Iowa Ambient Air Monitoring
2008 Network Plan

Iowa Department of Natural Resources
Air Quality Bureau

Table of Contents

Table of Contents

Introduction 1
Ozone Network Analysis 1
PM2.5 Network Analysis 1
PM10 Network Analysis 3
Sulfur Dioxide (SO2), Nitrogen Oxides (NO2), and Carbon Monoxide (CO) Network Analysis 3
Lead Network Analysis 3
Toxics Monitoring Network Analysis 3
Appendix A: 40 CFR Part 58 Requiring Annual Network Plans 5
Appendix B: Iowa Ambient Air Monitoring Locations 7
Appendix C: Iowa Ambient Air Monitors 9
Appendix D: Network Change Table 15
Appendix E: Iowa Ambient Air Monitoring Network Maps 16
Appendix F: Maps of Monitoring Locations in MSA's on the State Border 21
Appendix G: Design Value Maps for PM2.5 and Ozone 24
Appendix H: Highest PM10 values in 2005-2007 26
Appendix I: Census Bureau estimates for Iowa MSA's: 27
Appendix J: Population-Based Minimum Monitoring Requirements 28

Introduction

States and other agencies delegated to perform air monitoring under the Clean Air Act are required to examine their networks annually to insure that they meet federal requirements (Appendix A). These requirements include the number and type of monitors operated and the frequency of sampling. Certain monitors in the network, known as State and Local Air Monitoring Stations (SLAMS) generally represent long-term monitoring efforts, and discontinuing a SLAMS monitor requires concurrence from EPA. Special purpose monitors (SPM's) provide important additional air quality information; but these monitoring sites need not be permanent, and are highly dependent on available funding. Changes to the SPM network do not require concurrence from EPA.

One of the requirements of the annual network plan is to provide specific information for monitors that produce data that may be compared with federal air standards. This information, along with information concerning various types of monitors operated in the Iowa air monitoring network, is contained in Appendix C.

Ozone Network Analysis

EPA's population-based monitoring requirements for ozone are reproduced in Appendix J. These requirements apply to metropolitan statistical areas (MSA's) and depend on the population of the MSA (Appendix I) and the ozone levels monitored in or downwind of the MSA over the past three years (Appendix G). Based on this information, the minimum number of population-based SLAMS ozone monitors is indicated below:

MSA	Number of Monitors Required
Omaha-Council Bluffs, NE-IA	2
Des Moines-West Des Moines, IA	2
Davenport-Moline-Rock Island, IA-IL	2
Cedar Rapids, IA	1

In Iowa, there is one SLAMS monitor for the Omaha-Council Bluffs MSA, two SLAMS monitors for the Des Moines MSA, two SLAMS monitors for the Davenport-Moline-Rock Island MSA, and one SLAMS monitor for the Cedar Rapids MSA. The State of Iowa shares the responsibility for ozone monitoring in the Omaha-Council Bluffs MSA with Nebraska agencies, and in Davenport-Moline-Rock Island MSA with Illinois agencies (Appendix F). In 2007, three SLAMS ozone monitors were operated in Omaha, Nebraska, and one ozone monitor was operated in Rock Island, Illinois. Minimum population-based ozone monitoring requirements are satisfied for Iowa's MSA's, and the MSA's it shares with other states.

The total number of ozone monitoring sites needed to support the basic monitoring objectives of public data reporting, air quality mapping, compliance, and understanding ozone related atmospheric processes includes more sites than these minimum numbers. SLAMS ozone monitors sited to measure ozone background and transport are operated at Emmetsburg, Lake Sugema, and Viking Lake. Additional SLAMS monitors are located at Waverly (downwind of the Waterloo-Cedar Falls MSA) and at Clinton. There are no reductions to the SLAMS ozone monitoring network proposed prior to the submission of the next network plan.

SPM ozone monitors are listed in Appendix C. Changes to the SPM network that are expected to occur before the submission of the next network plan are indicated in Appendix D.

PM2.5 Network Analysis

EPA's population-based monitoring requirements for PM2.5 are contained in 40 CFR Pt 58, Appendix D (reproduced in Appendix J). These requirements apply to metropolitan statistical areas (MSA's) and depend on the population of the MSA (Appendix I) and the PM2.5 levels monitored in the MSA over the past three years (Appendix G). Based on this information, the minimum required number of population-based SLAMS PM2.5 monitors is indicated below:

MSA	Number of Monitors Required
Omaha-Council Bluffs, NE-IA	1
Des Moines-West Des Moines, IA	1
Davenport-Moline-Rock Island, IA-IL	1
Cedar Rapids, IA	0
Waterloo-Cedar Falls, IA	1
Iowa City, IA	1

Iowa operates one SLAMS PM2.5 monitor in Cedar Rapids, two in Des Moines, one in Davenport, one in Waterloo, and one in Iowa City. Iowa shares the responsibility for PM2.5 monitoring in the Omaha-Council Bluffs MSA with Nebraska agencies, and in the Davenport-Moline-Rock Island MSA with Illinois agencies (Appendix F). In 2007, four SLAMS PM2.5 monitoring sites were operated by Nebraska in the Omaha, Nebraska MSA; and one SLAMS PM2.5 monitor was operated by Illinois in the Davenport-Moline-Rock Island MSA (Appendix F).

In addition to population-based minimum requirements, 40 CFR Pt 58 also specifies that each state operate at least one PM2.5 monitor to measure background concentrations, and at least one site to measure regional transport of PM2.5. A SLAMS background monitor is located at Emmetsburg in northwest Iowa, and SLAMS transport monitors are located at Lake Sugema in Southeast Iowa and Viking Lake in Southwest Iowa.

In MSA's where a single PM2.5 monitor is required, 40 CFR Pt 58 requires that an additional continuous PM2.5 monitor is operated at same monitoring location. A continuous PM2.5 monitor for the Omaha-Council Bluffs MSA is operated by a Nebraska agency. Continuous PM2.5 monitors are currently operated in Des Moines and Davenport. To meet EPA's minimum monitoring requirements, continuous PM2.5 monitors would need to be installed at existing community-oriented manual sampling sites in Iowa City and Waterloo. Manual samplers in place at these locations are situated on roof tops, and it is Iowa's experience that it is not feasible to operate continuous PM2.5 samplers from rooftop locations. Iowa received EPA's approval to operate the required continuous PM2.5 samplers from climate controlled monitoring trailers at alternate community- oriented monitoring locations within these MSA's. In Waterloo, installation of the required continuous PM2.5 monitor is in progress. In Iowa City, final approval of a proposed monitoring location has not yet been granted. The Department intends to have these two sites operational before submission of the next monitoring plan.
With the addition of these continuous PM2.5 sites, Iowa's monitoring network will meet the minimum federal requirements.

40 CFR Pt 58 specifies that the minimum frequency for manual PM2.5 sampling at required SLAMS sites is one sample every three days. Required SLAMS sites with a 24-hour design value within 5% of the 24-hour PM2.5 NAAQS (34 $\mu g/m^3$ to 36 $\mu g/m^3$) must assume a daily sampling schedule. All PM2.5 samplers recording design values in this range are currently operating on a daily sampling schedule.

None of the five PM2.5 chemical speciation sites operated in Iowa have been designated as speciation trends network (STN) sites by EPA, and their continued operation is not required by 40 CFR Part 58.

The total number of PM2.5 monitoring sites needed to support the basic monitoring objectives of public data reporting, air quality mapping, compliance, and understanding PM2.5-related atmospheric processes includes more sites than these minimum numbers. Iowa's complete PM2.5 monitoring network is listed in Appendix C and displayed in Appendix E**.** Changes to monitors in the PM2.5 network that are expected to occur before the submission of the next network plan are detailed in Appendix D**.**

PM2.5 monitoring at sites near the Blackhawk Foundry in Davenport and at Chancy Park in Clinton have recorded elevated PM2.5 values relative to other PM2.5 monitors in Eastern Iowa. 40 CFR Part 58 indicates these population-oriented monitoring sites near industrial sources produce data that may be compared to the 24- hour PM2.5 NAAQS, but not to the annual PM2.5 NAAQS.

A review of the most recent (2005-2007) 24-hour design values indicates that monitoring locations near the Black Hawk Foundry in Davenport and at Garfield School in Muscatine exceed the 24-hour PM2.5 NAAQS. With EPA approval of this network plan, Department intends to add these SPM monitors to the SLAMS network on January 1, 2009.

PM10 Network Analysis

EPA's population-based monitoring requirements for PM10 are reproduced in Appendix J. These requirements apply to metropolitan statistical areas (MSA's) and depend on the population of the MSA (Appendix I) and PM10 levels in the MSA (Appendix H). Based on this information, the minimum numbers of population-based SLAMS PM10 monitors is indicated below:

MSA	Number of Monitors Required
Omaha-Council Bluffs, NE-IA	2-4
Des Moines-West Des Moines, IA	1-2
Davenport-Moline-Rock Island, IA-IL	1-2
Cedar Rapids, IA	0-1

The State of Iowa operates two SLAMS PM10 monitors in the Des Moines-West Des Moines MSA, and one in the Davenport-Moline-Rock Island MSA. Iowa shares the responsibility for PM10 monitoring in the Omaha- Council Bluffs MSA with Nebraska agencies, and in the Davenport-Moline-Rock Island MSA with Illinois agencies (Appendix F). In 2007, eight SLAMS PM10 sites were operated by Nebraska in the Omaha MSA; and no SLAMS PM10 monitors were operated by Illinois in the Davenport-Moline-Rock Island MSA.

In addition to these required population-based monitors, Iowa operates additional SLAMS monitors at source- oriented locations in Mason City, Davenport, and Buffalo, and at population-based locations in Cedar Rapids, Sioux City, and Waterloo. Additional PM10 SPM monitors are located at various locations across the state to support permitting activities and to compute background levels for air dispersion modeling. Iowa's PM10 monitoring network is listed in Appendix C and displayed in Appendix E**.** A SLAMS PM10 monitoring site at Lowell School in Sioux City will be discontinued before submission of the next network plan, as the school is scheduled to be closed at the end of May with demolition of the building shortly thereafter. Iowa intends to relocate the monitor to another school in the Sioux City area. There are no other reductions anticipated in the PM10 SLAMS monitoring network before the submission date of the next network plan. Changes to monitors in the PM10 SPM network that are expected to occur before the submission of the next network plan are indicated in Appendix D***.***

Sulfur Dioxide (SO2), Nitrogen Oxides (NO2), and Carbon Monoxide (CO) Network Analysis

There are currently no minimum requirements for the number of SO2, NO2, or CO monitors contained in 40 CFR Part 58. Iowa's SO2, NO2 and CO monitors are listed in the Appendix C and displayed at the locations indicated in Appendix E. EPA has encouraged states to use trace-level monitors at sites that have recorded pollutant levels that are much less than the NAAQS, and Iowa has deployed some trace level SO2 and CO monitors in its network. There are no planned reductions to the SLAMS monitoring network for these pollutants scheduled before submission of the next network plan. Changes to SPM monitors in the SO2, NO2 and CO network that are anticipated before the submission of the next network plan are indicated in Appendix D.

Lead Network Analysis

Iowa currently operates no lead monitors. There are no minimum requirements for the number of lead monitors contained in 40 CFR Part 58. The lead NAAQS, lead monitoring methods and network requirements for lead are currently under review by EPA; a final lead rule is expected before the next monitoring plan is due for submission.

Toxics Monitoring Network Analysis

Iowa currently operates three air toxics sites. There are no minimum requirements for the number of toxics sites contained in 40 CFR Part 58. Details concerning Iowa's air toxics network are contained in Appendix C and displayed in

Appendix E. No modifications to the air toxics network are anticipated before the submission of the next network plan.

Appendix A: 40 CFR Part 58 Requiring Annual Network Plans

§ 58.10 Annual monitoring network plan and periodic network assessment.

