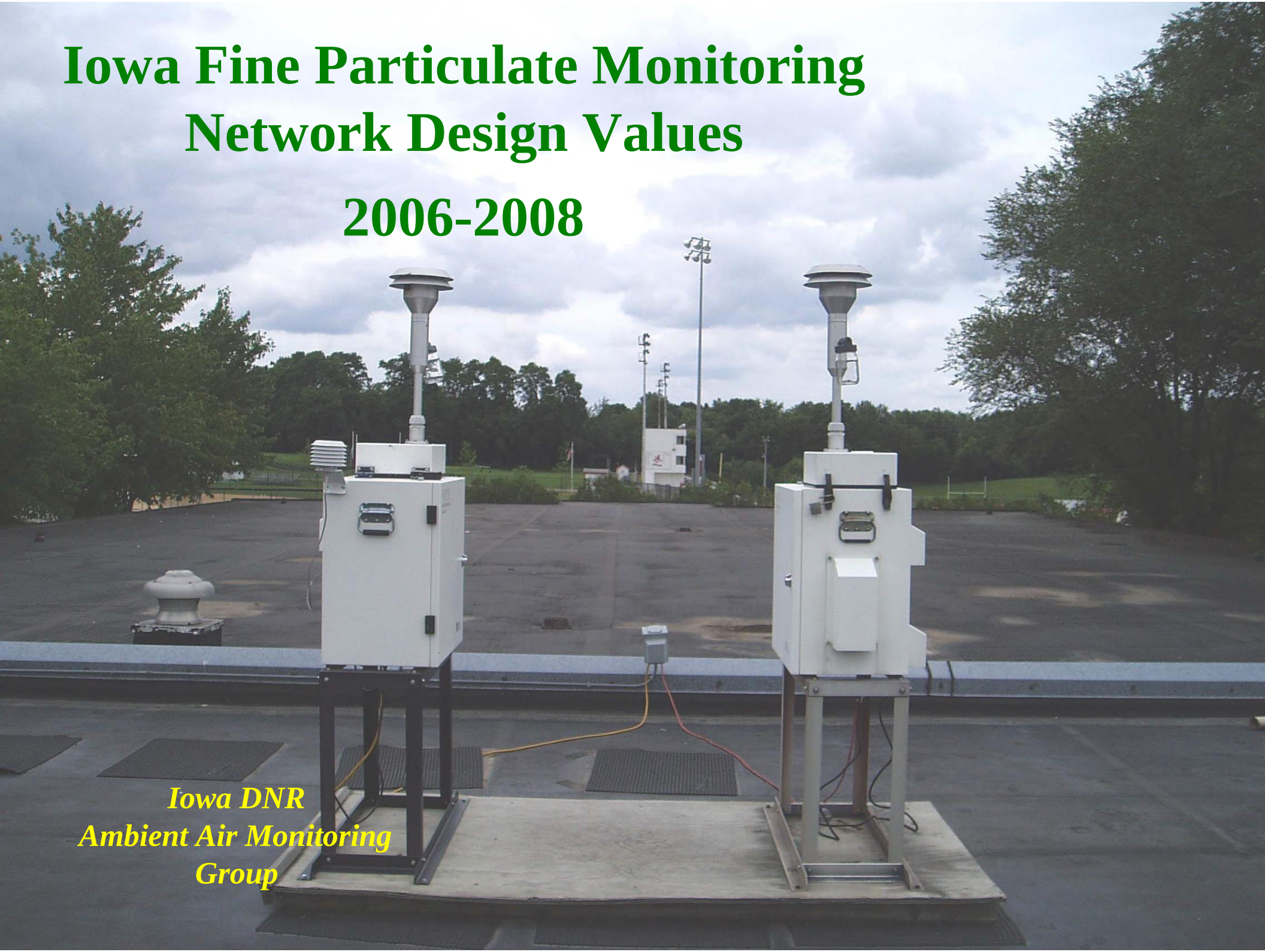
Iowa Fine Particulate Monitoring Network Design Values

2006-2008



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 15.0 µg/m^3 and the twenty-four hour standard is 35 µg/m^3. The 24-hour standard was lowered from 65 µg/m^3 to 35 µg/m^3 in December of 2006.

