



# Indiana Department of Environmental Management

## 2017 Ozone (O<sub>3</sub>) Season Summary Report

*Office of Air Quality*

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[www.IN.gov/idem/airquality/2391.htm](http://www.IN.gov/idem/airquality/2391.htm)



## About This Report

The Indiana Department of Environmental Management (IDEM) collects and analyzes air samples to monitor for regulated pollutants, including ozone referred to as O<sub>3</sub>. Monitoring and reporting of O<sub>3</sub> occurs from March 1 through October 31, as mandated by the U.S. Environmental Protection Agency (U.S. EPA). This **2017 Ozone (O<sub>3</sub>) Summary Report** provides an overview of O<sub>3</sub>, including 2017 data and air quality trends over the past 10 years (2008-2017).

The following information is included in this report:

- General information about ozone (*slide 3*)
- Overview of ozone air health standards and requirements (*slides 4-6*)
- Overview of Indiana's ozone monitoring network (*slides 7-8*)
- Summary of 2017 ozone monitoring data (*slides 9-10*)
- Ozone air quality trends over the last 10 years (*slides 11-13*)
- Status of ozone designations (*slides 14-18*)
- Links for additional information (*slide 19*)
- Contact information (*slide 20*)



# What is Ozone (O<sub>3</sub>)?

Ozone is a gas composed of three oxygen atoms that occurs throughout the Earth's atmosphere. Ozone occurs naturally in the stratosphere, approximately 10 to 30 miles above the Earth's surface, and forms a layer that protects life on Earth from the sun's harmful rays. Ozone also can form at ground level when other man-made pollutants react together in heat and sunlight. It is unhealthy to breathe at ground level.

## Where does O<sub>3</sub> come from?

Ground-level ozone is not emitted directly into the air. It is created by a chemical reaction between nitrogen oxides (NO<sub>x</sub>) and volatile organic compounds (VOCs) in the presence of sunlight. Emissions from industrial facilities and electric utilities, motor exhaust, gasoline vapors, and chemical solvents are some of the major sources of NO<sub>x</sub> and VOCs.

## What are the health effects of exposure to O<sub>3</sub>?

Breathing O<sub>3</sub> can cause respiratory problems for sensitive groups, such as the very young, the elderly, or people with asthma or other chronic respiratory problems, including:

- Chest pain, coughing, throat irritation, congestion.
- Can worsen bronchitis, emphysema, asthma.
- Decreased lung function and inflammation of the linings of the lungs.
- Scars lung tissues.



# National Ambient Air Quality Standards (NAAQS) for Ozone

The federal Clean Air Act requires U.S. EPA to establish National Ambient Air Quality Standards (NAAQS) for certain pollutants, including ground-level ozone. NAAQS are also known as “air health standards”.

