# Nebraska Department of Environment and Energy

# Nebraska 2022 Ambient Air Monitoring Network Plan

For the period 1 July 2022 through 30 June 2023

NDEE Document #22-043

**Jim Macy, Director**

**June 23, 2022**

NEBRASKA

Good Life. Great Resources.

DEPT. OF ENVIRONMENT AND ENERGY

This document fulfills the requirements of 40 CFR Part 58.10 for an annual plan for the ambient air quality monitoring conducted by the Nebraska Department of Environment and Energy, the Lincoln-Lancaster County Health Department, and the Douglas County Health Department.

**Contents** **Page**

**Contents** **Page**



## List of Figures

**Figure** **Page**

**Figure** **Page**



## List of Tables

**Table** **Page**

**Table** **Page**

# Acronyms, Abbreviations, and Definitions

### Agencies/Organizations

DCHD - Douglas County Health Department

EPA - United States Environmental Protection Agency

EPA R7 - United States Environmental Protection Agency Region VII

LLCHD - Lincoln/Lancaster County Health Department

NDEE - Nebraska Department of Environment and Energy

### Regulations

CFR - Code of Federal Regulations

DRR - Data Requirements Rule or 40 CFR Part 51 Subpart BB - Data Requirements for Characterizing Air Quality for the Primary $SO_2$ NAAQS

NAAQS - National Ambient Air Quality Standards

Title 129 - Nebraska Air Quality Regulations

### Site Types

IMPROVE - Interagency Monitoring of Protected Visual Environments (monitoring performed to evaluate regional haze)

MDN - Mercury Deposition Network (a type of NADP site)

NADP - National Atmospheric Deposition Program (analysis of deposition components in precipitation. May include NTN and MDN sites)

NCore - National Core multi-pollutant monitoring stations. Monitors at these sites are required to measure particles ($PM_{2.5}$, speciated $PM_{2.5}$, $PM_{10–2.5}$), $O_3$, $SO_2$, CO, nitrogen oxides ($NO/NO_y$), Pb, and basic meteorology.

NTN - National Trends Network (a type of NADP site that analyzes for acidity, sulfate, nitrate, ammonium, chloride, and base cations (e.g., CA, Mg, K and Na))

SLAMS - State and Local Air Monitoring Stations

### Monitor Terminology

AirNow - EPA web application that reports current local air quality conditions (airnow.gov).

AQS - Air Quality System, the name for EPA's air monitoring data base

FRM - Federal Reference Method used for determining compliance with the NAAQS

FEM - Federal Equivalent Method used for determining compliance with the NAAQS

PWEI - Population Weighted Emissions Index (a term defined in 40 CFR Part 58 Appendix D that relates to $SO_2$ monitoring requirements)

2021 Network Plan - Nebraska's *2021 Ambient Air Monitoring Network Plan*

2022 Network Plan – Nebraska's *2022 Ambient Air Monitoring Network Plan (i.e., this document)*

### Concentration Units

ppb - Parts per billion (a volume/volume concentration unit)

ppm - Parts per million (a volume/volume concentration unit)

$mg/m^3$ - Milligrams per cubic meter (a mass/volume concentration unit)

$\mu g/m^3$ - Micrograms per cubic meter (a mass/volume concentration unit)

# Acronyms, Abbreviations, and Definitions (continued)

**Pollutants**

CO - Carbon Monoxide

NO - Nitric Oxide

$NO_2$ - Nitrogen Dioxide

NOx - Oxides of nitrogen, including NO, $NO_2$, and NOy

NOy - Total reactive oxides of nitrogen. The parameter NOy – NO measured at NCore sites approximates the concentration of $NO_2$ but may report higher than the actual concentration.

$O_3$ - Ozone

Pb - Lead

TSP-Pb - Lead sampled using a TSP sampler

$PM_{2.5}$ - Particulate matter with an average diameter equal to or less than 2.5 micrometers or microns (reported as $\mu g/m^3$ with air volumes measured at local conditions)

$PM_{10}$ - Particulate matter with an average diameter equal to or less than 10 micrometers or microns (reported as $\mu g/m^3$ with air volumes measured at standard conditions (25º C, 1 atm))

$PM_{10-2.5}$ - The difference between $PM_{10}$ and $PM_{2.5}$ (Both being calculated at local conditions)

$SO_2$ - Sulfur Dioxide

SOx - Group of sulfur oxides, including $SO_2$ and $SO_3$

TSP - Total Suspended Particulates

**Definitions**

Criteria Pollutants – The six pollutants for which National Ambient Air Quality Standards (NAAQS) have been established: carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, particulates, and lead.

*in situ* - A Latin phrase meaning *in the place*. As used in this report it refers to the formation of pollutants in the atmosphere. For example, ozone is formed *in situ* from the photochemical reaction of pollutant precursors. Ozone is not emitted directly from sources. $PM_{2.5}$ and haze are also formed *in situ*, although they are also emitted by sources. $PM_{10}$ and CO, on the other hand, are largely emitted from sources; *in situ* formation being of minimal importance. NOx and SOx are emitted and then undergo transformations to $NO_2$ and $SO_2$; they also can play a role in the *in-situ* formation of ozone and $PM_{2.5}$.

**Census Terms**

Core-Based Statistical Area (CBSA) – a geographic area defined by the Office of Management and Budget containing an urbanized core of at least 10,000 people and adjacent areas that have a high degree of social and economic integration with the core. CBSAs are made up of whole counties or county equivalents.

Metropolitan Statistical Area (MSA) – a CBSA that has at least one urbanized area with population of 50,000 or more.

Micropolitan Statistical Area (MiSA) – a CBSA that has at least one urban cluster with population at least 10,000 but less than 50,000.

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## I. Introduction and Purpose

This Nebraska 2022 Ambient Air Monitoring Network Plan (hereafter referred to as the "2022 Network Plan") was prepared to meet federal requirements set forth in 40 CFR Part 58.10. State air monitoring agencies are required to submit to the U.S. Environmental Protection Agency (EPA) by July 1 each year an ambient air monitoring network plan with the following purposes:

- Describe the current ambient air monitoring network, including the location and purpose of each monitoring site.
- Describe changes made in the network since submission of the previous plan.
- Review whether the ambient air monitoring network meets the requirements set forth in 40 CFR Part 58 Appendices A, C, D, and E.
- Describe planned and possible changes in the ambient air monitoring network in the upcoming year, as best they can be determined at the time the plan is prepared.

## II. Public Participation

Federal regulations require that annual ambient air monitoring network plans must be made available for public inspection and comment for at least 30 days prior to submission to the EPA. The Nebraska Department of Environment and Energy (NDEE) meets this requirement by posting the plan on the NDEE website (http://deq.ne.gov/Publica.nsf/Pubs_Air_Amb.xsp). Written comments regarding this 2021 Network Plan may be submitted to the Nebraska Department of Environment and Energy during the 30-day inspection period as provided below:

Mail:

Nebraska Department of Environment and Energy
Attn: David Adams – Monitoring Section
PO Box 98922
Lincoln, NE 68509-8922

Email:

NDEE.airquality@nebraska.gov

The deadline for submittal of written comments can be found on the NDEE website. Informal inquiries may also be directed to David Adams at 402-471-4159. Verbal comments are not necessarily included or addressed as review comments.

## III. Purpose of Ambient Air Quality Monitoring

The Clean Air Act requires EPA to set National Ambient Air Quality Standards (NAAQS) for pollutants that are common in outdoor air, that come from numerous and diverse sources, and are considered harmful to public health and the environment. Standards have been established for six "criteria" air pollutants: carbon monoxide (CO), nitrogen dioxide ($NO_2$), sulfur dioxide ($SO_2$), ozone ($O_3$), lead, and particle pollution, which is subdivided into particulate matter less than 10 micrometers in diameter ($PM_{10}$), and particulate matter less than 2.5 micrometers in diameter ($PM_{2.5}$).

The statute established two types of national standards for each criteria pollutant. Primary standards set limits to protect public health, including the health of sensitive populations such as people with asthma, children, and the elderly. Secondary standards set limits to protect the public welfare and the environment, including protection against damage to animals, crops, vegetation, and to prevent visibility impairment. The current

primary and secondary standards are shown in Table III-1. Units of measure for the standards are parts per million (ppm) by volume, parts per billion (ppb) by volume, and micrograms per cubic meter of air ($\mu g/m^3$).

An ambient air monitoring network serves several purposes:

(1) Provide air pollution data to the public in a timely manner.
(2) Support compliance with ambient air quality standards and pollution control strategies.
(3) Support air pollution research studies.

An area that is in compliance with the standard for a criteria pollutant is said to be in attainment. All areas of Nebraska are currently in attainment for each of the NAAQS.

**Table III-1. National Ambient Air Quality Standards (NAAQS)**

| Pollutant | | Primary/ Secondary | Averaging Time | Level | Form |
|---|---|---|---|---|---|
| Carbon Monoxide (CO) | | Primary | 8 hours | 9 ppm | Not to be exceeded more than once per year |
| | | | 1 hour | 35 ppm | |
| Lead | | Primary and Secondary | Rolling 3-month average | 0.15 $\mu g/m^3$ (1) | Not to be exceeded |
| Nitrogen Dioxide ($NO_2$) | | Primary | 1 hour | 100 ppb | 98th percentile of 1-hour daily maximum concentrations, averaged over 3 years |
| | | Primary and Secondary | 1 year | 53 ppb (2) | Annual mean |
| Ozone ($O_3$) | | Primary and Secondary | 8 hours | 0.070 ppm (3) | Annual fourth-highest daily maximum 8-hour average concentration, averaged over 3 years |
| Particle Pollution (PM) | $PM_{2.5}$ | Primary | 1 year | 12.0 $\mu g/m^3$ | Annual mean, averaged over 3 years |
| | | Secondary | 1 year | 15.0 $\mu g/m^3$ | Annual mean, averaged over 3 years |
| | | Primary and Secondary | 24 hours | 35 $\mu g/m^3$ | 98th percentile, averaged over 3 years |
| | $PM_{10}$ | Primary and Secondary | 24 hours | 150 $\mu g/m^3$ | Not to be exceeded more than once per year on average over 3 years |
| Sulfur Dioxide ($SO_2$) | | Primary | 1 hour | 75 ppb (4) | 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years |
| | | Secondary | 3 hours | 0.5 ppm | Not to be exceeded more than once per year |

(1) In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 $\mu g/m^3$ as a calendar quarter average) also remain in effect.
(2) The level of the annual $NO_2$ standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.
(3) Final rule signed October 1, 2015, and effective December 28, 2015; retained in December 2020. The previous (2008) $O_3$ standards additionally remain in effect in some areas. The previous (2008) $O_3$ standards are not revoked and remain in effect for designated areas.
(4) The previous $SO_2$ standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet one year since the effective date of designation under the current (2010) standards, and (2) any area for which an implementation plan providing for attainment of the current (2010) standard has not been submitted and approved and which is designated nonattainment under the previous $SO_2$ standards or is not meeting the requirements of a SIP call under the previous $SO_2$ standards (40 CFR 50.4(3)). A SIP call is an EPA action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the required NAAQS.

When an air quality monitor records pollutant levels that exceed the NAAQS limit, that measurement is termed a "NAAQS exceedance". For most criteria pollutants a single recorded exceedance does not violate the standard; monitor data from the most recent three-year period must be analyzed to make that determination. Federal regulations specify for each pollutant how the 3-year monitor data must be analyzed to calculate a "design value" that is compared to the level of the NAAQS to establish whether or not the measured air quality is in compliance with the standard. The Form column in Table III-1 specifies how the design value is calculated for each criteria pollutant. The most recent design values for Nebraska's ambient air monitors are presented in Appendix B.

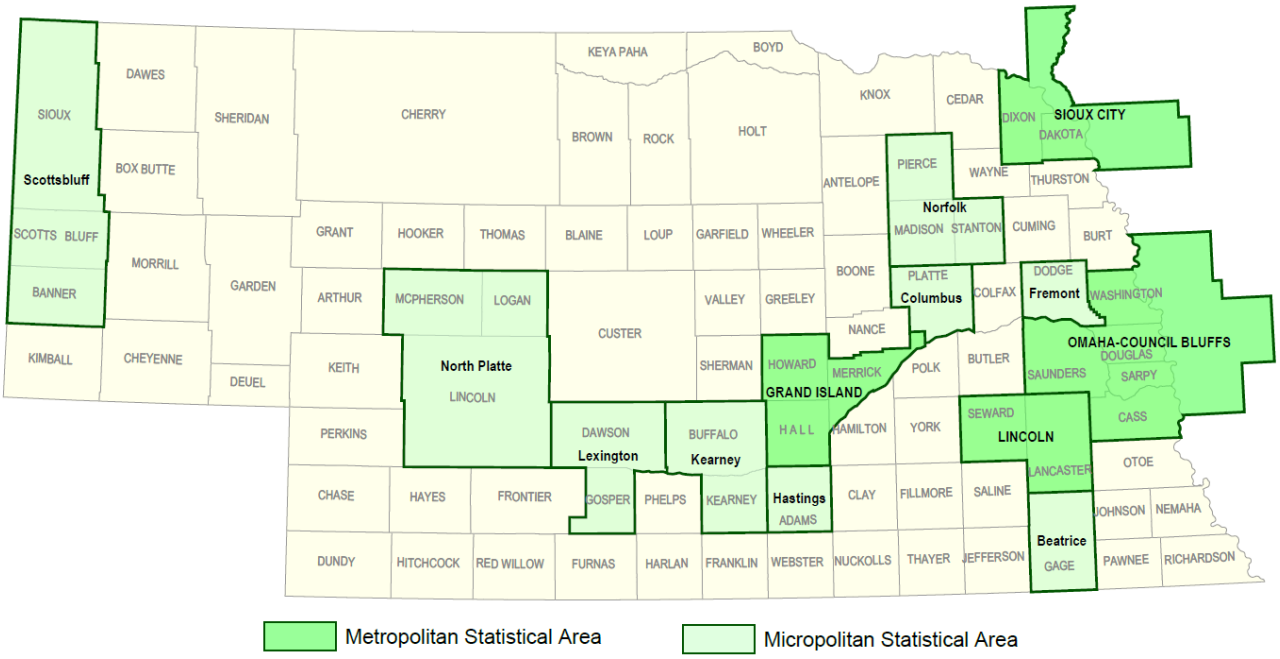
An ambient air monitoring network may include a variety of types of sites to provide information on peak air pollution levels, typical levels of exposure, air pollution levels near significant sources, and pollutant transport. EPA has identified the following general site types:

- Sites located to determine the highest concentrations expected to occur in the area covered by the network.
- Sites located to measure typical concentrations in areas of high population density.
- Sites located to determine the impact of significant sources or source categories.
- Sites located to determine general background levels.
- Sites located to determine the extent of regional pollutant transport among populated areas.
- Sites located to measure air pollution impacts on visibility, vegetation, or other welfare-based impacts.

## IV. Nebraska Metropolitan and Micropolitan Statistical Areas

Discussions in this document of the ambient air monitoring network in Nebraska are organized around the Metropolitan Statistical Areas (MSAs) and Micropolitan Statistical Areas (MiSAs) in which the monitors are located. Nebraska includes all or part of four Metropolitan Statistical Areas along with nine Micropolitan Statistical Areas. Each of these federally-defined urbanized units consists of one or more entire counties. A map of Nebraska's MSAs and MiSAs is shown in Figure IV-1 below.

**Figure IV-1. Nebraska Metropolitan and Micropolitan Statistical Areas (MSAs and MiSAs) ***



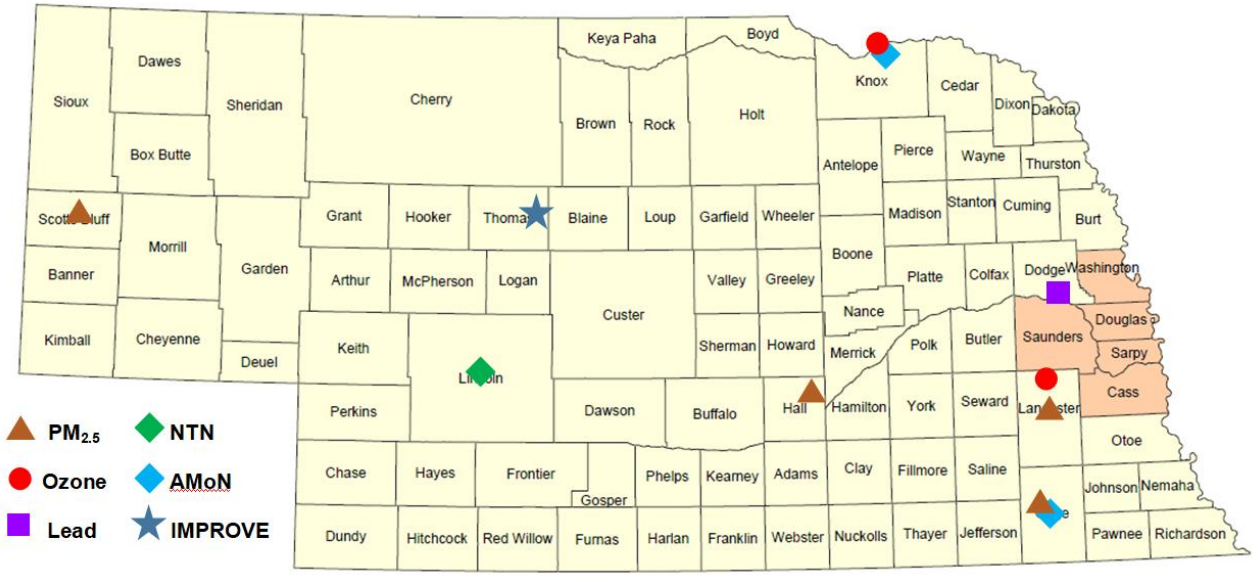

** Areas as defined by the U.S. Office of Management and Budget, September 2018.*

## V. Overview of Current Nebraska Ambient Air Monitoring Network

Nebraska's current air monitoring network is summarized in Table V-1 below, and monitor locations are shown in Figures V-1 and VI-2 below. The network description tables in Appendix A provide more detailed information on the network, including site locations and monitoring objectives.

Nebraska's State and Local Air Monitoring Stations (SLAMS) network includes sites for ozone, carbon monoxide, nitrogen oxides, sulfur dioxide, lead, $PM_{10}$, $PM_{2.5}$, and $PM_{10-2.5}$. A National Core Multipollutant Monitoring Network (NCore) station is located in Omaha to provide continuous monitoring of particles, pollutant gases, and meteorology. Monitors at the SLAMS sites are subject to 40 CFR Part 58 requirements and are used for NAAQS attainment determinations. The network is operated by the Nebraska Department of Environment and Energy and two local agencies: the Douglas County Health Department (DCHD) and the Lincoln-Lancaster County Health Department (LLCHD).

**Figure V-1. Nebraska Air Quality Monitoring Sites Outside of the Omaha-Council Bluffs Metropolitan Statistical Area, 3/31/2022**




**$PM_{2.5}$**
Lincoln (Lancaster County)
Homestead National Historic Park (Gage County)
Grand Island (Hall County)
Scottsbluff (Scottsbluff County)

**Ozone**
Davey (Lancaster County)
Santee Sioux (Knox County; CASTNET site operated by EPA)

**Lead**
Fremont (Dodge County, currently closed)

**National Atmospheric Deposition Program (NADP)**
North Platte (Lincoln County): NTN (National Trends Network)
Santee (Knox County): AMoN (Ammonia Monitoring Network)
Homestead (Gage County): AMoN

**IMPROVE**
Nebraska National Forest (Thomas County)

The Nebraska counties in the Omaha-Council Bluffs Metropolitan Statistical Area are indicated by the orange shading.

EPA operates other specialized ambient air monitoring sites in Nebraska that are not part of NDEE's SLAMS network and are not used for NAAQS attainment determinations. These sites are part of the CASTNET, IMPROVE, and NAPD networks.

The Clean Air Status and Trends Network (CASTNET) was established to assess trends in pollutant concentrations and dry deposition of acidic sulfur and nitrogen compounds. These sites also measure hourly ambient ozone concentrations. The ozone monitoring site in the Santee Sioux reservation in Knox County shown in the map above is a CASTNET site.

Interagency Monitoring of Protected Visual Environments (IMPROVE) sites host fine particulate and particulate speciation monitors intended to provide information for studying regional haze that may impact Class I National

Park and wilderness areas. The NDEE provides administrative support (with EPA funding) for one IMPROVE site at the Nebraska National Forest near Halsey, NE.

Four locations in Nebraska are part of the National Atmospheric Deposition Program (NADP), which includes several networks that measure surface deposition of air pollutants. The site at Mead (Saunders County) is part of the Mercury Deposition Network (MDN), which measures mercury concentrations in precipitation (rain and snow). The Mead and North Platte (Lincoln County) sites are part of the National Trends Network (NTN), which measures several chemicals in precipitation, including calcium, magnesium, sodium, potassium, sulfate, and nitrate. The Ammonia Monitoring Network (AMoN) measures ammonia concentrations in the air at rural sites, including the Santee Sioux CASTNET site and a location at Homestead National Historic Park. The NDEE provides administrative support (with EPA funding) for sample analyses for the NADP sites in the state.

**Table V-1. Nebraska Ambient Air Monitoring Network on March 31, 2022. (1)**

| | DCHD Omaha MSA (2)(3) | NDEE Cass County (4) | LLCHD Lincoln MSA | NDEE Other Areas | Total |
|---|---|---|---|---|---|
| SLAMS Sites (includes NCore) | 8 (5) | 1 | 2 | 4 | 15 |
| IMPROVE (6) | 0 | 0 | 0 | 1 | 1 |
| NADP (6) | 1 | 0 | 0 | 3 | 4 |
| CASTNET (6) | 0 | 0 | 0 | 1 | 1 |
| Total Monitoring Sites | 9 | 1 | 2 | 9 | 21 |
| **Sites by Pollutant: SLAMS Sites including NCore** (3) | | | | | |
| Ozone | 3 (5) | 0 | 1 | 0 | 4 |
| Carbon Monoxide | 2 | 0 | 0 | 0 | 2 |
| Nitrogen Oxides | 1 | 0 | 0 | 0 | 1 |
| Sulfur Dioxide | 2 | 0 | 0 | 0 | 2 |
| $PM_{10}$ | 3 (5) | 1 | 0 | 0 | 4 |
| $PM_{2.5}$ | 4 | 0 | 1 | 3 | 8 |
| $PM_{10-2.5}$ | 1 | 0 | 0 | 0 | 1 |
| $PM_{2.5}$ Speciation | 1 | 0 | 0 | 0 | 1 |
| Lead | 0 | 0 | 0 | 1 (7) | 1 |
| Total Pollutant Sites | 17 (3) | 1 | 2 | 4 | 24 |

Footnotes:

(1) This table summarizes the number of operating sites as of 3/31/22 in the NE SLAMS network (including NCore) by operating agency, as well as IMPROVE and NADP sites in Nebraska.

(2) The Omaha MSA encompasses five NE counties: Cass, Douglas, Sarpy, Saunders, & Washington. DCHD operates sites in Douglas, Sarpy & Washington counties. NDEE operates a site in Cass County.

(3) There were three multi-pollutant monitoring sites in the Omaha MSA in 2021: 1616 Whitmore – $SO_2$ & Ozone (2 pollutants); 24$^{th}$ & O Streets (South Omaha) – Ozone and $PM_{10}$ (2 pollutants); and NCore (42$^{nd}$ & Woolworth) – CO, NO-NOy, $O_3$, $SO_2$, and PM (8 pollutants). The number of monitoring sites by individual pollutant is thus greater than the number of monitoring locations within the Omaha MSA and for the state as a whole.

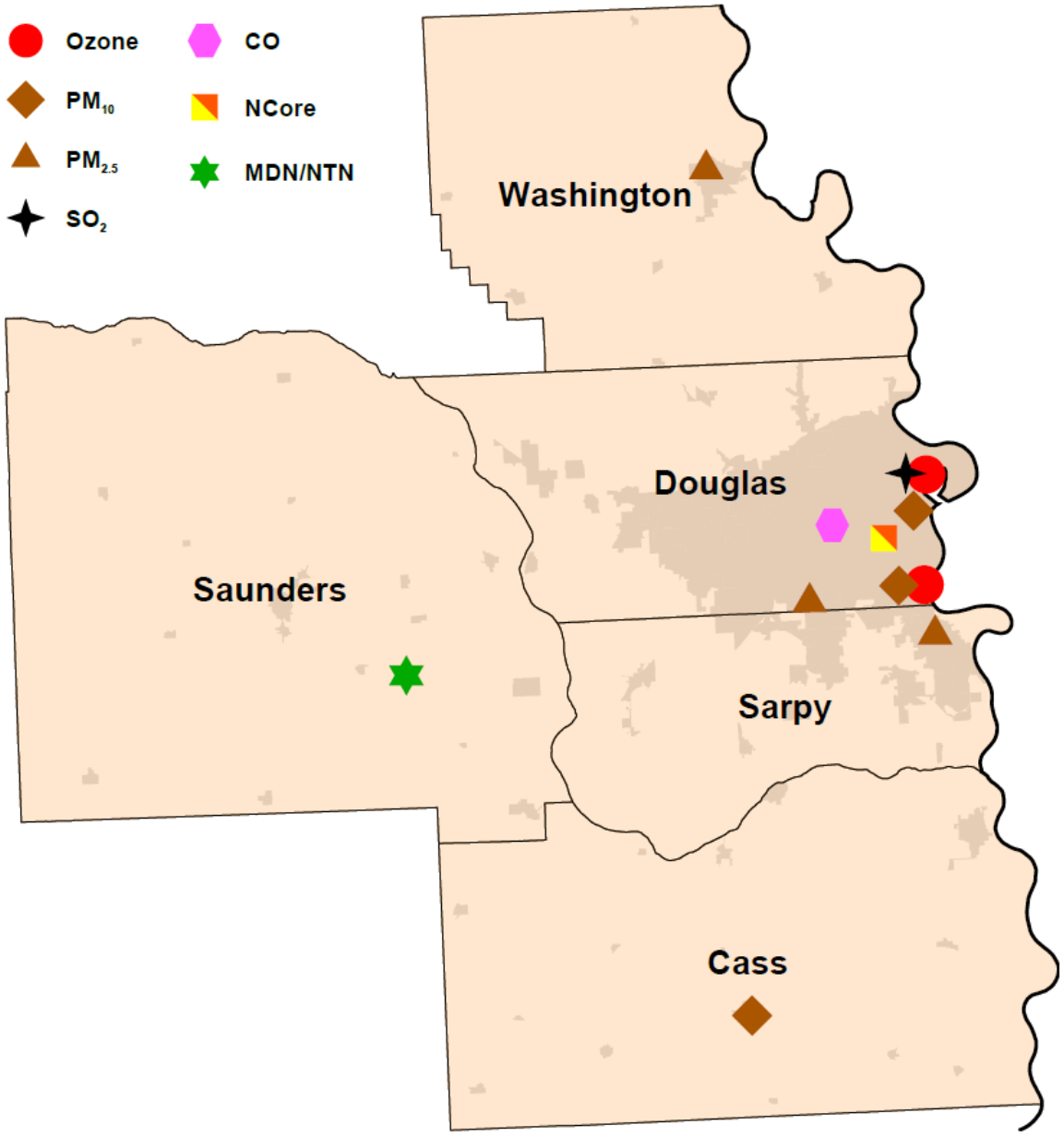
(4) Cass County has limestone mining and processing facilities, which are subject to specific air emission rules for the county set forth in Chapter 21 of Nebraska Administrative Code Title 129 – Nebraska Air Quality Regulations.

(5) Counts include the South Omaha ozone-$PM_{10}$ site currently closed for relocation.

(6) See text for discussion of CASTNET, IMPROVE, and NADP sites.

(7) Lead monitor in Fremont is currently closed for relocation.

**Figure V-2. Air Quality Monitor Locations in the Nebraska Portion of the Omaha-Council Bluffs Metropolitan Statistical Area, 3/31/2022.**




**NCore**
4102 Woolworth Avenue

**Ozone**
Omaha, 4102 Woolworth Avenue (NCore)
Omaha, 1616 Whitmore Street
Omaha, 2411 O Street (currently closed)

**Carbon Monoxide**
Omaha, 4102 Woolworth Avenue (NCore)
Omaha, 7747 Dodge Street

**Sulfur Dioxide ($SO_2$)**
Omaha, 4102 Woolworth Avenue (NCore)
Omaha, 1616 Whitmore Street

**$PM_{10}$**
Omaha, 19th & Burt Streets
Omaha, 2411 O Street (currently closed)
Omaha, 4102 Woolworth Avenue (NCore)
Weeping Water, 102 P Street

**$PM_{2.5}$**
Omaha, 4102 Woolworth Avenue (NCore)
Omaha, 9225 Berry Street
Bellevue, 2912 Coffey Avenue
Blair, 2242 Wright Street

**National Atmospheric Deposition Program**
Mead, Saunders County: MDN (Mercury Deposition Network), NTN (National Trends Network)

## VI. Nebraska Ambient Air Monitoring Network: January 1, 2021, through March 31, 2022

This section describes Nebraska's Ambient Air Monitoring Network in place from January 1, 2021, through March 31, 2022, and changes made during that period. Detailed information on individual monitoring sites, including purpose, scale, monitor specifications, and start dates is contained in Appendix A.

This section is organized around the Metropolitan Statistical Areas (MSAs) and Micropolitan Statistical Areas (MiSAs) in which monitoring is conducted.

### A. Omaha-Council Bluffs MSA Sites Operated by the Douglas County Health Department (DCHD)

DCHD operates an ambient air network of eight sites in Douglas, Sarpy, and Washington Counties, Nebraska. Multi-pollutant monitoring is currently conducted at three of the sites:

- The NCore site monitors for eight pollutant parameters (CO, NOy/NO, $O_3$, $SO_2$, $PM_{2.5}$, $PM_{10}$, $PM_{10-2.5}$, and $PM_{2.5}$ speciation), as well as meteorological parameters and atmospheric radiation (RADNET*).
- The South Omaha site has both an ozone and a $PM_{10}$ monitor.
- The 1616 Whitmore site has both $SO_2$ and ozone monitors.

In addition, there are single-pollutant monitoring sites for carbon monoxide (one), $PM_{2.5}$ (three), and $PM_{10}$ (one). The Omaha area monitoring network is therefore more extensive than the eight-site total might indicate; if the pollutants are counted separately, there are 17 pollutant monitoring sites. See Appendix A for detailed information on the sites operated by DCHD.

NDEE and Iowa DNR share responsibilities for air quality monitoring in the Omaha-Council Bluffs MSA. Iowa currently relies on monitors in the Nebraska portion of the MSA to meet minimum monitoring requirements for ozone, $PM_{2.5}$, $PM_{10}$, and $SO_2$.

* Note: RadNet is a nationwide system that monitors the nation's air, drinking water, precipitation, and pasteurized milk to determine levels of radiation in the environment. RadNet sample analyses and monitoring results provide baseline data on background levels of radiation in the environment and can detect increased radiation from radiological incidents. The RadNet monitor is not subject to the network planning process set forth in 40 CFR Part 58.10. It is recognized above for informational purposes only.

Several changes have occurred in the DCHD monitoring network in Omaha since January 2021.

#### 1. Closure of the South Omaha Ozone-$PM_{10}$ Monitoring Site Pending Relocation

Douglas County Health Department (DCHD) has operated an ozone and $PM_{10}$ monitoring site at 2411 O Street in south Omaha since 1978. In late 2020 the owner of that property requested the removal of the samplers. Ozone monitoring ceased at the end of October 2020 (the end of the required ozone monitoring season), and $PM_{10}$ monitoring ceased at the end of March 2021. At this time DCHD has not located an alternative site in south Omaha, but the department continues working to find a suitable site with a willing property owner.

#### 2. Change from Sequential to Continuous $PM_{2.5}$ Monitoring in Blair

DCHD operates a $PM_{2.5}$ monitoring site at 2242 Wright Street in Blair, Washington County. Beginning in 1999 this site operated with a sequential (filter-based) Federal Reference Method (FRM) sampler that collected particulates for a 24-hour period every three days. In 2021 a MetOne BAM 1020 Federal Equivalent Method (FEM) continuous sampler was installed at the site, though the sequential sampler continued to operate while electrical and data communication issues were resolved. Sequential sampling ended at the site on March 31, 2022 and the continuous sampler was placed online on April 1. Data from the continuous sampler is reported to AirNow as well as to EPA's Air Quality System (AQS) database.

### B. Omaha-Council Bluffs MSA Site Operated by NDEE

NDEE operates a MetOne BAM 1020 continuous $PM_{10}$ sampler at the Weeping Water wastewater treatment plant in Cass County. This is a population and source-oriented site that monitors nearby limestone mining and processing facilities in the surrounding rural area.

### C. Lincoln MSA Sites Operated by the Lincoln-Lancaster County Health Department (LLCHD)

LLCHD operates two SLAMS monitoring sites:

- A $PM_{2.5}$ site at 3140 N Street in Lincoln, and
- An ozone site in Davey (northern Lancaster County).

The N Street $PM_{2.5}$ site has three monitors: a primary filter-based FRM sampler, a collocated filter-based FRM sampler, and a MetOne BAM 1020 FEM continuous monitor. Data from the FRM samplers is reported to EPA's AQS database and used to demonstrate NAAQS compliance. Data from the continuous monitor is transmitted to AirNow but is not reported to AQS.

### D. Sioux City MSA

There are no monitoring sites in the Nebraska portion of the Sioux City MSA (Dakota and Dixon Counties). There are two monitoring sites in the Iowa and South Dakota portions of the MSA:

- A $PM_{2.5}$ site in Sioux City operated by the Iowa DNR, and
- A multi-pollutant site for $SO_2$, $NO_2$, $O_3$, $PM_{10}$, and $PM_{2.5}$ in Union County, South Dakota operated by the South Dakota Department of Agriculture and Natural Resources (DANR).

NDEE has an agreement with South Dakota DANR that Nebraska relies on the Union County monitors and data to meet minimum monitoring requirements for ozone in the Sioux City MSA. The 2021 South Dakota Ambient Air Monitoring Annual Plan stated that the contract for this site expires in 2022, and the landowner indicated they did not wish to renew the contract. According to AQS records, monitoring of all pollutants at this site ceased on 9/30/2021. A replacement ozone monitoring site will need to be established within the Sioux City MSA to meet the minimum monitoring requirements set forth in 40 CFR Part 58 Appendix D.