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 2006-2008, as well as two sites in Des Moines where the EPA data substitution algorithm has been applied.

All values in this report should be considered preliminary. Data values will be certified in July, 2009 and EPA will calculate design values for determination of compliance with the NAAQS later this year.

All monitoring sites in Iowa have design values equal to or below EPA's 35 $\mu g/m^3$ 24-hour fine particle NAAQS for the 2006-2008 period.

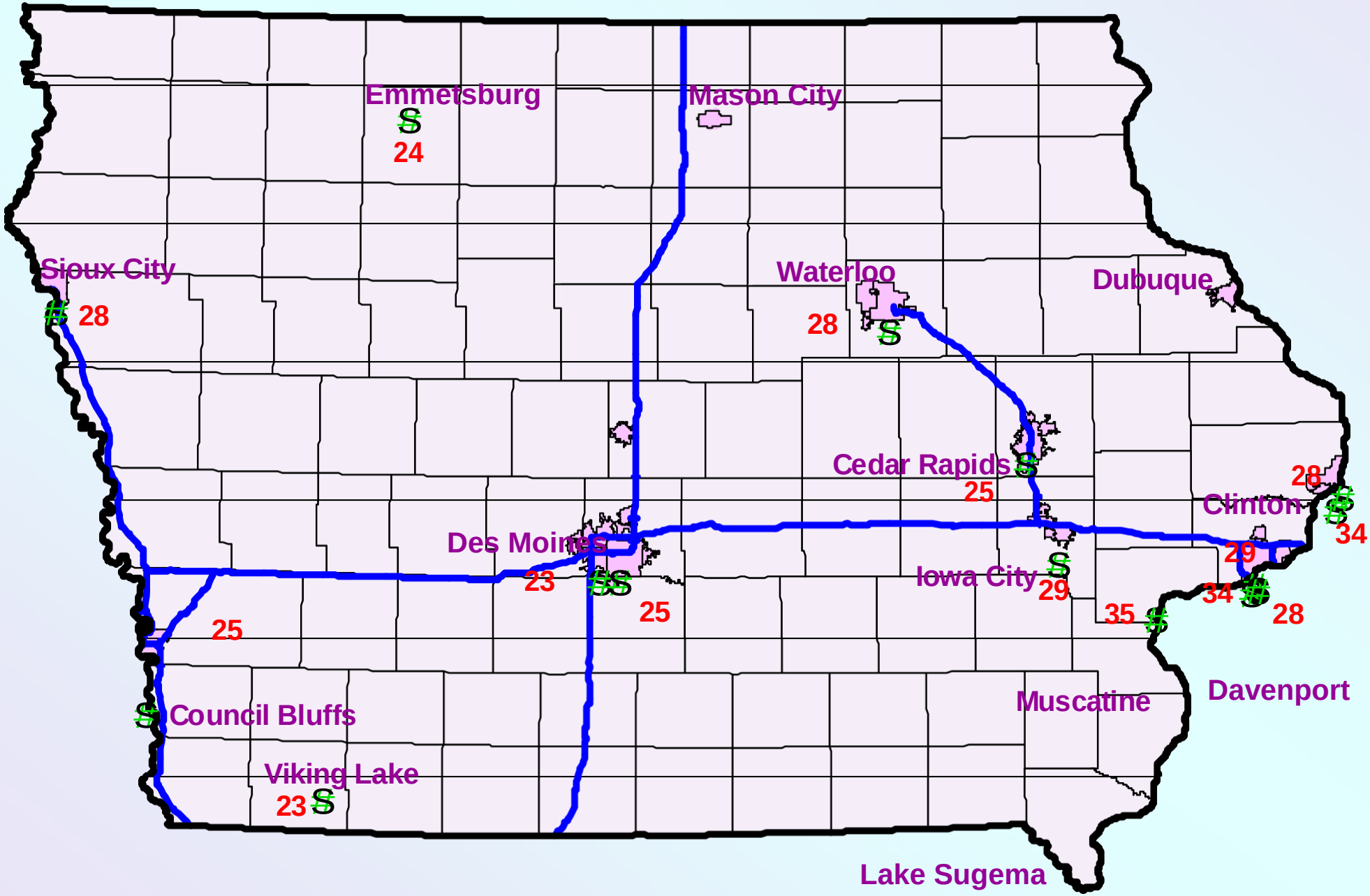
What Types of $PM_{2.5}$ Monitoring Data May be Used to Calculate Design Values?