(a) (1) Beginning July 1, 2007, the State, or where applicable local, agency shall adopt and submit to the Regional Administrator an annual monitoring network plan which shall provide for the establishment and maintenance of an air quality surveillance system that consists of a network of SLAMS monitoring stations including FRM, FEM, and ARM monitors that are part of SLAMS, NCore stations, STN stations, State speciation stations, SPM stations, and/or, in serious, severe and extreme ozone nonattainment areas, PAMS stations, and SPM monitoring stations. The plan shall include a statement of purposes for each monitor and evidence that siting and operation of each monitor meets the requirements of appendices A, C, D, and E of this part, where applicable. The annual monitoring network plan must be made available for public inspection for at least 30 days prior to submission to EPA.

(2) Any annual monitoring network plan that proposes SLAMS network modifications including new monitoring sites is subject to the approval of the EPA Regional Administrator, who shall provide opportunity for public comment and shall approve or disapprove the plan and schedule within 120 days. If the State or local agency has already provided a public comment opportunity on its plan and has made no changes subsequent to that comment opportunity, and has submitted the received comments together with the plan, the Regional Administrator is not required to provide a separate opportunity for comment.

(3) The plan for establishing required NCore multipollutant stations shall be submitted to the Administrator not later than July 1, 2009. The plan shall provide for all required stations to be operational by January 1, 2011.

(b) The annual monitoring network plan must contain the following information for each existing and proposed site:

(1) The AQS site identification number.

(2) The location, including street address and geographical coordinates.

(3) The sampling and analysis method(s) for each measured parameter.

(4) The operating schedules for each monitor.

(5) Any proposals to remove or move a monitoring station within a period of 18 months following plan submittal.

(6) The monitoring objective and spatial scale of representativeness for each monitor as defined in appendix D to this part.

(7) The identification of any sites that are suitable and sites that are not suitable for comparison against the annual $PM_{2.5}$NAAQS as described in § 58.30.

(8) The MSA, CBSA, CSA or other area represented by the monitor.

(c) The annual monitoring network plan must document how States and local agencies provide for the review of changes to a $PM_{2.5}$monitoring network that impact the location of a violating $PM_{2.5}$monitor or the creation/change to a community monitoring zone, including a description of the proposed use of spatial averaging for purposes of making comparisons to the annual $PM_{2.5}$NAAQS as set forth in appendix N to part 50 of this chapter. The affected State or local agency must document the process for obtaining public comment and include any comments received through the public notification process within their submitted plan.

(d) The State, or where applicable local, agency shall perform and submit to the EPA Regional Administrator an assessment of the air quality surveillance system every 5 years to determine, at a minimum, if the network meets the monitoring objectives defined in appendix D to this part, whether new sites are needed, whether existing sites are no longer needed and can be terminated, and whether new technologies are appropriate for incorporation into the ambient air monitoring network. The network assessment must consider the ability of existing and proposed sites to support air quality characterization for areas with relatively high populations of susceptible individuals (e.g., children with asthma), and, for any sites that are being proposed for discontinuance, the effect on data users other than the agency itself, such as nearby States and Tribes or health effects studies. For $PM_{2.5}$, the assessment also must identify needed changes to population-oriented sites. The State, or where applicable local, agency must submit a copy of this 5-year assessment, along with a revised annual network plan, to the Regional Administrator. The first assessment is due July 1, 2010.

(e) All proposed additions and discontinuations of SLAMS monitors in annual monitoring network plans and periodic

network assessments are subject to approval according to § 58.14.

Appendix B: Iowa Ambient Air Monitoring Locations

City	Site	Address	County	MSA	Latitude	Longitude	AQS Site ID	Responsible Agency
Buffalo	Linwood Mining	11100 110th Ave	Scott	DMR	41.46724	-90.68845	191630017	DNR
Cedar Rapids	Army Reserve Center	1599 Wenig Rd NE	Linn	CDR	42.00506	-91.67924	191130037	Linn Local Prog.
	Kirkwood College	6301 Kirkwood Blvd SW	Linn	CDR	41.91040	-91.65146	191130028	Linn Local Prog.
	Scottish Rite Temple	616 A Ave	Linn	CDR	41.98300	-91.66479	191130031	Linn Local Prog.
	Public Health	500 11th St NW	Linn	CDR	41.97677	-91.68766	191130040	Linn Local Prog.
Clarion	Jannsen Farm	2446 Quincy Ave.	Wright	-	42.69539	-93.65598	191970004	DNR
Clinton	Chancy Park	23rd & Camanche	Clinton	-	41.82328	-90.21198	190450019	DNR
	Rainbow Park	2600 Roosevelt	Clinton	-	41.87500	-90.17757	190450021	DNR
Clive	Indian Hills Jr. High Sch.	9401 Indian Hills	Polk	DSM	41.60348	-93.74782	191532510	Polk Local Prog.
Coggon	Coggon Elementary Sch.	408 E Linn	Linn	CDR	42.28062	-91.52740	191130033	Linn Local Prog.
Council Bluffs	Franklin Sch.	3130 C Ave	Pottawattamie	OMC	41.26417	-95.89612	191550009	DNR
Davenport	Adams Sch.	3029 N Division	Scott	DMR	41.55001	-90.60012	191630018	DNR
	Black Hawk Foundry	300 Wellman	Scott	DMR	41.51777	-90.61876	191630019	DNR
	Jefferson Sch.	10th & Vine	Scott	DMR	41.53001	-90.58761	191630015	DNR
Des Moines	Health Dept.	1907 Carpenter	Polk	DSM	41.60313	-93.64323	191530030	Polk Local Prog.
Emmetsburg	Iowa Lakes Coll.	Iowa Lakes College	Palo Alto	-	43.12370	-94.69352	191471002	DNR
Indianola	Lake Ahquabi	1650 118th Ave	Warren	DSM	41.28543	-93.58401	191810022	Polk Local Prog.
Iowa City	Hoover Sch.	2200 E Court	Johnson	IAC	41.65723	-91.50348	191032001	DNR
Keokuk	Fire Station	111 S 13th	Lee	-	40.40096	-91.39101	191110008	DNR
Mason City	Holcim	17th & Washington	Cerro Gordo	-	43.16944	-93.20243	190330018	DNR
	Washington Sch.	700 N Washington	Cerro Gordo	-	43.15856	-93.20301	190330020	DNR
Muscatine	Garfield Sch.	1409 Wisconsin	Muscatine	-	41.40095	-91.06781	191390015	DNR
	Musser Park	Oregon & Earl Ave.	Muscatine	-	41.40780	-91.06265	191390020	DNR
Pisgah	Highway Maintenance	1575 Hwy 183	Harrison	OMC	41.78026	-95.94844	190851101	DNR
Sioux City	Lowell Sch.	27th & Morgan	Woodbury	SXC	42.51797	-96.38790	191930017	DNR
Slater	City Hall	105 Greene	Story	DSM	41.88294	-93.68793	191690011	Polk Local Prog.
Waterloo	Grout Museum	West Park & South	Black Hawk	WTL	42.49255	-92.34383	190130008	DNR
Waverly	Airport	Waverly Airport	Bremer	WTL	42.74119	-92.51284	190170011	Linn Local Prog.
-	Backbone State Park	Backbone State Park	Delaware	-	42.60082	-91.53849	190550001	DNR
-	Lake Sugema State Park	24430 Lacey Trail	Van Buren	-	40.69311	-92.00632	191770006	DNR

City	Site	Address	County	MSA	Latitude	Longitude	AQS Site ID	Responsible Agency
-	Scott County Park	Scott County Park	Scott	DMR	41.69917	-90.52194	191630014	DNR
-	Viking Lake State Park	2780 Viking Lake Road	Montgomery	-	40.96911	-95.04495	191370002	DNR

Site Table Definitions:
City – the city closest to the monitor location.
Site – the name of the monitoring site.
Address – an intersection or street address close to the monitoring site.
County – the county where the monitoring site resides.
MSA – Metropolitan Statistical Area. Iowa's Metropolitan Statistical Areas (MSA's) according to July, 2007 U.S. Census Bureau estimates:

U.S. Census Geographic area	Abbreviation
Omaha-Council Bluffs, NE-IA	OMC
Des Moines-West Des Moines, IA	DSM
Davenport-Moline-Rock Island, IA-IL	DMR
Cedar Rapids, IA	CDR
Waterloo-Cedar Falls, IA	WTL
Sioux City, IA-NE-SD	SXC
Iowa City, IA	IAC
Dubuque, IA	-
Ames, IA	-

From: http://www.census.gov/population/www/estimates/CBSA-est2007-annual.html Annual Estimates of the Population of Metropolitan and Micropolitan Statistical Areas: April 1, 2000 to July 1, 2007 (CBSA-EST2007-01)Source: Population Division, U.S. Census Bureau, Release Date: March 27, 2008

Maximum ozone concentrations are typically measured 10-30 miles downwind of an MSA. The site intended to record the maximum ozone concentration resulting from a given MSA may be located outside the MSA boundaries. Sites intended to measure background levels of pollutants for an MSA may also be located upwind and outside of that particular MSA.

Latitude – the latitude of a monitoring site**,** given in decimal degrees using the WGS (World Geodetic System) 84 datum.
Longitude – the longitude of a monitoring site, given in decimal degrees using the WGS (World Geodetic System) 84 datum.
AQS Site ID – The identifier of a monitoring site used in the US EPA Air Quality System (AQS) database. It has the form XX-XXX-XXXX where the first two digits specify the state (19 for Iowa), the next set of three digits the county, and the last four digits the site.
Responsible Agency – The agency responsible for performing ambient air monitoring at a monitoring site. The Polk County Local Program operates sites near Polk County. The Linn County Local Program operates sites near Linn County. The Department of Natural Resources (DNR) contracts with the University of Iowa Hygienic Lab (UHL) to operate monitoring sites not operated by the Polk or Linn County Local Programs.