Based on population size and ambient PM levels measured at the Iowa and South Dakota sites, $PM_{2.5}$ monitors are not currently required in the Sioux City MSA (see Table C-2 in Appendix C).

### E. Grand Island MSA

NDEE began operating a filter-based FRM $PM_{2.5}$ sampler on the roof of Grand Island Senior High School in 2004. In 2019 NDEE acquired a continuous MetOne BAM 1020 Federal Equivalent Method (FEM) sampler as a replacement for the filter-based sampler. However, this rooftop location did not allow for a climate-controlled shelter required for operation of the continuous sampler, and NDEE was unable to obtain permission for a shelter elsewhere on the school grounds. As a result, NDEE relocated the Grand Island monitoring site about 2 miles south-southwest to a Nebraska Department of Transportation lot in Grand Island. The new site began operating on 11/26/2019, and the Grand Island Senior High School site was closed on 3/31/2020. The Grand Island continuous $PM_{2.5}$ data is reported to AirNow and to AQS.

### F. Beatrice MiSA

In accordance with Nebraska's 2021 Network plan, in June 2021 NDEE established a new $PM_{2.5}$ monitoring site at Homestead National Historical Park, three miles west of Beatrice. This site has a primary continuous FEM sampler and a collocated sequential (filter-based) FRM sampler that samples every third day. Data from

the continuous monitor is transmitted to AirNow. This site assists with background surveillance and is in the potential path of smoke moving northward from spring prescribed burns in the Kansas Flint Hills.

### G. Scottsbluff MiSA

NDEE operates a $PM_{2.5}$ monitoring site at Scottsbluff Senior High School. A filter-based FRM sampler operated at this location on a 3-day sampling schedule until 3/24/2020, when a MetOne BAM 1020 FEM continuous sampler was installed at the same location. NDEE staff were unable to correctly update the monitor information in the EPA AQS under the existing AIRS ID, so a new AIRS ID was assigned and the previous one marked as closed. Recently, the old AIRS ID information was updated successfully, and the site has resumed use of the former ID to ensure data continuity. The Scottsbluff continuous $PM_{2.5}$ data is reported to AirNow in addition to AQS.

### H. Fremont MiSA

NDEE operated primary and collocated total suspended particulate lead samplers at 1255 Front Street in Fremont beginning in 2010 to provide source-oriented monitoring of the Magnus LLC facility, which casts bronze railroad bearings. The site owner notified the Department in March 2018 that he no longer wished to host the lead monitors, which were removed from this location at the end of September 2018. An alternative location has been identified and approved by EPA Region 7, and NDEE staff are in negotiations with the property owner considering relocation of the monitors to that site.

## VII. Considerations for Network Planning

### A. EPA Air Monitoring and Network Design Requirements

The Nebraska Ambient Air Monitoring Network must comply with the applicable requirements of 40 CFR Part 58 Appendices A through E. As the review in Appendix C of this plan documents, the Nebraska network operated by NDEE, DCHD, and LLCHD is meeting all of the applicable requirements of 40 CFR Part 58 Appendices A, C, D, and E except for two minimum monitoring requirements set forth in 40 CFR Part 58 Appendix D:

1. With the closure of the Union County South Dakota site in 2021, the requirement for one ozone monitoring site in the Sioux City MSA is no longer being met.
2. The required source-oriented lead monitoring site in Fremont is not currently in operation.

Part 58 Appendix B applies to Prevention of Significant Deterioration (PSD) monitoring as part of New Source Review. Monitoring required for PSD is generally conducted by the source rather than a state or local monitoring agency. Therefore, compliance with Appendix B is not directly addressed in this network plan. No PSD-required background monitoring took place in Nebraska during 2021.

40 CFR Part 58 Appendix A Section 3.2.3 specifies quality control sampling procedures for $PM_{2.5}$ with respect to Federal Reference Method (FRM) and Federal Equivalent Method (FEM) samplers. This section requires that for each distinct monitoring method (FRM or FEM) that a Primary Quality Assurance Organization (PQAO) utilizes as a primary monitor, there must be a collocated quality control monitor at 15% of the monitor sites, with a minimum of one collocated monitor. The first collocated monitor must be a designated FRM monitor. NDEE operates primary FEM samplers at three sites (Homestead, Grand Island, and Scottsbluff) with one collocated FRM sampler at Homestead, which meets this collocation requirement.

## B. Air Quality and NAAQS Attainment

Nebraska's ambient air monitoring data for 2019 through 2021 show that all monitoring sites in Nebraska (and sites in portions of the Omaha and Sioux City MSAs in adjacent states) are in attainment with the NAAQS. See the monitoring data tables in Appendix B for the detailed results.

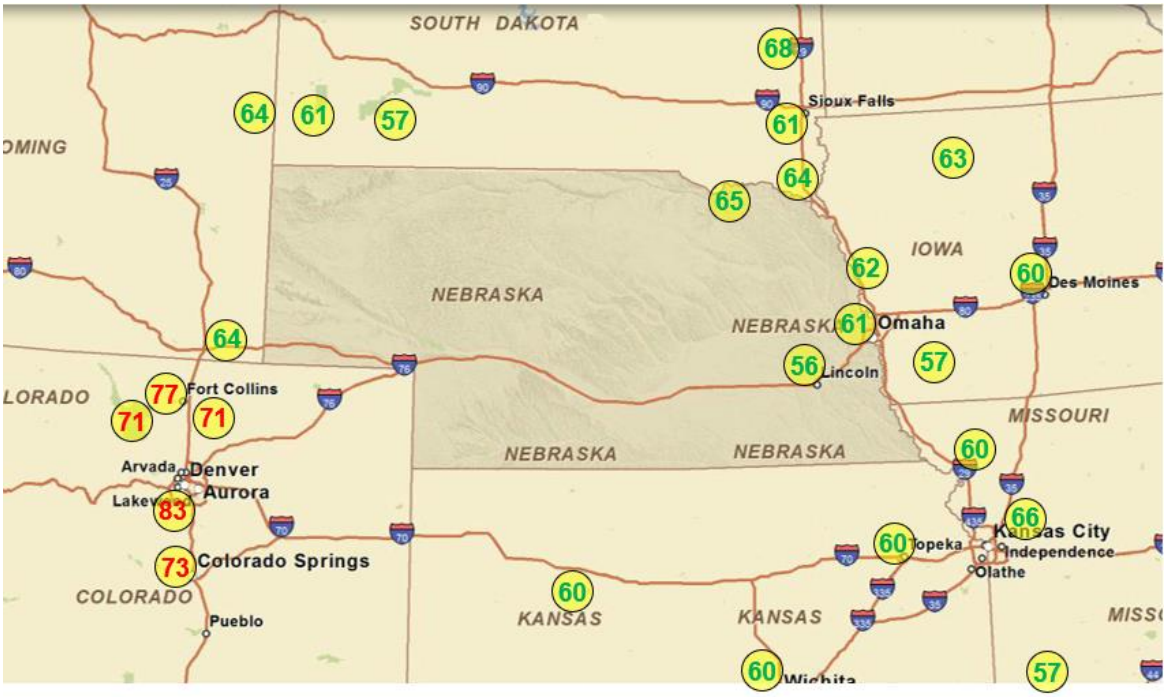
### 1. Ozone

The current NAAQS for ozone ($O_3$) of 0.070 parts per million (ppm; or 70 parts per billion) for both the primary and secondary standard was set in 2015 and retained in 2020. The previous (2008) standard was 0.075 ppm. In October 2021 EPA announced that it would reconsider the previous administration's decision to retain the 2015 standard, with a target completion date at the end of 2023.

Nebraska's ozone monitoring network includes four sites in the Omaha and Lincoln MSAs plus an EPA-operated site in the Santee Sioux reservation in northeast Nebraska. An ozone monitoring site in Union County, SD, in the Sioux City MSA was closed at the end of September 2021. Ozone monitoring is only required in Metropolitan Statistical Areas (MSAs), with the required number of monitors set by population and whether the most recent ozone Design Values (DVs) are greater or less than 85% of the ozone NAAQS. All of Nebraska's MSAs met the current ozone monitoring requirements (see Appendix C) in 2021, but some exceeded the 85% threshold that affects minimum monitoring requirements.

As shown in Appendix B, Table B-1, the 2019-2021 ozone DVs at monitoring sites in Nebraska are elevated but in attainment with the ozone NAAQS (ranging from 80% to 93% of the NAAQS). The highest ozone levels in Nebraska are found in the Omaha-Council Bluffs MSA, the Sioux City MSA, and at Santee. The map in Figure VII-1 shows the 2019-2021 ozone DVs for monitoring sites in Nebraska and surrounding states. Nearly all urban and rural monitoring sites in the region show DVs close to or above 60 ppb (a DV of 59.5 ppb is 85% of the NAAQS).

**Figure VII-1. Three-Year (2019-2021) Ozone Design Values (DVs, in ppb) for Locations in and Around Nebraska ***

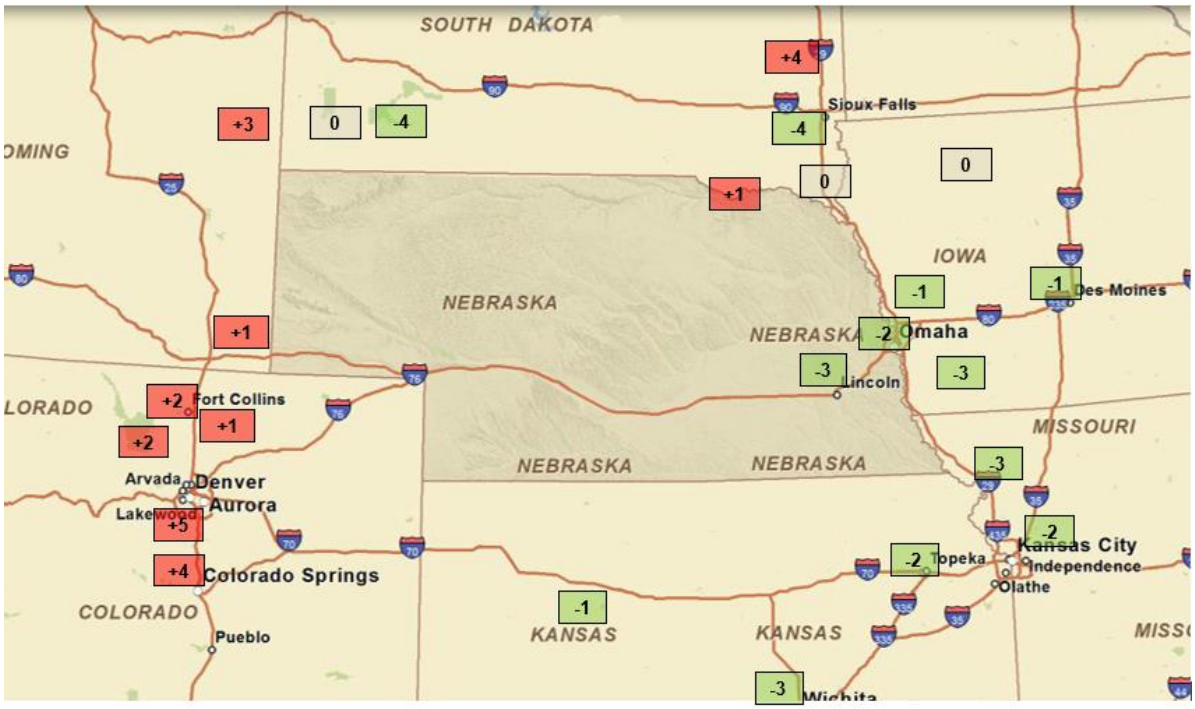



* Where there is more than one monitoring site in a locale, the highest ozone DV is shown. DVs in green are in attainment with the NAAQS (70 ppb); values in red are not in attainment.

Ozone monitoring sites in the Kansas City metropolitan area and in the vicinity of Sioux Falls, South Dakota also show elevated design values. Because prevailing winds in eastern Nebraska are from the south to south-southeast during the warmer months of the ozone season, it is likely that there is considerable northwestward transport of ozone and/or ozone precursors through the corridor extending from Kansas City to Sioux Falls, including the Omaha and Sioux City MSAs. Elevated ozone levels at rural sites in this corridor may be influenced by this transport. The highest ozone levels in the region are found in the northern Colorado Front Range area, including Colorado Springs, Denver, Fort Collins, and surrounding communities, where ozone levels are not in attainment with the NAAQS.

The map in Figure VII-2 shows the difference between the 2019-2021 ozone design value and the site-average design value from 2014 through 2019 for monitor sites in the Nebraska region. This period encompasses ozone trends since the historic drought year of 2012. Sites in Kansas, southeast Nebraska, northwest Missouri, and western Iowa show 2019-2021 ozone design values that are equal to or lower than the five-year site averages. Sites in northeast Nebraska and southern South Dakota show no clear geographic trends, with a mixture of increased and decreased ozone levels. Sites in eastern Colorado and eastern Wyoming show uniformly above average ozone levels for the 2019-2021 period.

**Figure VII-2. Difference Between 2019-2021 Ozone Design Value (ppb) and 2014-2019 Site Average Design Value for Monitor Sites in and Around Nebraska ***




* Red background color in boxes indicates sites with a 2019 DV higher than the site average; green background color indicates sites with a 2019 DV lower than the site average. Where there is more than one monitoring site in the locale, the value for the site with the highest 2019 DV is shown.

Exceedances of the 8-hour ozone NAAQS were recorded by monitors in Nebraska on five dates in June 2021, as shown in Table VII-1. Maximum daily 8-hour ozone values are shown for all monitoring sites in Nebraska for the relevant dates. The Santee Indian Reservation monitor recorded exceedances on all five dates (June 13-14, 16-17, and 23). Omaha monitors recorded exceedances on June 14 and 16. These short-lived exceedances did not result in Design Values exceeding the NAAQS at any location in Nebraska.

Figures VII-3a, VII-3b, and VII-3c show plots of annual 4th-highest daily maximum 8-hour ozone values for monitors in the Omaha-Council Bluffs MSA, Lincoln and Sioux City MSAs, and for rural monitor sites in the region, respectively. Values are shown for 2013 through 2021. These values are used in calculating the 3-year average design values.

**Table VII-1. Maximum 8-hour Ozone Values (ppb) for Nebraska Monitors on Dates of NAAQS Exceedances in 2021**

| | Omaha NCore | Omaha Whitmore | Santee | Davey |
|---|---|---|---|---|
| **Date** | **31-055-0019** | **31-055-0028** | **31-107-9991** | **31-109-0002** |
| 6/13/2021 | 62 | 67 | **72** | 52 |
| 6/14/2021 | **85** | 70 | 74 | 56 |
| 6/16/2021 | 68 | **72** | **74** | 65 |
| 6/17/2021 | 51 | 62 | **71** | 58 |
| 6/23/2021 | 47 | 52 | **74** | 54 |

Values exceeding the 8-hour ozone standard of 70 ppb are shown in red.

These plots show that most monitoring sites in the region experienced an upward trend in 4th-highest 8-hour ozone values from 2016 that peaked in 2018, followed by a declining trend through 2020 and small increases in 2021.

**Figure VII-3a. Annual 4th High Daily Maximum 8-hour Ozone Trends 2013 through 2021 for Monitors in the Omaha-Council Bluffs MSA**

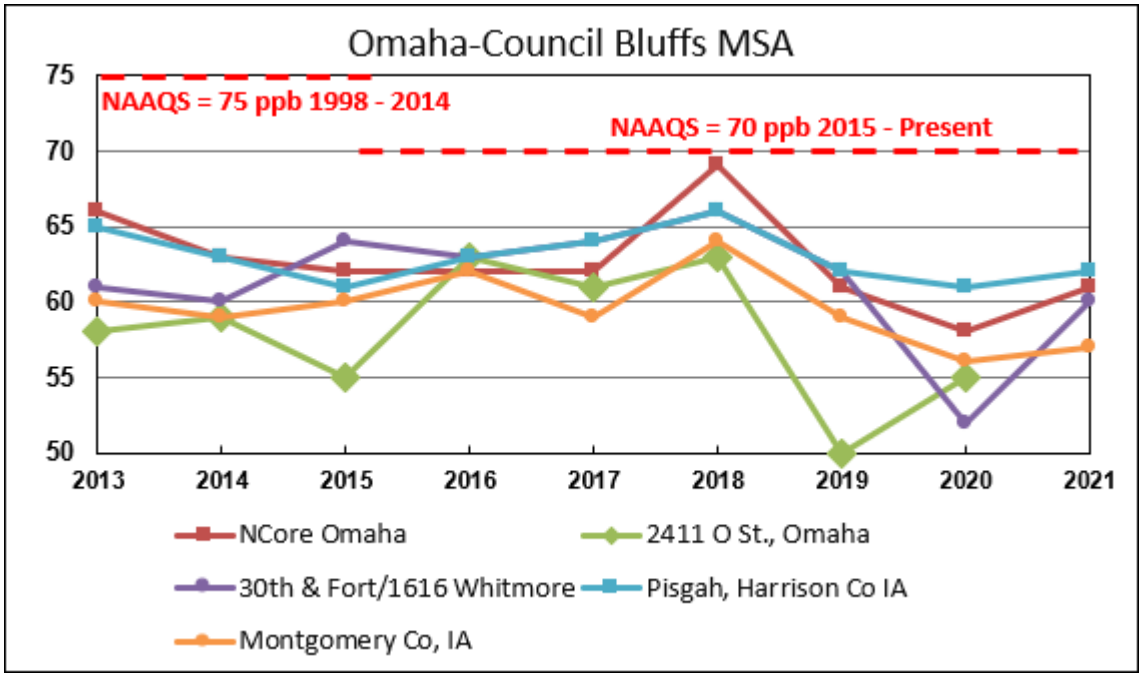


**Figure VII-3b. Annual 4th High Daily Maximum 8-hour Ozone Trends 2013 through 2020 for Monitors in the Lincoln, NE and Sioux City, IA MSAs**

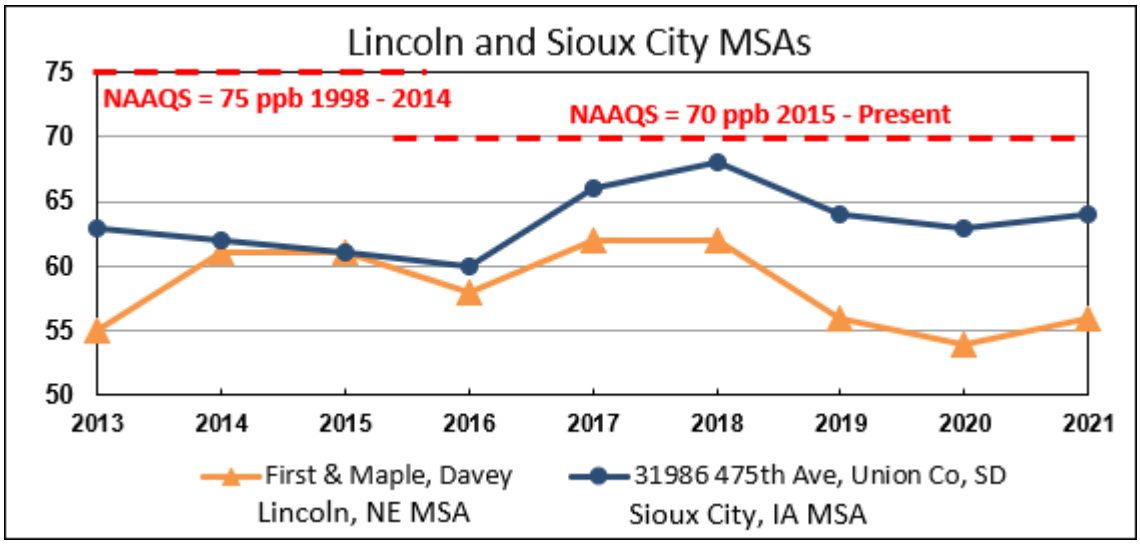
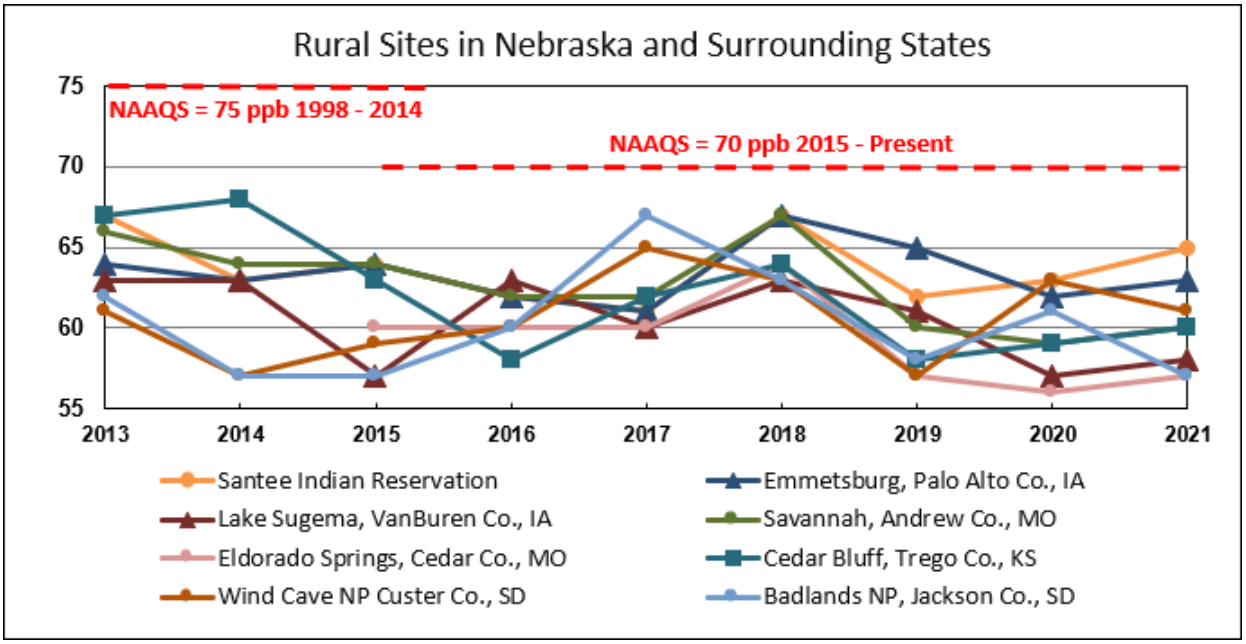



**Figure VII-3c. Annual 4th High Daily Maximum 8-hour Ozone Trends 2013 through 2020 for Monitors at Rural Sites in Nebraska and Surrounding States**




## 2. Fine Particulate Matter: $PM_{2.5}$

In December 2020 EPA announced that it would retain, without revision, the existing primary (health-based) and secondary (welfare-based) $PM_{2.5}$ NAAQS. On June 10, 2021, EPA announced that it would reconsider the December 2020 decision. As of April 2022, that reconsideration is not complete, and the primary annual average NAAQS (based on the three-year average of the weighted annual mean) remains at 12 $\mu g/m^3$ and the 24-hour NAAQS (based on the three-year average of the annual 98th percentile of 24-hour maximum values) remains at 35 $\mu g/m^3$.

As shown in Table VII-2 and in more detail in Appendix B Tables B-6a and B-6b, all monitored metropolitan areas in Nebraska are in attainment with the annual average and 24-hour $PM_{2.5}$ NAAQS. The design values range from 53% to 62% of the 24-hour standard and 50% to 69% of the annual average standard. The highest values are found in the Omaha MSA and Sioux City MSA.

**Table VII-2. $PM_{2.5}$ Levels (2019-2021 Design Values) as a Percent of the NAAQS** (1)

| Location | Percent 24-Hour DV | Percent Annual Average DV |
|---|---|---|
| Omaha MSA | 62% | 69% |
| Lincoln MSA | 53% | 55% |
| Sioux City MSA | 63% | 67% |
| Grand Island MSA | 54% | 50% |
| Scottsbluff MiSA | 53% | 51% |

(1): Where there is more than one monitoring site in a locale, the highest DV is used to calculate the % NAAQS value shown above.

As noted above, smoke from wildfires and prescribed fires can temporarily increase $PM_{2.5}$ levels in Nebraska. Prescribed burns are used in Nebraska and near-by states for prairie conservation and maintenance of grazing lands. Ranchers in the Flint Hills of Kansas and Oklahoma and surrounding areas make extensive use of prescribed fires, primarily in the spring months, to improve pastures and reduce the spread of invasive vegetation. The extent of Flint Hills burning varies from year to year depending on spring weather conditions, but averages about 2 million acres. Smoke impacts on Nebraska during periods of intense spring burning depend on wind direction and atmospheric mixing conditions. In addition, smoke from distant large wildfires in Canada and the western United States occasionally affects $PM_{2.5}$ levels in Nebraska during the summer months.

No short-term exceedances of the $PM_{2.5}$ standards were recorded in Nebraska during the 2021 spring burning season. However, exceedances of the 24-hour $PM_{2.5}$ standard were recorded at multiple monitoring sites in Nebraska on July 30 and July 31, 2021, as shown in Table VII-3.

**Table VII-3. Maximum 24-hour $PM_{2.5}$ Levels at Nebraska Monitors, July 30 & 31, 2021**

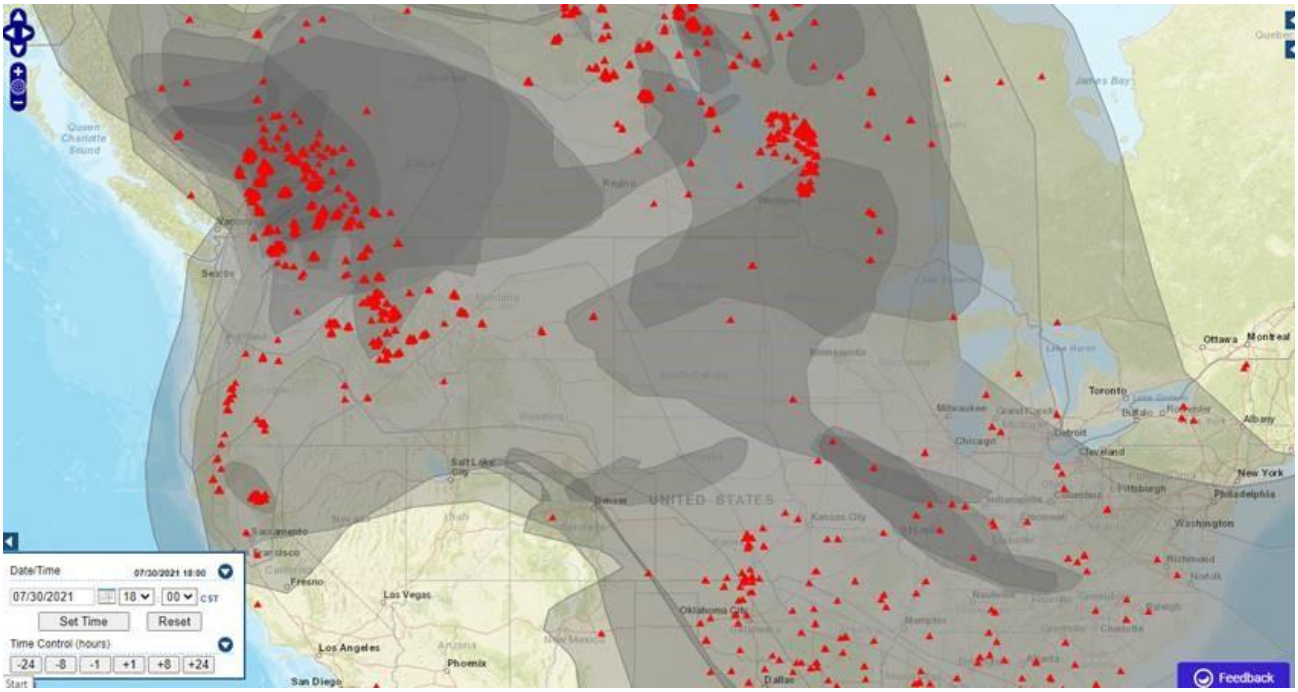
| Date | Omaha NCore 31-055-0019 | Berry St Omaha 31-055-0052 | Bellevue 31-153-0007 | Blair 31-177-0002 | Lincoln 31-109-0022 | Grand Island 31-079-0005 | Scottsbluff 31-157-0006 |
|---|---|---|---|---|---|---|---|
| 7/30 | 45.3 | 42.4 | 43.4 | 45.2 | ND | 28.2 | ND |
| 7/31 | 36.5 | ND | 34 | ND | ND | 48.8 | ND |

Values in red are exceedances of the 24-hour standard of 35 $\mu g/m^3$. ND = no data.

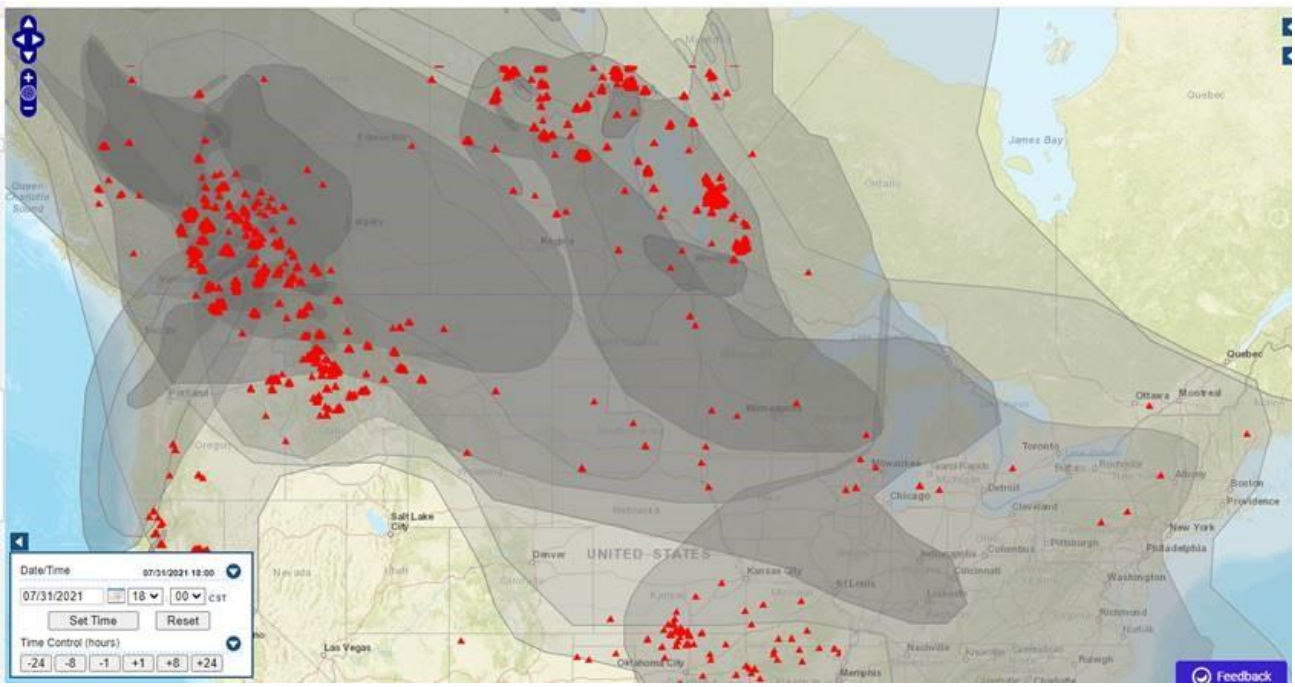
Exceedances were recorded at all four PM2.5 monitoring locations in the Omaha area on July 30, and at single monitors in Omaha and Grand Island on July 31. As shown by the fire and smoke maps for those dates presented in Figure VII-4, smoke from wildfires in the Pacific northwest and south-central central Canada was widespread over Nebraska and surrounding states during this period as northerly winds behind a cold front moved denser smoke southward. The Nebraska Department of Health and Human Services, in collaboration with NDEE, issued an air quality alert on July 29 for the period July 30 through August 1,

2021. Air quality agencies in Iowa, South Dakota, Minnesota, and Wisconsin also issued air quality alerts for all or parts of that period.

**Figure VII-4. Regional Fire and Smoke Maps for July 30 and July 31, 2021**[1]




July 30, 5:00 pm CDT

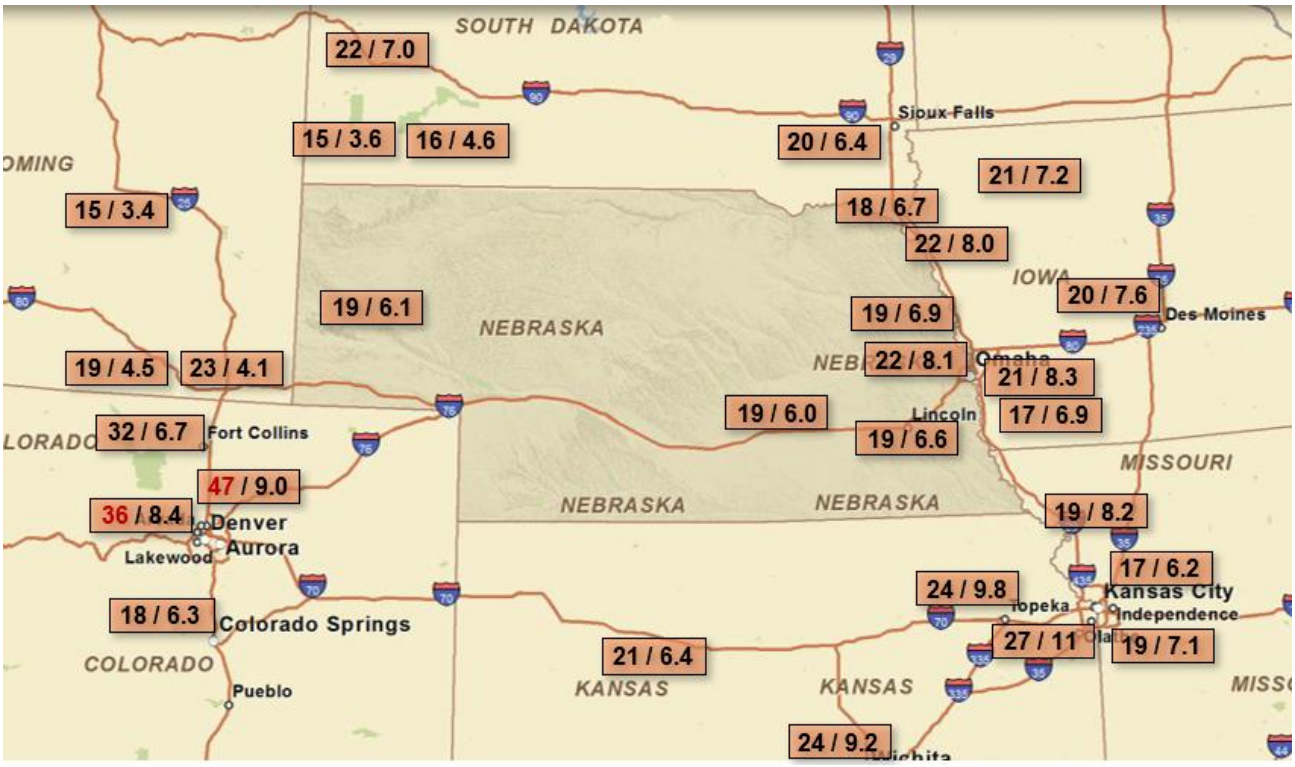



July 31, 5:00 pm CDT

(1) Maps of satellite-detected fire locations (red triangles) and smoke plumes (gray) from the EPA Air Now Tech website (http://www.airnowtech.org) .

