

Nebraska Department of Environment and Energy

2020 Ambient Air Monitoring Network Plan and 5-Year Assessment

NDEE Document #20-007

NEBRASKA



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Jim Macy, Director
May 18, 2020

Nebraska 2020 Ambient Air Monitoring Network Plan and 5-Year Assessment

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Executive Summary

This Nebraska 2020 Ambient Air Monitoring Network Plan and 5-Year Assessment was prepared to meet federal requirements set forth in 40 CFR Part 58.10. Nebraska's air quality monitoring network includes sites for the seven "criteria" air pollutants for which National Ambient Air Quality Standards (NAAQS) have been established: ozone, carbon monoxide, nitrogen oxides, sulfur dioxide, lead, PM₁₀, PM_{2.5}. Nebraska's measured pollutant levels are currently in attainment with the NAAQS for all of the criteria pollutants.

Most of Nebraska has a warm-summer or hot-summer humid continental climate. Air masses moving south across the northern Great Plains dominate in winter, bringing cold dry air from Canada. Summer weather is dominated by air masses moving northward, bringing warm dry air from Mexico and the desert southwest or warm humid air from the Gulf of Mexico and the Caribbean. Over most of the state these movements result in prevailing winds from the north to north-northwest in winter and from the south to south-southeast in summer. The state has a subdued topography, mostly forming a gently rolling surface that forms little impediment to the movement of air masses.

Nebraska is a largely rural state with relatively few large population centers. The most recent U.S. Census Bureau estimate of the state population (July 1, 2019) was 1,934,408. Large numbers of state residents are concentrated in urban areas: over 55% of the population resides in the three most populous counties (Douglas and Sarpy in the Omaha metropolitan area and Lancaster in the Lincoln metropolitan area). Over the past decade Nebraska's population has become increasingly concentrated in the more populous urbanized counties. Air pollutant emissions from industrial facilities and mobile sources in Nebraska show overall downward trends over the last two decades.

Nebraska's Ambient Air Quality Monitoring network is operated by the Nebraska Department of Environment and Energy (NDEE) and two local agencies: the Douglas County Health Department (DCHD) and the Lincoln-Lancaster County Health Department (LLCHD). DCHD operates 9 sites in the Omaha-Council Bluffs Metropolitan Statistical Area (MSA; Douglas, Sarpy, and Washington Counties). One of the Omaha sites is Nebraska's National Core Multipollutant Monitoring Network (NCore) site. LLCHD operates 3 sites in Lancaster County (Lincoln MSA). NDEE operates 3 sites in other areas of Nebraska. Nebraska's air quality monitoring network currently meets or exceeds all federal requirements for the minimum number of monitors. The current distribution of Nebraska's monitoring sites by pollutant is summarized below.

| Summary of Nebraska Air Quality Monitoring Sites by Pollutant (including NCore) | | | | | |
|---------------------------------------------------------------------------------|-------------------|-------------------|----------------------|---------------------|-------|
| | DCHD Omaha MSA | NDEE Omaha MSA | LLCHD Lincoln MSA | NDEE Other Areas | Total |
| Ozone | 3 | 0 | 1 | 0 | 4 |
| Carbon Monoxide | 2 | 0 | 0 | 0 | 2 |
| Nitrogen Oxides | 1 | 0 | 0 | 0 | 1 |
| Sulfur Dioxide | 3 | 0 | 1 | 0 | 4 |
| PM ₁₀ | 3 | 1 | 0 | 0 | 4 |
| PM _{2.5} | 4 | 0 | 1 | 2 | 7 |
| PM _{10-2.5} | 1 | 0 | 0 | 0 | 1 |
| PM _{2.5} Speciation | 1 | 0 | 0 | 0 | 1 |
| Lead | 0 | 0 | 0 | 1 | 1 |
| Total Pollutant Sites | 18 | 1 | 3 | 3 | 25 |

Short-Term Network Changes

Analysis of the monitoring networks for each of the criteria pollutants indicates that few changes are needed in Nebraska's air quality monitoring network in the short term. The Nebraska Department of Environment and

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Energy seeks approval from EPA Region 7 for the following recent or upcoming changes in Nebraska's air quality monitoring network.

- Relocation of the Grand Island PM_{2.5} monitoring site necessitated by replacement of the filter-based monitor with a continuous monitor (see section VI.E).
- Removal of the Sheldon Station (Lancaster County) Source-Oriented SO₂ Monitor as allowed by the 2010 SO₂ NAAQS Data Requirements Rule (see section XI-A).
- Removal of the North Omaha Station (Douglas County) Source-Oriented SO₂ Monitor as allowed by 2010 SO₂ NAAQS Data Requirements Rule (see section XI-B).

In addition, NDEE plans to replace the current filter-based PM_{2.5} monitor at Blair, Nebraska with a continuous monitor (see section IX).

Long-Term Planning for Additional Monitoring in the Omaha-Council Bluffs MSA

The population of the Omaha-Council Bluffs MSA increased by about 9,340 people per year on average between 2010 and 2019, based on U.S. Census Bureau annual population estimates. At this rate of growth, the population of the Omaha-Council Bluffs MSA would surpass 1,000,000 in 2024 or 2025. 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. Potential additional monitoring requirements in the Omaha-Council Bluffs MSA would include:

- Establish a Photochemical Assessment Monitoring Station (PAMS) at the Omaha NCore site for enhanced monitoring of ozone, oxides of nitrogen (NO_x), and volatile organic compounds, and meteorology to obtain more comprehensive and representative data on ozone air pollution.
- Establish a near-road nitrogen dioxide (NO₂) monitor near a road with high average daily traffic counts. DCHD currently operates a near-road, high-concentration carbon monoxide (CO) site that would likely be a suitable location for a near-road NO₂ monitor.
- Establish an area-wide NO₂ monitoring site in a high-concentration area. Adding a PAMS site at Omaha NCore would satisfy this requirement if the NO₂ monitor were operated year-round.
- Collocation of a CO monitor with a required near-road NO₂ monitor. This requirement would be satisfied by utilizing the current Omaha near-road CO site as the near-road NO₂ monitor site.

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 SO₂ 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}), O₃, SO₂, 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

- 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 SO₂ monitoring requirements)

2015 Network Plan - Nebraska's *2015 Ambient Air Monitoring Network Plan & 5-Year Assessment*

2019 Network Plan – *Nebraska's 2019 Ambient Air Monitoring Network Plan*

Concentration Units

- ppb - Parts per billion (a volume/volume concentration unit)
- ppm - Parts per million (a volume/volume concentration unit)
- mg/m³ - Milligrams per cubic meter (a mass/volume concentration unit)
- µg/m³ - Micrograms per cubic meter (a mass/volume concentration unit)

Acronyms, Abbreviations, and Definitions (continued)

Pollutants

| | | |
|----------------------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CO | - | Carbon Monoxide |
| NO | - | Nitrogen Oxide |
| NO ₂ | - | Nitrogen Dioxide |
| NO _y | - | Total reactive oxides of nitrogen. The parameter NO _y – NO measured at NCore sites approximates the concentration of NO ₂ , but may be higher. |
| O ₃ | - | Ozone |
| Pb | - | Lead |
| TSP-Pb | - | Lead sampled using a TSP sampler |
| PM _{2.5} | - | Particulate matter with a diameter equal to or less than 2.5 micrometers or microns (reported as µg/m ³ with air volumes measures at local conditions) |
| PM ₁₀ | - | Particulate matter with a diameter equal to or less than 10 micrometers or microns (reported as µg/m ³ with air volumes measures at standard conditions (25° 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 |
| 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. PM₁₀ and CO, on the other hand, are largely emitted from sources; *in situ* formation being of minimal importance. NO_x and SO_x are emitted and then undergo transformations to NO₂ and SO₂; 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 2020 Ambient Air Monitoring Network Plan and 5-Year Assessment (hereafter referred to as the “2020 Network Plan and Assessment” 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 are met;
- 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.

In addition, 40 CFR Part 58.10(d) requires states to submit to the EPA Regional Administrator an assessment of the air quality surveillance system every five years to determine, at a minimum, if the network meets the monitoring objectives defined in 40 CFR Part 58, Appendix D, whether new sites are needed, whether existing sites are no longer needed and can be terminated, and whether new technologies are appropriate for incorporation into the ambient air monitoring network. The 5-year assessment may be combined with the annual ambient air monitoring network plan. This document is intended to meet both requirements.

As part of the network assessment, this document reviews background information relevant to the efficacy of Nebraska’s ambient air quality network, including topography, climate, population distribution and trends, and historic trends in emissions of air pollutants.

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). During the 30-day inspection period, written comments regarding this 2020 Network Plan and Assessment may be submitted to the Nebraska Department of Environment and Energy (NDEE) as provided below:

Mail:

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

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.

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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, considered harmful to public health and the environment, and that come from numerous and diverse sources. Standards have been established for seven “criteria” air pollutants: carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), ozone (O₃), lead (Pb), particulate matter less than 10 microns in diameter (PM₁₀), and particulate matter less than 2.5 microns 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 (µg/m³).

| 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 µg/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 ppb ⁽³⁾ | Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years |
| Particle Pollution (PM) | PM _{2.5} | Primary | 1 year | 12.0 µg/m ³ | Annual mean, averaged over 3 years |
| | | Secondary | 1 year | 15.0 µg/m ³ | Annual mean, averaged over 3 years |
| | | Primary and Secondary | 24 hours | 35 µg/m ³ | 98 th percentile, averaged over 3 years |
| | PM ₁₀ | Primary and Secondary | 24 hours | 150 µg/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 µg/m³ as a calendar quarter average) also remain in effect.

(2) The level of the annual NO₂ 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. The previous (2008) O₃ standards additionally remain in effect in some areas. Revocation of the previous (2008) O₃ standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.

(4) The previous SO₂ 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 1 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 SO₂ standards or is not meeting the requirements of a SIP call under the previous SO₂ 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.

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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.

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 monitored 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 tabulated 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 Topography, Climate, Population, and Pollutant Emissions

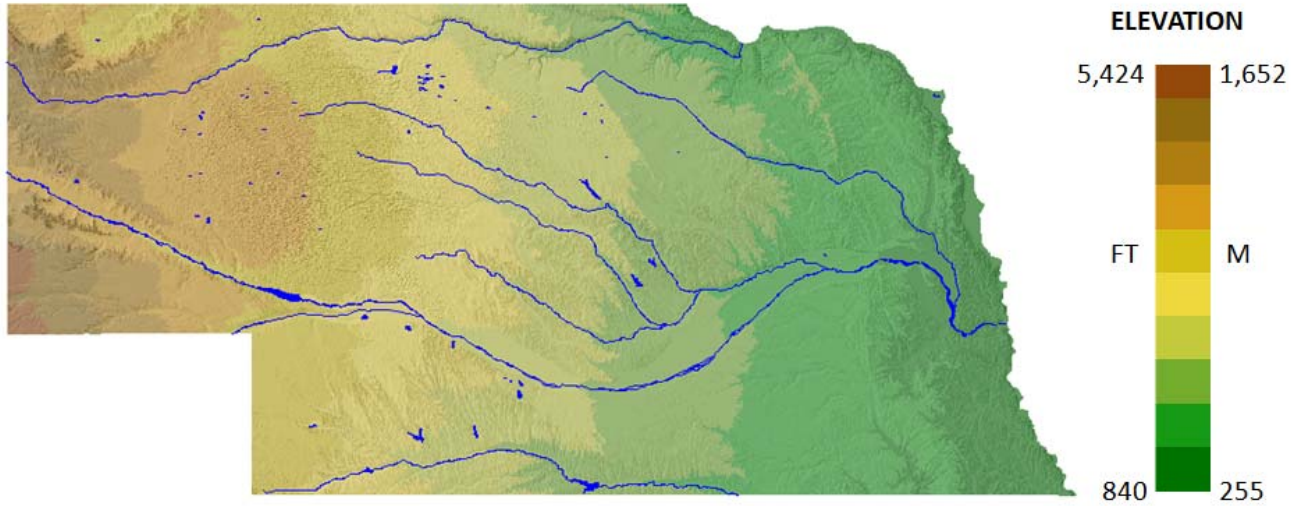
A. Topography

Nebraska lies in the heart of the Great Plains physiographic province. This low-relief surface slopes gently eastward from the Rocky Mountains toward the interior lowlands. Elevations in Nebraska range from 4,000 to over 5,000 feet along the western border to 840 to 1,100 feet in the Missouri River valley, which forms the eastern border of the state (see Figure IV-1). The Niobrara, Platte, and Republican rivers flow eastward in broad open valleys across the state toward the Missouri River.

Much of the Nebraska is an erosional surface variably dissected by streams. Plains, dissected plains, and rolling hills make up much of the state, with the sandhills covering a large area in north-central Nebraska (see Figure IV-2). Although there are some prominent buttes and escarpments in western Nebraska, most of the state is a gently rolling surface that forms little impediment to the movement of air masses across it.

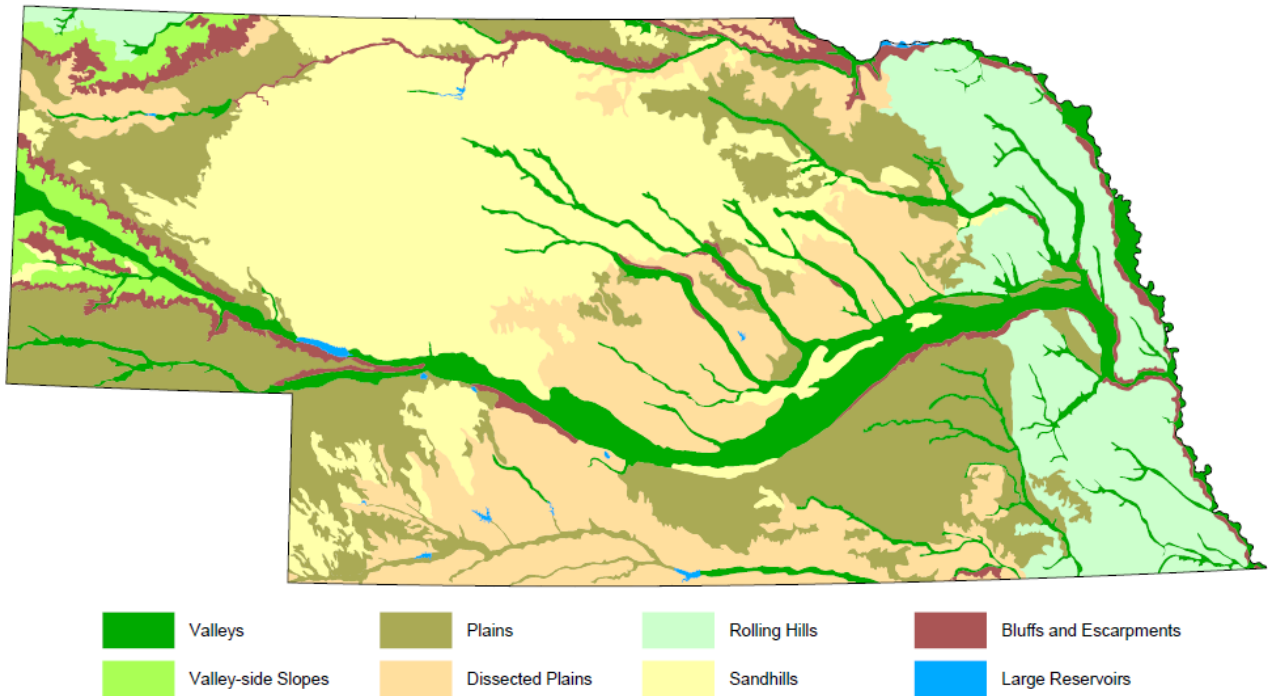
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Figure IV-1. Color Shaded Relief Map of Nebraska*



* Created from 30-meter digital elevation model provided by the U.S. Geological Survey.

Figure IV-2. Topographic Regions of Nebraska*



* Map data from Conservation and Survey Division/Institute of Agriculture and Natural Resources, University of Nebraska-Lincoln.

B. Climate

Nebraska's central position in the interior of North America places it in a climate crossroads. The state is affected by several air masses that have different origins and very different temperature and moisture properties. Air masses moving south across the northern Great Plains dominate in winter, bringing cold dry air from Canada (see Figure IV-3 below). Summer weather is dominated by air masses moving northward, bringing warm dry air from Mexico and the desert southwest or warm humid air from the Gulf of Mexico

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and the Caribbean. Cold or warm air masses originating in the Pacific Ocean also move eastward into the Great Plains, but much of the moisture carried by them is extracted during their transit across the Rocky Mountains.

Figure IV-3. Source Areas of Major Air Masses Affecting Nebraska

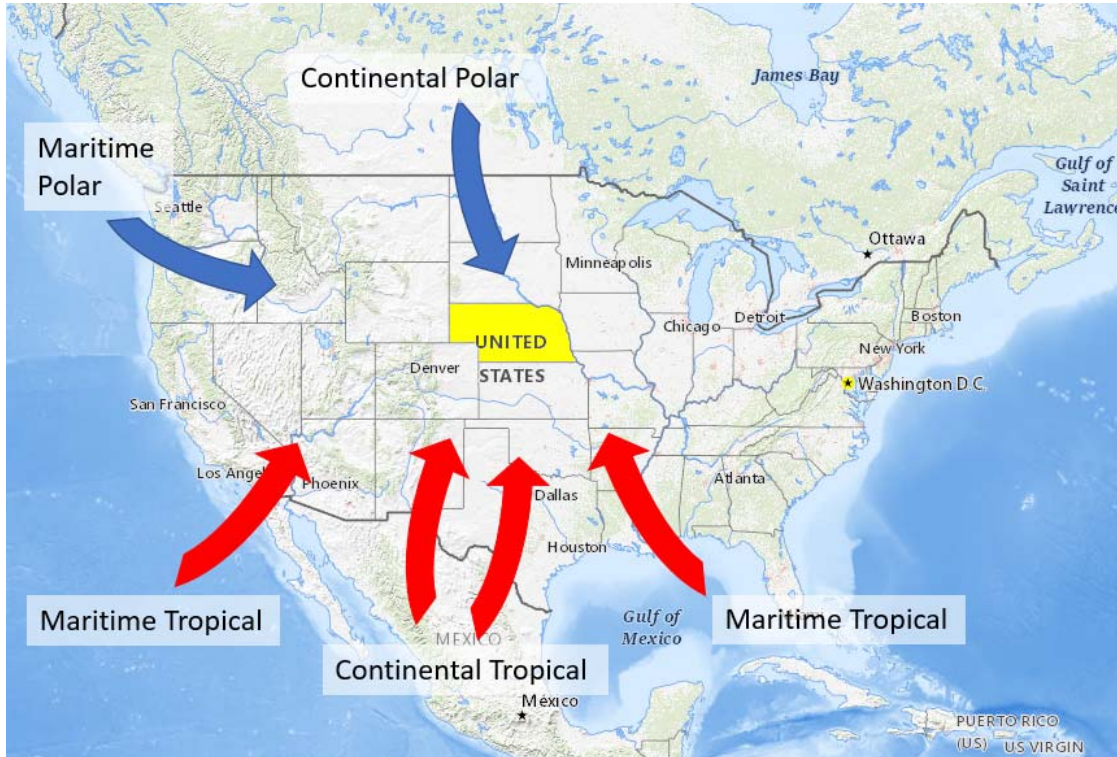


Figure IV-4. Köppen-Geiger Climate Zones in the Nebraska Region*



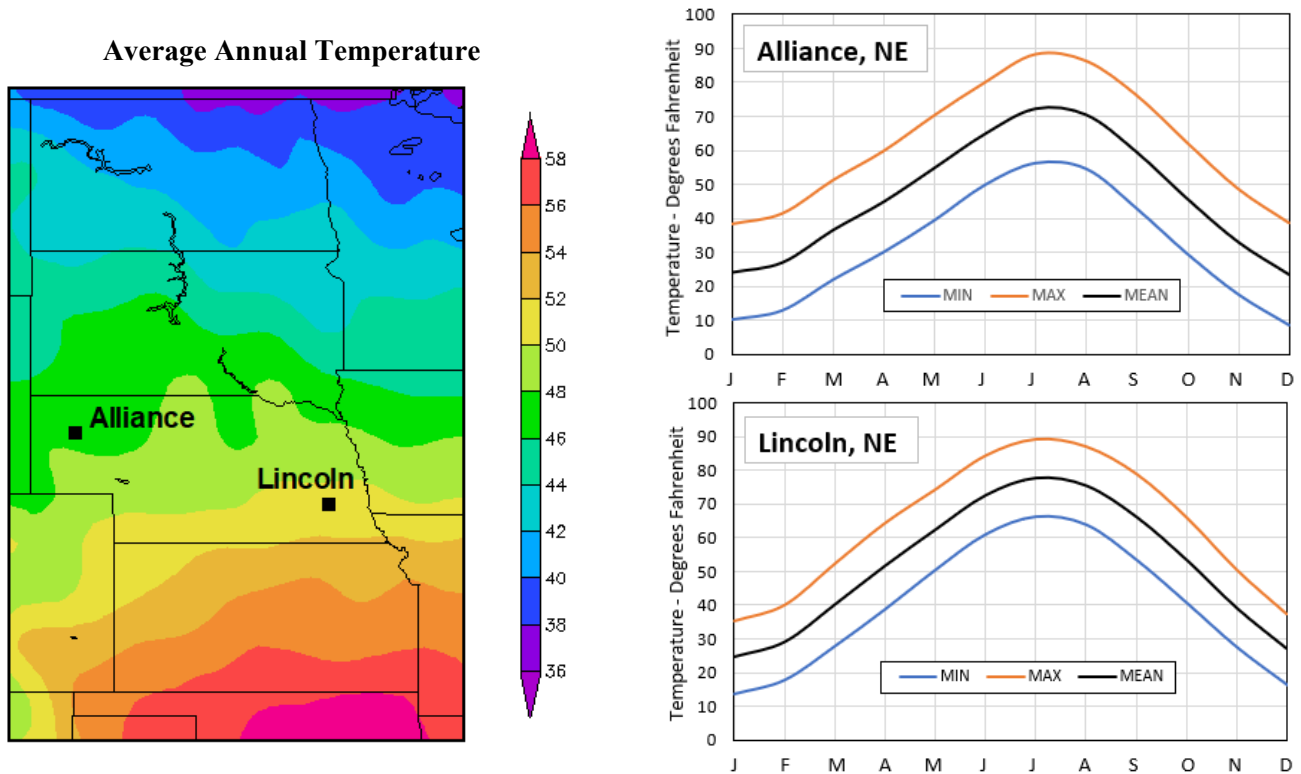
* Kottke, M., J. Grieser, C. Beck, B. Rudolf, and F. Rubel, 2006: World Map of the Köppen-Geiger climate classification updated. Map data accessed from <http://koepfen-geiger.vu-wien.ac.at/present.htm>.