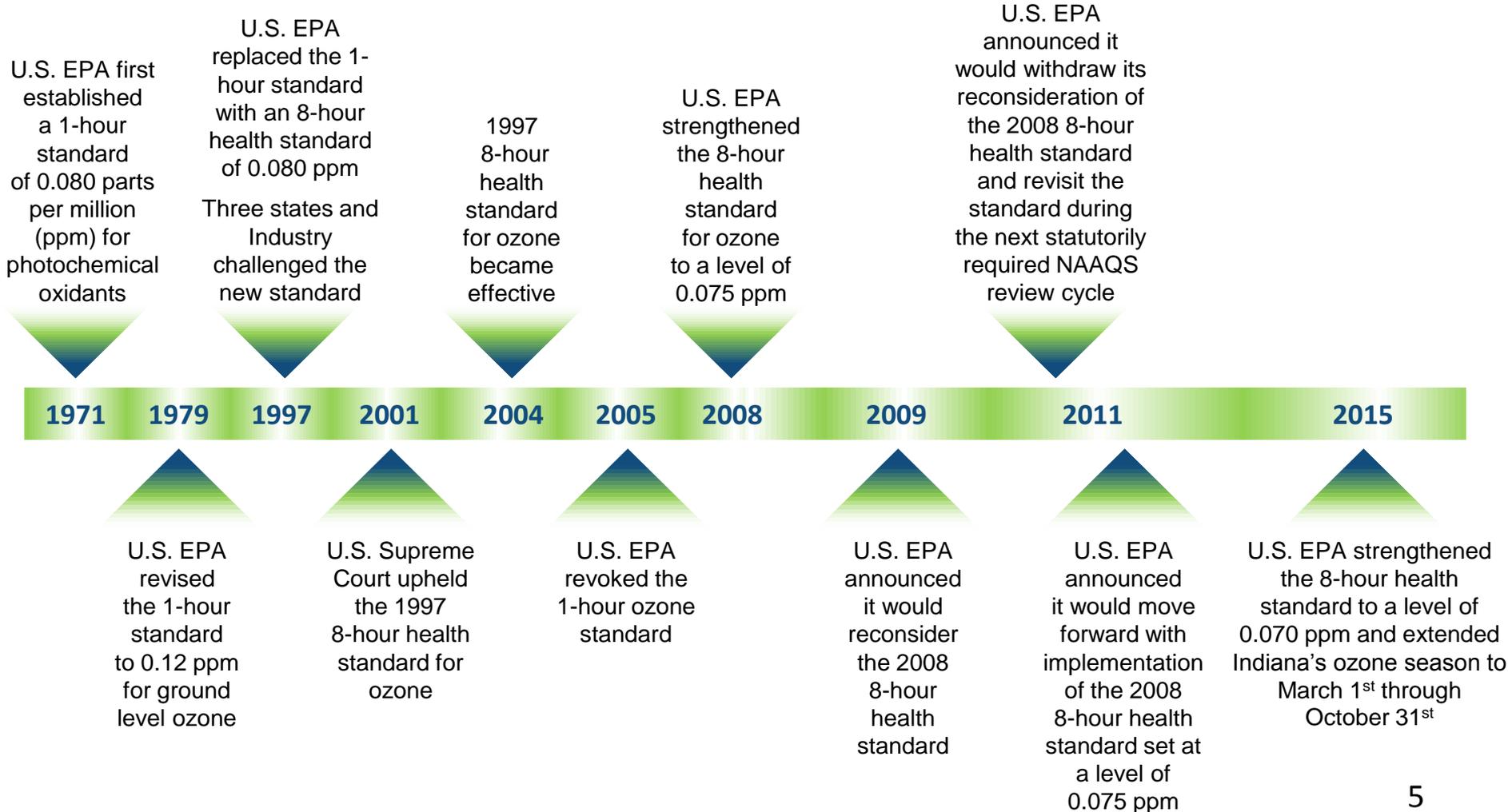
Primary and secondary NAAQS, established in 1971, set limits for total photochemical oxidants. In 1979, U.S. EPA revised the NAAQS to regulate ground-level ozone. Since then, the NAAQS for ground-level ozone have been reviewed periodically and revised.

**Primary Standards** - Primary standards, also known as health standards, are limits set to protect public health, including the health of “sensitive” populations such as asthmatics, children, and the elderly.

**Secondary Standards** - Secondary standards are set to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.



# History of the Ozone Standard





# Attaining the Ozone Standard

Air quality monitoring data must measure at or below the 8-hour standard set by U.S. EPA for three complete, consecutive years to remain in attainment of the primary and secondary 8-hour ozone standard. For example, an evaluation in 2018 will be based on data from 2015 to 2017.

**8-Hour Ozone Standard** – Air quality meets the 2015 primary 8-hour ozone standard when the fourth (4<sup>th</sup>) highest daily maximum concentration value, averaged over 3 years, does not exceed 0.070 parts per million (ppm).

**Design Values** – The three-year average of the 4<sup>th</sup> highest daily maximum concentration values is referred to as the Design Value.

