

## **M&P-XYLENES (C<sub>8</sub>H<sub>10</sub>)**

Chemical Abstracts Service (CAS) Number: 1330-20-7

### **General Information**

Commercial or mixed xylene usually contains about 40-65% m-xylene and up to 20% each of o-xylene and p-xylene and ethylbenzene. Mixed xylenes are colorless liquids that are practically insoluble in water and have a sweet odor. Acute (short-term) exposure to mixed xylenes in humans results in irritation of the eyes, nose, and throat, gastrointestinal effects, eye irritation, and neurological effects. Chronic (long-term) inhalation exposure of humans to mixed xylenes results primarily in central nervous system effects, such as headache, dizziness, fatigue, tremors, and incoordination; respiratory, cardiovascular, and kidney effects have also been reported. U.S. EPA has classified mixed xylenes as a Group D, not classifiable as to human carcinogenicity.

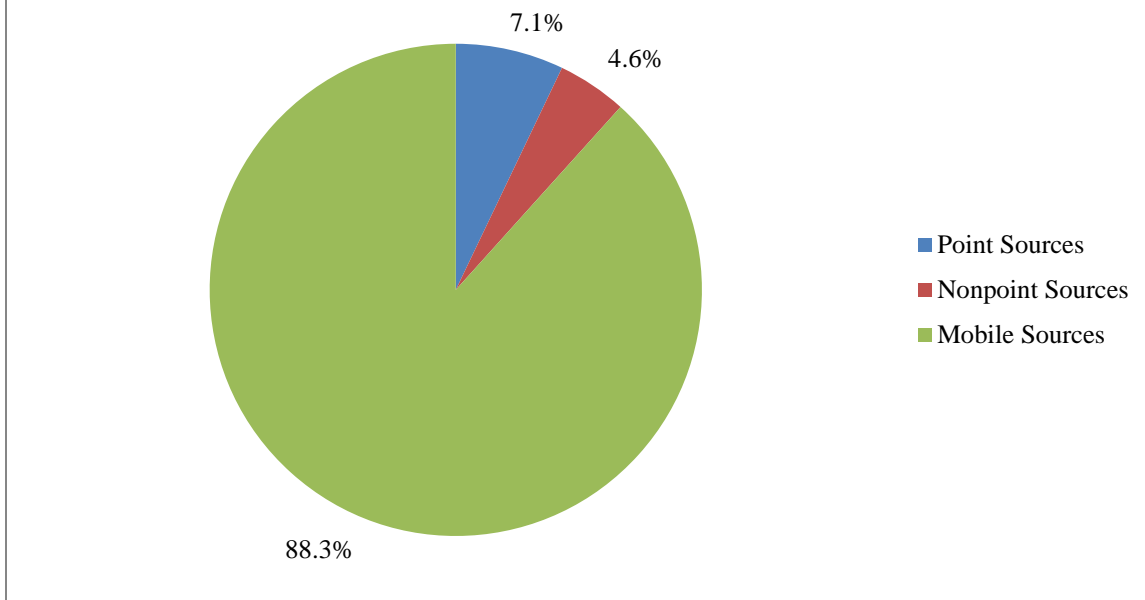
### **Sources**

- Mixed xylenes are used in the production of ethylbenzene, as solvents in products such as paints and coatings, and are blended into gasoline.
- Xylenes are released into the atmosphere as fugitive emissions from industrial sources, from auto exhaust, and through volatilization from their use as solvents.
- Occupational exposure to mixed xylenes may occur at workplaces where mixed xylenes are produced and used as industrial solvents.

### **Indiana Emissions**

IDEM collects HAP emissions information for the categories of point sources (large stationary sources like power plants and factories), nonpoint sources (aka area sources - smaller stationary sources like gas stations and dry cleaners), and mobile sources (vehicles, airplanes, marine vessels, etc.).\* Estimated statewide emissions of m&p-xylenes totaled 6633.86 tons in the 2014 calendar year. Of this total, 88.3% was attributed to mobile sources, 7.1% to point sources, and 4.6% to nonpoint sources.