Figure VII-5 below shows the 2019-2021 Design Values for $PM_{2.5}$ monitoring sites in and around Nebraska. The highest values are measured in the larger metropolitan areas in the region (Omaha-Council Bluffs, Kansas City, and Denver). Design Values at several sites in the Denver metropolitan area exceeded the 24-hour $PM_{2.5}$ NAAQS, but all other sites in the region were in attainment.

**Figure VII-5. $PM_{2.5}$ 2019-2021 Design Values (DVs) for Sites in and Around Nebraska.** (1),(2)




Footnotes:
(1) The first number is the 24-hour DV and the second number is the annual average DV.
(2) Where there is more than one site in a metropolitan area, the highest DVs are shown.

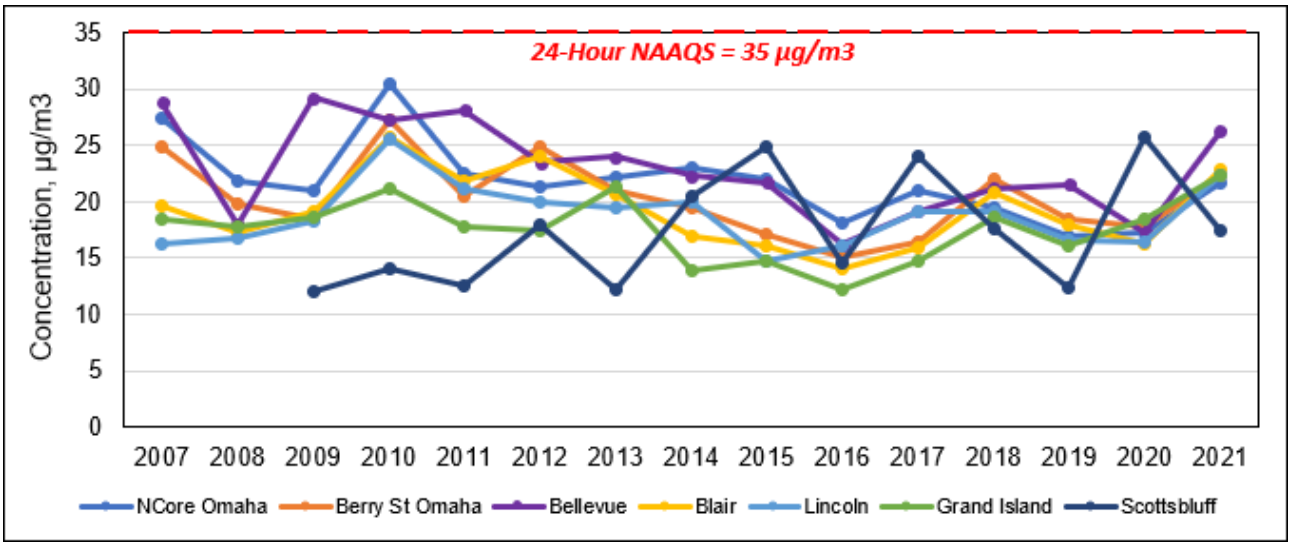
NDEE is working with Kansas Department of Health and Environment (KDHE), EPA Region 7, the National Weather Service, local air quality agencies, and other stakeholders on strategies to improve air quality in Nebraska during the spring prescribed burn season. To provide up-to-date information to the public regarding prescribed burning, NDEE created a smoke awareness web page in March 2017. During the spring burn season, current smoke forecast information is provided along with links to the Kansas Smoke Management Plan, AirNow, and other related information. The Department also monitors the AirNow Fire and Smoke Map throughout the year to evaluate the potential for wildfire smoke impacts in Nebraska.

NDEE has collaborated with the Nebraska Department of Health and Human Services (DHHS), LLCHD, and DCHD to develop a public smoke advisory system that was announced on April 10, 2018. Smoke advisories are issued by DHHS for impacted counties during the prescribed burn season based on forecasts provided by KDHE and for wildfire smoke events based on NDEE analysis and consultations with the National Weather Service.

Figures VII-6 and VII-7 plot trends in $PM_{2.5}$ values from 2007 through 2021 for the annual 98$^{th}$ percentile of daily maximum 24-hour data and the annual average data, respectively. Sites in eastern and central Nebraska show an overall downward trend in both parameters from 2010 to 2016, but from 2016 year-to-year variability increased, and there has been a slight overall increase in both measures during that period.

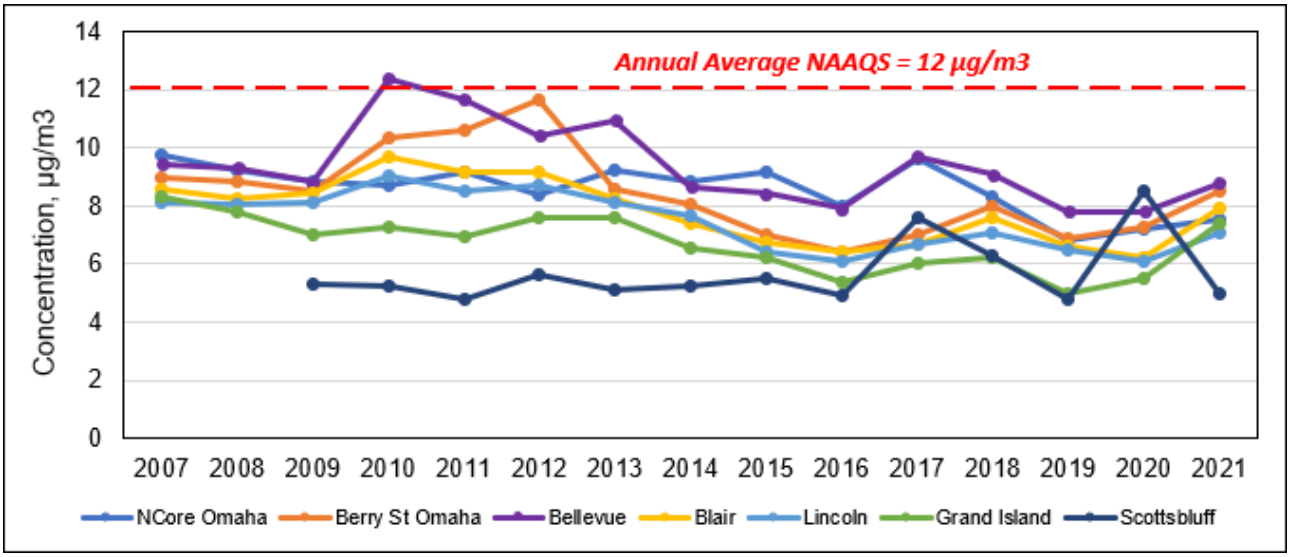
The Scottsbluff site is an exception. Low annual average values were recorded from 2009 through 2016, after which there were several years with much higher values. The 98th percentile data show more variability, as expected, with high values in 2015, 2017, and 2020. The highest daily values in 2017 coincided with a widespread smoke plume from wildfires in the western states and a cluster of fires in southeastern Montana and northern Wyoming. The 2020 values were also affected by smoke from wildfires in Colorado and Wyoming for much of September and October. In addition, in 2020 the filter-based monitor that record data over 3-day intervals was replaced by a continuous monitor. The 2020 annual values were calculated from the continuous data recorded over only 252 days and are thus not representative of the entire year and are not valid for NAAQS comparison. Both the 98th percentile daily maximum and the annual average value are likely to be anomalously high due to the shorter period of data collection.

**Figure VII-6. Trends in Annual 98th Percentile of Daily Maximum 24-hour $PM_{2.5}$ for Nebraska Monitoring Sites 2007-2021.** (1)




Footnote (1): A new continuous monitor was installed at Scottsbluff in 2020. The 2020 value shown was computed from only 252 days of continuous monitor data and is thus not valid for NAAQS comparison.

**Figure VII-7. Trends in Annual Average $PM_{2.5}$ for Nebraska Monitoring Sites 2007-2021** (1)




Footnote (1): A new continuous monitor was installed at Scottsbluff in 2020. The 2020 value shown was computed from only 252 days of continuous monitor data and is thus not valid for NAAQS comparison.

### 3. Coarse Particulate Matter: $PM_{10}$

The current national ambient air quality 24-hour standard (NAAQS) for $PM_{10}$ is 150 $\mu g/m^3$ for both the primary standard and the secondary standard. These standards were retained by EPA in December 2020. The $PM_{10}$ NAAQS states that the 24-hour standard of 150 $\mu g/m^3$ is not to be exceeded more than once per year on average over the latest 3-year time frame, where an exceedance is a 24-hour average value of 155 $\mu g/m^3$ or more. This means that the 4th highest value over the most recent 3 years needs to be below 155 $\mu g/m^3$ to avoid an exceedance.

Coarse particulate matter remains more localized to the source than $PM_{2.5}$., so monitoring must address both background levels and maximum levels near sources. At the beginning of 2021 there were five $PM_{10}$ monitoring sites in the Omaha MSA: three in Omaha operated by DCHD, one in Council Bluffs operated by Iowa DNR, and a source-oriented monitor in Weeping Water, Nebraska, operated by NDEE. $PM_{10}$ monitoring was discontinued at a south Omaha site at the end of March 2021 at the request of the property owner, leaving four active sites at the end of the year. South Dakota DANR operated a $PM_{10}$ monitor in Union County, SD in the Sioux City MSA until the site was closed at the end of September 2021.

There were no 24-hour exceedances of the 150 $\mu g/m^3$ value over the 2019-2021 period at any of these sites, so all are in attainment with the NAAQS. Their 4th highest values over that period ranged from 30% to 51% of the NAAQS (see Appendix B, Table B-5a and B-5b).

### 4. Sulfur Dioxide ($SO_2$)

The NAAQS for sulfur dioxide ($SO_2$) was revised in 2010 to establish a 1-hour standard of 75 ppb (99th percentile of daily maximum one-hour average concentrations), which was reviewed and retained in 2018. All areas of Nebraska were designated as "Attainment/Unclassifiable" with respect to this standard in 2016 except for Lancaster County, which was designated "Unclassifiable", and Douglas County, which was to be designated by December 31, 2020. Both counties were later designated as "Attainment/Unclassifiable", effective 4/30/2021 for Douglas County and August 16, 2021 for Lancaster County.

DCHD operates two $SO_2$ monitors in Omaha, one at the multipollutant NCore site and the other in an industrial area in north Omaha. Currently $SO_2$ monitors are not required in the other Nebraska MSAs or elsewhere in the state. South Dakota DANR monitored $SO_2$ at the multipollutant site in Union County, SD, within the Sioux City MSA until that site was closed at the end of September 2021.

The 2019-2021 1-hour $SO_2$ annual levels and Design Values (DVs) for Nebraska-area monitoring sites are listed in Appendix B, Table B-3. The highest DV (53% of the NAAQS) was recorded at the Whitmore Street site in an industrial area in north Omaha. The DV at the neighborhood-scale Omaha NCore site was 15% of the NAAQS and only 4% at the rural Union County, SD, site.

$SO_2$ monitoring was also carried out from 2017 through 2020 adjacent to coal-fired electrical generating plants in north Omaha and in southwest Lancaster County in accordance with rules set forth in 40 CFR Part 51 Subpart BB (known as the $SO_2$ Data Requirements Rule). The three-year design values at these two sites were below the threshold that would have required continued monitoring under the Data Requirements Rule. EPA approved termination of monitoring at these sites at the end of 2020. Nebraska also has three areas that are subject to ongoing requirements of the Data Requirements rule by demonstrating attainment with the 2010 $SO_2$ NAAQS by air quality modeling. As required by 40 CFR 51.1205(b), NDEE is submitting an annual report to document the $SO_2$ emissions of each applicable source in these areas and assess the cause of any emissions increase from the previous year. This report is being submitted as Appendix E of this Network Plan.

## 5. Nitrogen Dioxide ($NO_2$)

In 2010 EPA established a primary 1-hour NAAQS for $NO_2$ of 100 parts per billion (ppb; based on the 98th percentile of the annual distribution of daily maximum one-hour $NO_2$ concentrations, averaged over three years) and retained a primary and secondary annual average standard of 53 ppb. Both standards were retained in 2018. EPA has designated all areas of Nebraska (and all areas of the country) as "unclassifiable/attainment" with respect to these standards.

Currently there are no $NO_2$ monitoring sites within Nebraska. Until the end of September 2021, South Dakota DANR monitored $NO_2$ at the multipollutant site in Union County, SD, within the Sioux City MSA. This was an area background site with a 2019-2021 design value that was 19% of the NAAQS (see Appendix B, Table B-4a).

At multipollutant NCore sites EPA requires measurement of reactive oxides of nitrogen (NOy) instead of $NO_2$ in order to quantify more of the oxidation products of nitric oxide (NO). These additional oxidation products are relevant to the secondary formation of ozone and $PM_{2.5}$. NO and NOy are therefore measured at the Omaha NCore site.

The difference between measured NOy and NO (NOy-NO) generally approximates $NO_2$, with NOy-NO being equal to or possibly higher than $NO_2$. Table B-4b in Appendix B shows the measured NOy-NO annual values for 2019-2021. The three-year average of the 98$^{th}$ percentile one-hour NOy-NO levels at the Omaha NCore site was 38% of the NAAQS, while the annual average value was 12% of the NAAQS.

## 6. Carbon Monoxide (CO)

Vehicle emissions are a primary source of carbon monoxide emissions. EPA last reviewed the carbon monoxide NAAQS in 2011, at which time it retained a primary one-hour standard of 35 parts per million (ppm) and a primary 8-hour standard of 9 ppm. The Omaha NCore site includes a required neighborhood-scale CO monitor, and DCHD also operates a near-road, highest-concentration site at 78$^{th}$ and Dodge Streets in Omaha. As shown in Table B-2 in Appendix B, during the 2019-2021 time frame both sites recorded CO design values 5% or less of the one-hour NAAQS and less than 20% of the 8-hour standard.

## 7. Lead (Pb)

The lead NAAQS was last changed in 2008, when it was tightened from a concentration of 1.5 $\mu g/m^3$ to 0.15 $\mu g/m^3$ as determined from the highest three-month average concentration of suspended particulates in the last three years. This standard was reviewed and retained in 2016. EPA requires source-oriented SLAMS lead monitoring near industries that emit over 0.5 tons per year of lead. The rule allows for the EPA Regional Administrator to waive the monitoring requirements if the air agency can demonstrate that the lead source will not contribute to a maximum lead concentration in ambient air in excess of 50% of the NAAQS. This demonstration can be made through historical monitoring data or air dispersion modeling.

Currently there are two lead sources in Nebraska that are potentially subject to the lead monitoring requirement.

### a. Nucor Steel, Norfolk (Lead Monitoring Waiver)

In April 2014 EPA approved a lead monitoring waiver request from Nucor Steel that provided modeling demonstrating that ambient lead levels would not exceed 50% of the NAAQS. The waiver was effective for five years and thus expired in April 2019.

Nebraska's 2019 Ambient Air Quality Monitoring Network Plan included a request to renew the Nucor Steel lead monitoring waiver for an additional five years. Modeling presented with the request predicted three-month rolling average lead emissions of 0.04 μg/$m^3$, or 27% of the lead NAAQS. EPA Region 7 approved this waiver as part of the 2019 Network Plan in October 2019. The waiver will be in force until April 2024. Since the second waiver was approved, Nucor's lead emissions have been less than 0.35 tons per year according to the emissions inventories submitted through 2021, in accordance with waiver eligibility.

**b. Magnus LLC, Fremont**

Magnus, LLC in Fremont is a casting facility that produces bronze railway traction motor support bearings. NDEE operated a lead monitoring site at 1255 Front Street, north of this facility, beginning in 2010. The site had primary and collocated total suspended particulate samplers. In 2012 the maximum three-month average ambient lead level was 0.14 μg/m3 or 93% of the NAAQS. In 2016 through 2018 the maximum three-month average lead concentrations were lower at 41%, 28%, and 16% of the NAAQS, respectively. Facility awareness and diligence, coupled with agency feedback on ambient air lead concentrations, appear to have facilitated the air quality improvements.

In 2018 the landowner that hosted this monitoring site asked that the monitors be removed; removal occurred at the end of September 2018. Due to the location of this plant in an industrial area, there are few options for a nearby monitoring location. NDEE and EPA Region 7 staff evaluated several alternative monitoring sites, and EPA approved the relocation requested in Nebraska's 2019 Network Plan. However, negotiation of a site hosting agreement has been delayed due to COVID-19 health concerns. NDEE has contacted the landowner and is awaiting a response. NDEE will continue to work with EPA Region 7 on relocating this source-oriented monitor.

## C. Population Trends and Network Design

Population data is reviewed as part of the network planning process because:

- Population growth may be associated with pollution source growth.
- High population density generally correlates with high air pollution potential.
- Some 40 CFR Part 58 requirements are based on population and/or federally defined metropolitan statistical definitions.

Because 2020 Decennial Census data at the county level became available in late 2021, we present an updated analysis of population trends in Appendix D. Population data is presented for MSAs, MiSAs, and for other rural counties.

Overall growth trends in Nebraska appear basically unchanged from those described in previous annual Network Plans. Nebraska's population increased by 7.4% between 2010 and 2020, but almost all of this growth is occurring in the four Metropolitan Statistical Areas (12.6% growth). Population grew little in the Micropolitan Statistical Areas (1.3%), and population in the remaining rural counties declined by 3.6%

The basic design of the Nebraska ambient air monitoring network remains consistent with these population trends: 73% of the monitoring sites and 79% of the separate pollutant monitors are located within the Omaha and Lincoln MSAs. The Omaha MSA network contains 53% of the monitoring sites in Nebraska and 71% of the monitors.

## D. Funding

Air monitoring is supported by a combination of fees, federal, state, and local funding sources. Table VII-4 provides a summary of the primary funding sources used for air monitoring.

| **Table VII-4: Primary Funding Sources Used to Support Air Monitoring in Nebraska** | |
|---|---|
| **Nebraska Department of Environment and Energy (NDEE)** | |
| **Funding Source** | **Comments** |
| State General Funds | At a minimum must be sufficient to meet minimum federal match requirements |
| State Title V Funds | Fees paid by major sources based on the quantity of air pollutants they emit. NDEE collects Title V fees for sources throughout Nebraska, except those regulated by LLCHD and Omaha Air Quality Control. Title V funds cannot be used for state/local match. |
| CAA §105 Funds | Federal grant funds used for air monitoring activities set forth in a bi-annually negotiated EPA-NDEE work plan. Requires a 40% state/local match. A portion of this grant funding is passed on to DCHD and LLCHD. |
| CAA §103 Funds | Federal grant funds used for air monitoring activities set forth in a bi-annually negotiated EPA-NDEE work plan. This money is currently limited to funding $PM_{2.5}$ and IMPROVE monitoring, and sometimes for specified equipment purchases and/or special monitoring studies. Requires no state/local match. A portion of this grant funding is passed on to DCHD and LLCHD. |
| **Douglas County Health Department (DCHD)** | |
| Local County Funds | At a minimum must be sufficient to meet minimum federal match requirements |
| City of Omaha Title V funds | See *State Title V Funds* comments above. Omaha Air Quality Control regulates air emission sources in the City of Omaha, including the collection of Title V fees from major sources. A portion of the Omaha Title V funds are directed to DCHD to support air monitoring. Title V funds cannot be used for state/local match. |
| CAA §105 Funds | NDEE passes through a portion of the Federal §105 funds to DCHD for activities described in an NDEE/DCHD work plan. DCHD is required to meet the 40% state/local match requirement. |
| CAA §103 | NDEE passes through a portion of the federal §103 funds to DCHD for activities described in an NDEE/DCHD work plan, primarily $PM_{2.5}$ related monitoring activities. There is no state/local match requirement. |
| **Lincoln Lancaster County Health Department (LLCHD)** | |
| Local County Funds | At a minimum must be sufficient to meet minimum federal match requirements |
| Lancaster County Title V funds | See *State Title V Funds* comments above. LLCHD regulates air emission sources in Lancaster County, including the collection of Title V fees from major sources. A portion of the Title V funds are used to support air monitoring activities performed by LLCHD. Title V funds cannot be used for state/local match. |
| CAA §105 Funds | NDEE passes through a portion of the Federal §105 funds to LLCHD for activities described in an NDEE/LLCHD work plan. LLCHD is required to meet the 40% state/local match requirement. |
| CAA §103 | NDEE passes through a portion of the federal §103 funds to LLCHD for activities described in an NDEE/LLCHD work plan, primarily $PM_{2.5}$ related monitoring activities. There is no state/local match requirement. |

Federal CAA §103 funding is used to operate $PM_{2.5}$ and IMPROVE monitors. Funding for April 2021 through March 2022 was maintained at the same level as the previous year.

Current funding levels are adequate to continue the operation of the existing and planned Nebraska air monitoring network, provided major new equipment purchases are not required.

NDEE anticipates receiving American Rescue Plan funding in 2022 to replace filter-based sequential $PM_{2.5}$ monitors with continuous monitors that will report real-time data to the public via EPA's AirNow website and through local agency websites. In addition, these funds will be used to replace aging continuous ozone and $SO_2$ monitors, along with supporting equipment.

## VIII. Anticipated Nebraska Ambient Air Monitoring Network Modifications

### A. Relocation of Ozone and $PM_{10}$ Monitors from 2411 O Street, Omaha

Douglas County Health Department (DCHD) has operated an ozone and $PM_{10}$ monitoring site at 2411 O Street in south Omaha since 1978. As discussed in section VI.A.1, in late 2020 the owner of that property requested the removal of the monitors. Ozone monitoring ceased at the end of October 2020 (the end of the ozone monitoring season), while $PM_{10}$ monitoring continued until the site was closed at the end of March 2021. DCHD is working to locate and seek approval of a new ozone and $PM_{10}$ monitoring site (or sites) in south Omaha or the surrounding area.

### B. Replacement Ozone Monitoring Site in the Sioux City MSA

As discussed in section VI.D, in September 2021 the South Dakota Department of Agriculture and Natural Resources closed a multipollutant monitoring site in Union County at the request of the landowner. This site was located in the South Dakota portion of the Sioux City MSA and included an ozone monitor. Based on the population of the Sioux City MSA and the recent ozone Design Values at the Union County site, 40 CFR Part 58 Appendix D requires one ozone monitor within the MSA (see Appendix C, Table C-2.c of this document for details). NDEE will work with EPA Regions 7 and 8 and with Iowa and South Dakota to determine a replacement ozone monitoring site in one of the five counties in the Sioux City MSA.

### C. Replacement Lead Monitoring Site in Fremont

NDEE will continue to work with EPA Region 7 and local landowners in Fremont to secure a replacement source-oriented lead monitoring site near the Magnus, LLC facility. The owner of the preferred location recently informed NDEE that he plans to sell the property. We have asked to be notified when the sale is complete so we can contact the new owner.

### D. American Rescue Plan $PM_{2.5}$ Monitor Replacements in Omaha and Lincoln

NDEE anticipates using American Rescue Plan funds to replace the primary filter-based $PM_{2.5}$ monitor at the Berry Street location in Omaha with a continuous monitor and to replace an older continuous $PM_{2.5}$ monitor at the Omaha NCore site with a new continuous monitor. The Lincoln-Lancaster County Health Department prefers to continue sequential $PM_{2.5}$ monitoring for regulatory purposes, so these funds will be used for a new replacement sequential sampler at the Lincoln monitoring site.

### E. American Rescue Plan Additional Equipment Replacements in Omaha and Lincoln

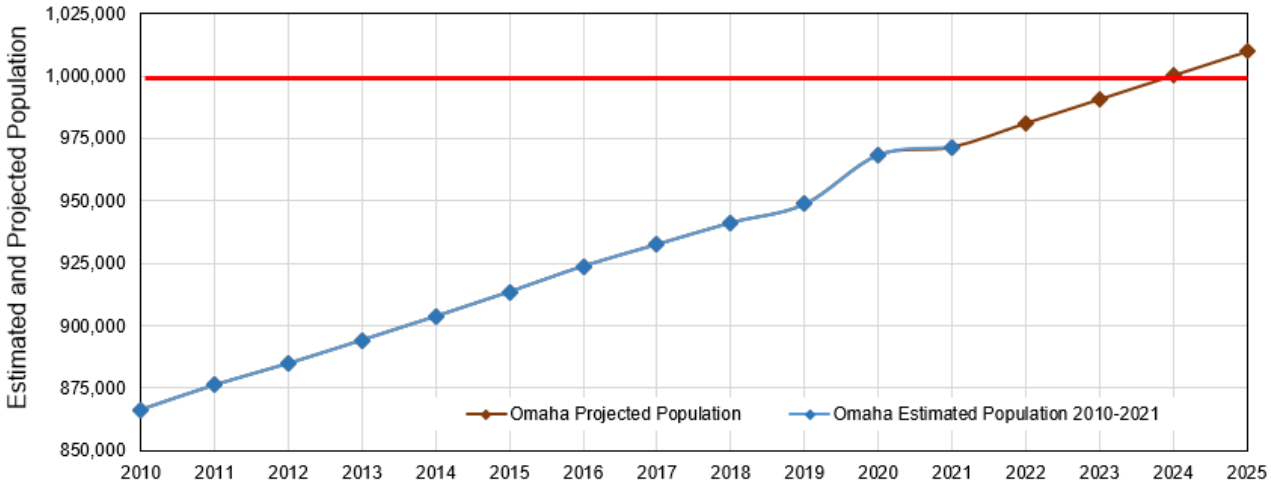
American Rescue Plan funds have also been allocated for replacement of other continuous pollutant monitors and supporting equipment in the Omaha and Lincoln areas. NDEE anticipates replacing ozone monitors at

the Omaha NCore and future replacement South Omaha sites, as well as the Davey site in Lancaster County. In addition, $SO_2$ samplers at Omaha NCore and the Whitmore Street site in north Omaha will be replaced.

## IX. Long-Term Planning for Additional Monitoring Needs in the Omaha-Council Bluffs MSA

The 2020 Decennial Census determined the population of the Omaha-Council Bluffs Metropolitan Statistical Area to be 967,604, a substantial increase from the 2010 population of 866,226. The Census Bureau's mid-year 2021 population estimate for the MSA was 971,637, which yields an average annual population increase of 9,583 since 2010. Figure IX-1 shows a graph of the Census Bureau's annual population estimates for the Omaha-Council Bluffs MSA along with projected populations through 2025 assuming this estimated average growth rate continues. At this rate of growth, the mid-year 2022 population would exceed 975,000, and the 2024 mid-year population estimate will likely exceed 1,000,000. (The 2024 official population estimates should be available in early 2025.)

**Figure IX-1. Omaha-Council Bluffs MSA Estimated and Projected Population 2010-2025**




***** Mid-year population estimates from U.S. Census Bureau. See Appendix D, Figure D-5 for population data.

Under current federal rules in 40 CFR Part 58 Appendix D, attainment of a population in excess of 1,000,000 in the Omaha-Council Bluffs MSA would impose additional air quality monitoring requirements on Nebraska and Iowa, which share responsibility for monitoring in this MSA. Additional requirements would apply to monitoring $NO_2$, CO, and to Photochemical Assessment Monitoring Stations (PAMS).

### A. Anticipated Photochemical Assessment Monitoring Station (PAMS) Requirements

Section 182(c)(1) of the 1990 Clean Air Act Amendments required the EPA Administrator to promulgate rules for the enhanced monitoring of ozone, oxides of nitrogen (NOx), and volatile organic compounds (VOC) to obtain more comprehensive and representative data on ozone air pollution. The regulations establishing the PAMS requirements are in 40 CFR Part 58, Appendix D, Section 5. Significant revisions to these requirements were made as part of the 2015 Ozone NAAQS review. The revised requirements call for ozone precursor measurements to be made during the 3-month PAMS season (June, July, and August) at existing NCore sites in core-based statistical areas (CBSA) with a population of one million or more as of the latest available census figures. The main objective of the required PAMS sites is to develop a database of ozone precursors and meteorological measurements to support ozone model development and track the trends of important ozone precursor concentrations.

Required PAMS measurements include:

1. Hourly average speciated VOCs;
2. Three 8-hour averaged carbonyl samples per day on a 1-in-3 day schedule, or hourly averaged formaldehyde;
3. Hourly averaged $O_3$;
4. Hourly averaged nitrogen oxide (NO), true nitrogen dioxide ($NO_2$), and total reactive nitrogen (NOy);
5. Hourly averaged ambient temperature;
6. Hourly vector-averaged wind direction;
7. Hourly vector-averaged wind speed;
8. Hourly averaged atmospheric pressure;
9. Hourly averaged relative humidity;
10. Hourly precipitation;
11. Hourly averaged mixing height;
12. Hourly averaged solar radiation; and
13. Hourly averaged ultraviolet radiation.

The 2015 Ozone NAAQS review revisions required states subject to PAMS requirements to start making PAMS measurements by June 1, 2019. A Final Rule promulgated by EPA effective 2/7/2020 extended the required start date to June 1, 2021. Thus NDEE anticipates that PAMS monitoring will be required at the Omaha NCore station when the latest U.S. Census estimates show an Omaha-Council Bluffs MSA population exceeding 1,000,000, possibly beginning in 2025.

## B. Anticipated Area-Wide and Near-Road $NO_2$ Monitoring Requirements

A CBSA with a population of 1,000,000 or more is required to have one site to monitor a location of expected highest $NO_2$ concentrations representing the neighborhood or larger spatial scales (i.e., an area-wide site). PAMS sites collecting $NO_2$ data that are situated in an area of expected high $NO_2$ concentrations at the neighborhood or larger spatial scale may be used to satisfy this minimum monitoring requirement if the $NO_2$ monitor is operated year-round.

In addition, a CBSA with a population of 1,000,000 or more is required to have one microscale near-road $NO_2$ site to monitor a location of expected maximum hourly concentrations sited near a major road with high annual average daily traffic counts. Measurements at near-road $NO_2$ monitor sites utilizing chemiluminescence FRMs must include, at a minimum, NO, $NO_2$, and NOx.

Nebraska's 2015 Ambient Air Quality Monitoring Network Plan and 5-Year Assessment (submitted when near-road monitoring was required to begin by January 2017 in MSA's with a population over 500,000) included a proposal from Douglas County Health Department to use the existing 78$^{th}$ and Dodge Streets CO site as a near-road $NO_2$ monitoring site. This location is a microscale, highest concentration site in a high-traffic area with the monitor situated immediately adjacent to the roadway. It is likely that NDEE and DCHD would carry that proposal forward when the Omaha-Council Bluffs MSA exceeds the population threshold of 1,000,000 people.

## C. Potential CO Monitoring Requirements

A CBSA with a population of 1,000,000 or more is required to have one CO monitor collocated with a required near-road $NO_2$ monitor. If the existing 78$^{th}$ and Dodge Streets near-road CO monitor site in Omaha is selected as the near-road $NO_2$ monitor location, this requirement will be satisfied.

# Appendix A: Ambient Air Monitoring Sites in Nebraska

See Appendix C for a compliance review with respect to 40 CFR Part 58 Appendices A through E.

