Iowa Ambient Air Monitoring Annual Report: 2016

Air Quality Bureau
Iowa Department of Natural Resources

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Iowa Ambient Air Monitoring Annual Network Report: 2016

Iowa Department of Natural Resources - Air Quality Bureau – Ambient Air Monitoring Group

Introduction

The purpose of this review is to compare the maximum values of ambient air monitoring data gathered in the state of Iowa during 2016 to the level of the National Ambient Air Quality Standards (NAAQS) established by the Environmental Protection Agency (EPA). The EPA has established NAAQS for seven "criteria" pollutants: particulate matter with a diameter less than 10 microns (PM_{10}), particulate matter with a diameter less than 2.5 microns ($PM_{2.5}$), sulfur dioxide (SO_2), ozone (O_3), nitrogen dioxide (NO_2), carbon monoxide (CO) and lead. Continuous monitoring methods have been approved by EPA for all criteria pollutants except lead. Filter samplers and laboratory filter weighing procedures have been approved by EPA for $PM_{2.5}$ and PM_{10}. All data summarized in this review was obtained using methods that are currently approved by EPA for NAAQS comparisons.

This report is divided into two parts. The first part is an executive summary, indicating where exceedances of the NAAQS were measured in Iowa during 2016. A more comprehensive review, which includes the location and summary data for each monitor in the network, is included in the second part.

Gaseous pollutant monitors (ozone, nitrogen dioxide, sulfur dioxide, and carbon monoxide) provide hourly values and operate 24 hours a day, seven days a week. Most ozone monitors are operated only when ozone levels are highest, from April through October. The ozone monitor located at the multi-pollutant site in Davenport operates year-round to establish ozone trends in cooler temperatures. Particulate filter samplers run for 24 hours at a time and collect one filter per day. Most PM_{10} and $PM_{2.5}$ filter based monitors are operated at a sampling frequency of one sample every third day. Some particulate monitoring sites are run at frequencies greater than this nominal frequency if they are located in highly populated areas, near pollution sources or if pollutant levels are close to health standards.

Incomplete data may skew the summary statistics for a monitor. In order to alert the reader to incomplete data problems, data completeness statistics have been provided for each monitor. If a monitor collected all of the scheduled samples, then it has an associated data completeness of 100%. If quarterly data capture falls below 75% in any quarter of the year, then the data set may not adequately capture the seasonal variability of the data. In these cases, the bar representing the comparison of the monitor data to the NAAQS is checkered.

In 2016 there were seven NAAQS exceedances in the state of Iowa. Four of the exceedances were associated with the 8-hour ozone standard, two were associated with the 24-hour $PM_{2.5}$ standard and one was an exceedance of the 1-hour sulfur dioxide standard. All of these exceedances are detailed in this report.

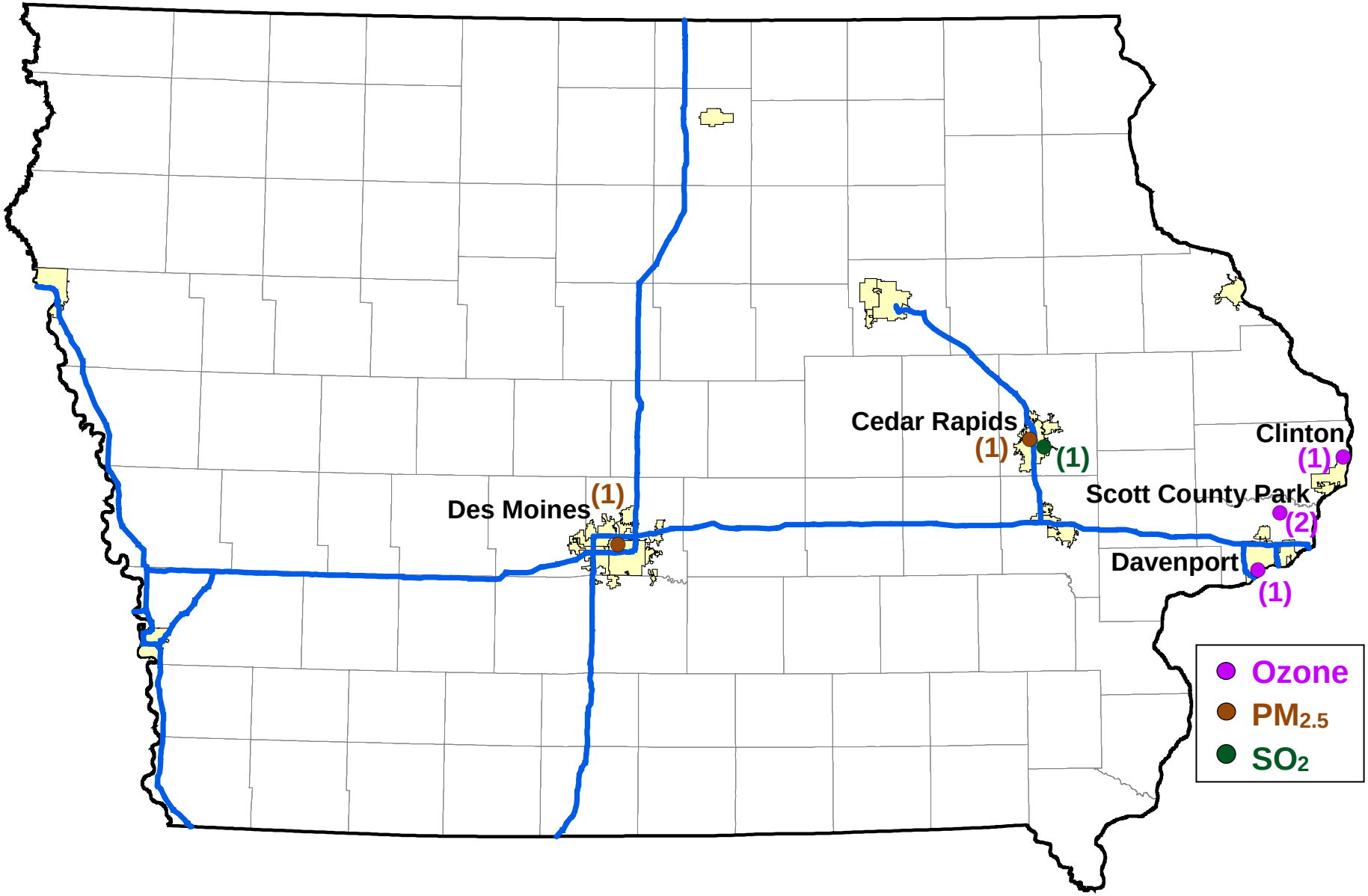
Data used to create this report were gathered by three organizations under contract with the Iowa Department of Natural Resources: the State of Iowa Hygienic Laboratory, the Linn County Public Health Department, and the Polk County Public Works Air Quality Division. Contract funds were provided by US EPA, the Iowa legislature, and regulated industry. Air pollution data for Iowa and all other states are available online at: https://www.epa.gov/outdoor-air-quality-data. Additional information on the NAAQS is available at: https://www.epa.gov/criteria-air-pollutants/naaqs-table.

Exceedances of National Ambient Air Quality Standards (NAAQS) in 2016

Pollutant	Averaging Period	Exceedance Level	Units	Number of Exceedances
Ozone	8hr	71	ppb	4
PM2.5	24hr	35.5	Micrograms per cubic meter	2
	Annual	12.05	Micrograms per cubic meter	0
PM10	24hr	155	Micrograms per cubic meter	0
Sulfur dioxide	1hr	75.5	ppb	1
	3hr	0.55	ppm	0
Carbon monoxide	1hr	35.5	ppm	0
	8hr	9.5	ppm	0
Nitrogen dioxide	Annual	0.0535	ppm	0
	1hr	100.5	ppb	0
Lead	Rolling 3-month average	0.155	micrograms per cubic meter	0

NAAQS Exceedance Counts at Iowa Monitoring Sites During 2016

(Values for individual sites indicated in parentheses)



$PM_{2.5}$ NAAQS Exceedances Measured in 2016

(2 $PM_{2.5}$ Exceedances Recorded in 2016)

Monitoring Site	Site ID	Exceedance Date	Concentration ($\mu g/m^3$)
Public Health	191130040	5/7/2016	35.6
Health Dept.	191530030	5/7/2016	43.0

SO_2 NAAQS Exceedances in 2016

(1 SO_2 Exceedances Recorded in 2016)

Monitoring Site	Site ID	Exceedance Date	Concentration (ppb)
Tait Cummins	191130041	7/11/2016	76.9

2016 Ambient Monitoring Network Changes

Sites Removed at the End of 2015:

Site ID	Name	City	County	Site Label	End Date	Pollutants
191930019	Bryant School	Sioux City	Woodbury	Sioux City, Bryant Sch.	12/31/2015	PM10, PM2.5

Sites Added at the Start of 2016:

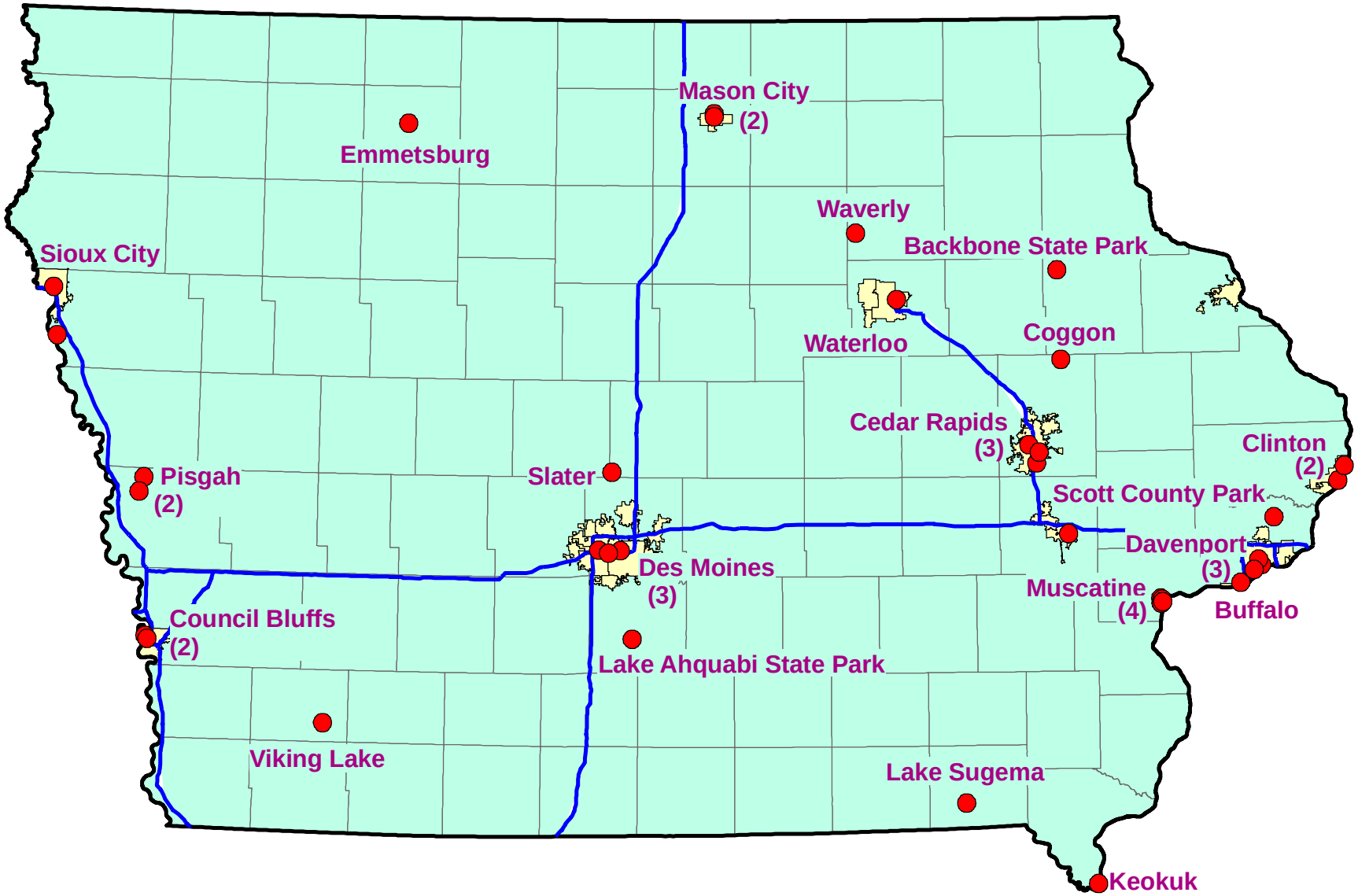
Site ID	Name	City	County	Site Label	Start Date	Pollutants
191930021	Irving School	Sioux City	Woodbury	Sioux City, Irving School	1/1/2016	PM10, PM2.5

No other monitors or sites were added or removed during 2016.

