

Iowa Fine Particulate Monitoring Network Design Values

2015-2017



*Iowa DNR
Ambient Air Monitoring
Group*

What is Fine Particulate Matter (PM_{2.5})?

The term “particulate matter” (PM) includes both solid particles and liquid droplets (excluding water droplets) that are found in outdoor air.

Particulate matter may be emitted directly into the air or can form from pollutants that react in the atmosphere. Small particles tend to pose the greatest health concern because they can be inhaled into and accumulate in the respiratory system.

Particles of less than 2.5 microns in diameter are referred to as fine particulate or PM_{2.5}.

Sources of PM_{2.5} emissions include all types of combustion (motor vehicles, power plants, wood burning, etc.) and some industrial processes. Secondary PM_{2.5} is produced in the atmosphere away from sources through atmospheric chemistry.

What are the Design Values for PM_{2.5}?

Design values for PM_{2.5} are numbers that are calculated from three years of data gathered at a particular monitoring site. If a design value is greater than the associated standard, the monitor is said to “fail the attainment test”. The annual standard for PM_{2.5} is 12.0 µg/m³ and the twenty-four hour standard is 35 µg/m³.

The design value for the 24-hour PM_{2.5} standard is the three year average of the annual 98th percentile values measured at a monitoring site. The design value for the annual PM_{2.5} standard is the three year average of the annual averages measured at a monitoring site. Additional details about design value calculations are contained in 40 CFR Part 50 Appendix N.

Data Completeness and Validation

If a monitor records 75% of the scheduled samples in each quarter of the year, the year's data is considered complete. EPA allows the use of data substitution in some cases where data is close to the 75% goal. Data used in this report includes all monitors with complete data for 2015-2017 as well as data from two sites where substitution was performed.

All values in this report should be considered preliminary. Data values will be certified in May, 2018 and EPA will calculate design values for determination of compliance with the National Ambient Air Quality Standards (NAAQS) later this year.

All Iowa monitoring sites currently have annual and 24-hour design values less than the NAAQS.

What Types of PM_{2.5} Monitoring Data May be Used to Calculate Design Values?

Iowa currently operates two different types of PM_{2.5} samplers. One type collects fine particles by drawing ambient air through a filter over a 24-hour period. The filters are then returned to an analytical laboratory where they are weighed. Provided EPA protocols for handling and weighing the filters are followed, these manual samplers produce data that may be used for design value calculations. Although manual samplers provide accurate concentrations, the data produced is not available in real time, and so EPA has encouraged States to use automated continuous samplers to inform the public of current air quality levels.

EPA has approved the use of certain types of continuous samplers for computing design values, but advises States to conduct ongoing evaluations of the comparability of the data from these samplers to filter samplers. Iowa's humid summers and wintertime nitrate episodes represent a challenging environment in which to demonstrate this comparability. Iowa continues to evaluate the performance of continuous samplers.

Iowa PM_{2.5} Monitors (2017)

AQS Site ID	Site Name	Location	County
190130009	Water Tower	Waterloo	Blackhawk
190450019	Chancy Park	Clinton	Clinton
190450021	Rainbow Park	Clinton	Clinton
190550001	Backbone State Park++	Rural Site	Delaware
191032001	Hoover Sch.	Iowa City	Johnson
191110008	Fire Station	Keokuk	Lee
191130040	Public Health	Cedar Rapids	Linn
191370002	Viking Lake State Park	Rural Site	Montgomery
191390015	Muscatine HS E Campus (Garfield)	Muscatine	Muscatine
191390016	Muscatine, Greenwood Cemetery	Muscatine	Muscatine
191390018	Muscatine, Franklin School++	Muscatine	Muscatine
191390020	Muscatine, Musser Park	Muscatine	Muscatine
191471002	Iowa Lakes Community College	Emmetsburg	Palo Alto
191530030	Public Health	Des Moines	Polk
191532510	Indian Hills School	Clive	Polk
191550009	Franklin Sch.	Council Bluffs	Pottawattamie
191630015	Jefferson School	Davenport	Scott
191630018	Adams Sch.++	Davenport	Scott
191630020	Hayes School	Davenport	Scott
191770006	Lake Sugema	Rural Site	Van Buren
191930021	Irving School+	Sioux City	Woodbury

+ Site began operation on January 1, 2016, no design value is available.