As a result of the influence of these contrasting air masses, portions of Nebraska fall into different climate zones (Figure IV-4). Most of the state has a warm-summer or hot-summer humid continental climate. The southernmost portion of the state is more influenced by warm, humid air masses from the south and is on the northern edge of the humid subtropical climate zone. The higher-elevation areas in the Nebraska panhandle and the far southwest are in the rain-shadow of the Rocky Mountains and have a cold semi-arid climate.

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Average annual temperatures in Nebraska range from 52° Fahrenheit near the southeastern border to 47° in the northwest (Figure IV-5). However, because of its location in the dry interior of the continent, all portions of the state show extreme variation in temperatures from summer to winter. Monthly temperature normals for southeastern (Lincoln) and northwestern (Alliance) Nebraska are shown in Figure IV-5. Over the period from 1981-2010, mean temperatures in July and August were in the upper 70s in Lincoln and in the lower 70s in Alliance, while mean January temperatures were about 24° in both locations. The more humid southeastern portion of the state shows a lower spread of normal minimum and maximum temperatures around the monthly mean (about 10°) than the drier panhandle region (about 15°).

Figure IV-5. Regional Average Annual Temperature Map and 30-year (1981-2010) Monthly Temperature Normals for Alliance and Lincoln, Nebraska



Map from High Plains Regional Climate Center
<https://hprcc.unl.edu/online dataservices.php#mapsGraphs>

Data from National Oceanic and Atmospheric Administration National Centers for Environmental Information

Most of Nebraska averages 40 to 45 days per year with temperatures above 90°, with lower values (as low as 32 days per year) in the northeastern part of the state. The average number of days per year with minimum temperatures below freezing increases from southeast (about 140 days per year) to northwest (about 175 days per year).

Precipitation is also unevenly distributed in the state. Average annual precipitation ranges from over 32 inches per year in the southeast corner to less than 16 inches per year in parts of far western Nebraska (see Figure IV-6).

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Figure IV-6. Map of Annual Average Precipitation in Nebraska, 1981-2010

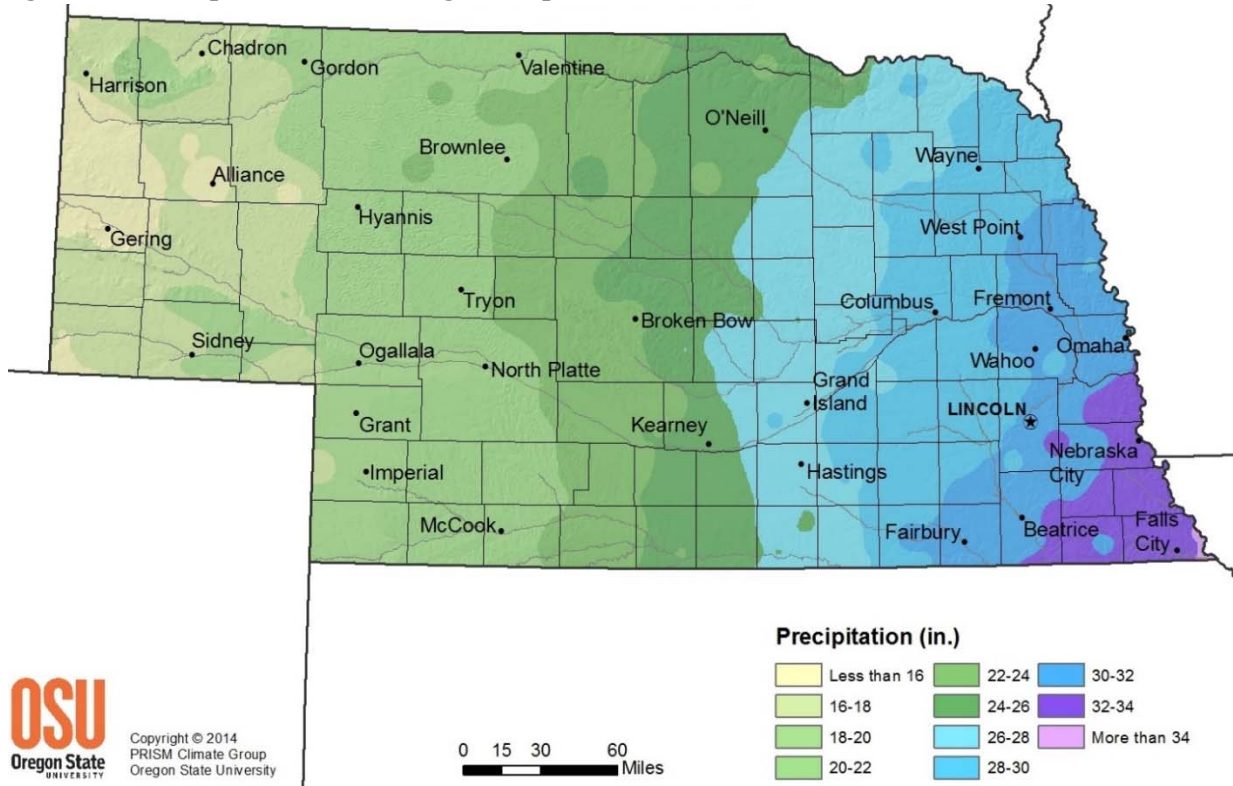
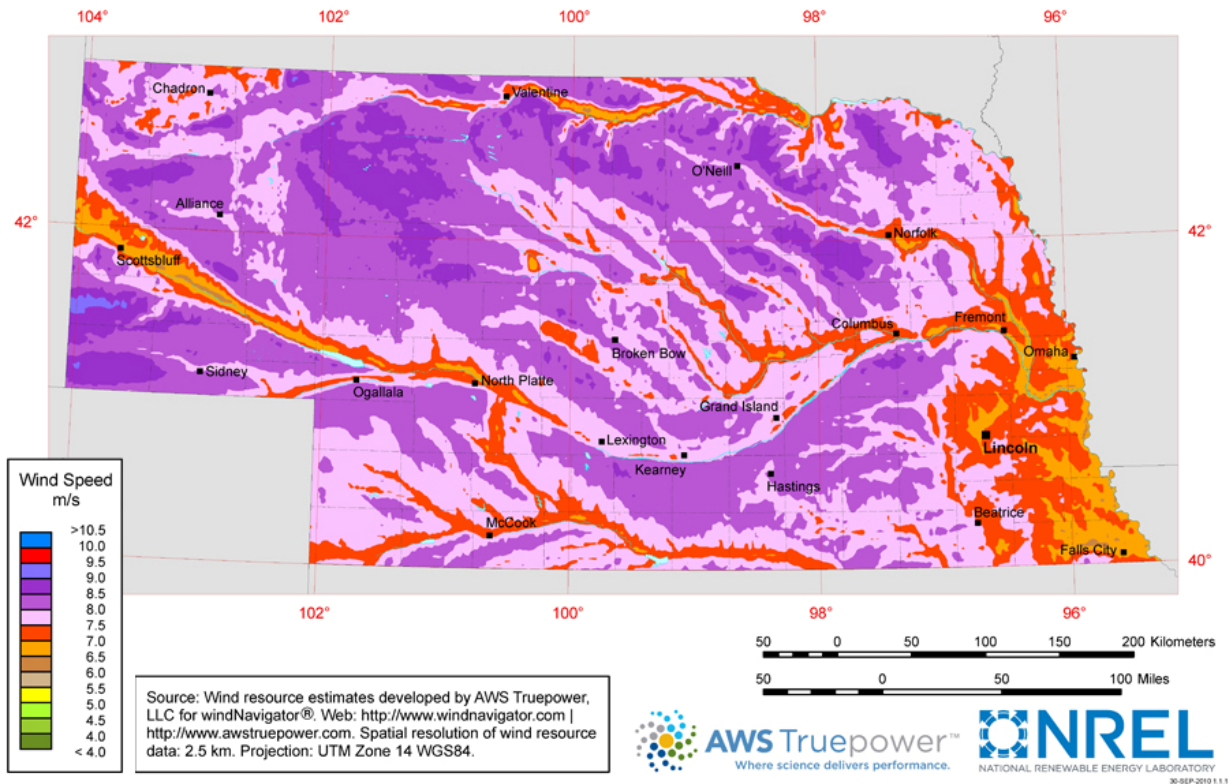


Figure IV-7. Nebraska Annual Average Wind Speed at 80 meters Above the Surface

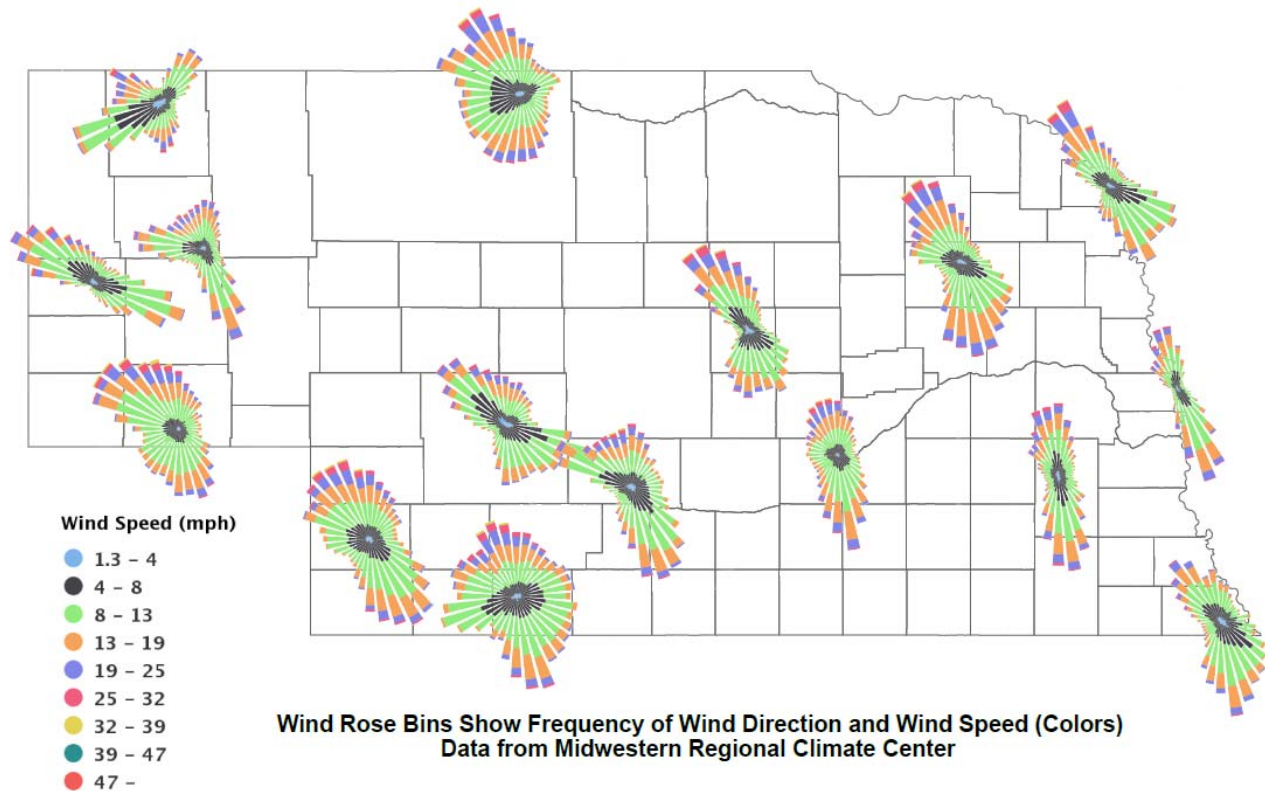


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The Great Plains region is known for its strong winds, and Nebraska is no exception. Figure IV-7 is a map of average annual wind speeds at 80 meters above the surface. Widespread upland areas between the main river valleys exhibit annual average wind speeds between 7.5 and 9.0 meters/second.

Figure IV-8 shows wind roses for a number of locations across Nebraska for a five-year period (2014 through 2018). Locations in the eastern half of the state experience two prevailing wind directions, from the north to northwest and from the south to southeast. Locations in southwestern and north-central Nebraska are also strongly influenced by these wind directions but with increased frequency of other wind directions. Locations in the northern panhandle exhibit variable winds including a high frequency of winds from the southwest, west, and northwest.

Figure IV-8. Wind Roses for Representative Nebraska Locations*

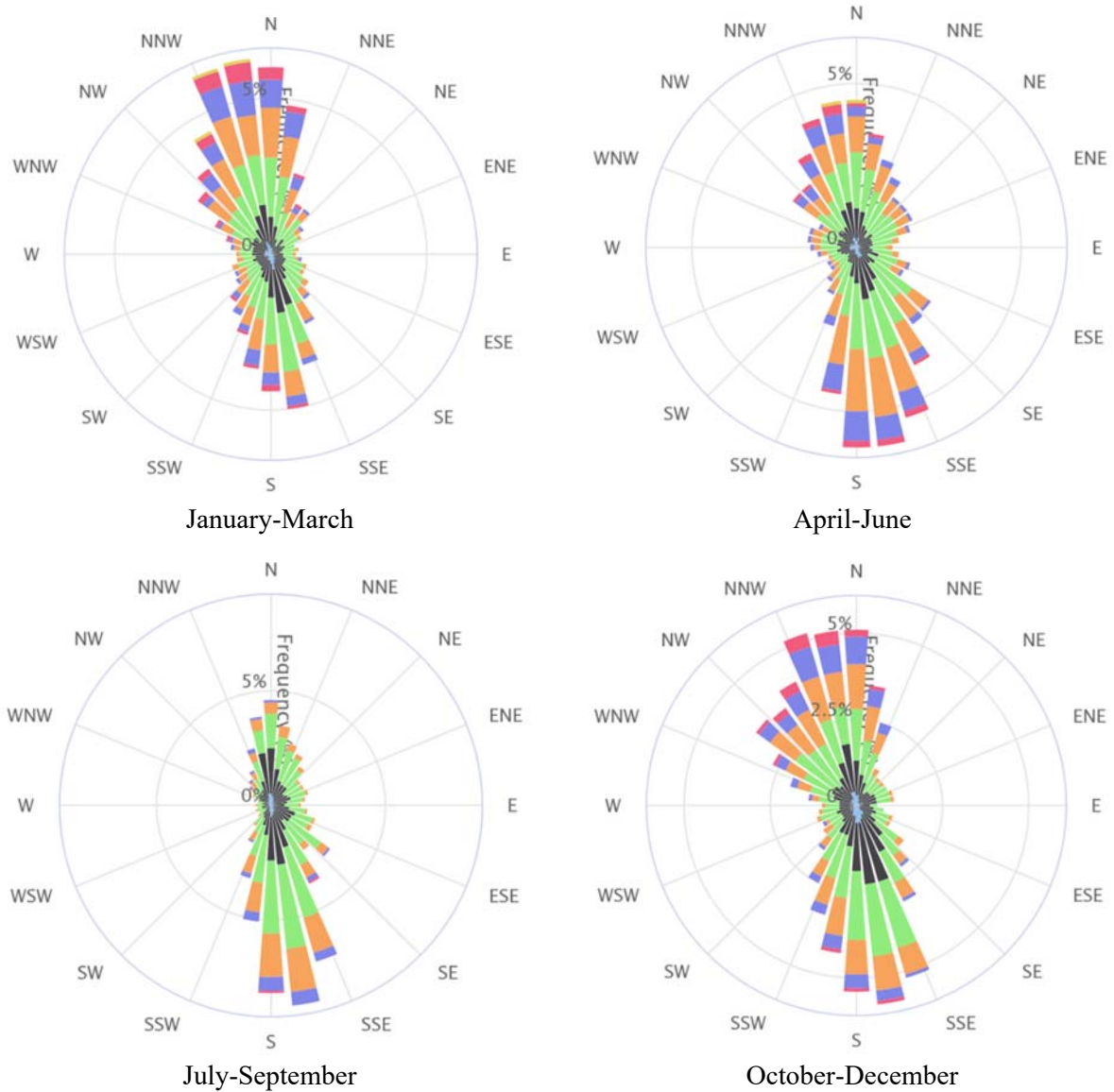


* Full-year hourly data, 1 January 2014 through 31 December 2018.

Prevailing wind directions vary greatly with the season, reflecting the seasonal movement of northern and southern air masses. Figures IV-9 and IV-10 show seasonal wind roses for Lincoln and Alliance, respectively. In Lincoln prevailing winds are from the south to south-southeast in the summer months but in the fall are matched in frequency by winds from the north to north-northwest. Winter shows a higher frequency of north to north-northwest winds but still with a significant component of southerly winds.

In Alliance, summer winds show a similar pattern to that of Lincoln, with prevailing winds from the south to south-southeast. However, the winter, fall, and to lesser extent spring roses show the strong influence of westerly winds. These patterns show the effect of Chinook winds originating along the eastern slopes of the Rocky Mountains as arctic fronts retreat to the east. Air descending the mountain front and down the slope of the high plains warms with increasing pressure and can attain very high speeds.

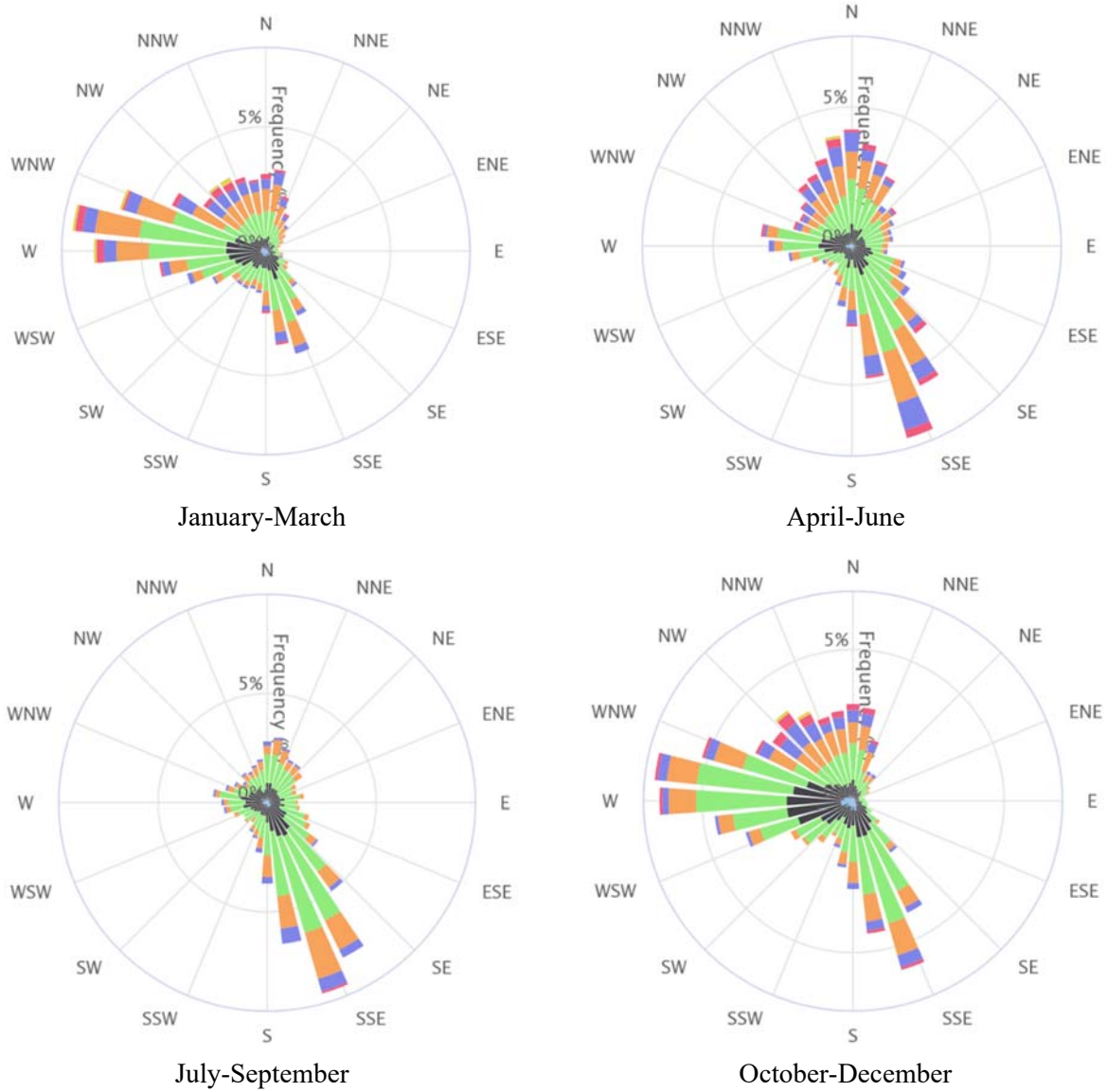
Figure IV-9. Seasonal Wind Roses for Lincoln, Nebraska



* Full-year hourly data, 1 January 2014 through 31 December 2018.

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Figure IV-10. Seasonal Wind Roses for Alliance, Nebraska

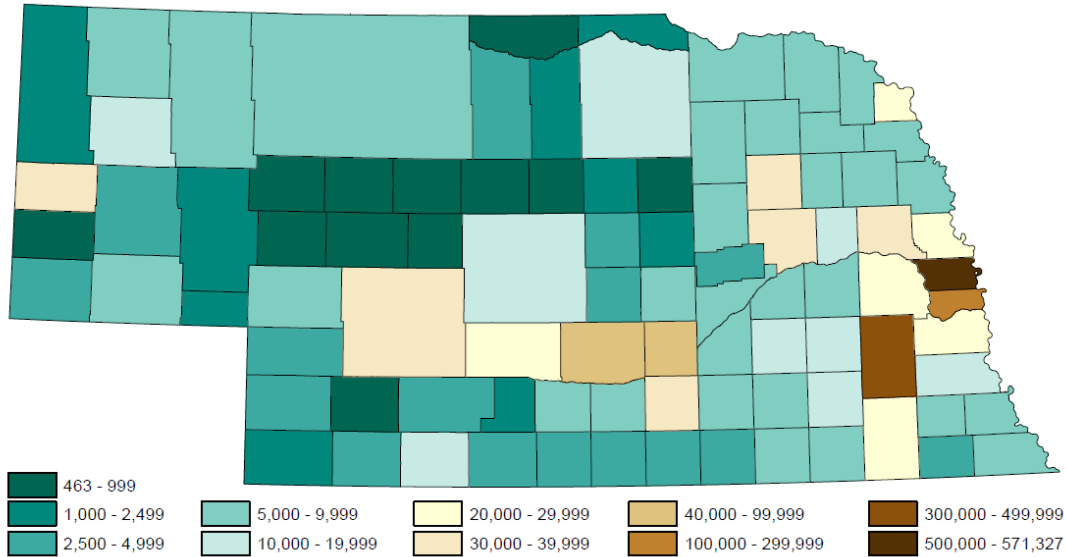


* Full-year hourly data, 1 January 2014 through 31 December 2018.