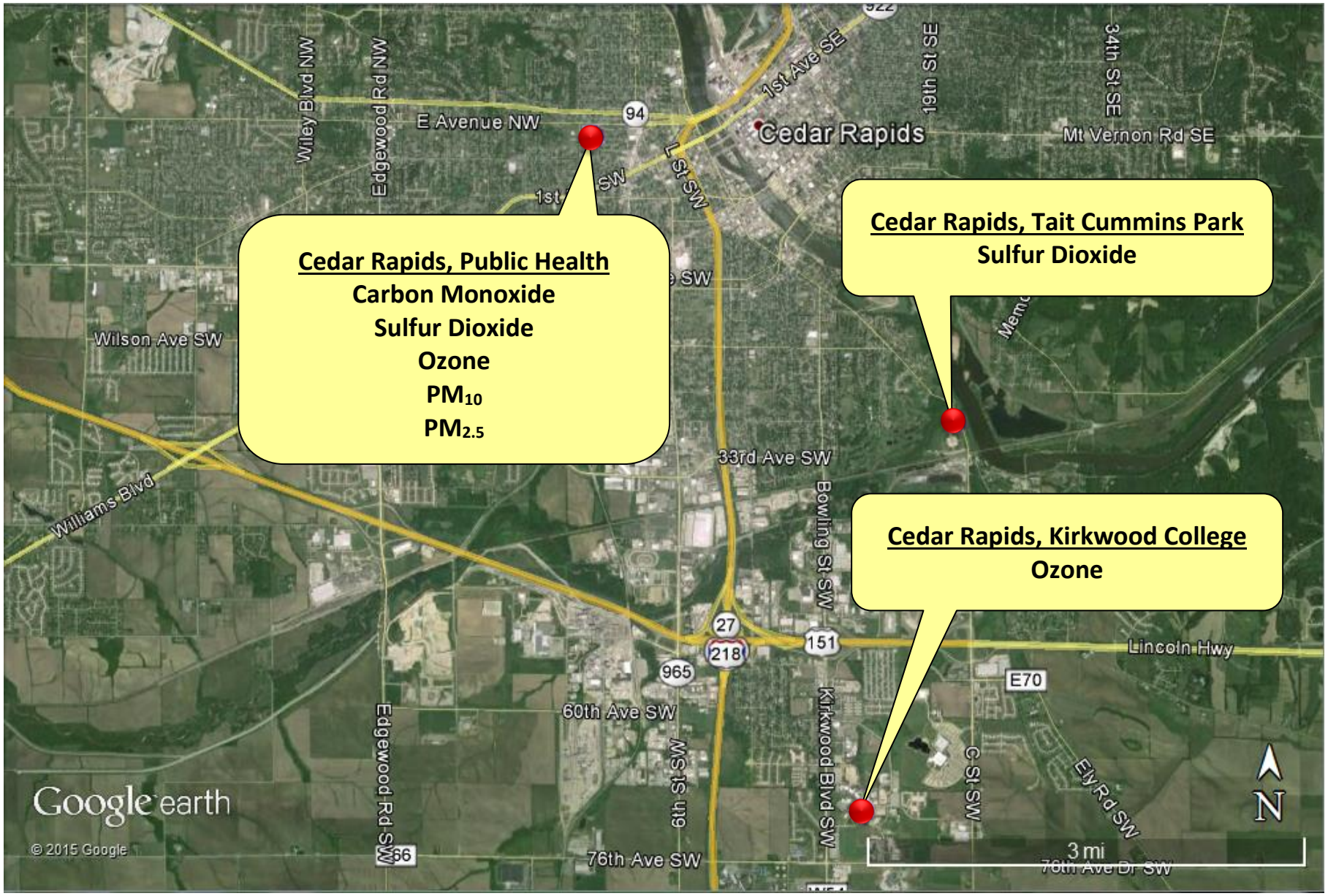
2016 Ambient Monitoring Network

Site ID	Name	City	Address	County	Site Label	Pollutants
190130009	Water Tower	Waterloo	Vine St. & Steely	Black Hawk	Waterloo, Water Tower	PM10, PM2.5
190170011	Waverly Airport	Waverly	Waverly Airport	Bremer	Waverly, Airport	Ozone
190330018	Holcim Cement	Mason City	17th St. & Washington St.	Cerro Gordo	Mason City, Holcim Cement	PM10
190330020	Washington School	Mason City	700 N. Washington Avenue	Cerro Gordo	Mason City, Washington Sch.	PM10
190450019	Chancy Park	Clinton	23rd & Camanche	Clinton	Clinton, Chancy Park	SO2, PM2.5
190450021	Rainbow Park	Clinton	Roosevelt St.	Clinton	Clinton, Rainbow Park	Ozone, PM2.5
190550001	Backbone State Park	not in a city	Fish Hatchery Backbone State Park	Delaware	Backbone State Park	PM10, PM2.5
190850007	Forestry Office	Pisgah	206 Polk St.	Harrison	Pisgah, Forestry Office	Ozone
190851101	Highway Maintenance Shed	Pisgah	1575 Hwy 183	Harrison	Pisgah, Highway Maintenance	Ozone
191032001	Hoover School	Iowa City	2200 East Court	Johnson	Iowa City, Hoover Sch.	PM10, PM2.5
191110008	Fire Station	Keokuk	111S. 13th St.	Lee	Keokuk, Fire Station	PM2.5
191130028	Kirkwood College	Cedar Rapids	6301 Kirkwood Blvd SW (Iowa Hall)	Linn	Cedar Rapids, Kirkwood Coll.	Ozone
191130033	Coggon Elementary School	Coggon	408 E Linn St.	Linn	Coggon, Coggon Sch.	Ozone
191130040	Public Health	Cedar Rapids	500 11th St. NW	Linn	Cedar Rapids, Public Health	CO, SO2, Ozone, PM10, PM2.5
191130041	Tait Cummins Park	Cedar Rapids	3000 C St SW	Linn	Cedar Rapids, Tait Cummins Park	SO2
191370002	Viking Lake State Park	not in a city	2780 Viking Lake Road	Montgomery	Viking Lake State Park	Ozone, PM10, PM2.5
191390015	Muscatine High E. Campus-Rooftop	Muscatine	1409 Wisconsin	Muscatine	Muscatine, Muscatine High E. Campus-Rooftop	PM10, PM2.5
191390016	Greenwood Cemetery	Muscatine	Fletcher St. & Kimble St.	Muscatine	Muscatine, Greenwood Cemetery	SO2, PM2.5
191390018	Franklin School	Muscatine	210 Taylor St.	Muscatine	Muscatine, Franklin Sch.	PM2.5
191390019	Muscatine High E. Campus-Trailer	Muscatine	1409 Wisconsin	Muscatine	Muscatine, Muscatine High E. Campus-Trailer	SO2
191390020	Musser Park	Muscatine	Oregon St. & Earl Ave.	Muscatine	Muscatine, Musser Park	SO2, PM2.5
191471002	Iowa Lakes College	Emmetsburg	Iowa Lakes Community College - S Camp	Palo Alto	Emmetsburg, Iowa Lakes Coll.	Ozone, PM10, PM2.5
191530030	Health Department	Des Moines	1907 Carpenter	Polk	Des Moines, Health Dept.	CO, SO2, NO2, Ozone, PM10, PM2.5
191532510	Indian Hills Jr. High School	Clive	9401 Indian Hills	Polk	Clive, Indian Hills Jr. High Sch.	PM10, PM2.5
191536011	Near-Road NO2	Des Moines	6011 Rollins	Polk	Des Moines, Near-Road NO2	NO2
191550009	Franklin School	Council Bluffs	3130 C Ave.	Pottawattamie	Council Bluffs, Franklin Sch.	PM10, PM2.5
191550011	Griffin Pipe	Council Bluffs	8th Avenue and 27th St	Pottawattamie	Council Bluffs, Griffin Pipe	Lead
191630014	Scott County Park	Davenport	Scott County Park	Scott	Scott County Park	Ozone
191630015	Jefferson School	Davenport	10th St. & Vine St.	Scott	Davenport, Jefferson Sch.	CO, SO2, NO2, Ozone, PM10, PM2.5
191630017	Linwood Mining	Buffalo	11100 110th Ave.	Scott	Buffalo, LW Mining	PM10
191630018	Adams School	Davenport	3029 N Division St.	Scott	Davenport, Adams Sch.	PM10, PM2.5
191630020	Hayes School	Davenport	622 South Concord St	Scott	Davenport, Hayes Elementary	PM10, PM2.5
191690011	City Hall	Slater	105 Greene	Story	Slater, City Hall	Ozone
191770006	Lake Sugema	not in a city	24430 Lacey Trl, Keosauqua Lake Sugema	Van Buren	Keosauqua, Lake Sugema	SO2, NO2, Ozone, PM10, PM2.5
191810022	Lake Ahquabi State Park	Indianola	1650 118th Ave.	Warren	Indianola, Lake Ahquabi	Ozone
191930021	Irving School	Sioux City	901 Floyd Blvd.	Woodbury	Sioux City, Irving School	PM10, PM2.5
191930020	George Neal North	Sergeant Bluff	1221 260th St, Sergeant Bluff, IA	Woodbury	Sergeant Bluff, George Neal North	SO2

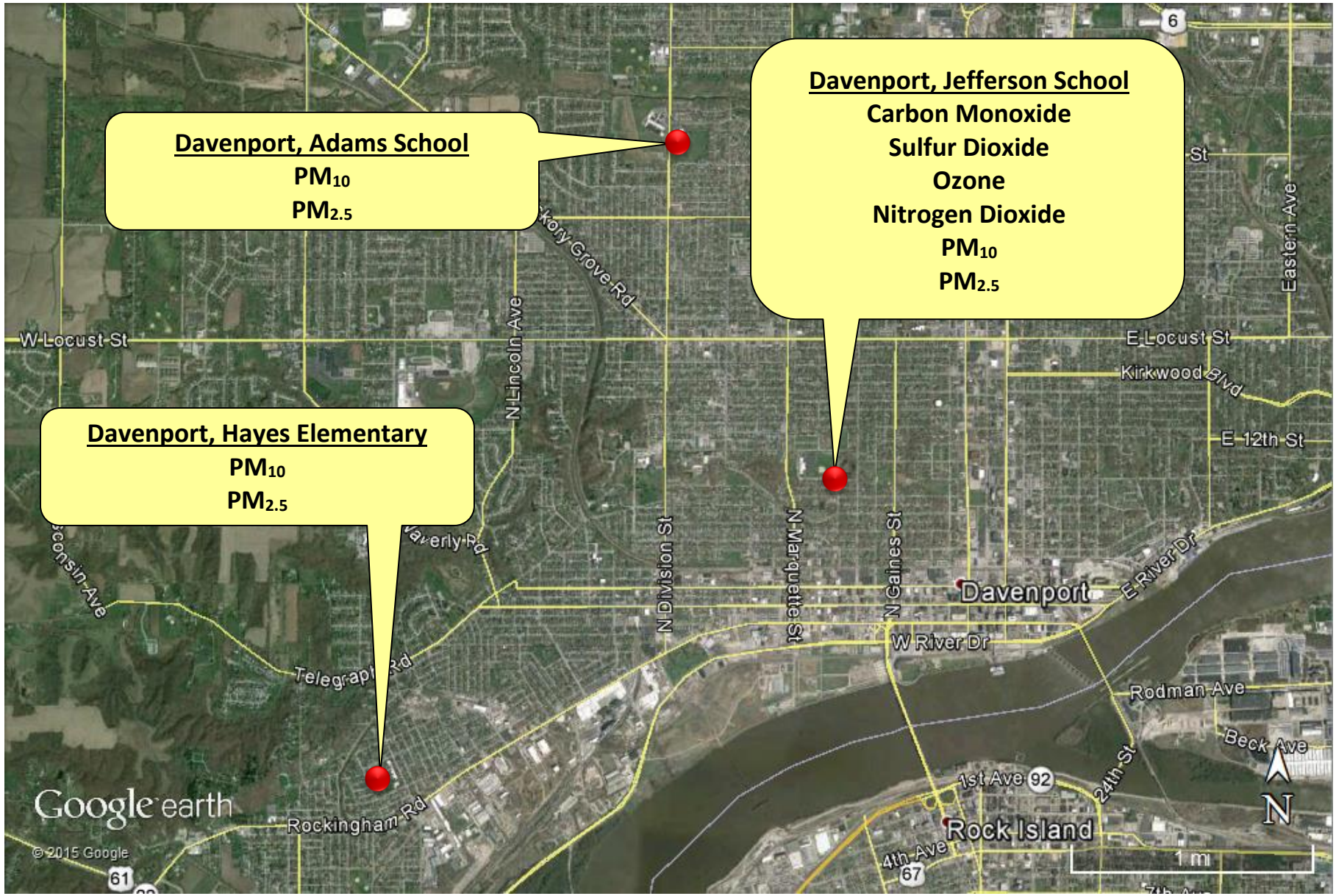
2016 Monitoring Site Locations (37)



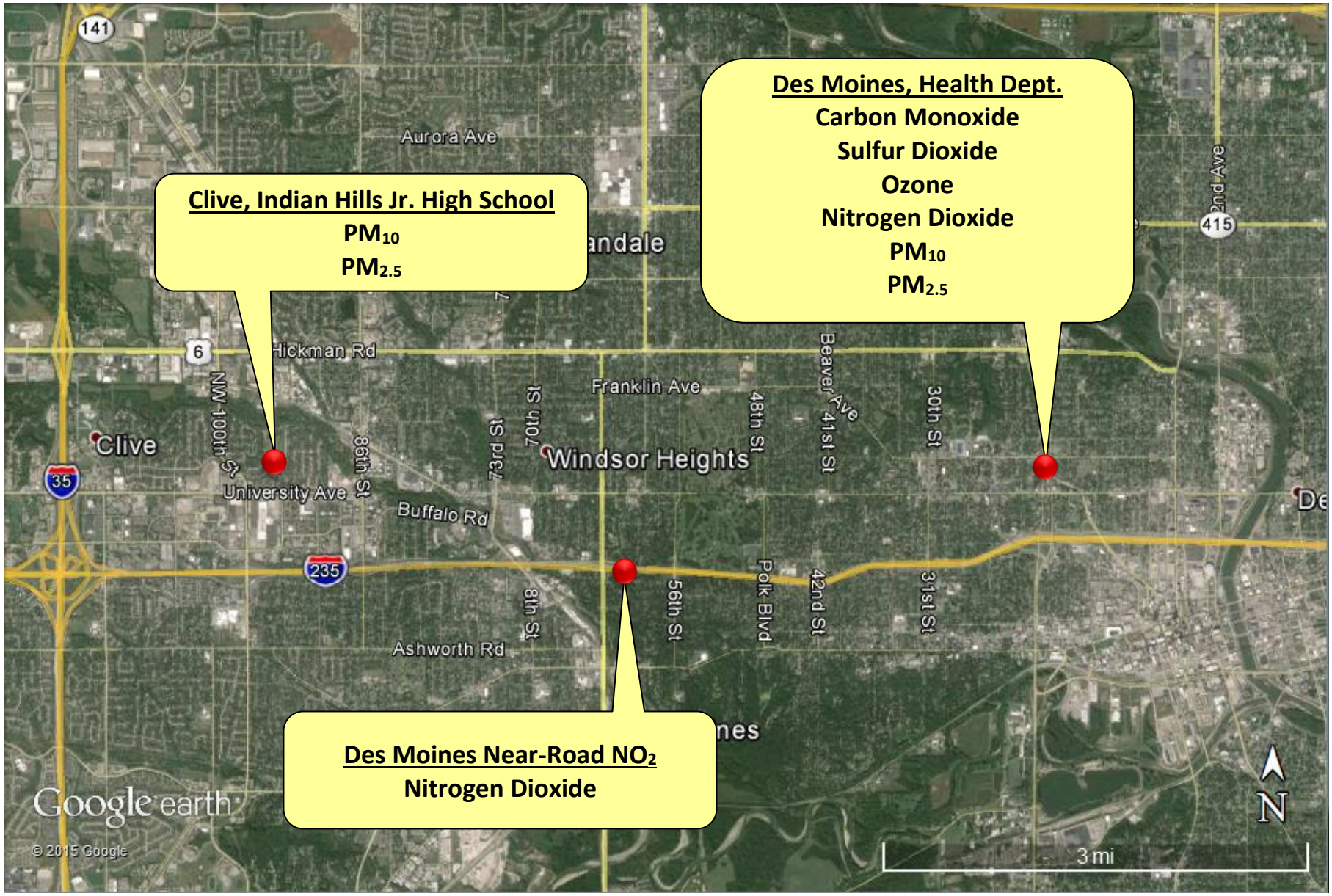
Monitoring Locations in Cedar Rapids



Monitoring Locations in Davenport



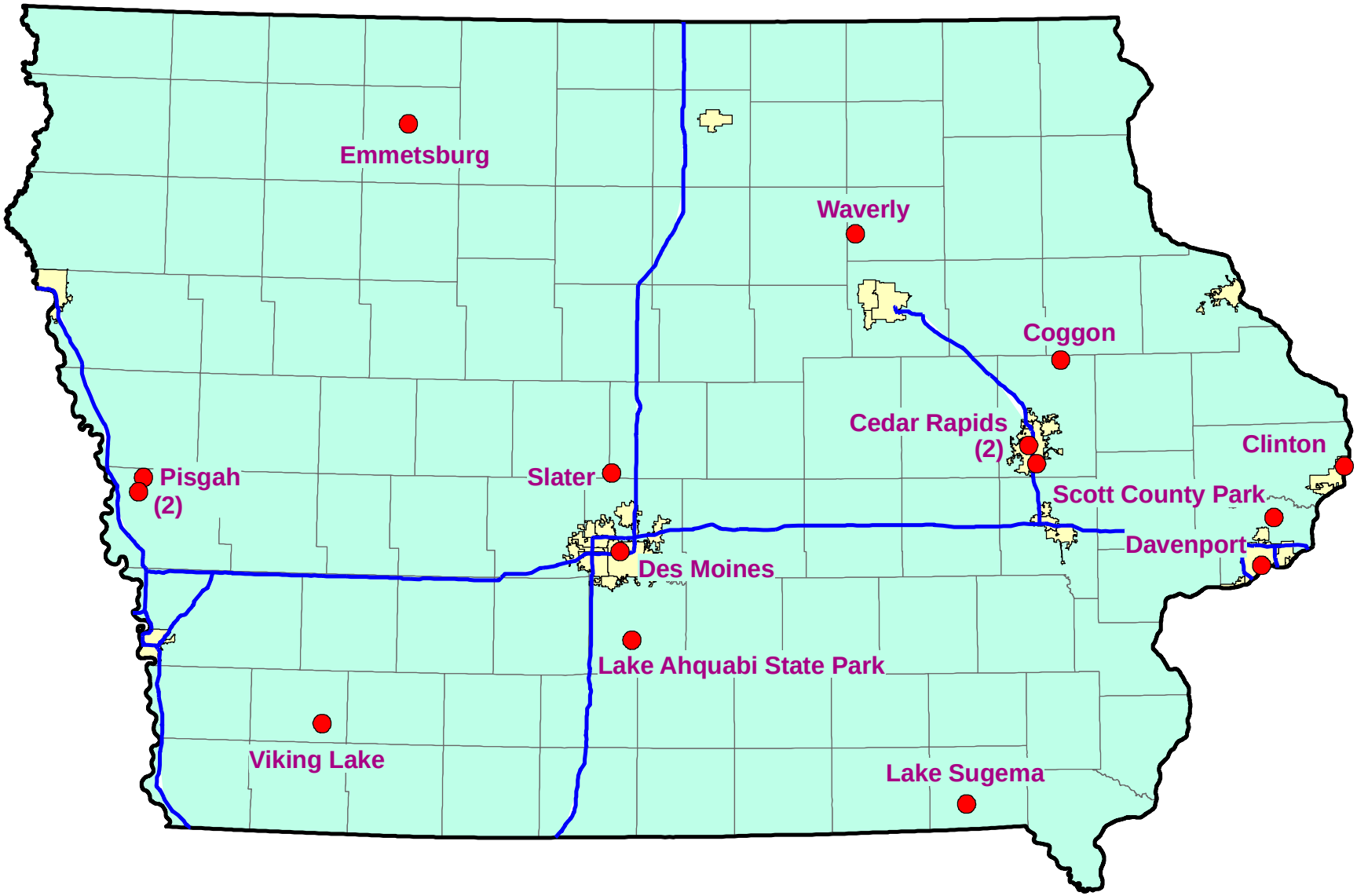
Monitoring Locations in Des Moines/Clive