++ Sites discontinued in 2017, no design values available.

Iowa PM_{2.5} Design Values 2017 – Preliminary Until May 2018

County	Site Name	City	EPA Site Id	Year	Annual 98 th Percentile (µg/m ³)	Daily Design Value (µg/m ³)	Annual Mean (µg/m ³)	Annual Design Value (µg/m ³)
Black Hawk	Water Tower	Waterloo	19-013-0009	2015	22.1		8.6	
				2016	19.7		7.5	
				2017	19.2	20	7.5	7.9
Clinton	Chancy Park	Clinton	19-045-0019	2015	24.9		9.7	
				2016	18.5		8.3	
				2017	18.8	21	7.8	8.6**
Clinton	Rainbow Park	Clinton	19-045-0021	2015	23.1*		9.1*	
				2016	17.8		7.7	
				2017	18.0	20	7.2	8.0
Johnson	Hoover Sch.	Iowa City	19-103-2001	2015	21.1		8.4	
				2016	17.4		7.4	
				2017	17.7	19	7.3	7.7
Lee	Fire Station	Keokuk	19-111-0008	2015	23.6		8.7	
				2016	18.1		8.4	
				2017	14.8	19	8.1	8.4
Linn	Public Health	Cedar Rapids	19-113-0040	2015	23.0		8.8	
				2016	18.5		7.8	
				2017	19.5	20	7.8	8.1
Montgomery	Viking Lake State Park	Not in a City	19-137-0002	2015	18.5		6.9	
				2016	15.5		6.1	
				2017	14.3	16	6.4	6.5

Iowa PM_{2.5} Design Values 2017 – Preliminary Until May 2018 (continued)