Appendix C: Iowa Ambient Air Monitors

Site Name	Pollutants Measured	Monitor Type	Design Value	High Design Value?	Sampling Method	Analysis	Operating Schedule	Monitoring Objective	Spatial Scale	NAAQS Comparable?
Backbone State Park	PM2.5	SPM			Low Volume FRM	Gravimetric	1/3 Day	General/Background	Regional	Yes
Buffalo, Linwood Mining	PM10	SLAMS			Low Volume FRM	Gravimetric	Daily	Source Oriented	Middle	Yes
Cedar Rapids, Army Reserve Center	PM10	SLAMS			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Cedar Rapids, Army Reserve Center	PM2.5	SLAMS	29	No	Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Cedar Rapids, Army Reserve Center	PM2.5	Supplemental Speciation			PM 2.5 Speciation	STN Protocol	1/6 Day	Population Exposure	Neighborhood	No
Cedar Rapids, Kirkwood College	Ozone	SPM	71	Yes	UV Absorbtion		Continuous	Transport	Urban	Yes
Cedar Rapids, Public Health	CO	SPM			Non-Dispersive Infrared		Continuous	Population Exposure	Neighborhood	No
Cedar Rapids, Public Health	Filter SO4	SPM			Low Volume	Ion Chromatography	1/3 Day	Population Exposure	Neighborhood	No
Cedar Rapids, Public Health	PM2.5	SPM			Low Volume FRM	Gravimetric	Daily	Population Exposure	Neighborhood	Yes
Cedar Rapids, Public Health	PM2.5	SLAMS			Continuous PM2.5		Continuous	Population Exposure	Neighborhood	No
Cedar Rapids, Public Health	SO2	SPM			UV Fluorescent		Continuous	Population Exposure	Neighborhood	Yes
Cedar Rapids, Public Health	SO4	SPM			UV Fluorescent		Continuous	Population Exposure	Neighborhood	No
Cedar Rapids, Public Health	Toxics	SPM			Cannister	TO-15, GC-FID	1/12 Day	Population Exposure	Neighborhood	No
Cedar Rapids, Public Health	Toxics	SPM			Cartridge	TO-11A	1/12 Day	Population Exposure	Neighborhood	No
Cedar Rapids, Scottish Rite Temple	SO2	SPM			UV Fluorescent		Continuous	Source Oriented	Middle	Yes
Clarion, Jannsen Farm	PM2.5	SPM	29	No	Low Volume FRM	Gravimetric	1/3 Day	Source Oriented	Neighborhood	Yes
Clinton, Chancy Park	PM2.5	SPM			Low Volume FRM	Gravimetric	Daily	Source Oriented	Middle	24 Hour Only
Clinton, Chancy Park	SO2	SPM			UV Fluorescent		Continuous	Source Oriented	Middle	Yes
Clinton, Rainbow Park	Ozone	SLAMS	72	Yes	UV Absorbtion		Continuous	Population Exposure	Urban	Yes
Clinton, Rainbow Park	PM2.5	SPM	32	Yes	Low Volume FRM	Gravimetric	Daily	Population Exposure	Neighborhood	Yes
Clinton, Rainbow Park	PM2.5	SPM			Continuous PM2.5		Continuous	Population Exposure	Neighborhood	No
Clive, Indian Hills Jr. High Sch.	PM10	SLAMS			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Clive, Indian Hills Jr. High Sch.	PM2.5	SLAMS			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Coggon, Coggon Elementary Sch.	Ozone	SLAMS	70	Yes	UV Absorbtion		Continuous	Max Ozone Conc.	Urban	Yes
Council Bluffs, Franklin Sch.	PM10	SPM			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Council Bluffs, Franklin Sch.	PM2.5	SPM	29	No	Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Davenport, Adams Sch.	PM10	SPM			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Davenport, Adams Sch.	PM2.5	SPM	32	Yes	Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Davenport, Blackhawk Foundry	PM10	SLAMS			Low Volume FRM	Gravimetric	1/3 Day	Source Oriented	Middle	Yes
Davenport, Blackhawk Foundry	PM2.5	SPM	37	Yes	Low Volume FRM	Gravimetric	Daily	Source Oriented	Middle	24 Hour Only
Davenport, Blackhawk Foundry	PM2.5	SPM			Continuous PM2.5		Continuous	Source Oriented	Middle	No
Davenport, Jefferson Sch.	CO	Proposed NCORE			Non-Dispersive Infrared		Continuous	Population Exposure	Neighborhood	No
Davenport, Jefferson Sch.	NO2	Proposed NCORE			Chemiluminescence		Continuous	Population Exposure	Neighborhood	Yes
Davenport, Jefferson Sch.	NO3	SPM			Low Volume	Ion Chromatography	1/3 Day	Population Exposure	Neighborhood	No
Davenport, Jefferson Sch.	NO3	SPM			Chemiluminescence		Continuous	Population Exposure	Neighborhood	No
Davenport, Jefferson Sch.	Ozone	SLAMS			UV Absorbtion		Continuous	Population Exposure	Urban	Yes
Davenport, Jefferson Sch.	PM10	Proposed NCORE			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Davenport, Jefferson Sch.	PM2.5	SLAMS	31	Yes	Low Volume FRM	Gravimetric	Daily	Population Exposure	Neighborhood	Yes
Davenport, Jefferson Sch.	PM2.5	SLAMS			Continuous PM2.5		Continuous	Population Exposure	Neighborhood	No
Davenport, Jefferson Sch.	PM2.5	Supplemental Speciation			PM 2.5 Speciation	STN Protocol	1/3 Day	Population Exposure	Neighborhood	No
Davenport, Jefferson Sch.	SO2	Proposed NCORE			UV Fluorescent		Continuous	Population Exposure	Urban	Yes
Davenport, Jefferson Sch.	SO4	SPM			Low Volume	Ion Chromatography	1/3 Day	Population Exposure	Neighborhood	No
Davenport, Jefferson Sch.	SO4	SPM			UV Fluorescent		Continuous	Population Exposure	Neighborhood	No
Davenport, Jefferson Sch.	Toxics	SPM			Cannister	TO-15, GC-FID	1/12 Day	Population Exposure	Neighborhood	No
Davenport, Jefferson Sch.	Toxics	SPM			Cartridge	TO-11A	1/12 Day	Population Exposure	Neighborhood	No

Site Name	Pollutants Measured	Monitor Type	Design Value	High Design Value?	Sampling Method	Analysis	Operating Schedule	Monitoring Objective	Spatial Scale	NAAQS Comparable?
Des Moines, Health Dept.	CO	Proposed NCORE			Non-Dispersive Infrared		Continuous	Population Exposure	Neighborhood	No
Des Moines, Health Dept.	NO2	Proposed NCORE			Chemiluminescence		Continuous	Population Exposure	Neighborhood	Yes
Des Moines, Health Dept.	Ozone	SLAMS			UV Absorbtion		Continuous	Population Exposure	Urban	Yes
Des Moines, Health Dept.	PM10	SLAMS			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Des Moines, Health Dept.	PM2.5	SLAMS			Low Volume FRM	Gravimetric	Daily	Population Exposure	Neighborhood	Yes
Des Moines, Health Dept.	PM2.5	SLAMS			Continuous PM2.5		Continuous	Population Exposure	Neighborhood	No
Des Moines, Health Dept.	PM2.5	Supplemental Speciation			PM 2.5 Speciation	STN Protocol	1/6 Day	Population Exposure	Neighborhood	No
Des Moines, Health Dept.	SO2	Proposed NCORE			UV Fluorescent		Continuous	Population Exposure	Urban	Yes
Des Moines, Health Dept.	Toxics	SPM			Cannister	TO-15, GC-FID	1/12 Day	Population Exposure	Neighborhood	No
Des Moines, Health Dept.	Toxics	SPM			Cartridge	TO-11A	1/12 Day	Population Exposure	Neighborhood	No
Emmetsburg, Iowa Lakes Coll.	Ozone	SLAMS	62	No	UV Absorbtion		Continuous	Regional Transport	Regional	Yes
Emmetsburg, Iowa Lakes Coll.	PM10	SPM			Low Volume FRM	Gravimetric	1/3 Day	General/Background	Regional	Yes
Emmetsburg, Iowa Lakes Coll.	PM2.5	SLAMS	26	No	Low Volume FRM	Gravimetric	1/3 Day	General/Background	Regional	Yes
Emmetsburg, Iowa Lakes Coll.	PM2.5	SPM			Continuous PM2.5		Continuous	Regional Transport	Regional	No
Indianola, Lake Ahquabi	Ozone	SPM	68	Yes	UV Absorbtion		Continuous	Upwind Background	Regional	Yes
Iowa City, Hoover Sch.	PM10	SPM			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Iowa City, Hoover Sch.	PM2.5	SLAMS	34	Yes	Low Volume FRM	Gravimetric	Daily	Population Exposure	Neighborhood	Yes
Keokuk, Fire Station	PM2.5	SPM			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Lake Sugema State Park	IMPROVE	IMPROVE			IMPROVE Sampler	IMPROVE Protocol	1/3 Day	Visibility/Regional Haze	Regional	No
Lake Sugema State Park	Ozone	SLAMS	69	Yes	UV Absorbtion		Continuous	Regional Transport	Regional	Yes
Lake Sugema State Park	PM10	SPM			Low Volume FRM	Gravimetric	1/3 Day	General/Background	Regional	Yes
Lake Sugema State Park	PM2.5	SLAMS	28	No	Low Volume FRM	Gravimetric	1/3 Day	Regional Transport	Regional	Yes
Lake Sugema State Park	PM2.5	SPM			Continuous PM2.5		Continuous	Regional Transport	Regional	No
Lake Sugema State Park	SO2	SPM			UV Fluorescent		Continuous	General/Background	Regional	Yes
Mason City, Holcim	PM10	SLAMS			Low Volume FRM	Gravimetric	Daily	Source Oriented	Middle	Yes
Mason City, Holcim	SO2	SPM			UV Fluorescent		Continuous	Source Oriented	Middle	Yes
Mason City, Washington Sch.	PM10	SPM			Low Volume FRM	Gravimetric	1/2 Day	Population Exposure	Neighborhood	Yes
Muscatine, Garfield Sch.	PM10	SPM			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Muscatine, Garfield Sch.	PM2.5	SPM	36	Yes	Low Volume FRM	Gravimetric	Daily	Population Exposure	Neighborhood	Yes
Muscatine, Musser Park	SO2	SLAMS			UV Fluorescent		Continuous	Source Oriented	Middle	Yes
Pisgah, Highway Maintenance	Ozone	SLAMS	74	Yes	UV Absorbtion		Continuous	Max Ozone Conc.	Urban	Yes
Scott County Park	Ozone	SLAMS	69	Yes	UV Absorbtion		Continuous	Max Ozone Conc.	Urban	Yes
Sioux City, Lowell Sch.	PM10	SLAMS			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Sioux City, Lowell Sch.	PM2.5	SPM	28	No	Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Slater, City Hall	Ozone	SLAMS	66	Yes	UV Absorbtion		Continuous	Max Ozone Conc.	Urban	Yes
Viking Lake State Park	IMPROVE	IMPROVE			IMPROVE Sampler	IMPROVE Protocol	1/3 Day	Visibility/Regional Haze	Regional	No
Viking Lake State Park	Ozone	SLAMS	68	Yes	UV Absorbtion		Continuous	Regional Transport	Regional	Yes
Viking Lake State Park	PM10	SPM			Low Volume FRM	Gravimetric	1/3 Day	General/Background	Regional	Yes
Viking Lake State Park	PM2.5	SLAMS	28	No	Low Volume FRM	Gravimetric	1/3 Day	Regional Transport	Regional	Yes
Viking Lake State Park	PM2.5	SPM			Continuous PM2.5		Continuous	Regional Transport	Regional	No
Waterloo, Grout Museum	PM10	SLAMS			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Waterloo, Grout Museum	PM2.5	SLAMS	30	Yes	Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Waverly, Airport	Ozone	SLAMS	67	Yes	UV Absorbtion		Continuous	Max Ozone Conc.	Urban	Yes

Monitor Table Definitions:

Site Name – a combination of the city and site name from the previous table

Pollutants Measured – indicates the pollutant, or set of pollutants, measured by each monitor

- CO – carbon monoxide
- IMPROVE - Interagency Monitoring of Protected Visual Environments; a federal program to protect visibility in national parks
- IMPROVE speciation – a speciation monitor and suite of lab analysis procedures developed by the IMPROVE program to identify and quantify the chemical components of PM2.5
- NO2 – nitrogen dioxide
- NO3 – the nitrate anion
- Ozone – an unstable molecule consisting of three oxygen atoms
- PM10 – particles with a diameter of 10 micrometers or less
- PM2.5 – particles with a diameter of 2.5 micrometers or less, also known as "fine particles".
- PM2.5 speciation – a speciation monitor and suite of lab analysis procedures developed by EPA for their national speciation trends network (STN), to identify and quantify the chemical components of PM2.5
- SO2 – sulfur dioxide
- SO4 – the sulfate anion
- Toxics – sampling that quantifies volatile organic compounds (VOC's), and carbonyls, including some known urban air toxics
- Visibility – the distance at which a distant object can be seen

Monitor Type – This column indicates how the monitor is classified in the AQS database.

- IMPROVE – a speciation monitor developed by the IMPROVE program to identify and quantify the chemical components of PM2.5.
- Nephelometer – a type of instrument that measures visibility by light scattering.
- Proposed NCORE – monitors operated at a site which has been proposed for inclusion in EPA's national network of long term multi-pollutant sites (NCORE).
- SLAMS – State and Local Air Monitoring Stations. SLAMS make up the ambient air quality monitoring sites that are primarily needed for NAAQS comparisons, but may serve other data purposes. SLAMS exclude special purpose monitor (SPM) stations and include NCore, and all other State or locally operated stations that have not been designated as SPM stations.
- SPM – means a monitor that is designated as a special purpose monitor in the monitoring network plan and in EPA's AQS database, and which does not count when showing compliance with minimum SLAMS requirements for monitor numbers and siting.
- Supplemental Speciation – a speciation site with monitors that are operated according to STN protocols, but not contained in the STN Network.