## 2014 Indiana m&p-Xylenes Emission Sources



\* For additional examples of types of emission sources, please visit IDEM's Hazardous Air Pollutants page at: <http://www.in.gov/idem/toxic/pages/hap/index.html>. For specific details on industrial sources of air toxics, please visit U.S. EPA's Toxics Release Inventory (TRI) page at: <https://www.epa.gov/toxics-release-inventory-tri-program>.

### Measured Concentration Trends

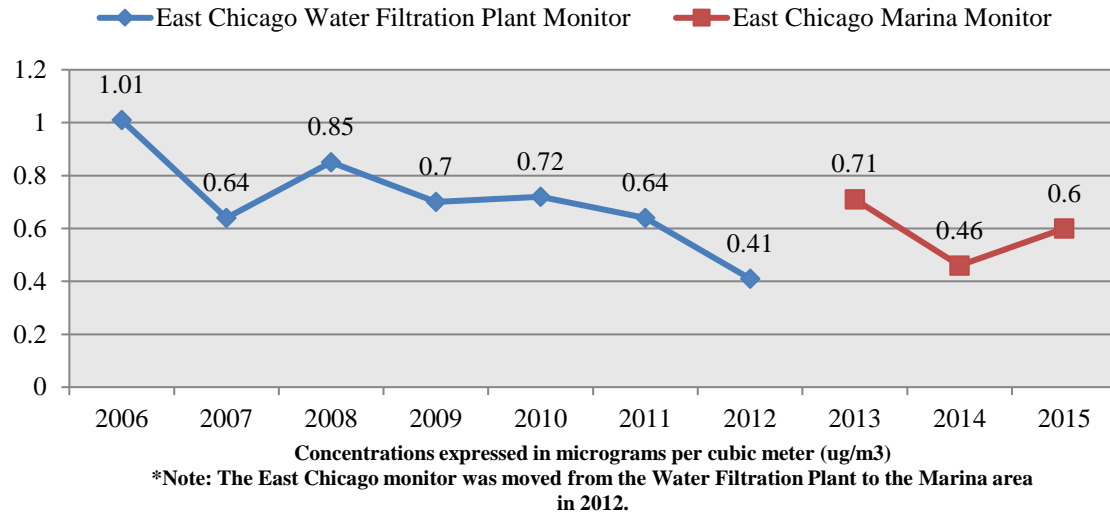
Ambient air monitoring data most accurately represents a limited area near the monitor location. All monitors for air toxics sample every sixth day. The monitoring locations by themselves are not sufficient to accurately characterize air toxic concentrations throughout the entire state, however, results from the monitors will provide exposure concentrations with a great deal of confidence at the monitoring locations.

The ambient air monitoring results were analyzed using U.S. EPA recommended statistical methods. IDEM evaluated the data so that a 95% upper confidence limit of the mean (UCL) could be determined. A 95% UCL represents a value which one can be 95% confident that the true mean of the population is below that value.