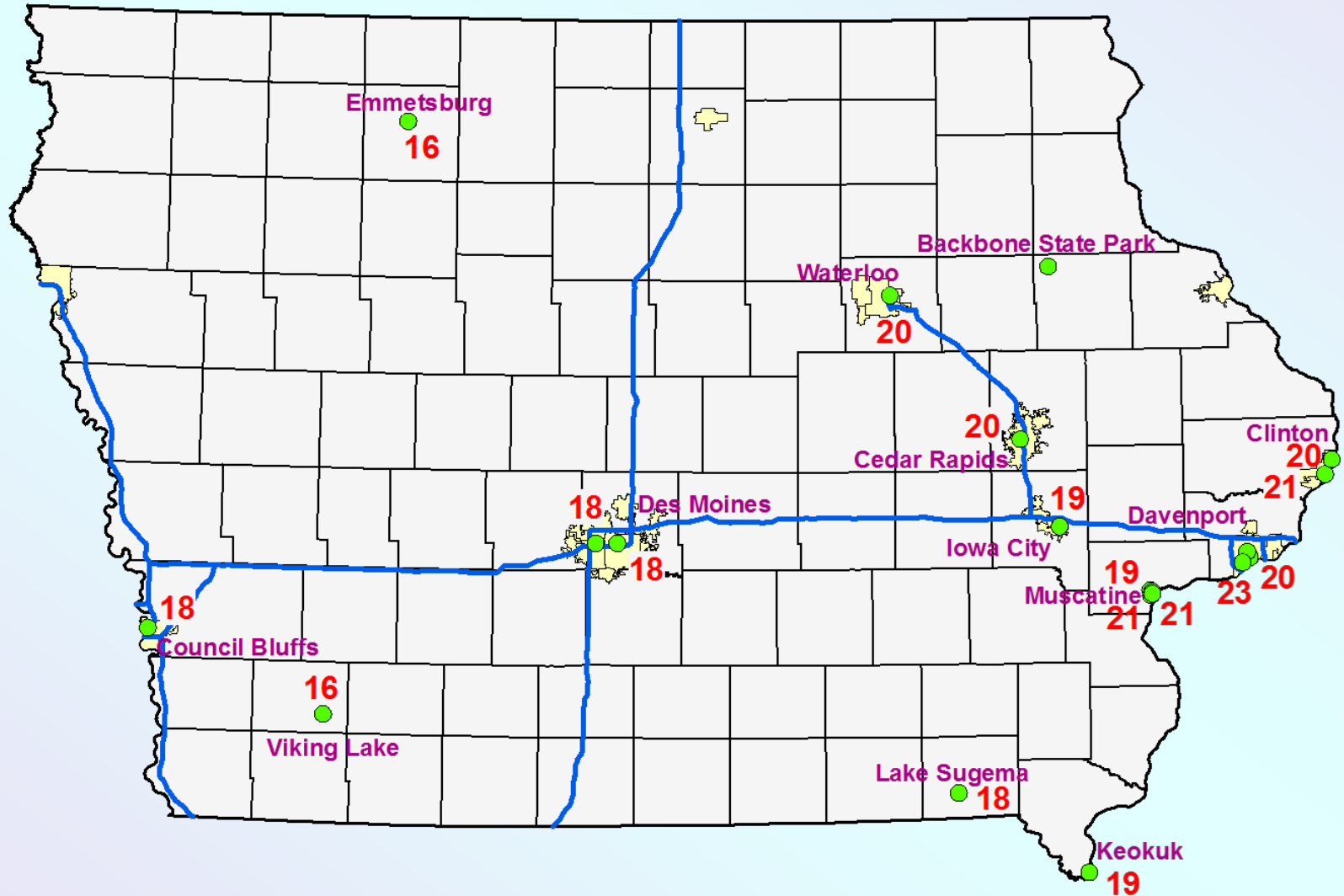
County	Site Name	City	EPA Site Id	Year	Annual 98 th Percentile (µg/m ³)	Daily Design Value (µg/m ³)	Annual Mean (µg/m ³)	Annual Design Value (µg/m ³)
Muscatine	Muscatine HS E Campus (Garfield)	Muscatine	19-139-0015	2015	22.3		9.0	
				2016	21.4		8.0	
				2017	18.9	21	8.1	8.3
Muscatine	Greenwood Cemetery	Muscatine	19-139-0016	2015	24.4		8.2	
				2016	17.0		7.2	
				2017	16.3	19	7.2	7.5
Muscatine	Musser Park	Muscatine	19-139-0020	2015	27.2		8.9	
				2016	18.9		8.1	
				2017	16.9	21	7.7	8.2**
Palo Alto	Iowa Lakes Community College	Emmetsburg	19-147-1002	2015	16.1*		7.5*	
				2016	15.3		6.6	
				2017	17.5	16	6.3	6.8
Polk	Health Dept.	Des Moines	19-153-0030	2015	18.1		7.7	
				2016	17.5		7.1	
				2017	17.3	18	7.3	7.4
Polk	Indian Hills School	Clive	19-153-2510	2015	18.0		7.4	
				2016	18.1		6.9	
				2017	17.2	18	7.3	7.2
Pottawattamie	Franklin Sch.	Council Bluffs	19-155-0009	2015	18.8		8.3	
				2016	17.0		7.2	
				2017	18.8	18	7.7	7.7

Iowa PM_{2.5} Design Values 2017 – Preliminary Until May 2018 (continued)

County	Site Name	City	EPA Site Id	Year	Annual 98 th Percentile (µg/m ³)	Daily Design Value (µg/m ³)	Annual Mean (µg/m ³)	Annual Design Value (µg/m ³)
Scott	Jefferson School	Davenport	19-163-0015	2015	23.0		9.3	
				2016	18.8		7.7	
				2017	19.0	20	7.7	8.2
Scott	Hayes School	Davenport	19-163-0020	2015	25.9		9.9	
				2016	21.5		8.2	
				2017	20.3	23	8.1	8.7
Van Buren	Lake Sugema	Not in a City	19-177-0006	2015	19.7		7.4	
				2016	19.3		6.8	
				2017	14.2	18	6.5	6.9
Three-year averages greater than 12.05 µg/m ³ indicate non-attainment with the annual NAAQS.								
*Data did not meet completeness requirements, but annual and daily design values passed substitution tests and are considered valid.								
**Source-oriented site. Annual NAAQS are not applicable.								