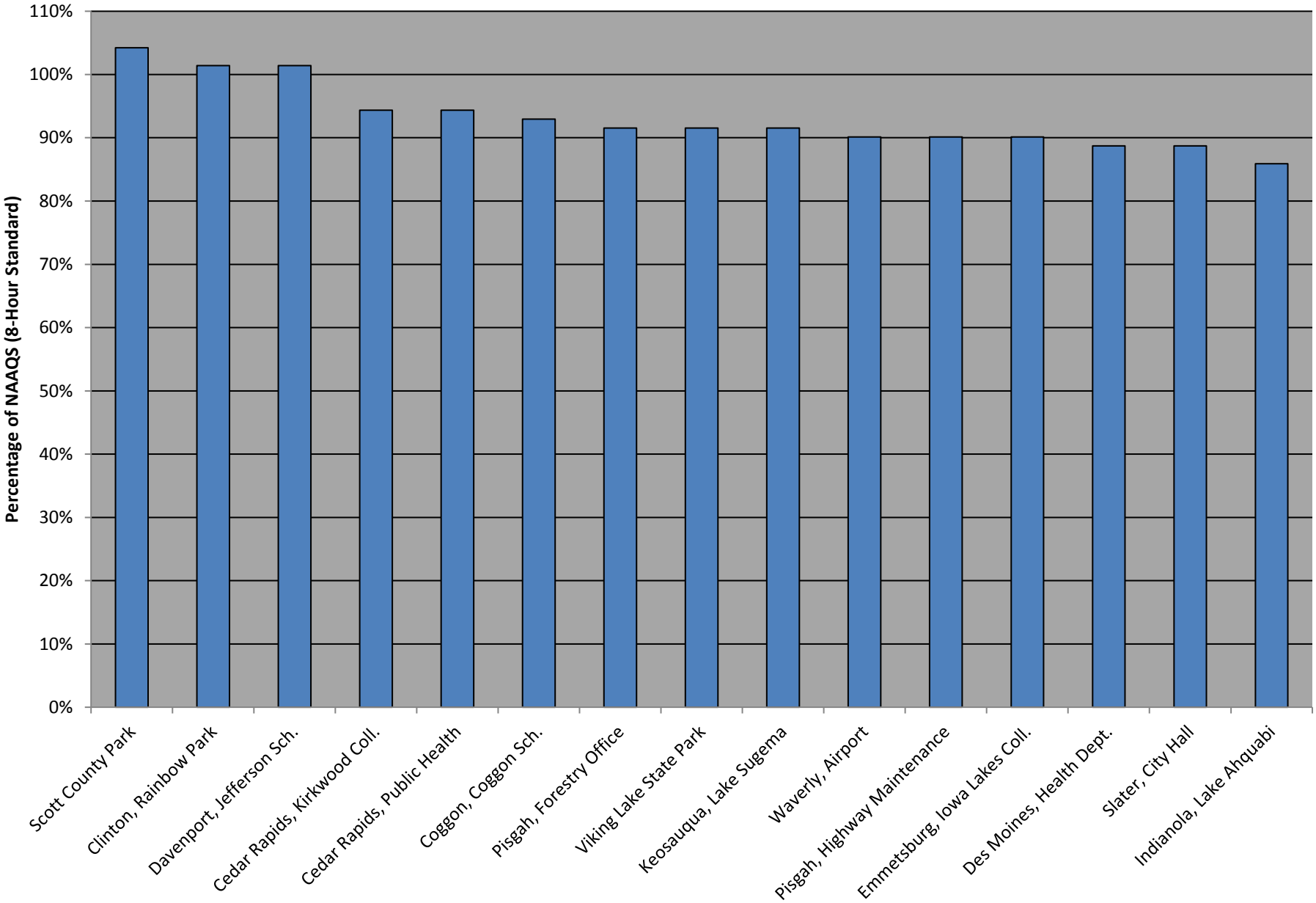
Ozone Monitoring Sites

Site	Name	City	County	Site Label
190170011	Waverly Airport	Waverly	Bremer	Waverly, Airport
190450021	Rainbow Park	Clinton	Clinton	Clinton, Rainbow Park
190850007	Forestry Office	Pisgah	Harrison	Pisgah, Forestry Office
190851101	Highway Maintenance Shed	Pisgah	Harrison	Pisgah, Highway Maintenance
191130028	Kirkwood College	Cedar Rapids	Linn	Cedar Rapids, Kirkwood Coll.
191130033	Coggon Elementary School	Coggon	Linn	Coggon, Coggon Sch.
191130040	Public Health	Cedar Rapids	Linn	Cedar Rapids, Public Health
191370002	Viking Lake State Park	not in a city	Montgomery	Viking Lake State Park
191471002	Iowa Lakes College	Emmetsburg	Palo Alto	Emmetsburg, Iowa Lakes Coll.
191530030	Health Department	Des Moines	Polk	Des Moines, Health Dept.
191630014	Scott County Park	Davenport	Scott	Scott County Park
191630015	Jefferson School	Davenport	Scott	Davenport, Jefferson Sch.
191690011	City Hall	Slater	Story	Slater, City Hall
191770006	Lake Sugema	not in a city	Van Buren	Keosauqua, Lake Sugema
191810022	Lake Ahquabi State Park	Indianola	Warren	Indianola, Lake Ahquabi