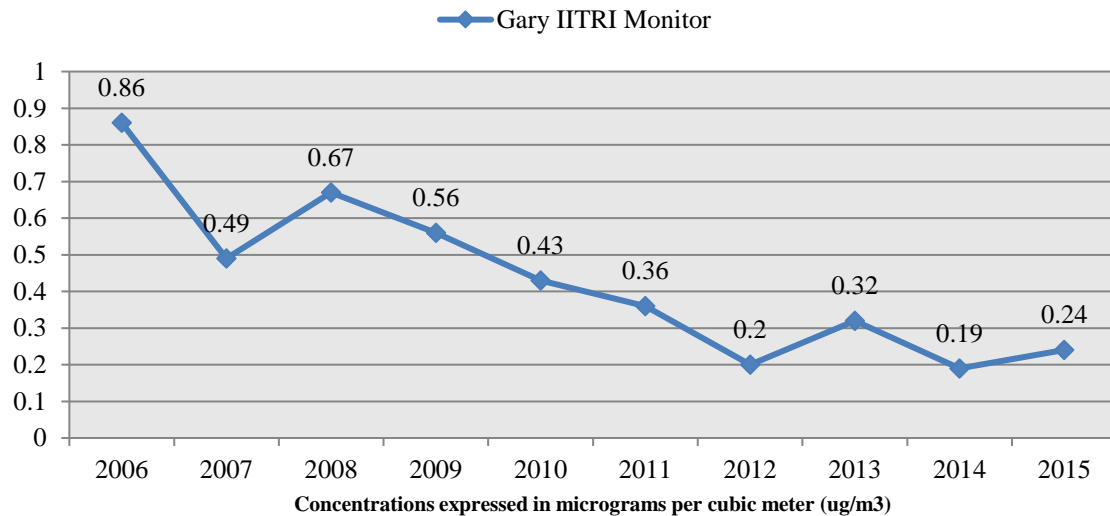
To learn more about the current monitoring locations, please visit IDEM's Air Toxics Monitor Siting webpage at: <http://www.in.gov/idem/toxic/2337.htm>

Data analysis was performed for each monitor that operated for a significant portion of the analysis period. This analysis determined the detection rate, which is defined as the percentage of valid samples taken statewide that had a quantifiable concentration of the pollutant. The statewide detection rate of m&p-xylenes for the monitors analyzed from 2006-2015 was 66.6%. Trend graphs for each of these monitors are provided below.

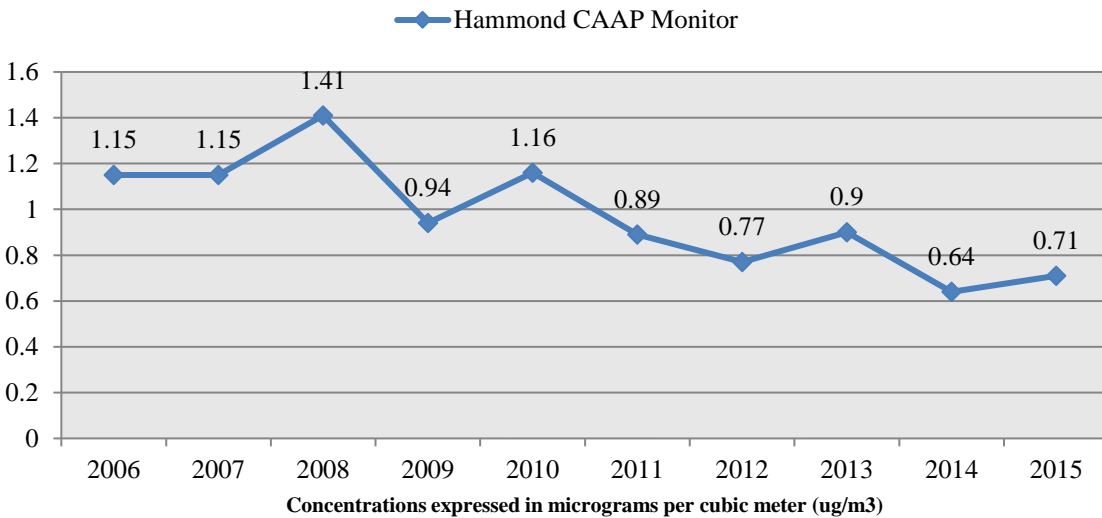
## 95% UCL m&p-Xylene Concentrations at East Chicago (2006-2015)