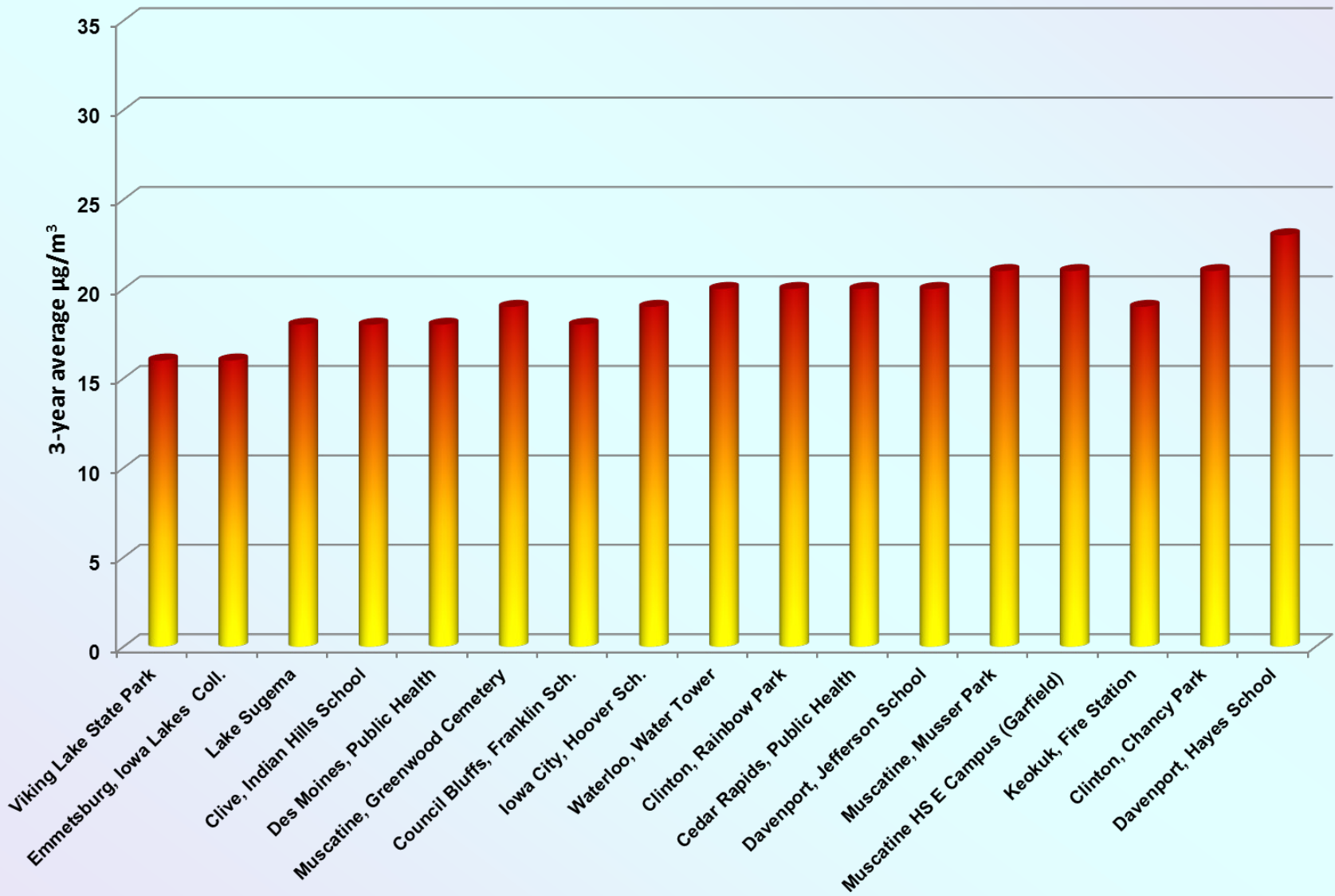
Iowa PM_{2.5} 24-hour Design Values 2015-2017

(NAAQS Standard is 35 µg/m³)



