

# Iowa Fine Particulate Monitoring Network Design Values

2021-2023



*Iowa DNR  
Ambient Air Monitoring  
Group*

## **What is Fine Particulate Matter (PM<sub>2.5</sub>)?**

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<sub>2.5</sub>.

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

## What are the Design Values for PM<sub>2.5</sub>?

Design values for PM<sub>2.5</sub> 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<sub>2.5</sub> is 9.0 µg/m<sup>3</sup> and the twenty-four hour standard is 35 µg/m<sup>3</sup>.

The design value for the 24-hour PM<sub>2.5</sub> standard is the three year average of the annual 98<sup>th</sup> percentile values measured at a monitoring site. The design value for the annual PM<sub>2.5</sub> 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 2021-2023 as well as data from two sites where substitution was performed.

All values in this report should be considered preliminary. Iowa certified the data in April, 2024 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<sub>2.5</sub> Monitoring Data May be Used to Calculate Design Values?**

Iowa currently operates two different types of PM<sub>2.5</sub> 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<sub>2.5</sub> Monitors (2023)

AQS Site ID	Site Name	Location	County
190130009	Water Tower	Waterloo	Blackhawk
190450019	Chancy Park	Clinton	Clinton
190450021	Rainbow Park	Clinton	Clinton
191032001	Hoover Sch.	Iowa City	Johnson
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
191390020	Muscatine, Musser Park	Muscatine	Muscatine
191471002	Iowa Lakes Community College	Emmetsburg	Palo Alto
191530030	Public Health	Des Moines	Polk
**191535885	Public Works	Des Moines	Polk
191550009	Franklin Sch.	Council Bluffs	Pottawattamie
191630015	Jefferson School	Davenport	Scott
191630020	Hayes School	Davenport	Scott
191770006	Lake Sugema	Rural Site	Van Buren
191930021	Irving School	Sioux City	Woodbury

\*\*The Polk County Public Works site began sampling on 1/1/2024

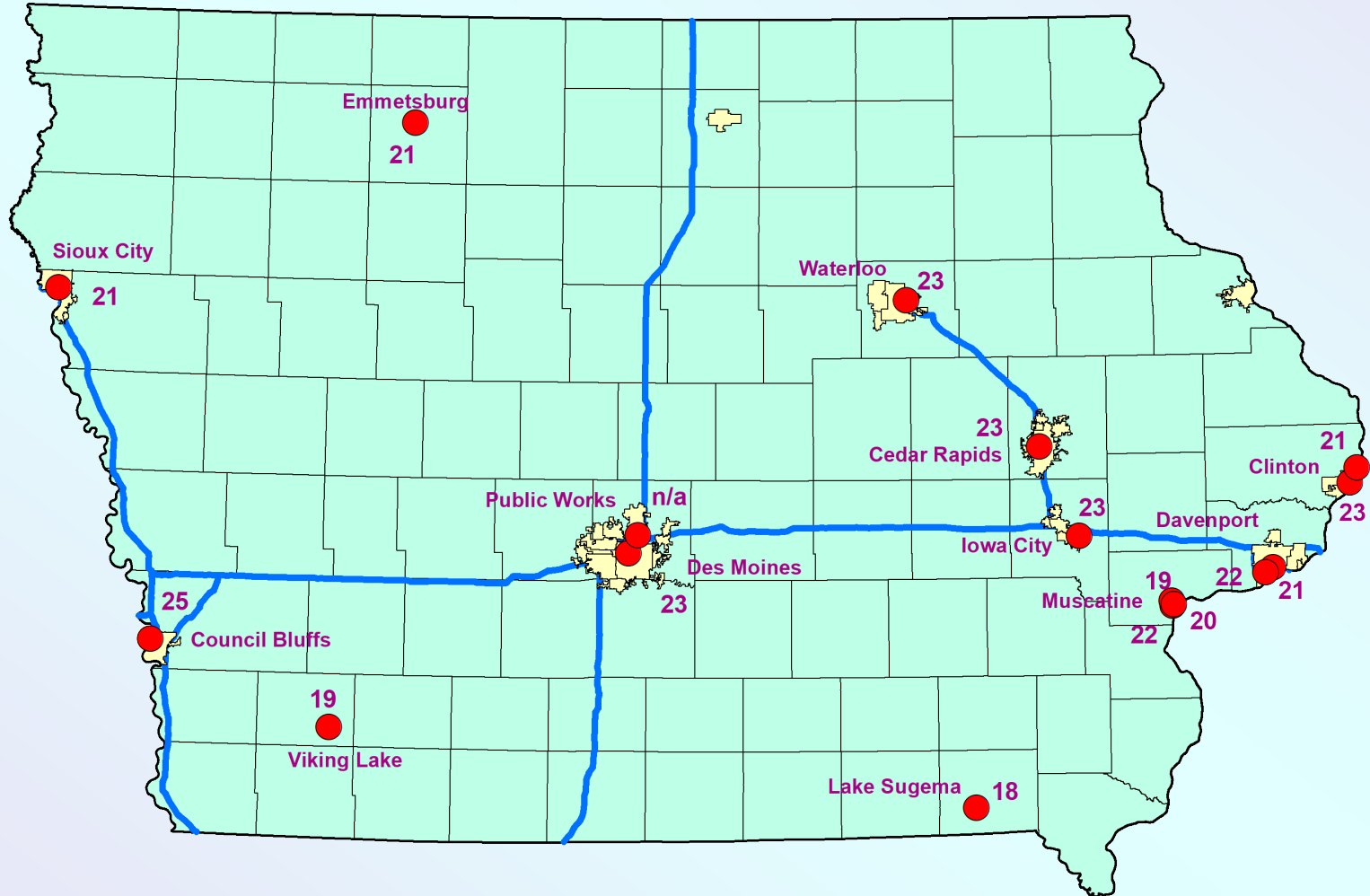
# Iowa PM<sub>2.5</sub> Design Values 2023