## Omaha NCore Site Operated by DCHD

| | |
|---|---|
| **Site Name: Omaha NCore** [1] | AIRS ID: 31-055-0019 [1] |
| **Location: 4102 Woolworth Ave., Omaha** | Latitude: 41.246792º Longitude: -95.973964º |
| Operating Agency: Douglas County Health Department | |
| Purpose: NCore | Scale: Neighborhood |
| **Monitor/Pollutant: Carbon Monoxide (CO)** - Trace Level | |
| Type/POC: Primary / POC 01 | Monitoring Frequency: Continuous |
| Analyzer/Sampler: Thermo 48i-TLE | EPA Method: RFCA-0981-054 (AQS 554) |
| Start-Up Date: 1/20/2011 | Closure Date: Currently operating |
| Data used for NAAQS comparison: Yes | |
| Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable | |
| **Monitor/Pollutant: Ozone ($O_3$)** | |
| Type/POC: Primary / POC 01 | Monitoring Frequency: Continuous |
| Analyzer/Sampler: Thermo 49i | EPA Method: EQOA-0880-047 |
| Start-Up Date: 4/1/2011 | Closure Date: Currently operating |
| Data used for NAAQS comparison: Yes | |
| Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable | |
| **Monitor/Pollutant: Nitrogen Oxides ($NO/NO_y$)** | |
| Type/POC: Primary / POC 01 | Monitoring Frequency: Continuous |
| Analyzer/Sampler: Thermo 42i $NO/NO_2/NOx$ | EPA Method: RFNA-1289-074 |
| Start-Up Date: 1/20/2011 | Closure Date: Currently operating |
| Data used for NAAQS comparison: Not Applicable. Monitors for NO & NOy, but not $NO_2$ | |
| Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable | |
| **Monitor/Pollutant: Sulfur Dioxide ($SO_2$)** – Trace Level | |
| Type/POC: Primary / POC 01 | Monitoring Frequency: Continuous |
| Analyzer/Sampler: Thermo 43i-TLE | EPA Method: EQSA-0486-060 (AQS 560) |
| Start-Up Date: 1/20/2011 | Closure Date: Currently operating |
| Data used for NAAQS comparison: Yes | |
| Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable | |
| **Monitor/Pollutant: Sulfur Dioxide ($SO_2$)** – Trace Level | |
| Type/POC: Primary / POC 02 | Monitoring Frequency: Continuous |
| Analyzer/Sampler: Thermo 43i-TLE | EPA Method: EQSA-0486-060 (AQS 560) |
| Start-Up Date: 1/20/2011 | Closure Date: Currently operating |
| Data used for NAAQS comparison: Yes | |
| Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable | |
| **Monitor/Pollutant: $PM_{2.5}$** [2] | |
| Type/POC: Primary Continuous / POC 01 | Monitoring Frequency: Continuous |
| Analyzer/Sampler: Met One BAM-1020 [2] [3] | EPA Method: EQPM-0308-170 |
| Start-Up Date: 2/1/2004 [2] | Closure Date: Currently operating |
| Data used for NAAQS comparison: Yes | |
| Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable | |
| **Monitor/Pollutant: $PM_{2.5}$** [2] | |
| Type/POC: POC 02 | Monitoring Frequency: Once every 6 days |
| Analyzer/Sampler: Met One E-SEQ-FRM [2] | EPA Method: RFPS-0717-245 |
| Start-Up Date: 1/1/1999 [2] | Closure Date: Currently operating |
| Data used for NAAQS comparison: Only when POC 1 data is not available. | |
| Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable | |
| Continued on next page | |

# Appendix A: Ambient Air Monitoring Sites in Nebraska

## Omaha NCore Site Operated by DCHD - continued

**Site Name: Omaha NCore** AIRS ID: 31-055-0019 (See Comment 1)
**Location: 4102 Woolworth Ave., Omaha** Latitude: 41.246792º Longitude: -95.973964º
Operating Agency: Douglas County Health Department (continued from previous page)

**Monitor/Pollutant: $PM_{2.5}$ Speciation**

Type/POC: Speciation / POC 05 — Monitoring Frequency: Once every 3 days
Analyzer/Sampler: $PM_{2.5}$ Speciation — Sampler Type: SASS and a 3000 URG (3)
Start-Up Date: 5/25/2001 — Closure Date: Currently operating

Data used for NAAQS comparison: Not applicable
Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable

**Monitor/Pollutant: $PM_{10}$** – STP & Local Conditions

Type/POC: Continuous / POC 01 — Monitoring Frequency: Continuous
Analyzer/Sampler: Met One BAM-1020 3) — EPA Method: EQPM-0798-122
Start-Up Date: 1/1/2011 (3) — Closure Date: Currently operating

Data used for NAAQS comparison: Local conditions data only
Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable

**Monitor/Pollutant: $PM_{10-2.5}$** – Local Conditions

Type/POC: Continuous / POC 01 — Monitoring Frequency: Continuous
Analyzer/Sampler: Met One BAM-1020 (3) — EPA Method: EQPM-0709-185
Start-Up Date: 1/1/2011 (3) — Closure Date: Currently operating

Data used for NAAQS comparison: Yes
Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable

**Meteorological Parameters** – Manufacturer & Model – Start Date
Wind Direction & Velocity – MetOne 50.5 Sonic - 5/13/11
Temperature - MetOne Model 083D – 4/12/2011 — Barometric Pressure – MetOne Model 090D – 4/12/2011
Relative Humidity – MetOne 083D – 4/12/2011 — Solar Radiation – MetOne Model 096-1 – 4/12/2011
Closure Date: Currently operating

**Atmospheric Radiation – RadNet Air Monitor**

RadNet is a nationwide system that monitors the nation's air, drinking water, precipitation, and pasteurized milk to determine levels of radiation in the environment. RadNet sample analyses and monitoring results provide baseline data on background levels of radiation in the environment and can detect increased radiation from radiological incidents. The RadNet monitor is not subject 40 CFR Part 58 requirements. It is recognized in this Network Plan for informational purposes only. The RadNet monitor began operating at the Woolworth site in June 2006.

Comments:

1. Site History: Site 31-055-0019 was referred to as the "Woolworth site" through 12/31/10. The Woolworth site was a PM monitoring site with $PM_{2.5}$ filter-based, continuous and speciation monitors located on the roof of Douglas County Hospital. To accommodate NCore monitoring, more space was required, and the site was moved approximately 550 ft north to the roof of an adjacent/attached building in December 2010. Gaseous and meteorological monitors began operation in 2011 and lead in 2012. Lead monitoring was discontinued at the end of 2017 in accordance with the 2017 Network Plan. Permanent discontinuation of lead monitoring was approved by EPA Region 7 in December 2018.
2. On 1/1/99 $PM_{2.5}$ sampling was initiated using primary and collocated R&P 2025 filter-based FRM samplers. A continuous monitor was first operated at this site 2/1/04. It was replaced by a MetOne BAM FEM monitor on 1/6/09. The MetOne BAM was operated as an auxiliary monitor to the primary and collocated R&P 2025 FRM samplers through September 2009. Beginning 10/1/09, the MetOne BAM was designated the primary sampler and an R&P 2025 FRM sampler was retained as the collocated sampler. The 2025 FRM sampler was replaced by a MetOne E-SEQ-FRM 16-channel sequential sampler on 1/1/2020.
3. Two Met One BAM-1020 samplers operate as a paired $PM_{10-2.5}$ monitoring system. The paired units comprising the $PM_{10-2.5}$ monitoring system were put on-line on 1/1/11.

# Appendix A: Ambient Air Monitoring Sites in Nebraska

## Carbon Monoxide Sites in the Omaha MSA Operated by DCHD

| | |
|---|---|
| **Site Name: 78th & Dodge – Omaha** | AIRS ID: 31-055-0056 |
| **Location: 78th St and W Dodge Rd, Omaha** | Latitude: 41.259175º Longitude: -96.028628º |
| Operating Agency: Douglas County Health Department | |
| **Monitor Information** | **Pollutant: Carbon Monoxide (CO)** |
| Type/POC: Primary / POC 01 | Monitoring Frequency: Continuous |
| Analyzer/Sampler: Thermo 48c | EPA Method: RFCA-0981-054 (AQS 554) |
| Purpose: Highest Concentration | Scale: Microscale |
| Start-Up Date: 10/01/2007 | Closure Date: Currently operating |
| Data used for NAAQS comparison: Yes | |
| Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable | |
| Comments: None | |

## Combined Sulfur Dioxide & Ozone Site in the Omaha MSA Operated by DCHD

| | |
|---|---|
| **Site Name: Whitmore – Omaha** | AIRS ID: 31-055-0053 |
| **Location: 1616 Whitmore St, Omaha (1)** | Latitude: 41.297778º Longitude: -95.937500º |
| Operating Agency: Douglas County Health Department | |
| **Monitor Information** | **Pollutant: Sulfur Dioxide ($SO_2$)** |
| Type/POC: Primary / POC 01 | Monitoring Frequency: Continuous |
| Analyzer/Sampler: Thermo 43c-TLE | EPA Method: EQSA-0486-060 (AQS 560) |
| Purpose: High Conc. & Population Oriented (1) | Scale: Neighborhood (1) |
| Start-Up Date: 7/1/1999 | Closure Date: Currently operating |
| Data used for NAAQS comparison: Yes | |
| Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable | |
| **Monitor Information** | **Pollutant: Ozone ($O_3$) (2)** |
| Type/POC: Primary / POC 01 | Monitoring Frequency: Continuous |
| Analyzer/Sampler: Thermo 49C | EPA Method: EQOA-0880-047 |
| Purpose: Population Oriented (1) | Scale: Neighborhood (1) |
| Start-Up Date: 4/1/2015 | Closure Date: Currently operating |
| Data used for NAAQS comparison: Yes | |
| Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable | |
| Comments: | |
| (1) This site is in a socioeconomically disadvantaged area. | |
| (2) The ozone monitor from the 30th & Fort Street site was re-located to this site in 2015. | |

# Appendix A: Ambient Air Monitoring Sites in Nebraska

## Temporarily Closed Combined Ozone & $PM_{10}$ Site in the Omaha MSA Operated by DCHD

| | |
|---|---|
| **Site Name: South Omaha – Ozone** | AIRS ID: 31-055-0028 |
| **Location: 2411 O Street, Omaha** | Latitude: 41.207500º Longitude: -95.947500º |
| Operating Agency: Douglas County Health Department | |
| **Monitor Information** | **Pollutant: Ozone ($O_3$)** |
| Type/POC: Primary / POC 01 | Monitoring Frequency: Continuous |
| Analyzer/Sampler: Thermo 49C | EPA Method: EQOA-0880-047 |
| Purpose: Population Oriented | Scale: Neighborhood |
| Start-Up Date: 7/1/1978 | Closure Date: 12/31/2020 |
| Data used for NAAQS comparison: Yes | |
| Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable | |
| **Monitor Information** | **Pollutant: $PM_{10}$** |
| Type/POC: Primary / POC 01 | Monitoring Frequency: Once every 6 days |
| Analyzer/Sampler: SA / GMW Hi-Vol Filter | EPA Method: RFPS 1287-063 |
| Purpose: Population & Source Oriented | Scale: Neighborhood |
| Start-Up Date: 6/1/2006 (1) | Closure Date: 3/31/2021 |
| Data used for NAAQS comparison: Only when there is no primary data | |
| Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable | |

Comments:
(1) The $PM_{10}$ sampler was initially set-up as a SPAM at 25th & L Sts and then moved to 2411 O St on 8/22/07.
(2) In 2020 the landowner at 2411 O Street asked for the site to be removed from the property. Ozone monitoring continued through the end of October 2020, the end of the required monitoring season. The owner has allowed $PM_{10}$ monitoring to continue while a new site is found. As of March 2021 a new site has not been located.

## $PM_{10}$ Sites in the Omaha MSA Operated by DCHD

| | |
|---|---|
| **Site Name: 19th & Burt, Omaha** | AIRS ID: 31-055-0054 |
| **Location: 723 North 18th St, Omaha** | Latitude: 41.26664º Longitude: -95.93940º |
| Operating Agency: Douglas County Health Department | |
| **Monitor Information** | **Pollutant: $PM_{10}$** |
| Type/POC: Primary / POC 01 | Monitoring Frequency: Once every 6 days |
| Analyzer/Sampler: SA / GMW Hi-Vol Filter | EPA Method: RFPS 1287-063 |
| Purpose: Population & Source Oriented | Scale: Middle |
| Start-Up Date: 6/1/2001 | Closure Date: Currently operating |
| Data used for NAAQS comparison: Yes | |
| Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable | |
| **Monitor Information** | **Pollutant: $PM_{10}$** |
| Type/POC: Collocated / POC 02 | Monitoring Frequency: Once every 6 days (1) |
| Analyzer/Sampler: SA / GMW Hi-Vol Filter | EPA Method: RFPS 1287-063 |
| Purpose: Population & Source Oriented | Scale: Middle |
| Start-Up Date: 6/1/2001 | Closure Date: Currently operating |
| Data used for NAAQS comparison: Only when there is no primary data | |
| Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable | |

Comments: The 19th & Burt Streets site was originally located at 1909 Burt Streets on the rooftop of a building owned by Creighton University. In 2019 the Douglas County Health Department was notified that the university planned to demolish this building to make way for new construction, but that action was postponed. The site was moved on March 10, 2021, one and one-half blocks to the east to the new location at 723 North 19th Streets.

# Appendix A: Ambient Air Monitoring Sites in Nebraska

## $PM_{2.5}$ Sites in the Omaha MSA Operated by DCHD

| | |
|---|---|
| **Site Name: Berry Street Omaha** | AIRS ID: 31-055-0052 |
| **Location: 9225 Berry Street, Omaha** | Latitude: 41.19812º Longitude: -96.00562º |
| Operating Agency: Douglas County Health Department | |
| **Monitor Information** | **Pollutant: $PM_{2.5}$** |
| Type/POC: Primary / POC 01 | Monitoring Frequency: Once every 3 days |
| Analyzer/Sampler: Thermo 2025 Sequential | EPA Method: RFPS-0498-118 |
| Purpose: Population & Source Oriented | Scale: Neighborhood |
| Start-Up Date: 1/1/1999 | Closure Date: Currently operating |
| Data used for NAAQS comparison: Yes | |
| Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable | |
| **Monitor Information** | **Pollutant: $PM_{2.5}$** |
| Type/POC: Collocated / POC 02 | Monitoring Frequency: Once every 6 days |
| Analyzer/Sampler: R&P/Thermo 2025 Sequential | EPA Method: RFPS-0498-118 |
| Purpose: Population & Source Oriented | Scale: Neighborhood |
| Start-Up Date: 10/1/2014 | Closure Date: Currently operating |
| Data used for NAAQS comparison: Only when there is no primary data | |
| Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable | |
| Comments: None | |

| | |
|---|---|
| **Site Name: Bellevue** | AIRS ID: 31-153-0007 |
| **Location: 2912 Coffey Ave., Bellevue** | Latitude: 41.166944º Longitude: -95.923889º |
| Operating Agency: Douglas County Health Department | |
| **Monitor Information** | **Pollutant: $PM_{2.5}$** |
| Type/POC: Primary Continuous / POC 01 | Monitoring Frequency: Continuous |
| Analyzer/Sampler: Met One BAM-1020 (1) | EPA Method: EQPM-0308-170 |
| Purpose: Population & Source Oriented | Scale: Neighborhood |
| Start-Up Date: 3/1/1999 | Closure Date: Currently operating |
| Data used for NAAQS comparison: Yes | |
| Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable | |
| Comments: (1) This site was operated with a 2025 sequential sampler from 3/1/99 thru 6/30/10 (RFPS-0498-118). On 7/1/10 a Met One BAM monitor began operating. | |

| | |
|---|---|
| **Site Name: Blair** | AIRS ID: 31-177-0002 |
| **Location: 2242 Wright St., Blair** | Latitude: 41.551136º Longitude: -96.146753 |
| Operating Agency: Douglas County Health Department | |
| **Monitor Information** | **Pollutant: $PM_{2.5}$** |
| Type/POC: Primary / POC 01 | Monitoring Frequency: Once every 3 days |
| Analyzer/Sampler: Met One BAM-1020 (1) | EPA Method: EQPM-0308-170 |
| Purpose: Population & Source Oriented | Scale: Neighborhood |
| Start-Up Date: 4/6/1999 | Closure Date: Currently operating |
| Data used for NAAQS comparison: Yes | |
| Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable | |
| Comments: This site was operated with a 2025 sequential sampler from 4/6/99 thru 3/31/22 (RFPS-0498-118). On 4/1/22 a Met One BAM monitor began operating. | |

# Appendix A: Ambient Air Monitoring Sites in Nebraska

## $PM_{10}$ Site in the Weeping Water Area* Operated by NDEE

* The Weeping Water Area is in Cass County, which is part of the Omaha MSA. This is a relatively non-urbanized area of the county with limestone mining and processing activities. The $PM_{10}$ monitoring conducted here is for evaluation of air quality in the vicinity of Weeping Water, and not the Omaha MSA as a whole.

| | |
|---|---|
| **Site Name: Weeping Water City** (1) | AIRS ID: 31-025-0002 |
| **Location: 102 P Street, Weeping Water** | Latitude: 40.866228 Longitude: -96.137678 |
| Operating Agency: Nebraska Department of Environment and Energy | |
| **Monitor Information** | **Pollutant: $PM_{10}$** |
| Type/POC: Primary / POC 01 | Monitoring Frequency: Continuous |
| Analyzer/Sampler: Met One BAM (2) | EPA Method: EQPM-0798-122 |
| Purpose: Population & Source Oriented | Scale: Neighborhood |
| Start-Up Date: 01/01/1985 | Closure Date: Currently operating |
| Data used for NAAQS comparison: Yes | |
| Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes. See Section V.A.1.a. App B not applicable | |

Comments:

(1) Site is located at the city wastewater treatment facility.

(2) This site was operated with a primary 2025 sequential monitor from 8/12/2004 to 9/30/2016. A MetOne BAM continuous monitor began operating on 10/1/2016. A collocated 2025 sequential monitor at the site suffered a major electronic breakdown and last sampled on 3/25/15. With the installation of the continuous monitor, collocation is no longer required.

# Appendix A: Ambient Air Monitoring Sites in Nebraska

## Sites in the Lincoln MSA Operated by LLCHD

| | |
|---|---|
| **Site Name: Davey** | AIRS ID: 31-109-0016 |
| **Location: 1st & Maple Sts., Davey** | Latitude: 40.984722º Longitude: -96.677222º |
| Operating Agency: Lincoln Lancaster County Health Department | |
| **Monitor Information** | **Pollutant: Ozone** |
| Type/POC: Primary / POC 01 | Monitoring Frequency: Continuous |
| Analyzer/Sampler: Teledyne API 400E | EPA Method: EQOA-0992-087 |
| Purpose: Population Oriented | Scale: Urban |
| Start-Up Date: 1/1/1985 | Closure Date: Currently operating |
| Data used for NAAQS comparison: Yes | |
| Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable | |
| Comments: This site was upgraded at the beginning of the 2014 ozone season with the Teledyne API 400E analyzer replacing the Dasibi 1003 AH analyzer. | |

| | |
|---|---|
| **Site Name: LLCHD Building** | AIRS ID: 31-109-0022 |
| **Location: 3140 N St., Lincoln** | Latitude: 40.812590º Longitude: -96.683020º |
| Operating Agency: Lincoln Lancaster County Health Department | |
| **Monitor Information** | **Pollutant: $PM_{2.5}$** |
| Type/POC: Primary / POC 01 | Monitoring Frequency: Once every 3 days |
| Analyzer/Sampler: R&P 2025 Seq. Filter | EPA Method: RFPS 0498-118 |
| Purpose: Population Oriented | Scale: Neighborhood |
| Start-Up Date: 1/1/1999 | Closure Date: Currently operating |
| Data used for NAAQS comparison: Yes | |
| Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable | |
| **Monitor Information** | **Pollutant: $PM_{2.5}$** |
| Type/POC: Collocated / POC 02 | Monitoring Frequency: Once every 6 days |
| Analyzer/Sampler: R&P 2025 Seq. Filter | EPA Method: RFPS 0498-118 |
| Purpose: Population Oriented | Scale: Neighborhood |
| Start-Up Date: 1/1/1999 | Closure Date: Currently operating |
| Data used for NAAQS comparison: Only when primary data is not available. | |
| Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable | |
| **Monitor Information** | **Pollutant: $PM_{2.5}$** |
| Type/POC: Continuous / POC 03(1) | Monitoring Frequency: Continuous |
| Analyzer/Sampler: Met One BAM-1020 | EPA Method: EQPM-0308-170 |
| Purpose: Population Oriented | Scale: Neighborhood |
| Start-Up Date: 7/1/2006 | Closure Date: Currently operating |
| Data used for NAAQS comparison: No. Reports to AirNow, but not AQS (1) | |
| Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable | |
| Comment: | |
| (1) The MetOne BAM monitor reported data to AirNow , but not AQS. Data from the MetOne BAM is not used for NAAQS comparison. The MetOne BAM data typically demonstrates a negative bias when compared to same day FRM data. In 2021, there was a -9.5% bias on same-day annual average data, and a -13.1% bias for the same-day 98th percentile. | |

# Appendix A: Ambient Air Monitoring Sites in Nebraska

## $PM_{2.5}$ Sites Operated by NDEE

| | |
|---|---|
| **Site Name: Homestead National Historical Park** AIRS ID: 31-067-0005<br>**Location: 24405 SW 75 Rd, Beatrice** Latitude: 40.28506º Longitude: -96.82431º<br>Operating Agency: Nebraska Department of Environment and Energy | |
| **Monitor Information** | **Pollutant: $PM_{2.5}$** |
| Type/POC: Primary Continuous/ POC 01 | Monitoring Frequency: Continuous |
| Analyzer/Sampler: Met One BAM-1020 | EPA Method: EQPM-0308-170 |
| Purpose: Background Surveillance | Scale: Regional |
| Start-Up Date: 06/02/2021 | Closure Date: Currently operating |
| Data used for NAAQS comparison: Yes<br>Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable | |
| **Monitor Information** | **Pollutant: $PM_{2.5}$** |
| Type/POC: Collocated / POC 02 | Monitoring Frequency: Once every 6 days |
| Analyzer/Sampler: Thermo 2025i Sequential | EPA Method: RFPS-0498-118 |
| Purpose: Background Surveillance | Scale: Regional |
| Start-Up Date: 06/02/2021 | Closure Date: Currently operating |
| Data used for NAAQS comparison: Only when primary data is not available.<br>Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable | |
| Comments: None | |

| | |
|---|---|
| **Site Name: Grand Island NDOT** AIRS ID: 31-079-0005<br>**Location: 3305 W Old Potash Hwy, Grand Island** Latitude: 40.918333º Longitude: -98.378889º<br>Operating Agency: Nebraska Department of Environment and Energy | |
| **Monitor Information** | **Pollutant: $PM_{2.5}$** |
| Type/POC: Primary Continuous/ POC 01 | Monitoring Frequency: Continuous |
| Analyzer/Sampler: Met One BAM-1020 | EPA Method: EQPM-0308-170 |
| Purpose: Background Surveillance & Transport | Scale: Regional |
| Start-Up Date: 11/26/2019 | Closure Date: Currently operating |
| Data used for NAAQS comparison: Yes<br>Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable | |
| Comments: None | |

| | |
|---|---|
| **Site Name: Scottsbluff Senior High School** AIRS ID: 31-157-0004<br>**Location: Hwy 26 & 5th Ave, Scottsbluff (1)** Latitude: 41.875556º Longitude: -103.658056º<br>Operating Agency: Nebraska Department of Environment and Energy | |
| **Monitor Information** | **Pollutant: $PM_{2.5}$** |
| Type/POC: Primary Continuous/ POC 01 | Monitoring Frequency: Continuous |
| Analyzer/Sampler: Met One BAM-1020 | EPA Method: EQPM-0308-170 |
| Purpose: Population Oriented & Transport | Scale: Regional & Neighborhood |
| Start-Up Date: 3/24/2020 | Closure Date: Currently operating |
| Data used for NAAQS comparison: Yes<br>Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable | |
| Comments:<br>(1) A Thermo 2025i FRM Sequential sampler operated at this location on a 3-day sampling schedule until 3/24/20, when a continuous sampler was installed. Due to AQS software issues a new AIRS ID (31-157-0006) at that time. As of April 2022 the site has reverted back to the original AIRS ID. | |

# Appendix A: Ambient Air Monitoring Sites in Nebraska

## Temporarily Closed Source-Oriented Lead (Pb) Site Operated by NDEE

| | |
|---|---|
| **Site Name: Fremont** | AIRS ID: 31-053-0005 |
| **Location: 1255 Front St., Fremont, NE** | Latitude: 41.90583º Longitude: -97.31583º |
| Operating Agency: Nebraska Department of Environmental Quality | |
| **Monitor Information** | **Pollutant: Lead (Pb)** |
| Type/POC: Primary / POC 01 | Monitoring Frequency: Once every 6 days |
| Analyzer/Sampler: Hi-Vol TSP-Pb (ICP-MS) | EPA Method: EQL-0310-189 |
| Purpose: Source Oriented (1) | Scale: Microscale |
| Start-Up Date: 3/9/2010 | Closure Date: Currently operating |
| Data used for NAAQS comparison: Yes | |
| Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable | |
| **Monitor Information** | **Pollutant: Lead (Pb)** |
| Type/POC: Collocated / POC 02 | Monitoring Frequency: Once every 6 days |
| Analyzer/Sampler: Hi-Vol TSP-Pb (ICP-MS) | EPA Method: EQL-0310-189 |
| Purpose: Source Oriented | Scale: Microscale |
| Start-Up Date: 3/9/2010 | Closure Date: 9/31/2018 |
| Data used for NAAQS comparison: Only if primary sampler data is not available | |
| Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable | |

Comments:

(1) Source-oriented with respect to Magnus Inc facility. Site closed at the request of the landowner. A nearby alternative site has been approved by EPA and a site agreement is being negotiated.

**Source-Oriented Lead Monitoring Waivers pursuant to 40 CFR Part 58 Section 4.5(ii)**

**(1) Nucor Steel in Norfolk, NE:** Waiver first approved by the EPA R7 Administrator in April 2014 and effective through April 2019. Renewal of this waiver was requested in the Nebraska 2019 Network Plan, which was approved by the EPA R7 Administrator in October 2019. The waiver will remain in effect until April 2024.

## Interagency Monitoring of Protected Visual Environments (IMPROVE) Site *

* Interagency Monitoring of Protected Visual Environments (IMPROVE) monitors are operated to evaluate regional haze that may impact Federal Class I areas in National Parks and Wilderness Areas. Fine particulate and particulate speciation monitoring is conducted at these sites. They do not have an AIRS ID, are not subject to 40 CFR Part 58 requirements, and are not used for NAAQS attainment determinations.

| | |
|---|---|
| **Site Name: NE National Forest IMPROVE** | AIRS ID: Not applicable, See Comments |
| **Location: Nebraska National Forest, Thomas Co.** | Latitude: 41.8888º Longitude: -100.3387º |
| Operating Agency: Nebraska Department of Environment and Energy / US Forest Service | |
| **Monitor Information** | **Pollutant: IMPROVE** (See Comments) |
| Type/POC: IMPROVE | Monitoring Frequency: Continuous |
| Method Description: : IMPROVE | EPA Method: Not applicable |
| Purpose: Background & Transport | Scale: Regional |
| Start-Up Date: 2002 | Closure Date: Currently operating |
| Data used for NAAQS comparison: Not applicable. | |
| Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Not applicable | |

Comments: None

# Appendix A: Ambient Air Monitoring Sites in Nebraska

## National Atmospheric Deposition Program (NADP) Sites**

** The NADP site information below is included in the Network Plan for informational purposes only. They are not subject to 40 CFR Part 58 requirements, nor used for NAAQS attainment determinations.

| | |
|---|---|
| **Site Name: Mead NADP** | AIRS ID: Not applicable, See Comments |
| **Location: U of NE Field Lab, Saunders Co.** | Latitude: 41.1528º Longitude: -96.4912 |
| Operating Agency: University of Nebraska | |
| **Monitor Information** | **Pollutant: TNT/MDN** |
| Type/POC: NTN/MDN | Monitoring Frequency: Weekly |
| Method Description: NTN/MDN | EPA Method: Not applicable |
| Purpose: Background & Transport | Scale: Regional |
| Start-Up Date: 7/25/1978 | Closure Date: Currently operating |

Comments: The Mead and North Platte National Atmospheric Deposition Program (NADP) sites are operated by the University of Nebraska with analytical and data processing support from the NADP. NADP sites are not subject to review under the provisions of 40 CFR Part 58.10, and thus are not subject to review under this Network Plan. They are included herein for informational purposes only.

- Monitoring methods are specific to this program and are not Federal Reference or Equivalent Methods (FRM/FEM).
- The National Trends Network (NTN) sites collect deposition data on acidity, sulfate, nitrate, ammonium, chloride, and base cations (e.g., calcium, magnesium, potassium, and sodium).
- Mercury Deposition Network (MDN) sites collect mercury deposition data.
- The NADP oversees both NTN and MDN sites and provides analytical and data processing support.
- The Mead site began operation as an NTN site in 1978 and began MDN operations in June 2007. NDEE provides financial support for MDN operations at this site through Title V fees.

| | |
|---|---|
| **Site Name: North Platte NADP** | AIRS ID: Not applicable, See Comments |
| **Location: U of Ne Ag Station, Lincoln, Co.** | Latitude: 41.0592º Longitude: -100.7464º |
| Operating Agency: University of Nebraska | |
| **Monitor Information** | **Pollutant:** NTN |
| Type/POC: NTN | Monitoring Frequency: Weekly |
| Method Description: NTN | EPA Method: Not applicable |
| Purpose: Background & Transport | Scale: Regional |
| Start-Up Date: 9/24/1985 | Closure Date: Currently operating |

Comments: The Mead and North Platte National Atmospheric Deposition Program (NADP) sites are operated by the University of Nebraska with analytical and data processing support from the NADP. NADP sites are not subject to review under the provisions of 40 CFR Part 58.10, and thus are not subject to review under this Network Plan. They are included herein for informational purposes only.

- Monitoring methods are specific to this program and are not Federal Reference or Equivalent Methods (FRM/FEM).
- The National Trends Network (NTN) sites collect deposition data on acidity, sulfate, nitrate, ammonium, chloride, and base cations (e.g., calcium, magnesium, potassium, and sodium).
- Mercury Deposition Network (MDN) data was collected at this site from October 2009 thru October 2011 using Nebraska Environmental Trust funding.
- The NADP oversees both NTN and MDN sites and provides analytical and data processing support.

# Appendix A: Ambient Air Monitoring Sites in Nebraska

## National Atmospheric Deposition Program (NADP) Sites (continued)

| | |
|---|---|
| **Site Name: Homestead NADP** | AIRS ID: Not applicable, See Comments |
| **Location: Homestead Nat. Historic Park** | Latitude: 40.2850º Longitude: -96.8244º |
| Operating Agency: National Park Service | |
| **Monitor Information** | **Pollutant:** Ammonia |
| Type/POC: AMoN | Monitoring Frequency: Weekly |
| Method Description: AMoN | EPA Method: Not applicable |
| Purpose: Background & Transport | Scale: Regional |
| Start-Up Date: 7/26/2016 | Closure Date: Currently operating |

Comments: The Homestead National Atmospheric Deposition Program (NADP) site is operated by the National Park Service. NADP sites are not subject to review under the provisions of 40 CFR Part 58.10, and thus are not subject to review under this Network Plan. They are included herein for informational purposes only.

- Monitoring methods are specific to this program and are not Federal Reference or Equivalent Methods (FRM/FEM).
- The Ammonia Monitoring Network (AMoN) sites measure ammonia concentrations in ambient air at rural location.
- The NADP oversees the AMoN sites and provides analytical and data processing support.

| | |
|---|---|
| **Site Name: Santee Sioux NADP** | AIRS ID: Not applicable, See Comments |
| **Location: State Spur 54D** | Latitude: 42.8292º Longitude: -97. 8541º |
| Operating Agency: EPA | |
| **Monitor Information** | **Pollutant:** Ammonia |
| Type/POC: AMoN | Monitoring Frequency: Weekly |
| Method Description: AMoN | EPA Method: Not applicable |
| Purpose: Background & Transport | Scale: Regional |
| Start-Up Date: 4/26/2011 | Closure Date: Currently operating |

Comments: The Santee Sioux National Atmospheric Deposition Program (NADP) site is operated by the U.S. EPA. NADP sites are not subject to review under the provisions of 40 CFR Part 58.10, and thus are not subject to review under this Network Plan. They are included herein for informational purposes only.

- Monitoring methods are specific to this program and are not Federal Reference or Equivalent Methods (FRM/FEM).
- The Ammonia Monitoring Network (AMoN) sites measure ammonia concentrations in ambient air at rural location.
- The NADP oversees the AMoN sites and provides analytical and data processing support.

# Appendix A: Ambient Air Monitoring Sites in Nebraska

## Clean Air Status and Trends Network (CASTNET) Site

| | |
|---|---|
| **Site Name: Santee Sioux CASTNET**<br>**Location: State Spur 54D**<br>Operating Agency: EPA | AIRS ID: Not applicable, See Comments<br>Latitude: 42.8292º Longitude: -97. 8541º |
| **Monitor Information**<br>Type/POC: CASTNET<br>Method Description: CASTNET<br>Purpose: Background & Transport<br>Start-Up Date: 7/5/2006 | **Pollutant:** CASTNET, Ozone<br>Monitoring Frequency: Weekly/Continuous ($O_3$)<br>EPA Method: Not applicable<br>Scale: Regional<br>Closure Date: Currently operating |
| Comments: The Santee Sioux CASTNET site is operated by the U.S. EPA. CASTNET sites are not subject to review under the provisions of 40 CFR Part 58.10, and thus are not subject to review under this Network Plan. They are included herein for informational purposes only.<br>Except for ozone, monitoring methods are specific to this program and are not Federal Reference or Equivalent Methods (FRM/FEM). | |

# Appendix B: Comparison of Ambient Air Monitoring Data to NAAQS

This appendix compares ambient air quality data from 2019 through 2021 to the NAAQS. The annual data and estimated Design Values (DVs) presented below were retrieved from the EPA AQS database.

## Table B-1: Ozone Data

| Comparison of 3-Year Design Values for 8-hour Ozone to NAAQS (1) | | | | | | |
|---|---|---|---|---|---|---|
| **Site** | **Operator** | **2019** | **2020** | **2021** | **DV** | **% NAAQS** |
| **Omaha MSA and Near-By Montgomery Co., IA** | | | | | | |
| **Omaha NCore** | DCHD | 0.061 | 0.058 | 0.064 | 0.061 | 87% |
| **1616 Whitmore St, Omaha** | DCHD | 0.062 | 0.052 | 0.066 | 0.060 | 86% |
| **Pisgah, Harrison Co., IA** | IA DNR | 0.062 | 0.061 | 0.063 | 0.062 | 89% |
| **Montgomery County, IA** (2) | IA DNR | 0.059 | 0.056 | 0.058 | 0.057 | 81% |
| **Lincoln MSA** | | | | | | |
| **First & Maple, Davey** | LLCHD | 0.056 | 0.054 | 0.059 | 0.056 | 80% |
| **Sioux City MSA** | | | | | | |
| **31986 475th Ave, Union Co, SD** | SD DEP | 0.064 | 0.063 | 0.065 | 0.064 | 91% |
| **Nebraska Non-MSA** | | | | | | |
| **Santee Sioux Indian Reservation** | US EPA | 0.062 | 0.063 | 0.072 | 0.065 | 93% |
| **Sites in Surrounding States** | | | | | | |
| **Emmetsburg, IA** | IA DNR | 0.065 | 0.062 | 0.064 | 0.063 | 90% |
| **Des Moines, IA** | IA DMR | 0.059 | 0.057 | 0.061 | 0.059 | 84% |
| **Savanah, MO** | MO DNR | 0.060 | 0.059 | 0.061 | 0.060 | 86% |
| **Kansas City Metro (Max DV site)** | MO DNR | 0.062 | 0.065 | 0.071 | 0.066 | 94% |
| **Topeka KS** | KS DHE | 0.061 | 0.057 | 0.063 | 0.060 | 86% |
| **Cedar Bluff Reservoir, KS** | KS DHE | 0.058 | 0.059 | 0.064 | 0.060 | 86% |
| **Denver, CO Metro (Max DV site)** | CO DPHE | 0.078 | 0.083 | 0.089 | 0.083 | 119% |
| **Greeley, CO** | CO DPHE | 0.065 | 0.072 | 0.076 | 0.071 | 101% |
| **Cheyenne, WY (Max DV site)** | WY DEQ | 0.059 | 0.060 | 0.075 | 0.064 | 91% |
| **Newcastle, WY** | WY BLM | 0.059 | 0.066 | 0.068 | 0.064 | 91% |
| **Sioux Falls, SD** (3) | SD DEP | 0.065 | 0.064 | 0.056 | 0.061 | 87% |
| **Wind Cave NP, Custer Co., SD** | SD DEP | 0.057 | 0.063 | 0.065 | 0.061 | 87% |
| **Badlands NP, Jackson Co., SD** | SD DEP | 0.058 | 0.061 | 0.054 | 0.057 | 81% |

Notes and Explanations:

(1) EPA AQS data retrieval 3/22/22. Concentrations are in units of ppm. Annual values are the 4th highest daily maximum 8-hour concentrations (ppm). The Design Value (DV) is the truncated 3-year average of the 4th highest max for each year. The NAAQS = 0.070 ppm (promulgated 10/1/2015).