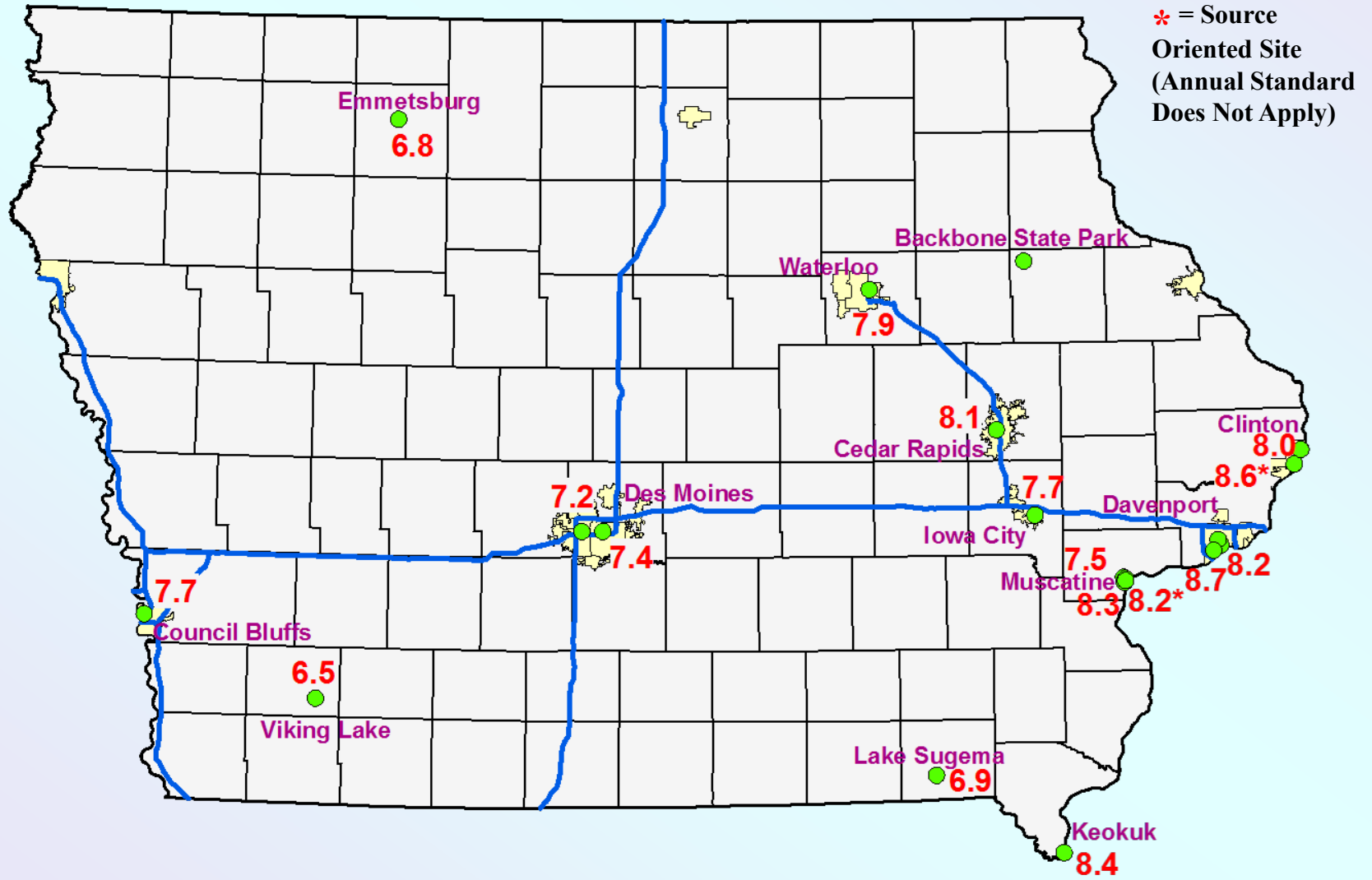
24-hour PM_{2.5} Design Values 2015-2017

(NAAQS Standard is 35 µg/m³)