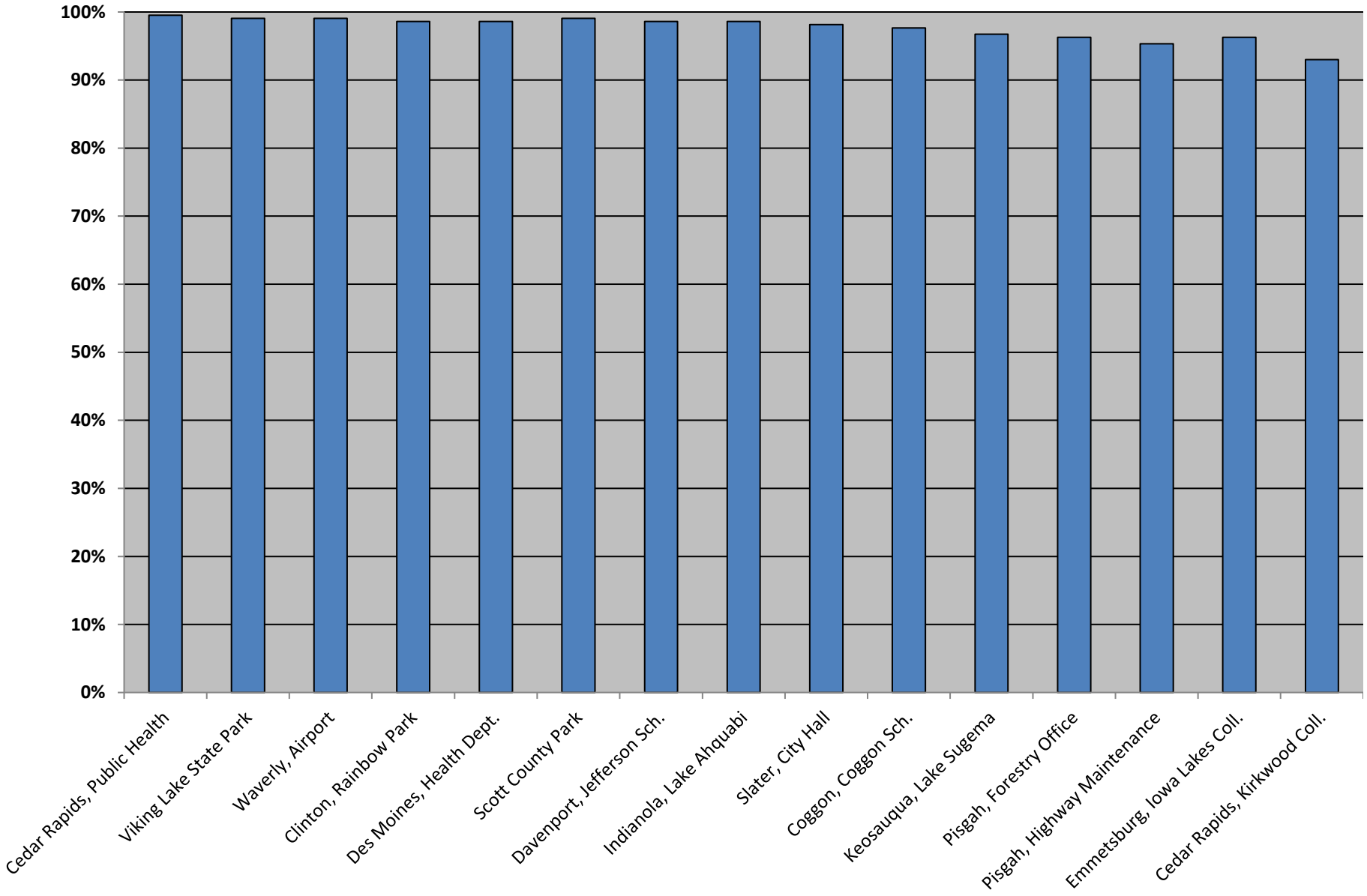
Ozone Monitoring Locations



Comparison of 2016 Ozone Data with National Ambient Air Quality Standard



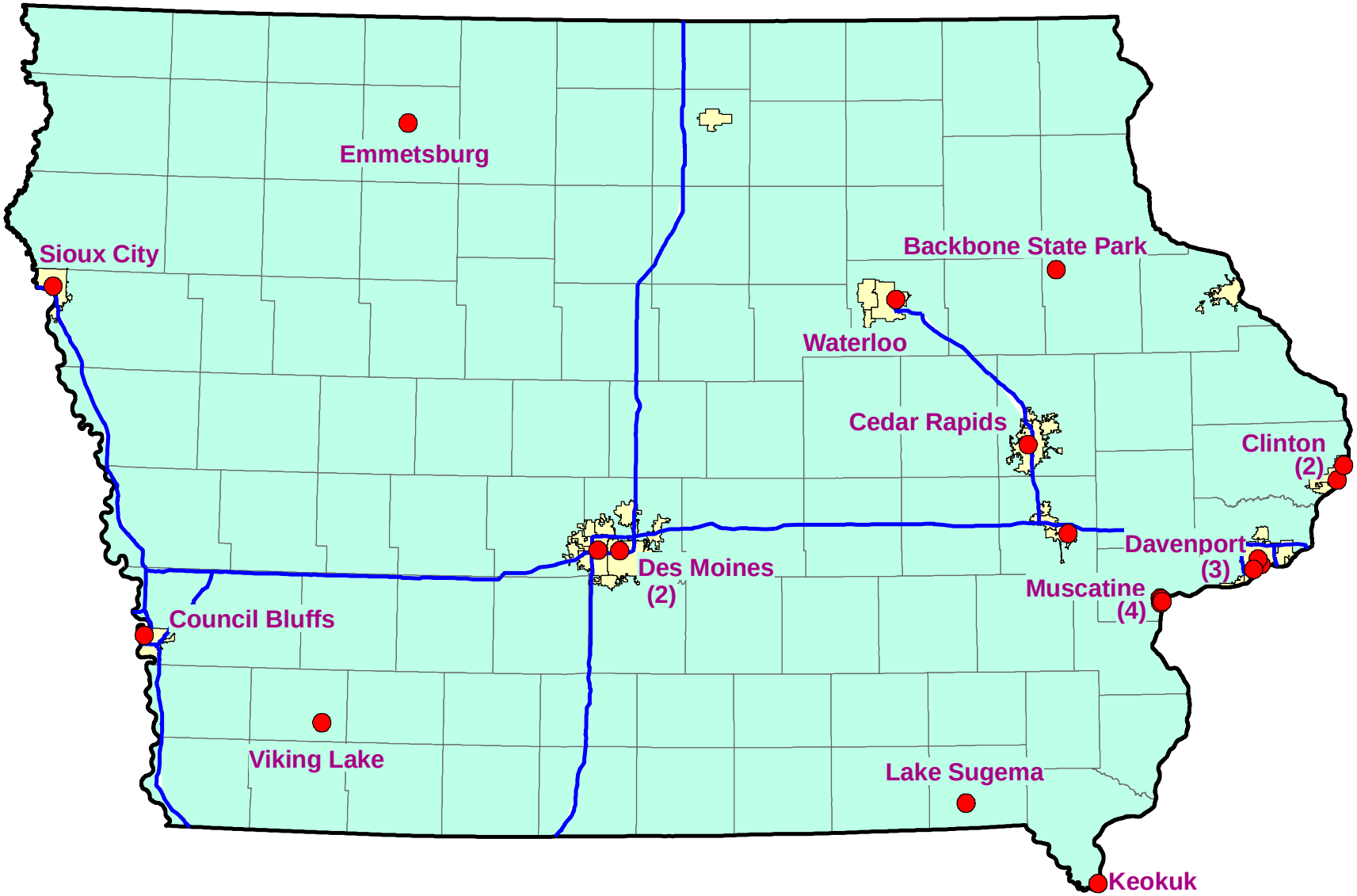
2016 Data Completeness – Ozone



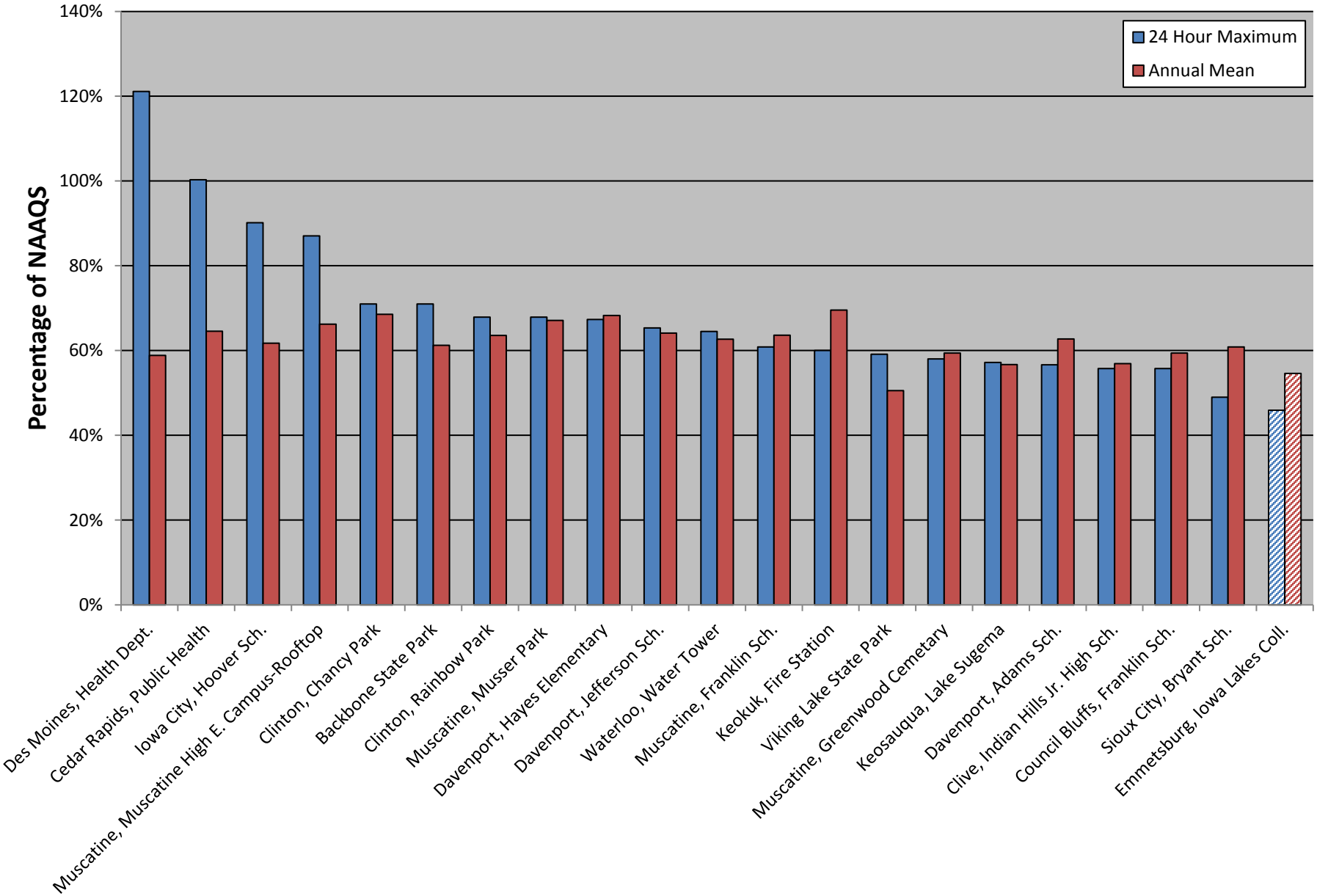
$PM_{2.5}$ Monitoring Sites

Site	Name	City	County	Site Label
190130009	Water Tower	Waterloo	Black Hawk	Waterloo, Water Tower
190450019	Chancy Park	Clinton	Clinton	Clinton, Chancy Park
190450021	Rainbow Park	Clinton	Clinton	Clinton, Rainbow Park
190550001	Backbone State Park	not in a city	Delaware	Backbone State Park
191032001	Hoover Elementary	Iowa City	Johnson	Iowa City, Hoover Sch.
191110008	Fire Station	Keokuk	Lee	Keokuk, Fire Station
191130040	Public Health	Cedar Rapids	Linn	Cedar Rapids, Public Health
191370002	Viking Lake State Park	not in a city	Montgomery	Viking Lake State Park
191390015	Muscatine High E. Campus-Rooftop	Muscatine	Muscatine	Muscatine, Muscatine High E. Campus-Rooftop
191390016	Greenwood Cemetery	Muscatine	Muscatine	Muscatine, Greenwood Cemetery
191390018	Franklin School	Muscatine	Muscatine	Muscatine, Franklin Sch.
191390020	Musser Park	Muscatine	Muscatine	Muscatine, Musser Park
191471002	Iowa Lakes College	Emmetsburg	Palo Alto	Emmetsburg, Iowa Lakes Coll.
191530030	Health Department	Des Moines	Polk	Des Moines, Health Dept.
191532510	Indian Hills Jr. High School	Clive	Polk	Clive, Indian Hills Jr. High Sch.
191550009	Franklin School	Council Bluffs	Pottawattamie	Council Bluffs, Franklin Sch.
191630015	Jefferson School	Davenport	Scott	Davenport, Jefferson Sch.
191630018	Adams School	Davenport	Scott	Davenport, Adams Sch.
191630020	Hayes School	Davenport	Scott	Davenport, Hayes Elementary
191770006	Lake Sugema	not in a city	Van Buren	Keosauqua, Lake Sugema
191930021	Irving School	Sioux City	Woodbury	Sioux City, Irving School