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. Recently, EPA

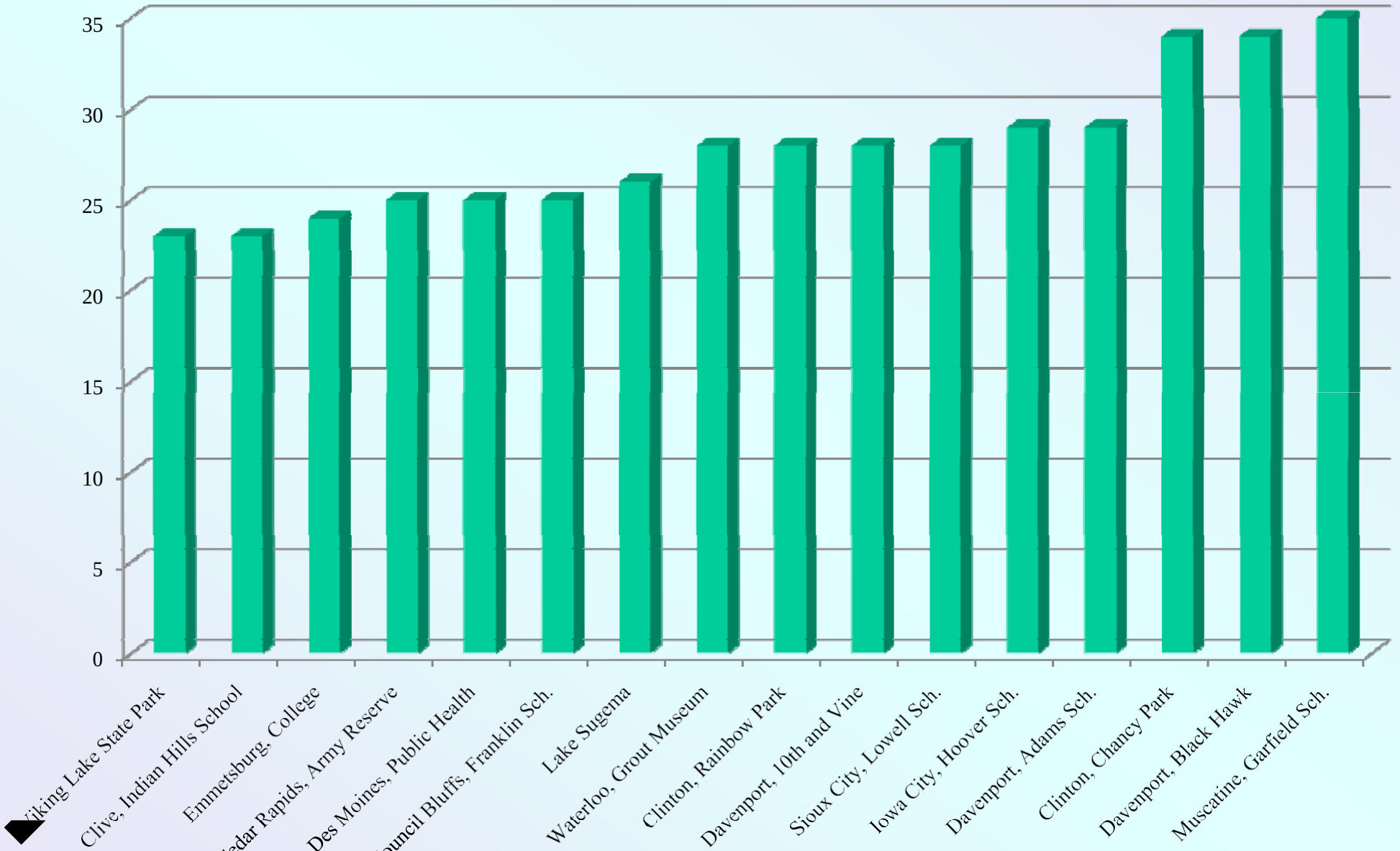
has approved the use of data from a certain type of continuous sampler for computing design values. Data from continuous monitors that pass EPA equivalency tests may be included in computing design values in the future.