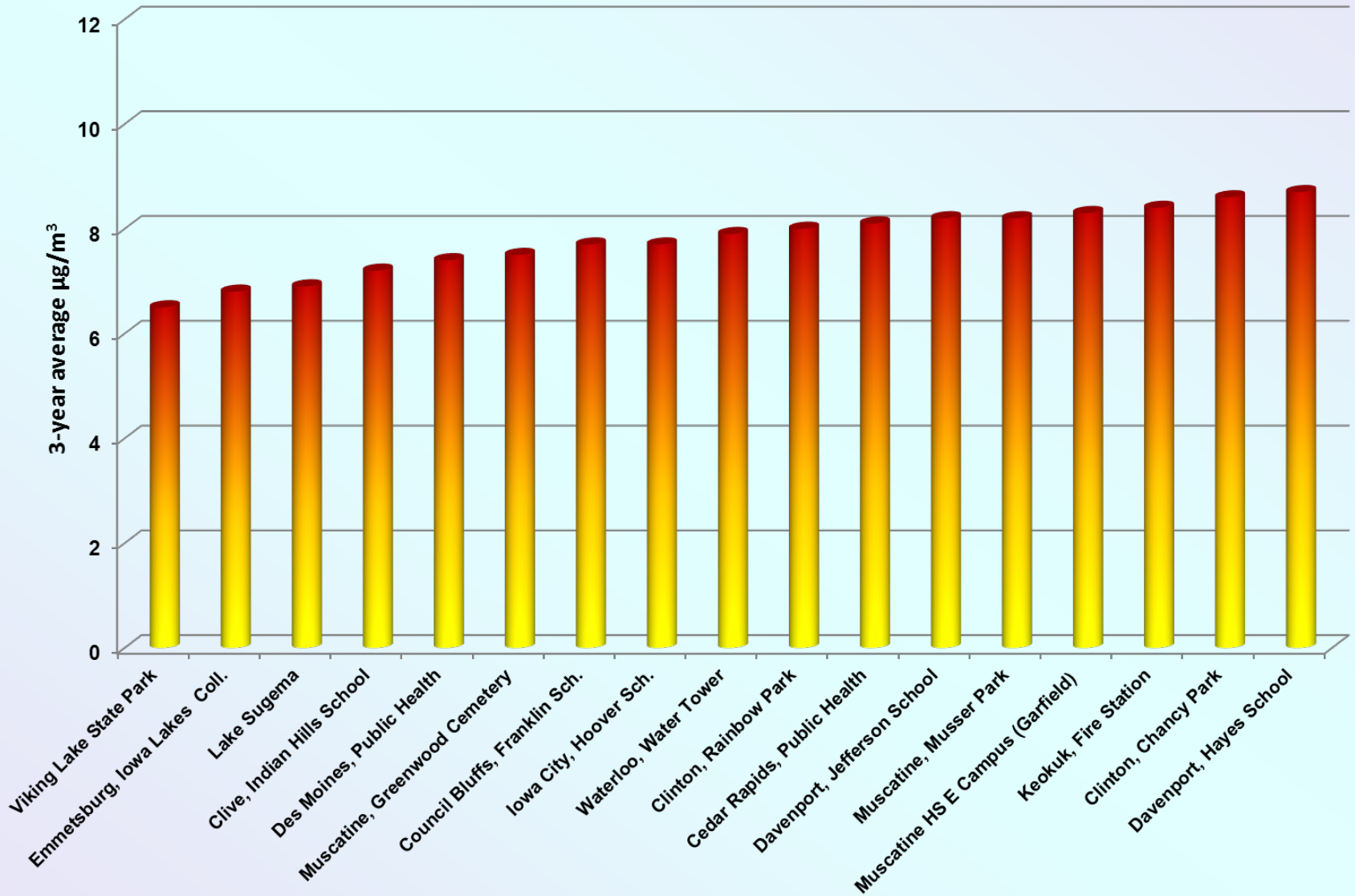
Iowa PM_{2.5} Annual Design Values 2015-2017

(NAAQS Standard is 12.0 $\mu\text{g}/\text{m}^3$)