(2) The Montgomery County, IA site is located outside the Omaha MSA at Viking Lake State Park; ~18 miles east of the Mills-Montgomery County line and ~ 45 miles SE of the I-29/I-80 intersection.

(3) The Sioux Falls NCore monitoring site was moved to a new location at the end of March 2021. The 2021 annual value and Design Value use a data composite from both old and new locations.

# Appendix B: Comparison of Ambient Air Monitoring Data to NAAQS

## Table B-2: Carbon Monoxide Data

| **Comparison of 3-Year Maximum Annual Values for 1-Hour Carbon Monoxide to NAAQS** (1) (2) | | | | | |
|---|---|---|---|---|---|
| **Site** | **2019** | **2020** | **2021** | **Design Value** (2) | **% NAAQS** |
| **Omaha MSA** | | | | | |
| **78th & Dodge Streets, Omaha** | 1.9 | 1.8 | 1.3 | 1.9 | 5% |
| **Omaha NCore** (4) | 0.95 | 0.85 | 0.75 | 0.95 | 3% |
| | | | | | |
| **Comparison of 3-Year Maximum Annual Values for 8-Hour Carbon Monoxide to NAAQS** (1) (3) | | | | | |
| **Site** | **2019** | **2020** | **2021** | **Design Value** (3) | **% NAAQS** |
| **Omaha MSA** | | | | | |
| **78th & Dodge Streets, Omaha** | 1.6 | 1.6 | 1.1 | 1.6 | 18% |
| **Omaha NCore** (4) | 0.6 | 0.5 | 0.5 | 0.6 | 7% |

Notes and Explanations:

(1) EPA AQS data retrieval 2/24/22. The CO NAAQS were last revised in 1984. The latest review was concluded in August 2011 when EPA determined no changes in the CO NAAQS were warranted.

(2) The 1-hour NAAQS = 35 ppm. The annual values shown are the 2nd highest maximum values. The Design Value is the highest annual 2nd highest maximum value over the last 3 years. Concentrations are in units of ppm.

(3) The 8-hour NAAQS = 9 ppm. The annual values shown are the 2nd highest 8-hour maximum values. The Design Value is the highest annual 2nd highest maximum value over the last 3 years. Concentrations are in units of ppm.

(4) Omaha NCore is a multi-pollutant monitoring site located at 4102 Woolworth Street.

# Appendix B: Comparison of Ambient Air Monitoring Data to NAAQS

## Table B-3: Sulfur Dioxide Data

| Comparison of Daily Maximum 1-Hour Sulfur Dioxide Levels to the Primary NAAQS (1) | | | | | |
|---|---|---|---|---|---|
| **Site** | **2019** | **2020** | **2021** | **Design Value (1)** | **% NAAQS** |
| **Omaha MSA** | | | | | |
| **1616 Whitmore St., Omaha** | 0.038 | 0.034 | 0.048 | 0.040 | 53% |
| **Omaha NCore (2)** | 0.009 | 0.008 | 0.018 | 0.011 | 15% |
| **Sioux City MSA Sites** | | | | | |
| **31986 475th Ave, Union Co, SD (5)** | 0.003 | 0.002 | 0.003 | 0.002 | 4% |

Notes and Explanations:

(1) EPA AQS data retrieval 4/4/22. The 1-hour NAAQS is 75 ppb or 0.075 ppm (promulgated in June 2010 and retained in December 2020). The annual values shown are the 99th percentile of the daily maximum values in ppm units. The Design Value is the three-year average of the annual 99th percentile daily maximum values. Annual values and Design Values that do not meet data completeness requirements are shown in red.

(2) Omaha NCore is a multi-pollutant monitoring site located at 4102 Woolworth Street.

(3) The 7288 John Pershing Dr. site began operation on 01/01/17 and was operated by DCHD. This site adjacent to the OPPD North Omaha Generating Station was established to satisfy the requirements of the Data Requirements Rule (DRR) in 40 CFR Part 51. These requirements being satisfied after three years of data collection, the site was closed on 12/31/2020.

(4) The SW 42nd St., Lancaster County site began operation on 12/23/16 and was operated by LLCHD. This site adjacent to the NPPD Sheldon Generating Station was established to satisfy the requirements of the Data Requirements Rule (DRR) in 40 CFR Part 51. These requirements being satisfied after three years of data collection, the site was closed on 12/31/2020.

(5) The Union Co., SD site is operated by the South Dakota Department of Environment & Natural Resources.

# Appendix B: Comparison of Ambient Air Monitoring Data to NAAQS

## Table B-4a: Nitrogen Dioxide Data

| Comparison of 1-Hour Maximum Levels of Nitrogen Dioxide to NAAQS (1)(2) | | | | | |
|---|---|---|---|---|---|
| **Site** | **2019** | **2020** | **2021** | **Design Value (2)** | **% NAAQS** |
| **Sioux City MSA** | | | | | |
| **31986 475th Ave, Union Co, SD (4)** | 0.012 | 0.022 | 0.023 | 0.019 | 19% |
| | | | | | |
| **Comparison of 3-Year Maximum Annual Average Value for Nitrogen Dioxide to NAAQS (3)** | | | | | |
| **Site** | **2019** | **2020** | **2021** | **Design Value (3)** | **% NAAQS** |
| **Sioux City MSA** | | | | | |
| **31986 475th Ave, Union Co, SD (4)** | 0.002 | 0.002 | 0.003 | 0.003 | 6% |

Notes and Explanations:

(1) EPA AQS data retrieval 4/04/22. All concentrations expressed in ppm units. Annual values and Design Values that do not meet data completeness requirements are shown in red.

(2) The 1-hour $NO_2$ NAAQS is 0.100 ppm (promulgated Feb. 2010 and retained Apr. 2018). NAAQS attainment is achieved if the 3-year average of the annual 98th percentile of the daily maximum 1-hour values does not exceed 0.100 ppm.

(3) The Annual Average $NO_2$ NAAQS is 0.053 ppm not to be exceeded in a calendar year. It was promulgated 1971 and retained in the 1996 and 2010 reviews. The Design Value is the highest annual average over the 3-year comparison period.

(4) The Union County SD site is operated by the South Dakota Department of Environment & Natural Resources.

## Table B-4b: Nitrogen Oxide Data from the Omaha NCore Site (1)(2)

| **Parameter** | **2019** | **2020** | **2021** | **Approx. DV (3)** | **Max % NAAQS** |
|---|---|---|---|---|---|
| **1-Hour Data: 98th Percentile** | | | | | |
| **NOy-NO (3)(4)(5)** | 0.040 | 0.035 | 0.037 | 0.037 | 38% |
| | | | | | |
| **Annual Average Data** | | | | | |
| **NOy-NO** | 0.0058 | 0.0045 | 0.0063 | 0.0063 | 12% |

Footnotes:

(1) EPA AQS data retrieval 4/04/22. All concentrations expressed in ppm units.

(2) Omaha NCore is a multi-pollutant monitoring site located at 4102 Woolworth Street.

(3) NOy – Reactive oxides of nitrogen, which include NO, $NO_2$ and other nitrogen oxides, including organic nitrogen oxide compounds.

(4) NO – Nitrogen oxide

(5) NOy-NO provides an approximation of nitrogen dioxide ($NO_2$), with some possibility of over-estimating the true $NO_2$ concentration. For this reason, the NOy-NO parameter can be used to demonstrate attainment, but not non-attainment.

## Table B-5a: $PM_{10}$ – Annual Number of Exceedances [1] [2]

| Site | 2019 | 2020 | 2021 | Design Value [1] |
|---|---|---|---|---|
| **Omaha MSA Sites** | | | | |
| **Omaha NCore, 4102 Woolworth St.** [3] | 0 | 0 | 0 | 0.0 |
| **2411 O St, Omaha** [4] | 0 | 0 | 0 | 0.0 |
| **19th & Burt Streets, Omaha** | 0 | 0 | 0 | 0.0 |
| **3130 C Ave, Council Bluffs, IA** [5] | 0 | 0 | 0 | 0.0 |
| **Weeping Water City** [6] | 0 | 0 | 0 | 0.0 |
| **Sioux City MSA Site** | | | | |
| **31986 475th Ave, Union Co, SD** [7] | 0 | 0 | 0 | 0.0 |

Notes and Explanations:

(1) EPA AQS data retrieval 4/5/22. The $PM_{10}$ NAAQS is an exceedance-based standard with a 24-hour averaging time and 150 $\mu g/m^3$ level at standard temperature (25° C) and pressure (760 mm Hg) conditions. This standard is not to be exceeded more than once per year on average over 3 years, where exceedance is defined as a value of 155 $\mu g/m^3$ or more. Sites with 3-year average of exceedances of 1.0 or less are in attainment with the NAAQS.

(2) NAAQS History: The primary 24-hour NAAQS was initially set at 150 $\mu g/m^3$ in 1987 and was retained at this level in the 1997, 2006 and 2012 PM NAAQS reviews.

(3) Omaha NCore is a multi-pollutant monitoring site located at 4102 Woolworth Street.

(4) The 2411 O Street site was closed for relocation 3/31/2021.

(5) The Council Bluffs, IA site is operated by the IA DNR

(6) Weeping Water is a limestone mining and processing area in Cass County, which is located 15 to 20 miles south of the main urbanized area within the Omaha MSA.

(7) The Union Co., SD site is operated by the South Dakota Department of Environment & Natural Resources

# Appendix B: Comparison of Ambient Air Monitoring Data to NAAQS

## Table B-5b: $PM_{10}$ – Annual Maximum 24-Hour Data [1] [2]

| Site | 2019 | 2020 | 2021 | 4th Highest Value [1] | % NAAQS |
|---|---|---|---|---|---|
| **Omaha MSA Sites [6]** | | | | | |
| **Omaha NCore, 4102 Woolworth St.** [3] | 52 | 71 | 74 | 67 | 45% |
| **2411 O St, Omaha** [4] | 43 | 83 | 46 | 50 | 33% |
| **19th & Burt Streets, Omaha** | 40 | 84 | 48 | 45 | 30% |
| **3130 C Ave, Council Bluffs, IA** [4] | 48 | 95 | 59 | 59 | 39% |
| **Weeping Water City** [5] | 50 | 95 | 81 | 76 | 51% |
| **Sioux City MSA Site** | | | | | |
| **31986 475th Ave, Union Co, SD** [6] | 56 | 94 | 92 | 80 | 53% |

Notes and Explanations:

(1) EPA AQS data retrieval 4/5/22. Year columns show annual maximum 24-hour average values of $PM_{10}$. NAAQS = 150 µg/$m^3$, not to be exceeded more than once per year on average over 3 years, where exceedance is defined as a value of 155 µg/$m^3$ or more. Annual values that do not meet completeness requirements are shown in red. The 4th-highest 24-hour average value in the three-year period is shown for informal comparison to the NAAQS.

(2) NAAQS History: The primary 24-hour NAAQS was initially set at 150 µg/$m^3$ in 1987, and was retained at this level in the 1997, 2006 and 2012 PM NAAQS reviews.

(3) Omaha NCore is a multi-pollutant monitoring site located at 4102 Woolworth Street.

(4) The 2411 O Street site was closed for relocation 3/31/2021.

(5) The Council Bluffs, IA site is operated by the IA DNR

(6) Weeping Water is a limestone mining and processing area in Cass County, which is located 15 to 20 miles south of the main urbanized area within the Omaha MSA.

(7) The Union Co., SD site is operated by the South Dakota Department of Environment & Natural Resources

# Appendix B: Comparison of Ambient Air Monitoring Data to NAAQS

## Table B-5c: $PM_{10}$ - Annual Average Data (1)

| Site | 2019 | 2020 | 2021 | 3-Year Average | % Old Std |
|---|---|---|---|---|---|
| **Omaha MSA (4)** | | | | | |
| **Omaha NCore, 4102 Woolworth St.** (2) | 17.7 | 20.6 | 32.0 | 20.4 | 41% |
| **2411 O St, Omaha** (3) | 20.7 | 23.8 | 19.1 | 21.2 | 42% |
| **19th & Burt Streets, Omaha** | 18.8 | 21.7 | 22.8 | 21.1 | 42% |
| **3130 C Ave, Council Bluffs, IA** 4) | 19.0 | 22.0 | 22.3 | 21.1 | 42% |
| **Weeping Water City** (5) | 15.7 | 18.7 | 22.4 | 18.9 | 38% |
| **Sioux City MSA** | | | | | |
| **31986 475th Ave, Union Co, SD** (6) | 15.2 | 19.4 | 21.2 | 18.6 | 37% |

Notes and Explanations:

(1) EPA AQS data retrieval 4/04/22. There is currently no NAAQS for the annual average $PM_{10}$ concentration. An annual average NAAQS of 50 $\mu g/m^3$ was established in 1987, and then rescinded on December 18, 2006. Annual values and average values that do not meet completeness requirements are shown in red. Comparison to the rescinded NAAQS is provided for informational purposes only. Concentrations are in units of $\mu g/m^3$.

(2) Omaha NCore is a multi-pollutant monitoring site located at 4102 Woolworth Street.

(3) The 2411 O Street site was closed for relocation 3/31/2021.

(4) The Council Bluffs IA site is operated by the IA DNR

(5) Weeping Water is a limestone mining and processing area in Cass County, which is located 15 to 20 miles south of the main urbanized area within the Omaha MSA.

(6) The Union Co., SD site is operated by the South Dakota Department of Environment & Natural Resources.

# Appendix B: Comparison of Ambient Air Monitoring Data to NAAQS

## Table B-6a: $PM_{2.5}$ - 98th Percentile 24-Hour Data (1) (2)

| Site | 2019 | 2020 | 2021 | Design Value (1) | % NAAQS |
|---|---|---|---|---|---|
| **Omaha MSA & Montgomery Co., IA (5)** | | | | | |
| **Omaha NCore** (3) | 17.0 | 17.3 | 21.6 | 18.6 | 53% |
| **9225 Berry St.; Omaha** | 18.5 | 17.7 | 22.4 | 19.5 | 56% |
| **2912 Coffey Ave., Bellevue** | 21.5 | 17.3 | 26.3 | 21.7 | 62% |
| **2242 Wright St., Blair** | 17.9 | 16.3 | 22.9 | 19.0 | 54% |
| **3130 C Ave., Council Bluffs, IA** (4) | 17.7 | 21.8 | 23.9 | 21.1 | 60% |
| **Montgomery Co., IA** (outside Omaha MSA) (4) (5) | 15.2 | 14.8 | 20.9 | 17.0 | 48% |
| **Lincoln MSA** | | | | | |
| **3140 N Street, Lincoln** | 16.6 | 16.5 | 22.4 | 18.5 | 53% |
| **Sioux City MSA** | | | | | |
| **901 Floyd Blvd, Sioux City, IA** (4) | 22.3 | 20.9 | 22.8 | 22.0 | 63% |
| **31986 475th Ave, Union Co, SD** (6) | 16.5 | 16.9 | 20.5 | 18.0 | 51% |
| **Other Nebraska Sites** | | | | | |
| **Grand Island** (7) | 16.1 | 18.5 | 22.4 | 19.0 | 54% |
| **Scottsbluff** (8) | 12.3 | 25.8 | 17.4 | 18.5 | 53% |

Notes and Explanations:

(1) EPA AQS data retrieval 3/25/22. The Design Values are the 3-year average of the annual 98th percentile values. To determine attainment status, the Design Values are compared to the 35 µg/m$^3$ NAAQS. Concentrations are in units of µg/m$^3$. Annual values and Design Values that do not meet data completeness requirements are shown in red.

(2) NAAQS History: The 24-hour $PM_{2.5}$ NAAQS was initially established at 65 µg/m$^3$ in 1997. It was lowered to 35 µg/m$^3$ in 2006 and retained at the 35 µg/m$^3$ level in 2012 and again in December 2020.

(3) Omaha NCore is a multi-pollutant monitoring site located at 4102 Woolworth Street.

(4) The Council Bluffs, Montgomery Co., and Sioux City IA sites are operated by the IA DNR

(5) The Montgomery County, IA site is located outside the Omaha MSA at Viking Lake State Park, ~18 miles east of the Mills-Montgomery County line and ~ 45 miles SE of the I-29/I-80 intersection.

(6) The Union Co., SD site is operated by the South Dakota Department of Environment & Natural Resources.

(7) The Grand Island site was relocated in 2020 and assigned a new AIRS ID. The 2020 value shown is from the new site and the Design Value is computed using values from both old and new sites.

(8) The sequential filter-based monitor in Scottsbluff was replaced in 2020 by a continuous monitor, and the site was assigned a new AIRS ID. The 2020 value shown was computed from the continuous monitor data recorded for only 252 days and is thus not valid for NAAQS comparison.

## Table B-6b: $PM_{2.5}$ - Annual Average Data (1) (2)

| Site | 2019 | 2020 | 2021 | Design Value (1) | % NAAQS |
|---|---|---|---|---|---|
| **Omaha MSA & Montgomery Co., IA (4)** | | | | | |
| **Omaha NCore** (3) | 6.8 | 7.2 | 7.5 | 7.2 | 60% |
| **9225 Berry St.; Omaha** | 6.9 | 7.3 | 8.5 | 7.6 | 63% |
| **2912 Coffey Ave., Bellevue** | 7.8 | 7.8 | 8.8 | 8.1 | 68% |
| **2242 Wright St., Blair** | 6.6 | 6.2 | 7.9 | 6.9 | 58% |
| **3130 C Ave., Council Bluffs, IA** (4) | 7.7 | 8.3 | 8.9 | 8.3 | 69% |
| **Montgomery Co., IA** (outside Omaha MSA) (4) (5) | 6.5 | 6.7 | 7.4 | 6.9 | 57% |
| **Lincoln MSA** | | | | | |
| **3140 N Street, Lincoln** | 6.5 | 6.1 | 7.1 | 6.6 | 55% |
| **Sioux City MSA** | | | | | |
| **901 Floyd Blvd, Sioux City, IA** (4) | 7.4 | 7.6 | 9.1 | 8.0 | 67% |
| **31986 475th Ave, Union Co, SD** (6) | 5.8 | 6.1 | 8.3 | 6.7 | 56% |
| **Other Nebraska Sites** | | | | | |
| **Grand Island** (7) | 5.0 | 5.5 | 7.4 | 6.0 | 50% |
| **Scottsbluff** (8) | 4.8 | 8.5 | 5.0 | 6.1 | 51% |

Notes and Explanations:

(1) EPA AQS data retrieval 3/25/22. The Design Values are the 3-year average of the annual average values. To determine attainment status, the Design Values are compared to the 12 µg/m$^3$ NAAQS. Concentrations are in units of µg/m$^3$. Annual values and Design Values that do not meet completeness requirements are shown in red.

(2) NAAQS History: The annual average $PM_{2.5}$ NAAQS was initially established in 1997 at 15µg/m$^3$. It was retained at this level in the 2006 review, then lowered to 12 µg/m$^3$ in December 2012 and retained at that level in December 2020.

(3) Omaha NCore is a multi-pollutant monitoring site located at 4102 Woolworth Street.

(4) The Council Bluffs, Montgomery Co., and Sioux City IA sites are operated by the IA DNR

(5) The Montgomery County, IA site is located outside the Omaha MSA at Viking Lake State Park, ~18 miles east of the Mills-Montgomery County line and ~ 45 miles SE of the I-29/I-80 intersection.

(6) The Union Co., SD site is operated by the South Dakota Department of Environment & Natural Resources.

(7) The Grand Island site was relocated in 2020 and assigned a new AIRS ID. The 2020 value shown is from the new site and the Design Value is computed using values from both old and new sites.

(8) The sequential filter-based monitor in Scottsbluff was replaced in 2020 by a continuous monitor, and the site was assigned a new AIRS ID. The 2020 value shown was computed from the continuous monitor data recorded for only 252 days and is thus not valid for NAAQS comparison.

## Table B-7: Lead in Total Suspended Particulate (TSP-Pb)

| **Annual Maximum Rolling 3-Month Average Values** (1) (2) | | | | | |
|---|---|---|---|---|---|
| **Site** | **2016** | **2017** | **2018** | **DV** (1) | **% NAAQS** |
| **Fremont** (3) | 0.061 | 0.042 | 0.024 | 0.061 | 41% |

Notes and Explanations:

(1) Concentrations are in units of $\mu g/m^3$. The 3-month average NAAQS = 0.15 $\mu g/m^3$. The DV or Design Value is the highest 3-month average in the last 3 years. The values shown here are for the last valid three-year monitoring period prior to site closure.

(2) NAAQS History: The initial NAAQS was promulgated in 1978 and was set at 1.5 $\mu g/m^3$ calendar quarter average. In 2008, it was modified to 0.15 $\mu g/m^3$ 3-month running average.

(3) The Fremont lead monitor was temporarily closed 9/31/2018 pending relocation at the request of the site host. A new location has been determined and approved by EPA Region 7. The new site is expected to be in operation in 2021.

**Nebraska 2022 Ambient Air Monitoring Network Plan**

**Appendix C: Compliance Verification with 40 CFR Part 58**

This appendix reviews compliance with applicable requirements in 40 CFR Part 58 Appendices A through E, including revisions effective 4/27/16. Nebraska Ambient Monitoring activities and network are in compliance with these requirements.

## I. 40 CFR Part 58 Appendix A Review

40 CFR Part 58 Appendix A sets forth quality assurance requirements for the collection, calculation, and reporting of ambient air monitoring data. The *Quality Assurance Project Plan (QAPP) for the Nebraska Ambient Air Monitoring Program for Criteria Pollutants, NCore Parameters, $PM_{2.5}$ Speciation, and Total Reduced Sulfur* (EPA approved October 2018) was developed to comply with Part 58 requirements and the provisions of the EPA *Quality Assurance Handbook for Air Pollution Measurement Systems Volume II* (May 2013). The DCHD, LLCHD and NDEE all use this QAPP. Actual procedures for operating monitors, as well as for collecting, reviewing and submitting data, are set forth in Standard Operating Procedures (SOPs) that comply with the QAPP.

40 CFR Part 58 Appendix A also sets forth requirements specifying the number of collocated monitors required for $PM_{2.5,}$ $PM_{10,}$ $PM_{10\text{-}2.5}$ and Lead (Pb) monitors. Table C-1 summarizes the collocated sites in Nebraska. All PM and Pb sub-networks operated by DCHD, LLCHD and NDEE either currently meet collocation requirements or will do so after network changes outlined in this 2021 Network Plan.

## II. 40 CFR Part 58 Appendix C Review

40 CFR Part 58 Appendix C contains requirements for approved ambient air monitoring methodologies. Any monitor that is used to evaluate NAAQS compliance must be a Federal Reference Method (FRM) or a Federal Equivalent Method (FEM) sampler or an alternatively approved method as defined in Appendix C. The network description tables in Appendix A of this network plan identify the sampling method used by each monitor in the Nebraska ambient air monitoring network. All monitors used to evaluate compliance with the NAAQS are FRM or FEM certified. The only monitors that are not FRM/FEM certified are those not subject to 40 CFR Part 58 requirements (i.e., NADP, IMPROVE, RadNet, etc.)

**Table C-1: Compliance Summary: Collocation Requirements of 40 CFR Part 58 Appendix A[1]**

| Parameter | Primary Sampler Method<br>FRM = Federal Reference Method<br>FEM = Federal Equivalent Method | Percent Collocation Required | NDEE/LLCHD [2] | | | DCHD [2] | | |
|---|---|---|---|---|---|---|---|---|
| | | | # of Sites | # Collocated | % Collocated | # of Sites | # Collocated | % Collocated |
| $PM_{10}$ | Hi-Vol Sampler (FRM) | 15% | 0 | 0 | na | 2 [3] | 1 | 50% |
| $PM_{10}$ | Sequential 2025 Sampler (FRM) | 15% | 0 | 0 | na | 0 | 0 | na |
| $PM_{10}$ | Met One BAM Continuous (FEM) | None | 1 | 0 | (4) | 1 | 0 | (3) |
| $PM_{2.5}$ | Sequential 2025 Sampler (FRM) | 15% | 1 | 1 | 100% | 1 | 1 | 100% |
| $PM_{2.5}$ | Met One BAM Continuous (FEM) | 15% | 3 [5] | 1 [5] | 33% | 3 | 1 | 33% |
| $PM_{10-2.5}$ | Met One BAM Continuous (FEM) | None | 0 | 0 | na | 1 | 0 | (6) |
| TSP-Lead | Hi-Vol Sampler (FRM) | 15% except NCore | 1 [7] | 1 | 100% | 0 | 0 | 0 |

Footnotes:

(1) Collocation Requirements: 40 CFR Part 58 Appendix A requires 15% of the sites in each parameter/method category to have collocated monitors with certain exceptions and additional requirements. Listed site counts incorporate network changes outlined in this Network Plan.

(2) Collocation requirements apply to each Primary Quality Assurance Organization (PQAO) separately. There are two PQAO's in Nebraska: DCHD and NDEE/LLCHD.

(3) Includes South Omaha site currently closed for relocation

(4) Collocated monitors are not required for continuous $PM_{10}$ monitors.

(5) LLCHD operates a MetOne BAM $PM_{2.5}$ sampler for AirNow and AQI reporting. It is collocated with the primary and collocated sequential samplers at the site.

(6) DCHD operates 2 MetOne BAM samplers at the NCore site. One is set-up to sample $PM_{2.5}$ and the other samples $PM_{10}$. $PM_{10-2.5}$ is calculated using the results from these 2 samplers. There is a sequential $PM_{2.5}$ collocated sampler at the NCore site, but not a collocated $PM_{10}$ sampler. Collocated $PM_{10}$ samplers are not required in Appendix A for continuous $PM_{10}$ samplers. EPA has designated some NCore sites to have collocated samplers for $PM_{10-2.5}$; the Omaha NCore site is not one of them.

(7) Fremont lead site is currently closed for relocation.

**Network Descriptions**:

NDEE Continuous $PM_{10}$: Weeping Water City (collocation not required)

NDEE MetOne BAM Continuous $PM_{2.5}$: Grand Island and Scottsbluff

NDEE MetOne BAM Continuous and collocated sequential 2025i $PM_{2.5}$: Homestead

LLCHD Primary and collocated sequential 2025 $PM_{2.5}$: Lincoln

NDEE TSP-Lead: Fremont (collocated; currently closed)

DCHD Hi-Vol $PM_{10}$: 19 & Burt (collocated) and South Omaha (currently closed)

DCHD MetOne BAM Continuous $PM_{10}$: NCore

DCHD Primary and collocated sequential 2025 $PM_{2.5}$: Berry St

DCHD MetOne BAM Continuous and collocated sequential 2025 $PM_{2.5}$: NCore

DCHD MetOne BAM Continuous $PM_{2.5}$: Bellevue and Blair

DCHD MetOne BAM Continuous $PM_{10-2.5}$: NCore (collocation not required)

## III. 40 CFR Part 58 Appendix D Review

40 CFR Part 58 Appendix D sets forth monitoring objectives and minimum monitoring site requirements that must be met. The review that follows demonstrates that the Nebraska ambient air monitoring network meets the Appendix D requirements in effect on February 28, 2013.

EPA periodically re-evaluates the NAAQS and monitoring requirements. Regulatory modifications may impact the minimum monitoring requirements in one of two ways:

- Appendix D minimum monitoring requirements may be changed (i.e., more or less monitoring could be required); or
- Monitoring needs may change as a result of a NAAQS modification (e.g., when the annual average $PM_{2.5}$ NAAQS was lowered from 15 *u*g/$m^3$ to 12 *u*g/$m^3$, the 85% of NAAQS threshold set forth in 40 CFR Part 58 Appendix D Sec. 4.7 Table D.5 was crossed, and the minimum number of $PM_{2.5}$ monitoring sites for the Omaha MSA increased from 1 to 2).

### A: 40 CFR Part 58 Appendix D - Objectives Review

40 CFR Part 58 Appendix D Section 1.1 sets forth three objectives that ambient air monitoring networks must be designed to meet:

- Provide air pollution data to the general public in a timely manner.
- Support compliance with ambient air quality standards and emissions strategy development.
- Support for air pollution research studies.

Each of these objectives is discussed below.

#### 1. Timely Dissemination of Data - Met

Air monitoring data is made available to the public and other parties in several ways.

a. Ambient air monitoring data is reviewed quarterly and entered into the national EPA-operated AQS database. The AQS database is available to federal, state, and local monitoring agency personnel, as well as some other public agencies and researchers. AQS data cannot be directly accessed by the general public, but the NDEE does respond to data requests.

b. Air Quality Index reporting is performed by DCHD and LLCHD for their respective jurisdictions. The AQI information is made available on their respective city websites.

c. Monitoring data from continuous particulate, ozone, and CO monitors in the Omaha, Lincoln, and Grand Island MSAs and the Beatrice and Scottsbluff MiSAs report directly to the EPA AirNow system. The general public can access air quality index information on-line at www.airnow.gov.

#### 2. Support compliance with ambient air quality standards and emissions strategy development – Met

The NDEE reviews all data collected by DCHD, LLCHD, and NDEE during the previous year as part of the annual data certification process, which is submitted to EPA by May 1st. At this time design values are calculated and compared with the NAAQS. This design value information is then incorporated into the annual Network Plan. The annual Network Plans discuss attainment/non-attainment status and monitoring strategies that may be related.

The NDEE, DCHD, and LLCHD also perform data validation reviews at least once each quarter and in many instances monthly. Any potential non-attainment or near non-attainment circumstances will be

recognized during these reviews. If such conditions are identified, efforts are made to ascertain the cause and to the extent possible bring about corrective action through regulatory and/or voluntary mechanisms.

NDEE staff can access current ozone and $PM_{2.5}$ values through the AirNow Tech website when needed. When elevated ozone or $PM_{2.5}$ levels are reported, this information is passed on to air quality managers at DCHD, LLCHD, and NDEE.

The examples below illustrate how state and local air quality programs have recognized air quality issues and reacted to them.

a. In the summer of 2012, Nebraska monitoring sites began reporting ozone levels above those seen in recent years. The NDEE began using AirNow data to track the current 4$^{th}$ highest values for sites in and around Nebraska as the ozone season progressed. Although the 4$^{th}$ high values at two sites in the Omaha MSA exceeded 0.075 ppm 8-hour ozone NAAQS, the 3-year average design values did not exceed the NAAQS (i.e., the maximum unofficial 2010-2012 DVs = 0.069 ppm).

b. In the spring of 2014, 2016, and 2017, smoke from prescribed grassland fires in the Flint Hills area of Kansas impacted Nebraska. AirNow data was used to track the degree and extent of the impact on ambient ozone and $PM_{2.5}$. At times, the impact from these controlled burns raised ozone and $PM_{2.5}$ levels in Nebraska, but there were no NAAQS violations. Both DCHD and LLCHD issued air quality alerts related to these burns.

c. Beginning in early 2018, NDEE has engaged with stakeholders and key players to address the air quality impacts associated with prescribed fires in the Flint Hills and the surrounding region. Roundtable meetings are held in February each year to discuss current trends, research, and options for collaboration and coordination to provide timely health advisories and notifications to the public. In addition to the local Nebraska air quality agencies, the group includes representatives from EPA Region 7, Kansas Department of Health and Environment (KDHE), the National Weather Service, the University of Nebraska Lincoln, the Nebraska Department of Health and Human Services (DHHS), the Nebraska Game and Parks Commission, and the Nebraska Prescribed Fire Council.

   As a result of this effort, beginning with the 2018 spring burn seasons KDHE has provided NDEE and local Nebraska air quality agencies with weekly summaries of burn activity in the Flint Hills and the resulting smoke impacts. KDHE also issues predictions of fire activity and impacts for the upcoming week and more frequently as needed. Working group conference calls assess potential smoke impacts and health advisories are issued when needed. These advisories are relayed to relevant local health departments in Nebraska and disseminated to the public by DHHS. The Smoke Awareness web page on the NDEE website has been expanded with additional information on spring burn activity and to provide access to smoke impact outlooks. Although favorable weather patterns during the 2018 through 2020 spring burn seasons resulted in minimal impacts on air quality in Nebraska from Flint Hills burning, the communication framework that has been established will be instrumental in addressing future smoke and air quality impacts and in providing timely communication to the public regarding those impacts and related health concerns.

### 3. Support for air pollution research studies – Met

The NDEE, DCHD, and LLCHD operate the Nebraska SLAMS network in accordance with the monitor specifications, site placement, and QA requirements set forth in 40 CFR Part 50 and 58. EPA R7 provides oversight to ensure that regulatory requirements are met with respect to methodology and QA.

Data is reviewed quarterly before being submitted to EPA's AQS database. Once in AQS, the data is available for pollution research studies.

Near real-time data is also reported to the EPA AirNow data from the continuous PM, CO, and ozone monitors operating in the Omaha and Lincoln MSA. This data is also available for research purposes.

### B: 40 CFR Part 58 Appendix D Review – Minimum Monitoring Site Requirements

Nebraska meets the requirements set in 40 CFR Part 58 Appendix D for the minimum number of monitoring sites. The minimum monitoring site requirements are set by Core Based Statistical Areas (CBSAs), which include Metropolitan Statistical Areas (MSAs) and Micropolitan Statistical Areas (MiSAs). The minimum monitoring site requirements for each of the four MSAs in Nebraska are examined separately and documented in Tables C-2.a through C-2.d below.

The review for non-MSA areas of the state was performed on a pollutant-specific basis. This review is documented in narrative form in Section III.C below.

It should be noted that the number of monitoring sites required in a network generally needs to be greater than the minimum number required by 40 CFR Part 58 Appendix D. This is stated in 40 CFR Part 58 Appendix D Section 1.1.2: "… total number of monitoring sites that will serve the variety of data needs will be substantially higher than these minimum requirements provide…"

### C: 40 CFR Part 58 Appendix D Review – Minimum Monitoring Requirements for non-MSAs

**NCore** – (40 CFR Part 58 App. D Sec. 3) No sites required or operated.

Nebraska has one required NCore site located in the Omaha MSA. At this time there is no requirement or plan to develop an additional NCore site in Nebraska.