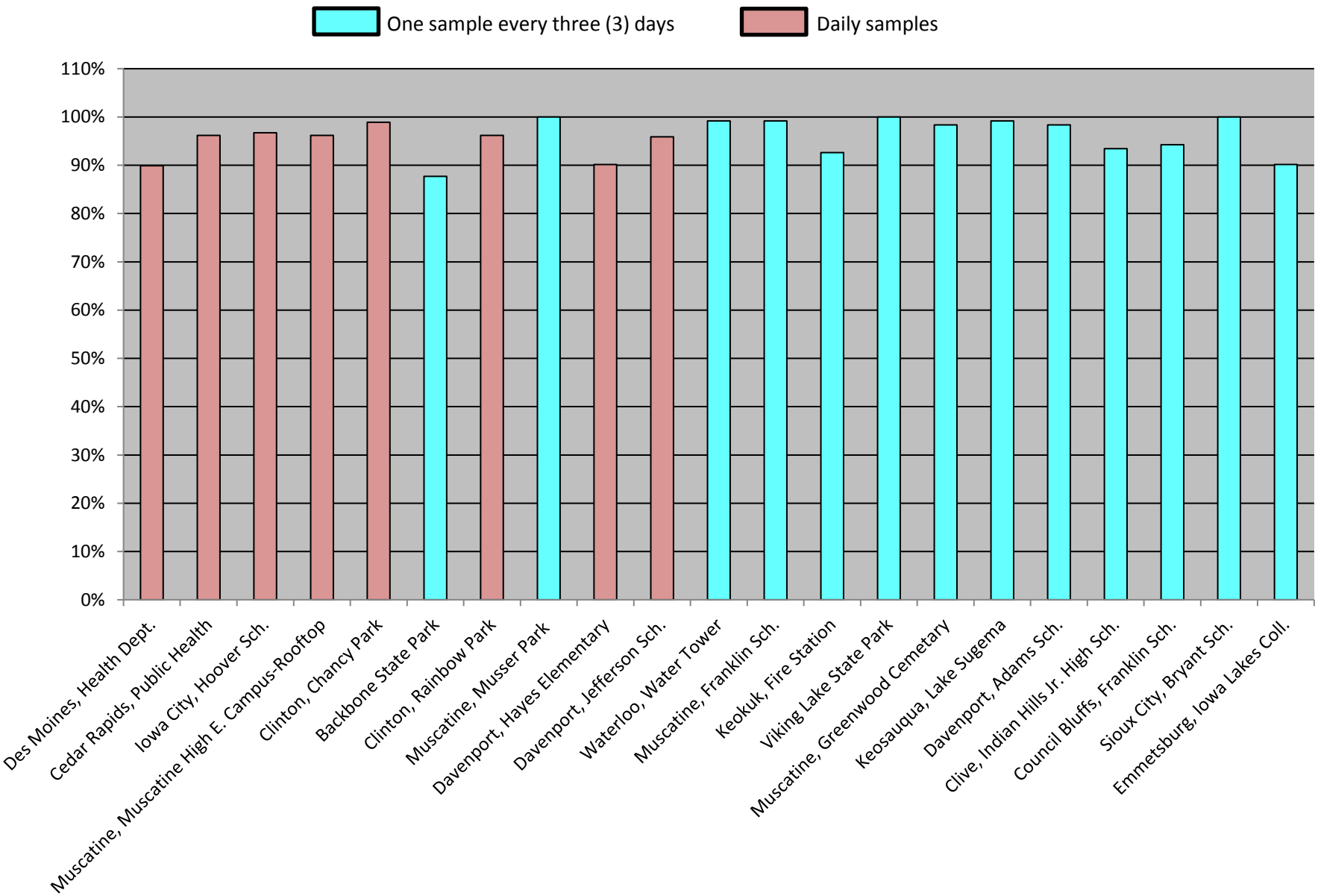
$PM_{2.5}$ Monitoring Locations



Comparison of 2016 $PM_{2.5}$ Data with National Ambient Air Quality Standards



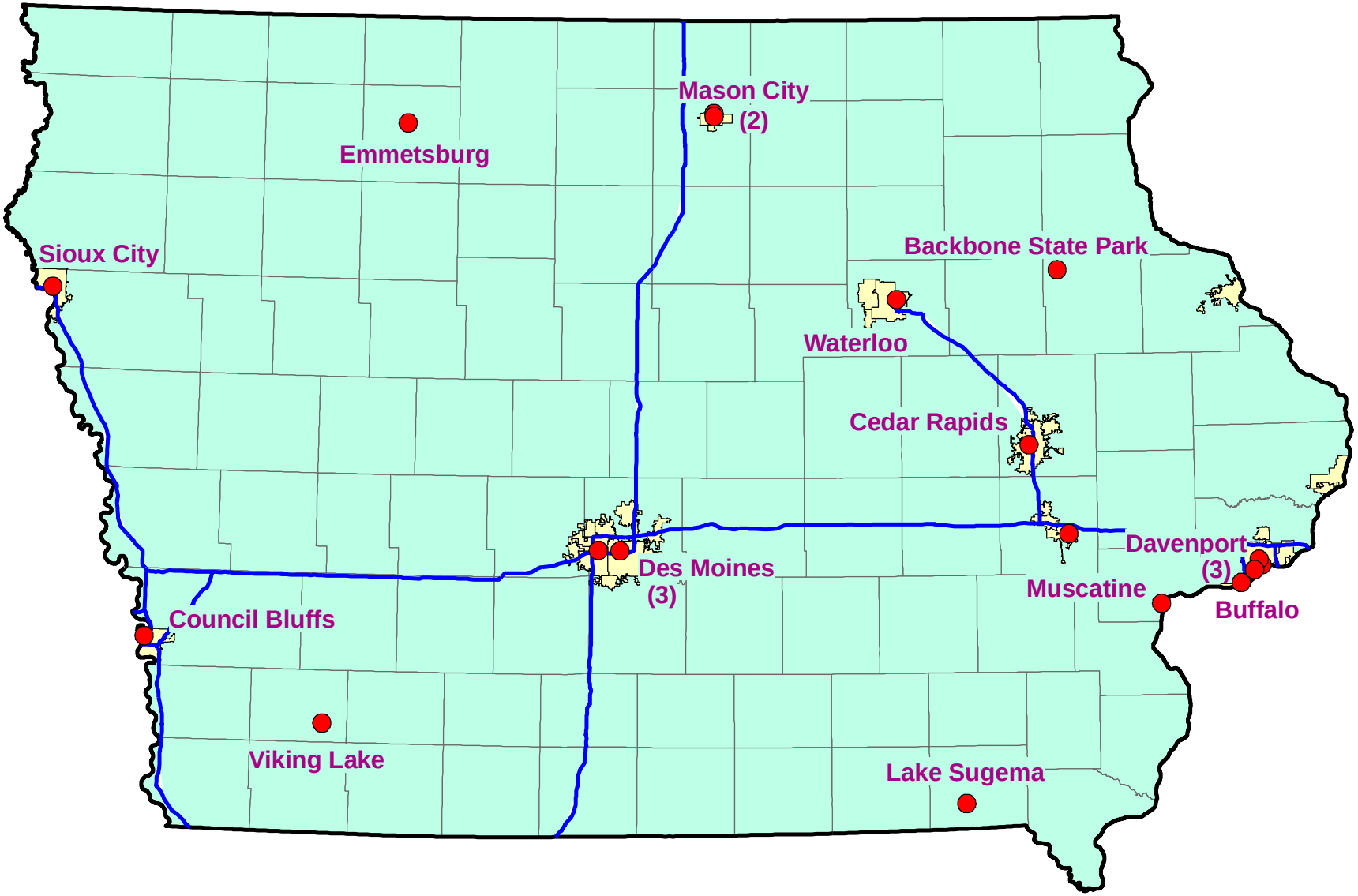
2016 Data Completeness – $PM_{2.5}$



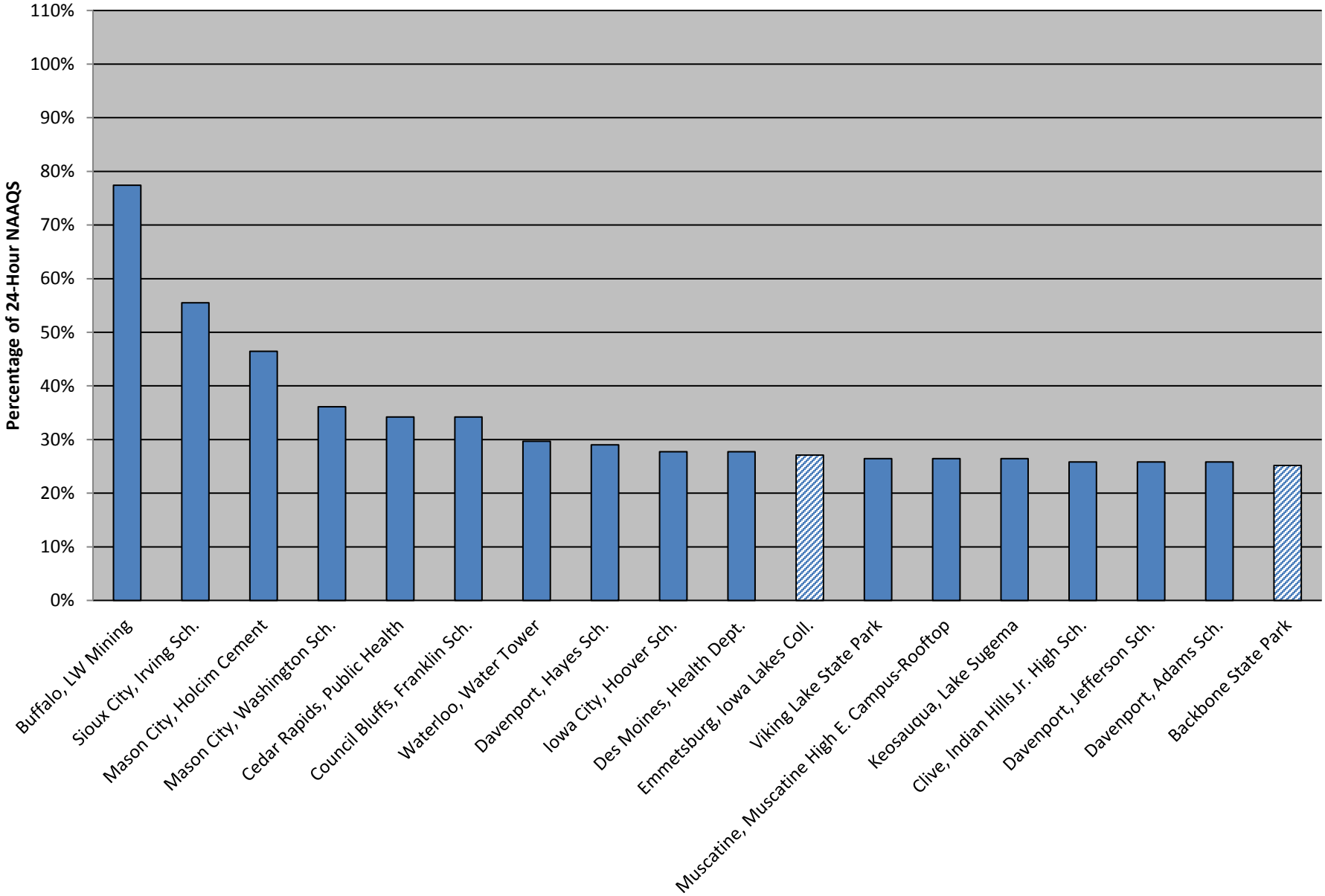
PM_{10} Monitoring Sites

Site	Name	City	County	Site Label
190130009	Water Tower	Waterloo	Black Hawk	Waterloo, Water Tower
190330018	Holcim Cement	Mason City	Cerro Gordo	Mason City, Holcim Cement
190330020	Washington School	Mason City	Cerro Gordo	Mason City, Washington Sch.
190550001	Backbone State Park	not in a city	Delaware	Backbone State Park
191032001	Hoover Elementary	Iowa City	Johnson	Iowa City, Hoover Sch.
191130040	Public Health	Cedar Rapids	Linn	Cedar Rapids, Public Health
191370002	Viking Lake State Park	not in a city	Montgomery	Viking Lake State Park
191390015	Muscatine High E. Campus-Rooftop	Muscatine	Muscatine	Muscatine, Muscatine High E. Campus-Rooftop
191471002	Iowa Lakes College	Emmetsburg	Palo Alto	Emmetsburg, Iowa Lakes Coll.
191530030	Health Department	Des Moines	Polk	Des Moines, Health Dept.
191532510	Indian Hills Jr. High School	Clive	Polk	Clive, Indian Hills Jr. High Sch.
191550009	Franklin School	Council Bluffs	Pottawattamie	Council Bluffs, Franklin Sch.
191630015	Jefferson School	Davenport	Scott	Davenport, Jefferson Sch.
191630017	Linwood Mining	Buffalo	Scott	Buffalo, LW Mining
191630018	Adams School	Davenport	Scott	Davenport, Adams Sch.
191630020	Hayes School	Davenport	Scott	Davenport, Hayes School
191770006	Lake Sugema	not in a city	Van Buren	Keosauqua, Lake Sugema
191930021	Irving School	Sioux City	Woodbury	Sioux City, Irving School

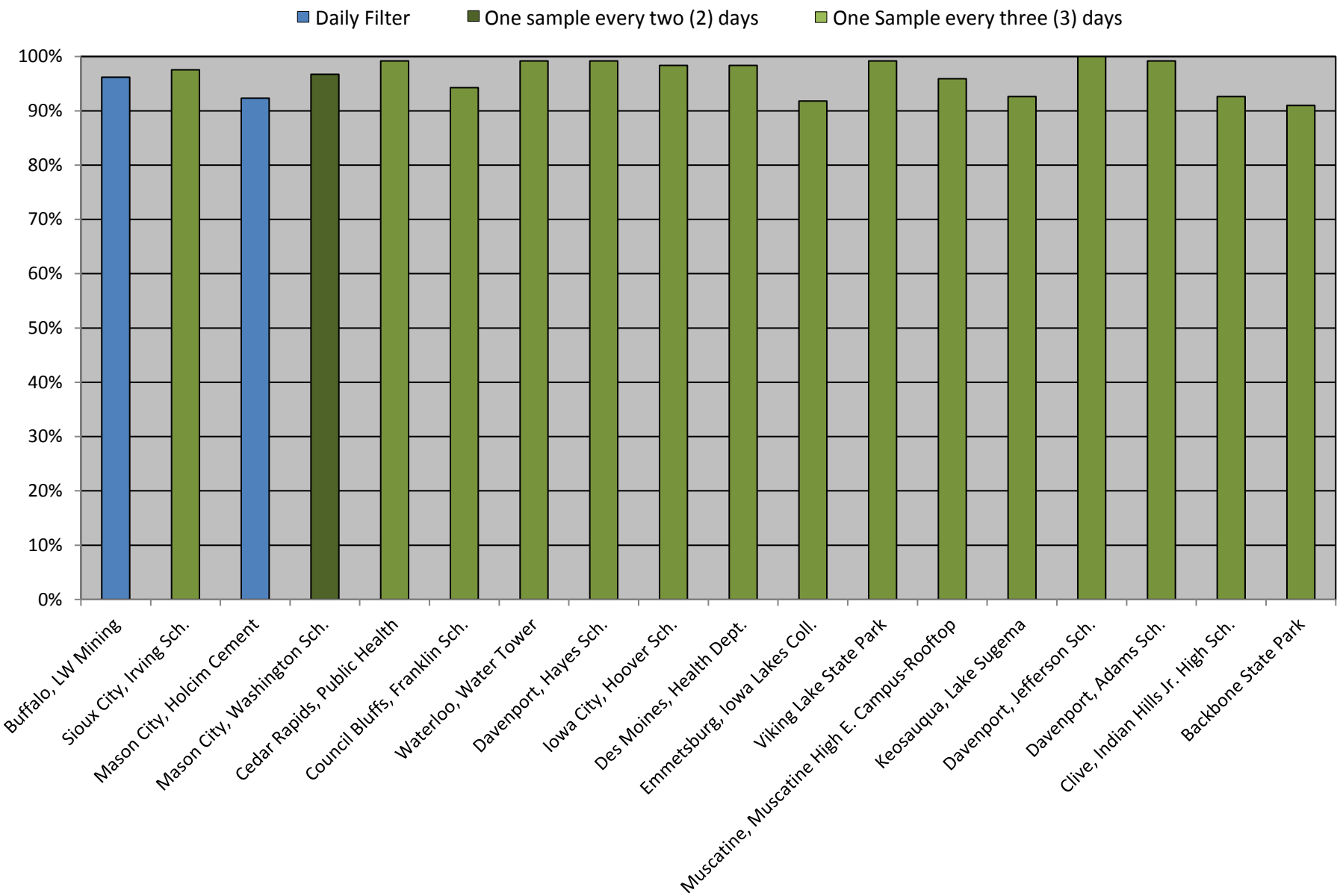
PM_{10} Monitoring Locations



Comparison of 2016 PM_{10} Data with the National Ambient Air Quality Standard



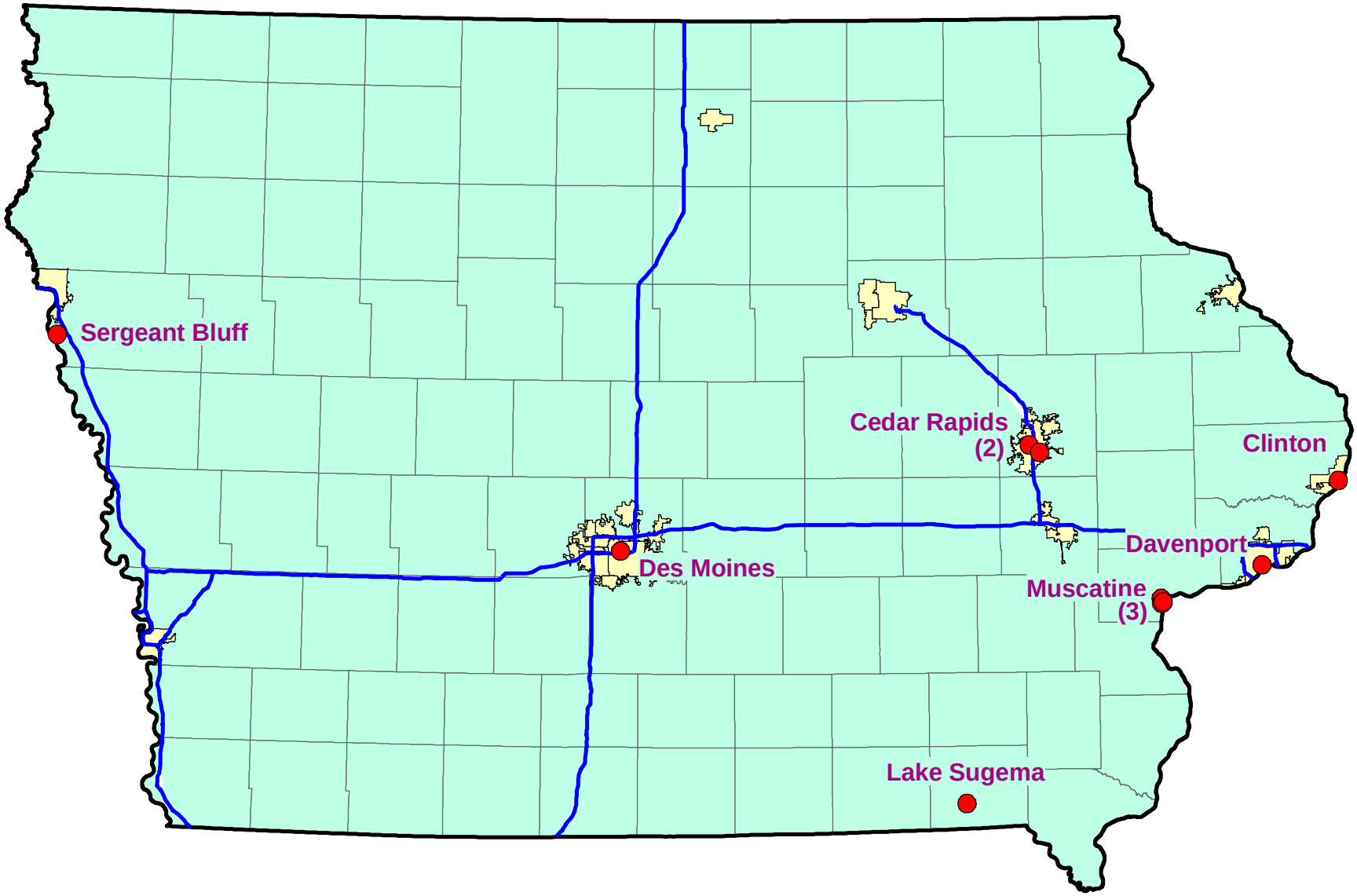
2016 Data Completeness – PM_{10}



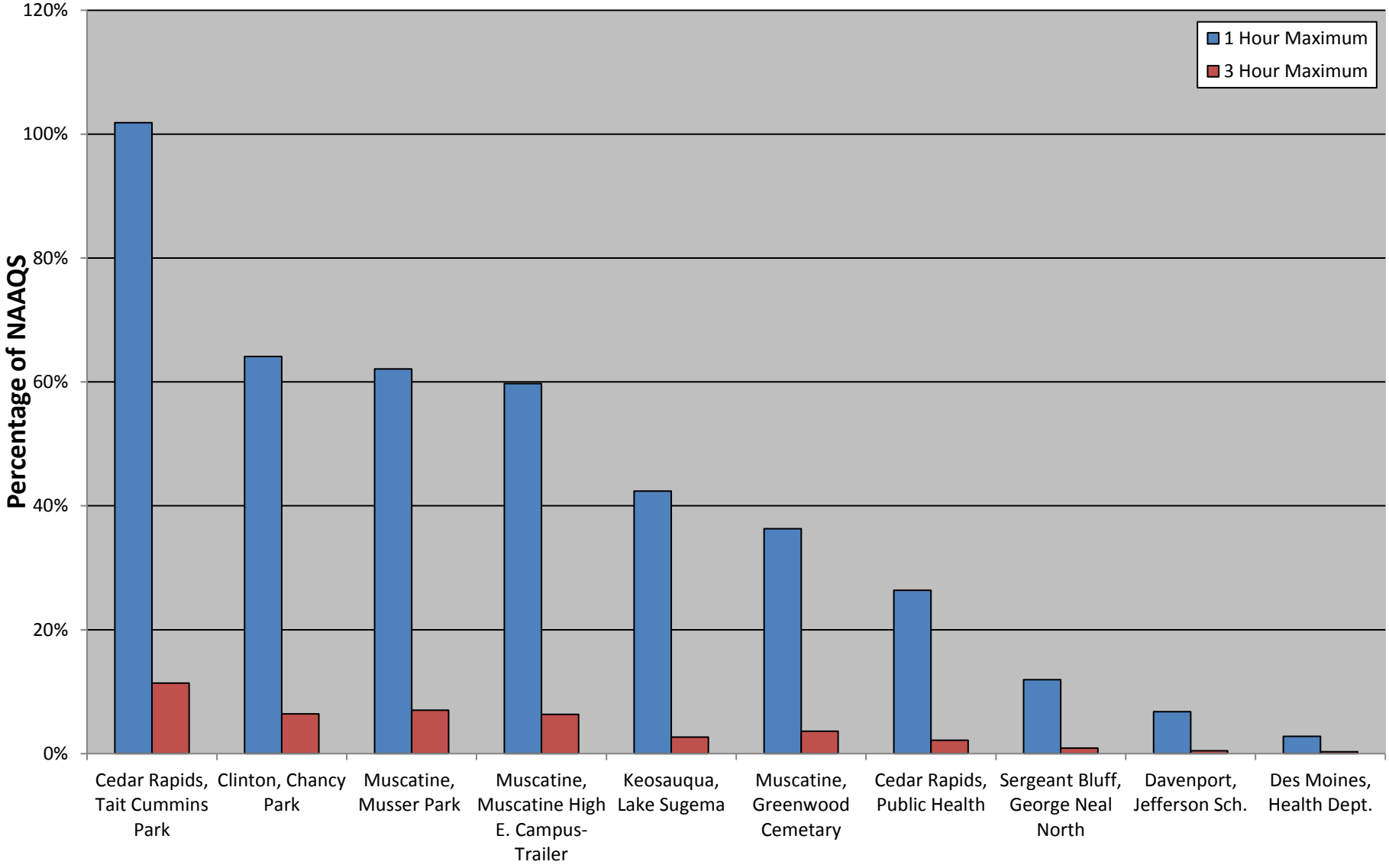
Sulfur Dioxide Monitoring Sites

Site	Name	City	County	Site Label
190450019	Chancy Park	Clinton	Clinton	Clinton, Chancy Park
191130040	Public Health	Cedar Rapids	Linn	Cedar Rapids, Public Health
191130041	Tait Cummins Park	Cedar Rapids	Linn	Cedar Rapids, Tait Cummins Park
191390016	Greenwood Cemetery	Muscatine	Muscatine	Muscatine, Greenwood Cemetery
191390019	Muscatine High E. Campus-Trailer	Muscatine	Muscatine	Muscatine, Muscatine High E. Campus-Trailer
191390020	Musser Park	Muscatine	Muscatine	Muscatine, Musser Park
191530030	Health Department	Des Moines	Polk	Des Moines, Health Dept.
191630015	Jefferson School	Davenport	Scott	Davenport, Jefferson Sch.
191770006	Lake Sugema	not in a city	Van Buren	Keosauqua, Lake Sugema
191930020	George Neal North	Sergeant Bluff	Woodbury	Sergeant Bluff, George Neal North