(from AQS database 7/10/2024)

County	Site Name	City	EPA Site Id	Years	Daily Design Value (µg/m <sup>3</sup> )	Annual Design Value (µg/m <sup>3</sup> )
Black Hawk	Water Tower	Waterloo	19-013-0009	2021-2023	23	8.4
Clinton	Chancy Park	Clinton	19-045-0019	2021-2023	23	9.2**
Clinton	Rainbow Park	Clinton	19-045-0021	2021-2023	21	8.3
Johnson	Hoover Sch.	Iowa City	19-103-2001	2021-2023	23	8.5
Linn	Public Health	Cedar Rapids	19-113-0040	2021-2023	23	8.6
Montgomery	Viking Lake State Park	Not in a City	19-137-0002	2021-2023	19	7.2
Muscatine	Muscatine HS E Campus (Garfield)	Muscatine	19-139-0015	2021-2023	22	8.6
Muscatine	Greenwood Cemetery	Muscatine	19-139-0016	2021-2023	19	8.3
Muscatine	Musser Park	Muscatine	19-139-0020	2021-2023	20	8.5**
Palo Alto	Iowa Lakes Community College	Emmetsburg	19-147-1002	2021-2023	21	n/a
Polk	Health Dept.	Des Moines	19-153-0030	2021-2023	23	8.2
Polk	Public Works	Des Moines	19-153-5885	2021-2023	n/a	n/a
Pottawattamie	Franklin Sch.	Council Bluffs	19-155-0009	2021-2023	25	8.7
Scott	Jefferson School	Davenport	19-163-0015	2021-2023	21	8.4
Scott	Hayes School	Davenport	19-163-0020	2021-2023	22	8.9
Van Buren	Lake Sugema	Not in a City	19-177-0006	2021-2023	18	7.5
Woodbury	Irving School	Sioux City	19-193-0021	2021-2023	21	8.6
Values greater than 9.0 µg/m <sup>3</sup> indicate non-attainment with the annual NAAQS.						
Values greater than 35 µg/m <sup>3</sup> indicate non-attainment with the Daily NAAQS.						
**Source-oriented site. Annual NAAQS are not applicable.						

