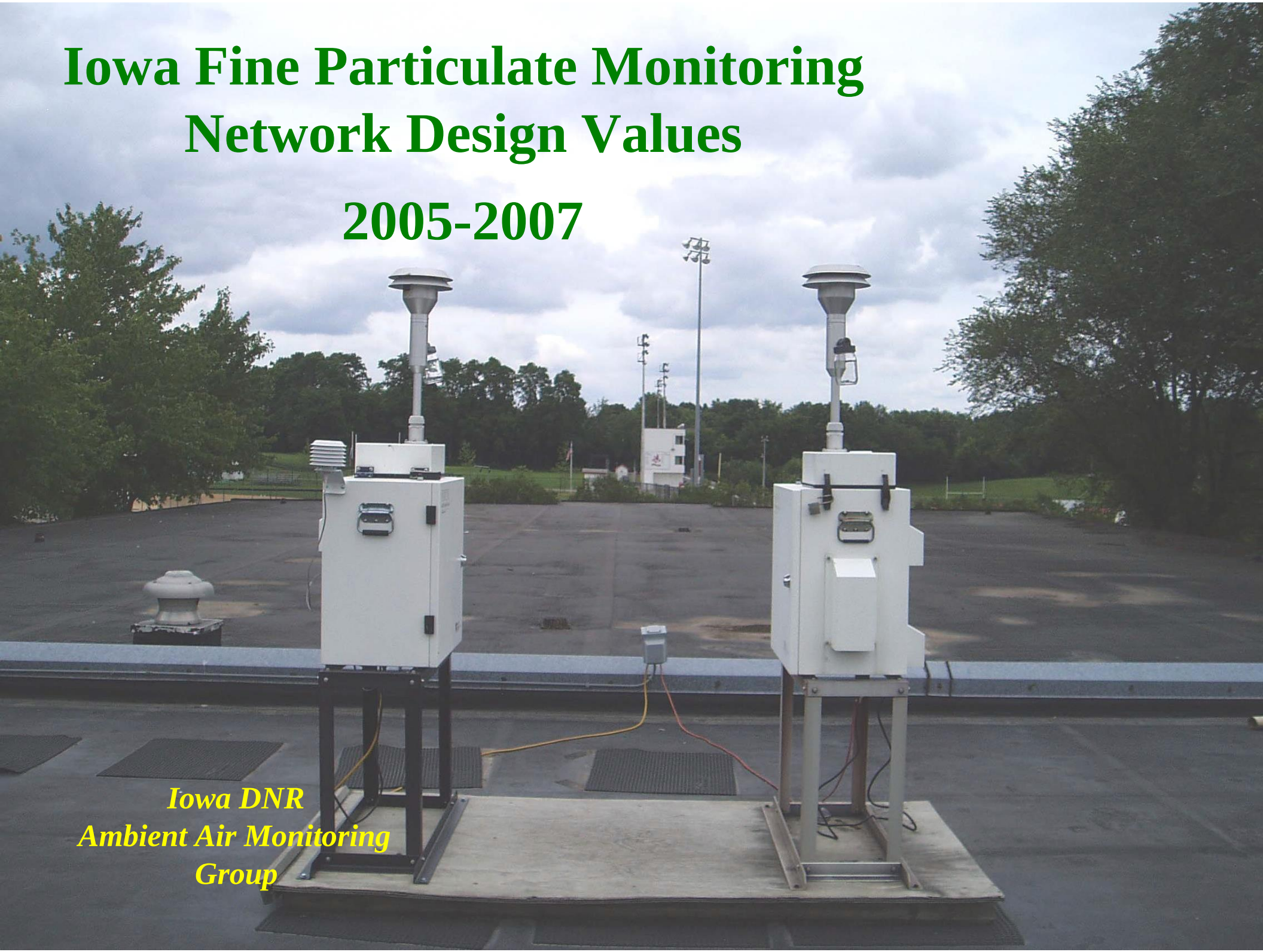
Iowa Fine Particulate Monitoring Network Design Values

2005-2007



Iowa DNR
Ambient Air Monitoring Group

What is Fine Particulate Matter (PM2.5)?

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 are referred to as fine particulate or PM2.5.