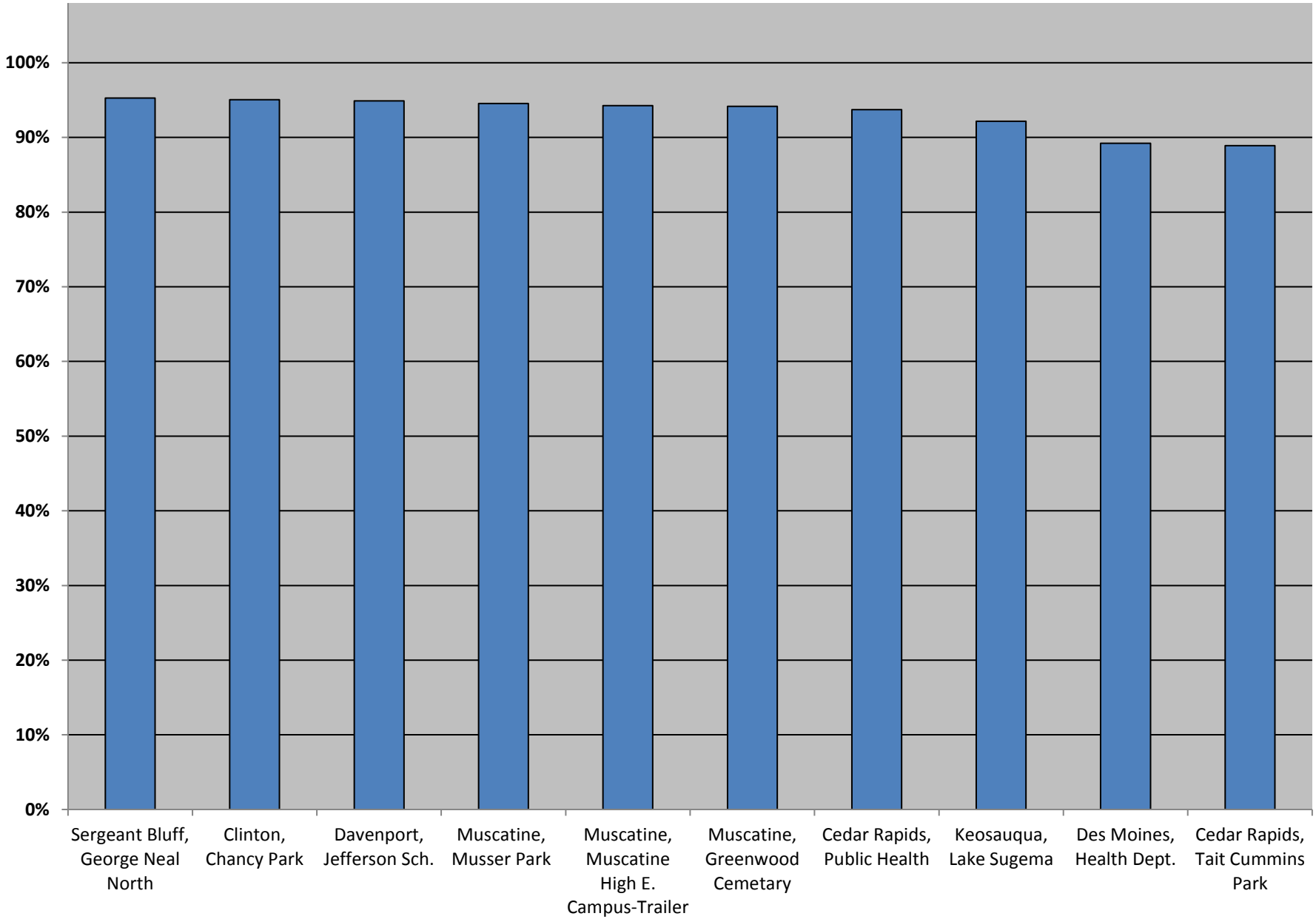
Sulfur Dioxide Monitoring Locations



Comparison of 2016 Sulfur Dioxide Data with National Ambient Air Quality Standards



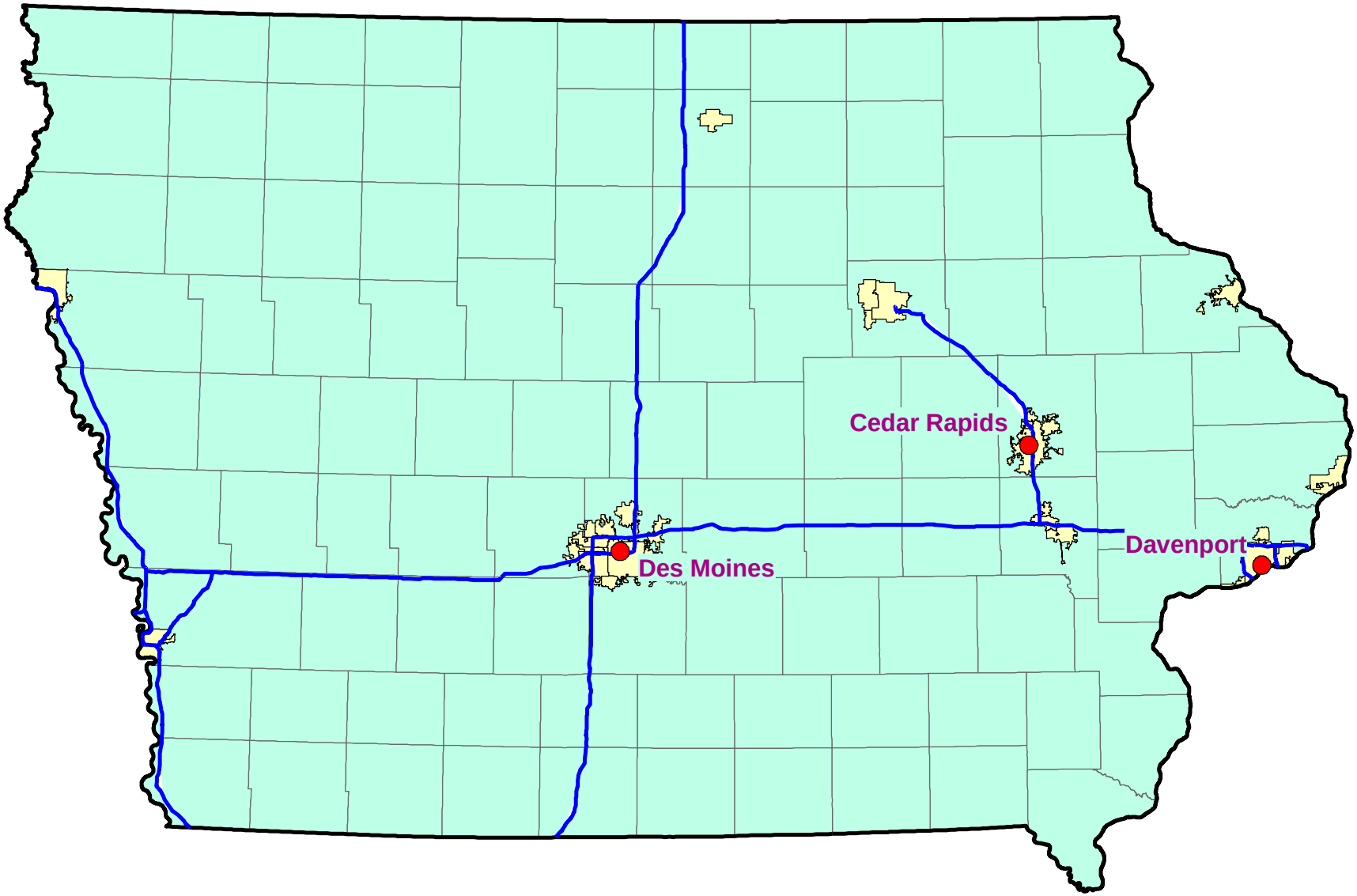
2016 Data Completeness – Sulfur Dioxide



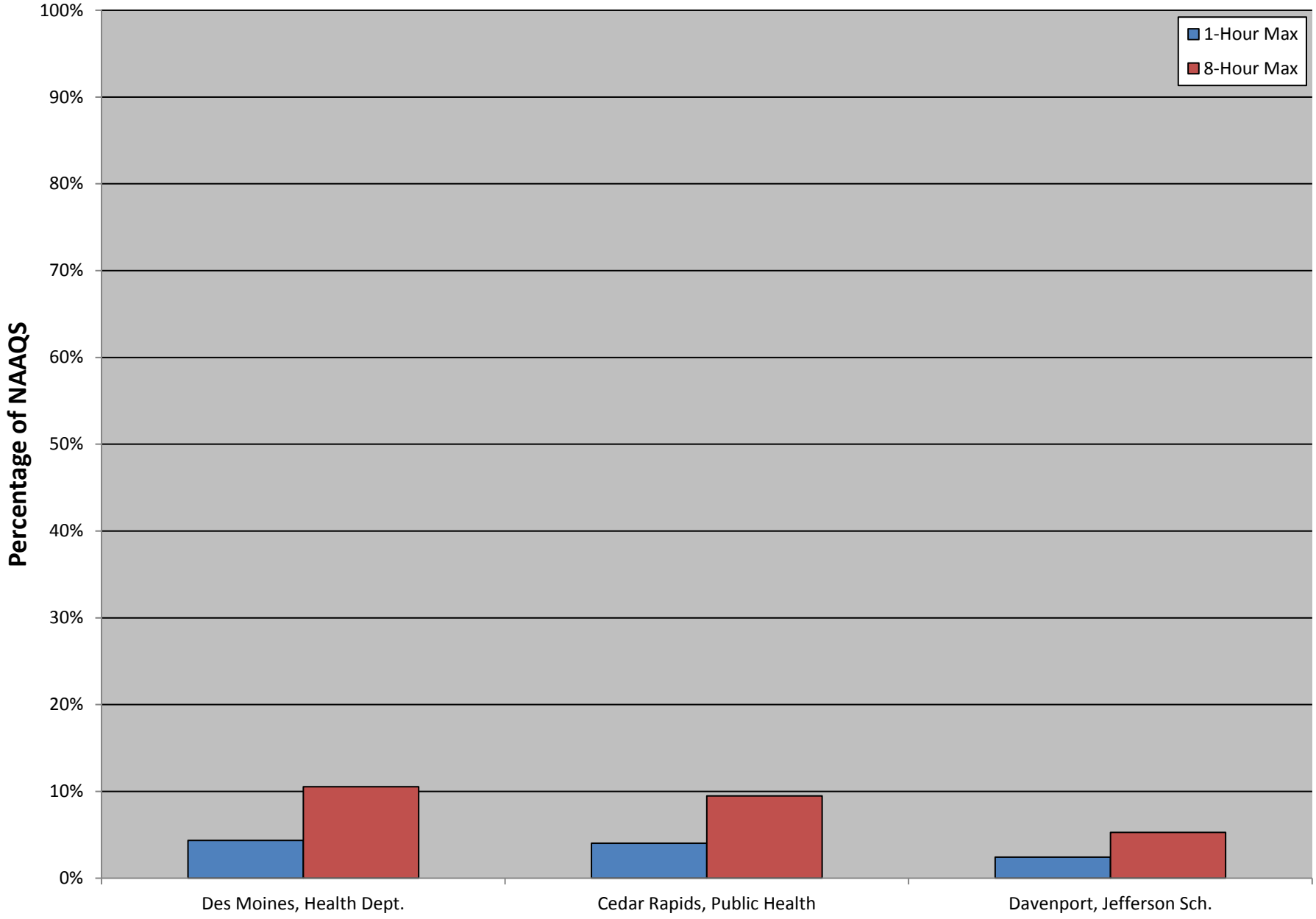
Carbon Monoxide Monitoring Sites

Site	Name	City	County	Site Label
191130040	Public Health	Cedar Rapids	Linn	Cedar Rapids, Public Health
191530030	Health Department	Des Moines	Polk	Des Moines, Health Dept.
191630015	Jefferson School	Davenport	Scott	Davenport, Jefferson Sch.

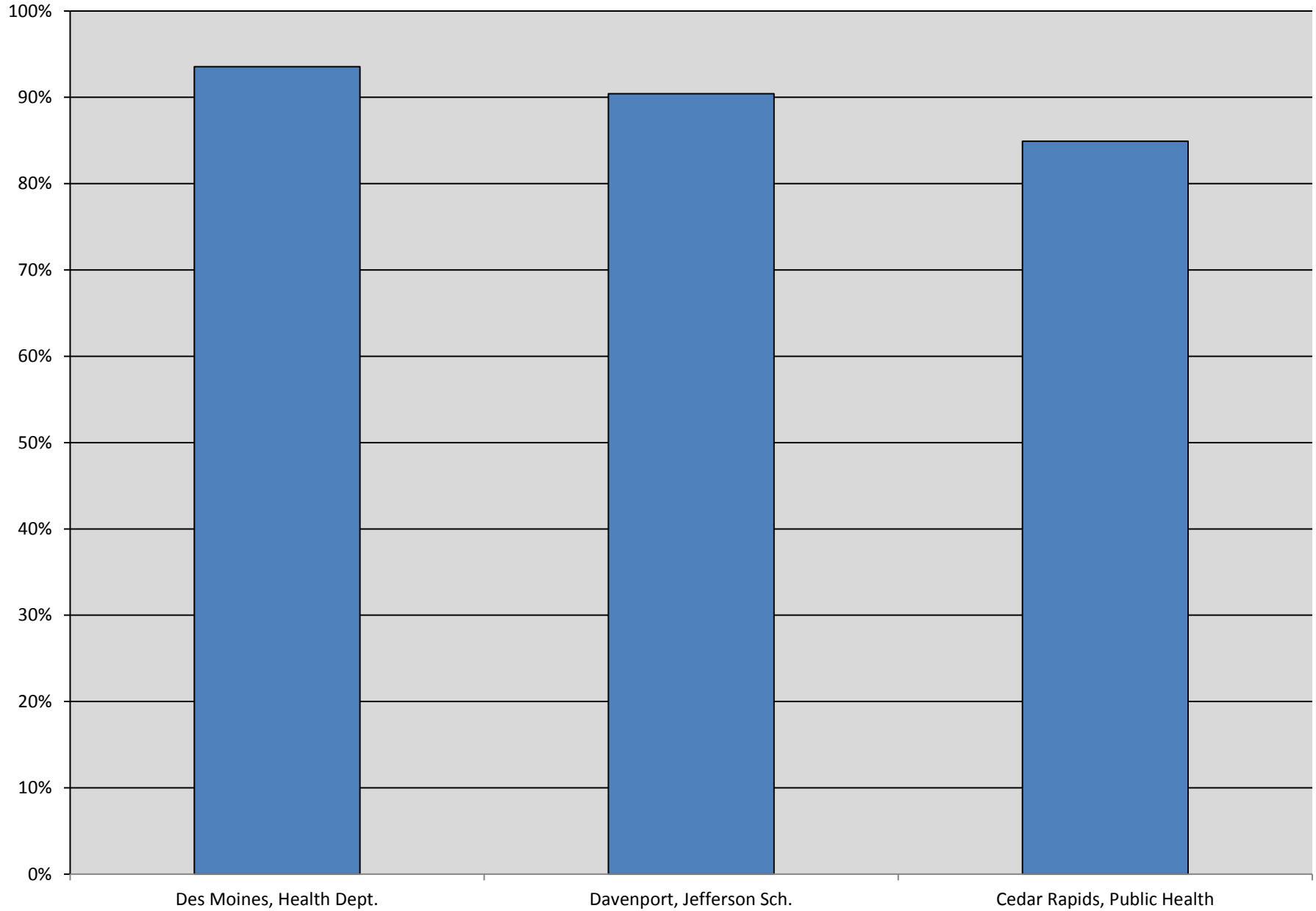
Carbon Monoxide Monitoring Locations



Comparison of 2016 Carbon Monoxide Data with National Ambient Air Quality Standards