C. Population Distribution and Trends

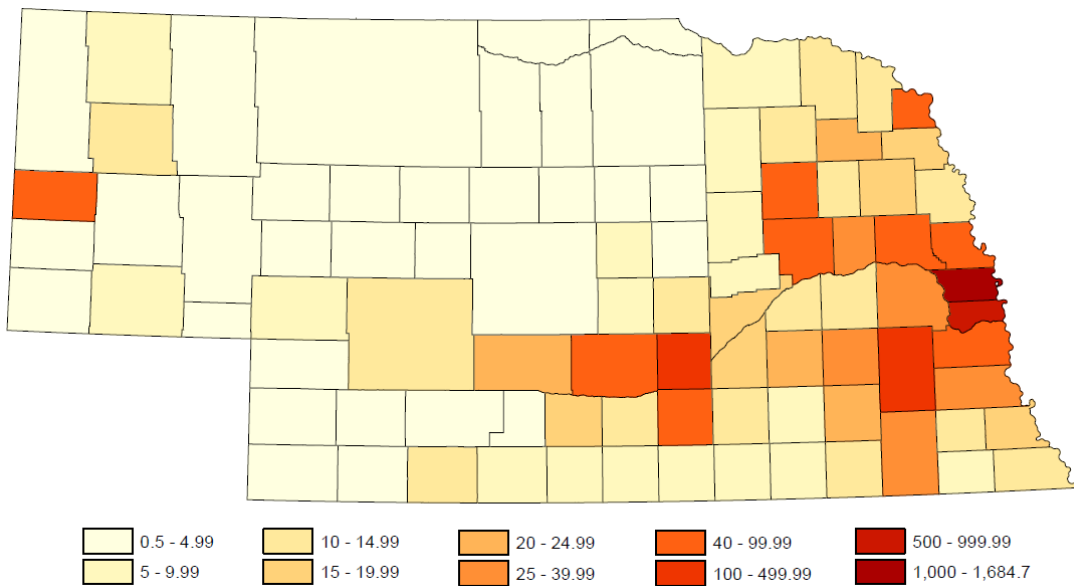
Nebraska is a largely rural state with relatively few large population centers. The state population at the last decennial census in 2010 was 1,826,341. The U.S. Census Bureau estimates that by July 1, 2019 the state population had grown to 1,934,408. Large numbers of state residents are concentrated in urban areas: over 55% of the population resides in the three most populous counties (Douglas and Sarpy in the Omaha metropolitan area and Lancaster in the Lincoln metropolitan area). The uneven population distribution is illustrated in the maps of county population (Figure IV-11) and county population density (Figure IV-12) below.

Figure IV-11. Estimated Nebraska County Populations as of 7/1/2019*



* Population estimates from the U.S. Census Bureau, retrieved 4/2020.

Figure IV-12. Estimated Nebraska County Population Densities* as of 7/1/2019

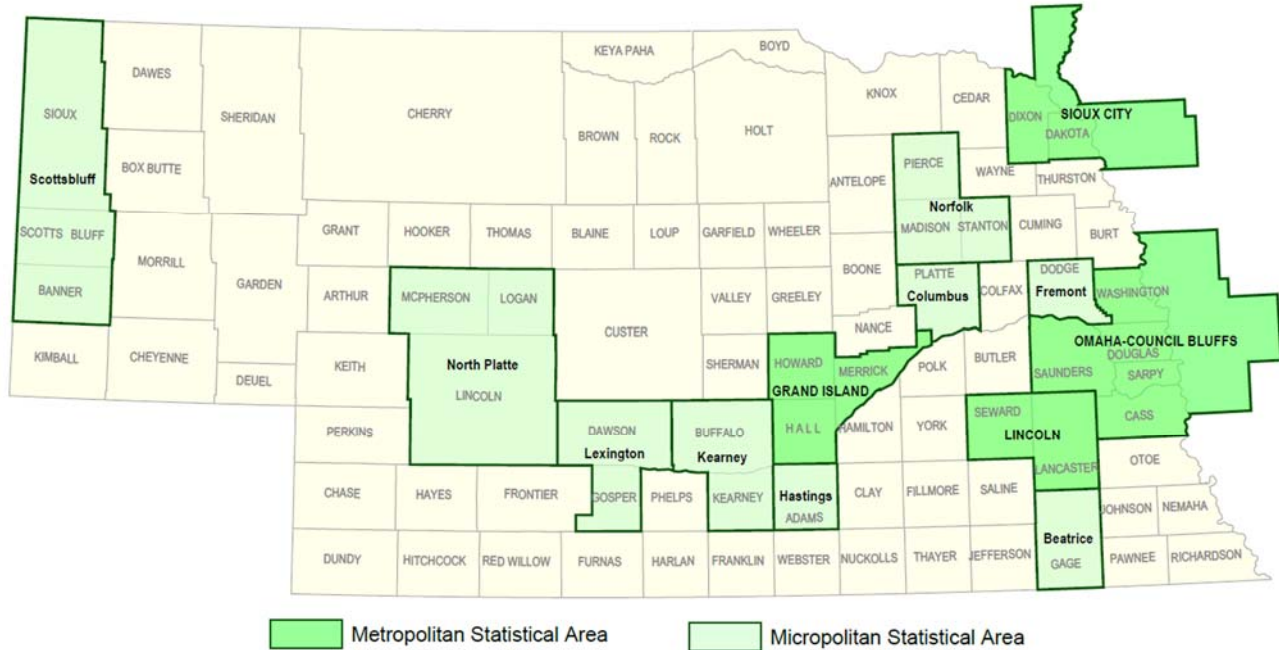


* Population Densities in Persons per square mile

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Nebraska includes all or part of four Metropolitan Statistical Areas (MSAs) along with nine Micropolitan Statistical Areas (MiSAs). Each of these federally-defined urbanized units consists of one or more entire counties (see Appendix C). A map of Nebraska’s MSAs and MiSAs is shown in Figure IV-13 below, and their 2019 estimated populations are shown in Table IV-1 below. Population details for the MSAs and MiSAs can be found in Appendix C.

Figure IV-13. Nebraska Metropolitan and Micropolitan Statistical Areas (MSAs and MiSAs)*



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

| Area | Population | NE Population | NE % CBSA ² | % NE ³ | Cum % NE ⁴ |
|-------------------|------------|---------------|------------------------|-------------------|-----------------------|
| Nebraska | 1,934,408 | 1,934,408 | na | 100% | na |
| Omaha-C.B. MSA | 949,442 | 827,078 | 87.1% | 42.8% | 42.8% |
| Lincoln MSA | 336,374 | 336,374 | 100% | 17.4% | 60.1% |
| Grand Island MSA | 75,553 | 75,553 | 100% | 3.9% | 64.1% |
| Sioux City MSA | 169,878 | 25,662 | 15.1% | 1.3% | 65.4% |
| Kearney MiSA | 56,154 | 56,154 | 100% | 2.9% | 68.3% |
| Norfolk MiSA | 48,167 | 48,167 | 100% | 2.5% | 70.8% |
| Scottsbluff MiSA | 37,529 | 37,529 | 100% | 1.9% | 72.7% |
| Fremont MiSA | 36,565 | 36,565 | 100% | 1.9% | 74.6% |
| North Platte MiSA | 36,156 | 36,156 | 100% | 1.9% | 76.5% |
| Columbus MiSA | 33,470 | 33,470 | 100% | 1.7% | 78.2% |
| Hastings MiSA | 31,363 | 31,363 | 100% | 1.6% | 79.8% |
| Lexington MiSA | 25,585 | 25,585 | 100% | 1.3% | 81.1% |
| Beatrice MiSA | 21,513 | 21,513 | 100% | 1.1% | 82.3% |

¹ Estimated population on 7/1/2019 from U.S. Census Bureau.
² Percent of the MSA population contributed by Nebraska counties.
³ % NE refers to the percent of total Nebraska population contributed by residents in each MSA or MiSA.
⁴ Cum % NE refers to the cumulative sum of the % NE column. Thus 60.1% of Nebraska’s residents live in the Omaha and Lincoln MSAs, while 82.3% live in an MSA or MiSA.

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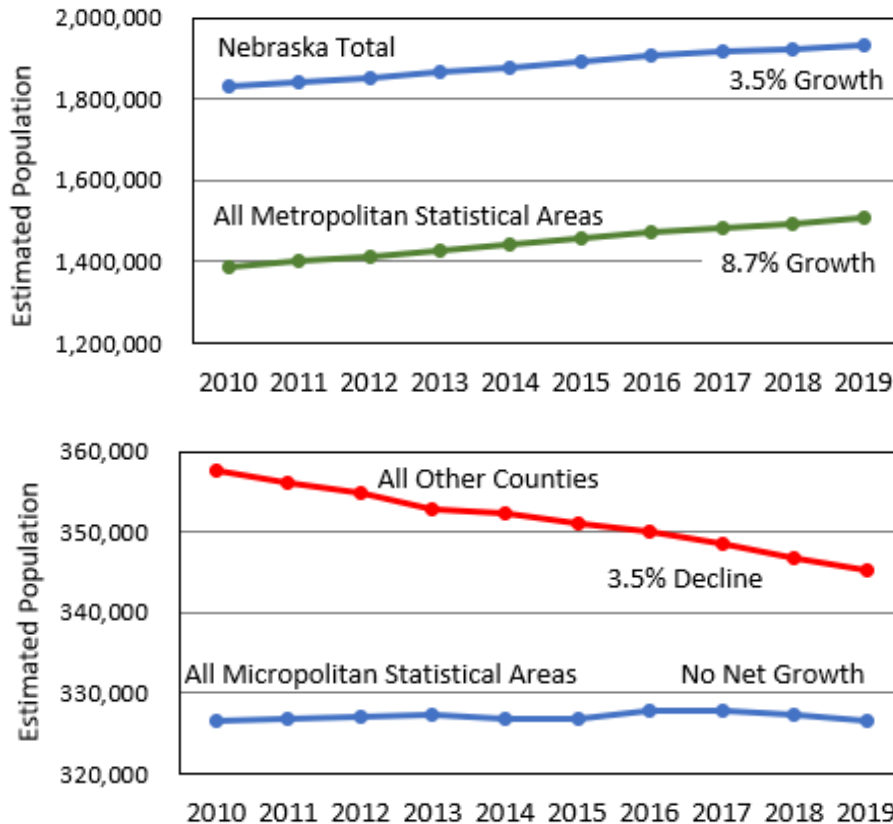
Out of Nebraska’s 93 counties, 12 are part of an MSA and 17 are part of an MiSA. The counties in the four MSAs included over 65% of the state’s population in 2019, and those in the MiSAs included an additional 17%. The 62 Nebraska counties outside of these urbanized areas have only an 18% share of the state’s population.

Table IV-2. Metropolitan and Rural Area Population Trends 2010-2019*

| | Nebraska Total | All Metropolitan Statistical Areas | All Micropolitan Statistical Areas | All Other Counties |
|----------|----------------|------------------------------------|------------------------------------|--------------------|
| 2010 | 1,829,542 | 1,385,148 | 326,562 | 357,778 |
| 2011 | 1,840,672 | 1,400,359 | 326,797 | 356,160 |
| 2012 | 1,853,303 | 1,412,844 | 327,001 | 354,923 |
| 2013 | 1,865,279 | 1,426,242 | 327,420 | 352,794 |
| 2014 | 1,879,321 | 1,441,799 | 326,814 | 352,278 |
| 2015 | 1,891,277 | 1,455,218 | 326,924 | 351,161 |
| 2016 | 1,905,616 | 1,470,282 | 327,737 | 350,062 |
| 2017 | 1,915,947 | 1,481,583 | 327,779 | 348,605 |
| 2018 | 1,925,614 | 1,494,033 | 327,185 | 346,914 |
| 2019 | 1,934,408 | 1,506,070 | 326,502 | 345,229 |
| % Growth | 5.7% | 8.7% | 0.0% | -3.5% |

* Mid-year population estimates from U.S. Census Bureau

Figure IV-14. Population Trends for Urban and Rural Areas 2010-2019*



* Mid-year population estimates from U.S. Census Bureau

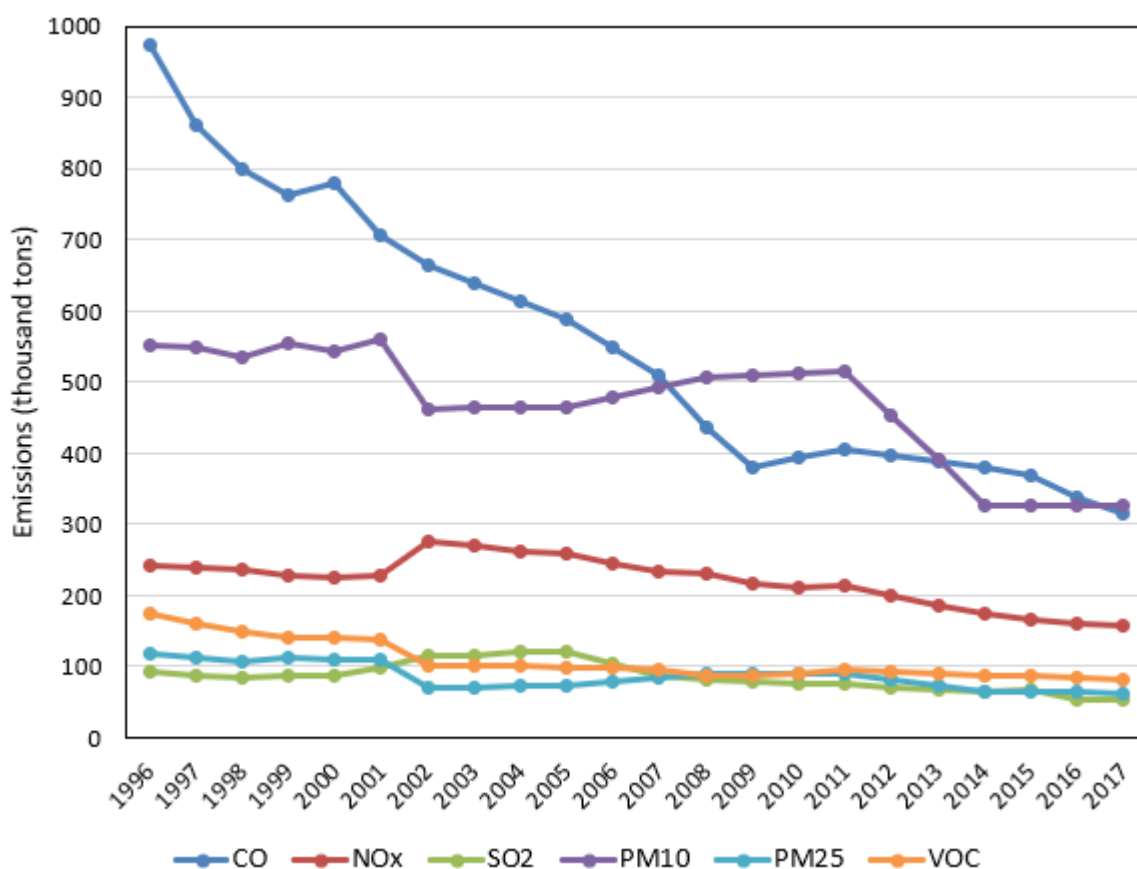
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Table IV-2 and Figure IV-14 on the previous page show trends in estimated population in Nebraska from 2010 through 2019. During this period the total state population grew 3.5%, but that growth was not evenly distributed. Aggregate population growth in the four MSAs was 8.7%, while there was negligible aggregate growth in the nine MiSAs. Counties outside these urbanized areas experienced an aggregate 3.5% decline in population. These figures show that Nebraska’s population is becoming increasingly concentrated in the more populous urbanized counties.

D. Air Pollutant Emissions in Nebraska

Figure IV-15 shows trends in air pollutant emissions in Nebraska from 1996 through 2017 using data and modeling from EPA’s 2014 National Emissions Inventory. The annual estimates for each pollutant are based on reported emissions from larger industrial facilities, estimated emissions from smaller facilities that are not required to report emissions, and modeling of emissions from mobile sources (highway vehicles and non-road vehicles and equipment). The data for all of these pollutants show overall downward trends in emissions over this period.

Figure IV-15. Trends in Air Pollutant Emissions in Nebraska, 1996-2017*



* Data for criteria pollutants and precursors from EPA National Emissions Inventory 2014: <https://www.epa.gov/air-emissions-inventories/air-pollutant-emissions-trends-data>. VOC = Volatile Organic Compounds; NOx = oxides of nitrogen.

Several of the criteria air pollutants are byproducts of fuel combustion at electric power plants, industrial facilities, and mobile sources. Carbon monoxide (CO) is a colorless and odorless gas formed when carbon in fuel is not burned completely. Breathing air with a high concentration of CO reduces the amount of oxygen that can be transported in the bloodstream to critical organs like the heart and brain. Much of the

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dramatic decrease in CO emissions since 1996 is the result of stricter vehicle emissions standards and resulting emission controls.

Sulfur dioxide (SO₂) is formed from burning coal or fuel oil containing sulfur. Coal-fired electric power plants are its largest source. SO₂ dissolves in water vapor to form sulfuric acid, which in high concentrations can irritate the human respiratory system and can contribute to acid rain that damages plant foliage. It can also react with other compounds in the air to form small particles that contribute to particulate matter pollution and atmospheric haze that reduces visibility.

Nitrogen dioxide (NO₂) is the indicator pollutant for a family of nitrogen oxides (NO_x) that are formed by burning of fuels at high temperature. NO₂ forms from emissions from cars, trucks and buses, power plants and industrial boilers, and off-road equipment. It is an irritant that can aggravate respiratory diseases, including asthma. NO₂ and other NO_x react with other chemicals in the air to form both particulate matter and ozone, which are also harmful when inhaled due to effects on the respiratory system. NO_x compounds can also react with water vapor to form acid droplets that contribute to acid rain and reduced visibility.

Ground level ozone (O₃) is a criteria pollutant that is not directly emitted. Ozone is formed in the atmosphere from NO_x and volatile organic compounds (VOC) in the presence of sunlight, which necessitates the tracking of VOC emissions. Volatile organic compounds are produced by fuel combustion (vehicles and industrial sources), gasoline vapors, and chemical solvents and paints. Ozone is produced primarily on hot sunny days in urban environments, but it can be transported long distances by wind into surrounding rural areas. Breathing ozone can trigger a variety of health problems including chest pain, coughing, throat irritation, and airway inflammation. It also can reduce lung function and harm lung tissue. Ozone can worsen bronchitis, emphysema, and asthma, leading to increased medical care.

Particulate matter (PM) is a general term for a mixture of solid particles and liquid droplets found in the air that are small enough to be inhaled. Larger particles (PM₁₀) include dust blown from construction sites, agricultural fields, or unpaved roads; the concentration of these particles in the air typically decreases rapidly away from these local sources. Finer particles (PM_{2.5}) include combustion products from industrial sources and fires, organic compounds, and metals, as well as droplets produced in the atmosphere by complex reactions of chemicals such as SO₂ and NO_x. Because of their small size and secondary production, finer particles may be transported large distances in the atmosphere.

Inhaled particles less than 10 microns in diameter can get deep into the lungs, and finer particles may be transferred from the lungs into the bloodstream. These particles can cause damage to the lungs as well as to the heart. Fine particles are also the main cause of reduced visibility (haze) in parts of the United States.

Lead emission trends are not included in Figure VII-1. Lead pollution typically affects small areas proximal to industrial sources such as lead smelters, foundries, and steel plants. Depending on the level of exposure, lead can adversely affect the nervous system, kidney function, immune system, reproductive and developmental systems and the cardiovascular system. Lead exposure also affects the oxygen carrying capacity of the blood. The lead effects most commonly encountered in current populations are neurological effects in children and cardiovascular effects (e.g., high blood pressure and heart disease) in adults.

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.