**Ozone ($O_3$)** – (40 CFR Part 58 App. D Sec. 4.1) No sites required or operated.

At this time there is no requirement or plan to deploy ozone monitoring sites outside of the MSAs.

**Carbon Monoxide (CO)** – (40 CFR Part 58 App. D Sec. 4.2) No sites required or operated.

At this time there is no requirement or plan to conduct CO monitoring outside the MSAs. Elevated CO levels are primarily associated with vehicle emissions and congested traffic areas. Highest levels would be anticipated in the Omaha and Lincoln MSAs. Highest concentration site monitoring in Lincoln and Omaha has consistently found CO levels well below the NAAQS. Thus there is no need for additional monitoring sites in less populated communities.

**Nitrogen Dioxide ($NO_2$)** – (40 CFR Part 58 App. D Sec. 4.3) No sites required or operated.

At this time there is no requirement or plan to conduct $NO_2$ monitoring outside the MSAs.

**Sulfur Dioxide ($SO_2$)** – (40 CFR Part 58 App. D Sec. 4.4) No sites required or operated.

There are no Part 58 requirements to operate $SO_2$ monitoring sites in non-MSA areas. However, pursuant to Part 51, Subpart BB, monitoring may be used to demonstrate attainment with the 1-hour $SO_2$ NAAQS. NDEE has no current plans for $SO_2$ monitoring in non-MSA areas.

**Lead (Pb)** – (40 CFR Part 58 App. D Sec. 4.5)

Two source-oriented sites required; 1 currently suspended and 1 waived.

40 CFR Part 58 Appendix D requires source-oriented monitoring near sources with lead emissions of 0.5 tpy or more. Three sources in Nebraska initially met this threshold: Magnus LLC in Fremont, Magnolia Metals in Auburn, and Nucor Steel in Norfolk.

Monitoring near the Magnus facility in Fremont and Magnolia Metals in Auburn was initiated in 2010. A waiver pursuant to Part 58 Appendix D Section 4.5 was sought from and granted by EPA R7 for Nucor Steel in Norfolk in April 2014. This waiver expired in April 2019. NDEE sought a renewal of this waiver in the 2019 Network Plan, which was approved by EPA R7 in October 2019.

In 2012 and 2013 Magnolia Metals installed pollution-control equipment that reduced their lead emissions to 0.1 tpy. Ambient lead levels dropped to below 5% of the NAAQS in 2015. The 2015 Network Plan proposed to discontinue lead monitoring near Magnolia Metals. The Auburn lead site was shut down in June 2016 in accordance with the approved 2015 Network Plan.

The Magnus LLC facility in Fremont currently is the only Nebraska facility that requires lead monitoring. Monitoring on a property adjacent to this facility was discontinued in September 2018 at the request of the site host. NDEE has identified an alternative site that was approved by EPA Region 7 during a site visit on December 5, 2019. Monitoring of lead emissions by the Magnus LLC facility remains suspended at this time until the alternative site can be established.

**$PM_{10}$ Particulate Matter** (40 CFR Part 58 App. D Sec. 4.6) No sites required. No sites operated.

There are no minimum $PM_{10}$ monitoring requirements for areas outside of MSAs.

**Fine Particulate Matter: $PM_{2.5}$** (40 CFR Part 58 Appendix D Section 4.7 & 4.7.3) Two (2) sites required and three operated.

States are required to operate a background site and a transport site for $PM_{2.5}$. The Homestead (Beatrice MSA) location is a background site, Scottsbluff is a transport site, and the Grand Island monitor serves as both a background and transport site.

**Coarse Particulate Matter: $PM_{10-2.5}$** (40 CFR Part 58 App D Sec 4.8) No sites required or operated.

**Photochemical Assessment Monitoring Stations (PAMS)** (40 CFR Part 58 Appendix D Section 5) No sites required or deployed.

EPA requires state and local air monitoring agencies to make PAMS measurements (including hourly averaged mixing height) at NCore sites in CBSAs with a population of 1,000,000 or more. The 2021 estimated population of the Omaha-Council Bluffs MSA, where Nebraska's only NCore site is located, was 971,637 which is below the threshold requiring PAMS monitoring.

## IV: 40 CFR Part 58 Appendix E Review

This appendix sets forth requirements for probe and monitoring path placement, including: horizontal and vertical placement, spacing from minor sources, spacing from obstructions, spacing from trees, spacing from roadways, cumulative interferences on a monitoring path, maximum monitoring path length, and probe material and sample residence time. Compliance with these criteria is verified when the site is set up and periodically thereafter. Compliance is evaluated using review sheets developed for that purpose.

**Tables C-2.a through C-2d: Minimum Monitoring Reviews for Each Nebraska MSA**

**Table C-2a: 40 CFR Part 58 Appendix D Review: Omaha-Council Bluffs MSA (MSA Population ~ 971,637) ***

| Pollutant | App. D Citation | Review Criteria & *Comments* | Sites Required | NE Sites Operated | Criteria Met? |
|---|---|---|---|---|---|
| **Ozone** | Sec. 4.1 Table D-2 | The Omaha MSA population is between 350K to 4M and $O_3$ levels are $\geq$ 85% of NAAQS (*See Design Values in Attachment B).* | 2 | 2** Includes NCore | Y |
| **CO** | Sec. 4.2 | The population threshold for requiring a near-road CO monitoring site in a CBSA is 1 million. The population of the Omaha MSA is below this threshold. | 0 | 2 Includes NCore | Y |
| **$NO_2$** | Sec. 4.3.2 | The Omaha MSA has a population between 500K and 1M and is thus not currently required to have a near-road NOx monitoring site. | 0 | 0 | Y |
| | Sec.4.3.3 | Area-Wide monitoring only required if CBSA $\geq$ 1M (Omaha MSA population < 1 M) | 0 | 1 @ NCore | Y |
| | Sec. 4.3.4 | Regional Administrator required monitoring: None at this time. | 0 | 0 | Y |
| **$SO_2$** | Sec. 4.4 | The need for $SO_2$ sites is based on the *Population Weighted Emissions Index* (PWEI). Omaha's PWEI = 20,012, which falls within the 5,000 to 100,000 range requiring 1 site (see Table C-3 below for PWEI calculation data). The current network of one highest concentration site and one NCore site exceeds the minimum requirements. | 1 | 2 Includes NCore | Y |
| | | Regional Administrator required monitoring: None at this time. | 0 | 0 | Y |
| **Lead** | Sec. 4.5 (a) | There are no sources emitting $\geq$ 0.5 tpy of lead in the Nebraska portion of the Omaha MSA. | 0 | 0 | Y |
| | Sec. 4.5 (b) | Revised regulations effective 4/27/16 eliminated the requirement for one community-based lead monitor at each NCore site. DCHD discontinued lead monitoring at the Omaha NCore site at the end of 2017 in accordance with this regulation change and the 2017 Network Plan. | 0 | 0 | Y |
| | Sec. 4.5 (c) | Regional Administrator required monitoring: None at this time. | 0 | 0 | Y |
| **$PM_{10}$** | Sec. 4.6 Table D-4 | The Omaha MSA has a population between 500K – 1M and a low $PM_{10}$ concentration range with max values < 80% of NAAQS. No sites in the MSA have exceeded this threshold since 2017 See Attachment B for $PM_{10}$ data. | 1-2 | 3** Includes NCore & 1 site @ Weeping Water | Y |
| **$PM_{2.5}$** | Sec 4.7 Table D-5 | The Omaha MSA has a population between 500K – 1M and $PM_{2.5}$ levels < 85% of NAAQS range (*See Design Values in Appendix B).* | 1 | 4 Includes NCore | Y |
| | Sec 4.7.2 | Continuous monitor required. | 1 | 3 Includes NCore | Y |
| | Sec. 4.7.4 | $PM_{2.5}$ Speciation Trends Network monitoring required (included SASS and URG samplers as one) | 1 | 1 @ NCore | Y |
| **PAMS** | Sec. 5 | Only required for areas classified as serious, severe, or extreme non-attainment for $O_3$ and at NCore sites in CBSAs with populations over 1,000,000. Omaha MSA population < 1 million. | 0 | 0 | NA |
| **NCore** | Sec. 3 | Omaha has been designated to operate an NCore site with NOx/NOy monitoring. | 1 | 1 | Y |

* Unless noted otherwise, this analysis does not count monitors located in Iowa toward meeting the minimum monitoring requirements. It does consider pollutant levels measured at Iowa sites when determining minimum monitoring needs for ozone and $PM_{2.5}$.

** Counts do not include the South Omaha Ozone-$PM_{10}$ site that is currently closed for relocation.

| **Table C-2b: 40 CFR Part 58 Appendix D Review: Lincoln MSA (Population ~ 342,117)** | | | | | |
|---|---|---|---|---|---|
| **Pollutant** | App. D Citation | **Review Criteria & *Comments*** | Sites Required | Sites Operated | Criteria Met? |
| **Ozone** | Sec. 4.1 Table D-2 | The Lincoln MSA population is between 50K to 350K and $O_3$ levels < 85% of NAAQS (*See Design Values in Attachment B).* | 0 | 1 | Y |
| **CO** | Sec. 4.2 | No minimum requirement | 0 | 0 | Y |
| **$NO_2$** | Sec. 4.3.2 | Near-road monitoring: No requirement for CBSA < 500K. | 0 | 0 | Y |
| | Sec.4.3.3 | Area-Wide monitoring only required if CBSA $\geq$ 1M (Lincoln MSA population < 1 M). | 0 | 0 | Y |
| | Sec. 4.3.4 | Regional Administrator required monitoring: none. | 0 | 0 | Y |
| **$SO_2$** | Sec. 4.4 | The number of $SO_2$ sites required is based on the *Population Weighted Emissions Index* (PWEI). Lincoln's PWEI = 923, which falls below 5,000 (see Table C-3 below for PWEI calculation data). Thus no sites are required. | 0 | 0 | Y |
| | | Regional Administrator required monitoring: none. | 0 | 0 | Y |
| **Lead** | Sec. 4.5 (a) | There are no sources emitting $\geq$ 0.5 tpy of lead. | 0 | 0 | Y |
| | Sec. 4.5 (b) | Community-based monitoring not required. | 0 | 0 | Y |
| | Sec. 4.5 (c) | Regional Administrator required monitoring: none. | 0 | 0 | Y |
| **$PM_{10}$** | Sec. 4.6 Table D-4 | The Lincoln MSA population is between 250K and 500K. Monitoring is only required if current monitoring indicates $PM_{10} \geq$ 85% of NAAQS. *The highest 24-hr value found during monitoring in Lincoln from 1988-98 was 102 $\mu g/m^3$ or 68% of the NAAQS, and $PM_{10}$ concentrations have been declining in Nebraska since that time.* | 0-1 | 0 | Y |
| **$PM_{2.5}$** | Sec 4.7 Table D-5 | The Lincoln MSA population is between 50K – 500K and $PM_{2.5}$ levels < 85% of NAAQS (*See Design Values in Appendix B).* | 0 | 1 | Y |
| | Sec 4.7.2 | Continuous monitor not required. | 0 | 1 | Y |
| | Sec. 4.7.4 | $PM_{2.5}$ Speciation Trends Network monitoring not required. | 0 | 0 | Y |
| **PAMS** | Sec. 5 | Only required for areas classified as serious, severe, or extreme non-attainment for $O_3$. | 0 | 0 | Y |
| **NCore** | Sec. 3 | Lincoln has not been designated to operate an NCore site. | 0 | 0 | Y |

**Table C-2c: 40 CFR Part 58 Appendix D Review: Sioux City MSA (Population ~ 174,915) ***

| **Pollutant** | App. D Citation | **Review Criteria & *Comments*** | Sites Required | NE Sites Operated | Criteria Met? |
|---|---|---|---|---|---|
| **Ozone** | Sec. 4.1 Table D-2 | The Sioux City MSA population is between 50K and 350K. Appendix D Sec. 4.1, Table D-2 states that for MSAs of this size one ozone site is required if the DV $\geq$ 85% of the NAAQS. Until 9/31/2021 there was one ozone monitor in the MSA located in a rural area of Union County, SD. The latest 3-year Design Value from this Union County site is 64 ppb or 91% of the NAAQS. Thus a replacement for the Union County ozone monitoring site will be required. | 1 | 0 | Y See comment |
| **CO** | Sec. 4.2 | No minimum requirement. | 0 | 0 | Y |
| **$NO_2$** | Sec. 4.3.2 | Near-road monitoring: No requirement for CBSA < 500K. | 0 | 0 | Y |
| | Sec.4.3.3 | Area-Wide monitoring only required if CBSA $\geq$ 1M (Sioux City MSA population < 1 M) | 0 | 0 | Y |
| | Sec. 4.3.4 | Regional Administrator required monitoring; none. | 0 | 0 | Y |
| **$SO_2$** | Sec. 4.4 | The number of $SO_2$ sites required is based on the *Population Weighted Emissions Index* (PWEI). Sioux City MSA's PWEI = 1,725, which falls below the 5,000 to 100,000 range requiring 1 site (see Table C-3 below for PWEI calculation data). *One site exists in the MSA in Union County, SD.* | 0 | 0 | Y See comment |
| | | Regional Administrator required monitoring: none | 0 | 0 | Y |
| **Lead** | Sec. 4.5 (a) | There are no sources emitting $\geq$ 0.5 tpy of lead in the Nebraska portion of the Sioux City MSA. | 0 | 0 | Y |
| | Sec. 4.5 (b) | Community-based lead monitoring not required. | 0 | 0 | Y |
| | Sec. 4.5 (c) | Regional Administrator required monitoring: none. | 0 | 0 | Y |
| **$PM_{10}$** | Sec. 4.6 Table D-4 | The Sioux City MSA population is between 100K – 250K and $PM_{10}$ levels are < 80% of NAAQS (*See Design Values in Attachment B).* | 0 | 0 | Y |
| **$PM_{2.5}$** | Sec 4.7 Table D-5 | The Sioux City MSA population is between 50K and 500K and $PM_{2.5}$ levels are < 85% of NAAQS, thus no monitor is required. (*See Design Values in Appendix B).* | 0 | 0 | Y |
| | Sec 4.7.2 | Continuous monitor not required | 0 | 0 | Y |
| | Sec. 4.7.4 | $PM_{2.5}$ Speciation Trends Network monitoring not required | 0 | 0 | Y |
| **PAMS** | Sec. 5 | Only required for areas classified as serious, severe, or extreme non-attainment for $O_3$ | 0 | 0 | Y |
| **NCore** | Sec. 3 | The Nebraska portion of the Sioux City MSA has not been designated to operate an NCore site. | 0 | 0 | Y |

* Unless noted otherwise, this analysis does not count monitors located in Iowa and South Dakota toward meeting the minimum monitoring requirements. It does use pollutant levels measured at IA and SD monitoring sites when determining minimum monitoring needs for ozone and PM.

| **Table C-2d: 40 CFR Part 58 Appendix D Review: Grand Island MSA (Population ~ 76,175)** | | | | | |
|---|---|---|---|---|---|
| **Pollutant** | App. D Citation | **Review Criteria & *Comments*** | Sites Required | Sites Operated | Criteria Met? |
| **Ozone** | Sec. 4.1 Table D-2 | Grand Island MSA population is between 50K -350K. Monitoring is only required if current monitoring finds $O_3$ > 85% of NAAQS as set forth in Part 58 Appendix D Table D-2. | 0 | 0 | Y |
| **CO** | Sec. 4.2 | No minimum requirement. | 0 | 0 | Y |
| **$NO_2$** | Sec. 4.3.2 | Near-road monitoring: No requirement for CBSA < 500K. | 0 | 0 | Y |
| | Sec.4.3.3 | Area-Wide monitoring only required if CBSA $\geq$ 1M (Grand Island MSA population < 1 M) | 0 | 0 | Y |
| | Sec. 4.3.4 | Regional Administrator required monitoring: none | 0 | 0 | Y |
| **$SO_2$** | Sec. 4.4 | *Population Weighted Emissions Index* (PWEI) = 53, which falls below 5,000 (see Table C-3 below for PWEI calculation data). No monitoring sites required. | 0 | 0 | Y |
| | | Regional Administrator required monitoring: none | 0 | 0 | Y |
| **Lead** | Sec. 4.5 (a) | There are no sources emitting $\geq$ 0.5 tpy of lead | 0 | 0 | Y |
| | Sec. 4.5 (b) | Community-based lead monitoring not required. | 0 | 0 | Y |
| | Sec. 4.5 (c) | Regional Administrator required monitoring: none | 0 | 0 | Y |
| **$PM_{10}$** | Sec. 4.6 Table D-4 | $PM_{10}$ monitoring is not required if MSA population < 100,000 | 0 | 0 | Y |
| **$PM_{2.5}$** | Sec 4.7 Table D-5 | Grand Island's CBSA population is between 50K – 500K and $PM_{2.5}$ levels are < 85% of NAAQS (*See Design Values in Appendix B)* | 0 | 1(1) | Y |
| | Sec 4.7.2 | Continuous monitoring is not required | 0 | 0 | Y |
| | Sec. 4.7.4 | $PM_{2.5}$ Speciation Trends Network monitoring is not required | 0 | 0 | Y |
| **PAMS** | Sec. 5 | Only required for areas classified as serious, severe, or extreme non-attainment for $O_3$ | 0 | 0 | Y |
| **NCore** | Sec. 3 | The Grand Island MSA has not been designated to operate a NCore site | 0 | 0 | Y |

Footnote:

(1) The $PM_{2.5}$ site operated in Grand Island as one of Nebraska's transport and background monitoring sites.

**Table C-3: $SO_2$ Population Weighted Emissions Index (PWEI) Data for Nebraska Core Based Statistical Areas (CBSAs)** [a] [b] [c] Page 1 of 2

| CBSA | County | Population 7/1/2021 [c] | $SO_2$ Emissions (tons/year) | | $SO_2$ Emissions % Change | PWEI [a] [b] | |
|---|---|---|---|---|---|---|---|
| | | | 2014 EI | 2017 EI | | 2014 EI | 2017 EI |
| Omaha MSA | Douglas | 585,008 | 11,498 | 8,980 | -22% | 25,992 | **20,012** |
| | Sarpy | 193,418 | 58 | 267 | 360% | | |
| | Cass | 27,017 | 1,269 | 749 | -41% | | |
| | Saunders | 22,787 | 34 | 46 | 35% | | |
| | Washington | 20,969 | 30 | 63 | 110% | | |
| | Pottawattamie, IA | 93,304 | 13,797 | 10,430 | -24% | | |
| | Mills, IA | 14,465 | 15 | 30 | 100% | | |
| | Harrison, IA | 14,669 | 50 | 60 | 20% | | |
| | **Totals** | **971,637** | **26,751** | **20, 626** | **-23%** | | |
| Lincoln MSA | Lancaster | 324,514 | 3,424 | 2,628 | -23% | 1,181 | **923** |
| | Seward | 17,603 | 27 | 73 | 170% | | |
| | **Totals** | **342,217** | **3,451** | **2,701** | **-22%** | | |
| Sioux City MSA | Woodbury, IA | 105,607 | 13,472 | 9,316 | -31% | 2,369 | **1,725** |
| | Plymouth, IA | 25,650 | 25 | 331 | 1224% | | |
| | Dakota | 21,241 | 24 | 138 | 475% | | |
| | Dixon | 5,545 | 12 | 29 | 142% | | |
| | Union, SD | 16,872 | 12 | 50 | 317% | | |
| | **Totals** | **174,915** | **13,545** | **9,865** | **-27%** | | |
| Grand Island MSA[d] | Hall | 61,979 | 1,528 | 622 | -59% | 121 | **53** |
| | Howard | 6,531 | 29 | 27 | -7% | | |
| | Merrick | 7,665 | 30 | 52 | 73% | | |
| | **Totals** | **76,175** | **1,587** | **701** | **-56%** | | |

Observation: The EPA's emission inventory data indicates that $SO_2$ emissions from the four Nebraska MSAs decreased by 22% to 56% from 2014 to 2017.

Footnotes at bottom of page 2 of this table.

**Table C-3 (continued): $SO_2$ Population Weighted Emissions Index (PWEI) Data for Nebraska Core Based Statistical Areas (CBSAs) [a] [b] [c]** Page 2 of 2

| CBSA | County | Population 7/1/2021 [c] | $SO_2$ Emissions (tons/year) | | $SO_2$ Emissions (% Change) | PWEI [a] [b] | |
|---|---|---|---|---|---|---|---|
| | | | 2014 EI | 2017 EI | | 2014EI | 2017 EI |
| Kearney MiSA | Buffalo | 50,339 | 34 | 137 | 303% | 2 | **9** |
| | Kearney | 6,674 | 4 | 16 | 300% | | |
| | **Totals** | **57,013** | **38** | **153** | **303%** | | |
| Norfolk MiSA | Madison | 35,337 | 16 | 102 | 538% | 8 | **16** |
| | Pierce | 7,313 | 28 | 37 | 32% | | |
| | Stanton | 5,816 | 126 | 188 | 49% | | |
| | **Totals** | **48,466** | **170** | **327** | **92%** | | |
| Hastings MiSA | Adams | **31,027** | **3,172** | **2,604** | -18% | 98 | **81** |
| Scottsbluff MiSA | Banner | 692 | 1 | 1 | 0% | 7 | **8** |
| | Scotts Bluff | 35,745 | 163 | 224 | 37% | | |
| | Sioux | 1,143 | 12 | 1 | -92% | | |
| | **Totals** | **37,580** | **176** | **226** | **28%** | | |
| North Platte MiSA | Lincoln | 34,133 | 24,534 | 21,346 | -13% | 864 | **752** |
| | Logan | 687 | 1 | 4 | 300% | | |
| | McPherson | 379 | 3 | 2 | -33% | | |
| | **Totals** | **35,199** | **24,538** | **21,352** | **-13%** | | |
| Fremont MiSA | Dodge | **37,103** | **2,247** | **1,032** | **-54%** | 83 | **38** |
| Columbus MiSA | Platte | **34,241** | **395** | **516** | **31%** | 14 | **18** |
| Lexington MiSA | Dawson | 23,898 | 29 | 114 | 293% | 1 | **3** |
| | Gosper | 1,824 | 6 | 11 | 83% | | |
| | **Totals** | **25,722** | **35** | **125** | **257%** | | |
| Beatrice MiSA | Gage | **21,616** | **31** | **93** | **200%** | 1 | **2** |

Footnotes:

(a) Population Weighted Emission Index (PWEI) = (CBSA Population) x ($SO_2$ Emissions (tpy))/1,000,000.

(b) $SO_2$ Emission data were obtained from the EPA National Emission Inventory database for 2011, 2014, and 2017. The 2017 NEI data is the most recent data available from EPA at the time this table was created (May 7, 2020).

(c) U.S. Census population estimate data for 7/1/2021 were used in this table and the PWEI calculations.

(d) Prior to September 2018, the Grand Island MSA also included Hamilton County, Nebraska.

The PWEI calculated with 2017 Emission Inventory data is currently applicable. The PWEI was also calculated with 2014 EI data to document any change that might have occurred.

**Nebraska 2022 Ambient Air Monitoring Network Plan**
**Appendix D: Population Dynamics**

## Population Dynamics

Population related data is reviewed as part of the network planning process because:

- Population growth may be associated with pollution source growth;
- High population density generally correlates with high air pollution potential and higher potential for exposure to air pollutants; and
- Some 40 CFR Part 58 requirements are based on population and/or federally-defined metropolitan statistical definitions.

## U.S. Census Bureau and U.S. Office of Management and Budget Basics

The U.S. Census Bureau conducts a comprehensive population census every 10 years referred to as a decennial census. The last decennial census was completed in 2020. In addition, the US Census Bureau conducts annual surveys to provide annual population estimates for each interim year, including 2021. This population dynamics analysis is updated through the 2020 decennial Census at the county and city levels.

The U.S. Office of Management and Budget (OMB) uses the decennial census data to categorize urbanized areas by population and business inter-connections. These Core-Based Statistical Areas (CBSAs) consist of one or more whole counties that center on an urban center of at least 10,000 people along with adjacent areas that are socioeconomically tied to the urban center by commuting. These urban categories, which may cross state boundaries, are used to define some Federal program applications, including, in some instances, air monitoring requirements.

Three such categories are:

- Metropolitan Statistical Areas (MSAs), which contain an urban area (delineated by the U.S. Census Bureau) that contains 50,000 or more people.
- Micropolitan Statistical Areas (MiSAs), which contain an urban area with a population of 10,000 to 49,999.
- Combined Statistical Areas (CSAs), which are adjacent MSAs and MiSAs with social and economic ties.

These designations are important from an ambient monitoring perspective because:

- They are sometimes used in defining minimum monitoring requirements, and
- They are often used as the default boundary when defining non-attainment areas.

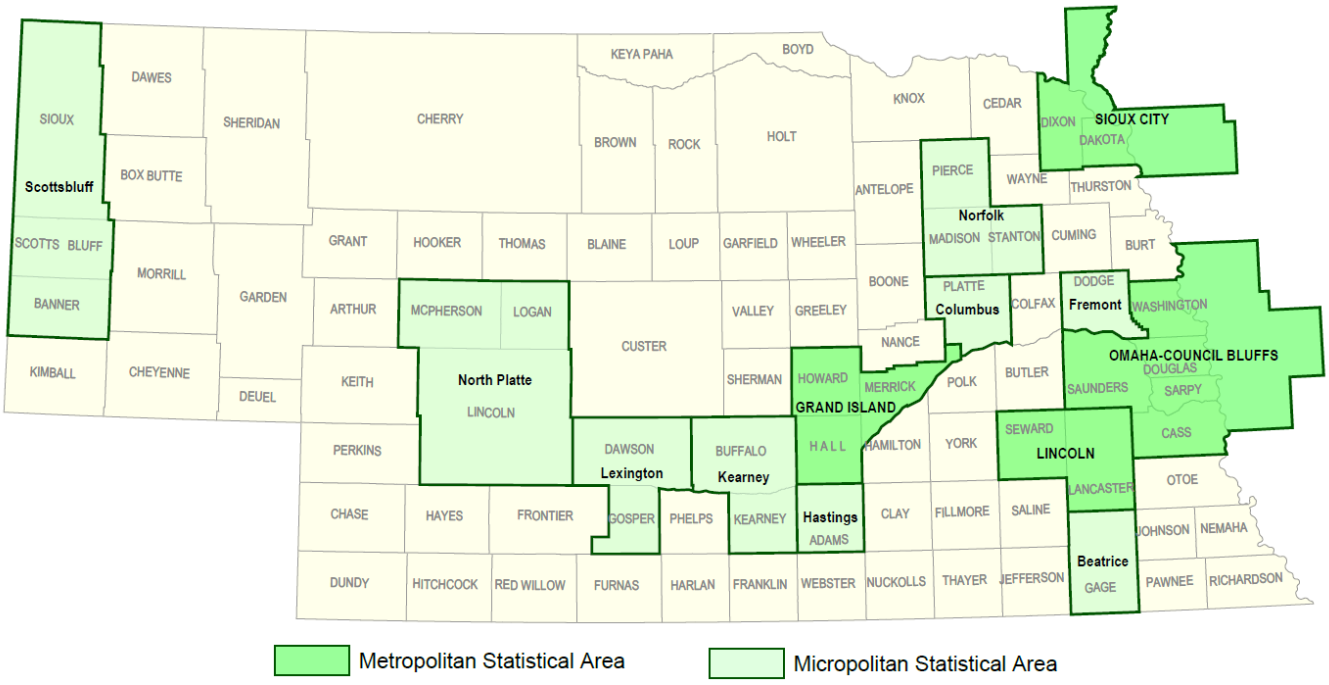
Nebraska contains all or part of four MSAs along with nine MiSAs. Out of Nebraska's 93 counties, 12 are part of an MSA and 17 are part of an MiSA. Figure D-1 (below) shows the location and boundaries of MSAs and MiSAs in Nebraska as delineated by the Office of Management and Budget in March 2020. There are also two CSAs within NE:

- Omaha-Council Bluffs-Fremont NE-IA CSA, which is the Omaha MSA plus Dodge County, NE;
- Sioux City-Vermillion IA-NE-SD CSA, which is the Sioux City MSA plus Clay County, SD.

## Demographics and Growth Trends

Nebraska is a largely rural state with most of the area used for agricultural production (farming and ranching). The state population at the most recent decennial census in 2020 was 1,961,504. Large numbers of residents are concentrated in the few urban areas: 82.5% live within the boundaries of the designated MSAs and MiSAs (see Table D-1 below). Even within these statistical areas, agriculture is the predominant land use by area except in the two most densely populated counties, Douglas and Sarpy.

**Figure D-1: Nebraska Metropolitan Statistical Areas (MSAs) and Micropolitan Statistical Areas (MiSAs)**




| Table D-1: 2020 Decennial Census Population within Nebraska's MSAs and MiSAs | | | | | |
|---|---|---|---|---|---|
| **Area** | **Population** | **Nebraska Population** | **Nebraska % of CBSA[a]** | **Percent NE [b]** | **Cumulative Percent NE [c]** |
| Nebraska | 1,961,504 | 1,961,504 | na | 100% | na |
| MSAs: | 1,559,101 | 1,287,918 | na | 65.7 | |
| Omaha-Council Bluffs | 967,604 | 844,871 | 87% | 43.1% | 43.1% |
| Lincoln | 340,217 | 340,217 | 100% | 17.3% | 60.4% |
| Grand Island | 77,038 | 77,038 | 100% | 3.9% | 64.3% |
| Sioux City | 174,242 | 25,792 | 15% | 1.3% | 65.7% |
| MiSAs: | 330,708 | 330,708 | na | 16.9% | |
| Kearney | 56,722 | 56,722 | 100% | 2.9% | 68.6% |
| Norfolk | 48,744 | 48,744 | 100% | 2.5% | 70.0% |
| Scottsbluff | 37,893 | 37,893 | 100% | 1.9% | 73.0% |
| Fremont | 37,167 | 37,167 | 100% | 1.9% | 74.9% |
| North Platte | 35,791 | 35,791 | 100% | 1.8% | 76.7% |
| Columbus | 34,296 | 34,296 | 100% | 1.7% | 78.4% |
| Hastings | 31,364 | 31,364 | 100% | 1.6% | 80.0% |
| Lexington | 26,370 | 26,370 | 100% | 1.3% | 81.4% |
| Beatrice | 22,311 | 22,311 | 100% | 1.1% | 82.5% |

(a) Percent of the CBSA population contributed by Nebraska counties.
(b) **Percent NE** refers to the percent of total Nebraska population contributed by residents in each MSA or MiSA.
(c) **Cumulative Percent NE** refers to the cumulative sum of the **Percent NE** column. Thus 60.4% of Nebraska's residents live in the Omaha and Lincoln MSAs, while 82.5% live in an MSA or MiSA.

**Nebraska 2022 Ambient Air Monitoring Network Plan**
**Appendix D: Population Dynamics**

The uneven population distribution in Nebraska is illustrated by maps of county population (Figure D-2) and county population density (Figure D-3) below.