**The Difference Between an Exceedance and a Violation** - When a monitor records a concentration above the limit established by the standard, it is referred to as an **exceedance**. A monitor can have an **exceedance** without being in **violation** of the standard. However, if a monitor's three-year **Design Value** exceeds the standard, the monitor is in **violation**.



# 2017 Ozone Monitoring Network

## Placement

- U.S. EPA provides guidance on placement of monitors.
- Monitor placement is based on population density and manufacturing levels.
- Indiana conducts an annual review of its ambient air monitoring network and publishes it as the annual "Indiana Ambient Air Monitoring Network Plan".

## Monitors

- IDEM operated 42 ozone monitors in 28 counties across Indiana.
- U.S. EPA operated 2 ozone monitors in 2 counties in Indiana.

## Calculating the Monitoring Data

- A monitor's Design Value is calculated at the end of each ozone season, once all of the data has been quality assured.
  - Ozone design value: three-year average of the 4<sup>th</sup> highest daily maximum concentration values.

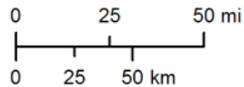


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# 2017 Ozone Ambient Air Monitoring Network

## Legend

● Ozone Monitor



### Notes:

<sup>1</sup> Monitors owned and operated by the U.S. Environmental Protection Agency (U.S. EPA).

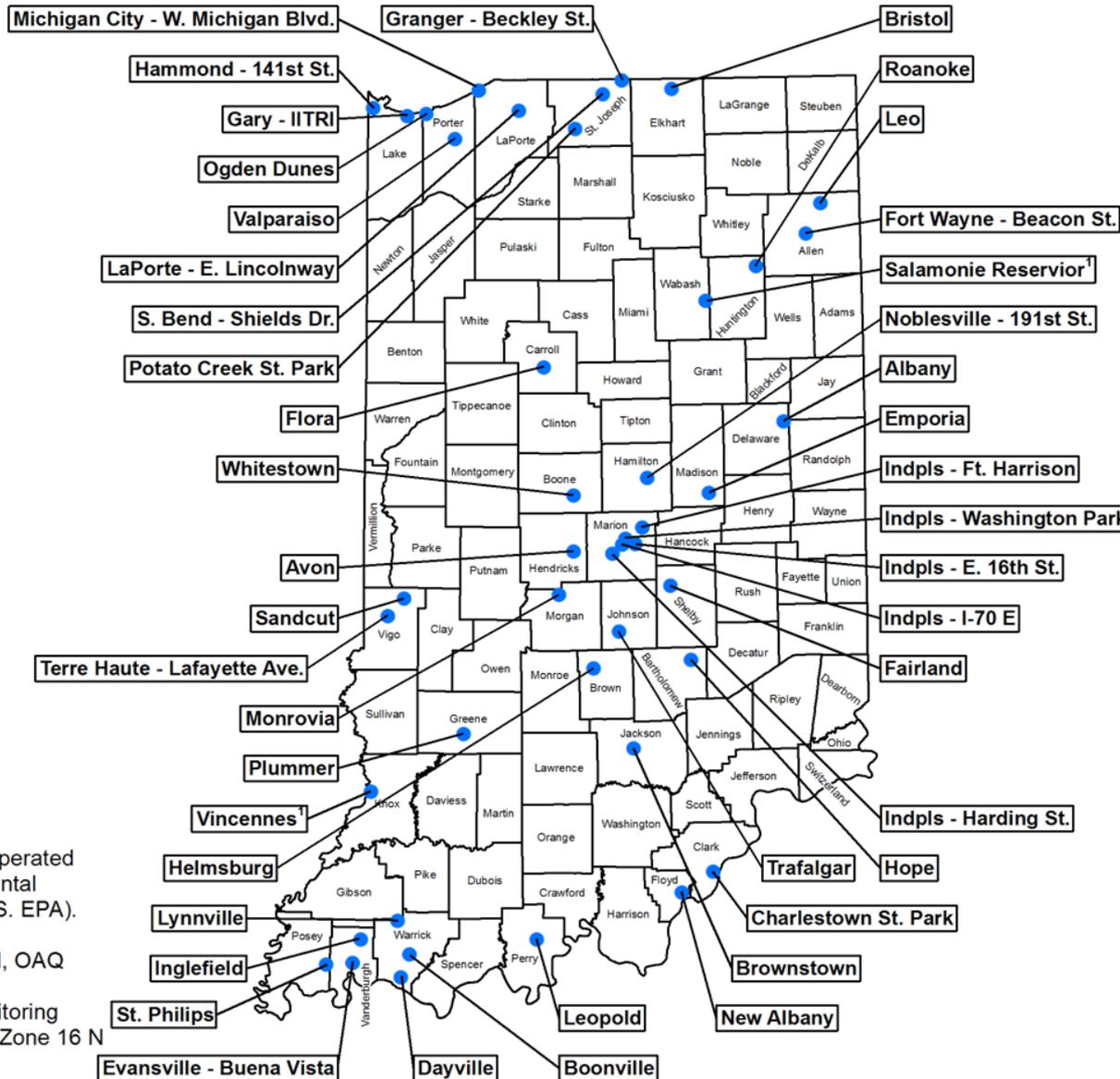
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Date: 04/12/2018