The network includes monitoring sites for ozone, carbon monoxide, nitrogen oxides, sulfur dioxide, lead,

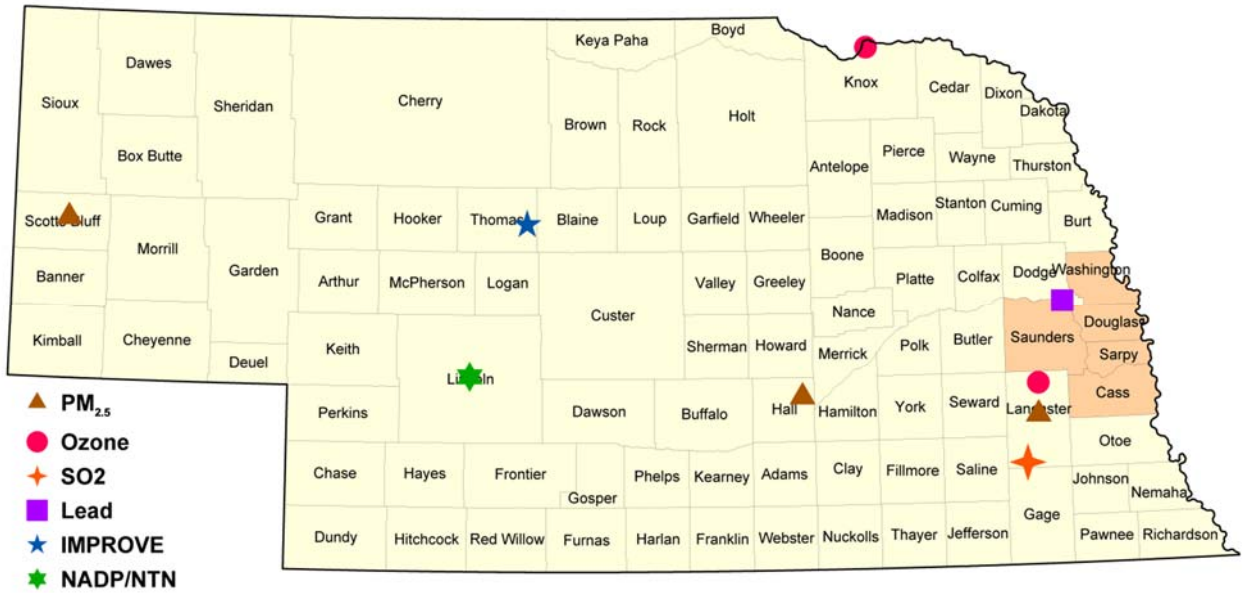
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PM₁₀, PM_{2.5}, PM_{10-2.5} and regional haze (i.e., IMPROVE monitor). The network is operated by the Nebraska Department of Environment and Energy and two local agencies: the Douglas County Health Department (DCHD) and the Lincoln-Lancaster County Health Department (LLCHD).

| Table V-1. Nebraska Air Monitoring Network on March 31, 2020. ⁽¹⁾ | | | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|------------------------------------|----------------------|------------------------------|-------|
| | DCHD Omaha MSA ⁽²⁾⁽³⁾ | NDEE Cass County ⁽⁴⁾ | LLCHD Lincoln MSA | NDEE Other Areas of NE | Total |
| SLAMS Sites (includes NCore) | 9 | 1 | 3 | 3 | 16 |
| IMPROVE ⁽⁵⁾ | 0 | 0 | 0 | 1 | 1 |
| NADP ⁽⁶⁾ | 1 | 0 | 0 | 1 | 2 |
| Total Monitoring Sites | 10 | 1 | 3 | 5 | 19 |
| Sites by Pollutant: SLAMS Sites including NCore ⁽³⁾ | | | | | |
| Ozone | 3 | 0 | 1 | 0 | 4 |
| Carbon Monoxide | 2 | 0 | 0 | 0 | 2 |
| Nitrogen Oxides | 1 | 0 | 0 | 0 | 1 |
| Sulfur Dioxide | 3 | 0 | 1 | 0 | 4 |
| PM ₁₀ | 3 | 1 | 0 | 0 | 4 |
| PM _{2.5} | 4 | 0 | 1 | 2 | 7 |
| PM _{10-2.5} | 1 | 0 | 0 | 0 | 1 |
| PM _{2.5} Speciation | 1 | 0 | 0 | 0 | 1 |
| Lead | 0 | 0 | 0 | 1 | 1 |
| Total Pollutant Sites | 18 ⁽³⁾ | 1 | 3 | 3 | 25 |
| Footnotes: | | | | | |
| (1) This table summarizes the number of operating sites as of 3/31/20 in the NE SLAMS network (including NCore) as well as IMPROVE and NADP sites in Nebraska. | | | | | |
| (2) The Omaha MSA encompasses 5 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 3 multi-pollutant monitoring sites in the Omaha MSA in 2019: 1616 Whitmore – SO ₂ & Ozone (2 pollutants); 24 th & O Sts (South Omaha) – Ozone and PM ₁₀ (2 pollutants); and NCore (42 nd & Woolworth) – CO, NO-NO _y , 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) IMPROVE – Interagency Monitoring of Protected Visual Environments. These are fine particulate and particulate speciation monitors intended to provide information for studying regional haze that may impact Class I National Park and wilderness Areas. IMPROVE sites are not part of the SLAMS network. EPA is responsible for the design of the IMPROVE network. Changes to the IMPROVE Network within Nebraska do not need to be included in Nebraska’s annual network plan, but the existence of the site is recognized within the network plans. The NDEE provides administrative support (with EPA funding) for one IMPROVE site at the Nebraska National Forest near Halsey, NE. | | | | | |
| (6) NADP - National Atmospheric Deposition Program sites are not part of the SLAMS network. They are not subject to 40 CFR Part 58 requirements and are not used for NAAQS attainment determinations. They are included in the Network Plan for informational purposes only. | | | | | |

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Figure V-1. Nebraska Air Quality Monitoring Sites Outside of the Omaha-Council Bluffs Metropolitan Statistical Area, 3/31/2020



PM_{2.5}

- Lincoln (Lancaster County)
- Grand Island (Hall County)
- Scottsbluff (Scottsbluff County)

Ozone

- Davey (Lancaster County)
- Santee (Knox County; operated by EPA)

Lead

- Fremont (Dodge County)

Sulfur Dioxide (SO₂)

- Sheldon Station (Lancaster County)

NADP/NTN

- Maxwell (Lincoln County)

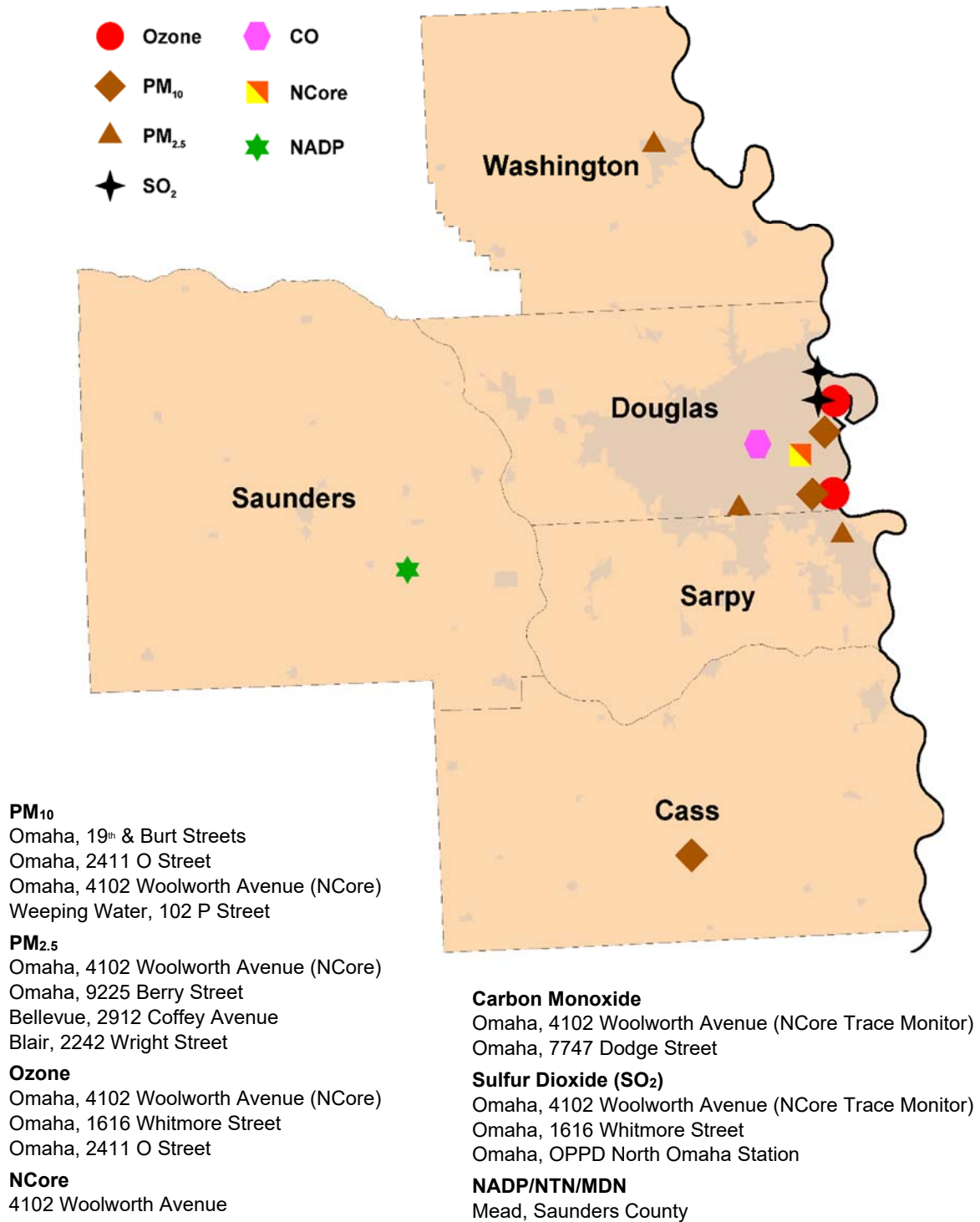
IMPROVE

- Nebraska National Forest (Thomas County)

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

Note: The Ozone monitoring site in Knox County is operated by EPA on the Santee Indian Reservation and is not part of NDEE’s SLAMS network.

Figure V-2. Air Quality Monitor Locations in the Nebraska Portion of the Omaha-Council Bluffs Metropolitan Statistical Area



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VI. Nebraska Ambient Air Monitoring Network: January 1, 2019 through March 31, 2020

This section describes Nebraska's Ambient Air Monitoring Network in place from January 1, 2019 through March 31, 2020, and changes made during that time period. Detailed information on individual monitoring sites, including purpose, scale, monitor specifications, and start dates is contained in Appendix A.

For the most part, 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 9 sites in Douglas, Sarpy, and Washington Counties, Nebraska. Multi-pollutant monitoring is currently conducted at three of the sites:

- The NCore site monitors for 8 pollutant parameters (CO, NOy/NO, O₃, SO₂, PM_{2.5}, PM₁₀, 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 PM₁₀ monitor; and
- The 1616 Whitmore site has both SO₂ and ozone monitors.

In addition, there are single-pollutant monitoring sites for carbon monoxide (1), PM_{2.5} (3), PM₁₀ (1), and SO₂ (1). The Omaha area monitoring network is therefore more extensive than the 9-site total might indicate; if the pollutants are counted separately, there are 18 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}, PM₁₀, and SO₂.

* 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.

DCHD has operated a Population and Source-Oriented PM₁₀ monitoring site at 19th and Burt Streets in Omaha since 2001. This site has primary and collocated filter-based samplers situated on the roof of a building owned by Creighton University. In NDEE's 2019 Network Plan, we reported that DCHD had been informed that Creighton University planned to demolish this building to make way for new construction, with demolition to begin later in 2019. DCHD therefore began a search for suitable alternative locations for this monitoring site. In October 2019 the EPA Region 7 Administrator approved relocation of this site. However, the University subsequently informed DCHD that demolition plans had been postponed indefinitely, and the monitors have continued operating at the 19th and Burt Streets location.

One change has occurred in the Omaha DCHD monitoring network since January 1, 2019. The Omaha NCore site includes a primary continuous PM_{2.5} monitor (MetOne BAM-1020) and a collocated filter-based monitor with a 6-day sampling frequency. An R&P 2025 FRM sampler served as the collocated monitor starting in 2009. On January 1, 2020, this monitor was replaced by a MetOne E-SEQ-FRM sequential sampler capable of accommodating up to 16 filters. This change will increase the time between DCHD staff visits to collect filters for analysis.

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B. Omaha-Council Bluffs MSA Sites Operated by NDEE

NDEE operates a MetOne BAM continuous PM₁₀ 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 three SLAMS monitoring sites:

- A PM_{2.5} site at 3140 N Street in Lincoln,
- An ozone site in Davey, NE (northern Lancaster County), and
- A source-oriented SO₂ monitoring site at NPPD's Sheldon Station near Hallam, NE.

The N Street PM_{2.5} site has three monitors: a primary filter-based FRM sampler, a collocated filter-based FRM sampler, and a continuous MetOne BAM monitor. Data from the continuous monitor is reported to AirNow, but not to AQS.

The Sheldon Station monitor began operation on December 23, 2016 to satisfy changes to 40 CFR Part 51 Subpart BB, §51.1200 – §51.1205 (a.k.a. the Data Requirements Rule) finalized on August 21, 2015. These changes set forth additional requirements with respect to demonstrating attainment with the 1-hour SO₂ NAAQS promulgated in 2010.

D. Sioux City MSA in Dakota and Dixon Counties

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

- A PM₁₀/PM_{2.5} site in Sioux City operated by the Iowa DNR, and
- A multi-pollutant site for SO₂, NO₂, O₃, PM₁₀, and PM_{2.5} in Union County, South Dakota operated by the South Dakota Department of Environment and Natural Resources (DENR).

NDEE has an agreement with South Dakota DENR that Nebraska relies on the Union County monitors and data to meet minimum monitoring requirements for ozone and SO₂ in the Sioux City MSA. Based on population size and ambient PM levels measured at the Iowa and South Dakota sites, PM₁₀ and PM_{2.5} monitors are not currently required in the Sioux City MSA (see Table D-2 in Appendix D).

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 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. Work is in progress to report the Grand Island continuous PM_{2.5} data to AirNow.

F. Scottsbluff MSA

NDEE operates a PM_{2.5} monitoring site at Scottsbluff Senior High School. A filter-based sampler operated at this location on a 3-day sampling schedule until 3/24/2020, when a MetOne BAM 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. Work is in progress to report the Scottsbluff continuous PM_{2.5} data to AirNow.

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G. Fremont MiSA

NDEE operated primary and collocated TSP-Pb (lead) samplers at 1255 Front Street in Fremont beginning in 2010 to provide source-oriented monitoring of the Magnus-Farley brass/bronze foundry. 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 was approved by EPA Region 7 during a visit to the potential site on December 5th, 2019. NDEE staff are in negotiations with the property owner considering relocation of the monitors to that site.

H. Lexington MiSA

Currently there are no ambient air monitoring sites in the Lexington MiSA.

I. IMPROVE Site

IMPROVE is the acronym for Interagency Monitoring of Protected Visual Environments. These sites contain fine particulate and particulate speciation monitors intended to provide information for studying regional haze that may impact Class I National Park and Wilderness Areas. There are no Class I National Park and Wilderness Areas in Nebraska; the nearest sites are in Colorado and South Dakota.

NDEE provides administrative support for one IMPROVE site at Halsey National Forest in Thomas County. Data collected at this site facilitates regional haze and pollution transport studies.

J. National Atmospheric Deposition Program (NADP): National Trends Network (NTN) & Mercury Deposition Network (MDN)

The National Atmospheric Deposition Program/National Trends Network (NADP/NTN) is a federal, nationwide network of sites that monitor for deposition constituents in precipitation. The deposition parameters examined include acidity, sulfate, nitrate, ammonium, chloride, and base cations (e.g., calcium, magnesium, potassium and sodium).

There are two NADP/NTN sites in Nebraska: one near Mead (Saunders County) that has operated since 1978 and one near North Platte (Lincoln County) that has operated since 1985. These sites are operated by the University of Nebraska with analytical and data development support from the federal NADP. There were no changes to the NADP/NTN network from January 1, 2019 thru March 31, 2020.

Mercury Deposition Network (MDN) monitoring was initiated at the Mead site on June 26, 2007, and is continuing. At the North Platte site, MDN monitoring was conducted from October 2008 thru October 2010.

The operation of NADP sites is not subject to the provisions of 40 CFR Part 58.10. Their inclusion in this Network Plan is for informational purposes only. More information on the NADP/NTN and the NADP/MDN sites can be found in Appendix A of this network plan. For NADP, NTN and MDN program information see: <http://nadp.slh.wisc.edu>.

VII. NCore Monitoring

EPA established the National Core Multipollutant Monitoring Network (NCore) in 2011 to deploy advanced measurement systems for airborne particles, pollutant gases, and meteorology. Each state is required to operate at least one NCore site. Each site must measure, at a minimum, PM_{2.5} particle mass using continuous and filter-based samplers, speciated PM_{2.5} (chemical identification of particles), PM_{10-2.5} particle mass, O₃, SO₂, CO, total reactive nitrogen (NO_y) and nitrogen oxide (NO), wind speed and direction, relative humidity, and ambient temperature.

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The NCore network objectives are to provide timely reporting of air quality data to the public, compliance monitoring, support for long-term health and ecosystem assessments, and support to scientific studies.

Nebraska's NCore site is located at 4102 Woolworth Avenue in Omaha, on the campus of the Douglas Health Department, which operates the site. This neighborhood-scale urban site is located to provide representative concentrations of exposure to be expected throughout the metropolitan area (see Figure VII-1). NDEE has no current plans to expand the NCore network in Nebraska.

Figure VII-1. Omaha NCore Site



Google Maps image of Omaha showing site location marked by yellow circle.

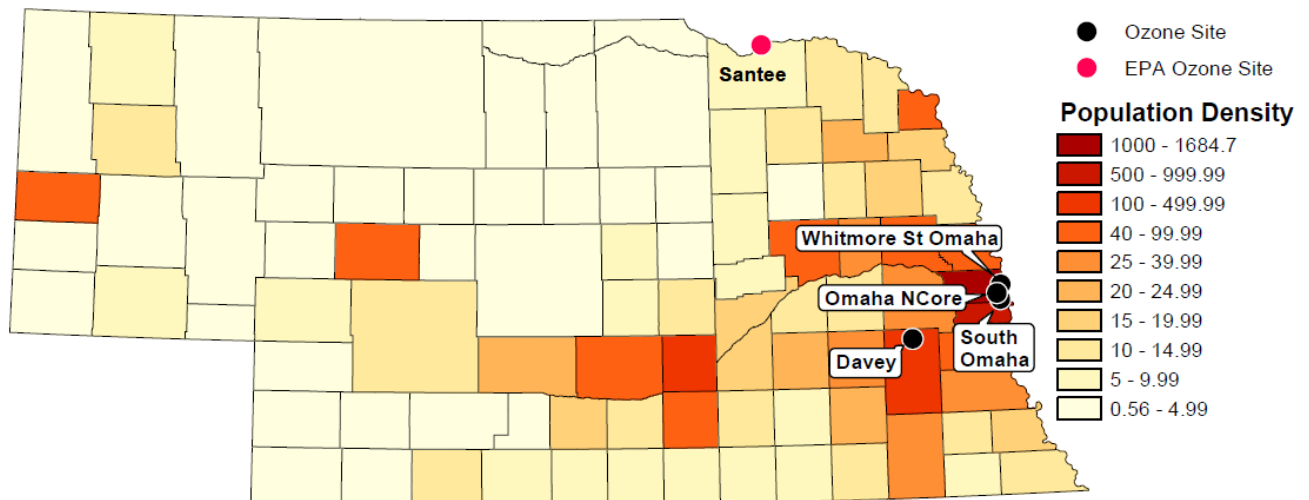


Photo of NCore instruments courtesy of Douglas County Health Department.

VIII. Ozone Monitoring Network

The current NAAQS for ozone (O_3) was set in 2015 at 0.070 parts per million (ppm; or 70 parts per billion) for both the primary and secondary standard. The previous standard was 0.075 ppm. Nebraska's ozone monitoring network includes four sites, plus an EPA-operated site at Santee, Nebraska (Figure VIII-1).

Figure VIII-1: Nebraska Ozone Monitor Locations and County Population Density*



* Population density is shown as persons per square mile.

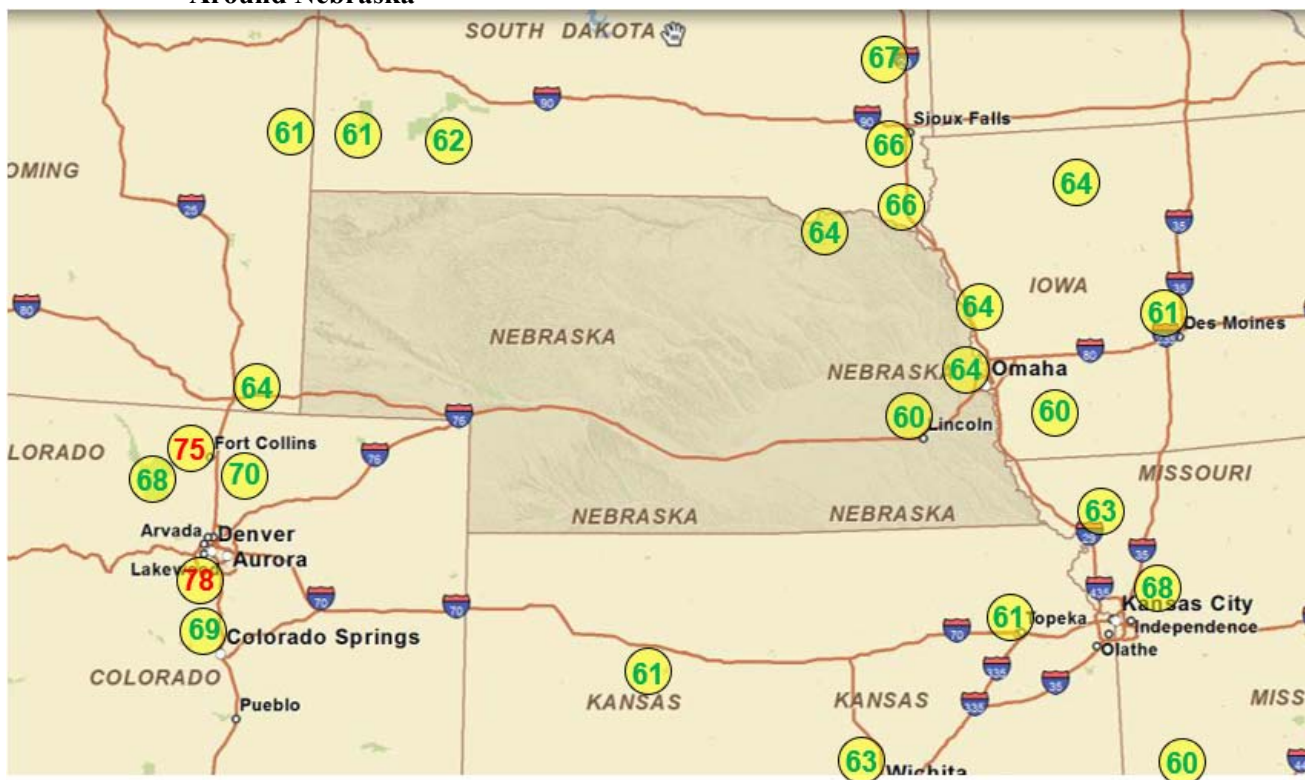
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Ozone monitoring is only required in Metropolitan Statistical Areas (MSAs), with the required number of monitors set by population and whether the most recent ozone Design Values (DVs) are greater or less than 85% of the ozone NAAQS. All of Nebraska's MSAs meet current ozone monitoring requirements (see Appendix D).

Three of Nebraska's ozone monitors are in the Omaha-Council Bluffs MSA: two population-oriented sites (South Omaha and Whitmore Street) and the neighborhood-scale NCore site (all operated by the Douglas County Health Department). Iowa DNR also operates two ozone sites in the Iowa portion of the Omaha-Council Bluffs MSA. The Lincoln-Lancaster County Health Department operates a site at Davey in northern Lancaster County in the Lincoln MSA. South Dakota Department of Environment and Natural Resources (DENR) operates an ozone monitor in the Sioux City MSA. No monitor is present or required in the Grand Island MSA.