Design Value – A design value is a number computed from monitoring data (see 40 CFR Part 50, Appendix N) that is used to compare air quality at the site to the National Ambient Air Quality Standards (NAAQS).

High Design Value? – A "Yes" in this column indicates that the design value is within 85% of the NAAQS. For PM2.5, 24 hour design values of 30 $\mu g/m^3$ or greater are considered greater than or equal to 85% of the 24- hour NAAQS (35 $\mu g/m^3$). EPA lowered the ozone NAAQS from 84 to 75 ppb. For ozone, 8 hour design values of 64 ppb are considered greater than or equal to 85% of the 8 hour NAAQS (75 ppb).

Sampling Method – Indicates how the sample is collected. This column also shows how the sample is analyzed, if it is analyzed on site at the time of collection.

- Continuous PM2.5- a monitor that reports PM2.5 levels in real time. Continuous PM2.5 monitors typically have three components: a size selective inlet (cyclone) that knocks out all but the fine particles, a conditioning system that rapidly dries the fine particles, and a mass measurement system that determines the mass of the

conditioned sample. The two types of continuous PM2.5 monitors currently used in the Iowa Network are the PM2.5 FDMS (FDMS=Filter Dynamic Measurement System) and the PM2.5 BAM (BAM=Beta Attenuation Monitor).

  - PM2.5 FDMS – a continuous fine particle monitor that that uses a heater and dehumidifier to condition fine particles and a microbalance ("or TEOM"-see definition below) to perform mass measurements. This type of monitor corrects for volatization losses during sampling by measuring the change in the mass of the fine particles collected on the sampling filter after the fine particle flow is switched off.
  - PM2.5 BAM- A continuous fine particle monitor that conditions particles using a heater that is actuated when the relative humidity exceeds 35%. Mass measurements are made by measuring the attenuation of beta particles caused by a spot of fine particles collected on a sampling tape during the sampling period.

- Canister – Specially treated stainless steel canisters are used to collect VOC's.
- Cartridge – A 2,4-Dinitrophenylhydrazine (DNPH) cartridge is used to collect toxics that contain a carbonyl group.
- Chemiluminescence – When a nitric oxide (NO) molecule collides with an ozone molecule, a nitrogen dioxide (NO2) molecule and an oxygen (O2) molecule result. The NO2 molecule is in an excited state, and subsequently emits infrared light that can be measured by a photomultiplier tube. This property is the basis of the analytical method used to quantify NO. To measure NO2, the NO2 must first be converted to NO using a heated molybdenum converter. To measure Nitrate, the collected particulate is heated rapidly, and the vaporization/decomposition process converts the particulate nitrate contained in the collected sample to nitrogen oxides, which are quantified by the chemiluminescence method.
- IMPROVE Sampler – See IMPROVE in the "Pollutants Measured" section above.
- Low Volume – a sampler that uses a flow of 16.67 liters per minute.
- Low Volume FRM – a sampler that uses a flow of 16.67 liters per minute, which has been designated as a Federal Reference Method.
- Non-Dispersive Infrared – Carbon Monoxide absorbs infrared radiation; this property is the basis of the analytical method used by continuous CO monitors to quantify CO concentrations.
- PM2.5 Speciation – See PM2.5 Speciation in the "Pollutants Measured" section above.
- TEOM – Gravimetric – particulate laden air is drawn through a filter attached to an oscillating glass tube (Tapered Element Oscillating Microbalance). The frequency of oscillation is used to establish the mass of the particulate on the filter.
- UV Absorption – Ozone absorbs ultraviolet light; this property is the basis of the analytical method used by continuous ozone monitors to quantify ozone concentrations.
- UV Fluorescent – When excited by ultraviolet light, SO2 molecules emit light at a lower frequency that may be detected by a photomultiplier tube. This property is the basis for the analytical method used for both continuous SO2 gas analyzers, as well as continuous particulate sulfate monitors. In the latter case, sulfate particles are first converted to SO2 gas.

Analysis – indicates the method of post-collection analysis that is done in a lab environment.

- Gravimetric – A filter is weighed before and after collecting a particulate sample.
- IMPROVE Protocol – This protocol uses a suite of analytical procedures (X-Ray Fluorescence, Ion Chromatography, and Thermal Optical Reflectance) to identify and quantify the components of PM2.5. See http://vista.cira.colostate.edu/improve/ for further details.
- Ion Chromatography – a liquid chromatography method used to analyze the extract from filters for the nitrate and sulfate anion.
- STN Protocol – refers to the EPA's speciation trends network protocol. This protocol uses a suite of analytical procedures, such as X-Ray Fluorescence, and Ion Chromatography, to identify and quantify the components of PM2.5. Although the EPA's STN program has historically used the Thermal Optical Transmission method for carbon measurements, this method is in the process of being phased out across the national network, and should be replaced by the Thermal Optical Reflectance method in the next one or two years. See http://www.epa.gov/ttn/amtic/speciepg.html for further details.
- TO-11A – an EPA protocol in which carbonyl cartridge extracts are analyzed using High Performance Liquid Chromatography and an ultraviolet detector.

- TO-15, GC-FID – These analysis methods are used for air samples collected in specially treated stainless steel canisters. EPA protocol TO-15 is used for UATMP (Urban Air Toxics Monitoring Program) compounds. According to method TO-15, toxic gases are separated with a gas chromatograph, and quantified by a mass spectrometer (GCMS). The SNMOC (Speciated Non- Methane Organic Carbon) pollutants are also separated by a gas chromatograph, but are quantified by a flame ionization detector (GC-FID).

Operating Schedule – Continuous monitors run constantly and measure hourly average concentrations in real time. Manual samplers, such as PM filter samplers or toxics samplers, collect a single 24 hour sample from midnight to midnight on a particular day, which is quantified later in an analytical laboratory. A fractional (e.g. 1/3, 1/6, and 1/12) schedule for a manual samplers refers to collecting a sample every third, sixth, and twelfth day, respectively. Ozone monitors in Iowa are operated only during ozone season (April to October) when higher temperatures favor ozone formation. Cartridges for toxic carbonyl compounds are normally collected every twelfth day, but the schedule is accelerated to 1/6 days during ozone season.

Monitoring Objective – the primary reason a monitor is operated at a particular location.

- General Background – The objective is to establish the background levels of a pollutant.
- Highest Conc. – The objective is to measure at a site where the concentration of the pollutant is highest.
- Max. Ozone Conc. – The objective is to record the maximum ozone concentration. Because ozone is a secondary pollutant, ozone concentrations are typically highest 10-30 miles downwind of an urban area.
- Population Exposure – The objective is to monitor the exposure of individuals in the area represented by the monitor.
- Regional Transport – The objective is to assess the extent to which pollutants are transported between two regions that are separated by tens to hundreds of kilometers.
- Source Oriented – The objective is to determine the impact of a nearby source.
- Transport – The objective is to assess the extent to which pollutants are transported from one location to another.
- Upwind Background – The objective is to establish the background levels of a pollutant, typically upwind of a source or urban area.

Spatial Scale – The scale of representativeness is described in terms of the physical dimensions of the air parcel nearest to a monitoring site throughout which actual pollutant concentrations are reasonably similar. Monitors are classified according to the largest applicable scale below:

- Microscale - defines the concentrations in air volumes associated with area dimensions ranging from several meters up to about 100 meters.
- Middle scale - defines the concentration typical of areas up to several city blocks in size with dimensions ranging from about 100 meters to 0.5 kilometer.
- Neighborhood scale - defines concentrations within some extended area of the city that has relatively uniform land use with dimensions in the 0.5 to 4.0 kilometers range. The neighborhood and urban scales listed below have the potential to overlap in applications that concern secondarily formed or homogeneously distributed air pollutants.
- Urban scale - defines concentrations within an area of city-like dimensions, on the order of 4 to 50 kilometers. Within a city, the geographic placement of sources may result in there being no single site that can be said to represent air quality on an urban scale.
- Regional scale - defines a usually a rural area of reasonably homogeneous geography without large sources, and extends from tens to hundreds of kilometers.

NAAQS Comparable?

This column shows whether the data from the monitor can be compared to the National Ambient Air Quality Standards (NAAQS). Entries under this column are Yes, No, and 24 Hour Only. For a monitor's data to be eligible for comparison against the NAAQS, the type of monitor used must be defined as a federal reference method or federal equivalent method by EPA.

EPA is currently in the process of evaluating several types of continuous PM2.5 monitors to see if the data they produce,

when the monitors are configured in well-defined ways, and operated under a specific set operational protocols, is sufficiently close to FRM data to allow the monitors to be certified as federal equivalent methods (FEMs). The continuous monitors currently used in the Iowa network are not FEMs, but the status of these continuous monitors could change within the planning period.

For PM2.5, there is both an annual and a 24 hour NAAQS. To be comparable to either PM2.5 NAAQS a site must be population-oriented. In 40 CFR Part 58, EPA defines a population-oriented monitoring as follows:

Population-oriented monitoring (or sites) means residential areas, commercial areas, recreational areas, industrial areas where workers from more than one company are located, and other areas where a substantial number of people may spend a significant fraction of their day.

Following this definition, all PM2.5 monitoring sites in Iowa are population-oriented.

In a populated area near an industrial source, monitoring data may only be comparable to the 24 hour PM2.5 NAAQS; According to Subpart D of 40 CFR Part 58:

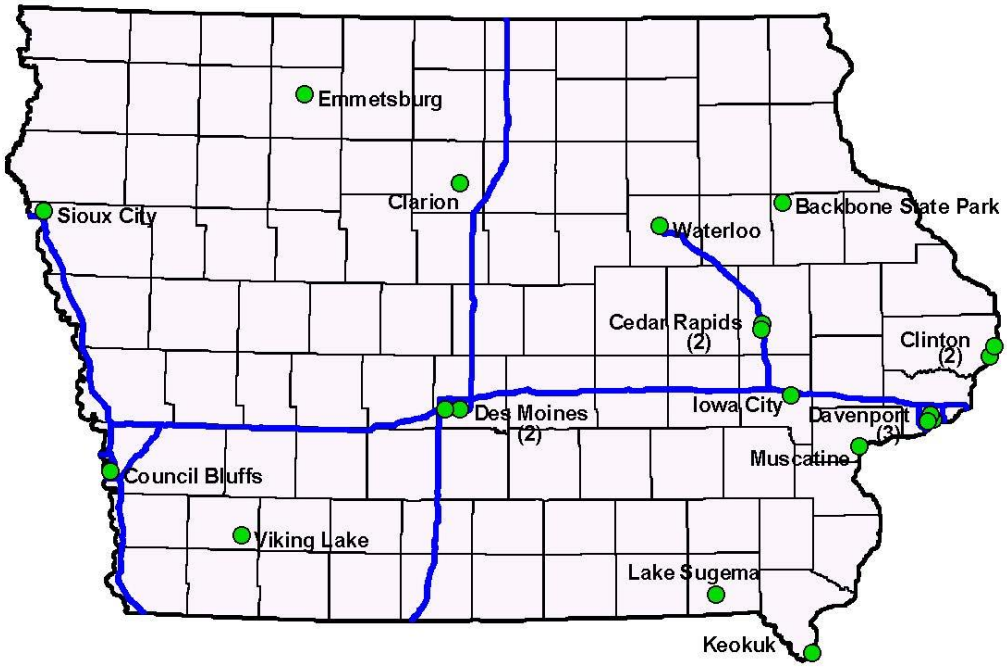
PM2.5 data that are representative, not of areawide but rather, of relatively unique population-oriented microscale, or localized hot spot, or unique population-oriented middle-scale impact sites are only eligible for comparison to the 24-hour PM2.5 NAAQS. For example, if the PM2.5 monitoring site is adjacent to a unique dominating local PM2.5 source or can be shown to have average 24-hour concentrations representative of a smaller than neighborhood spatial scale, then data from a monitor at the site would only be eligible for comparison to the 24-hour PM2.5 NAAQS.