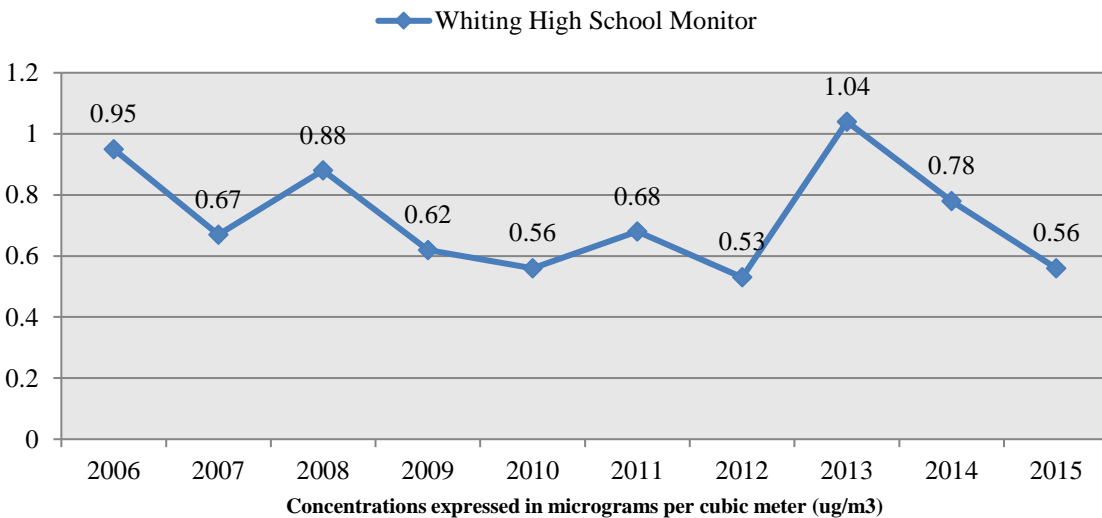
## 95% UCL m&p-Xylene Concentrations at Gary (2006-2015)