As shown in Appendix B Table B-1, the 2017-2019 O₃ DVs at monitoring sites in Nebraska and adjacent state areas are elevated but in attainment with the ozone NAAQS. The most recent ozone DVs in the area range from 83% to 94% of the NAAQS. The highest ozone levels in Nebraska are found in the Omaha-Council Bluffs MSA and the Sioux City MSA and Santee. The map in Figure VIII-2 shows the 2017-2019 ozone DVs for monitoring sites in Nebraska and surrounding states. Nearly all urban and rural monitoring sites in the region show DVs of 60 ppb or higher (a DV of 59.5 ppb is 85% of the NAAQS).

Figure VIII-2. Three-Year (2017-2019) Ozone Design Values (DVs, in ppb) for Locations in and Around Nebraska*



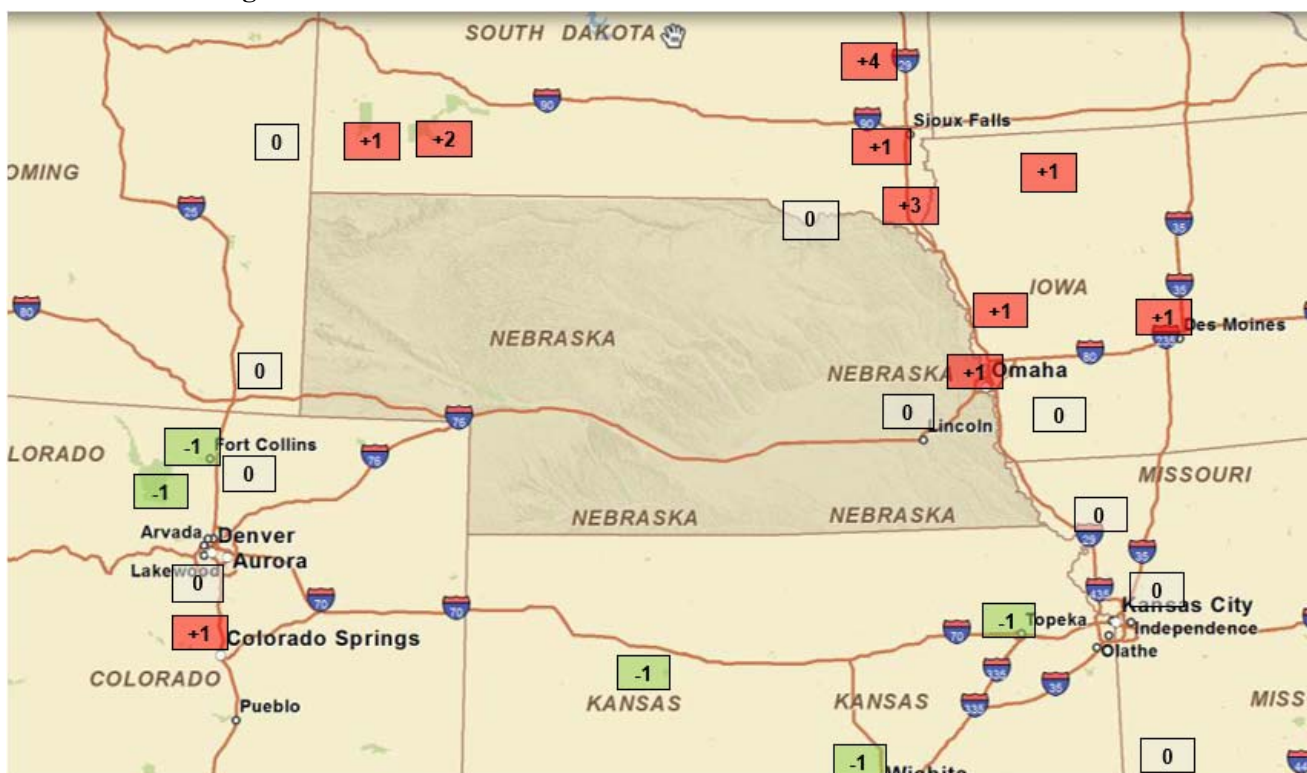
* Where there is more than one monitoring site in a locale, the highest ozone DV is shown. DVs in green are in attainment with the NAAQS (70 ppb); values in red are not in attainment.

Ozone monitoring sites in the Kansas City metropolitan area and 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.

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The map in Figure VIII-3 shows the difference between the 2017-2019 ozone design value and the site-average design value from 2014 through 2019 for monitor sites in the Nebraska region. This time period encompasses ozone trends since the historic drought year of 2012. Sites in Omaha, northwest Iowa, and South Dakota show 2017-2019 ozone design values that are higher than the site average. Remaining sites in Nebraska, along with sites in southwest Iowa, northwest Missouri, and southeast Wyoming show 2017-2019 design values equal to the long-term site average, while Kansas sites show below-average design values.

Figure VIII-3. Difference Between 2017-2019 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.

Figures VIII-4a, VIII-4b, and VIII-4c show plots of annual 4th-high 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 2019. These values are used in calculating the 3-year average design values.

These plots show no clear trend from 2013 to 2015, with some sites showing increasing values, some flat, and some decreasing. However, nearly all sites in the region show an upward trend in 4th-high 8-hour ozone values from 2015 or 2016 through 2018. This trend is evident for many of the rural sites as well as those in more urban areas. Although several sites show 4th high daily values approaching the NAAQS standard of 70 ppb, only one daily exceedance of this value was recorded by Nebraska monitors between 2015 and 2018: 71 ppb at Santee in June 2016. Nearly all sites recorded lower 4th high values in 2019, a year which saw average temperatures in eastern Nebraska but above-average precipitation.

Figure VIII-4a. Annual 4th High Daily Maximum 8-hour Ozone Trends 2013 through 2019 for Monitors in the Omaha-Council Bluffs MSA

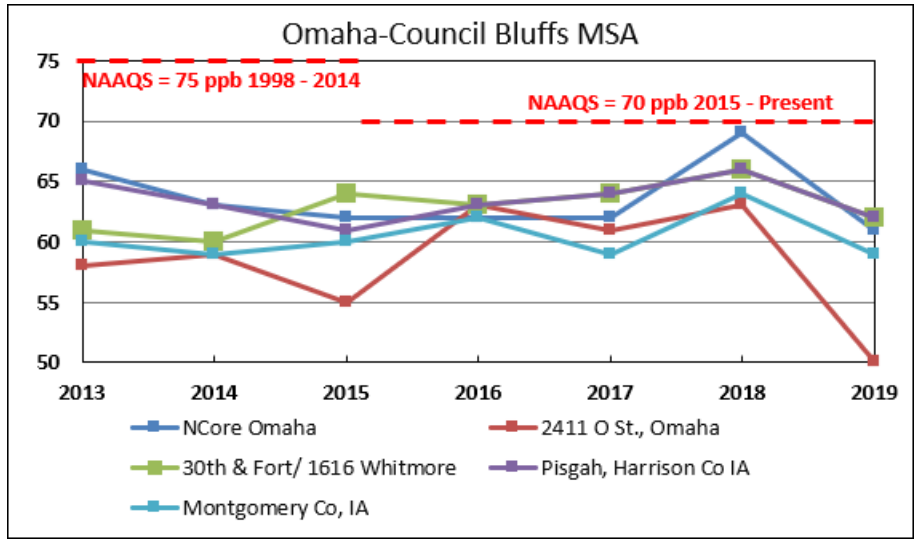


Figure VIII-4b. Annual 4th High Daily Maximum 8-hour Ozone Trends 2013 through 2019 for Monitors in the Lincoln, NE and Sioux City, IA MSAs

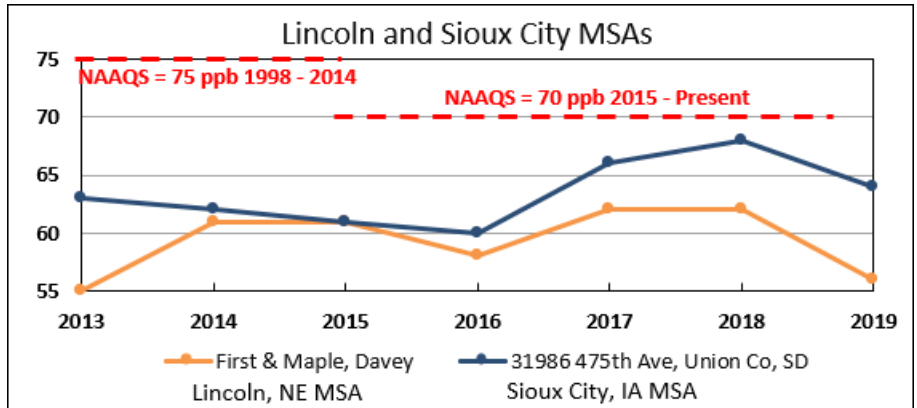
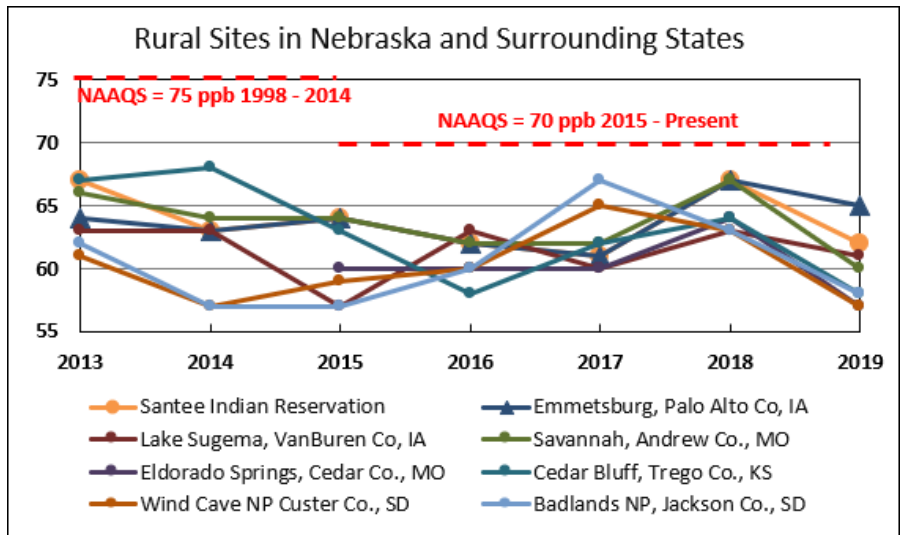


Figure VIII-4c. Annual 4th High Daily Maximum 8-hour Ozone Trends 2013 through 2019 for Monitors at Rural Sites in Nebraska and Surrounding States



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IX. PM_{2.5} Monitoring Network

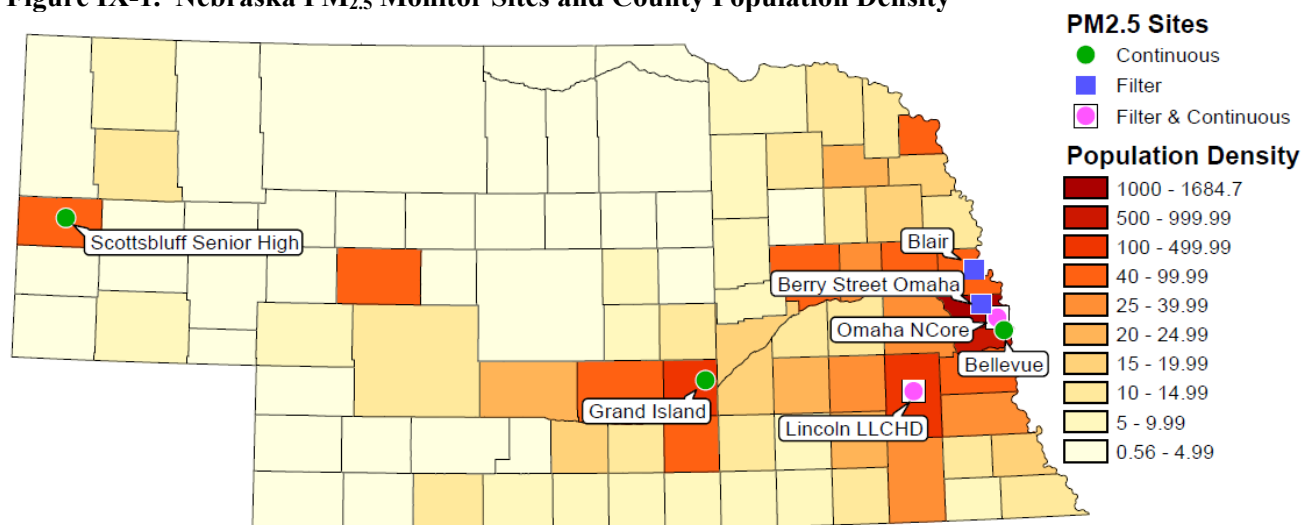
EPA last revised the PM_{2.5} NAAQS in 2012, setting the primary annual average NAAQS at 12 µg/m³ and the secondary annual average NAAQS at 15 µg/m³. These standards are based on the three-year average of the weighted annual mean. The primary and secondary 24-hour NAAQS, which is based on a three-year average of annual 98th percentile of 24-hour maximum values, was retained at 35 µg/m³.

Minimum PM_{2.5} monitoring requirements apply to MSAs and are shown in the Table IX-1. Nebraska's PM_{2.5} monitoring network consists of seven sites (Figure IX-1). Four sites are in the Omaha-Council Bluffs MSA, and there is one site each in the Lincoln and Grand Island MSAs and one in the Scottsbluff MiSA. The Sioux City MSA includes two PM_{2.5} monitors, one operated by South Dakota Department of Environment and Natural Resources (DENR) and one operated by Iowa Department of Natural Resources (DNR).

| MSA Population Category ¹ | Design Value > 85% of NAAQS ² | Design Value < 85% of NAAQS ² |
|--------------------------------------|------------------------------------------|------------------------------------------|
| > 1,000,000 | 3 | 2 |
| 500,000 – 1,000,000 | 2 | 1 |
| 50,000 – 500,000 | 1 | 0 |

¹ Population based on latest available census figures.
² These minimum monitoring requirements apply in the absence of a design value.

Figure IX-1. Nebraska PM_{2.5} Monitor Sites and County Population Density*



* Population density is shown as persons per square mile.

| Location | 2019 Population | 24-Hour Average DV | Annual Average DV | Number of Monitors |
|--------------------------|-----------------|--------------------|-------------------|--------------------|
| Omaha-Council Bluffs MSA | 949,442 | 74% | 59% | 4 |
| Lincoln MSA | 336,374 | 56% | 52% | 1 |
| Grand Island MSA | 75,553 | 48% | 47% | 1 |
| Scottsbluff MiSA | 37,529 | 52% | 51% | 1 |
| Sioux City MSA | 169,878 | 65% | 58% | 2 ² |

¹ Where there is more than one monitoring site in a locale, the highest DV was used to calculate the % NAAQS value.
² Monitors operated in South Dakota and Iowa

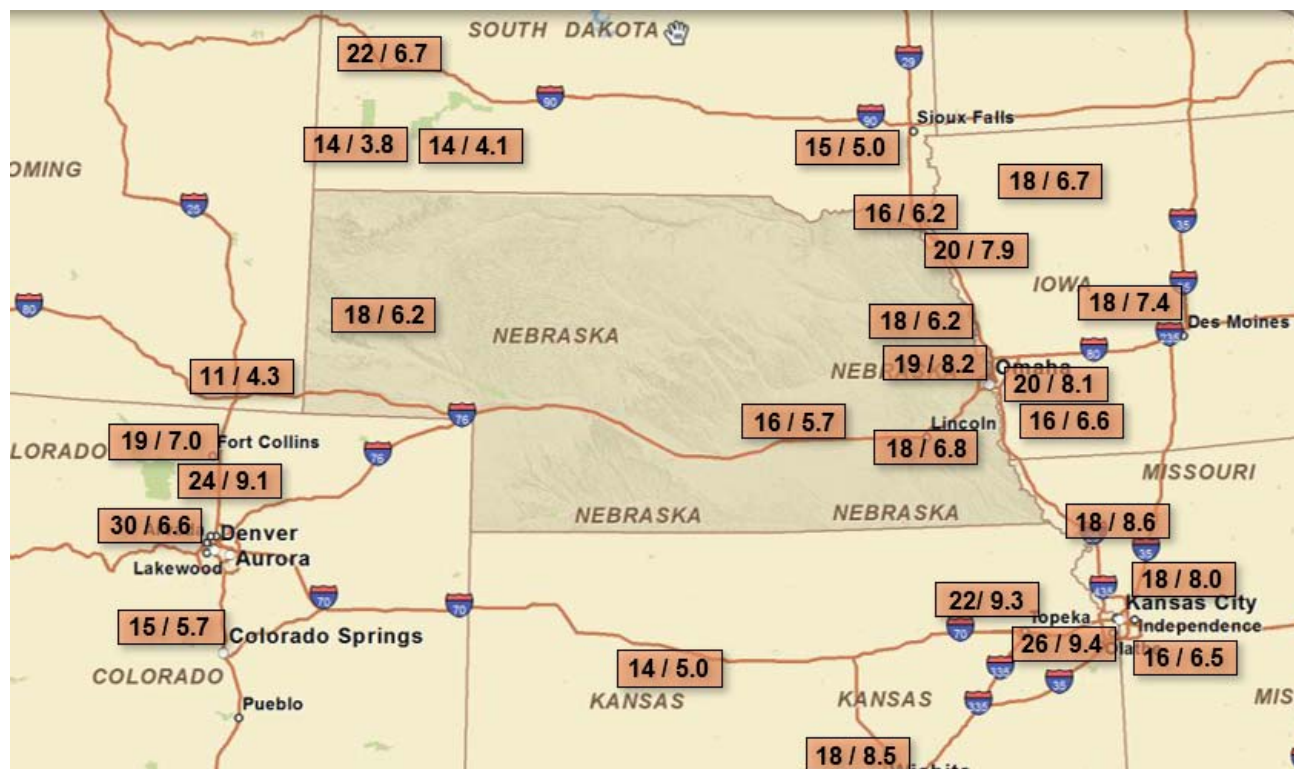
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As shown in Table IX-2 and in more detail in Appendix B, all PM_{2.5} sites in Nebraska (and in the Sioux City MSA) are in attainment with the annual average and 24-hour NAAQS, and the most recent DVs are all below 85% of the NAAQS. Nebraska's PM_{2.5} network therefore meets current minimum monitoring requirements for MSAs (see Appendix D for more details). The highest PM_{2.5} concentrations are found in the Omaha-Council Bluffs MSA and the second-highest are in the Sioux City MSA.

In addition to the minimum number of monitors required, at least one-half of the minimum required sites must be operated with continuous PM_{2.5} analyzers. Currently five of the seven Nebraska sites operate with continuous monitors. Each state must also operate at least one site to monitor for regional background, and at least one site for regional transport. Scottsbluff serves as the regional background site and Grand Island as the regional transport site.

Figure IX-2 shows the 2017-2019 DVs for PM_{2.5} 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). PM_{2.5} values are generally lower in smaller metropolitan and micropolitan areas and in rural areas.

Figure IX-2. PM_{2.5} 2017-2019 Design Values (DV) for Sites in and Around Nebraska^{1,2}



¹ The first number is the 24-hour DV and the second number is the annual average DV.

² When there was more than one site in a metropolitan area, the highest DVs are shown.

Figures IX-3 and IX-4 show annual PM_{2.5} trends from 2007 through 2019 for 98th percentile of daily maximum 24-hour data and annual average data, respectively. Since 2010 most stations have shown an overall downward trend in both parameters. The Scottsbluff site is an exception, showing basically flat trends with large fluctuations in the daily maximum 24-hour data, with peaks in 2015 and 2017. 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.

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Figure IX-3. Trends in Annual 98th Percentile of Daily Maximum 24-hour PM_{2.5} for Nebraska Monitoring Sites 2007-2019

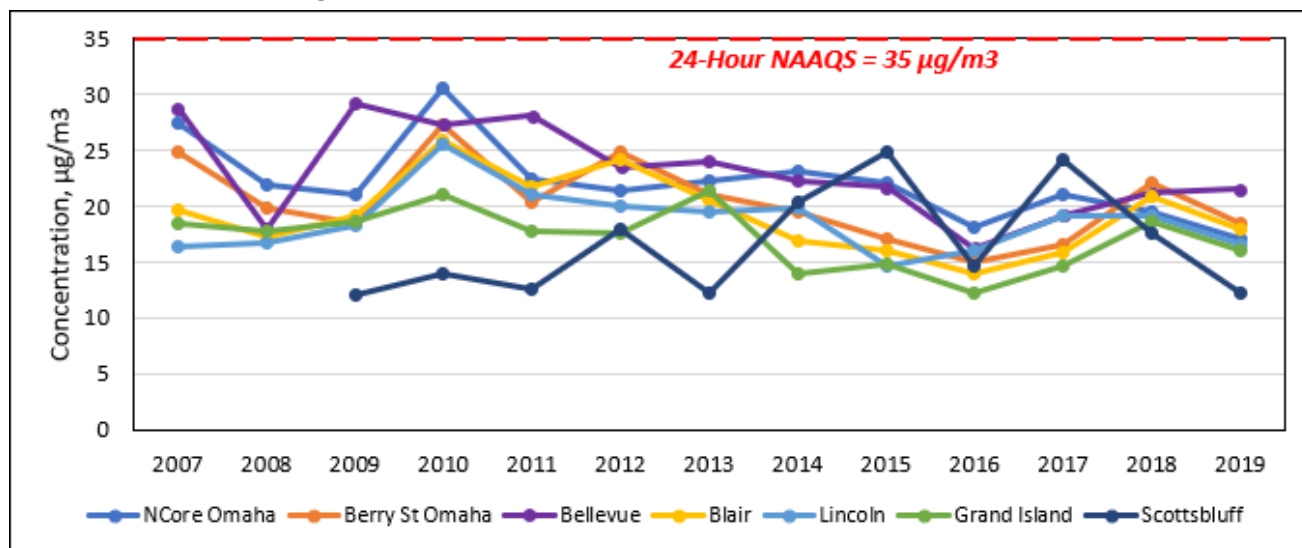
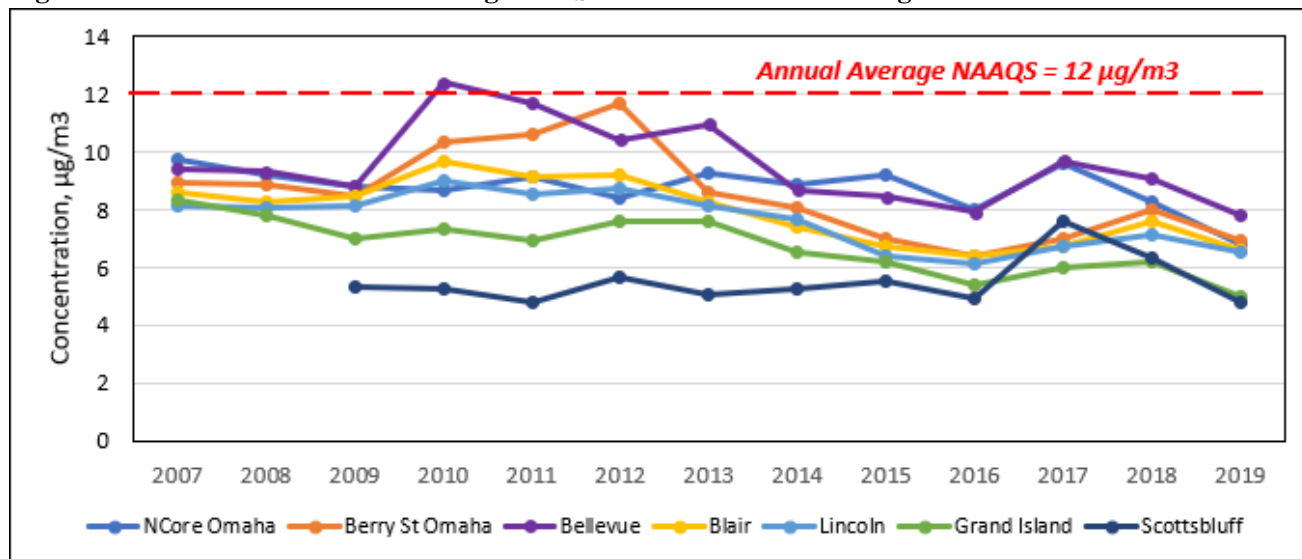


Figure IX-4. Trends in Annual Average PM_{2.5} for Nebraska Monitoring Sites 2007-2019



Wildfires as well as prescribed fires also can impact air quality in eastern Nebraska. Prescribed burns are used in Nebraska and near-by states for prairie conservation and maintenance of grazing lands. The Flint Hills of Kansas and Oklahoma, and areas near the Flint Hills in Kansas, are areas of concentrated use of prescribed fires, primarily in the spring months. In 2017 smoke from prescribed fires in the Flint Hills and near-by areas was a major source of elevated PM_{2.5} levels experienced in Lincoln and Omaha in early April. In 2018 and 2019 favorable weather patterns during Flint Hills burn events resulted in minimal impacts on air quality in Nebraska.