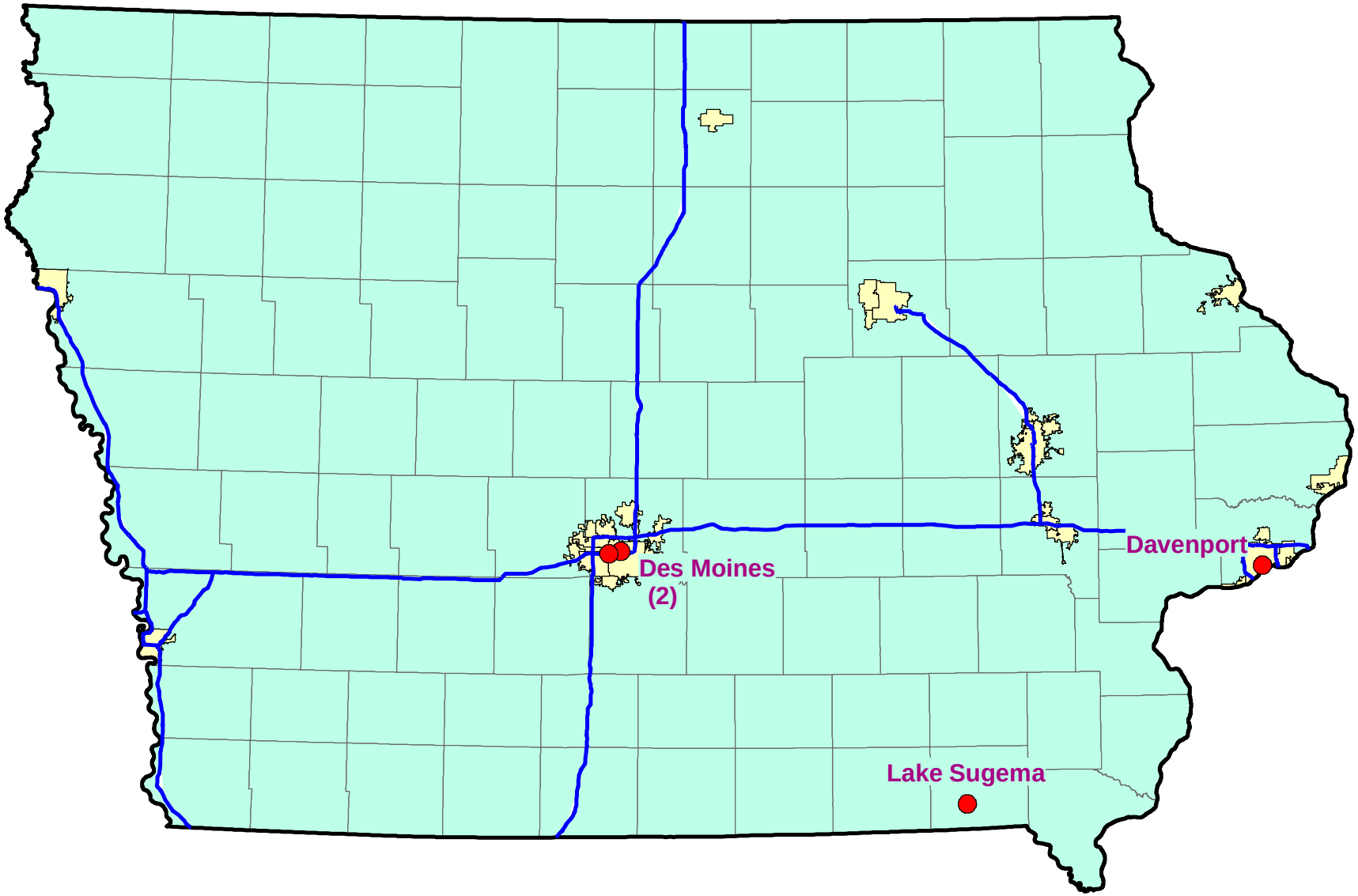
2016 Data Completeness – Carbon Monoxide



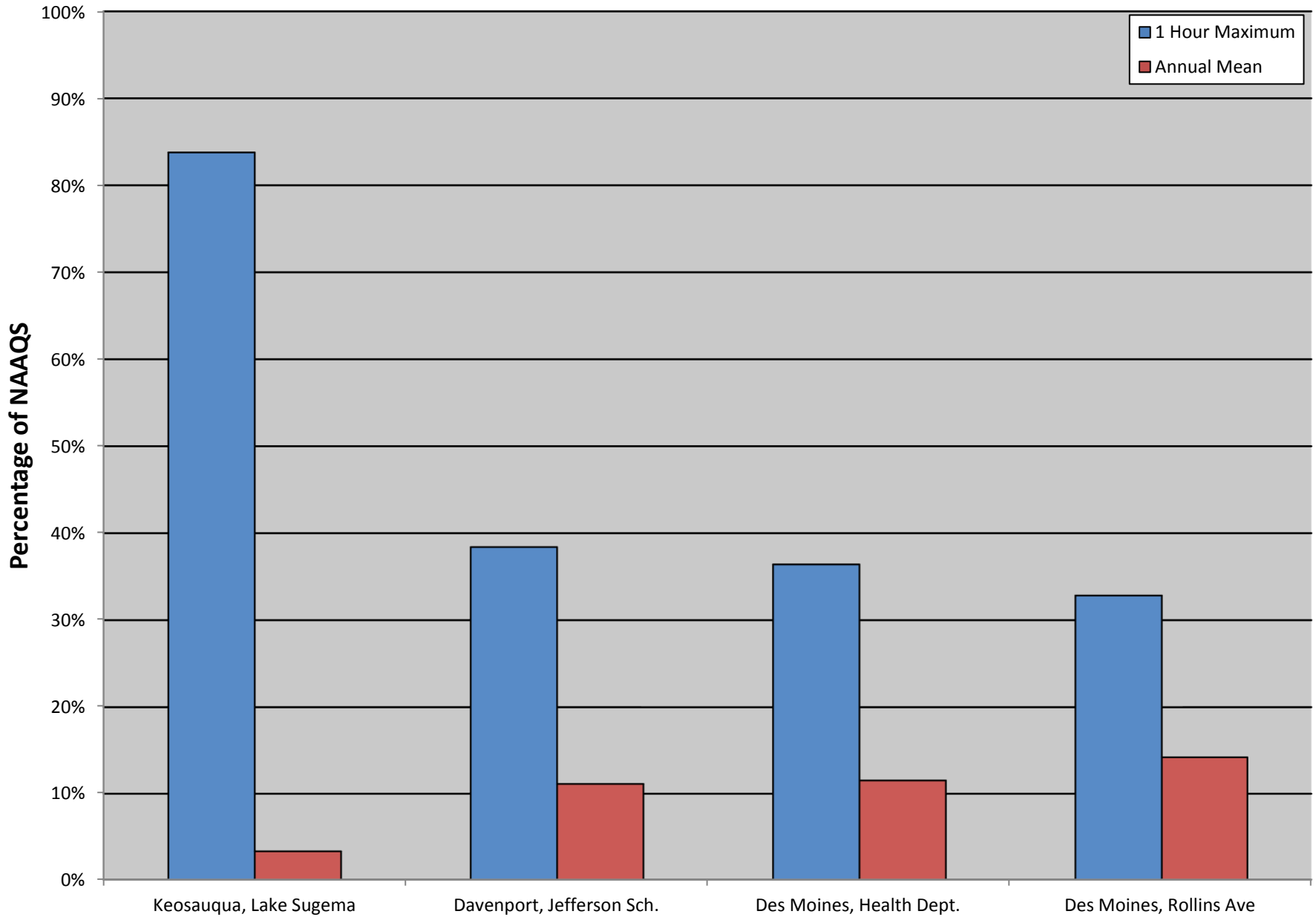
Nitrogen Dioxide Monitoring Sites

Site	Name	City	County	Site Label
191530030	Health Department	Des Moines	Polk	Des Moines, Health Dept.
191536011	Des Moines, Near-Road NO_2	Des Moines	Polk	Des Moines, Near-Road NO_2
191630015	Jefferson School	Davenport	Scott	Davenport, Jefferson Sch.
191770006	Lake Sugema	not in a city	Van Buren	Keosauqua, Lake Sugema

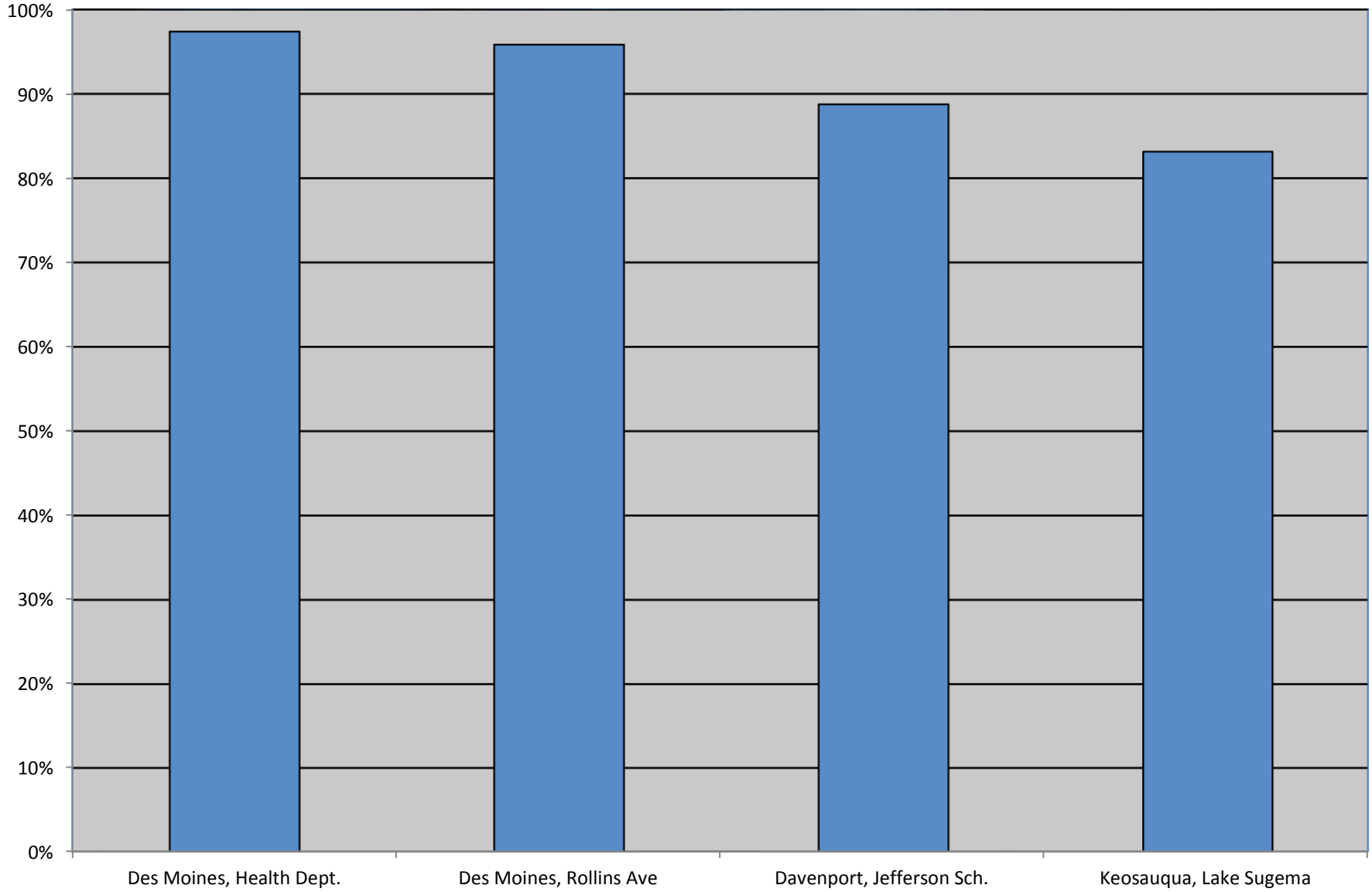
Nitrogen Dioxide Monitoring Locations



Comparison of 2016 Nitrogen Dioxide Data with the National Ambient Air Quality Standards



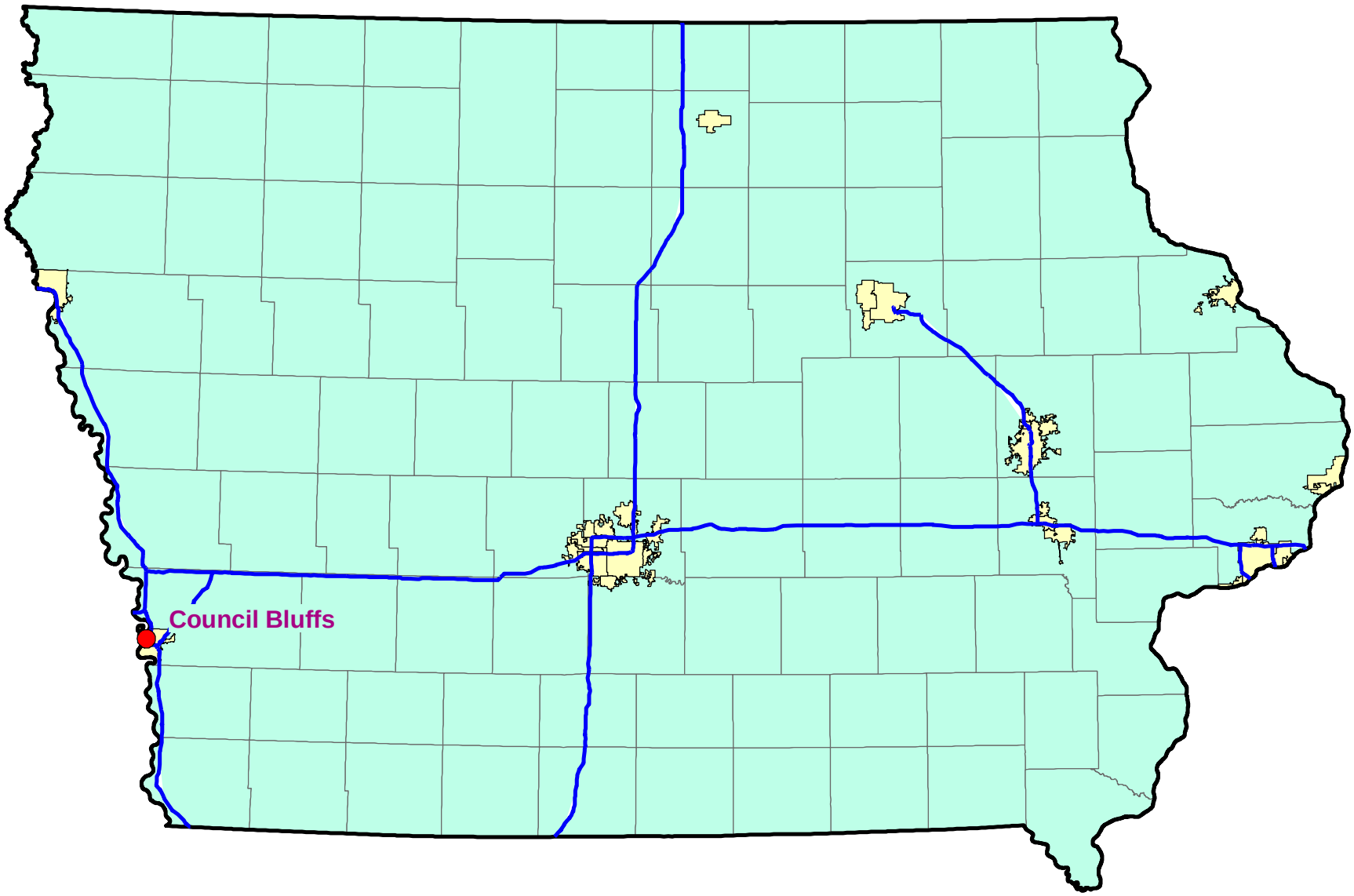
2016 Data Completeness – Nitrogen Dioxide