# Iowa PM<sub>2.5</sub> 24-hour Design Values 2021-2023

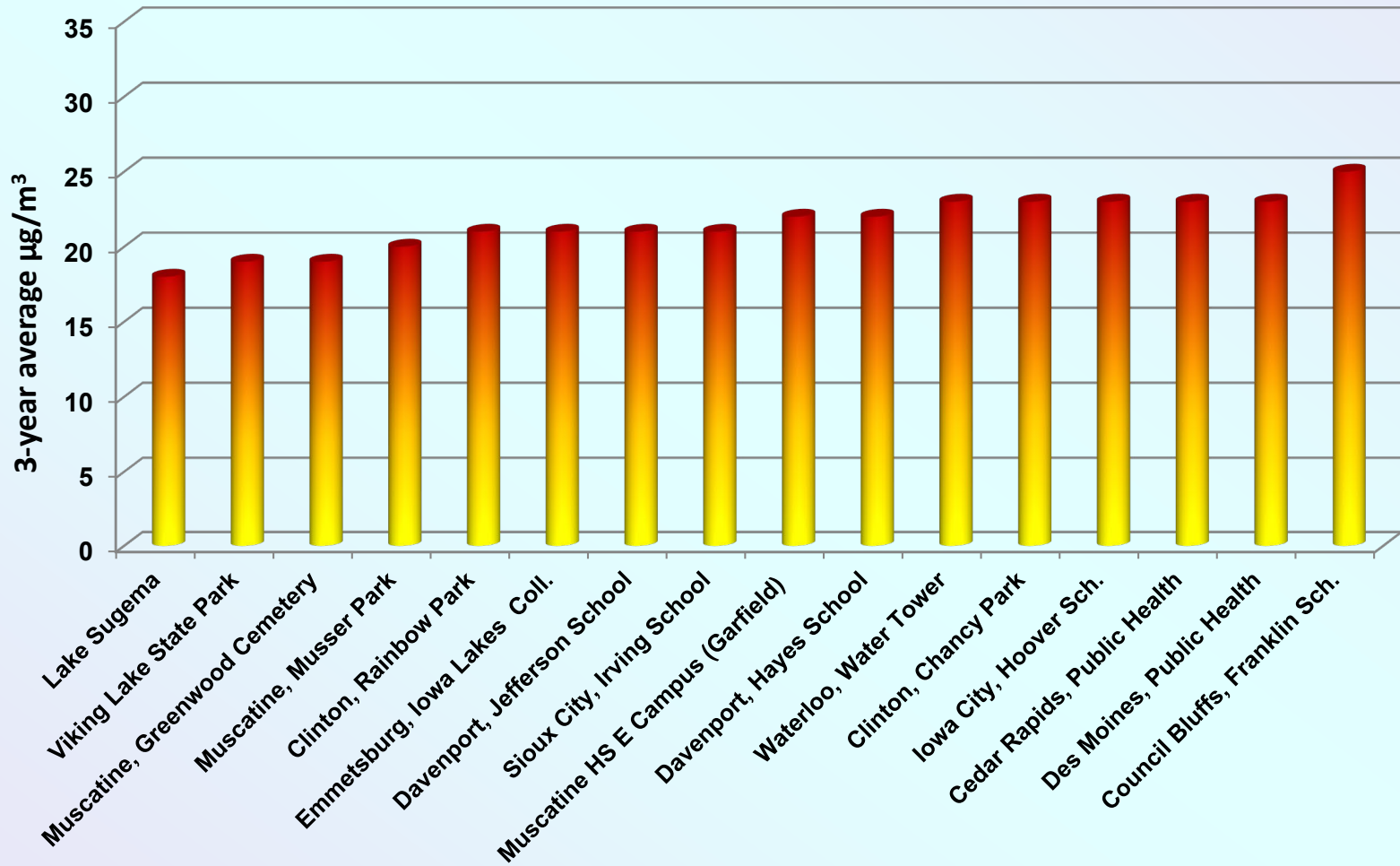
(NAAQS Standard is 35 µg/m<sup>3</sup>)