NDEE is working with Kansas Department of Health and Environment (KDHE), EPA Region 7, 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 burn season, current smoke forecast information is provided, along with links to the Kansas Smoke Management Plan, AirNow, and other related information.

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NDEE has also 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 based on forecasts provided by KDHE.

One change in Nebraska’s PM_{2.5} network is currently planned for 2020. NDEE has purchased a MetOne BAM continuous PM_{2.5} sampler and climate-controlled enclosure to replace the current filter-based sampler operated by DCHD in Blair, Nebraska.

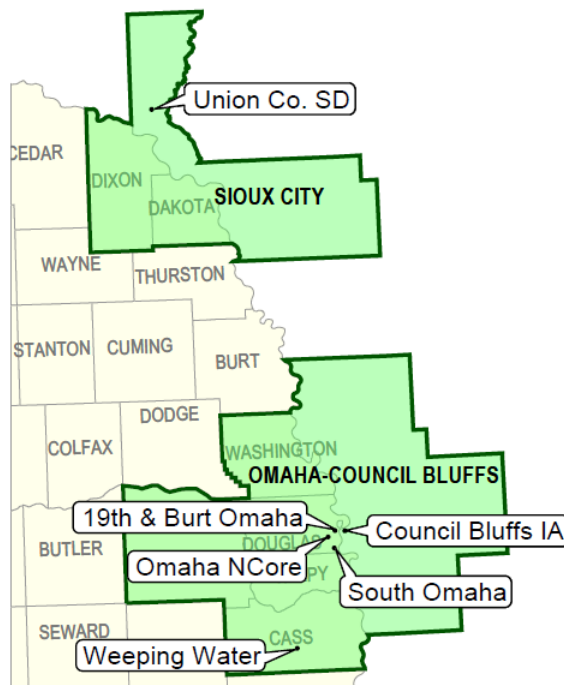
X. PM₁₀ Monitoring Network

The current national ambient air quality standard (NAAQS) for PM₁₀ is 150 µg/m³ for both the primary standard and the secondary standard. Minimum monitoring requirements for PM₁₀ apply to MSAs and are shown in Table X-1. Nebraska’s network consists of 4 sites in the Omaha-Council Bluffs MSA (Figure X-1). Three of these are within the city of Omaha, and one (Weeping Water) in Cass County is located close to limestone mining sites that are sources of PM₁₀. In addition, Iowa DNR operates an urban site in Council Bluffs, within the Omaha-Council Bluffs MSA, and South Dakota DENR operates a multipollutant site including PM₁₀ monitoring in rural Union County within the Sioux City MSA.

| MSA Population | High Concentration ≥ 120% of NAAQS | Medium Concentration > 80% of NAAQS | Low Concentration² < 80% of NAAQS |
|-----------------------|-----------------------------------------------|---------------------------------------------------|------------------------------------------------------------|
| > 1,000,000 | 6 – 10 | 4 – 8 | 2 – 4 |
| 500,000 – 1,000,000 | 4 – 8 | 2 – 4 | 1 – 2 |
| 250,000 – 500,000 | 3 - 4 | 1 – 2 | 0 – 1 |
| 100,000 – 250,000 | 1 – 2 | 0 – 1 | 0 |

¹ Selection of urban areas and actual numbers of stations per area within the ranges shown to be jointly determined by EPA and the State Agency.
² These minimum monitoring requirements apply in the absence of a design value.

Figure X-1. PM₁₀ Monitoring Sites in Nebraska MSAs



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Table X-2 shows the maximum 24-hour PM₁₀ concentrations measured over the past three years for each of the Nebraska MSAs, presented as a percentage of the NAAQS. The Omaha-Council Bluffs MSA value of 55% falls in the Low Concentration category. The four total PM₁₀ monitoring sites within the MSA exceed the minimum monitoring requirements for its population. The Sioux City MSA value of 87% places it in the Medium Concentration category, the single Union County South Dakota monitoring site satisfies the minimum monitoring requirement for the MSA population. No PM₁₀ monitoring is conducted or required in the Lincoln or Grand Island MSAs.

| MSA | 2019 Population | PM ₁₀ %NAAQS ² | Number of Monitors |
|----------------------|-----------------|--------------------------------------|--------------------|
| Omaha-Council Bluffs | 949,442 | 55% | 4 ³ |
| Lincoln | 336,374 | NA | 0 |
| Sioux City | 169,878 | 87% | 1 ⁴ |
| Grand Island | 75,553 | NA | 0 |

¹ The highest annual daily maximum value in the last three years was used to calculate concentration percentages.
² Where the MSA includes more than one monitoring site, the highest value is shown.
³ Three monitors are in the Nebraska portion of the MSA and one in Council Bluffs, Iowa operated by Iowa DNR.
⁴ Monitor operated in Union County South Dakota by South Dakota DENR.

The PM₁₀ NAAQS states that the 24-hour standard of 150 μg/m³ 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 μg/m³ or more. This means that the 4th high value over the most recent 3 years needs to be below 155 μg/m³. For the 2017-2019 time frame, there were no 24-hour exceedances of the NAAQS, and the 4th high value over that period ranged from 29% to 56% of the NAAQS at Nebraska and nearby monitoring sites (see Appendix B, Table B-5a and B-5b).

Figure X-2. Trends in Annual 24-Hour Maximum PM₁₀ Values at Nebraska Area Sites, 2007-2019

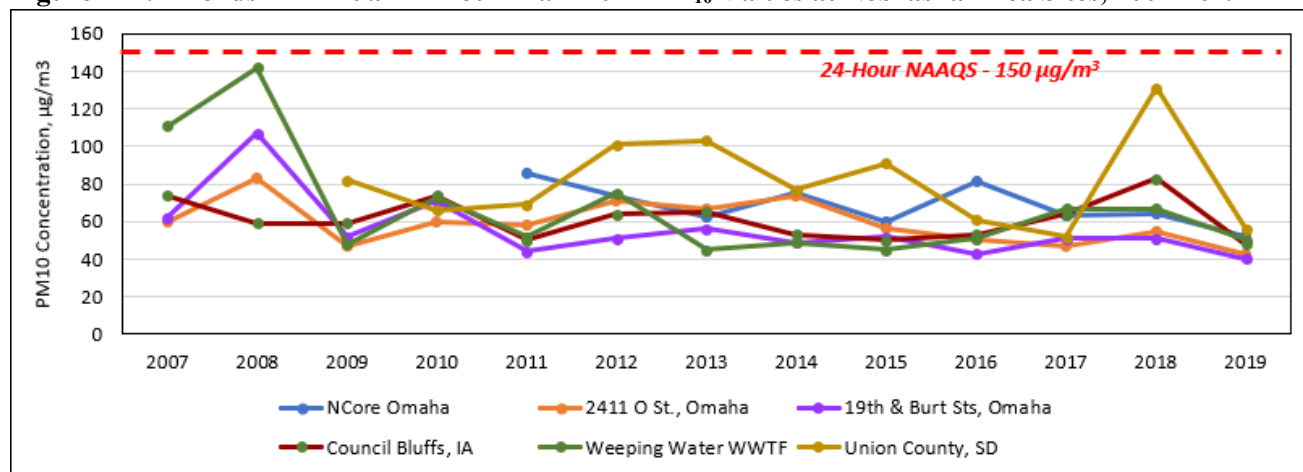
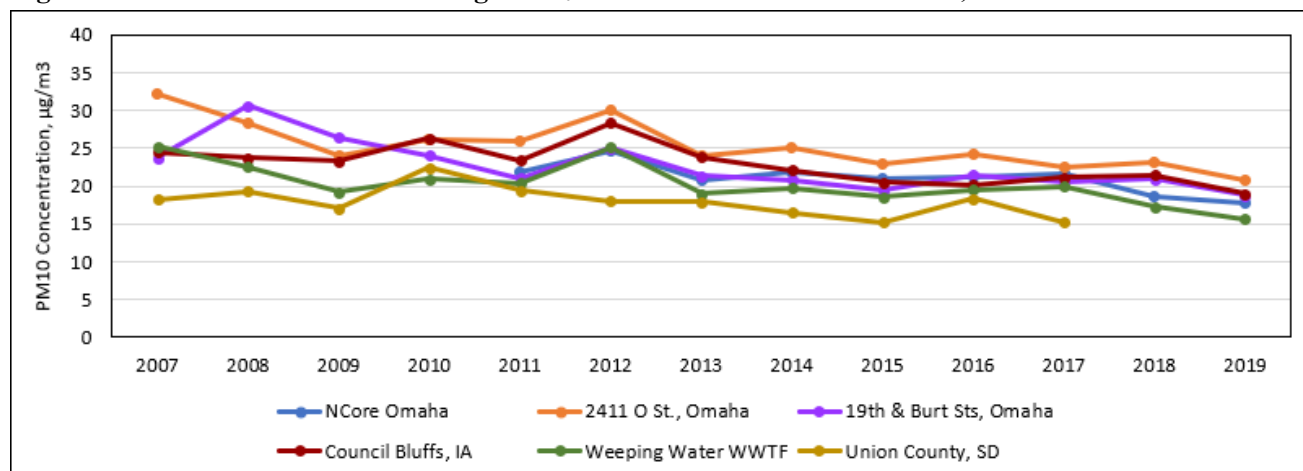


Figure X-2 shows trends in annual 24-hour maximum PM₁₀ values at monitoring sites in and around Nebraska from 2007 through 2019, and Figure X-3 shows trends in annual average values for the same time period. Both plots shown overall downward trends in PM₁₀ values with time.

NDEE has no plans for changes in the PM₁₀ monitoring network over the next year.

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Figure X-3. Trends in Annual Average PM₁₀ Values at Nebraska Area Sites, 2007-2019.



XI. Sulfur Dioxide (SO₂) Monitoring Network

The NAAQS for SO₂ was revised in 2010 to establish a 1-hour standard of 75 ppb (99th percentile of daily maximum 1-hour average concentrations), which was reviewed and retained in 2018. All areas of Nebraska have been designated as “Attainment/Unclassifiable” with respect to this standard except for Lancaster County, which has been designated “Unclassifiable”, and Douglas County, which will be designated by December 31, 2020. Nebraska has submitted a recommendation to designate both counties as “Attainment/Unclassifiable” based on source-oriented monitoring (see below).

Federal rules set forth in 40 CFR Part 58 Appendix D require monitors in populated areas with high SO₂ emissions. To implement these requirements EPA uses the Population Weighted Emissions Index (PWEI) to determine if SO₂ monitoring is required in an MSA. The PWEI is calculated by multiplying the population of the MSA by the total SO₂ emissions in the MSA and dividing by 1,000,000. Data that NDEE used to calculate PWEI values for Nebraska MSAs are shown in Appendix D, Table D-3. Based on this information, the minimum number of SLAMS SO₂ monitoring sites for Nebraska MSAs are shown in Table XI-1, along with the number of actual monitor sites.

| MSA | Minimum Required Sites | Nebraska SLAMS Sites | Other State SLAMS Sites | DRR Sites |
|----------------------|------------------------|----------------------|-------------------------|-----------|
| Omaha-Council Bluffs | 1 | 2 | 0 | 1 |
| Lincoln | 0 | 0 | NA | 1 |
| Sioux City | 0 | 0 | 1 | 0 |
| Grand Island | 0 | 0 | NA | 0 |

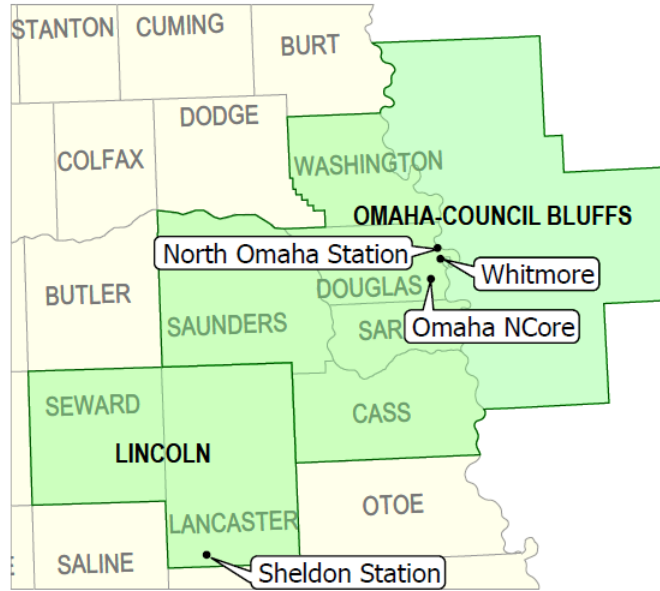
Nebraska operates two SLAMS SO₂ sites in the Omaha MSA (including the multipollutant NCore site), exceeding the minimum monitor requirement. SLAMS monitors are not required in the other Nebraska MSAs; however, South Dakota DENR monitors SO₂ at the multipollutant Union County site in the Sioux City MSA.

40 CFR Part 51 Subpart BB (known as the SO₂ Data Requirements Rule), promulgated in 2015, required states to provide data on air quality in areas with large sources of SO₂ emissions (greater than 2,000 tons per year). The rule required characterization of the air quality of the area associated with each SO₂ source by either monitoring (beginning by January 1, 2017) or by modeling. In accordance with the Data Requirements Rule, NDEE is conducting source-oriented SO₂ monitoring at two coal-fired electricity generating stations: North Omaha Station (Douglas County, Omaha-Council Bluffs MSA) and Sheldon Station (Lancaster County, Lincoln

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MSA). These sites are listed in the DRR Sites column in Table XI-1. The locations of all Nebraska SO₂ monitor sites are shown in Figure XI-1.

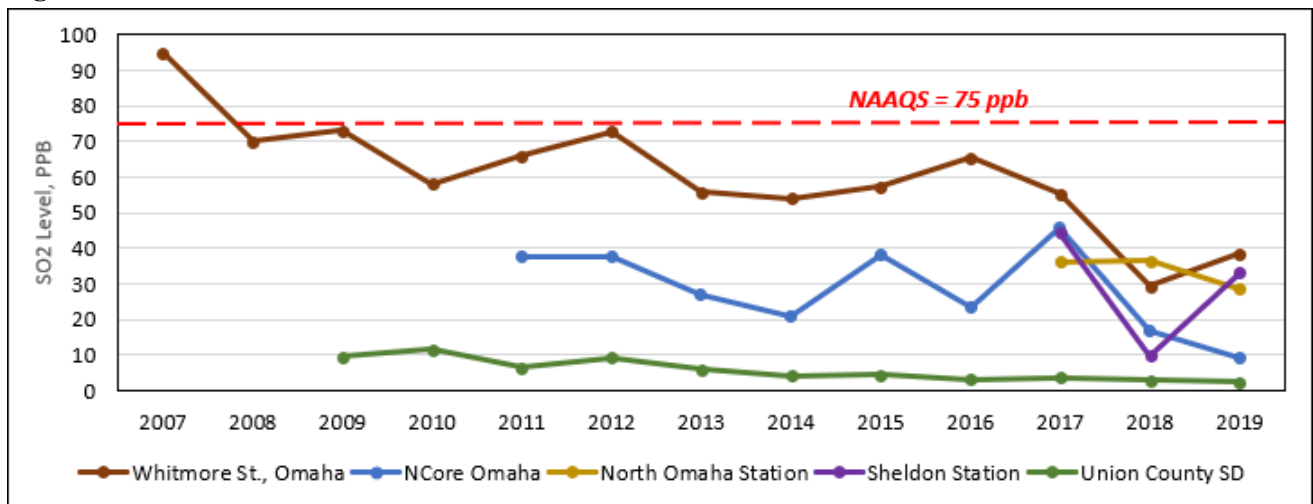
Figure XI-1. Locations of Nebraska SO₂ Monitor Sites



The 2017-2019 1-hour SO₂ annual levels and Design Values (DV) for Nebraska-area monitoring sites are listed in Appendix B, Table B-3. The Whitmore Street site, located in an industrial area of north Omaha, has the highest level, equal to 55% of the NAAQS. The DV at the neighborhood-scale Omaha NCore site was 32% of the NAAQS. The two sites monitoring coal-fired power plants also have levels in attainment with the NAAQS: for North Omaha Station the 2017-2019 DV was 45% of the NAAQS, and for Sheldon Station it was 39% of the NAAQS. The DV at the rural site in Union County South Dakota was 4% of the NAAQS.

Figure XI-2 shows trends in annual 99th percentile 1-hour SO₂ levels at Nebraska-area monitors from 2007 through 2019. No exceedances of the NAAQS have been recorded since 2007, and maximum levels have been declining overall through time.

Figure XI-2. Trends in Annual 99th Percentile 1-Hour SO₂ Levels at Nebraska Area Sites, 2007-2019



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Nebraska has two areas subject to the SO₂ Data Requirements Rule that are demonstrating attainment with the SO₂ NAAQS by air quality modeling. As required by 40 CFR 51.1205(b), by July 1, 2020 the NDEE will submit an annual report to document the annual SO₂ emissions of each applicable source in these areas and assess the cause of any emissions increase from the previous year.

Under the SO₂ Data Requirements Rule (§51.1203), an air agency may seek EPA approval to terminate the operation of a monitor established pursuant to the rule if the monitored design value for the first 3-year period or second 3-year period is no greater than 50% of the 1-hour SO₂ NAAQS. As such, NDEE requests approval for two changes in the Nebraska SO₂ monitor network.

A. Request for Removal of Sheldon Station (Lancaster County) Source-Oriented SO₂ Monitor

The Lincoln-Lancaster County Health Department (LLCHD) has operated a source-oriented SO₂ monitor site (AIRS ID 31-109-0025) on SW 42nd Street approximately 0.2 mi north of West Pella Road, near Hallam, NE, since January 2017. This monitor has operated pursuant to the 2010 SO₂ NAAQS Data Requirements Rule (DRR) to characterize air quality near the NPPD Sheldon Station coal-fired power plant. Monitoring data has demonstrated compliance with the NAAQS, with a calculated a 3-year Design Value (DV) of 0.029 ppm (39% of the NAAQS). As this DV is less than 50% of the 1-hour SO₂ NAAQS, the NDEE requests approval from EPA for removal of this monitor from operation as its purpose under the DRR has been satisfied.

B. Request for Removal of North Omaha Station (Douglas County) Source-Oriented SO₂ Monitor

The Douglas County Health Department (DCHD) has operated a source-oriented SO₂ monitor site (AIRS ID 31-055-0057) at 7288 John Pershing Drive (Omaha) since 2017, pursuant to the 2010 SO₂ NAAQS Data Requirements Rule (DRR). Monitoring at this site was carried out to characterize air quality near the OPPD North Omaha Station coal-fired power plant. Monitoring data has demonstrated compliance with the NAAQS, with a calculated a 3-year Design Value (DV) of 0.034 ppm (45% of the NAAQS). As this DV is less than 50% of the 1-hour SO₂ NAAQS, the NDEE requests approval from EPA for removal of this monitor from operation as its purpose under the DRR has been satisfied.

XII. Nitrogen Dioxide (NO₂) Monitoring

In 2010 EPA established a primary 1-hour NAAQS for NO₂ of 100 parts per billion (ppb; based on the 98th percentile of the annual distribution of daily maximum 1-hour NO₂ concentrations, averaged over 3 years) and retained a primary and secondary annual average standard of 53 ppb. Both standards were retained in 2018. The 2010 NAAQS included population-based monitoring requirements and traffic-based (near-road) monitoring requirements.

EPA's population-based monitoring rules require one NO₂ monitor in any Core-Based Statistical Area (CBSA) with a population greater than 1,000,000 in order to measure community-wide concentrations. Nebraska does not contain or share any MSAs with populations this large, so monitoring is not currently required on this basis. However, South Dakota DENR operates an NO₂ monitor at the rural multipollutant site in Union County in the Sioux City MSA.

The 2010 NAAQS also required a near-road NO₂ monitor to be installed in any CBSA with a population greater than 500,000 but less than 1,000,000. However, in 2016 EPA revised the population threshold for near-road monitoring to 1,000,000. Nebraska does not contain or share any MSAs with populations this large, so monitoring is also not currently required on this basis.

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At NCore sites EPA requires measurement of reactive oxides of nitrogen (NO_y) instead of NO₂ 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 NO_y are therefore measured at the Omaha NCore site.

