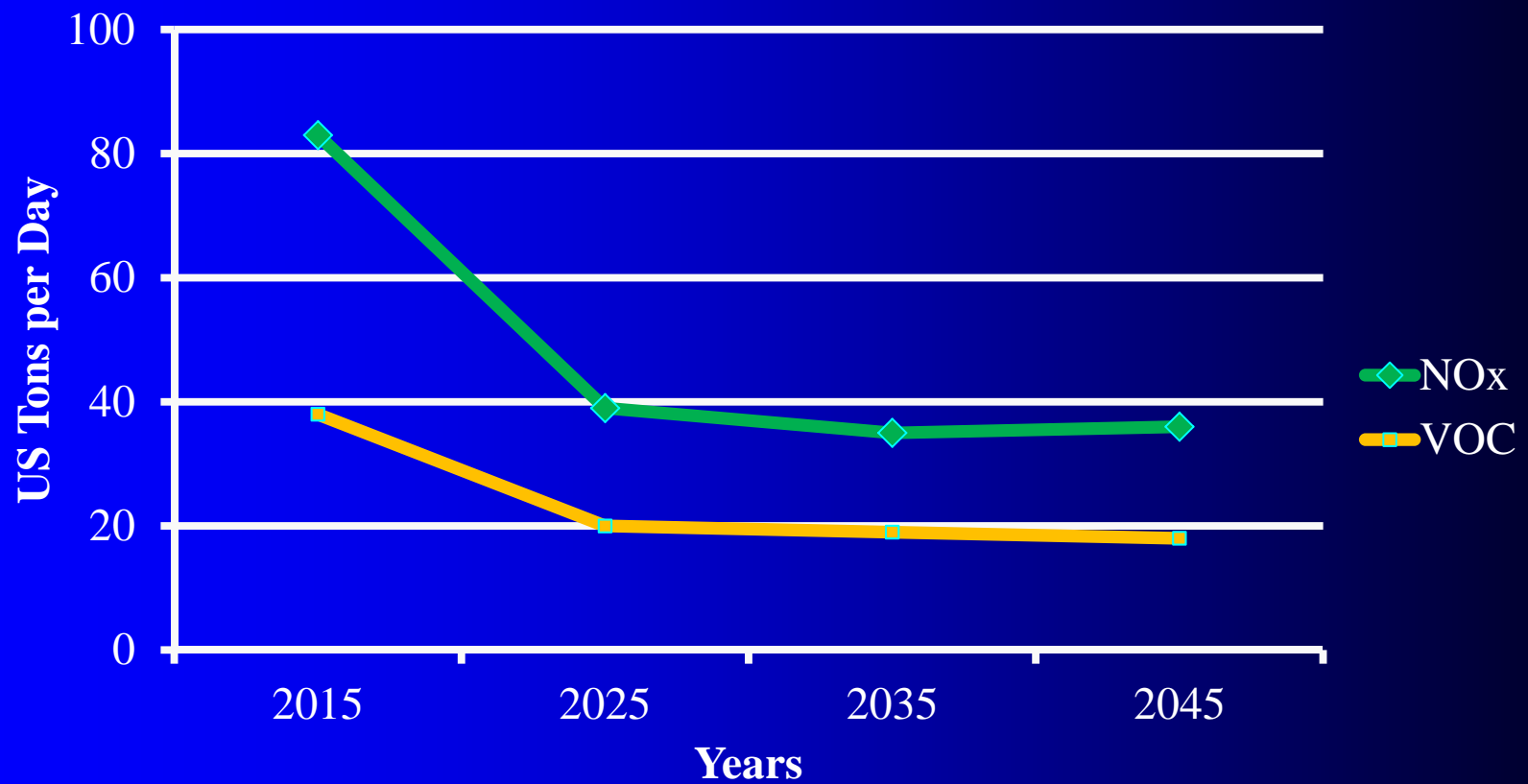
Daily Vehicle Miles Traveled (VMT) St. Louis Region 1982-2014



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Projected Vehicle Emissions



Trends

- Moderate to Marginal classification July 2012
- 2015 ozone monitoring data to be quality assured
- Based on 2013-2015 data, anticipate area will be in attainment of 2008 ozone standard



2015 Ozone Standard

- October 1, 2015 – EPA strengthened standard to 70 ppb
- October 2016 – State submit boundary designation recommendations to EPA
- June 2017 – EPA proposes area designations
- October 2017 – EPA finalizes designations
- 2020-2021 – SIPs due
- 2020 – 2037 – Attainment year (depending on classification)



Then and Now



October 28, 1938 looking east along
Pine from 200 block of N. Tucker
St. Louis Post-Dispatch



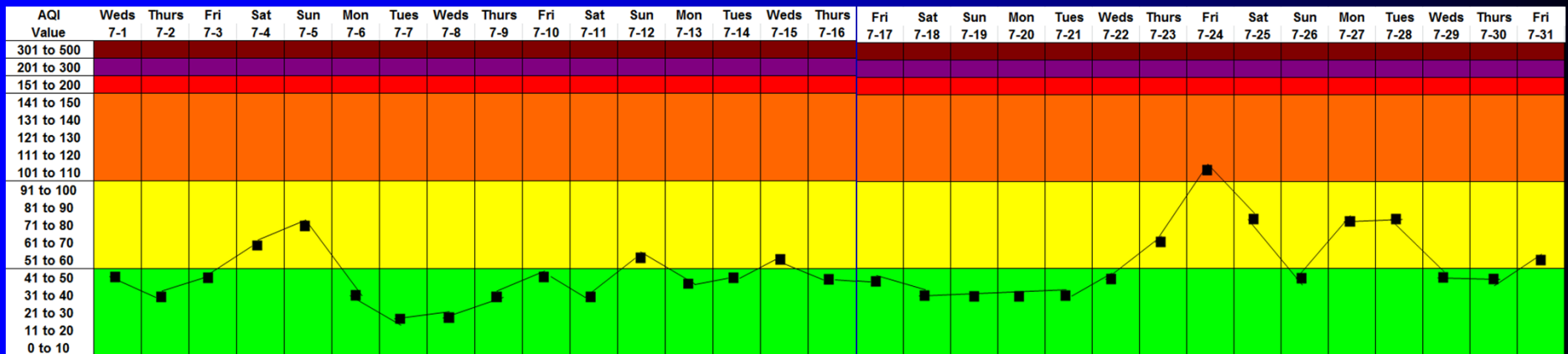
October 29, 2015 looking east from
SSM St. Mary's Health Center
in Richmond Heights
MDNR Visual Air Pollution Camera

For Additional Information

On-line Air Quality Resource Center

www.ewgateway.org/environment/aq/aq.htm

July 2015 AQI Calendar



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