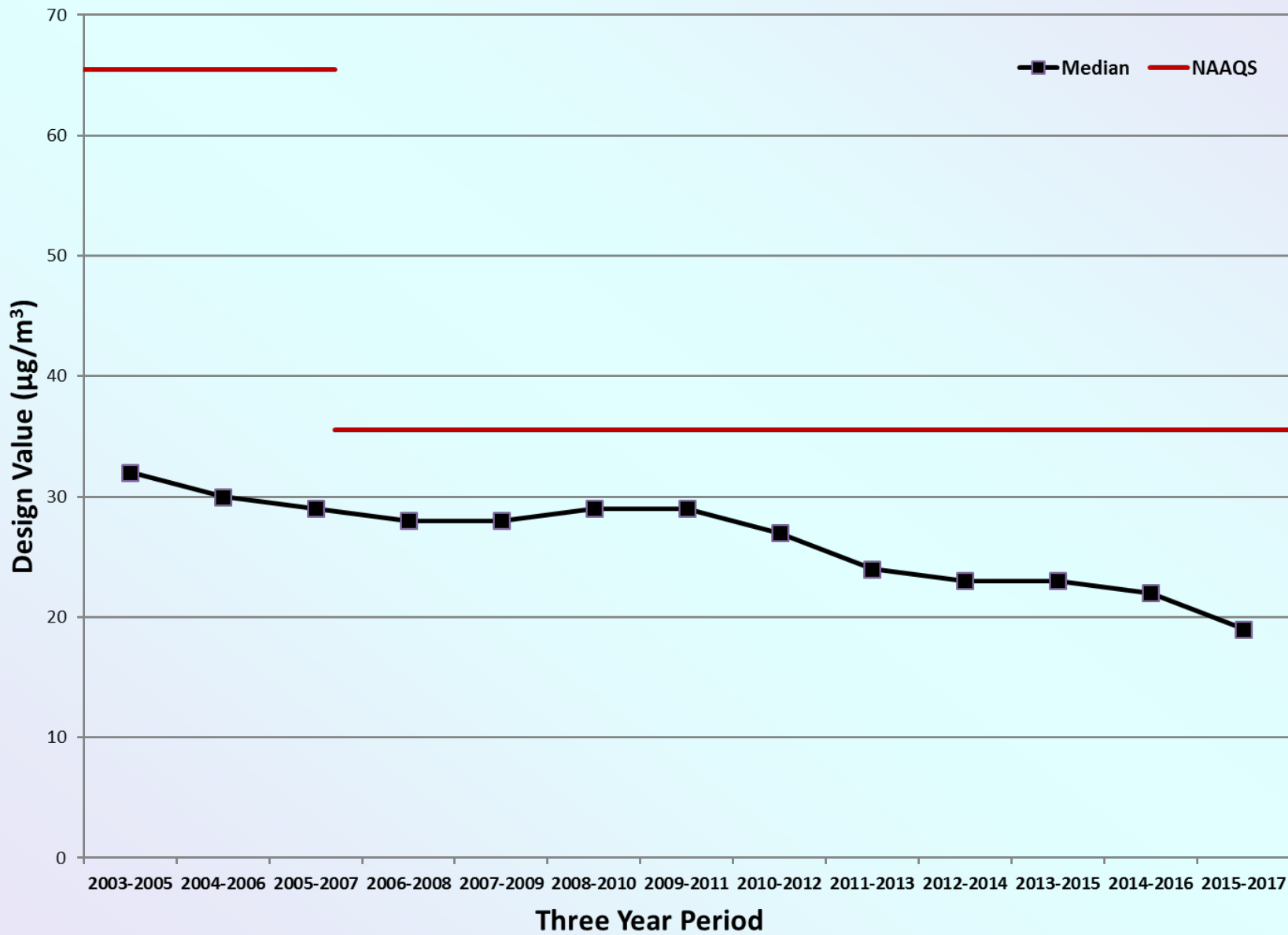


Annual PM_{2.5} Design Values 2015-2017

(NAAQS Standard is 12.0 µg/m³)