Iowa $PM_{2.5}$ 24-hour Design Values 2006-2008

(NAAQS Standard is 35 µg/m^3)

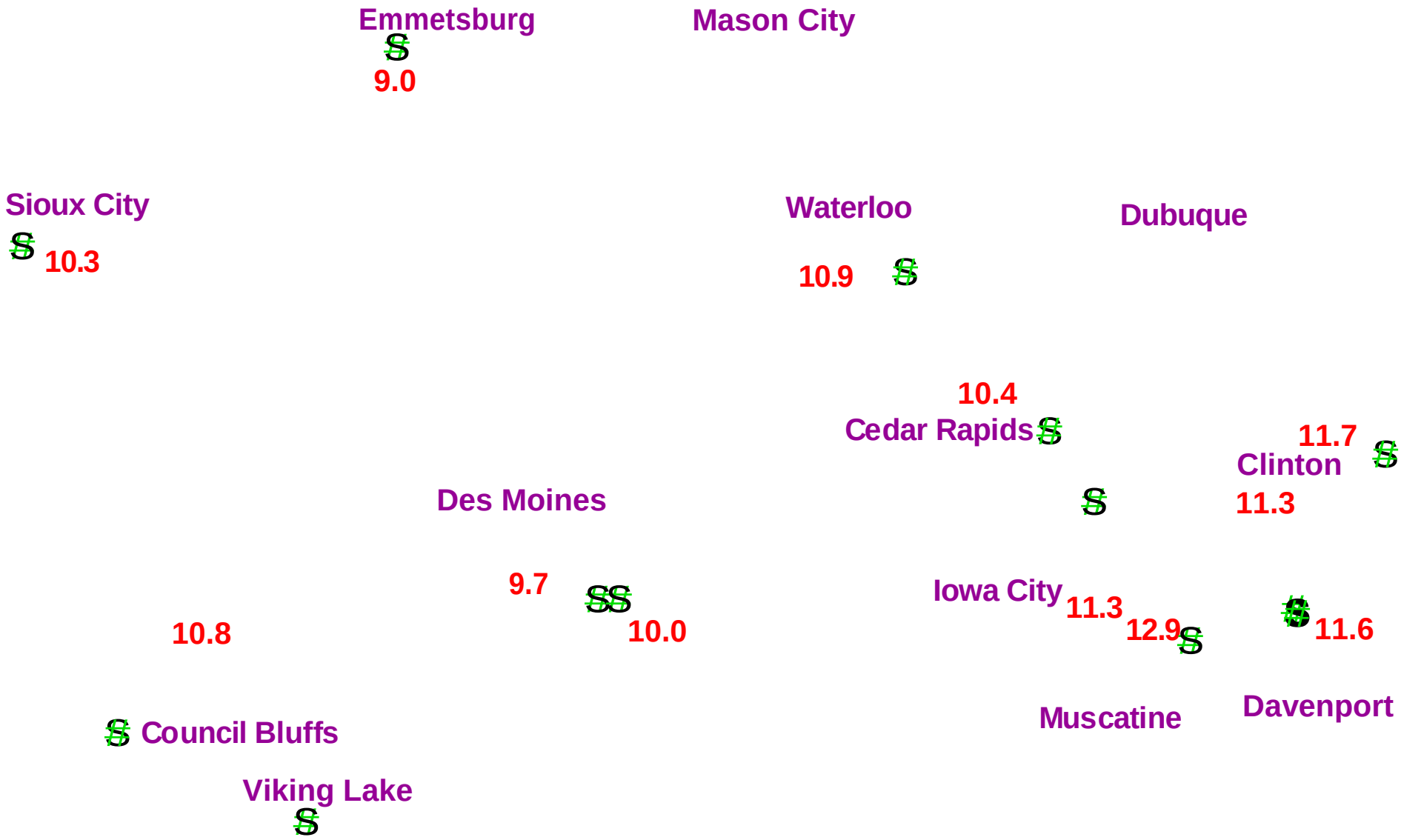


24-hour $PM_{2.5}$ Design