The difference between measured NO_y and NO (NO_y-NO) generally approximates NO₂, with NO_y-NO being equal to or possibly higher than NO₂. See Appendix B Tables B-4a and B-4b for NO₂ and NO_y-NO concentration data for the 2017-2019 time frame. The three-year average of the 98th percentile 1-hour NO_y-NO levels at the Omaha NCore site was 38% of the NAAQS, while the annual average value was 11% of the NAAQS.

Figures XII-1 and XII-2 show trends in annual 1-hour and average NO₂ levels, respectively, for Nebraska area sites from 2009 through 2019. Both parameters have remained well below their respective NAAQS throughout this period, with slight declines in annual average values since 2012.

Figure XII-1. Trends in Annual 98th Percentile Daily 1-Hour NO₂ at Nebraska Area Sites, 2009-2019

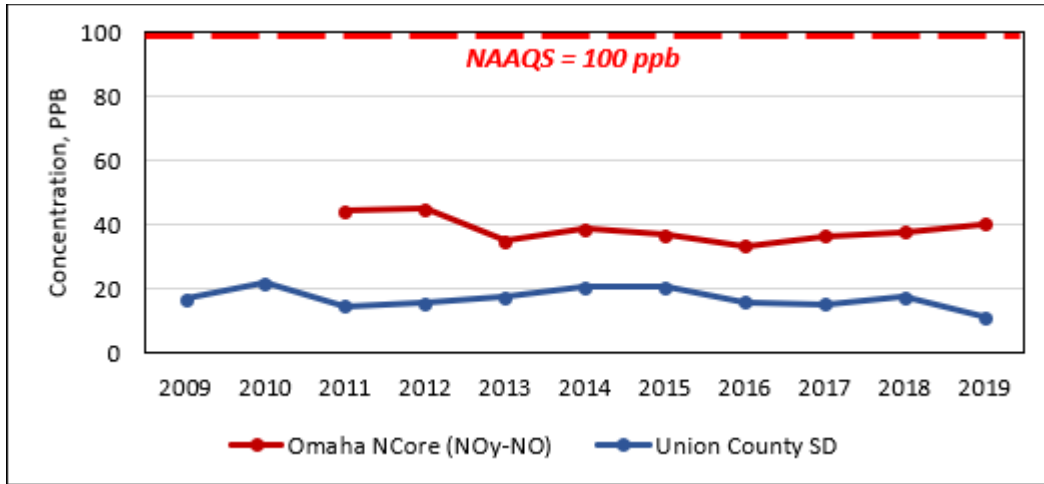
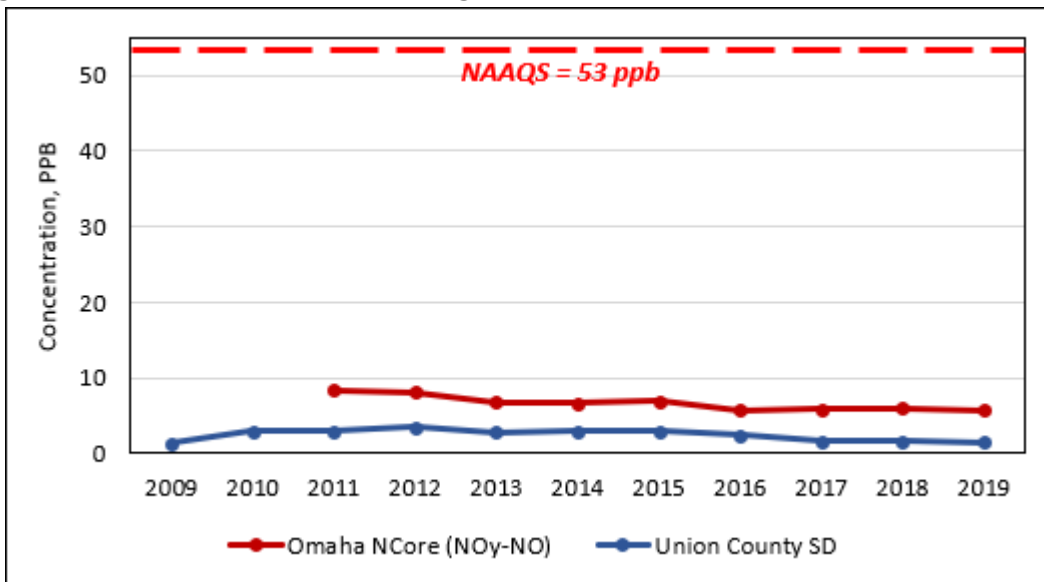


Figure XII-2. Trends in Annual Average NO₂ Levels at Nebraska Area Sites, 2009-2019



XIII. Carbon Monoxide (CO) Monitoring

EPA last reviewed the carbon monoxide NAAQS in 2011, at which time it retained a primary 1-hour standard of 35 parts per million (ppm) and a primary 8-hour standard of 9 ppm. Federal rules require one CO monitor to be collocated with a required near-road NO₂ monitor in any CBSA with a population of 1,000,000 or more. As noted in the previous section, Nebraska does not contain or share any MSA with a population that large, so no near-road CO monitor is required on this basis. However, the 78th and Dodge Street site in Omaha, operated by the Douglas County Health Department, is a near-road, highest-concentration site.

Carbon monoxide monitoring is also required at NCore sites, and the Omaha NCore site includes the required neighborhood-scale CO monitor. Nebraska therefore meets all minimum monitoring requirements for carbon monoxide.

Both monitors recorded CO levels less than 10% of the 1-hour NAAQS and less than 20% of the 8-hour NAAQS in the 2017-2019 time period (see Appendix B Table B-2). Figures XIII-1 and XIII-2 show trends in annual 1-hour and 8-hour CO levels, respectively, for Nebraska sites from 2007 through 2019. These charts show that CO levels have remained well below both NAAQS through this entire period, and the near-road levels at the 78th and Dodge Streets site show a gradual decrease in CO levels through time.

Figure XIII-1. Trends in Annual 2nd Highest 1-Hour CO Levels at Nebraska Sites, 2007-2019

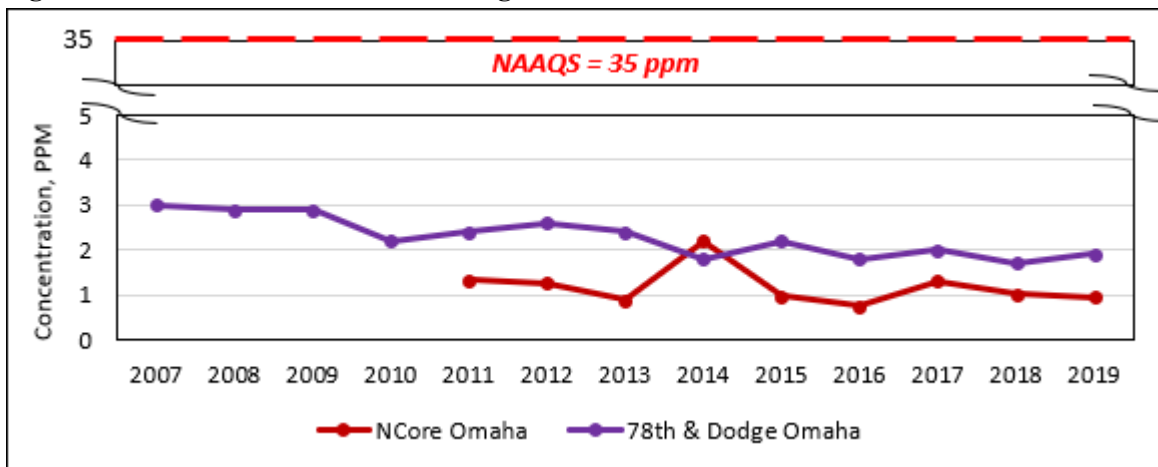
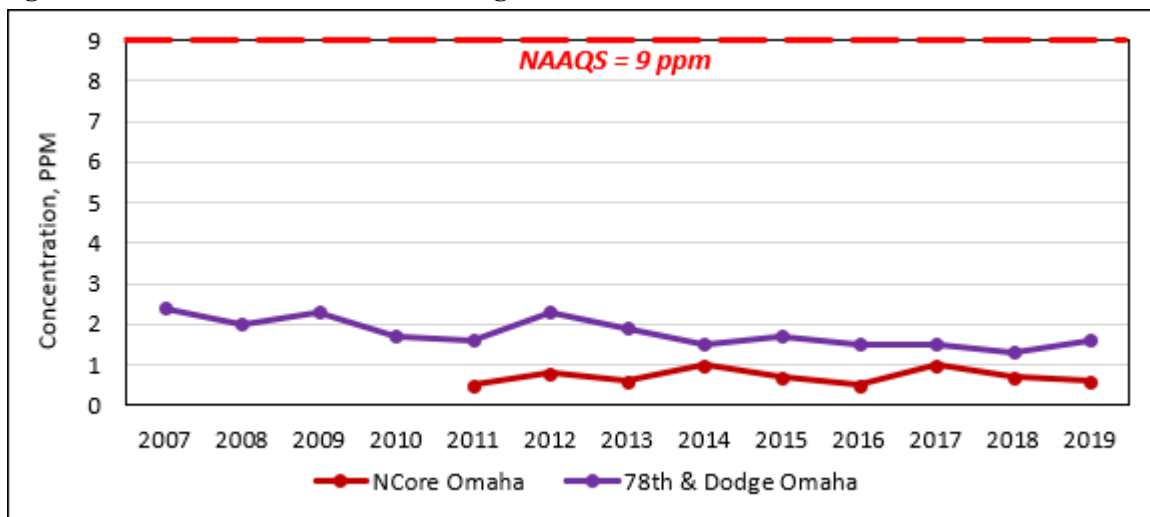


Figure XIII-2. Trends in Annual 2nd Highest 8-Hour CO Levels at Nebraska Sites, 2007-2019



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XIV. Lead

The lead NAAQS was last changed in 2008, when it was tightened from 1.5 $\mu\text{g}/\text{m}^3$ to 0.15 $\mu\text{g}/\text{m}^3$. 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 (tpy) 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.

Two lead sources in Nebraska currently are potentially subject to the lead monitoring requirement.

A. Nucor Steel, Norfolk Lead Monitoring Waiver

Nucor Steel submitted a lead monitoring waiver request in 2011 and provided modeling that demonstrated ambient lead levels would not exceed 50% of the NAAQS. NDEQ reviewed and concurred with a revised Nucor submittal. EPA approved this waiver request in April 16, 2014. The waiver was effective for 5 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 5 years. Modeling presented with the request predicted 3-month rolling average lead emissions or 0.04 $\mu\text{g}/\text{m}^3$, or 27% of the lead NAAQS. EPA Region 7 approved this waiver as part of the 2019 Network Plan in October 2019. This waiver is effective until 2024.

B. Magnus Farley, Fremont Monitor

Magnus-Farley is a bronze and brass casting facility in Fremont, Nebraska. Nebraska operated a lead monitoring site at 1255 Front Street, adjacent to this facility, beginning in 2010. The site had primary and collocated TSP samplers. In 2012 the maximum 3-month average ambient lead level was 0.14 $\mu\text{g}/\text{m}^3$ or 93% of the NAAQS. In 2016 thru 2018 the maximum 3-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. NDEE and EPA Region 7 staff evaluated several alternative monitoring sites, and EPA approved the relocation requested in Nebraska's 2019 Network Plan. Lead monitoring will resume at the new site when negotiation of a site hosting agreement is concluded.

XV. Summary of Changes in Nebraska Air Quality Monitoring Network 2019-2020

The Nebraska Department of Environment and Energy seeks approval from EPA Region 7 for the following recent or upcoming changes in Nebraska's air quality monitoring network.

- Relocation of the Grand Island PM_{2.5} monitoring site necessitated by replacement of the filter-based monitor with a continuous monitor (see section VI.E).
- Removal of the Sheldon Station (Lancaster County) Source-Oriented SO₂ Monitor as allowed by the 2010 SO₂ NAAQS Data Requirements Rule (see section XI-A).
- Removal of the North Omaha Station (Douglas County) Source-Oriented SO₂ Monitor as allowed by 2010 SO₂ NAAQS Data Requirements Rule (see section XI-B).

In addition, NDEE plans to replace the current filter-based PM_{2.5} monitor at Blair, Nebraska with a continuous monitor (see section IX).

Nebraska 2020 Ambient Air Monitoring Network Plan and 5-Year Assessment

XVI. Funding

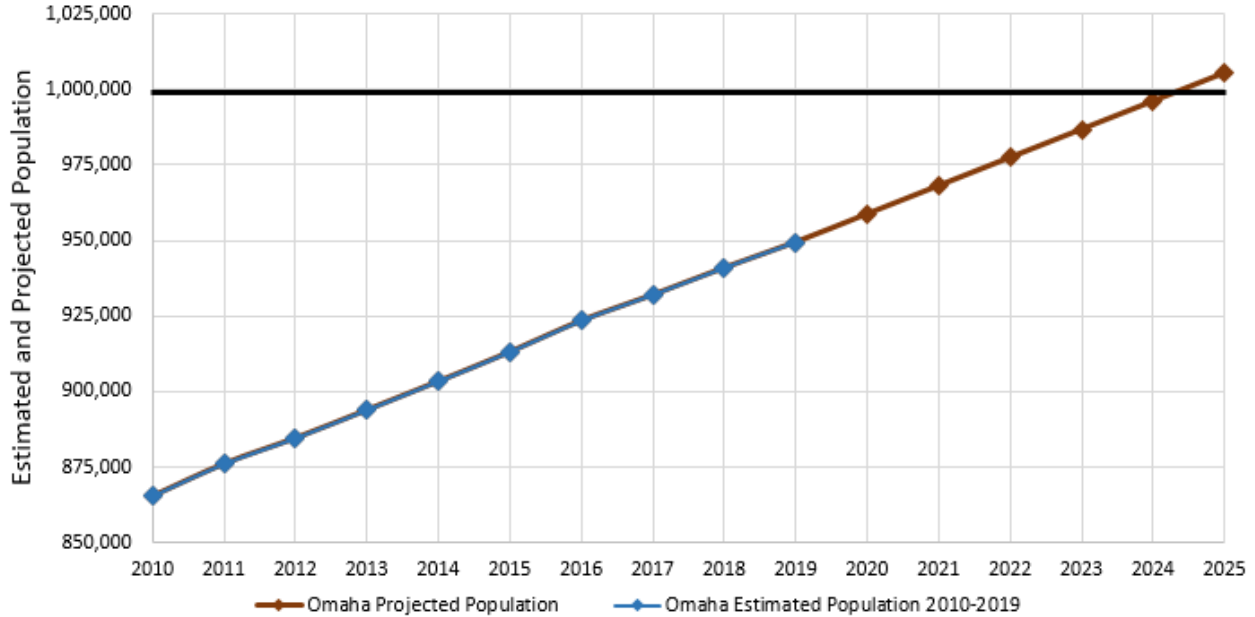
Air monitoring is supported by a combination of federal, cash, state, and local funding sources. Table XVI-1 provides a summary of the primary funding sources used for air monitoring. Federal CAA §103 funding is used to operate PM_{2.5} and IMPROVE monitors. Funding for April 2018 through March 2019 was maintained at the same level as the previous year. Current funding levels are adequate to continue the operation of the existing Nebraska air monitoring network, provided major new equipment purchases are not required.

| Table XVI-1: Primary Funding Sources Used to Support Air Quality Monitoring in Nebraska | |
|------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Nebraska Department of Environmental 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 <i>State Title V Funds</i> 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 NDEQ/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. |
| Metropolitan Area Planning Assoc. (MAPA) Funds | Typically federal grant funds obtained by MAPA are for specific purposes such as transportation or homeland security. Historically they have been used for equipment purchases and site set-up, not network operating costs. |
| 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 <i>State Title V Funds</i> 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 NDEQ/LLCHD work plan, primarily PM _{2.5} related monitoring activities. There is no state/local match requirement. |

XVII. Long-Term Planning for Additional Monitoring in the Omaha-Council Bluffs MSA

The population of the Omaha-Council Bluffs MSA increased by about 9,340 people per year on average between 2010 and 2019, based on U.S. Census Bureau annual population estimates. Figure XVII-1 shows a graph of these annual population estimates along with projected populations through 2025 assuming this estimated growth rate continues unchanged. At this rate of growth, the population of the Omaha-Council Bluffs MSA would surpass 1,000,000 in 2024 or 2025. Availability of 2020 Decennial Census data should allow the 2021 Nebraska Ambient Air Quality Network Plan to include a firmer estimate of the date of this event

Figure XVII-1: Omaha-Council Bluffs MSA Estimated and Projected Population 2010-2025*



* Mid-year population estimates from U.S. Census Bureau. See Appendix C, Figure C-2 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 NO₂, 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 (NO_x), 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.

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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 O₃;
4. Hourly averaged nitrogen oxide (NO), true nitrogen dioxide (NO₂), and total reactive nitrogen (NO_y);
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 by 2024 or 2025.

B. Anticipated Area-Wide and Near-Road NO₂ 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 NO₂ concentrations representing the neighborhood or larger spatial scales (i.e., an area-wide site). PAMS sites collecting NO₂ data that are situated in an area of expected high NO₂ concentrations at the neighborhood or larger spatial scale may be used to satisfy this minimum monitoring requirement if the NO₂ 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 NO₂ 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 NO₂ monitor sites utilizing chemiluminescence FRMs must include, at a minimum, NO, NO₂, and NO_x.

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 78th and Dodge Streets CO site as a near-road NO₂ 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 that proposal would be carried forward when the Omaha-Council Bluffs MSA exceeds the 1,000,000 population threshold.

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 NO₂ monitor. If the existing 78th and Dodge Streets near-road CO monitor site in Omaha is selected as the near-road NO₂ monitor location, this requirement will be satisfied.

Nebraska 2020 Ambient Air Monitoring Network Plan and 5-Year Assessment

Appendix A: Ambient Air Monitoring Sites in Nebraska

See Appendix D for a compliance review with respect to 40 CFR Part 58 Appendixes 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: 41.246792° Longitude: -95.973964° |
| 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: 1/20/11 | 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 (O₃) | | |
| Type/POC: Primary / POC 01 | Monitoring Frequency: Continuous | |
| Analyzer/Sampler: Thermo 49i | EPA Method: EQOA-0880-047 | |
| Start-Up Date: 4/1/11 | 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 /NO _x | EPA Method: RFNA-1289-074 | |
| Start-Up Date: 1/20/11 | Closure Date: Currently operating | |
| Data used for NAAQS comparison: Not Applicable. Monitors for NO & NO _y , 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 (SO₂) – 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: 1/20/11 | 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: 2/1/04 ⁽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: 1/1/99 ⁽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 | | |
| Monitor/Pollutants: 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: 5/25/01 | 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 | | |
| Continued on next page | | |

Nebraska 2020 Ambient Air Monitoring Network Plan and 5-Year Assessment

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: 41.246792° | Longitude: -95.973964° |
| Operating Agency: Douglas County Health Department | | (continued from previous page) | |
| Monitor/Pollutant: PM₁₀ – 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: 1/1/11 ⁽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: 1/1/11 ⁽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 | | | |
| Monitor/Pollutant: Lead (Pb) – Non-source oriented | | | |
| Type/POC: Primary / POC 01 | Monitoring Frequency: Once every 6 days | | |
| Analyzer/Sampler: Hi-Vol TSP-Pb (ICP-MS) | EPA Method: EQL-0310-189 | | |
| Start-Up Date: 12/1/12 | Closure Date: 12/31/17 | | |
| Data used for NAAQS comparison: NA (not operating) | | | |
| Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: NA (site closed) | | | |
| Meteorological Parameters – Manufacturer & Model – Start Date | | | |
| Wind Direction & Velocity – MetOne 50.5 Sonic - 5/13/11 | | | |
| Temperature - MetOne Model 083D – 4/12/11 | Barometric Pressure – MetOne Model 090D – 4/12/11 | | |
| Relative Humidity – MetOne 083D – 4/12/11 | Solar Radiation – MetOne Model 096-1 – 4/12/11 | | |
| 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: | | | |
| <ol style="list-style-type: none"> 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. Between 10/28/10 and 1/3/11, the PM_{2.5} Met One BAM-1020 was temporarily removed from service while being reconfigured to operate as the PM_{2.5} portion of a paired PM_{10-2.5} monitoring system. The other part of the paired system is a PM₁₀ Met One BAM-1020, which is configured to report data in local and STP conditions. The paired units comprising the PM_{10-2.5} monitoring system were put on-line on 1/1/11. | | | |

Nebraska 2020 Ambient Air Monitoring Network Plan and 5-Year Assessment

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: 41.259175° | Longitude: -96.028628° |
| 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: | |
| Purpose: Highest Concentration | | Scale: Microscale | |
| Start-Up Date: 10/01/07 | | 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: 41.297778° | Longitude: -95.937500° |
| Operating Agency: Douglas County Health Department | | | |
| Monitor Information | | Pollutant: Sulfur Dioxide (SO₂) | |
| Type/POC: Primary / POC 01 | | Monitoring Frequency: Continuous | |
| Analyzer/Sampler: Thermo 43c-tle | | EPA Method: EQSA-0486-060 | |
| Purpose: High Conc. & Population Oriented ⁽¹⁾ | | Scale: Neighborhood ⁽¹⁾ | |
| Start-Up Date: 7/1/99 | | 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 (O₃)⁽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: 4/1/15 | | 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 30 th & Fort Street site was re-located to this site in 2015. | | | |

Nebraska 2020 Ambient Air Monitoring Network Plan and 5-Year Assessment

Appendix A: Ambient Air Monitoring Sites in Nebraska

Combined Ozone & PM₁₀ Site in the Omaha MSA Operated by DCHD

| | | | |
|-------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------------------------------------|------------------------|
| Site Name: South Omaha – Ozone | | AIRS ID: 31-055-0028 | |
| Location: 2411 O Street, Omaha | | Latitude: 41.207500° | Longitude: -95.947500° |
| Operating Agency: Douglas County Health Department | | | |
| Monitor Information | | Pollutant: Ozone (O₃) | |
| Type/POC: Primary / POC 01 | Analyzer/Sampler: Thermo 49C | Monitoring Frequency: Continuous | |
| Purpose: Population Oriented | Start-Up Date: 7/1/78 | EPA Method: EQOA-0880-047 | |
| Data used for NAAQS comparison: Yes | | Scale: Neighborhood | |
| Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable | | Closure Date: Currently operating | |
| Monitor Information | | Pollutant: PM₁₀ | |
| Type/POC: Primary / POC 01 | Analyzer/Sampler: Hi-Vol Filter | Monitoring Frequency: Once every 6 days | |
| Purpose: Population & Source Oriented | Start-Up Date: 6/1/06 ⁽¹⁾ | EPA Method: RFPS 1287-063 | |
| Data used for NAAQS comparison: Only when there is no primary data | | Scale: Neighborhood | |
| Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable | | Closure Date: Currently operating | |
| Comments: | | | |
| (1) The PM ₁₀ sampler was initially set-up as a SPAM at 25 th & L Sts and then moved to 2411 O St on 8/22/07. | | | |