Appendix D: Network Change Table

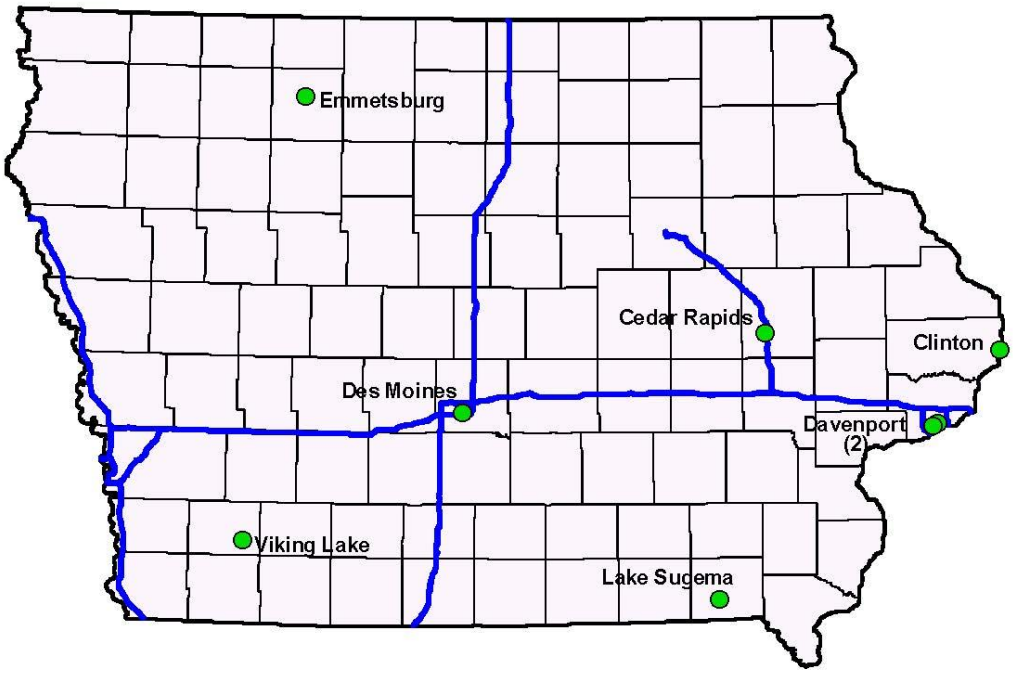
Site Name	Pollutant	Monitor Type	Sampling Method	Analysis	NAAQS Comparable?	Operating Schedule	Action
Backbone State Park	PM2.5	SPM	Low Volume FRM	Gravimetric	Yes	1/3	Deletion
Backbone State Park	PM10	SPM	Low Volume FRM	Gravimetric	Yes	1/3	Addition
Cedar Rapids, Public Health	Ozone	SPM	UV Absorption		Yes	Seasonal Continuous	Addition
Clinton, Chancy Park	PM2.5	SPM	Continuous		No	Continuous	Addition
Iowa City, New Site	PM2.5	SPM	Low Volume FRM	Gravimetric	Yes	Daily	Addition
Iowa City, New Site	PM2.5	SPM	Continuous		No	Continuous	Addition
Loess Hills, New Site	Ozone	SPM	UV Absorption		Yes	Continuous	Addition
Meskwaki Settlement, New Site	PM2.5	SPM	Low Volume FRM	Gravimetric	Yes	1/3	Addition
Mason City, 17th and Washington	SO2	SPM	UV Fluorescent		Yes	Continuous	Deletion
Muscatine, New Site	PM2.5	SPM	Low Volume FRM	Gravimetric	Yes	1/3	Addition
Muscatine, New Site	PM2.5	SPM	Continuous		No	Continuous	Addition
Sioux City, Lowell School	PM10	SLAMS	Low Volume FRM	Gravimetric	Yes	1/ 3	Deletion
Sioux City, Lowell School	PM2.5	SPM	Low Volume FRM	Gravimetric	Yes	1 / 3	Deletion
Sioux City, New Site	PM10	SLAMS	Low Volume FRM	Gravimetric	Yes	1 / 3	Addition
Sioux City, New Site	PM2.5	SPM	Low Volume FRM	Gravimetric	Yes	1/ 3	Addition
Waterloo, Water Tower	PM2.5	SPM	Low Volume FRM	Gravimetric	Yes	Daily	Addition
Waterloo, Water Tower	PM2.5	SPM	Continuous		No	Continuous	Addition

Appendix E: Iowa Ambient Air Monitoring Network Maps

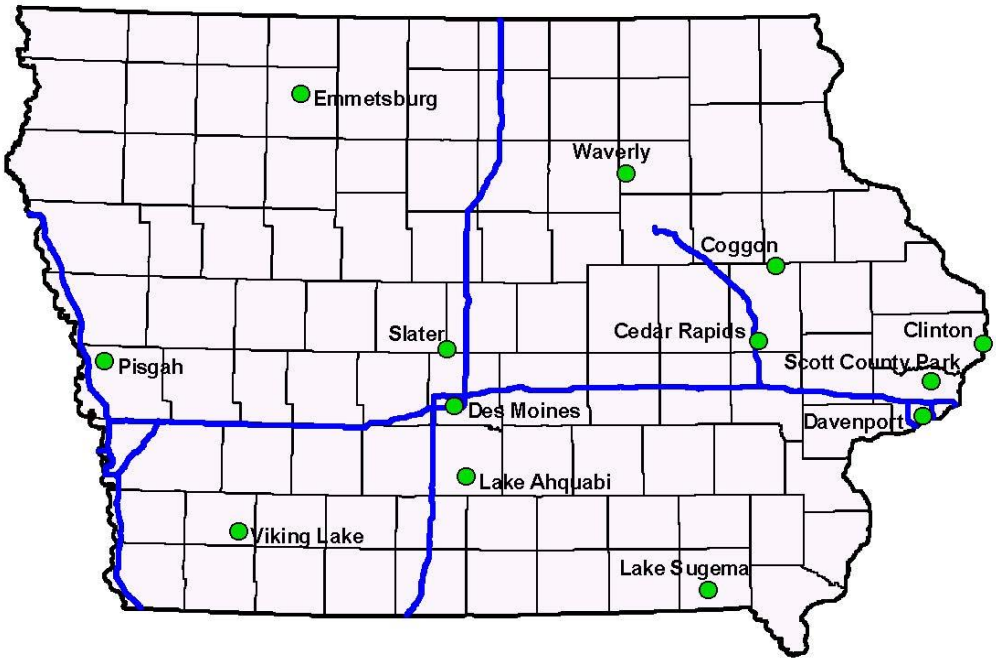
The following maps show the locations for the criteria pollutant monitors in the state of Iowa, which are current as of June 30th, 2008. Non-criteria pollutant maps are also included for the continuous PM2.5 monitoring network and the Toxics and Speciation monitoring networks.



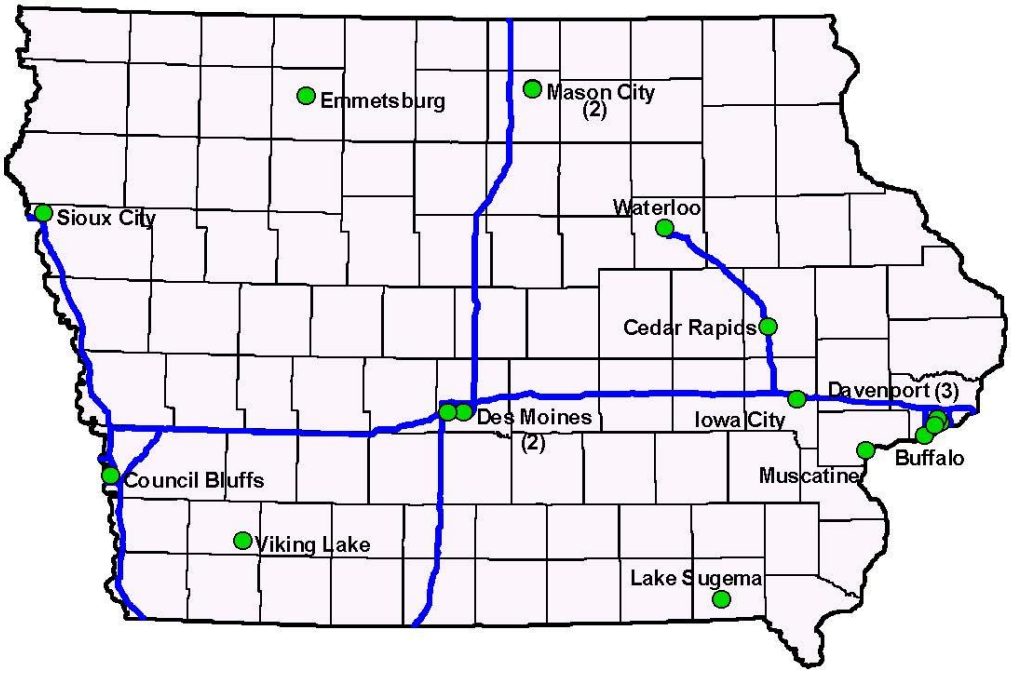
Manual PM2.5 (FRM) Monitoring Sites



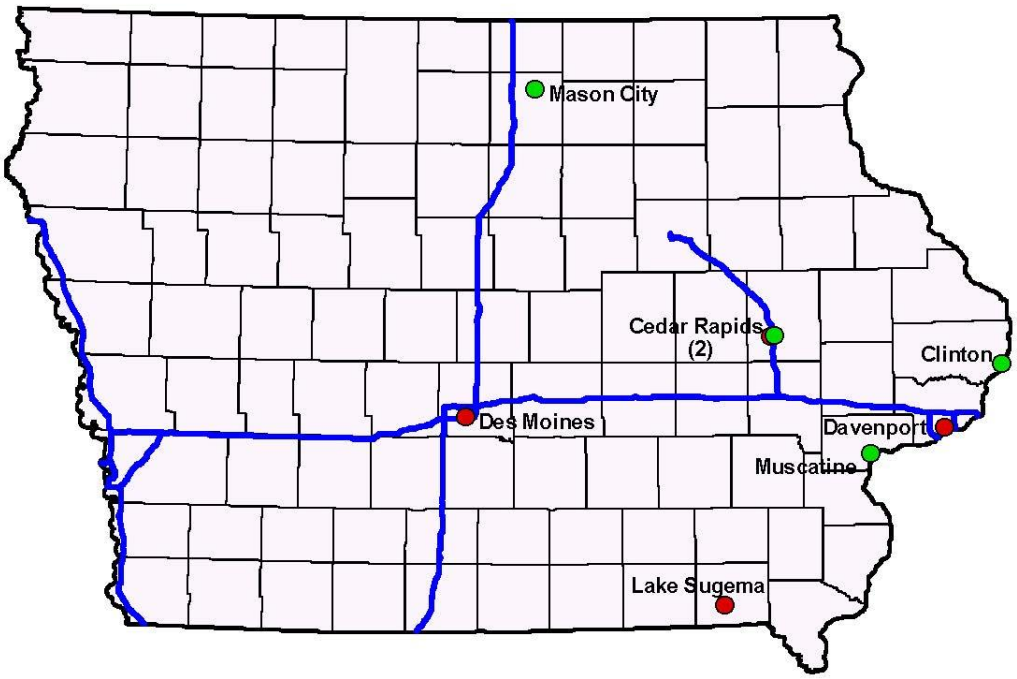
Continuous PM2.5 (non-FRM) Monitoring Sites