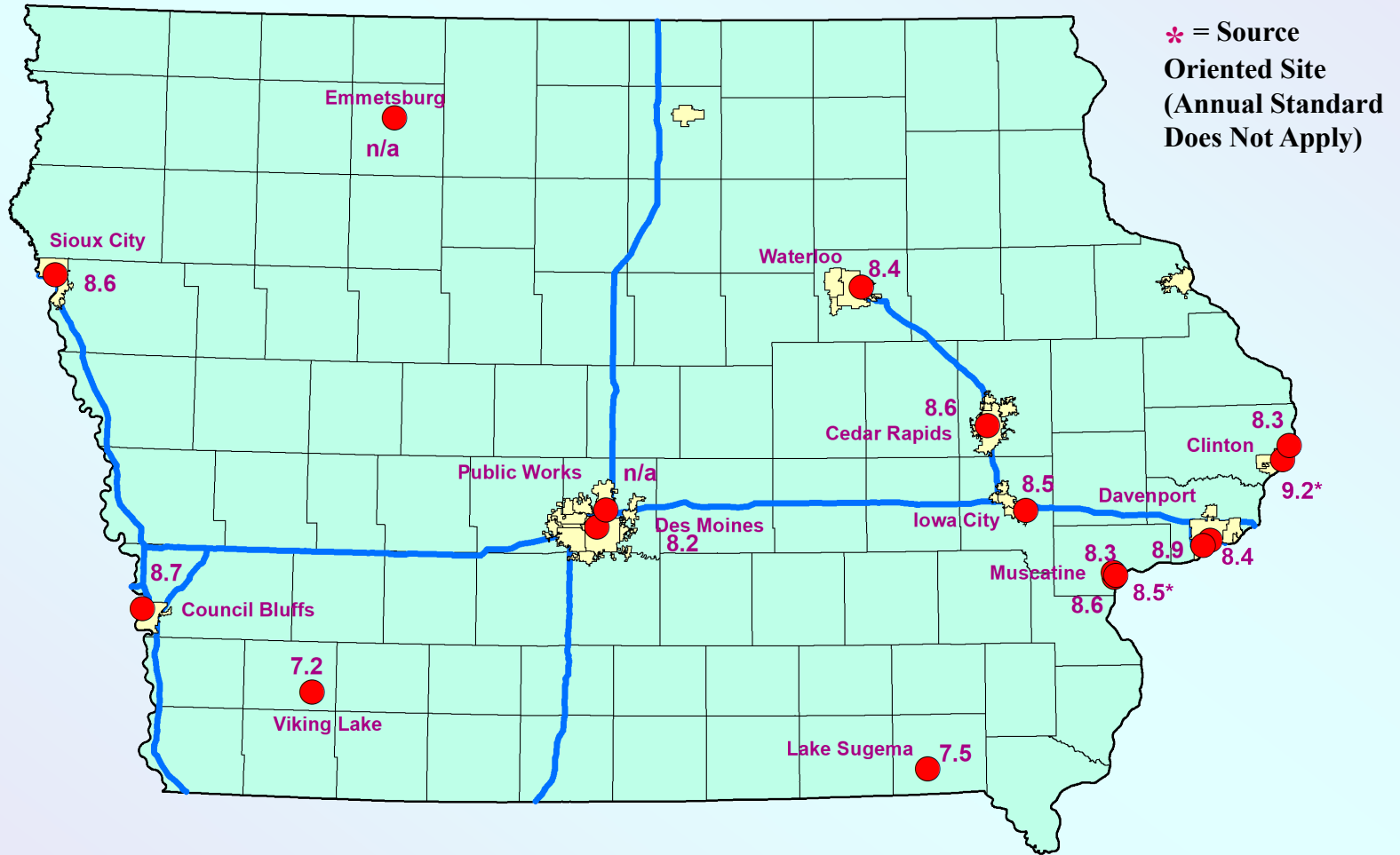
# 24-hour PM<sub>2.5</sub> Design Values 2021-2023

(NAAQS Standard is 35 µg/m<sup>3</sup>)