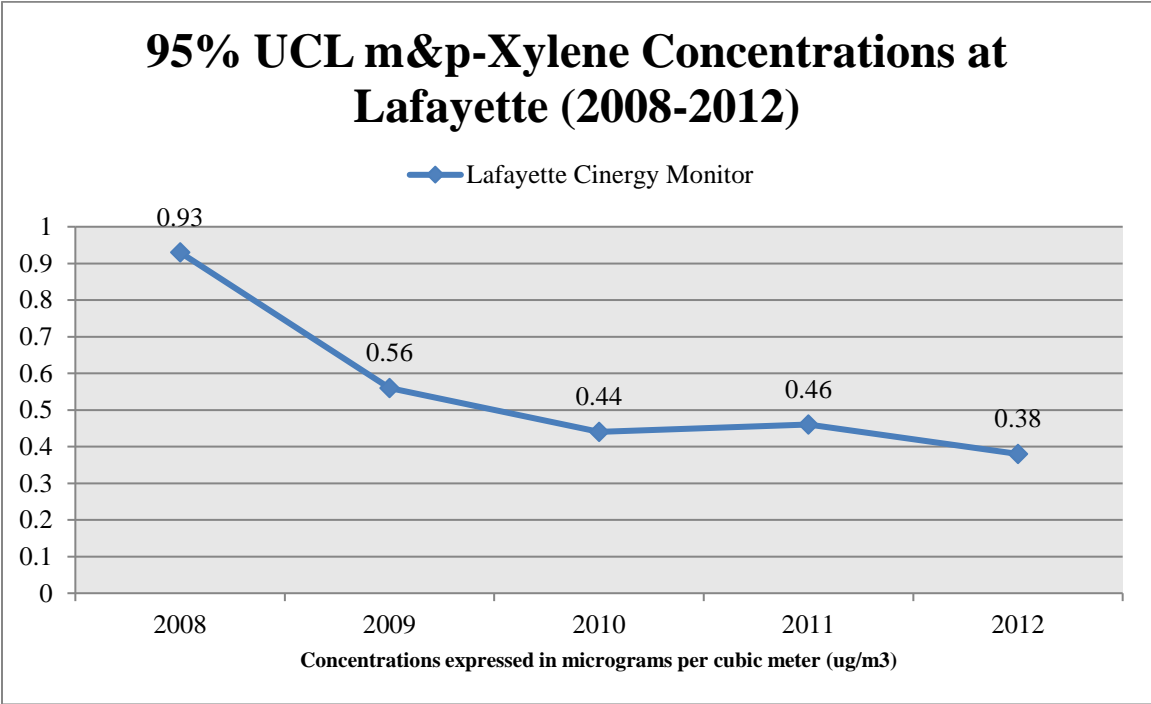
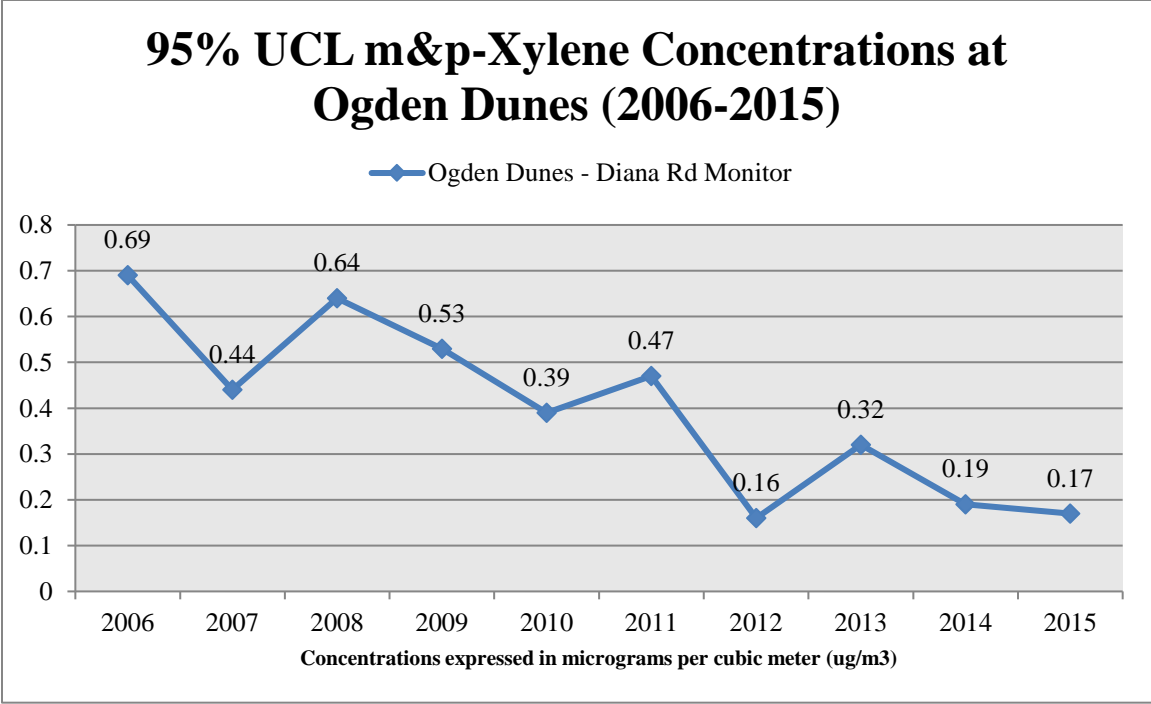