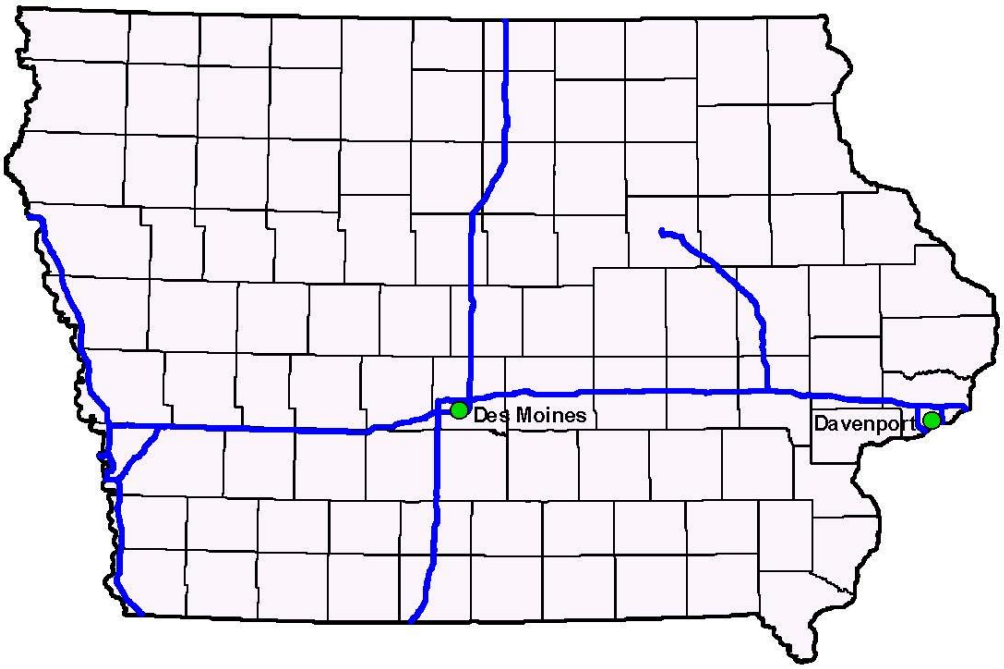
Ozone Monitoring Sites



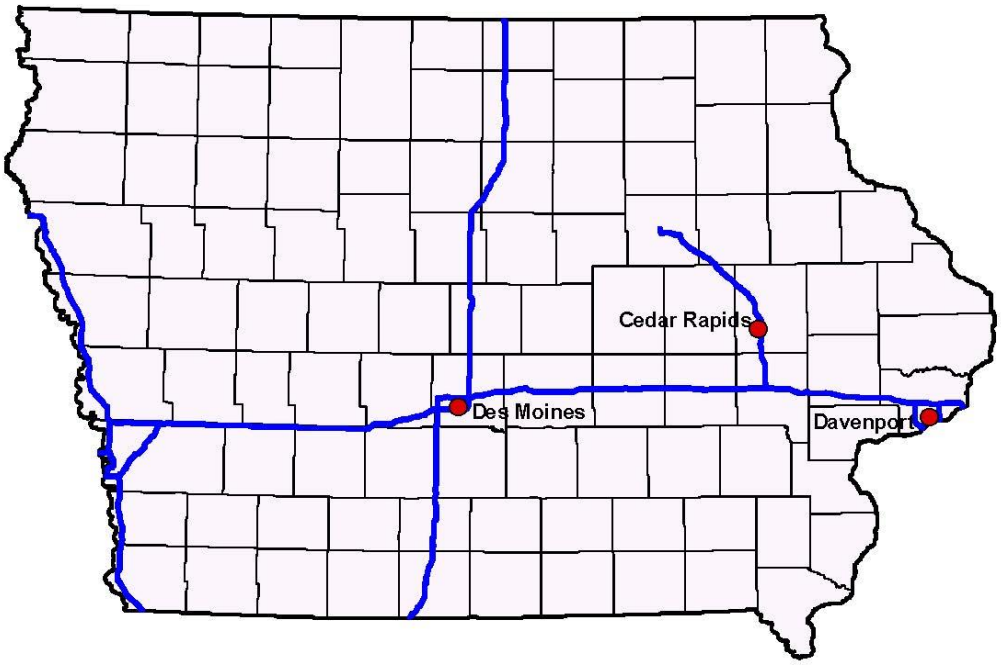
PM10 Monitoring Sites



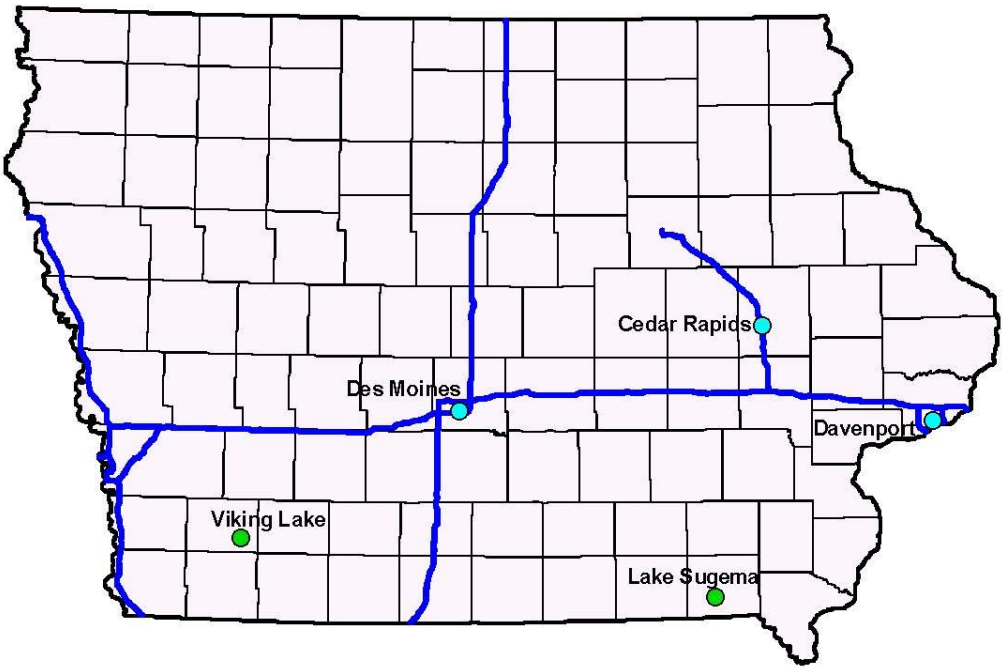
SO2 Monitoring Sites; trace-level monitors are shown in red, ordinary SO2 monitors are shown in green.



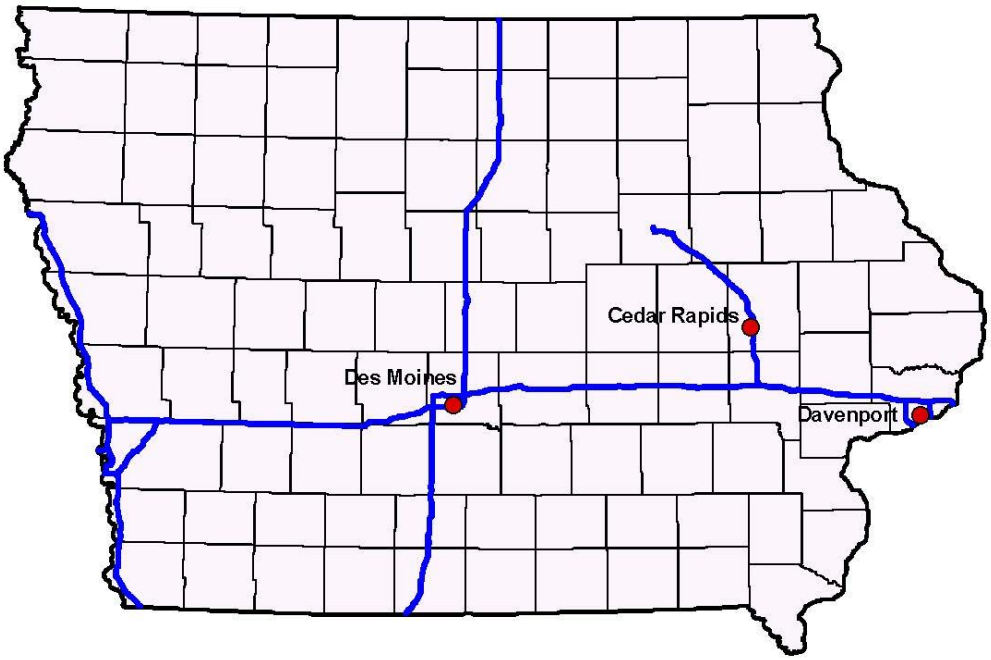
NO2 Monitoring Sites



CO Monitoring Sites (Trace Level)



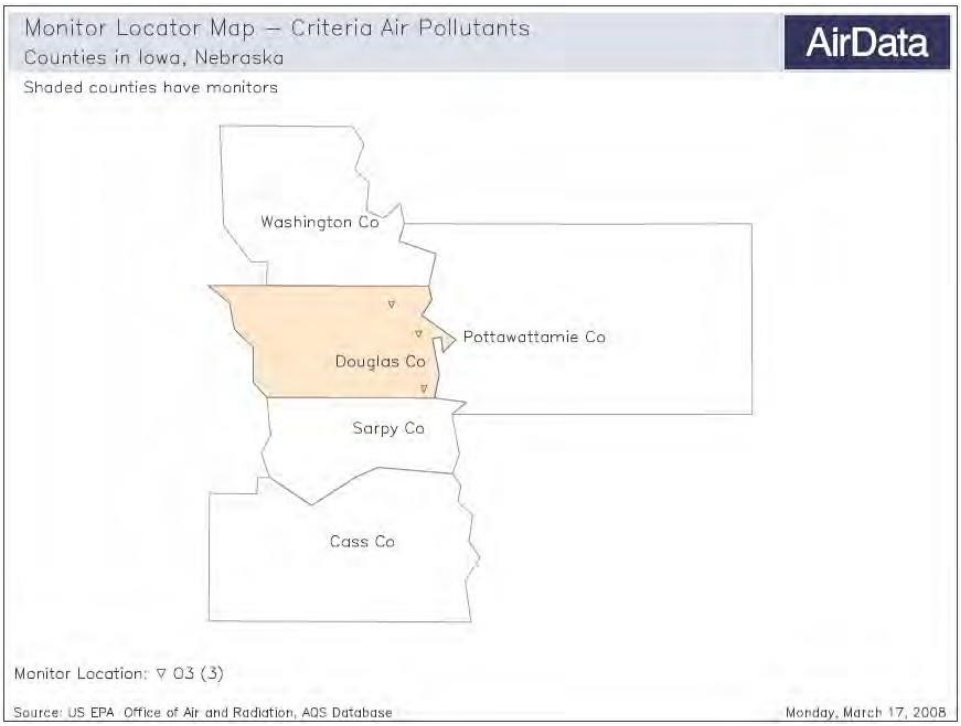
Speciation Monitors; STN Speciation samplers are located at the blue dots, IMPROVE speciation samplers are located at the green dots.