Sources of PM2.5 emissions include all types of combustion (motor vehicles, power plants, wood burning, etc.) and some industrial processes. Secondary PM2.5 is produced in the atmosphere away from sources through atmospheric chemistry.

What are the Design Values for PM2.5?

Design values for PM2.5 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 PM2.5 is 15.0 $\mu g/m^3$ and the twenty-four hour standard is 35 $\mu g/m^3$. The 24 hr standard was lowered from 65 $\mu g/m^3$ to 35 $\mu g/m^3$ in December of 2006.

The design value for the 24 hr PM2.5 standard is the three year average of the annual 98th percentile values measured at a monitoring site. The design value for the annual PM2.5 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. Data used in this report only includes monitors with complete data for 2005-2007. EPA has used data substitution to calculate design values for two sites in Des Moines that did not meet the 75% completeness goal. These sites are included in this report.

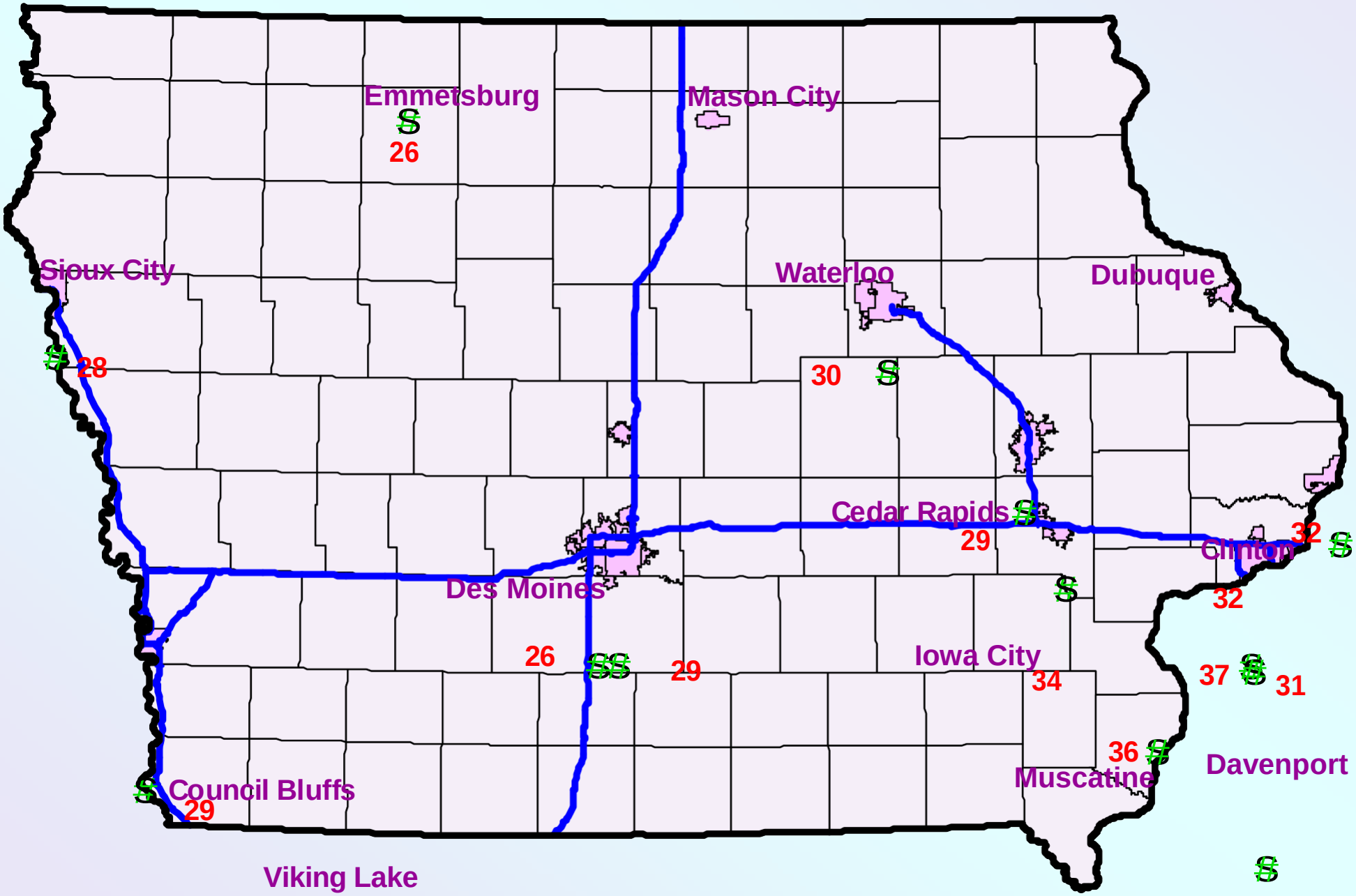
There are two monitoring sites in Iowa with design values above EPA's 35 $\mu g/m^3$ 24 hour fine particle NAAQS for the 2005-2007 period. The fine particulate monitor located near Black Hawk Foundry in Davenport recorded a design value of 37 $\mu g/m^3$, and the monitor located at Garfield School in Muscatine recorded a design value of 36 $\mu g/m^3$.