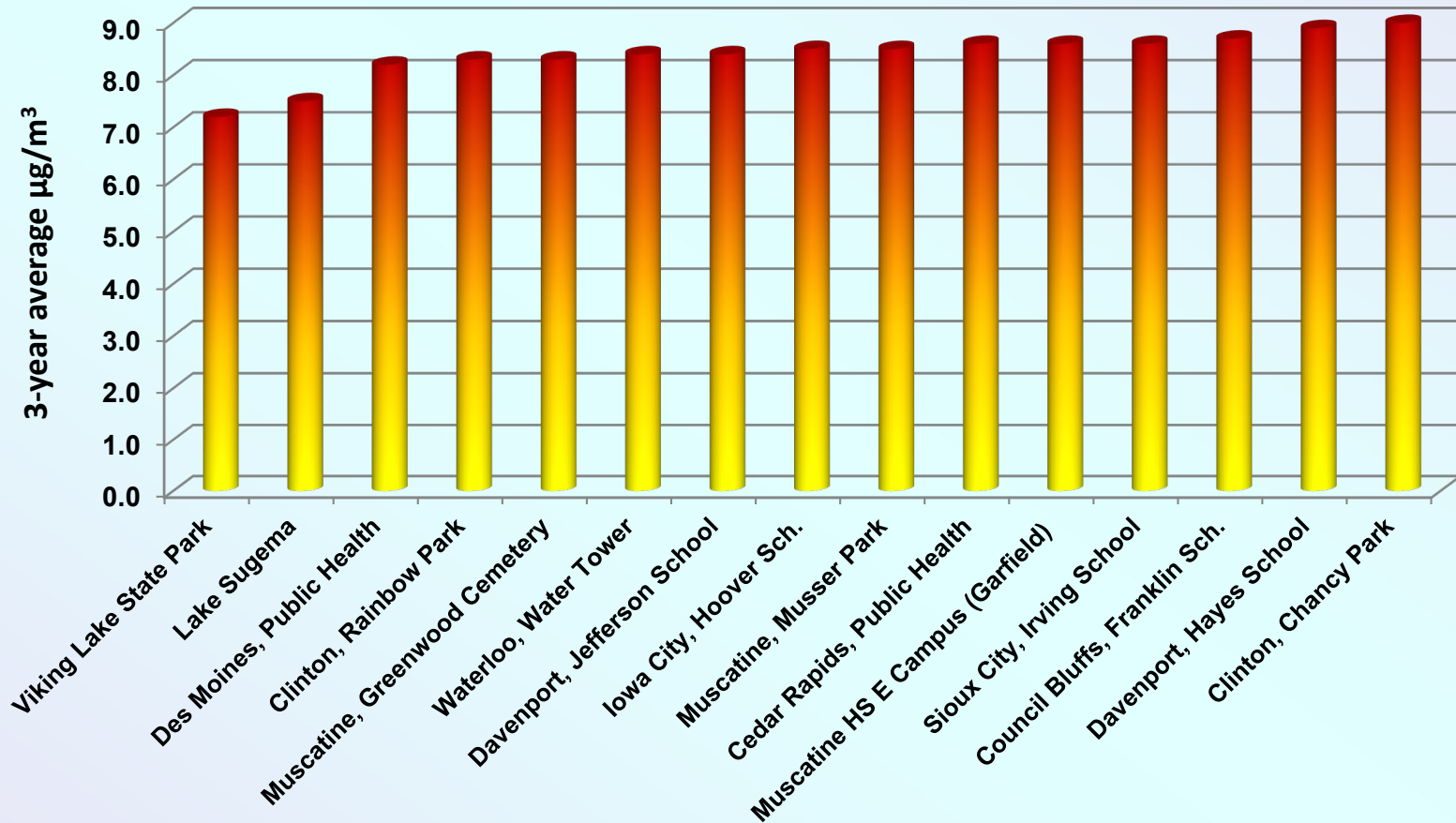
# Iowa PM<sub>2.5</sub> Annual Design Values 2021-2023

(NAAQS Standard is 9.0  $\mu\text{g}/\text{m}^3$ )