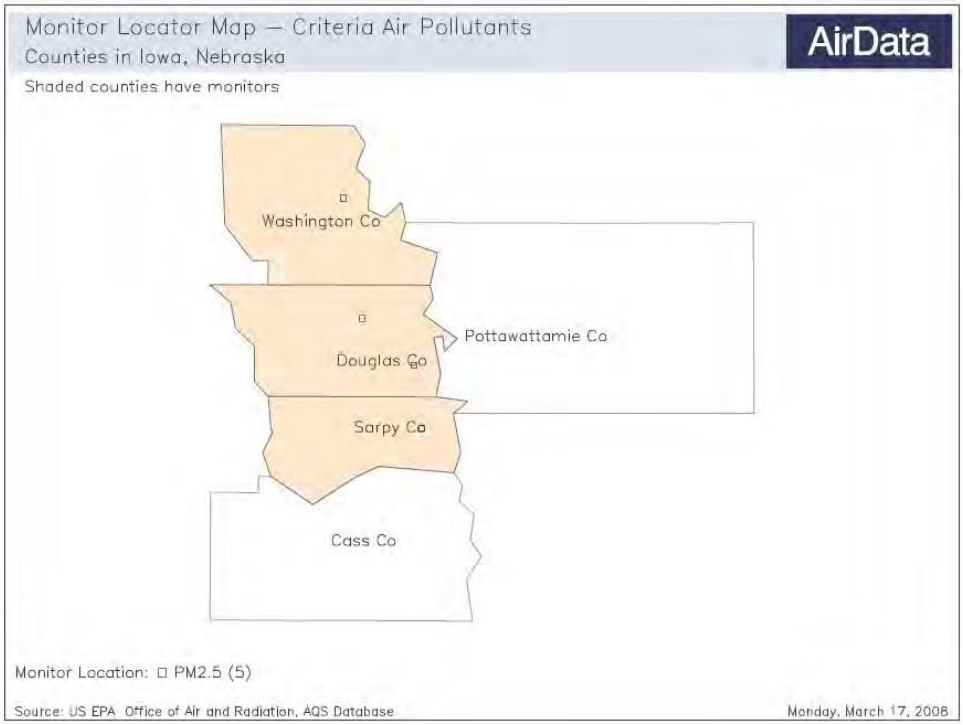
Toxics Monitoring Sites

Appendix F: Maps of Monitoring Locations in MSA's on the State Border

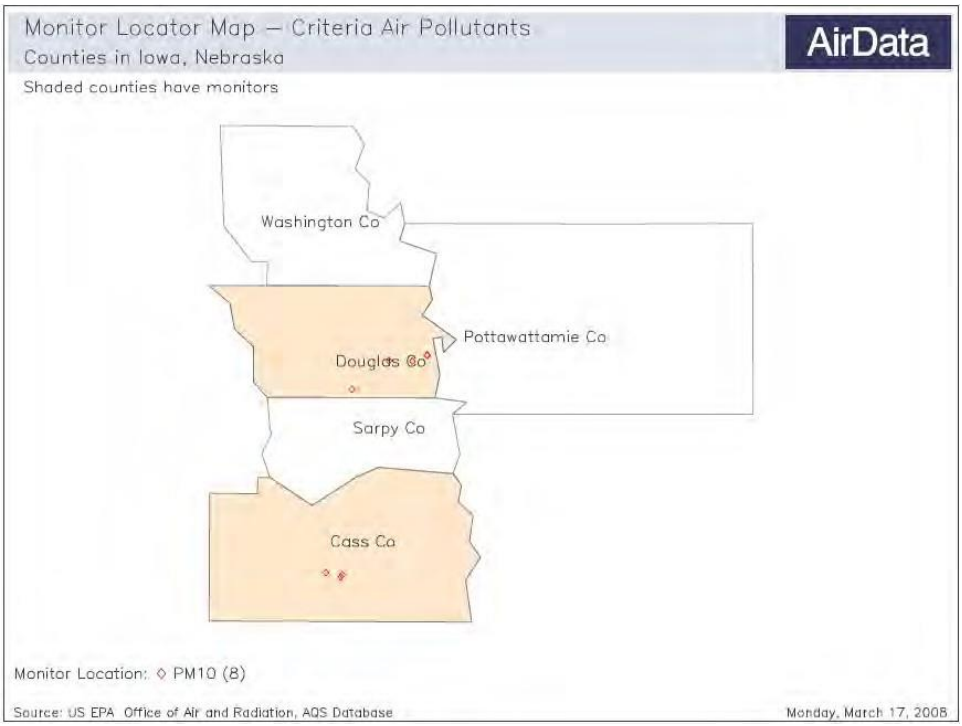
The two largest MSA's that span both sides of the Iowa border are Davenport-Moline-Rock Island, IA-IL; and Omaha-Council Bluffs, NE-IA. The following maps show all the locations for SLAMS monitors that were operated in 2007 for Ozone, PM2.5, and PM10 in these metro areas, including those operated by Illinois and Nebraska.



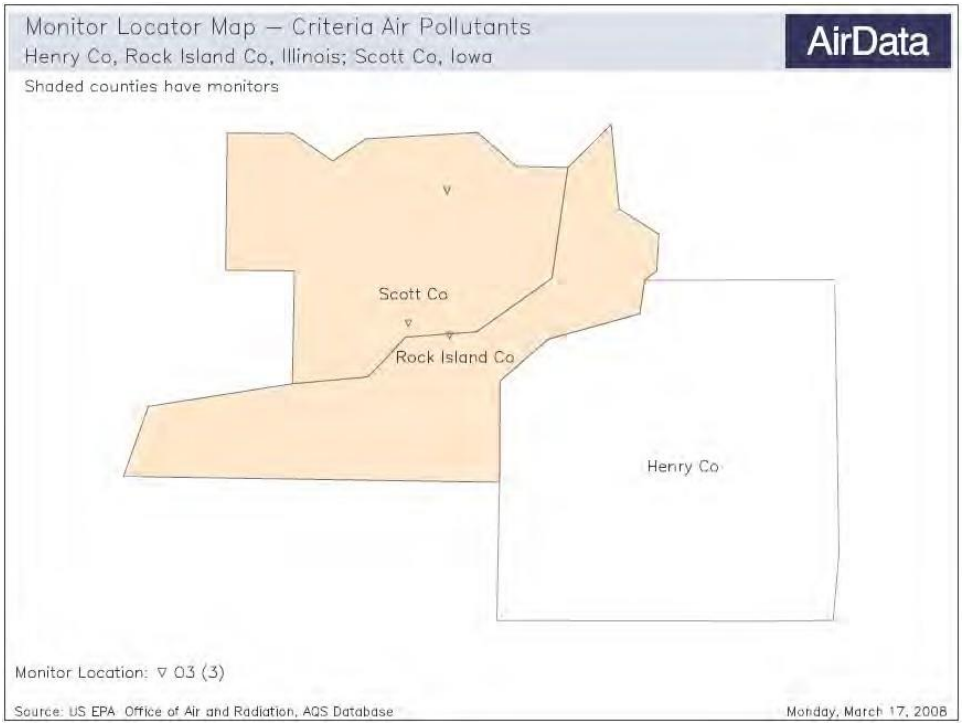
Omaha-Council Bluffs, NE-IA Ozone Monitors



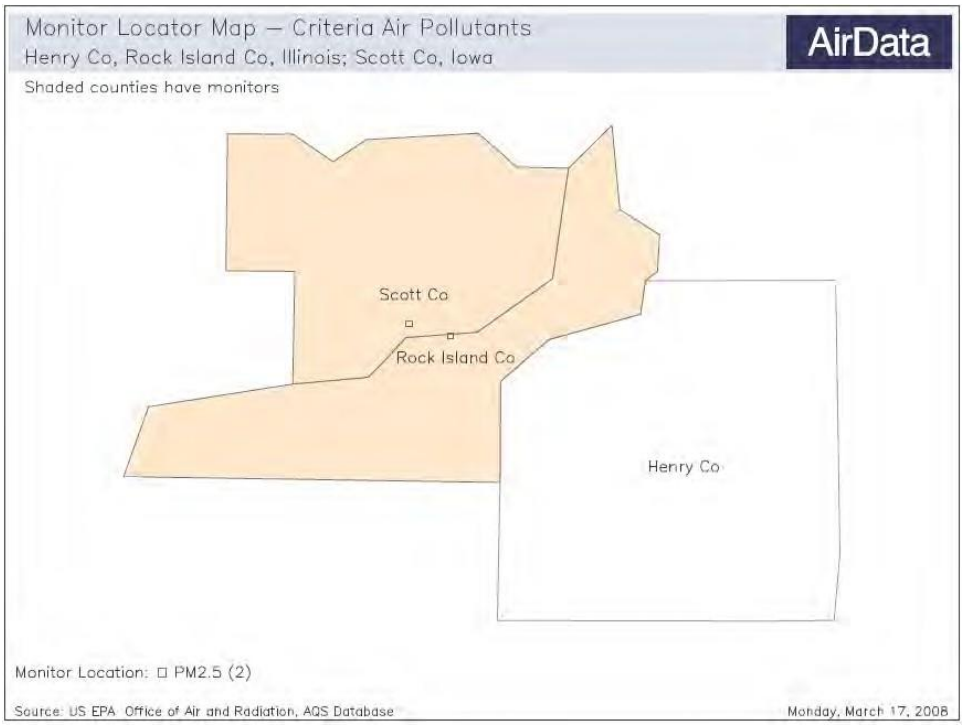
Omaha-Council Bluffs, NE-IA PM2.5 SLAMS Monitors



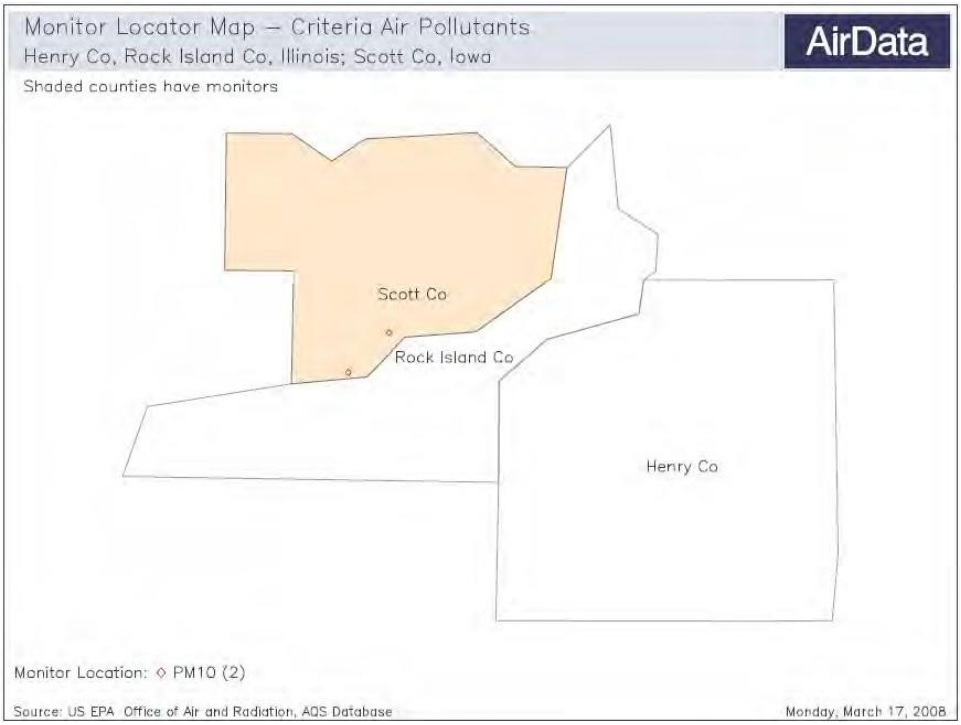
Omaha-Council Bluffs, NE-IA PM10 SLAMS Monitors