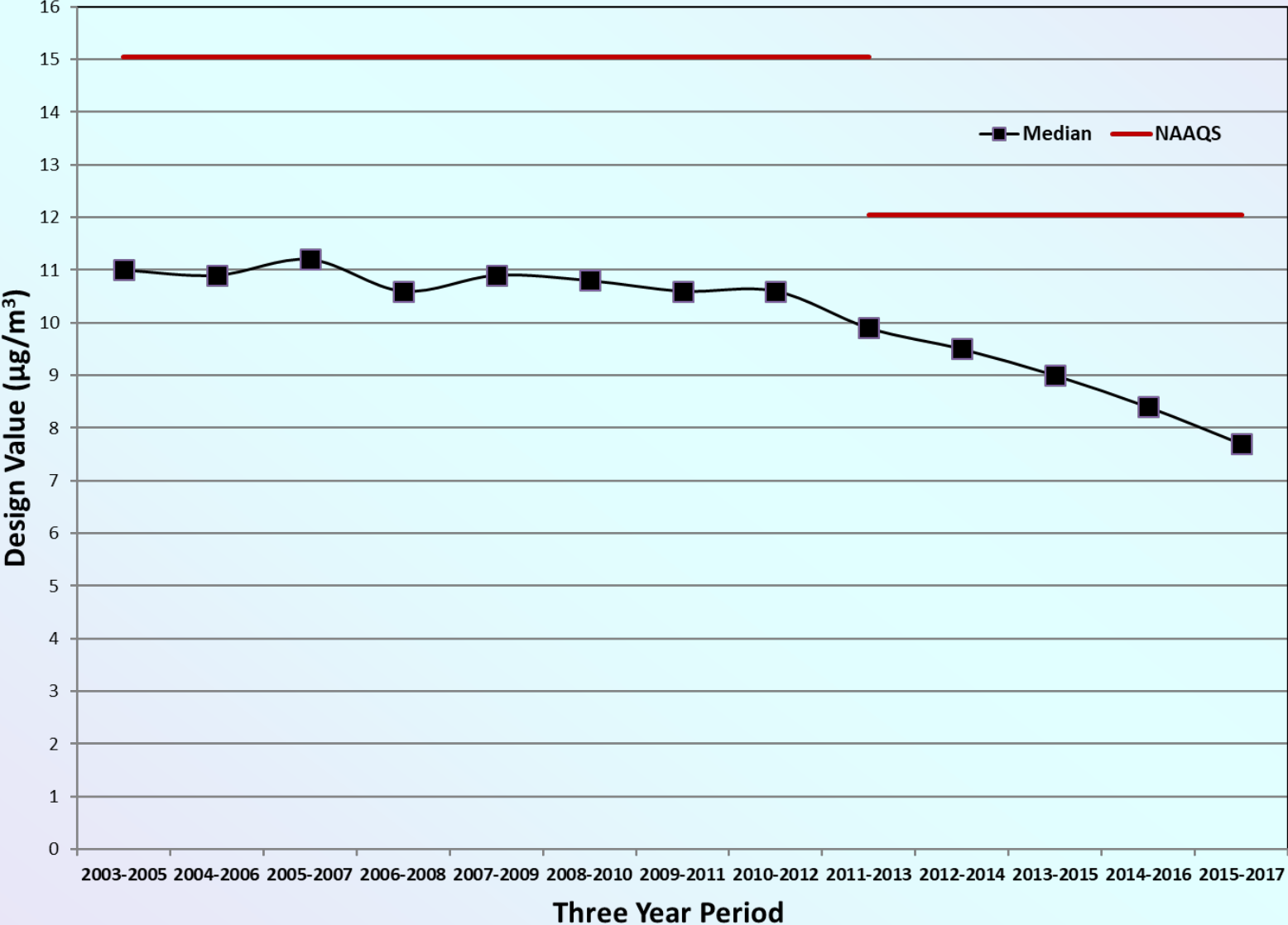


Median PM_{2.5} 24-Hour Design Values in Iowa PM_{2.5} Monitoring Network



Median PM_{2.5} Annual Design Values in Iowa PM_{2.5} Monitoring Network

(Source oriented monitoring sites are not included)



Web Resources

Calculation of the $PM_{2.5}$ Design Values is treated in Appendix N of 40 CFR Pt. 50:

http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title40/40cfr50_main_02.tpl

EPA's Design Value calculations for $PM_{2.5}$ and other pollutants:

<https://www.epa.gov/air-trends>

Information from EPA on $PM_{2.5}$ standards:

<https://www.epa.gov/naaqs/particulate-matter-pm-air-quality-standards>

Historical Air Pollution Data for Iowa and Other States:

<https://www.epa.gov/outdoor-air-quality-data>

Web links listed are as accessed on 3/20/2018.