## 95% UCL m&p-Xylene Concentrations at Hammond (2006-2015)

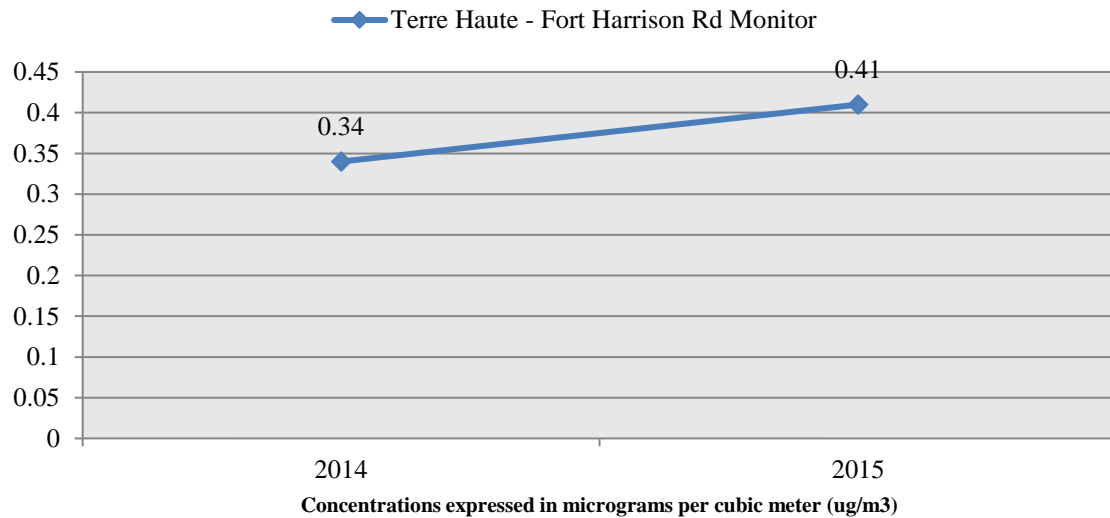


## 95% UCL m&p-Xylene Concentrations at