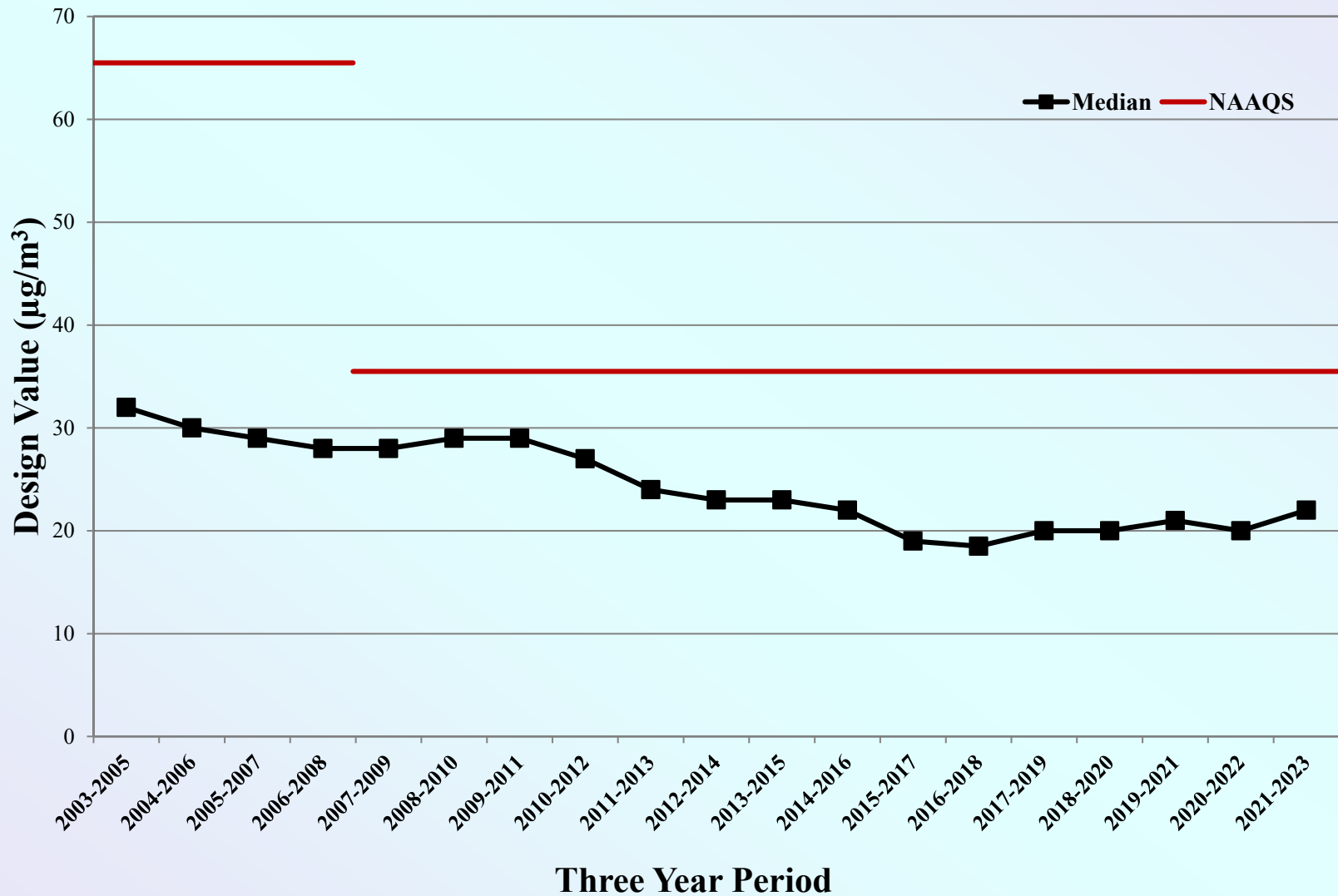


# Annual PM<sub>2.5</sub> Design Values 2021-2023

(NAAQS Standard is 9.0 µg/m<sup>3</sup>)