**Figure D-2. Nebraska County Populations in the 2020 Decennial Census**

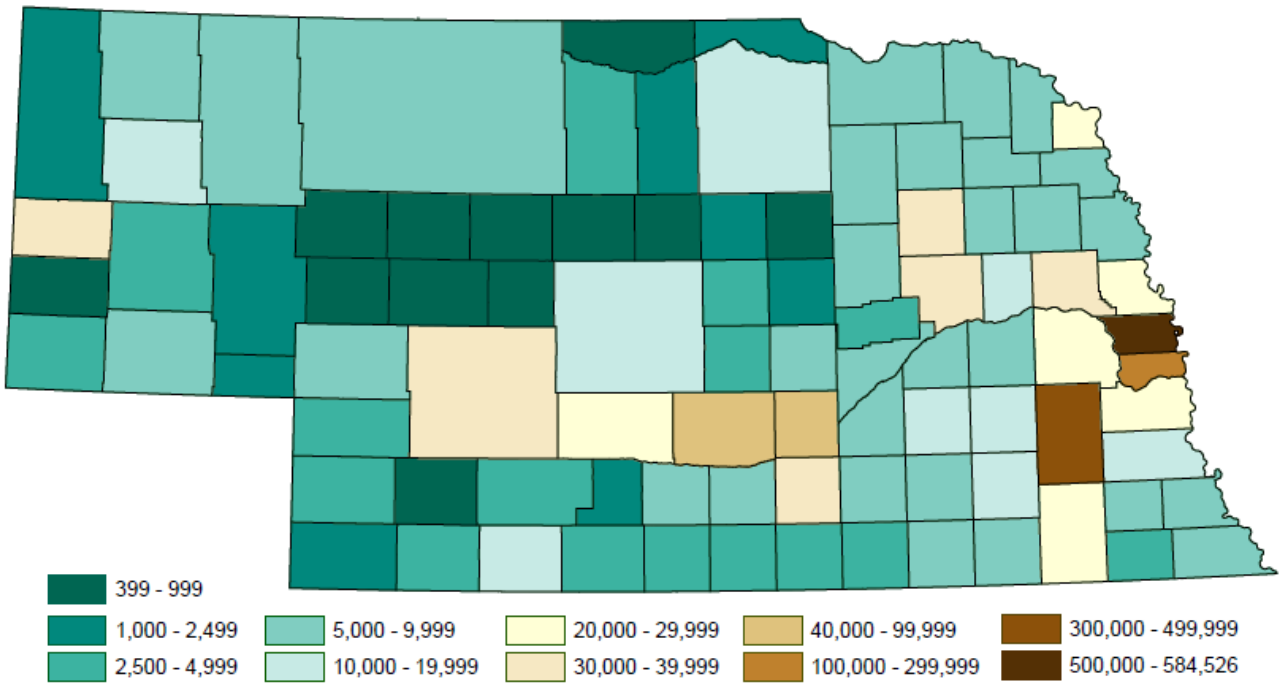
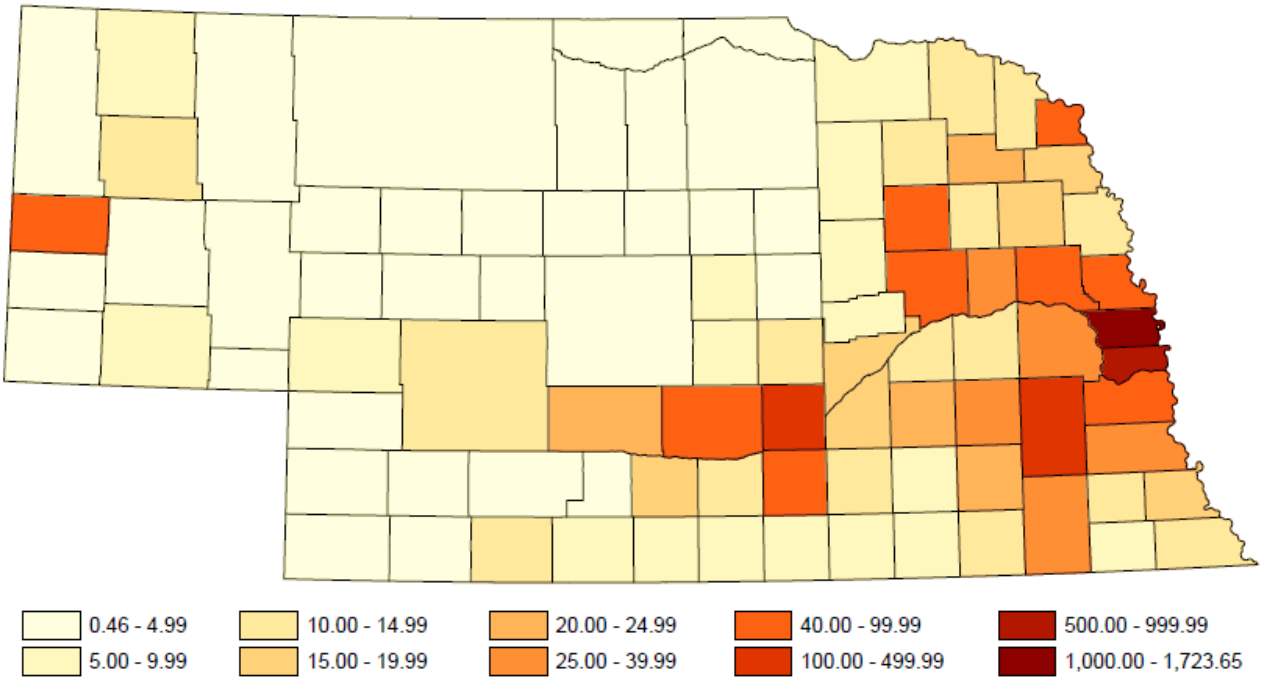



**Figure D-3. Nebraska County 2020 Decennial Census Population Densities (persons per square mile)**



| Table D-2. Decennial Census Populations for Nebraska, All MSAs, All MiSAs, and All Other Counties for 1990 through 2020 | | | | |
|---|---|---|---|---|
| | **1990** | **2000** | **2010** | **2020** |
| Nebraska | 1,578,417 | 1,711,265 | 1,826,341 | 1,961,504 |
| All MSAs | 874,794 | 994,312 | 1,144,094 | 1,287,918 |
| All MiSAs | 301,767 | 322,337 | 326,396 | 330,708 |
| All Other Counties | 401,856 | 394,616 | 355,851 | 342,878 |

**Figure D-4. Decennial Census Population Trends for Urban and Rural Areas 1990-2020 with Decadal Percentage Changes**

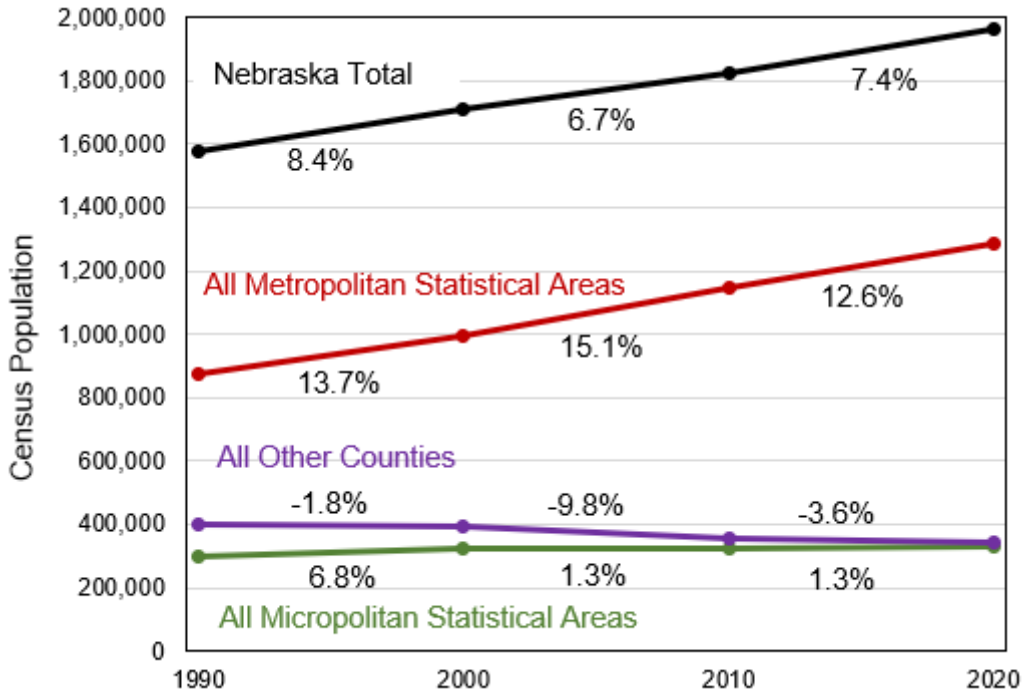



Table D-2 and Figure D-4 above show trends in decennial census populations from 1990 to 2020 in Nebraska. During this period the total state population showed steady growth, but that growth was not evenly distributed. Nearly all of the population growth occurred within the four Metropolitan Statistical Areas, with 12.6% population growth since 2010. The aggregate population in the nine Micropolitan Statistical Areas grew by only 1.3% during the last 20 years, and the population in the remaining rural counties has been decreasing. These data shown that Nebraska's growing population is becoming increasingly concentrated in the more populous urbanized counties.

Table D-3 below shows population and growth data for Nebraska's 18 most populous counties in 2010, 2015, and 2020. All of these counties are part of an MSA or MiSA, and all of the MSAs and MiSAs are represented. The same counties appear in each year's list with only minor changes in rank order during this time frame. These data further illustrate the fact that the population of Nebraska is located predominantly in the core urbanized areas, a pattern that has not changed over the past four decades.

**Table D-3: Eighteen Most Populated Nebraska Counties, 2010, 2015 and 2020[(a)(b)]**

| 2010 | | | 2015 | | | 2020 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Rank | County | Census 2010 Population | Rank | County | Estimated 2015 Population | Rank | County | Census 2020 Population | % State Pop. | Cum. % State Pop | MSA Or *MiSA* |
| 1 | Douglas | 517,110 | 1 | Douglas | 549,029 | 1 | Douglas | 584,526 | 29.8 | 29.8 | Omaha-Council Bluffs |
| 2 | Lancaster | 285,407 | 2 | Lancaster | 306,096 | 2 | Lancaster | 322,608 | 16.4 | 46.2 | Lincoln |
| 3 | Sarpy | 158,840 | 3 | Sarpy | 175,173 | 3 | Sarpy | 190,604 | 9.7 | 56.0 | Omaha-Council Bluffs |
| 4 | Hall | 58,607 | 4 | Hall | 61,132 | 4 | Hall | 62,895 | 3.2 | 59.2 | Grand Island |
| 5 | Buffalo | 46,102 | 5 | Buffalo | 48,578 | 5 | Buffalo | 50,084 | 2.6 | 61.7 | *Kearney* |
| 6 | Scotts Bluff | 36,970 | 6 | Dodge | 36,567 | 6 | Dodge | 37,167 | 1.9 | 63.6 | *Fremont* |
| 7 | Dodge | 36,691 | 7 | Scotts Bluff | 36,245 | 7 | Scotts Bluff | 36,084 | 1.8 | 65.5 | *Scottsbluff* |
| 8 | Lincoln | 36,288 | 8 | Lincoln | 35,501 | 8 | Madison | 35,585 | 1.8 | 67.3 | *Norfolk* |
| 9 | Madison | 34,876 | 9 | Madison | 34,999 | 9 | Lincoln | 34,676 | 1.8 | 69.0 | *North Platte* |
| 10 | Platte | 32,237 | 10 | Platte | 32,876 | 10 | Platte | 34,296 | 1.7 | 70.8 | *Columbus* |
| 11 | Adams | 31,364 | 11 | Adams | 31,567 | 11 | Adams | 31,205 | 1.6 | 72.4 | *Hastings* |
| 12 | Cass | 25,241 | 12 | Cass | 25,421 | 12 | Cass | 26,598 | 1.4 | 73.7 | Omaha-Council Bluffs |
| 13 | Dawson | 24,326 | 13 | Dawson | 23,892 | 13 | Dawson | 24,111 | 1.2 | 75.0 | *Lexington* |
| 14 | Gage | 22,311 | 14 | Gage | 21,715 | 14 | Saunders | 22,278 | 1.1 | 76.1 | Omaha-Council Bluffs |
| 15 | Dakota | 21,006 | 15 | Saunders | 20,949 | 15 | Gage | 21,704 | 1.1 | 77.2 | *Beatrice* |
| 16 | Saunders | 20,780 | 16 | Dakota | 20,550 | 16 | Dakota | 21,582 | 1.1 | 78.3 | Sioux City, IA-NE-SD |
| 17 | Washington | 20,234 | 17 | Washington | 19,917 | 17 | Washington | 20,865 | 1.1 | 79.4 | Omaha-Council Bluffs |
| 18 | Seward | 16,750 | 18 | Seward | 16,994 | 18 | Seward | 17,609 | 0.9 | 80.3 | Lincoln |
| | Nebraska | 1,826,341 | | Nebraska | 1,891,277 | | Nebraska | 1,961,504 | | | |

Footnotes:
**(a)** The population data used in this table were obtained from the U.S. Census Bureau in November 2021.
**(b)** Counties that maintained the same ranking throughout this time period are shown with the orange background color.

Observations:

- The 18 most populated Nebraska counties are all within Metropolitan or Micropolitan Statistical Areas (MSAs/MiSAs).
- All 14 of Nebraska's MSAs/MiSAs are represented in this list.
- Over half of the people in Nebraska (56.0%) live in the 3 most populated counties, and 80.3% live in the 18 most populated counties.
- The same counties were in the top 18 throughout this period, with only minor changes in ranking.

**Table D-4: Top Ten Nebraska Counties for 2020 Population, 2010-2015 Population Growth, and 2010-2020 Population Growth**

| 2020 Population | | | | Population Growth 2010-2015 | | | | | Population Growth 2010-2020 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rank | County | Census 2020 Population | % State Pop. | Rank | County | Estimated 2015 Population | Pop. Growth 2010-2015 | % Pop. Growth | Rank | County | Census 2010 Population | Pop. Growth 2010-2020 | % Pop. Growth |
| 1 | **Douglas** | 584,526 | 29.8 | 1 | **Douglas** | 549,029 | 31,919 | 6.2 | 1 | **Douglas** | 517,110 | 67,416 | 13.0 |
| 2 | **Lancaster** | 322,608 | 16.4 | 2 | **Lancaster** | 306,096 | 20,689 | 7.2 | 2 | **Lancaster** | 285,407 | 37,201 | 13.0 |
| 3 | **Sarpy** | 190,604 | 9.7 | 3 | **Sarpy** | 175,173 | 16,333 | 10.3 | 3 | **Sarpy** | 158,840 | 31,764 | 20.0 |
| 4 | **Hall** | 62,895 | 3.2 | 4 | **Hall** | 61,132 | 2,525 | 4.3 | 4 | **Hall** | 58,607 | 4,288 | 7.3 |
| 5 | **Buffalo** | 50,084 | 2.6 | 5 | **Buffalo** | 48,578 | 2,476 | 5.4 | 5 | **Buffalo** | 46,102 | 3,982 | 8.6 |
| 6 | Dodge | 37,167 | 1.9 | 6 | **Platte** | 32,876 | 639 | 2.0 | 6 | **Platte** | 32,237 | 2,059 | 6.4 |
| 7 | Scotts Bluff | 36,084 | 1.8 | 7 | Seward | 16,994 | 244 | 1.5 | 7 | Saunders | 20,780 | 1,498 | 7.2 |
| 8 | Madison | 35,585 | 1.8 | 8 | Adams | 31,567 | 203 | 0.6 | 8 | Cass | 25,241 | 1,357 | 5.4 |
| 9 | Lincoln | 34,914 | 1.8 | 9 | Colfax | 10,717 | 202 | 1.9 | 9 | Seward | 16,750 | 859 | 5.1 |
| 10 | **Platte** | 34,676 | 1.8 | 10 | Cass | 25,421 | 180 | 0.7 | 10 | Madison | 34,876 | 709 | 2.0 |
| | Nebraska | 1,961,504 | 100 | | Nebraska | 1,934,408 | 64,936 | 3.6 | | Nebraska | 1,826,341 | 135,163 | 7.4 |

**Observations** from the data above and from additional data in Table D-1:

(1) The six counties identified with **Bold font** and the orange highlight (**Buffalo, Douglas, Hall, Lancaster, Platte,** and **Sarpy**) appear in the top 10 for population, population growth, and percent growth.

(2) The five most-populous counties in Nebraska (**Buffalo, Douglas, Hall, Lancaster,** and **Sarpy**) include 61.7% of the state's 2020 population.

(3) These five most-populous counties also were the counties with the highest population growth from 2010 to 2015 and 2010 to 2020. The aggregate population growth 2010-2020 in these five counties was 144,651, which was 107% of Nebraska's total population gain over this period. (This value is greater than 100% because 69 of the state's 93 counties lost population, a total of 19,397 people).

(4) Nebraska's three most populous counties (Douglas, Lancaster, and Sarpy) have a total population of 1,097,738, or 56.0% of the state population. These three counties also had the highest percentage population growth from 2010 to 2020 of any Nebraska counties.

The population data used in this table were obtained from the U.S. Census Bureau in November 2021.

Table D-4 above lists the top ten Nebraska counties with respect to 2020 census population, population growth (estimated) from 2010 to 2015, and population growth from 2010 to 2020. As shown in this table, the five most populated counties (Douglas, Lancaster, Sarpy, Hall, and Buffalo) also have the highest population growth in the past decade, and they are among the seven counties with the highest percent population growth in that period. The 2020 census population of these five counties accounts for 61.7% of the state population.

**Omaha-Council Bluffs MSA**

Table D-4 also shows that the three most populated and fastest-growing counties (Douglas, Lancaster, and Sarpy) include 56% of the state population and in aggregate added 136,381 people between 2010 and 2020. This population growth exceeds the net growth of the entire state population by over 1,200 people because 69 of Nebraska's 93 counties lost population during the decade (see Table D-7 at the end of this appendix).

Douglas and Sarpy Counties are in the Omaha-Council Bluffs MSA, which has the largest population of any urbanized area in the state (967,604 in 2020, including 122,733 in three Iowa counties). These two Nebraska counties had a combined 2020 population of 775,130, which was 80.1% of the MSA population. Both of these counties are highly urbanized and, along with Council Bluffs, IA form the urban core of the MSA. See Figure D-5 for additional population data for the Omaha-Council Bluffs MSA.

According to Decennial Census data, the population of the entire Omaha-Council Bluffs MSA grew by 102,254 from 2010 to 2020, or approximately 10,225 people, or 1.2%, each year. Figure D-6a plots this past population growth along with projected growth to 2025 assuming a linear growth rate. Figure D-6b plots U.S. Census Bureau's estimated population data from 2010 through 2021 along with projected population growth through 2025 assuming an average annual growth rate. If either of these growth rates hold true, the total MSA population will exceed 1,000,000 by 2024. This milestone will trigger additional monitoring requirements for several air pollutants.

**Lincoln MSA**

The Lincoln MSA is the second most populous MSA in Nebraska with 340,217 people in the 2020 census. It consists of Lancaster and Seward Counties. Most of the population and growth is in Lancaster County, which includes the city of Lincoln, the urbanized core of the MSA with 86% of its total population. The average annual growth rate of the Lincoln MSA is 1.6%. See Figure D-7 for additional information on the Lincoln MSA.

**Grand Island and Sioux City MSAs**

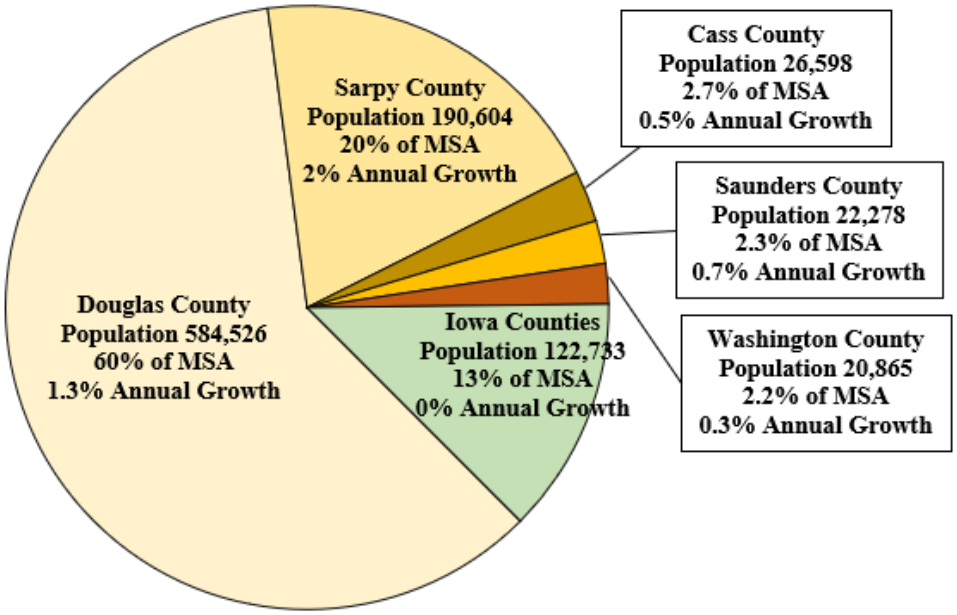
The smaller Grand Island and Sioux City MSAs have average annual growth rates of less than 1%. Population and population growth data from the 2010 and 2020 decennial census for the Sioux City and Grand Island MSAs can be found in Figures D-8 and D-9.

**Micropolitan Statistical Areas and Rural Nebraska Counties**

Table D-5 provides population and population growth data from the 2010 and 2020 decennial census for Nebraska's nine Micropolitan Statistical Areas. Only the Columbus, Fremont, Kearney, and Norfolk MiSAs experienced net growth (1% or less) during the decade; the other areas had population losses of up to 0.6%. Table D-6 provides the same types of data for eight additional counties with 2020 census populations greater than 10,000 that are not part of a designated MSA or MiSA.

Table D-7 lists 2010 and 2020 census population and population growth data for all 93 Nebraska counties. The counties are ranked based on their population growth during this decade. This table also has a column for population density, which ranges from a high of 1,723.7 persons per square mile in Douglas County to less than one person per square mile in eight counties. There are also 48 counties with a population density less than ten persons per square mile. These figures further illustrate the rural nature of most of Nebraska.

**Figure D-5: Omaha-Council Bluffs MSA Population Distribution Chart and Table**




| | 2010 Census Population | 2020 Census Population | % MSA Population 2020 | Avg. Ann. Growth 2010-2020 | Avg. Ann. % Growth 2010-2020 |
|---|---|---|---|---|---|
| **Omaha-C. B. MSA** | **865,350** | **967,604** | **100%** | **10,225** | **1.2%** |
| **NE Counties** | **742,205** | **844,871** | **87%** | **10,267** | **1.4%** |
| Douglas County | 517,110 | 584,526 | 60.4% | 6,742 | 1.3% |
| Omaha (city) | 408,958 | 468,262 | 49.7% | 7,413 | 1.8% |
| Sarpy County | 158,840 | 190,604 | 19.7% | 3,176 | 2.0% |
| Bellevue (city) | 50,137 | 53,627 | 5.7% | 436 | 0.9% |
| Papillion (city) | 18,894 | 20,530 | 2.2% | 205 | 1.1% |
| La Vista (city) | 15,758 | 17,163 | 1.8% | 176 | 1.1% |
| Cass County | 25,241 | 26,598 | 2.7% | 136 | 0.5% |
| Plattsmouth (city) | 6,502 | 6,480 | 0.7% | -3 | -0.0% |
| Saunders County | 20,780 | 22,278 | 2.3% | 150 | 0.7% |
| Wahoo (city) | 4,508 | 4,514 | 0.5% | 1 | 0.0% |
| Washington County | 20,234 | 20,865 | 2.2% | 63 | 0.3% |
| Blair (city) | 7,990 | 7,815 | 0.8% | -22 | -0.3% |
| **Iowa Counties** | **123,145** | **122,733** | **13%** | **-41** | **0.0%** |
| Pottawatamie County | 93,158 | 93,667 | 9.7% | 51 | 0.1% |
| Council Bluffs (city) | 62,230 | 62,799 | 6.5% | 57 | 0.1% |
| Carter Lake (city) | 3,785 | 3,791 | 0.4% | 1 | 0.0% |
| Mills County | 15,059 | 14,484 | 1.5% | -58 | -0.4% |
| Glenwood (city) | 5,269 | 5,073 | 0.5% | -20 | -0.4% |
| Harrison County | 14,928 | 14,582 | 1.5% | -35 | -0.2% |
| Missouri Valley (city) | 2,838 | 2,678 | 0.3% | -16 | -0.6% |

Observation: Most of the population growth is in Douglas and Sarpy Counties, Nebraska.

**Figure D-6a: Omaha-Council Bluffs MSA Decennial Census and Projected Population, 2010-2025**

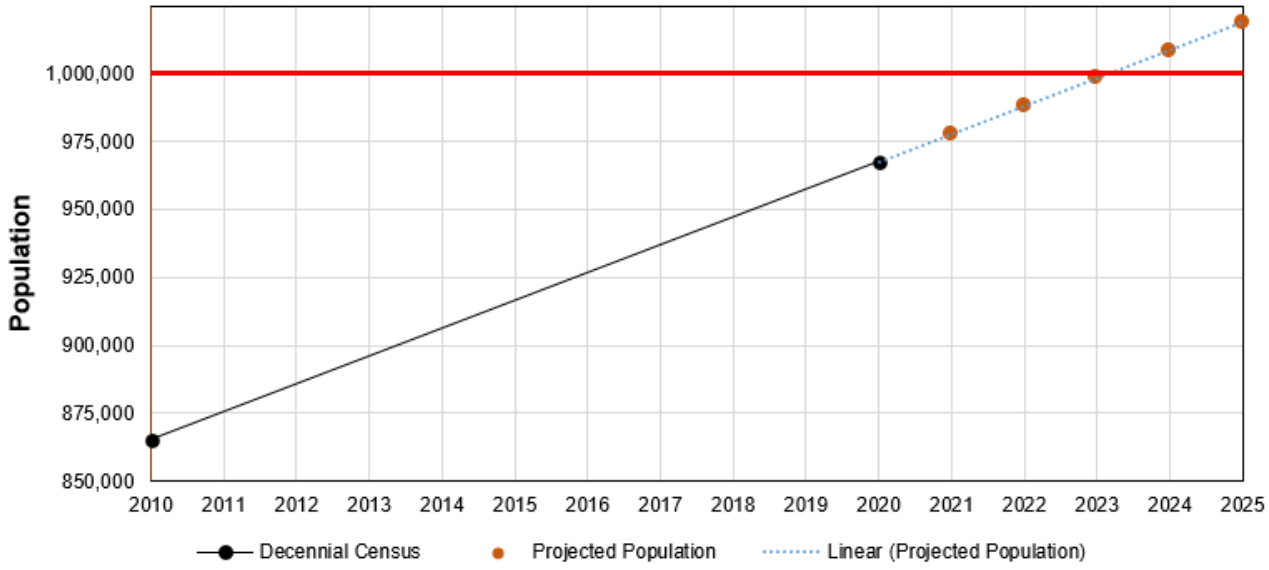
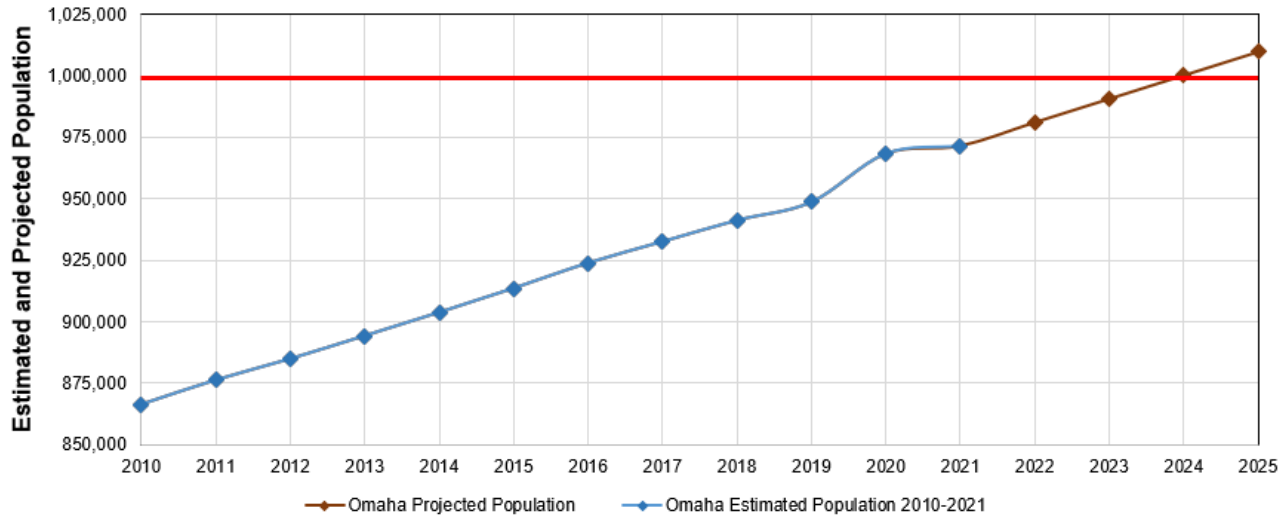
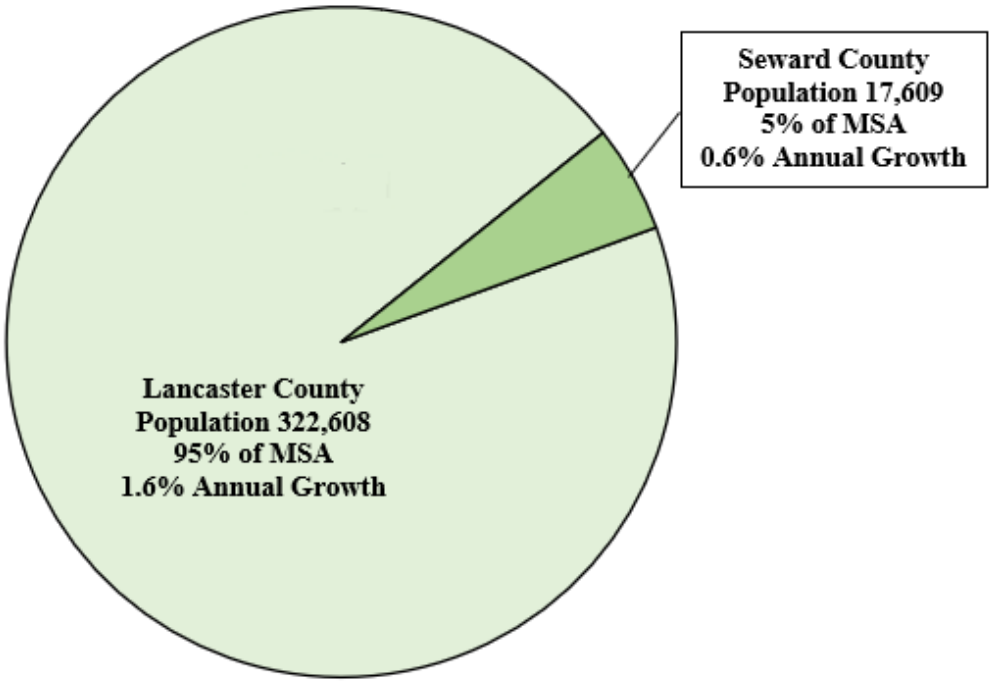



**Figure D-6b: Omaha-Council Bluffs MSA Estimated and Projected Population, 2010-2025**




Observation: If the population of the Omaha-Council Bluffs MSA continues to grow at an average rate determined from either the 2010 and 2020 Decennial Census data or the Census Bureau's 2010 to 2021 estimated population values, the total population of the MSA will exceed 1,000,000 by 2024.

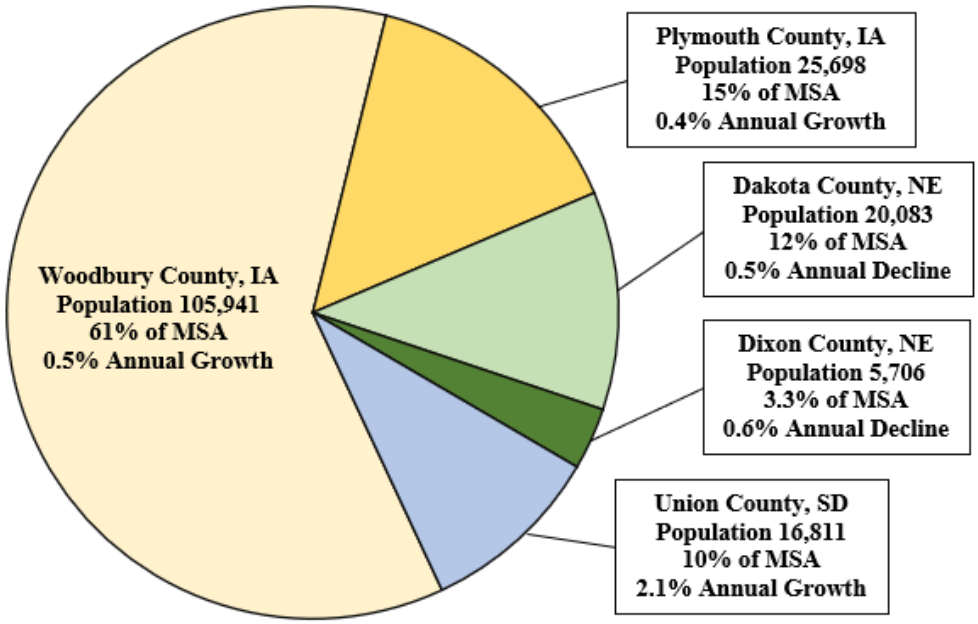
**Figure D-7: Lincoln MSA Population Distribution Chart and Table**




| | 2010 Census Population | 2020 Census Population | % MSA Population 2020 | Avg. Ann. Growth 2010-2020 | Avg. Ann. % Growth 2010-2020 |
|---|---|---|---|---|---|
| **Lincoln MSA** | **302,157** | **340,217** | **100%** | **4,758** | **1.6%** |
| Lancaster County | 285,407 | 322,608 | 95% | 4,650 | 1.6% |
| Lincoln (city) | 258,379 | 291,082 | 86% | 4,088 | 1.6% |
| Waverly (city) | 3,277 | 4,279 | 1.3% | 125 | 3.8% |
| Seward County | 16,750 | 17,609 | 5% | 107 | 0.6% |
| Seward (city) | 6,964 | 7,643 | 2.2% | 85 | 1.2% |

Observation: Most of the population and growth is in Lancaster County and the cities of Lincoln and Waverly.

## Figure D-8: Sioux City MSA Population Distribution Chart and Table

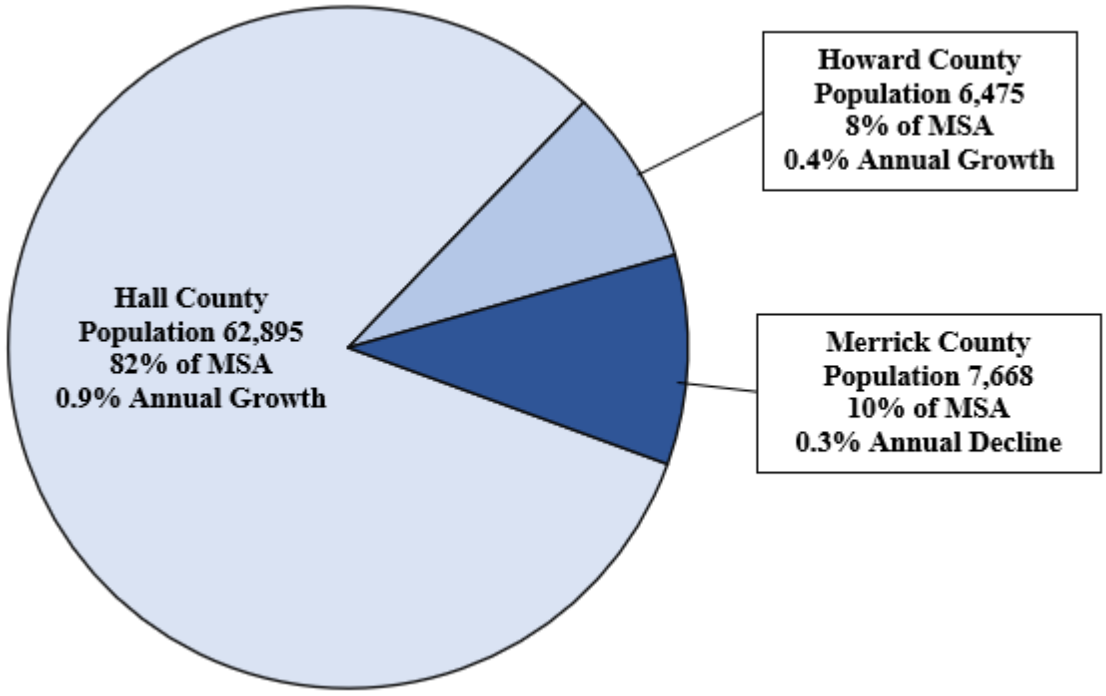



| | 2010 Census Population | 2020 Census Population | % MSA Population 2020 | Avg. Ann. Growth 2010-2020 | Avg. Ann. % Growth 2010-2020 |
|---|---|---|---|---|---|
| **Sioux City MSA** | **168,563** | **174,242** | **100%** | **710** | **0.4%** |
| **Iowa Counties** | **127,158** | **131,639** | **76%** | **560** | **0.4%** |
| Woodbury County | 102,172 | 105,941 | 61% | 471 | 0.5% |
| Sioux City | 82,684 | 85,797 | 49% | 389 | 0.5% |
| Sergeant Bluff (city) | 4,227 | 5,015 | 2.9% | 99 | 2.3% |
| Plymouth County | 24,986 | 25,698 | 15% | 89 | 0.4% |
| Le Mars (city) | 9,826 | 10,571 | 6.1% | 93 | 0.9% |
| **Nebraska Counties** | **27,006** | **25,792** | **15%** | **-152** | **-0.6%** |
| Dakota County | 21,006 | 20,083 | 12% | -115 | -0.5% |
| South Sioux City | 13,353 | 14,043 | 8.1% | 86 | 0.6% |
| Dakota City | 1,919 | 2,081 | 1.2% | 20 | 1.1% |
| Dixon County | 6,000 | 5,709 | 3.3% | -36 | -0.6% |
| Wakefield (city) | 1,451 | 1,522 | 0.9% | 9 | 0.6% |
| **South Dakota Counties** | **14,399** | **16,811** | **9.6%** | **302** | **2.1%** |
| Union County | 14,399 | 16,811 | 9.6% | 302 | 2.1% |
| North Sioux City | 2,530 | 3,042 | 1.7% | 64 | 2.5% |
| Elk Point (city) | 1,963 | 2,149 | 1.2% | 23 | 1.2% |
| Beresford (city) | 2,005 | 2,180 | 1.3% | 22 | 1.1% |

Observations:

- Most of the population is in Woodbury County, Iowa and Sioux City, Iowa
- There was minimal overall population growth in the Sioux City MSA from 2010 to 2020. Growth occurred primarily in Union County, South Dakota, North Sioux City, South Dakota, and in Sergeant Bluff, Iowa. Populations declined in the Nebraska counties in the Sioux City MSA, though their cities showed slight growth.