What Types of PM2.5 Monitoring Data May be Used to Calculate Design Values?

Iowa currently operates two different types of PM2.5 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 PM2.5 24-hour Design Values 2005-2007

(NAAQS Standard is 35 µg/m^3)



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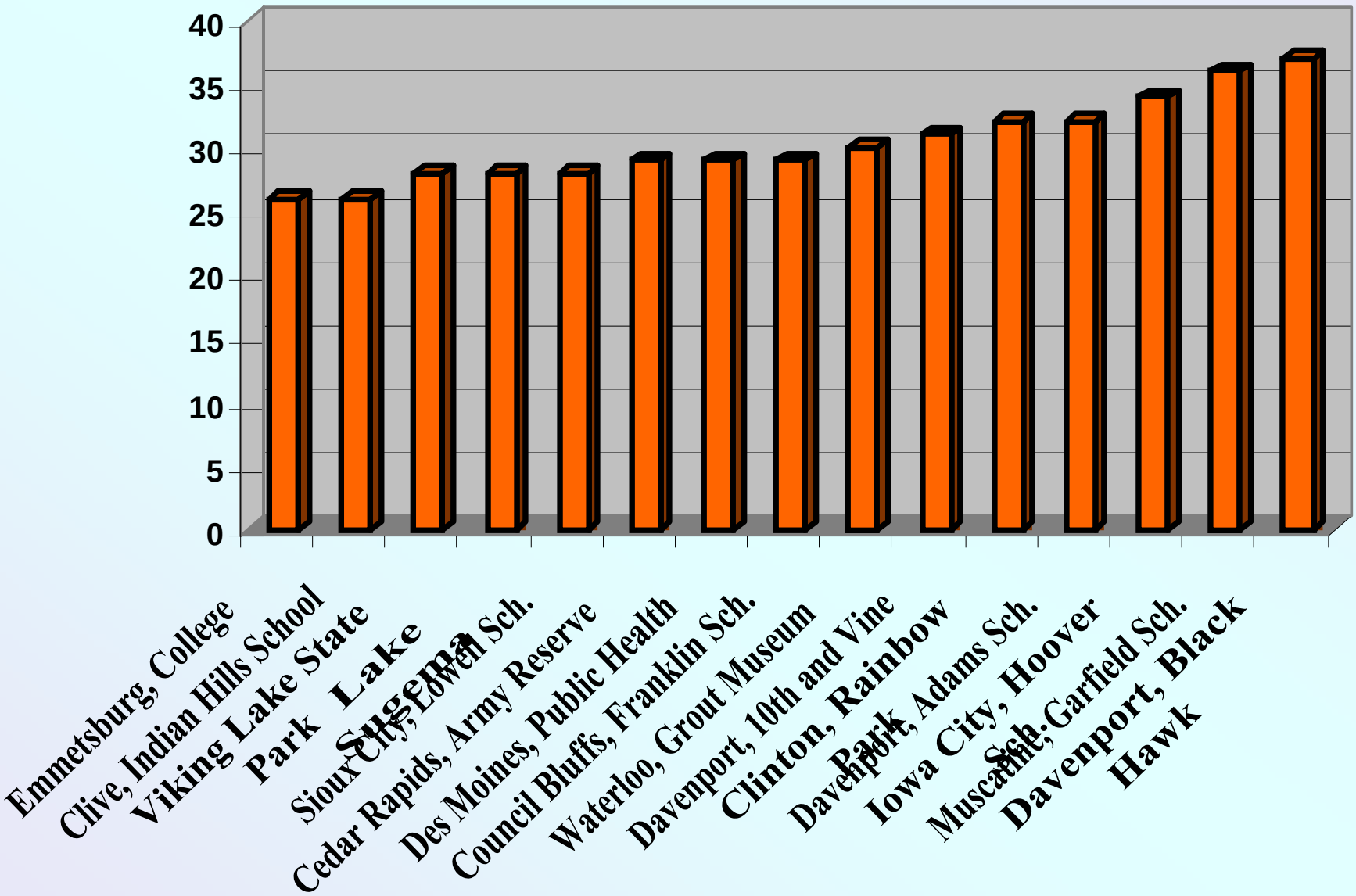
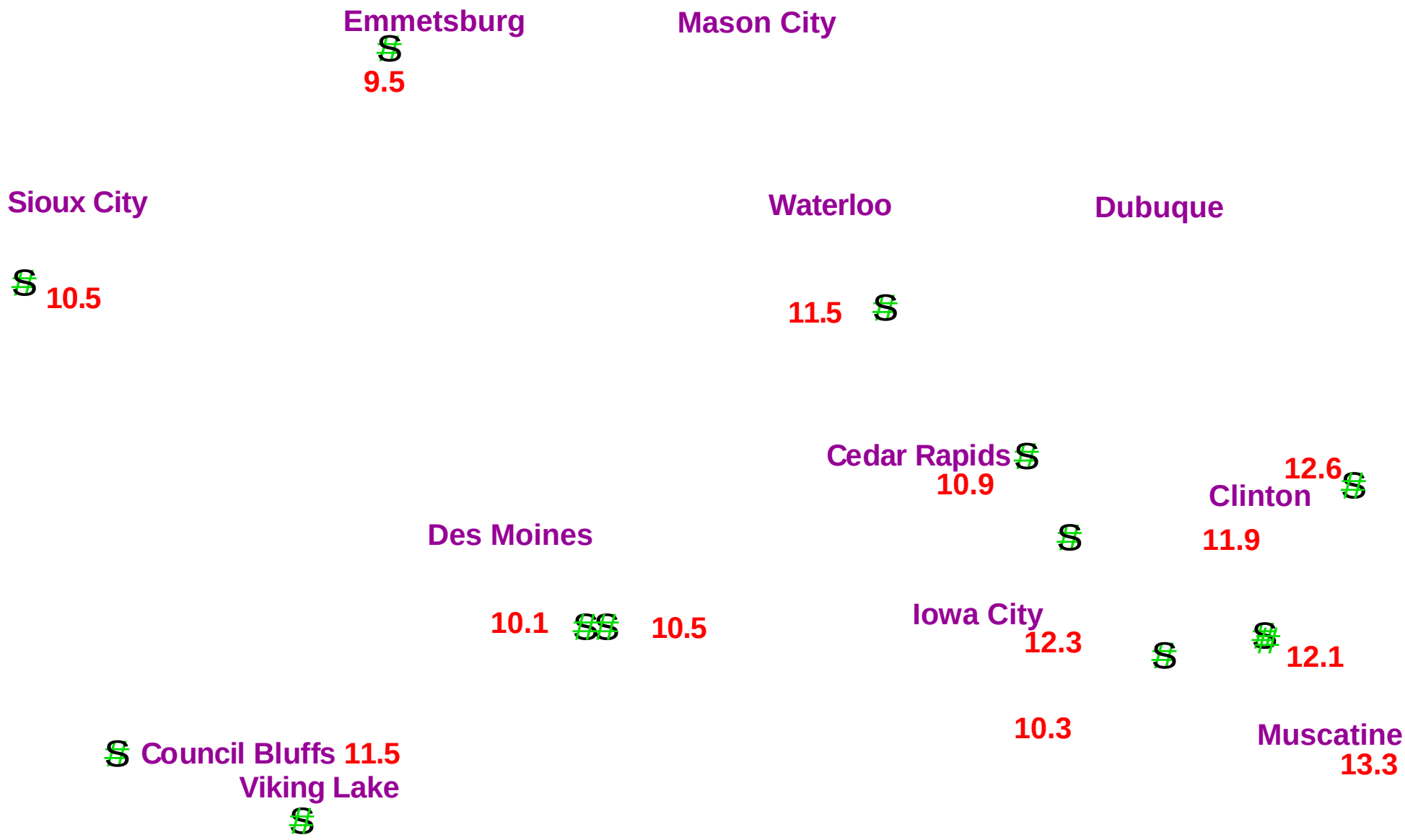
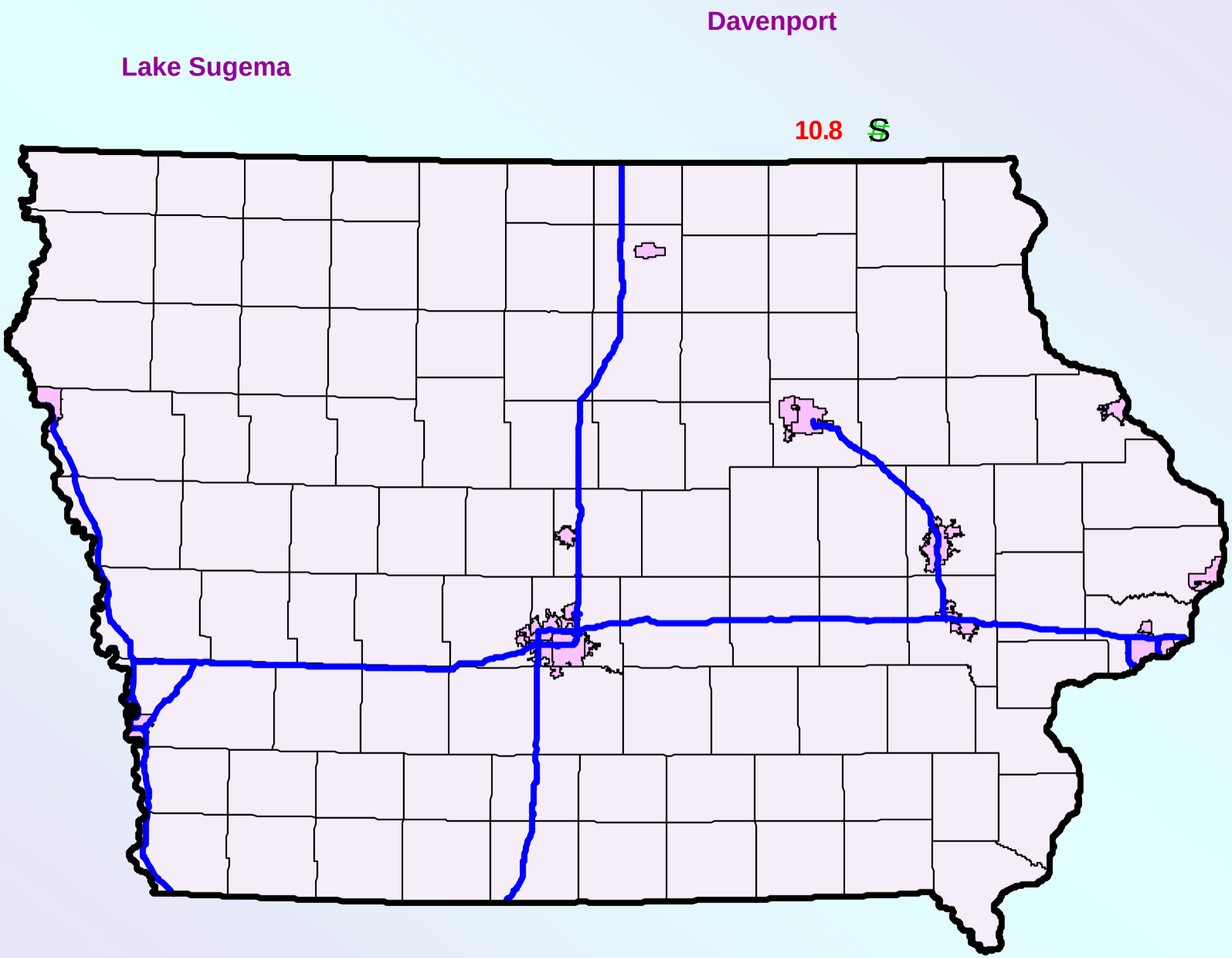
24-hr. PM2.5 Design Values 2005-2007