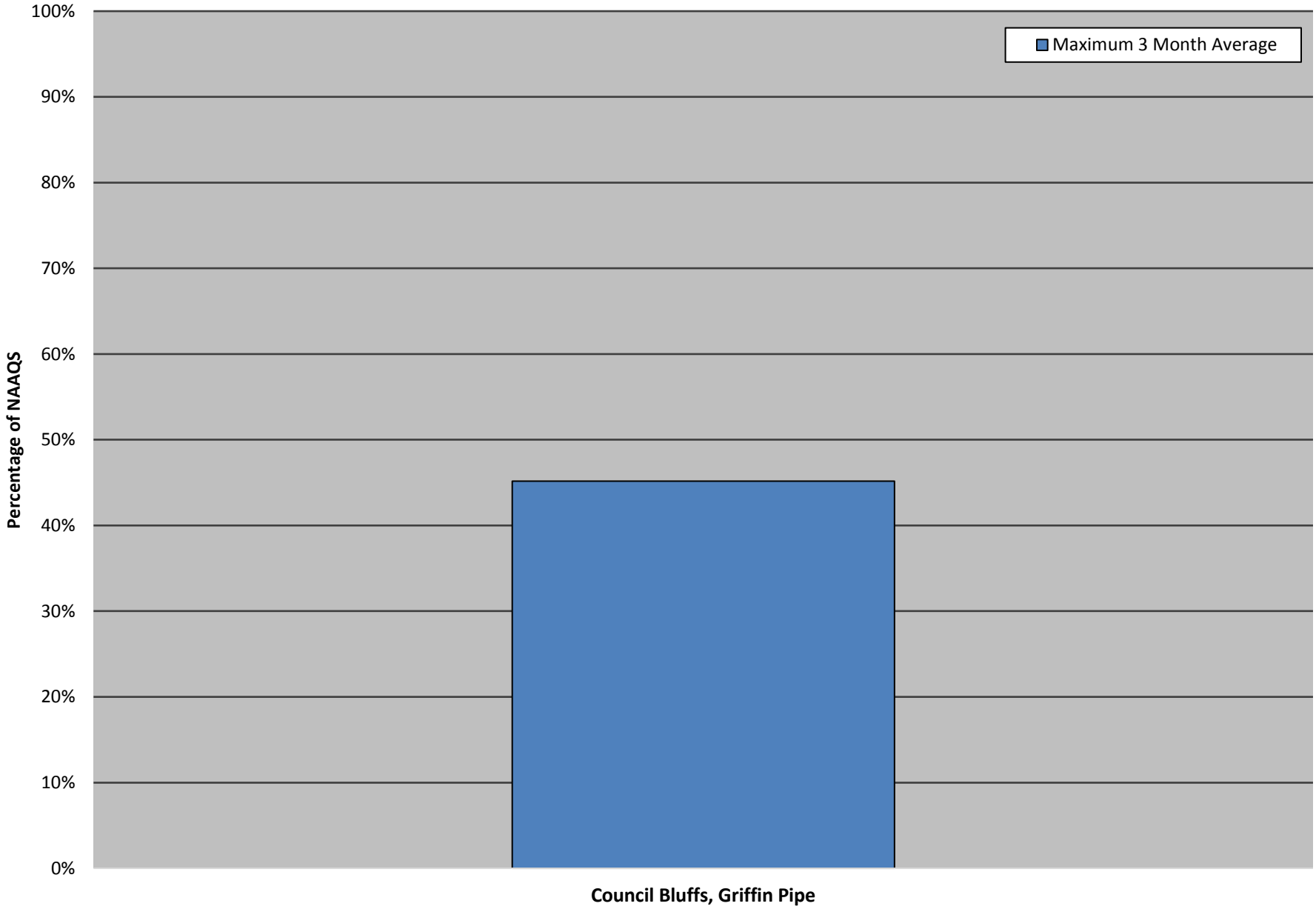
Lead Monitoring Site

Site	Name	City	County	Site Label
191550011	Griffin Pipe	Council Bluffs	Pottawattamie	Council Bluffs, Griffin Pipe

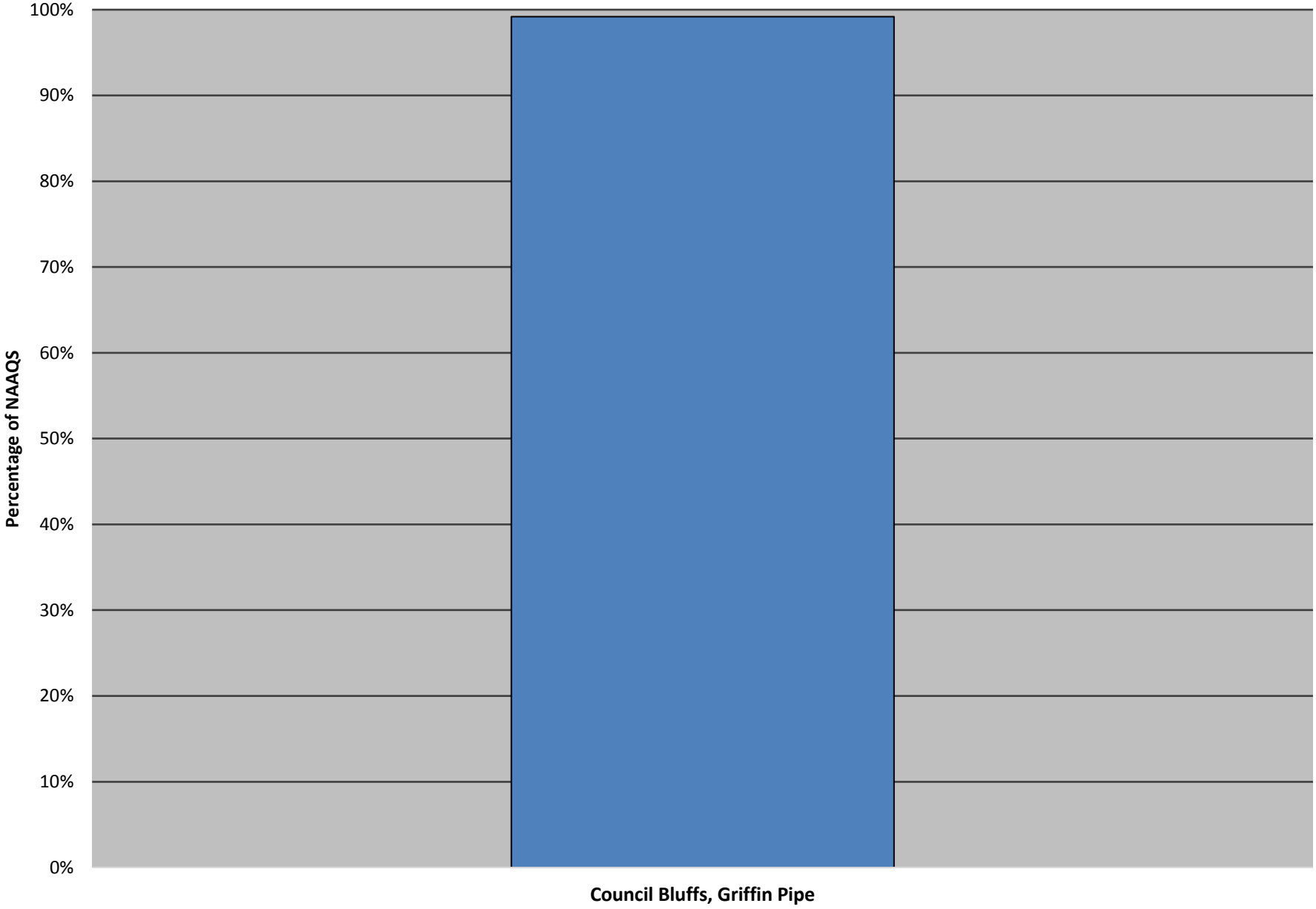
Lead Monitoring Locations



Comparison of 2016 Lead Data with the National Ambient Air Quality Standard



2016 Data Completeness – Lead



Appendix A

Additional Chart Information

Listed below is additional information that may be useful in interpreting the charts contained in this review

Ozone

Comparison of 2016 Ozone Data with National Ambient Air Quality Standard

This chart shows the highest eight-hour ozone average expressed as a percentage of the 71 ppb eight-hour NAAQS for each ozone monitoring site in 2016. Striped bars on the graph denote monitors with completeness of less than 75%.

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Data Completeness – Ozone

This chart shows the total number of valid ozone monitoring days (expressed as a percentage of the total number of days in ozone season) for each ozone site operated in 2016. Two monitors are operated at each site ozone site. One monitor at the site is designated as the primary monitor, and the other is designated as the secondary monitor. The hourly ozone data for the site is the same as the data from the primary monitor unless the data from the primary monitor is missing, and in this case the data from the secondary monitor is substituted into the site record.

This chart shows the total number of valid ozone monitoring days (expressed as a percentage of the total number of days in ozone season) for each ozone site operated in 2016. According to EPA guidelines, an ozone monitoring day is considered valid if at least 13 of the 17 eight-hour averages from 7:00 am – 11:00 pm each day are valid. An 8-hour average is valid if at least 75% of the hourly average values for the 8-hour period are available. In the event that less than 13 of the 8-hour averages are recorded, a day is also deemed valid if the daily maximum 8-hour average for that day exceeds the NAAQS (>71 ppb). Ozone season runs from April through October, and amounts to 214 possible sampling days. Ozone sites that recorded data for all 214 days of the season would have a data capture rate of 100%.

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$PM_{2.5}$

Comparison of 2016 $PM_{2.5}$ Data with National Ambient Air Quality Standards

This chart shows the highest 24-hour value (expressed as a percentage of the 35.5 $\mu g/m^3$ 24-hour NAAQS), and the annual average (expressed as a percentage of the 12.05 $\mu g/m^3$ annual NAAQS) for each $PM_{2.5}$ site operated in 2016. Striped bars on the graph denote sites with one or more calendar quarters with completeness of less than 75%. The site at Emmetsburg, Iowa Lakes Community College experienced completeness of 73% fourth quarter of 2016.

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Data Completeness – $PM_{2.5}$

This chart shows the fraction of scheduled sampling days for each $PM_{2.5}$ site operated in 2016. During 2016 $PM_{2.5}$ samplers in Iowa were scheduled to operate at a sampling frequency of either one sample every third day (122 scheduled samples) or one sample every day (366 scheduled samples). The sampling frequency of each monitor is indicated by the color of the bar. Data capture at a site may be improved by consolidating sampler data from primary and secondary monitors (if a pair of collocated monitors is present at a site) or by collecting makeup samples. Following EPA rules, to consolidate data from two monitors, the data from the primary monitor is chosen for the site record, unless the data from the primary sampler is missing. In this case, the value from the secondary monitor is substituted into the site record. Most sites have only one sampler, and to improve data capture when a sample is missed, EPA allows makeup samples to count toward data completeness under certain circumstances.[1] Continuous $PM_{2.5}$ monitors operated in Iowa are used for real-time reporting only and are not summarized in this report.

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PM_{10}

Comparison of 2016 PM_{10} Data with National Ambient Air Quality Standard

This chart shows the highest 24-hour value (expressed as a percentage of the 155 $\mu g/m^3$ 24-hour NAAQS) for each primary PM_{10} monitor operated in 2016. Striped bars on the graph denote sites with one or more calendar quarters with completeness of less than 75%. Emmetsburg, Iowa Lakes Coll. (70% in the fourth quarter) and Backbone State Park (74% in the first quarter) failed to meet completeness requirements in 2016.

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Data Completeness – PM_{10}

This chart shows the fraction of scheduled sampling days for each PM_{10} monitor operated in 2016 where a valid PM_{10} sample was collected. During 2016 PM_{10} samplers in Iowa were scheduled to operate at a frequency of one sample every third day (122 scheduled samples), one sample every other day (183 scheduled samples) or one sample every day (366 scheduled samples). The sampling frequency of each monitor is indicated by the color of the bar in the chart. Continuous PM_{10} monitors operated in Iowa are used for real-time reporting only and are not summarized in this report.

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Sulfur Dioxide

Comparison of 2016 Sulfur Dioxide Data with National Ambient Air Quality Standards

This chart shows the highest 1-hour value (expressed as a percentage of the 75.5 ppb 1-hour NAAQS), and highest 3-hour value (expressed as a percentage of the 0.55 ppm 3-hour NAAQS) for each sulfur dioxide monitor operated in 2016.

[1] https://www3.epa.gov/ttnamti1/files/ambient/pm25/replacem.pdf

Lake Sugema experienced much higher than normal SO_2 readings during a day in which burning near the site was conducted. Excluding the day when the burning occurred, the next highest daily maximum hourly value that Lake Sugema sampled in 2016 was 2.8 ppb which is 4% of the SO_2 NAAQS.

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Data Completeness – Sulfur Dioxide

This chart shows the total number of hourly sulfur dioxide values (expressed as a percentage of the total number of hours) for each sulfur dioxide monitor that operated in 2016. A sulfur dioxide monitor that recorded data for all 8784 hours during 2016 would have a data capture rate of 100%.

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Carbon Monoxide

Comparison of 2016 Carbon Monoxide Data with National Ambient Air Quality Standards

This chart shows the highest 1-hour value (expressed as a percentage of the 35.5 ppm 1-hour NAAQS) and the highest 8-hour value (expressed as a percentage of the 9.5 ppm 8 hour NAAQS) for each carbon monoxide monitor operated in 2016.

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Data Completeness – Carbon Monoxide

This chart shows the total number of hourly carbon monoxide values (expressed as a percentage of the total number of hours in 2016). A carbon monoxide monitor that recorded data for all 8784 hours during 2016 would have a data capture rate of 100%.

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Nitrogen Dioxide

Comparison of 2016 Nitrogen Dioxide Data with National Ambient Air Quality Standards

This chart shows the maximum 1-hour value (expressed as a percentage of the 100.5 ppb 1-hour NAAQS), and the annual average (expressed as a percentage of the 0.0535 ppm annual NAAQS) for each nitrogen dioxide monitoring site that operated in 2016.

Lake Sugema experienced much higher than normal NO_2 readings during a day in which burning near the site was conducted. Excluding the day when the burning occurred, the next highest daily maximum hourly value that Lake Sugema sampled in 2016 was 12.4 ppb which is 12% of the NO_2 NAAQS.

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Data Completeness – Nitrogen Dioxide

This chart shows the total number of hourly nitrogen dioxide values (expressed as a percentage of the total number of hours in 2016). A nitrogen dioxide monitor that recorded data for all 8784 hours during 2016 would have a data capture rate of 100%.

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Lead

Comparison of 2016 Lead Data with National Ambient Air Quality Standards

This chart shows the maximum three month average (expressed as a percentage of the 0.155 $\mu g/m^3$ annual NAAQS) for each lead monitoring site that operated in 2016.

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Data Completeness – Lead

This chart shows the fraction of scheduled sampling days for each lead monitor operated in 2016 where a valid lead sample was actually collected. During 2016, lead samplers in Iowa were scheduled to operate at a one in three day sampling frequency (122 scheduled samples).

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