Davenport-Moline-Rock Island, IA-IL Ozone Monitors

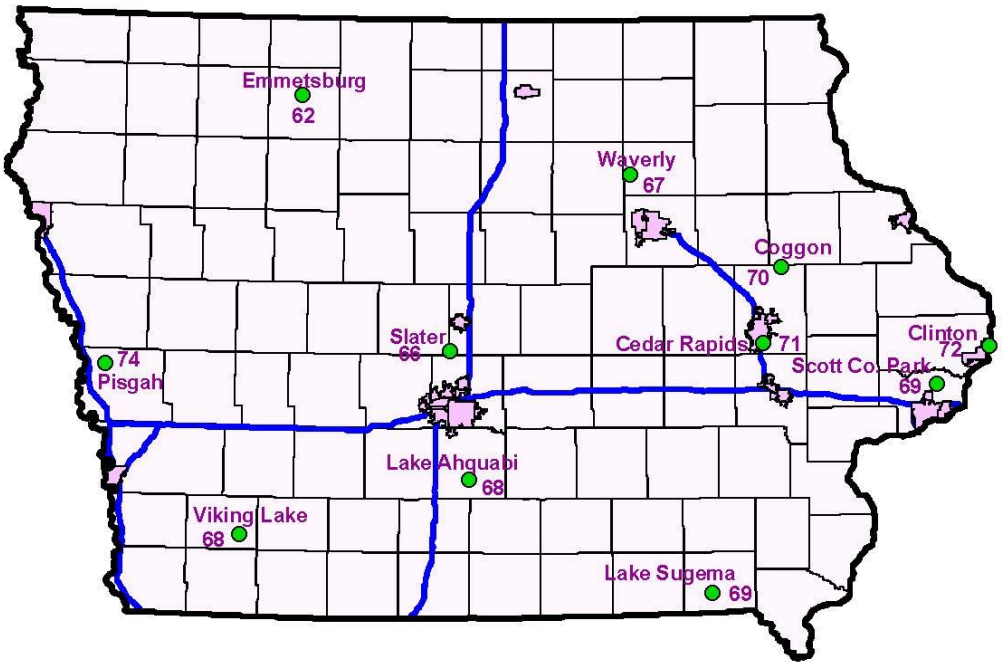


Davenport-Moline-Rock Island, IA-IL PM2.5 Monitors

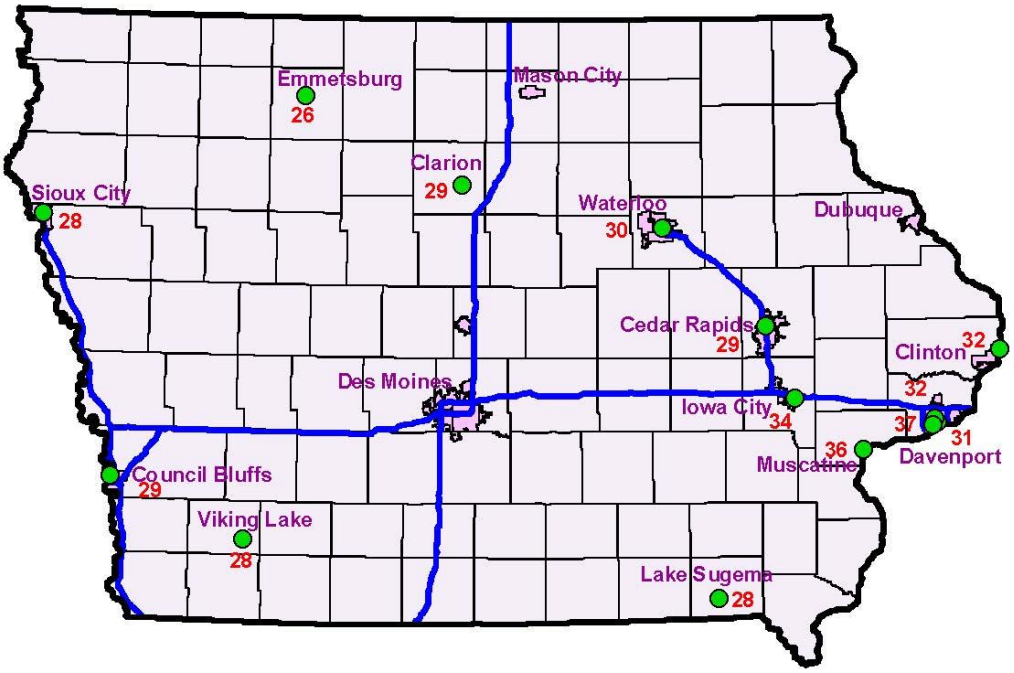


Davenport-Moline-Rock Island, IA-IL PM10 SLAMS Monitors

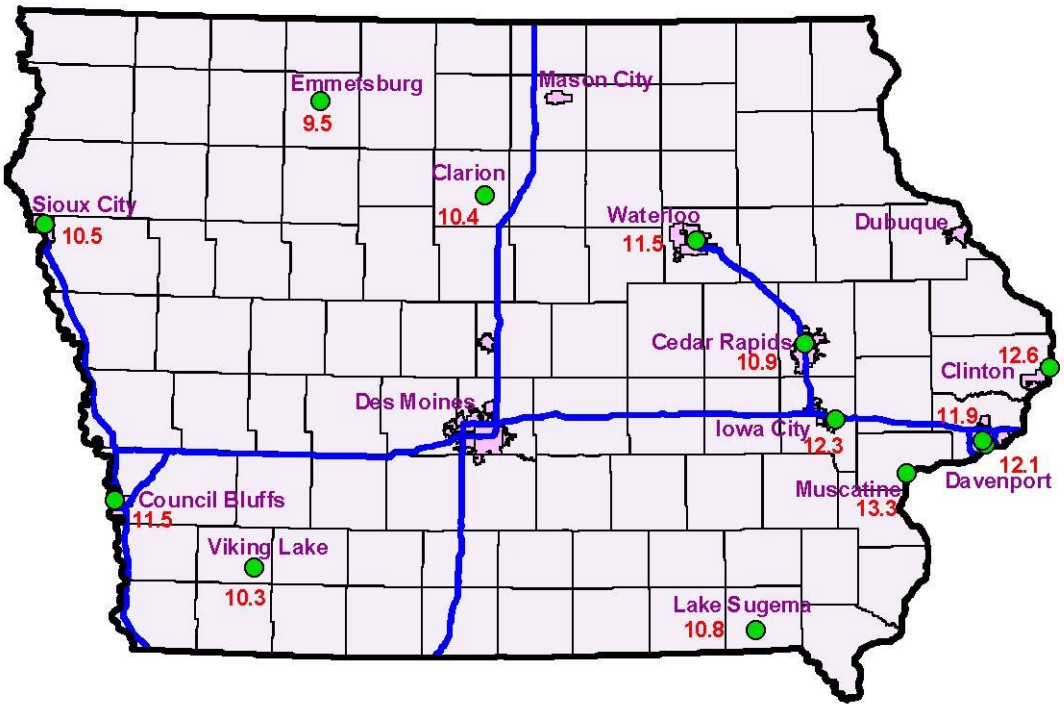
Appendix G: Design Value Maps for PM2.5 and Ozone



2005-2007 Ozone Design Values (ppb)



2005-2007 PM2.5 24-hr Design Values (ug/m3)



2005-2007 PM2.5 Annual Design Values (µg/m3)

Appendix H: Highest PM10 values in 2005-2007

The following table shows the highest value recorded by any PM10 monitor in a Metropolitan Statistical Area, including those operated by Illinois and Nebraska.

Table D-4 of Appendix D to Part 58 of the Code of Federal Regulations, specifies different minimum monitoring requirements for PM10, depending on whether the concentrations are high, medium, or low. High concentrations are defined as exceeding the PM10 NAAQS by 20% or more (186 µg/m^3 or greater). Medium levels are defined as concentrations exceeding 80% of the NAAQS (between 124 and 186 µg/m^3). If ambient concentrations are less than 80% of the PM10 NAAQS, the levels are characterized as low. These categories are reflected in the last column of the following table.

Maximum PM10 Value in MSA (in µg/m^3)

MSA	2005	2006	2007	3 Year Maximum	High, Medium, Low Classification
Omaha-Council Bluffs, NE-IA	129	141	167	167	Medium
Des Moines-West Des Moines, IA	108	64	63	108	Low
Davenport-Moline- Rock Island, IA-IL	164	161	119	164	Medium
Cedar Rapids, IA	66	64	53	66	Low
Waterloo-Cedar Falls, IA	58	58	62	62	Low
Sioux City, IA-NE- SD	84	100	85	100	Low

Appendix I: Census Bureau estimates for Iowa MSA's:

US Census Geographic Area	US Census Population Estimate, July 1, 2007
Omaha-Council Bluffs, NE-IA	829,890
Des Moines-West Des Moines, IA	546,599
Davenport-Moline-Rock Island, IA-IL	376,160
Cedar Rapids, IA	252,784
Waterloo-Cedar Falls, IA	163,329
Iowa City, IA	147,038
Sioux City, IA-NE-SD	142,794
Dubuque, IA	92,359
Ames, IA	84,752

From: http://www.census.gov/population/www/estimates/CBSA-est2007-annual.html Annual Estimates of the Population of Metropolitan and Micropolitan Statistical Areas: April 1, 2000 to July 1, 2007 (CBSA-EST2007-01) Source: Population Division, U.S. Census Bureau, Release Date: March 27, 2008

Appendix J: Population-Based Minimum Monitoring Requirements

Ozone

40 CFR Part 58 Appendix D, Table D-2 specifies the minimum number of SLAMS (State and Local Air Monitoring Stations) ozone monitors required based on population and the most recent three years of monitoring data (design value).

TABLE D-2 OF APPENDIX D TO PART 58 - SLAMS MINIMUM O3 MONITORING REQUIREMENTS

MSA population[1, 2]	Most recent 3- year design value concentrations ≥85% of any O_3 NAAQS[3]	Most recent 3- year design value concentrations <85% of any O_3 NAAQS[3, 4]
>10 million	4	2
4–10 million	3	1
350,000–<4 million	2	1
50,000–<350,000[5]	1	0

[1]Minimum monitoring requirements apply to the Metropolitan statistical area (MSA).
[2]Population based on latest available census figures.
[3]The ozone (O3) National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR part 50.
[4]These minimum monitoring requirements apply in the absence of a design value.
[5]Metropolitan statistical areas (MSA) must contain an urbanized area of 50,000 or more population.

PM2.5

40 CFR Part 58 Appendix D, Table D-5 specifies the minimum number of SLAMS PM2.5 monitors required based on population and 3-year design values.

TABLE D-5 OF APPENDIX D TO PART 58 - PM2.5 MINIMUM MONITORING REQUIREMENTS

MSA population[1, 2]	Most recent 3- year design value ≥85% of any $PM_{2.5}$ NAAQS[3]	Most recent 3- year design value <85% of any $PM_{2.5}$ NAAQS[3, 4]
>1,000,000	3	2
500,000–1,000,000	2	1
50,000–<500,000[5]	1	0

[1]Minimum monitoring requirements apply to the Metropolitan statistical area (MSA)
[2]Population based on latest available census figures.
[3]The PM2.5 National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR part 50.
[4]These minimum monitoring requirements apply in the absence of a design value.
[5]Metropolitan statistical areas (MSA) must contain an urbanized area of 50,000 or more population.

PM10

40 CFR Part 58 Appendix D, Table D-4 lists the minimum requirements for the number of PM10 stations per MSA based on population and measured levels:

TABLE D-4 OF APPENDIX D TO PART 58 - PM10 MINIMUM MONITORING REQUIREMENTS (NUMBER OF STATIONS PER MSA)[1]

Population category	High concentration[2]	Medium concentration[3]	Low concentration[4, 5]
>1,000,000	6-10	4-8	2-4
500,000–1,000,000	4-8	2-4	1-2
250,000–500,000	3-4	1-2	0-1
100,000–250,000	1-2	0-1	0

[1]Selection of urban areas and actual numbers of stations per area within the ranges shown in this table will be jointly determined by EPA and the State Agency.
[2]High concentration areas are those for which ambient PM10 data show ambient concentrations exceeding the PM10 NAAQS by 20 percent or more.

[3]Medium concentration areas are those for which ambient PM10 data show ambient concentrations exceeding 80 percent of the PM10
NAAQS.
[4]Low concentration areas are those for which ambient PM10 data show ambient concentrations less than 80 percent of the PM10 NAAQS.
[5]These minimum monitoring requirements apply in the absence of a design value.