Values 2006-2008



Iowa $PM_{2.5}$ Annual Design Values 2006-2008

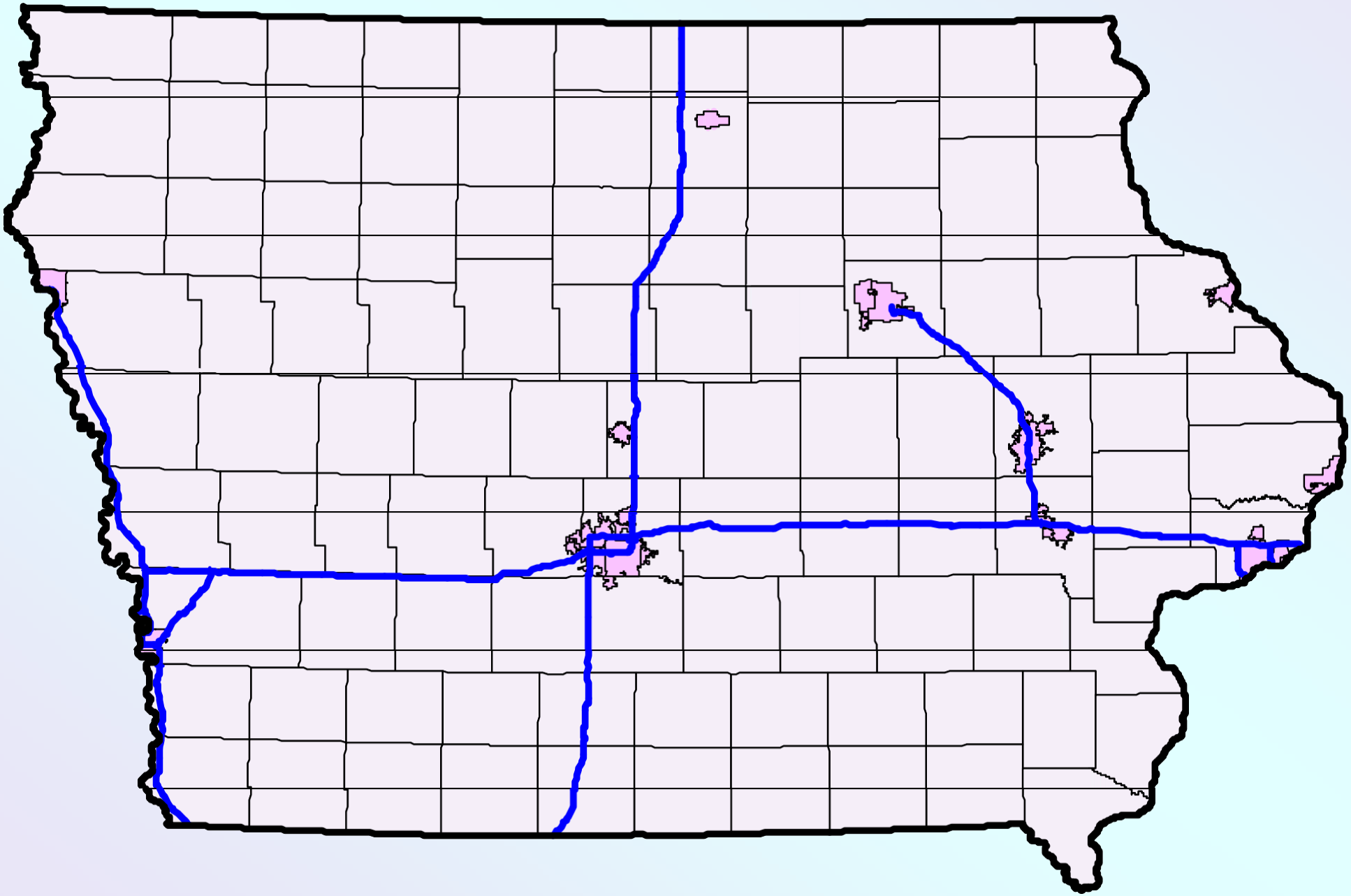
(NAAQS Standard is 15.0 µg/m^3)