Iowa PM2.5 Annual Design Values 2005-2007

(NAAQS Standard is 15.0 µg/m³)

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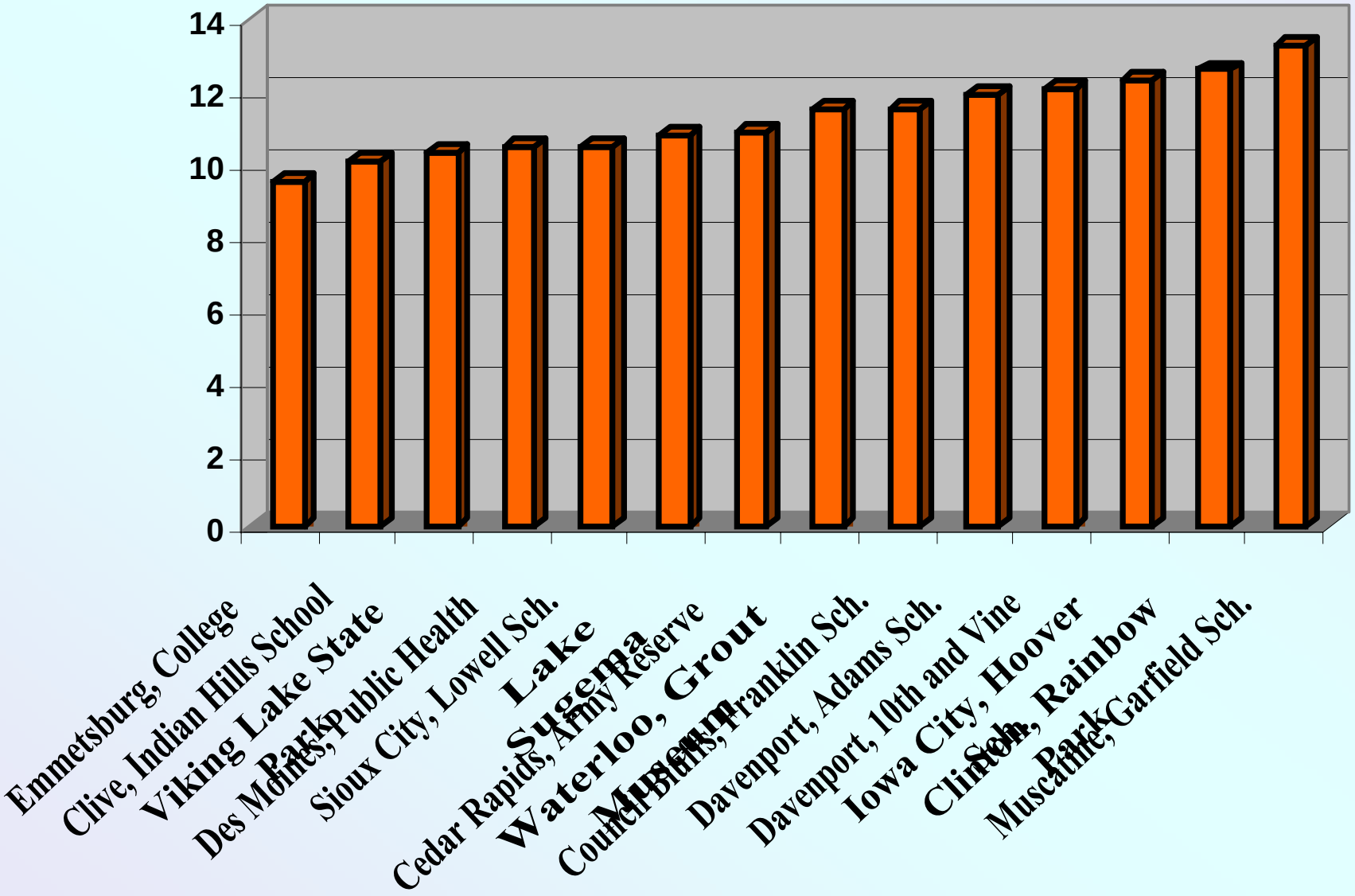
Annual PM2.5 Design Values 2005-2007