Source: IDEM, Air Monitoring

Map Projection: UTM Zone 16 N

Map Datum: NAD83





# 2017 Ozone Monitoring Data Summary

## **Air Quality Action Days:**

Twenty Air Quality Action Days were issued for ozone (*Indiana and local, state and regional partners analyze data and issue air quality forecasts year-round. Air Quality Action Days are issued when poor air quality is forecasted.*)

## **Exceedances:**

Exceedances were recorded on fifteen days. Exceedance is the term for a concentration that is recorded above the standard.

## **Quality Assured Monitoring Data:**

- Six monitors had a 4<sup>th</sup> high daily maximum value above the current primary 8-hour standard of 0.070 ppm, down from thirteen in 2016.

## **Quality Assured Monitoring Data for the 2015–2017 Three-Year Timeframe:**

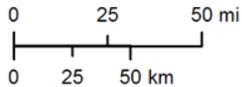
- Two monitors had a Design Value (*the average of the 4<sup>th</sup> highest daily maximum 8-hour ozone concentrations over a three year period*) slightly above 0.070 ppm. Both monitors are located in southeast Indiana and averaged 0.071 ppm.
- More monitoring data is found on slide 10.



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**Legend**

- Ozone monitor with design value less than or equal to the standard.
- + Ozone monitor with design value over the standard.