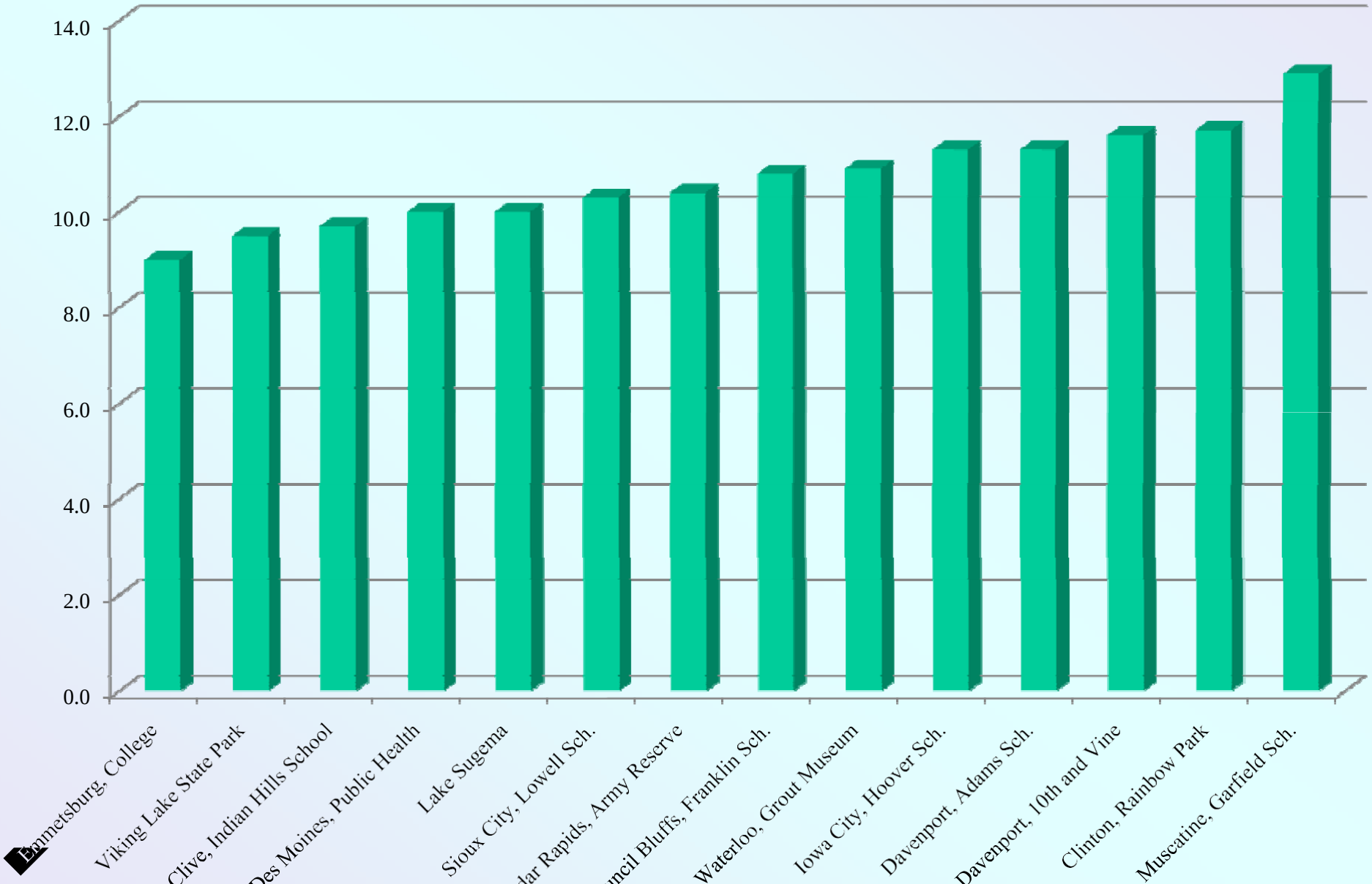
9.5

Lake Sugema

10.0



Annual $PM_{2.5}$ Design Values 2006-2008



Preliminary Iowa $PM_{2.5}$ Attainment Calculations 2006-2008

Site Name	City/County	EPA Monitor Id	Year	Annual 98th percentile (ug/m3)	24-hour $PM_{2.5}$ Design Value	Annual averages (ug/m3)	Annual $PM_{2.5}$ Design Value
Grout	Waterloo	190130008	2006	23.8		**9.9**	
Museum	Black Hawk		2007	31.5		**12.4**	
			2008	28.5	**28**	**10.4**	**10.9**
Chancy Park	Clinton	190450019	2006	35.5		**n/a**	
	Clinton		2007	36.6		**n/a**	
			2008	31	**34**	**n/a**	**n/a***
Rainbow	Clinton	190450021	2006	27.2		**11.9**	
Park	Clinton		2007	29.6		**12.1**	
			2008	28.3	**28**	**11.0**	**11.7**
Hoover	Iowa City	191032001	2006	27.1		**11.0**	
Elementary	Johnson		2007	32.8		**12.2**	
			2008	28.3	**29**	**10.7**	**11.3**
Public Health	Cedar Rapids	191130037	2006	24.4		**9.7**	
	Linn		2007	25.9		**11.1**	
			2008	25.4	**25**	**10.3**	**10.4**
Viking Lake	Red Oak	191370002	2006	25.5		**9.9**	
	Montgomery		2007	24.7		**10.0**	
			2008	18.8	**23**	**8.7**	**9.5**
Garfield	Muscatine	191390015	2006	27.6		**11.7**	
Elementary	Muscatine		2007	44		**14.2**	
			2008	33.7	**35**	**12.6**	**12.9**
Iowa Lakes	Emmetsburg	191471002	2006	24.5		**9.1**	
Community	Emmet		2007	25		**9.3**	
College			2008	21.3	**24**	**8.6**	**9.0**
Public Health	Des Moines	191530030	2006	23.6		**9.3**	
	Polk		2007	27.9		**11.0**	
			2008	24.2	**25****	**9.8**	**10.0 ****
Indian Hills	Clive	191532510	2006	22.4		**9.2**	