## Figure D-9: Grand Island MSA Population Distribution Chart and Table




| | 2010 Census Population | 2020 Census Population | % MSA Population 2020 | Avg. Ann. Growth 2010-2020 | Avg. Ann. % Growth 2010-2020 |
|---|---|---|---|---|---|
| **Grand Island MSA [(a)]** | **72,726** | **77,038** | **100%** | **539** | **0.7%** |
| Hall County | 58,607 | 62,895 | 82% | 536 | 0.9% |
| Grand Island (city) | 48,520 | 53,131 | 69% | 576 | 1.2% |
| Howard County | 6,274 | 6,475 | 8% | 25 | 0.4% |
| St. Paul (city) | 2,290 | 2,416 | 3% | 16 | 0.7% |
| Merrick County | 7,845 | 7,668 | 10% | -22 | -0.3% |
| Central City | 2,934 | 3,039 | 4% | 13 | 0.4% |

Footnotes:
(a) In 2010, the Grand Island MSA encompassed four counties: Hall, Hamilton, Howard, and Merrick. Hamilton County was removed from the MSA in September 2018. The populations shown here for 2010 and 2020 include only the three remaining counties listed in the table.

Observations: Most of the population of the Grand Island MSA is in Hall County and the City of Grand Island. Population growth is also fastest within these areas, whereas population is declining in Merrick County.

**Table D-5: Micropolitan Statistical Area (MiSA) Population Data: 2010 through 2020**

| MiSA | Counties & Cities | 2010 Census Population | 2020 Census Population | Percent of MiSA | Avg. Ann. Growth 2010-2020 | Avg. Ann. % Growth 2010-2020 |
|---|---|---|---|---|---|---|
| Kearney MiSA | | 52,591 | 56,722 | 100% | 523 | 1.0% |
| | Buffalo County | 46,102 | 50,084 | 88.2% | 498 | 1.1% |
| | Kearney (city) | 30,787 | 33,790 | 59.5% | 375 | 1.2% |
| | Kearney County | 6,489 | 6,688 | 11.8% | 25 | 0.4% |
| Norfolk MiSA | | 48,271 | 48,744 | 100% | 59 | 0.1% |
| | Madison County | 34,876 | 35,585 | 73.0% | 89 | 0.3% |
| | Norfolk (city) | 24,210 | 24,955 | 51.2% | 93 | 0.4% |
| | Pierce County | 7,266 | 7,317 | 15.0% | 6 | 0.1% |
| | Stanton County | 6,129 | 5,842 | 12.0% | -36 | -0.6% |
| Scottsbluff MiSA | | 38,971 | 37,893 | 100% | -135 | -0.3% |
| | Scotts Bluff County | 36,970 | 36,084 | 95.2% | -111 | -0.3% |
| | Scottsbluff (city) | 15,039 | 14,436 | 38.1% | -75 | -0.5% |
| | Gering (city) | 8,500 | 8,564 | 22.6% | 8 | 0.1% |
| | Banner County | 690 | 674 | 1.8% | -2 | -0.3% |
| | Sioux County | 1,311 | 1,135 | 3.0% | -22 | -1.7% |
| North Platte MiSA | | 37,590 | 35,791 | 100% | -225 | -0.6% |
| | Lincoln County | 36,288 | 34,676 | 96.9% | -202 | -0.6% |
| | North Platte (city) | 24,733 | 23,390 | 65.4% | -168 | -0.7% |
| | Logan County | 763 | 716 | 2.0% | -6 | -0.8% |
| | McPherson County | 539 | 399 | 1.1% | -18 | -3.2% |
| Fremont MiSA | | 36,691 | 37,167 | 100% | 60 | 0.2% |
| Part of Omaha CSA | Dodge County | 36,691 | 37,167 | 100% | 60 | 0.2% |
| | Fremont (city) | 26,397 | 27,141 | 73.0% | 93 | 0.4% |
| Columbus MiSA | | 32,237 | 34,296 | 100% | 257 | 0.8% |
| | Platte County | 32,237 | 34,296 | 100% | 257 | 0.8% |
| | Columbus (city) | 22,111 | 24,028 | 70.1% | 240 | 1.1% |
| Hastings MiSA | | 31,364 | 31,205 | 100% | -20 | -0.1% |
| | Adams County | 31,364 | 31,205 | 100% | -20 | -0.1% |
| | Hastings (city) | 24,907 | 25,152 | 80.6% | 31 | 0.1% |
| Lexington MiSA | | 26,370 | 26,004 | 100% | -46 | -0.2% |
| | Dawson County | 24,326 | 24,111 | 92.7% | -27 | -0.1% |
| | Lexington (city) | 10,230 | 10,348 | 39.8% | 15 | 0.1% |
| | Cozad (city) | 3,977 | 3,988 | 15.3% | 1 | 0.0% |
| | Gothenburg (city) | 3,574 | 3,478 | 13.4% | -12 | -0.3% |
| | Gosper County | 2,044 | 1,893 | 7.3% | -19 | -0.9% |
| Beatrice MiSA | | 22,311 | 21,704 | 100% | -76 | -0.3% |
| | Gage County | 22,311 | 21,704 | 100% | -76 | -0.3% |
| | Beatrice (city) | 12,459 | 12,261 | 56.5% | -25 | -0.2% |

Observation: Four of these 9 MiSAs experienced population growth from 2010 to 2020: Kearney, Norfolk, Fremont, and Columbus. No MiSA had an annual population gain greater than 1%. Five MiSAs experienced population declines, all of which were less 1%.

| Table D-6: Nebraska Counties Outside of MSAs and MiSAs with Populations Greater Than 10,000 | | | | | |
|---|---|---|---|---|---|
| Counties & Cities | 2010 Census Population | 2020 Estimated Population | % County 2020 Population | Avg. Ann. Growth 2010-2020 | Avg. Ann. % Growth 2010-2020 |
| Otoe County | 15,740 | 15,912 | 100% | 22 | 0.1% |
| Nebraska City | 7,289 | 7,222 | 45.4% | -8 | -0.1% |
| Otoe County is adjacent to the Omaha and Lincoln MSAs. | | | | | |
| Saline County | 14,200 | 14,292 | 100% | 19 | 0.1% |
| Crete (city) | 6,960 | 7,099 | 49.7% | 17 | 0.2% |
| Saline County lies southwest of and is adjacent to the Lincoln MSA and is also adjacent to the Beatrice MiSA. | | | | | |
| York County | 13,665 | 14,125 | 100% | 58 | 0.4% |
| York (city) | 7,766 | 8,066 | 57.1% | 38 | 0.5% |
| York County lies between the Lincoln and Grand Island MSAs. | | | | | |
| Box Butte County | 11,308 | 10,842 | 100% | -58 | -0.5% |
| Alliance (city) | 8,491 | 8,151 | 75.2% | -43 | -0.5% |
| Alliance is the largest Nebraska city outside of an MSA or MiSA.<br>Box Butte County is adjacent to the Scottsbluff MiSA. | | | | | |
| Custer County | 10,939 | 10,545 | 100% | -49 | -0.5% |
| Broken Bow (city) | 3,559 | 3,506 | 33.2% | -7 | -0.2% |
| Custer County is adjacent to the North Platte, Lexington, and Kearney MiSAs. | | | | | |
| Red Willow County | 11,055 | 10,702 | 100% | -44 | -0.4% |
| McCook (city) | 7,698 | 7,446 | 69.6% | -32 | -0.4% |
| Red Willow County is on the southwest border of Nebraska. | | | | | |
| Colfax County | 10,515 | 10,582 | 100% | 8 | 0.1% |
| Schuyler (city) | 6,211 | 6,547 | 61.9% | 42 | 0.7% |
| Colfax County lies between and adjoins the Columbus, Fremont, and Norfolk MiSAs. | | | | | |
| Holt County | 10,435 | 10,127 | 100% | -39 | -0.4% |
| O'Neill (city) | 3,705 | 3,581 | 35.4% | -16 | -0.4% |
| Atkinson (city) | 1,245 | 1,306 | 12.9% | 8 | 0.6% |
| Holt County is in north-central Nebraska. | | | | | |

Observations:

- Four of these eight counties experienced population growth between 2010 and 2020: Otoe, Saline, York, and Colfax. Population growth rates were less than 0.5% per year.
- Micropolitan Statistical Areas (MiSAs) have a core urban area with a population of 10,000 to 49,999. None of these counties appear to be approaching the upper threshold.
- All counties in this list except for Red Willow and Holt are adjacent to MSAs and /or MiSAs.

**Table D-7: Population and Population Growth Data for Nebraska and Nebraska Counties Ordered by Population Growth 2010 to 2020[a]** Page 1 of 3

| Rank | County | Census 2010 Population | Census 2020 Population | Population Growth 2010-2020 | % Growth 2010-2020 | Population Density[b] 2020 |
|---|---|---|---|---|---|---|
| | Nebraska | 1,826,341 | 1,961,504 | 135,163 | 7.4% | 25.4 |
| 1 | Douglas | 517,110 | 584,526 | 67,416 | 13.0% | 1,723.7 |
| 2 | Lancaster | 285,407 | 322,608 | 37,201 | 13.0% | 381.4 |
| 3 | Sarpy | 158,840 | 190,604 | 31,764 | 20.0% | 770.5 |
| 4 | Hall | 58,607 | 62,895 | 4,288 | 7.3% | 114.0 |
| 5 | Buffalo | 46,102 | 50,084 | 3,982 | 8.6% | 51.4 |
| 6 | Platte | 32,237 | 34,296 | 2,059 | 6.4% | 50.1 |
| 7 | Saunders | 20,780 | 22,278 | 1,498 | 7.2% | 29.3 |
| 8 | Cass | 25,241 | 26,598 | 1,357 | 5.4% | 47.0 |
| 9 | Seward | 16,750 | 17,609 | 859 | 5.1% | 30.6 |
| 10 | Madison | 34,876 | 35,585 | 709 | 2.0% | 61.9 |
| 11 | Washington | 20,234 | 20,865 | 631 | 3.1% | 53.1 |
| 12 | Dakota | 21,006 | 21,582 | 576 | 2.7% | 80.7 |
| 13 | Dodge | 36,691 | 37,167 | 476 | 1.3% | 68.5 |
| 14 | York | 13,665 | 14,125 | 460 | 3.4% | 24.5 |
| 15 | Hamilton | 9,124 | 9,429 | 305 | 3.3% | 17.3 |
| 16 | Howard | 6,274 | 6,475 | 201 | 3.2% | 11.3 |
| 17 | Kearney | 6,489 | 6,688 | 199 | 3.1% | 13.0 |
| 18 | Otoe | 15,740 | 15,912 | 172 | 1.1% | 25.7 |
| 19 | Wayne | 9,595 | 9,697 | 102 | 1.1% | 21.9 |
| 20 | Saline | 14,200 | 14,292 | 92 | 0.6% | 24.8 |
| 21 | Johnson | 5,217 | 5,290 | 73 | 1.4% | 14.0 |
| 22 | Colfax | 10,515 | 10,582 | 67 | 0.6% | 25.4 |
| 23 | Pierce | 7,266 | 7,317 | 51 | 0.7% | 12.7 |
| 24 | Thomas | 647 | 669 | 22 | 3.4% | 0.9 |
| 25 | Grant | 614 | 611 | -3 | -0.5% | 0.8 |
| 26 | Banner | 690 | 674 | -16 | -2.3% | 0.9 |
| 27 | Hooker | 736 | 711 | -25 | -3.4% | 1.0 |
| 28 | Loup | 632 | 607 | -25 | -4.0% | 1.1 |
| 29 | Butler | 8,395 | 8,369 | -26 | -0.3% | 14.2 |
| 30 | Arthur | 460 | 434 | -26 | 5.7% | 0.6 |
| 31 | Keith | 8,368 | 8,335 | -33 | -0.4% | 7.5 |

Footnotes:
(a) This table contains 2010 and 2020 population counts published by the U.S. Census Bureau.
(b) Population Density is the population divided by the county area in square miles: persons per square mile.

**Table D-7: Population and Population Growth Data for Nebraska and Nebraska Counties Ordered by Population Growth 2010 to 2020[a]** Page 2 of 3

| Rank | County | Census 2010 Population | Census 2020 Population | Population Growth 2010-2020 | % Growth 2010-2020 | Population Density[b] 2020 |
|---|---|---|---|---|---|---|
| 32 | Wheeler | 818 | 774 | -44 | -5.4% | 1.3 |
| 33 | Logan | 763 | 716 | -47 | -6.2% | 1.3 |
| 34 | Blaine | 478 | 431 | -47 | -9.8% | 0.6 |
| 35 | Keya Paha | 824 | 769 | -55 | -6.7% | 1.0 |
| 36 | Chase | 3,966 | 3,893 | -73 | -1.8% | 4.3 |
| 37 | Deuel | 1,941 | 1,838 | -103 | -5.3% | 4.2 |
| 38 | Hayes | 967 | 856 | -111 | -11.5% | 1.2 |
| 39 | Perkins | 2,970 | 2,858 | -112 | -3.8% | 3.2 |
| 40 | Cuming | 9,139 | 9,013 | -126 | -1.4% | 15.7 |
| 41 | Boone | 5,505 | 5,379 | -126 | -2.3% | 7.8 |
| 42 | Burt | 6,858 | 6,722 | -136 | -2.0% | 13.5 |
| 43 | McPherson | 539 | 399 | -140 | -26.0% | 0.5 |
| 44 | Gosper | 2,044 | 1,893 | -151 | -7.4% | 4.1 |
| 45 | Adams | 31,364 | 31,205 | -159 | -0.5% | 55.3 |
| 46 | Thurston | 6,940 | 6,773 | -167 | -2.4% | 17.1 |
| 47 | Nemaha | 7,248 | 7,074 | -174 | -2.4% | 17.3 |
| 48 | Sioux | 1,311 | 1,135 | -176 | -13.4% | 0.5 |
| 49 | Merrick | 7,845 | 7,668 | -177 | -2.3% | 15.4 |
| 50 | Garden | 2,057 | 1,874 | -183 | -8.9% | 1.1 |
| 51 | Polk | 5,406 | 5,214 | -192 | -3.6% | 11.8 |
| 52 | Sherman | 3,152 | 2,959 | -193 | -6.1% | 5.2 |
| 53 | Thayer | 5,228 | 5,034 | -194 | -3.7% | 8.8 |
| 54 | Valley | 4,260 | 4,059 | -201 | -4.7% | 7.1 |
| 55 | Dawson | 24,326 | 24,111 | -215 | -0.9% | 23.7 |
| 56 | Phelps | 9,188 | 8,968 | -220 | -2.4% | 16.6 |
| 57 | Pawnee | 2,773 | 2,544 | -229 | -8.3% | 5.9 |
| 58 | Garfield | 2,049 | 1,813 | -236 | -11.5% | 3.2 |
| 59 | Frontier | 2,756 | 2,519 | -237 | -8.6% | 2.6 |
| 60 | Brown | 3,145 | 2,903 | -242 | -7.7% | 2.4 |
| 61 | Cherry | 5,713 | 5,455 | -258 | -4.5% | 0.9 |
| 62 | Rock | 1,526 | 1,262 | -264 | -17.3% | 1.2 |

Footnotes:
(a) This table contains 2010 and 2020 population counts published by the U.S. Census Bureau.
(b) Population Density is the population divided by the county area in square miles: persons per square mile.

**Table D-7: Population and Population Growth Data for Nebraska and Nebraska Counties Ordered by Population Growth 2010 to 2020[a]** Page 3 of 3

| Rank | County | Census 2010 Population | Census 2020 Population | Population Growth 2010-2020 | % Growth 2010-2020 | Population Density[b] 2020 |
|---|---|---|---|---|---|---|
| 63 | Stanton | 6,129 | 5,842 | -287 | -4.7% | 13.6 |
| 64 | Boyd | 2,099 | 1,810 | -289 | -13.8% | 3.3 |
| 65 | Hitchcock | 2,908 | 2,616 | -292 | -10.0% | 3.6 |
| 66 | Jefferson | 7,547 | 7,240 | -307 | -4.1% | 12.6 |
| 67 | Holt | 10,435 | 10,127 | -308 | -3.0% | 4.2 |
| 68 | Knox | 8,701 | 8,391 | -310 | -3.6% | 7.4 |
| 69 | Furnas | 4,959 | 4,636 | -323 | -6.5% | 6.4 |
| 70 | Franklin | 3,225 | 2,889 | -336 | -10.4% | 5.0 |
| 71 | Fillmore | 5,890 | 5,551 | -339 | -5.8% | 9.6 |
| 72 | Sheridan | 5,469 | 5,127 | -342 | -6.3% | 2.1 |
| 73 | Harlan | 3,423 | 3,073 | -350 | -10.2% | 5.4 |
| 74 | Greeley | 2,538 | 2,188 | -350 | -13.8% | 3.8 |
| 75 | Red Willow | 11,055 | 10,702 | -353 | -3.2% | 14.9 |
| 76 | Dundy | 2,008 | 1,654 | -354 | -17.6% | 1.8 |
| 77 | Nance | 3,735 | 3,380 | -355 | -9.5% | 7.5 |
| 78 | Kimball | 3,821 | 3,434 | -387 | -10.1% | 3.6 |
| 79 | Antelope | 6,685 | 6.295 | -390 | -5.8% | 7.3 |
| 80 | Custer | 10,939 | 10,545 | -394 | -3.6% | 4.1 |
| 81 | Dixon | 6,000 | 5,606 | -394 | -6.6% | 11.6 |
| 82 | Nuckolls | 4,500 | 4,095 | -405 | -9.0% | 7.1 |
| 83 | Webster | 3,812 | 3,395 | -417 | -10.9 | 5.9 |
| 84 | Clay | 6,542 | 6.104 | -438 | -6.7% | 10.6 |
| 85 | Box Butte | 11,308 | 10,842 | -466 | -4.1% | 10.1 |
| 86 | Cedar | 8,852 | 8,380 | -472 | -5.3% | 11.2 |
| 87 | Morrill | 5,042 | 4,555 | -487 | -9.7% | 3.2 |
| 88 | Richardson | 8,363 | 7,871 | -492 | -5.9% | 14.2 |
| 89 | Cheyenne | 9,998 | 9,468 | -530 | -5.3% | 7.9 |
| 90 | Gage | 22,311 | 21,704 | -607 | -2.7% | 25.2 |
| 91 | Scotts Bluff | 36,970 | 36,084 | -886 | -2.4% | 48.8 |
| 92 | Dawes | 9,182 | 8,199 | -983 | -10.7 | 5.9 |
| 93 | Lincoln | 36,288 | 34,676 | -1,612 | -4.4% | 13.5 |

Footnotes:
(a) This table contains 2010 and 2020 population counts published by the U.S. Census Bureau.
(b) Population Density is the population divided by the county area in square miles: persons per square mile.

# Nebraska Department of Environment and Energy

## 2022 Annual Report on Modeled Facilities (Data Requirements Rule, 2010 $SO_2$ NAAQS)

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**Jim Macy, Director**
**May 9, 2022**

## Introduction

The Data Requirements Rule (DRR) for the 2010 1-hour $SO_2$ Primary National Ambient Air Quality Standards (NAAQS) was issued in August 2015 and outlines ongoing requirements for states with areas designated as attainment based on air quality modeling. Of the three areas in Nebraska subject to the rule, there are two areas that meet the criteria for ongoing requirements.

Nebraska Department of Environment and Energy (NDEE) asserts that all areas continue to demonstrate attainment with the NAAQS, and that additional air quality modeling is not necessary at this time. Analysis of emissions data and discussion are provided below.

## Areas Subject to Ongoing Requirements

The following areas are subject to the ongoing requirements described in 40 CFR Part 51.1205. Modeling analyses used to characterize these areas utilized actual emissions data and these areas have no subsequent "nonattainment" designations.

### The area surrounding Gerald Gentleman Station (GGS), Sutherland, NE

Nebraska Public Power District (Lincoln County)

The modeling analysis used to characterize this area was performed in September 2015 and utilized actual facility emissions from 2012-2014. This analysis indicated the $SO_2$ impact (99$^{th}$ percentile 1-hour $SO_2$ concentration) on the area to be 144.8 ug/m$^3$, or 55.3 parts per billion (ppb). This impact value equates to 73.7% of the 1-hour $SO_2$ NAAQS of 75 ppb, and this area (Lincoln County) was designated "unclassifiable/attainment" on July 12, 2016 (81 FR 45039).

Emissions data for GGS is shown in Table E-1. Data from 2012-2014 used in the modeling analysis, and emissions data for 2019-2021, are included for comparison. The $SO_2$ emissions reported for 2021 indicate a 6.8% increase from 2020, largely attributed to normal variations in generation and the sulfur content of the coal. Despite the increase, the 2019-2021 average emissions are 23.1% lower than the 2012-2014 modeled three-year average, and overall facility $SO_2$ emissions have decreased 26.6% since 2012. Therefore, NDEE asserts that the area surrounding GGS continues to be in attainment with the 1-hour $SO_2$ NAAQS, and additional modeling is not necessary at this time.

GGS participates in the Cross-State Air Pollution Rule (CSAPR) trading program for $SO_2$, and actual 2021 facility emissions are below the $SO_2$ allocations of 13,780 tons (Unit 1) and 15,116 tons (Unit 2).[1]

[1] CSAPR Allowance Allocations https://www.epa.gov/csapr/csapr-allowance-allocations

| Table E-1. Gerald Gentleman Station | | | | | | |
|---|---|---|---|---|---|---|
| **Unit** | **$SO_2$ Emissions (tons per year)** | | | | | |
| | **2012** | **2013** | **2014** | **2019** | **2020** | **2021** |
| 1 | 14,832 | 13,047 | 12,539 | 10,467 | 10,187 | 10,220 |
| 2 | 11,605 | 15,383 | 11,945 | 12,946 | 7,989 | 9,184 |
| **Total** | **26,437** | **28,430** | **24,484** | **23,413** | **18,176** | **19,404** |
| **Average (2012-2014)** | **26,450** | | | | | |
| **Average (2019-2021)** | | | | **20,331** | | |

Emissions data acquired from the Clean Air Markets Division, https://ampd.epa.gov/ampd/.

## The area surrounding Gerald Whelan Energy Center

Hastings Utilities (Adams County)

The modeling analysis used to characterize this area was performed in December 2016 and utilized actual facility emissions data from 2013-2015. This analysis indicated the $SO_2$ impact ($99^{th}$ percentile 1-hour $SO_2$ concentration) on the area to be 188.7 µg/$m^3$, or 72.02 ppb, which equates to 96% of the NAAQS. This impact value is below the 1-hour $SO_2$ NAAQS of 75 ppb and the area (Adams County) was designated "attainment/unclassifiable" on January 9, 2018 (83 FR 1098).

Emissions data for Whelan Energy Station is shown in Table E-2. Data from 2013-2015 used in the modeling analysis, and emissions data for 2019-2021, are included for comparison. The $SO_2$ emissions reported for 2021 indicate a 22.9% increase from 2020, and overall facility $SO_2$ emissions have increased by 16.2% since 2013. This increase is attributed to an increase in demand for electric generation as set forth by the Southwest Power Pool. Despite this increase, the 2019-2021 average emissions are 3.7% less than the 2013-2015 modeled three-year average. Therefore, NDEE asserts that the area surrounding Gerald Whelan Energy Center continues to be in attainment with the 1-hour $SO_2$ NAAQS, and additional modeling is not necessary at this time.

Whelan Energy Center participates in the Cross-State Air Pollution Rule (CSAPR) trading program for $SO_2$ (Unit 1), and actual 2021 emissions from Unit 1 were above the $SO_2$ allocations of 1,722 tons for that unit[2], and trading credits were used to offset the exceedance.

[2] CSAPR Allowance Allocations https://www.epa.gov/csapr/csapr-allowance-allocations

| Table E-2. Gerald Whelan Energy Center | | | | | | |
|---|---|---|---|---|---|---|
| **Unit** | **$SO_2$ Emissions (tons per year)** | | | | | |
| | **2013** | **2014** | **2015** | **2019** | **2020** | **2021** |
| 1 | 1,439 | 2,302 | 1,495 | 1,622 | 1,641 | 1,898 |
| 2 | 692 | 598 | 409 | 569 | 374 | 578 |
| **Total** | **2,131** | **2,900** | **1,904** | **2,191** | **2,015** | **2,476** |
| **Average (2013-2015)** | **2,312** | | | | | |
| **Average (2019-2021)** | | | | **2,227** | | |

Emissions data (except for 2018-Unit 2) acquired from the Clean Air Markets Division, https://ampd.epa.gov/ampd/

## The area surrounding Nebraska City Station (NCS)

Omaha Public Power District (Otoe County)

This area was last addressed in the 2021 Modeled Facilities Report, due to a slight increase in annual emissions in 2020; it is included in this report to address the emissions decrease in 2021. Per 40 CFR Part 51.1205(b)(2), the state is not required to annually report on areas in which the impact value is less than 50% of the NAAQS, therefore this area was not addressed in the 2018, 2019, and 2020 reports. If no increases in emissions are experienced in 2022, this facility will not be addressed in the next report.

The modeling analysis used to characterize this area was performed in August 2015 and utilized actual facility emissions data from 2012-2014. This analysis indicated the $SO_2$ impact ($99^{th}$ percentile 1-hour $SO_2$ concentration) on the area to be 78.5 ug/$m^3$, or 32.7 ppb. This impact value is below the 1-hour $SO_2$ NAAQS of 75 ppb and the area was designated "unclassifiable/attainment" on July 12, 2016 (81 FR 45039).

Emissions data for NCS is shown in Table E-3. Data from 2012-2014 used in the modeling analysis, and emissions data for 2019-2021, are included for comparison. The $SO_2$ emissions reported for 2021 indicate a 17.5% decrease from 2020, and the 2019-2021 average emissions are 37.1% less than the 2012-2014 modeled three-year average. Overall facility $SO_2$ emissions have decreased by 43.5% since 2012. Therefore, NDEE asserts that the area surrounding NCS continues to be in attainment with the 1-hour $SO_2$ NAAQS, and that additional modeling is not necessary at this time.

NCS participates in the Cross-State Air Pollution Rule (CSAPR) trading program for $SO_2$, and actual 2020 facility emissions are below the $SO_2$ allocations of 12,313 tons (Unit 1) and 3,337 tons (Unit 2).[3]

Omaha Public Power District voluntarily requested and obtained a plantwide applicability limit (PAL) permit, issued by NDEE in March of 2020, that limits total Nebraska City Station $SO_2$ emissions to less than 17,389 tons per year. This PAL is 4.7% greater than the 2012-2014 average $SO_2$ emissions provided in Table D-3 that was the basis for modeling, which demonstrated the impact in the area surrounding Nebraska City Station at 43.6% of the 2010 $SO_2$ NAAQS. The NCS is meeting this PAL with some margin.

**Table E-3. Nebraska City Station**

| Unit | $SO_2$ Emissions (tons per year) | | | | | |
|---|---|---|---|---|---|---|
| | **2012** | **2013** | **2014** | **2019** | **2020** | **2021** |
| 1 | 14,544 | 14,696 | 13,969 | 8,452 | 9,459 | 7,467 |
| 2 | 2,222 | 2,214 | 2,165 | 1,934 | 2,020 | 1,999 |
| **Total** | **16,766** | **16,910** | **16,134** | **10,386** | **11,479** | **9,466** |
| **Average (2012-2014)** | **16,603** | | | | | |
| **Average (2019-2021)** | | | | **10,444** | | |

Emissions data acquired from the Clean Air Markets Division, https://ampd.epa.gov/ampd/.

## Conclusion

Emissions data analysis from the areas subject to the ongoing requirements indicates that these areas continue to demonstrate attainment with the 2010 1-hour $SO_2$ NAAQS. Based on this analysis, NDEE asserts that additional modeling is not necessary at this time to further characterize these areas.

## Public Notice

This document was made available for public inspection and comment from May 23, 2022 until June 22, 2022. No comments were received during this time. A copy of the public notice is attached.

[3] CSAPR Allowance Allocations https://www.epa.gov/csapr/csapr-allowance-allocations

# 22-043 Draft 2022 Ambient Air Quality Monitoring Network Plan

This information is provided by the Nebraska Department of Environment and Energy to assist the public and regulated community.

Form #: 22-043 **Annual Reports** Revised: 5/23/22

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Nebraska's Draft 2022 Ambient Air Quality Monitoring Network Plan was prepared to meet the federal requirements set forth in 40 CFR Part 58.10. It describes the current ambient air quality monitoring network in Nebraska and planned and possible changes through June 2023.

## Written comments

Written comments regarding this Draft Network Plan may be submitted to the Nebraska Department of Environment and Energy (NDEE) at the mail or e-mail addresses below.

Comments should be submitted by June 22, 2022. Comments will be addressed as appropriate in the Final Network Plan.

### Mail

Nebraska Department of Environment and Energy
Attn: David Adams – Air Quality Monitoring Section
PO Box 98922
Lincoln, NE 68509

### Email

NDEE.airquality@nebraska.gov

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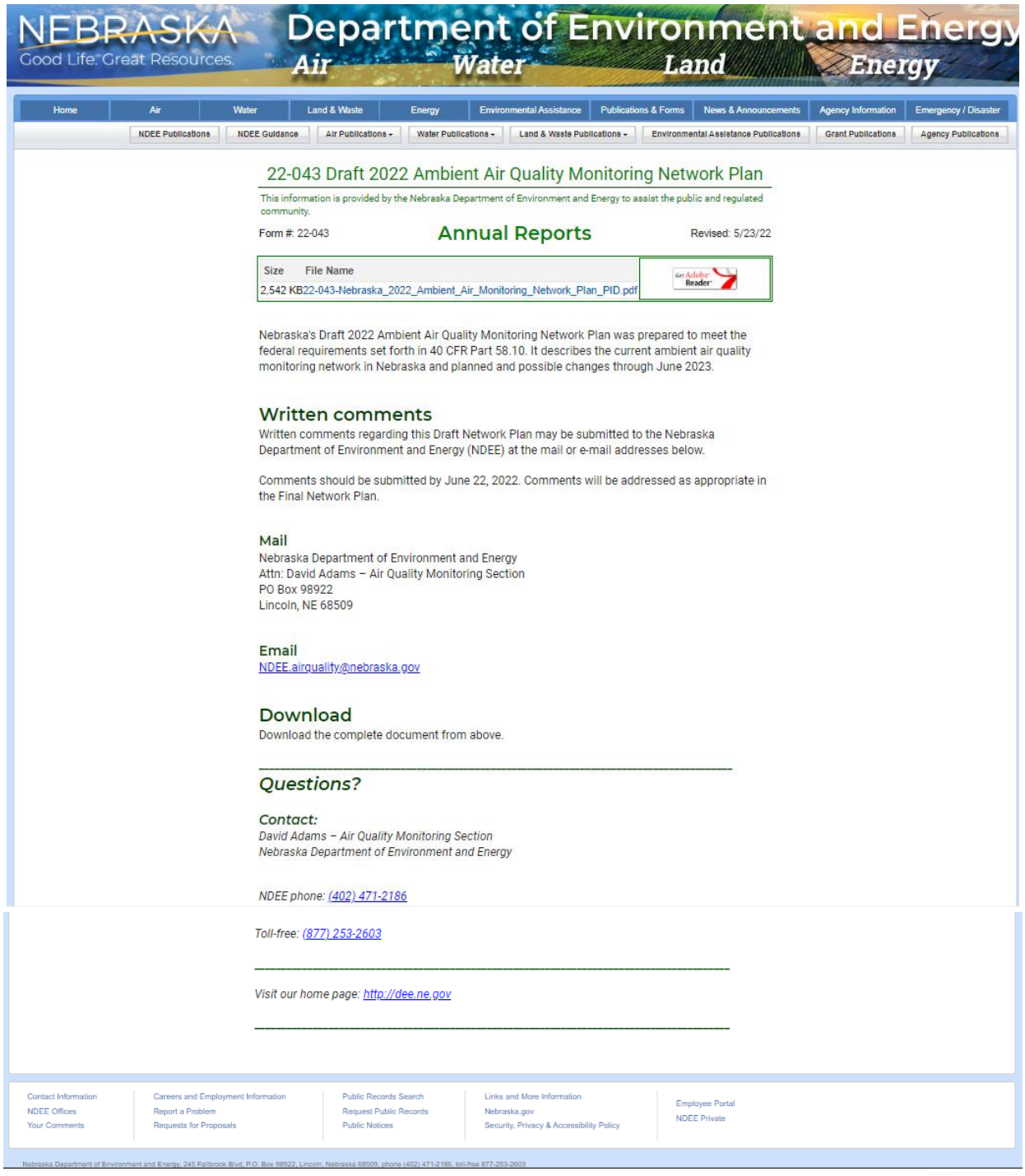

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Form #: 22-043

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|---|---|
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Attn: David Adams – Air Quality Monitoring Section
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