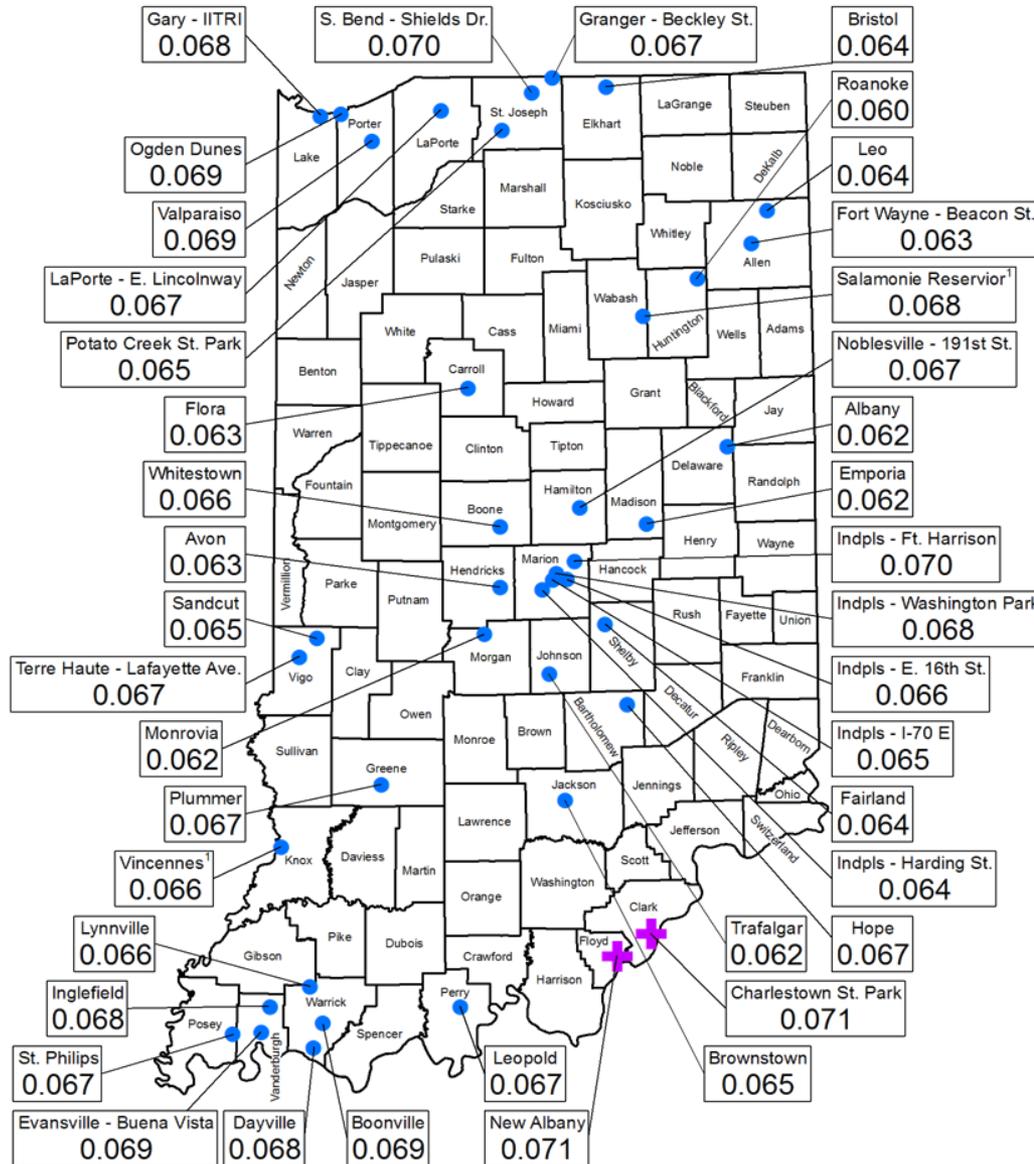


**Notes:**

- Posted data are in units of parts per million (ppm).

<sup>1</sup> Monitors owned and operated by the U.S. Environmental Protection Agency (U.S. EPA).

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**Ozone 8-Hour Design Values 2015 - 2017**