Elementary	Polk		2007	25.2		**10.5**	
			2008	22.6	**23****	**9.5**	**9.7 ****
Franklin	Council Bluffs	191550009	2006	23.1		**10.9**	
Elementary	Pottawattamie		2007	33		**11.2**	
			2008	20.2	**25**	**10.3**	**10.8**
Jefferson	Davenport	191630015	2006	25.9		**10.7**	
Elementary	Scott		2007	30.4		**12.5**	
			2008	28.2	**28**	**11.7**	**11.6**
Adams	Davenport	191630018	2006	26.3		**10.3**	
Elementary	Scott		2007	32.8		**12.5**	
			2008	27.5	**29**	**11.2**	**11.3**
Blackhawk	Davenport	191630019	2006	32.7		**n/a**	
Foundry	Scott		2007	37.4		**n/a**	
			2008	31.3	**34**	**n/a**	**n/a***
Lake Sugema	Keosauqua	191770006	2006	25.7		**9.9**	
	Van Buren		2007	26.5		**10.8**	
			2008	25.7	**26**	**9.4**	**10.0**
Lowell	Sioux City	191930017	2006	29		**10.3**	
Elementary	Woodbury		2007	31.2		**10.6**	
			2008	24.7	**28**	**9.8**	**10.3**

*** Annual Standard Not Applicable**

**** EPA Data Substitution Techniques Used to Meet Completeness**

***** Annual Value for 2006 not valid**

24-hour Design Values Less than or Equal to 35 ug/m^3 Indicate Attainment with the 24-hour NAAQS.

Annual Design Values Less than or Equal to 15.0 ug/m^3 Indicate Attainment with the Annual NAAQS.

Sites without enough data to calculate summary statistics have been excluded from this report.

Web Resources

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

http://edocket.access.gpo.gov/cfr_2008/julqtr/pdf/40cfr50AppN.pdf

http://www.epa.gov/airtrends/values.html

Web links listed are as accessed on 2/16/2009.