Iowa PM2.5 Attainment Calculations 2005-2007

County	City	EPA Monitor Id	Year	Annual 98th percentil e (ug/m3)	3-yeat· average 98th percentile (ug/m3)	Annual avernges (ug/m3)	3-year avel'age annual average (ug /m3)
Blac k Hawk	Waterloo	190130 008	2005	35, l		12.2	
			2006	23.8		9.9	
			2007	31.5	30	12.4	11.5
Clinton	Clinton	19045002 1	200 5	39,7		13.9	
			2006	27.2		11.9	
			2007	29.6	32	12.1	12.6
Johnson	Iowa City	19 103200 1	2005	41		13.6	
			2006	27.1		11.0	
			2007	32.8	34	12.2	12.3
Li1m	Ce dar Rapids	191130 03 *i*	20 05	35.4		11.8	
			2006	24.4		9.7	
			2007	25.9	29	11.1	10.9
Montgome1y	Red Oa k	191370002	2005	33		11.1	
			2006	25.5		9.9	
			2007	24.7	28	10.0	10.3
Muscati ne	Muscatine	191390015	200 5	36.8		13.9	
			2006	27.6		11.7	
			2007	44	36	14.2	13.3
Enunet	Emmetsb urg	191 47 1002	2005	27.7		10.1	
			2006	24.5		9.1	
			2007	25	26	9.3	9.5
Polk	Des Moine s	1 5 1530030	200 5	34.4		11.3	
			2006	23.6		9.3	
			2007	27 .9	29**	11.0	10.5**
Polk	C live	191532510	20 05	28 .9		10.5	
			2006	22.4		9.2	
			2007	25.2	26**	10.5	10.1**
Pottawa ttam ie	Counc il Bluffs	191550009	2005	30		12.5	
			2006	23.1		10.9	
			2007	33	29	11.2	11. 5
Scott	Dav enport	191630015	200 5	36.7		13.0	
			2006	25.9		10.7	
			2007	30.4	31	12.5	12.1
Scott	Dav enport	191630018	200 5	36.8		12.9	
			2006	26.3		10.3	
			2007	32.8	32	12.5	11.9
Scott	Black Hawk Foundry	191630019	200 5	41.2		nla	
			2006	32.7		nla	
			20 07	37.4	37	nla	n/a*
Van Buren	Lake Suge nrn	19 1770006	2005	32.9		11.8	
			2006	25.7		*9.9*	
			20 07	26.5	28	10.8	10.8
Woodbmy	Sioux City	1919300 *Ii*	2005	25.2		10. 6	
			20 06	29		10.3	
			2007	31.2	28	10.6	10.5

* **Annual Standard Not AppUcable**

** **EPA Data Substitu tion Technique s Used to Meet Completeness**

24-hom· Design Values Less **than 01· Equal** to **35 ug/m³ Indic ate Attainment with the 24-hour NAAQS.**

Annual Design Values Less than or **Equal** to **15.0 uglm³ Indica te Att ainment "1th** the **Annual NAAQS.**

Sitl"s **"ithout t>nough data** lo **calculatl" summary statistics haw bt>en excludt>d from Ibis 1·t>p0 r t.**

Web Resources

Calculation of the PM2.5 Design Values is treated in Appendix N of 40 CFR Pt. 50:

http://a257.g.akamaitech.net/7/257/2422/01jan20061800/edocket.access.gpo.gov/2006/pdf/06-8477.pdf

EPA's Design Value calculations for PM2.5 and other pollutants:

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

EPA's timeline for meeting the PM2.5 standards (page 21).

http://epa.gov/pm/pdfs/20061013_presentation.pdf

Historical Air Pollution Data for Iowa and Other States:

http://www.epa.gov/air/data/

Web links listed are as accessed on 9/15/2008.