Whiting (2006-2015)

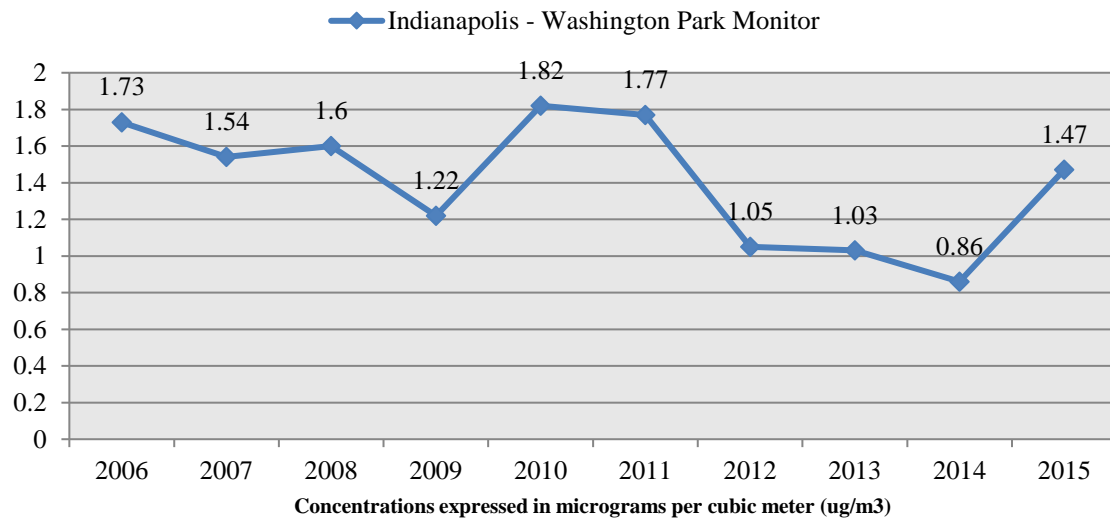


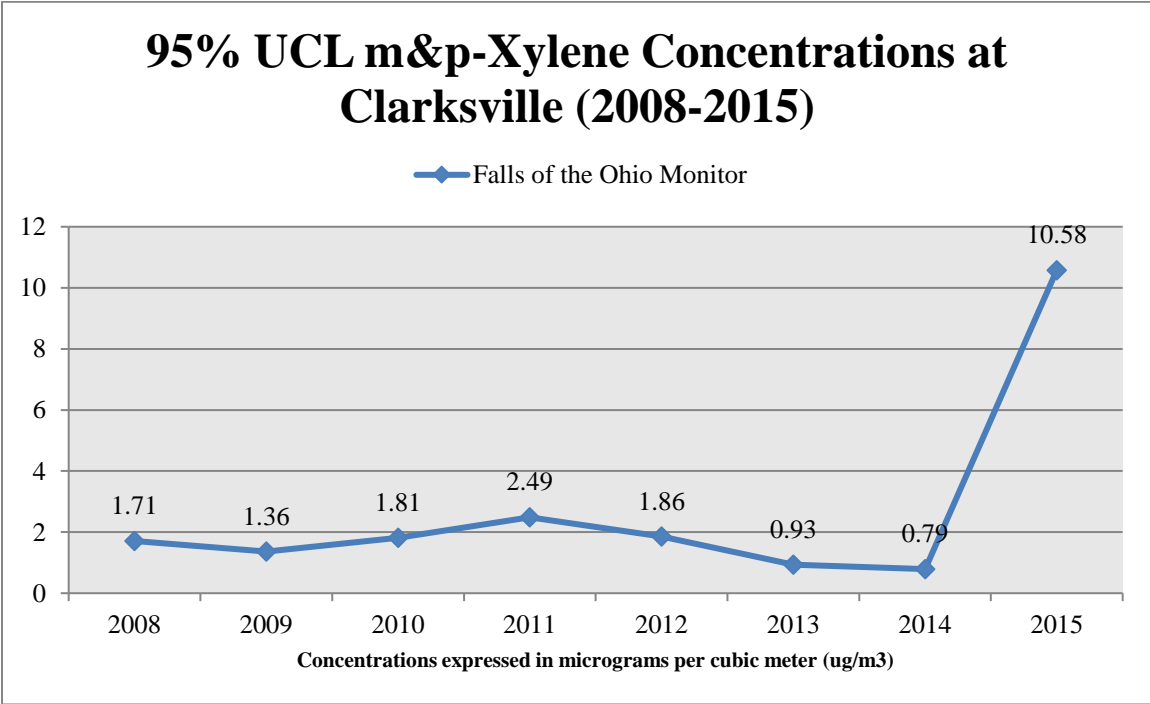
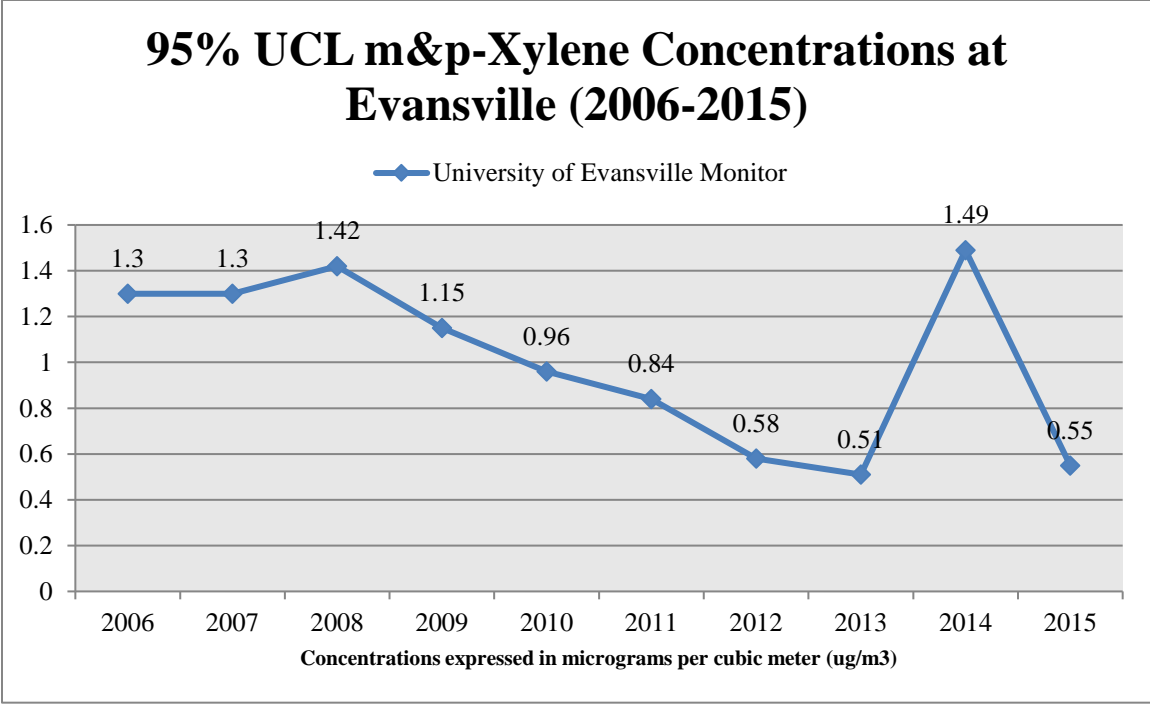