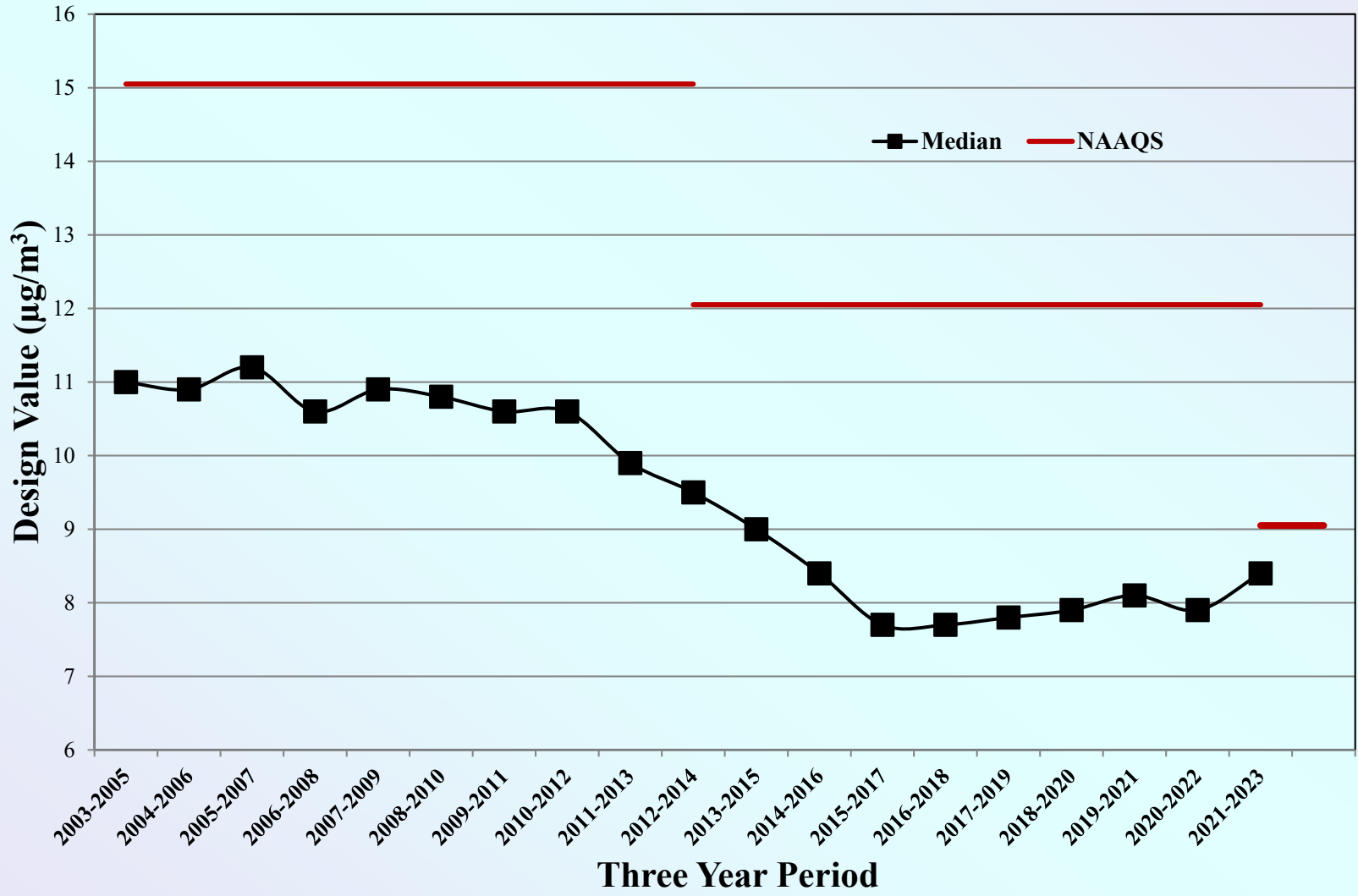


# Median PM<sub>2.5</sub> 24-Hour Design Values in Iowa PM<sub>2.5</sub> Monitoring Network



# Median PM<sub>2.5</sub> Annual Design Values in Iowa PM<sub>2.5</sub> Monitoring Network

(Source oriented monitoring sites are not included)





# Web Resources

*Calculation of the PM<sub>2.5</sub> 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](http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title40/40cfr50_main_02.tpl)

*EPA's Design Value calculations for PM<sub>2.5</sub> and other pollutants:*

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

*Information from EPA on PM<sub>2.5</sub> 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 7/10/2024*