Standard set at 0.070 ppm



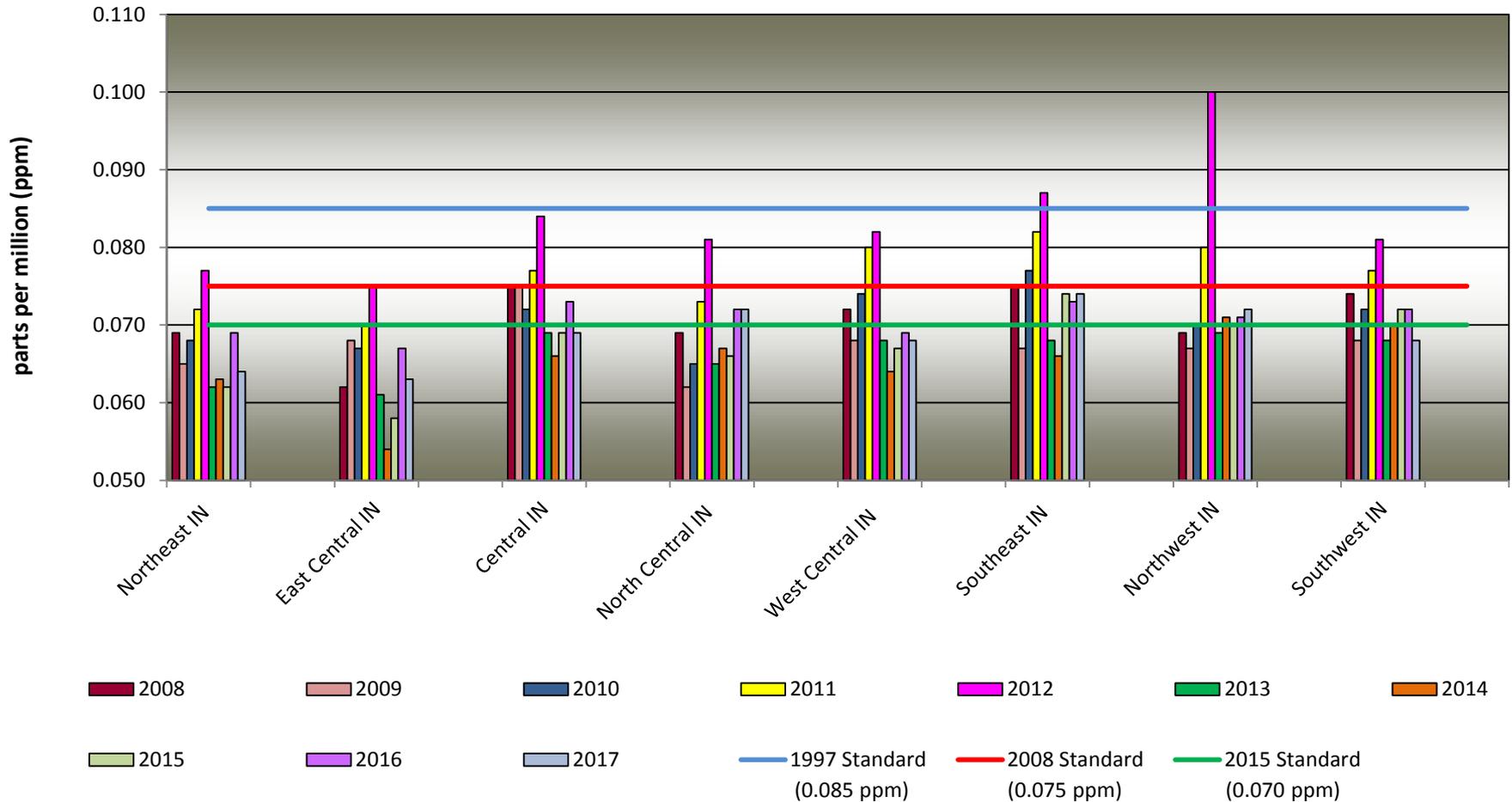


# Ozone Air Quality Trends

Monitoring data shows significant improvements in Indiana's air quality over the past 10 years. The following two slides provide illustrations.