## 95% UCL m&p-Xylene Concentrations at Terre Haute (2014-2015)



## 95% UCL m&p-Xylene Concentrations at Indianapolis (2006-2015)





The analysis of monitoring data from 2006 to 2015 indicates that concentrations of m&p-xylene have declined or held steady at most Indiana monitors. The exception to this is a spike in concentrations recorded at Clarksville in 2015. The apparent spike was heavily influenced by an outlier reading of 120.99 ug/m<sup>3</sup> recorded on 11/19/2015. This reading exceeded the pollutant's Reference Concentration of 100.00, but was the only reading in this study to do so. More information about the reference concentration can be found in the hazard quotient section below.

## Hazard Quotient

IDEM evaluates chronic (lifetime) non-cancer hazard assuming a threshold for each pollutant at which a health effect can be observed. That is, it assumes safe exposure to the pollutant up to a certain level before it is possible to experience a health effect from breathing the pollutant. IDEM uses health protective assumptions by taking into account people who might be more sensitive to the pollutants. The hazard quotient is a ratio that divides the measured concentration of a pollutant by the reference concentration (RfC). A hazard quotient under 1.0 is commonly recognized to be below the health-protective level. Hazard quotients over 1.0 indicate that further investigation may be necessary and does not necessarily mean that health effects are expected. Given the many health-protective assumptions used in the evaluation, most non-cancer hazards over 1.0 are still unlikely to be associated with observable adverse health effects.

The average concentration of m&p-xylene was evaluated for each air pollutant monitor over the span of this study. The results for each monitor are displayed in the table below. The calculated hazard quotient is well below 1.0 at all monitors, which indicates that the measured concentrations of m&p-xylene do not present a risk for non-cancer health effects.

**Table 1. m&p-Xylene Hazard Quotients** (concentrations expressed in micrograms per cubic meter)

<b>Monitor</b>	<b>Years</b>	<b>Average Concentration</b>	<b>Reference Concentration (RfC)*</b>	<b>Hazard Quotient</b>
East Chicago Water Filtration Plant	2006-2012	0.65	100.00	0.0065
East Chicago Marina	2013-2015	0.56	100.00	0.0056
Gary IITRI	2006-2015	0.42	100.00	0.0042
Hammond CAAP	2006-2015	0.87	100.00	0.0087
Whiting High School	2006-2015	0.65	100.00	0.0065
Ogden Dunes – Diana Rd	2006-2015	0.38	100.00	0.0038
Lafayette Cinergy	2008-2012	0.53	100.00	0.0053
Terre Haute – Fort Harrison Rd	2014-2015	0.36	100.00	0.0036
Indianapolis – Washington Park	2006-2015	1.22	100.00	0.0122
University of Evansville	2006-2015	0.84	100.00	0.0084



Clarksville – Falls of the Ohio	2008-2015	2.33	100.00	0.0233
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\* Reference Concentration Source: Integrated Risk Information Service (IRIS)

### **Cancer Risk**

Xylenes are not classifiable as to their potential to cause cancer.