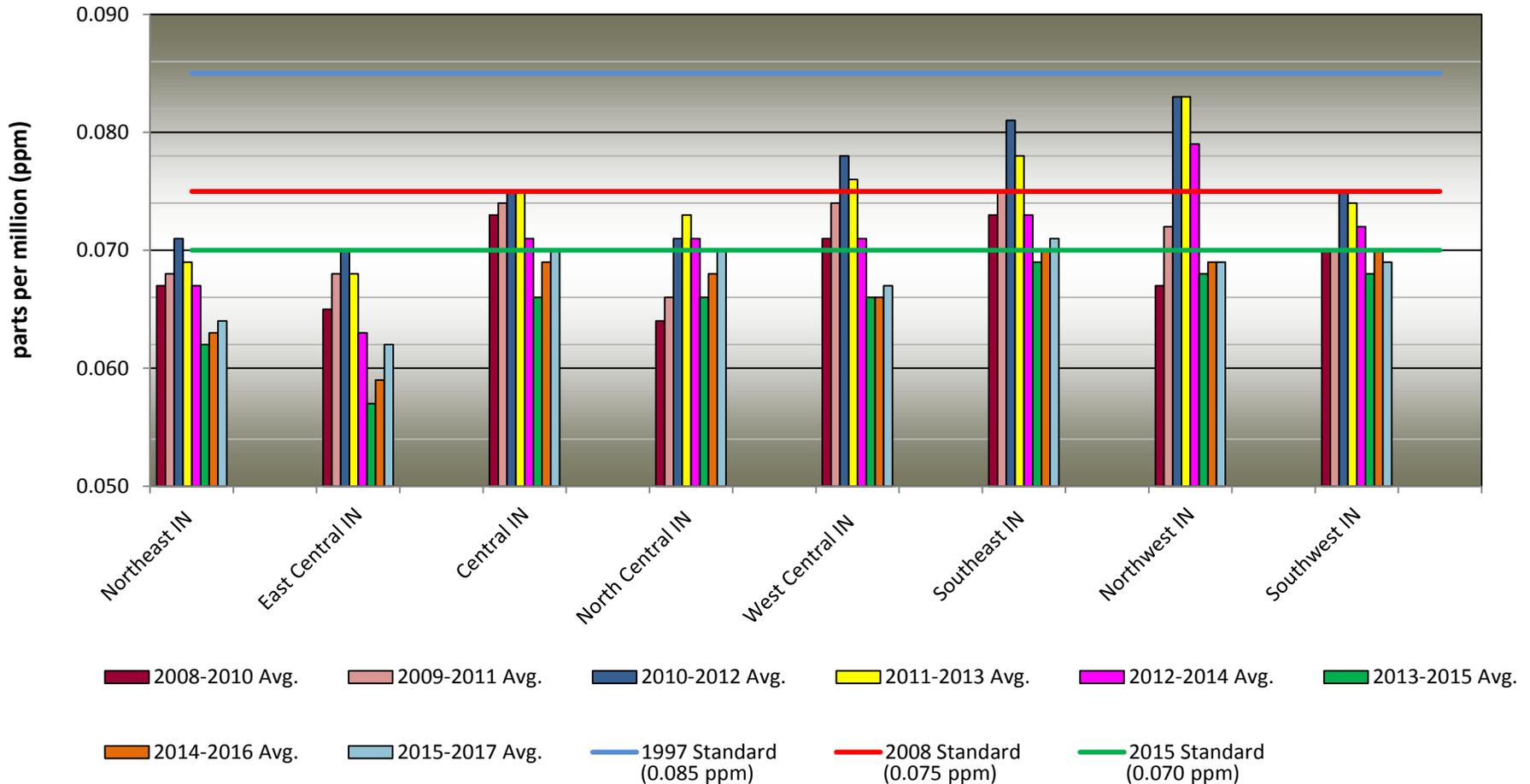
# Annual 4<sup>th</sup> High Trends 2008 – 2017



\* In regions with multiple monitors, the highest monitored value from the region is depicted on the chart.



# Design Value Trends 2008 – 2017



\* In regions with multiple monitors, the highest monitored value from the region is depicted on the chart.



# Ozone Designations

When a new NAAQS is issued, the implementation process begins. The first step is to identify any areas that do not meet the new standard. This is referred to as the designation process. U.S. EPA is responsible for designating areas that do not meet the standard. IDEM works to ensure that the designations are appropriate and that Indiana receives formal recognition for its achievements under the standards.

**1997 Standards** – U.S. EPA revised the former health standard in 1997 to 0.080 ppm. Designations were completed several years later, in April of 2004, following the resolution of legal challenges to the new standards. Although 23 counties and one township in Indiana were initially designated as nonattainment, subsequent monitoring data showed compliance. Indiana submitted petitions for the redesignation of all 12 areas. By May 2010, all areas of the state were reclassified to attainment status under the 1997 standard.



## Ozone Designation (Cont.)

**2008 Standards** - The 8-hour standard was strengthened in 2008 to 0.075 ppm.

- On April 30, 2012, and May 31, 2012, U.S. EPA, based on 2008 – 2010 monitoring data, completed designations for Indiana. Lawrenceburg Township in Dearborn County and Lake and Porter counties were designated nonattainment, and classified as “marginal”, effective July 20, 2012. All other areas of the state were classified as “unclassifiable/attainment”.
- On February 23, 2016, IDEM, based on 2012 – 2014 data, submitted a redesignation petition and maintenance plan to U.S. EPA for Lawrenceburg Township.
- On April 11, 2016, U.S. EPA, based on 2012 - 2014 data, determined that Lake and Porter counties failed to attain the standard by the attainment date of July 20, 2015, and were reclassified from “marginal” to “moderate” with an attainment date of July 20, 2018 (81 FR 26697).
- On March 17, 2017, U.S. EPA approved the redesignation of Lawrenceburg Township to attainment with an effective date of April 7, 2017 (82 FR 16940).



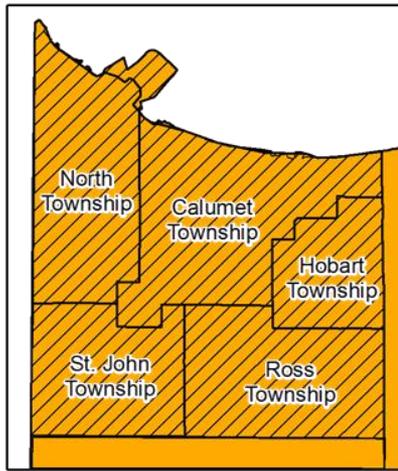
## Ozone Designations (Cont.)

**2015 Standards** - On October 1, 2015, U.S. EPA finalized a rule to strengthen the 8-hour ozone standard to 0.070 ppm, and to extend the ozone season from March 1 through October 31.

- On November 6, 2017, U.S. EPA designated 74 of Indiana's 92 counties as "attainment/unclassifiable" (82 FR 54232).
- On April 30, 2018, U.S. EPA designated Indiana's remaining counties. Clark and Floyd counties were designated as part of the Louisville, KY-IN marginal nonattainment area and Calumet, Hobart, North, Ross, and St. John townships in Lake County were designated as part of the Chicago, IL-IN-WI marginal nonattainment area. Remaining areas of the state were designated as "attainment/unclassifiable".

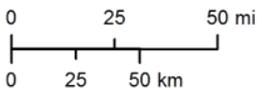


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**Legend**

- Nonattainment for the 2008 8-Hour Ozone Standard
- Nonattainment for the 2015 8-Hour Ozone Standard



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**Source:** IDEM, Air Monitoring  
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## Indiana's Ozone Nonattainment Areas

County	Nonattainment for 2008 Standard
Lake	Entire County
Porter	Entire County

County	Nonattainment for 2015 Standard
Clark	Entire County
Floyd	Entire County
Lake	Calumet Township
	Hobart Township
	North Township
	Ross Township
	St. John Township



## Additional Information

- For additional Ozone monitoring information, visit IDEM's website: [www.IN.gov/idem/airquality/2346.htm](http://www.IN.gov/idem/airquality/2346.htm)
- For additional information regarding the designation process or Indiana's redesignation petitions and maintenance plans, visit [www.IN.gov/idem/airquality/2342.htm](http://www.IN.gov/idem/airquality/2342.htm)
- For additional information regarding the NAAQS for ozone, visit U.S. EPA's Ozone Standards website: <https://www.epa.gov/naaqs>



## Contact

Please feel free to direct questions or comments to Ms. Catherine Mitchell with IDEM's Office of Air Quality at (800) 451-6027 (*toll free*), (317) 234-6530 (*direct*), or [cmitchel@idem.IN.gov](mailto:cmitchel@idem.IN.gov).