PM₁₀ Sites in the Omaha MSA Operated by DCHD

| | | | |
|----------------------------------------------------------------------------------------------|---------------------------------|--------------------------------------------------------|------------------------|
| Site Name: 19th & Burt, Omaha | | AIRS ID: 31-055-0054 | |
| Location: 19th & Burt Sts., Omaha | | Latitude: 41.267770° | Longitude: -95.940830° |
| Operating Agency: Douglas County Health Department | | | |
| Monitor Information | | Pollutant: PM₁₀ | |
| Type/POC: Primary / POC 01 | Analyzer/Sampler: Hi-Vol Filter | Monitoring Frequency: Once every 6 days | |
| Purpose: Population & Source Oriented | Start-Up Date: 6/1/01 | EPA Method: RFPS 1287-063 | |
| Data used for NAAQS comparison: Yes | | Scale: Middle | |
| Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable | | Closure Date: Currently operating | |
| Monitor Information | | Pollutant: PM₁₀ | |
| Type/POC: Collocated / POC 02 | Analyzer/Sampler: Hi-Vol Filter | Monitoring Frequency: Once every 6 days ⁽¹⁾ | |
| Purpose: Population & Source Oriented | Start-Up Date: 6/1/01 | EPA Method: RFPS 1287-063 | |
| Data used for NAAQS comparison: Only when there is no primary data | | Scale: Middle | |
| Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable | | Closure Date: Currently operating | |
| Comments: None | | | |

Nebraska 2020 Ambient Air Monitoring Network Plan and 5-Year Assessment

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: 41.333056° | Longitude: -96.099722° |
| 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: 2025 Sequential | | EPA Method: RFPS-0498-118 | |
| Purpose: Population & Source Oriented | | Scale: Neighborhood | |
| Start-Up Date: 1/1/99 | | 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: 2025 Sequential | | EPA Method: RFPS-0498-118 | |
| Purpose: Population & Source Oriented | | Scale: Neighborhood | |
| Start-Up Date: 10/1/14 | | 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: 41.166944° | Longitude: -95.923889° |
| 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: 3/1/99 | | 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: 41.551136° | 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: 2025 Sequential | | EPA Method: RFPS-0498-118 | |
| Purpose: Population & Source Oriented | | Scale: Neighborhood | |
| Start-Up Date: 4/6/09 | | 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 | | | |

Nebraska 2020 Ambient Air Monitoring Network Plan and 5-Year Assessment

Appendix A: Ambient Air Monitoring Sites in Nebraska

Sulfur Dioxide Site in the Omaha MSA Operated by DCHD

| | | | |
|-------------------------------------------------------------------------------------------------------------------|--|---------------------------------------------------|------------------------|
| Site Name: OPPD North Omaha Station | | AIRS ID: 31-055-0057 | |
| Location: 7288 John Pershing Drive | | Latitude: 41.325579° | Longitude: -95.946297° |
| Operating Agency: Douglas County Health Department | | | |
| Monitor Information | | Pollutant: Sulfur Dioxide (SO₂) | |
| Type/POC: Primary / POC 01 | | Monitoring Frequency: Continuous | |
| Analyzer/Sampler: Thermo 43i | | EPA Method: EQSA-0486-060 | |
| Purpose: Population & Source Oriented | | Scale: Microscale | |
| Start-Up Date: 01/01/17 | | Closure Date: Currently operating | |
| Data used for NAAQS comparison: Yes | | | |
| Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, Appendix B not applicable | | | |
| Comments: This site was established to satisfy requirements of the Data Requirements Rule (DRR) in 40 CFR Part 51 | | | |

PM₁₀ Sites 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 PM₁₀ 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: PM₁₀ | |
| Type/POC: Primary / POC 01 | | Monitoring Frequency: Continuous | |
| Analyzer/Sampler: Met One BAM ⁽²⁾ | | EPA Method: EQPM-0798-170 | |
| Purpose: Population & Source Oriented | | Scale: Neighborhood | |
| Start-Up Date: 01/01/85 | | 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 waste water 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. | | | |

Nebraska 2020 Ambient Air Monitoring Network Plan and 5-Year Assessment

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: 40.984722° | Longitude: -96.677222° |
| Operating Agency: Lincoln Lancaster County Health Department | | | |
| Monitor Information | | Pollutant: Ozone | |
| Type/POC: Primary / POC 01 | Analyzer/Sampler: Teledyne API 400E | Monitoring Frequency: Continuous | EPA Method: EQOA-0992-087 |
| Purpose: Population Oriented | Start-Up Date: 1/1/85 | Scale: Urban | 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: 40.812590° | Longitude: -96.683020° |
| Operating Agency: Lincoln Lancaster County Health Department | | | |
| Monitor Information | | Pollutant: PM_{2.5} | |
| Type/POC: Primary / POC 01 | Analyzer/Sampler: R&P 2025 Seq. Filter | Monitoring Frequency: Once every 3 days | EPA Method: RFPS 0498-118 |
| Purpose: Population Oriented | Start-Up Date: 1/1/99 | Scale: Neighborhood | 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 | Analyzer/Sampler: R&P 2025 Seq. Filter | Monitoring Frequency: Once every 6 days | EPA Method: RFPS 0498-118 |
| Purpose: Population Oriented | Start-Up Date: 1/1/99 | Scale: Neighborhood | 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⁾ | Analyzer/Sampler: Met One BAM-1020 | Monitoring Frequency: Continuous | EPA Method: EQPM-0308-170 |
| Purpose: Population Oriented | Start-Up Date: 7/1/06 | Scale: Neighborhood | 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 positive bias when compared to same day FRM data. In 2015, there was a 39% bias on same-day annual average data, and a 17% positive bias for the same-day 98 th percentile. | | | |

Nebraska 2020 Ambient Air Monitoring Network Plan and 5-Year Assessment

Appendix A: Ambient Air Monitoring Sites in Nebraska

Sites in the Lincoln MSA Operated by LLCHD - continued

| | | | |
|-------------------------------------------------------------------------------------------------------------------|--|---------------------------------------------------|------------------------|
| Site Name: Sheldon Station | | AIRS ID: 31-109-0025 | |
| Location: SW 42nd St ~0.2 mi N of W Pella Rd | | Latitude: 40.554722° | Longitude: -96.780278° |
| Operating Agency: Lincoln-Lancaster County Health Department | | | |
| Monitor Information | | Pollutant: Sulfur Dioxide (SO₂) | |
| Type/POC: Primary / POC 01 | | Monitoring Frequency: Continuous | |
| Analyzer/Sampler: Teledyne API T100 | | EPA Method: EQSA-0495-100 | |
| Purpose: Highest Concentration | | Scale: Microscale | |
| Start-Up Date: 12/23/16 | | 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 established to satisfy requirements of the Data Requirements Rule (DRR) in 40 CFR Part 51 | | | |

Permanently Closed PM_{2.5} Sites Operated by NDEE

| | | | |
|----------------------------------------------------------------------------------------------|--|-----------------------------------------|------------------------|
| Site Name: Grand Island Senior High | | AIRS ID: 31-079-0004 | |
| Location: 2124 N Lafayette Ave, Grand Island | | Latitude: 40.942099° | Longitude: -98.364967° |
| Operating Agency: Nebraska Department of Environment and Energy | | | |
| Monitor Information | | Pollutant: PM_{2.5} | |
| Type/POC: Primary FRM/ POC 01 | | Monitoring Frequency: Once every 3 days | |
| Analyzer/Sampler: R&P 2025 Sequential | | EPA Method: RFPS-0498-118 | |
| Purpose: Transport & Population Oriented | | Scale: Regional & Neighborhood | |
| Start-Up Date: 5/7/04 | | Closure Date: 3/31/20 | |
| Data used for NAAQS comparison: Yes | | | |
| Meets applicable provisions of 40 CFR Part 58 Appendixes A thru E: Yes, App B not applicable | | | |
| Comments: Site superseded by site 31-079-0005 in Grand Island. | | | |

| | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------------|-----------------------|
| Site Name: Scottsbluff Senior High School | | AIRS ID: 31-157-0004 | |
| Location: Hwy 26 & 5th Ave, Scottsbluff⁽¹⁾ | | Latitude: 41.87609° | Longitude: -103.6587° |
| Operating Agency: Nebraska Department of Environment and Energy | | | |
| Monitor Information | | Pollutant: PM_{2.5} | |
| Type/POC: Primary FRM/ POC 01 | | Monitoring Frequency: Once every 3 days | |
| Analyzer/Sampler: Thermo 2025i Sequential | | EPA Method: RFPS-0498-118 | |
| Purpose: Background & Population Oriented | | Scale: Regional & Neighborhood | |
| Start-Up Date: 5/13/09 | | Closure Date: 3/23/2020 | |
| 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) The previous sampler was moved ~170 m W-SW on 4/15/16 (1 st sample date at new location). The move was necessitated by re-construction of athletic fields and at the request of the school. The site ID # was retained at that time. | | | |

Nebraska 2020 Ambient Air Monitoring Network Plan and 5-Year Assessment

Appendix A: Ambient Air Monitoring Sites in Nebraska

PM_{2.5} Sites Operated by NDEE

| | | | |
|----------------------------------------------------------------------------------------------|------------------------------------|------------------------------------|-----------------------------------|
| Site Name: Grand Island NDOT | | AIRS ID: 31-079-0005 | |
| Location: 3305 W Old Potash Hwy, Grand Island | | Latitude: 40.918333° | Longitude: -98.378889° |
| Operating Agency: Nebraska Department of Environment and Energy | | | |
| Monitor Information | | Pollutant: PM_{2.5} | |
| Type/POC: Primary Continuous/ POC 01 | Analyzer/Sampler: Met One BAM-1020 | Monitoring Frequency: Continuous | EPA Method: EQPM-0308-170 |
| Purpose: Background Surveillance | Start-Up Date: 11/26/19 | Scale: Regional | 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 | | | |

| | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|------------------------------------|-----------------------------------|
| Site Name: Scottsbluff Senior High School | | AIRS ID: 31-157-0006 | |
| Location: Hwy 26 & 5th Ave, Scottsbluff ⁽¹⁾ | | Latitude: 41.875556° | Longitude: -103.658056° |
| Operating Agency: Nebraska Department of Environment and Energy | | | |
| Monitor Information | | Pollutant: PM_{2.5} | |
| Type/POC: Primary Continuous/ POC 01 | Analyzer/Sampler: Met One BAM-1020 | Monitoring Frequency: Continuous | EPA Method: EQPM-0308-170 |
| Purpose: Background & Population Oriented | Start-Up Date: 5/13/09 | Scale: Regional & Neighborhood | 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) A Thermo 2025i FRM Sequential sampler operated at this location on a 3-day sampling schedule with the AIRS ID 31-157-0004 until 3/24/20, when a continuous sampler was installed at the same location and a new AIRS ID was assigned. | | | |

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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: 41.90583° | Longitude: -97.31583° |
| 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: Micro-scale | |
| Start-Up Date: 3/9/10 | | 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: Micro-scale | |
| Start-Up Date: 3/9/10 | | 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 Farley. Site closed at the request of the landowner. A nearby alternative site has been approved 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 approved by the EPA R7 Administrator in April 2014 and is effective through April 2019, unless revoked or extended. Renewal of this waiver was requested in the Nebraska 2019 Network Plan, which was approved by the EPA R7 Administrator in October 2019.

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Appendix A: Ambient Air Monitoring Sites in Nebraska

Interagency Monitoring of Protected Visual Environments (IMPROVE) Sites *

* 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: 41.8888° | Longitude: -100.3387° |
| 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 | | | |

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: 41.1528° | Longitude: -96.4912 |
| Operating Agency: University of Nebraska | | | |
| Monitor Information | | Pollutant: TNT/MDN | |
| Type/POC: NTN/MDN | | Monitoring Frequency: Continuous | |
| Method Description: NTN/MDN | | EPA Method: Not applicable | |
| Purpose: Background & Transport | | Scale: Regional | |
| Start-Up Date: 7/25/78 | | Closure Date: Currently operating | |
| <p>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.</p> <ul style="list-style-type: none"> 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 initiated 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. | | | |

Nebraska 2020 Ambient Air Monitoring Network Plan and 5-Year Assessment

Appendix A: Ambient Air Monitoring Sites in Nebraska

National Atmospheric Deposition Program (NADP) Sites (continued)

| | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---------------------------------------|-----------------------|
| Site Name: North Platte NADP | | AIRS ID: Not applicable, See Comments | |
| Location: U of Ne Ag Station, Lincoln, Co. | | Latitude: 41.0592° | Longitude: -100.7464° |
| Operating Agency: University of Nebraska | | | |
| Monitor Information | | Pollutant: NTN | |
| Type/POC: NTN | | Monitoring Frequency: Continuous | |
| Method Description: NTN | | EPA Method: Not applicable | |
| Purpose: Background & Transport | | Scale: Regional | |
| Start-Up Date: 9/24/85 | | Closure Date: Currently operating | |
| <p>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.</p> <ul style="list-style-type: none"> • 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. | | | |

Nebraska 2020 Ambient Air Monitoring Network Plan and 5-Year Assessment
Appendix B: Comparison of Ambient Air Monitoring Data to NAAQS

This appendix compares ambient air quality data from 2017 through 2019 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 | 2017 | 2018 | 2019 | DV | % NAAQS |
| Omaha MSA and Near-By Montgomery Co., IA⁽⁴⁾ | | | | | | |
| Omaha NCore | DCHD | 0.062 | 0.069 | 0.061 | 0.064 | 91% |
| 2411 O St., Omaha | DCHD | 0.061 | 0.063 | 0.050 | 0.058 | 83% |
| 1616 Whitmore St, Omaha | DCHD | 0.064 | 0.066 | 0.062 | 0.064 | 91% |
| Pisgah, Harrison Co., IA | IA DNR | 0.064 | 0.066 | 0.062 | 0.064 | 91% |
| Montgomery County, IA⁽²⁾ | IA DNR | 0.059 | 0.064 | 0.059 | 0.060 | 86% |
| Lincoln MSA | | | | | | |
| First & Maple, Davey | LLCHD | 0.062 | 0.062 | 0.056 | 0.060 | 86% |
| Sioux City MSA | | | | | | |
| 31986 475th Ave, Union Co, SD | SD DEP | 0.066 | 0.068 | 0.064 | 0.066 | 94% |
| Nebraska Non-MSA | | | | | | |
| Santee Indian Reservation | US EPA | 0.067 | 0.065 | 0.062 | 0.064 | 91% |
| Sites in Surrounding States | | | | | | |
| Emmetsburg, IA | IA DNR | 0.061 | 0.067 | 0.065 | 0.064 | 91% |
| Des Moines, IA | IA DMR | 0.060 | 0.065 | 0.059 | 0.061 | 87% |
| Savannah, MO | MO DNR | 0.062 | 0.067 | 0.060 | 0.063 | 90% |
| Kansas City Metro (Max DV site) | MO DNR | 0.070 | 0.072 | 0.062 | 0.068 | 97% |
| Topeka KS | KS DHE | 0.062 | 0.062 | 0.061 | 0.061 | 87% |
| Cedar Bluff Reservoir, KS | KS DHE | 0.062 | 0.064 | 0.058 | 0.061 | 87% |
| Denver, CO Metro (Max DV site) | CO DPHE | 0.074 | 0.083 | 0.078 | 0.078 | 111% |
| Greeley, CO | CO DPHE | 0.072 | 0.073 | 0.065 | 0.070 | 100% |
| Cheyenne, WY (Max DV site) | WY DEQ | 0.065 | 0.068 | 0.059 | 0.064 | 91% |
| Newcastle, WY | WY BLM | 0.062 | 0.063 | 0.059 | 0.061 | 87% |
| Sioux Falls, SD | SD DEP | 0.066 | 0.069 | 0.065 | 0.066 | 94% |
| Wind Cave NP, Custer Co., SD | SD DEP | 0.065 | 0.063 | 0.057 | 0.061 | 87% |
| Badlands NP, Jackson Co., SD | SD DEP | 0.067 | 0.063 | 0.058 | 0.062 | 89% |
| Notes and Explanations: | | | | | | |
| (1) EPA AQS data retrieval 4/8/20. Concentrations are in units of ppm. Annual values are the 4 th highest daily maximum 8-hour concentrations (ppm). The Design Value (DV) is the truncated 3-year average of the 4 th 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. | | | | | | |

Nebraska 2020 Ambient Air Monitoring Network Plan and 5-Year Assessment
Appendix B: Comparison of Ambient Air Monitoring Data to NAAQS

Table B-2: Carbon Monoxide Data

| Comparison of 3-Year Maximum Value for 1-Hour Carbon Monoxide to NAAQS ^{(1) (2)} | | | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------|-------------|------------------------------------|----------------|
| Site | 2017 | 2018 | 2019 | Design Value ⁽²⁾ | % NAAQS |
| Omaha MSA | | | | | |
| 78th & Dodge Sts, Omaha | 2.0 | 1.7 | 1.9 | 2.0 | 6% |
| Omaha NCore ⁽⁴⁾ | 1.31 | 1.01 | 0.95 | 1.31 | 4% |
| Comparison of 3-Year Maximum Value for 8-Hour Carbon Monoxide to NAAQS ^{(1) (3)} | | | | | |
| Site | 2017 | 2018 | 2019 | Design Value ⁽³⁾ | % NAAQS |
| Omaha MSA | | | | | |
| 78th & Dodge Sts., Omaha | 1.5 | 1.3 | 1.6 | 1.6 | 18% |
| Omaha NCore ⁽⁴⁾ | 1.0 | 0.7 | 0.6 | 1.0 | 11% |
| Notes and Explanations: | | | | | |
| (1) EPA AQS data retrieval 4/8/20. 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 Design Value is the highest annual 2 nd highest maximum value over the last 3 years. The annual values shown are the annual 2 nd highest maximum values. Concentrations are in units of ppm. | | | | | |
| (3) The 8-hour NAAQS = 9 ppm. The Design Value is the highest annual 2 nd highest maximum value over the last 3 years. The annual values shown are the 2 nd highest 8-hour maximum values. Concentrations are in units of ppm. | | | | | |
| (4) Omaha NCore is a multi-pollutant monitoring site located at 4102 Woolworth Street. | | | | | |

Nebraska 2020 Ambient Air Monitoring Network Plan and 5-Year Assessment
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 | 2017 | 2018 | 2019 | Design Value ⁽¹⁾ | % NAAQS |
| Omaha MSA | | | | | |
| 1616 Whitmore St., Omaha | 0.055 | 0.029 | 0.038 | 0.041 | 55% |
| Omaha NCore ⁽²⁾ | 0.046 | 0.017 | 0.009 | 0.024 | 32% |
| 7288 John Pershing Dr., Omaha ⁽³⁾ | 0.036 | 0.037 | 0.029 | 0.034 | 45% |
| Lincoln MSA | | | | | |
| SW 42nd St., Lancaster Co. ⁽⁴⁾ | 0.044 | 0.010 | 0.033 | 0.029 | 39% |
| Sioux City MSA Sites | | | | | |
| 31986 475th Ave, Union Co, SD ⁽⁵⁾ | 0.004 | 0.003 | 0.003 | 0.003 | 4% |
| <p>Notes and Explanations:</p> <p>(1) EPA AQS data retrieval 4/8/20. The 1-hour NAAQS is 75 ppb or 0.075 ppm (promulgated in June 2010 and retained in March 2019). 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. Values from monitors with less than 3 years of data are shown in red.</p> <p>(2) Omaha NCore is a multi-pollutant monitoring site located at 4102 Woolworth Street.</p> <p>(3) The 7288 John Pershing Dr. site began operation on 01/01/17 and is 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.</p> <p>(4) The SW 42nd St., Lancaster County site began operation on 12/23/16 and is 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.</p> <p>(5) The Union Co., SD site is operated by the South Dakota Department of Environment & Natural Resources.</p> | | | | | |

Nebraska 2020 Ambient Air Monitoring Network Plan and 5-Year Assessment
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 | 2017 | 2018 | 2019 | Design Value ⁽²⁾ | % NAAQS |
| Sioux City MSA | | | | | |
| 31986 475th Ave, Union Co, SD ⁽⁴⁾ | 0.015 | 0.018 | 0.012 | 0.015 | 15% |
| Comparison of 3-Year Maximum Annual Average Value for Nitrogen Dioxide to NAAQS ⁽³⁾ | | | | | |
| Site | 2017 | 2018 | 2019 | Design Value ⁽³⁾ | % NAAQS |
| Sioux City MSA | | | | | |
| 31986 475th Ave, Union Co, SD ⁽⁴⁾ | 0.002 | 0.002 | 0.002 | 0.002 | 3% |
| Notes and Explanations: | | | | | |
| (1) EPA AQS data retrieval 4/8/20. All concentrations expressed in ppm units. | | | | | |
| (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 | 2017 | 2018 | 2019 | Approx. DV ⁽³⁾ | Max % NAAQS |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------|-------------|----------------------------------|--------------------|
| 1-Hour Data: 98th Percentile | | | | | |
| NOy-NO ⁽³⁾⁽⁴⁾⁽⁵⁾ | 0.037 | 0.038 | 0.040 | 0.038 | 38% |
| Annual Average Data | | | | | |
| NOy-NO | 0.0059 | 0.0060 | 0.0058 | 0.0059 | 11% |
| Footnotes: | | | | | |
| (1) EPA AQS data retrieval 4/8/20. 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. | | | | | |

Nebraska 2020 Ambient Air Monitoring Network Plan and 5-Year Assessment
Appendix B: Comparison of Ambient Air Monitoring Data to NAAQS

Table B-5a: PM₁₀ – Annual Number of Exceedances ^{(1) (2)}

| Site | 2017 | 2018 | 2019 | Design Value ⁽¹⁾ |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|-----------------------------|
| Omaha MSA Sites ⁽⁶⁾ | | | | |
| Omaha NCore, 4102 Woolworth St. ⁽³⁾ | 0 | 0 | 0 | 0.0 |
| 2411 O St, Omaha | 0 | 0 | 0 | 0.0 |
| 19th & Burt Sts, Omaha | 0 | 0 | 0 | 0.0 |
| 3130 C Ave, Council Bluffs, IA ⁽⁴⁾ | 0 | 0 | 0 | 0.0 |
| Weeping Water City ⁽⁵⁾ | 0 | 0 | 0 | 0.0 |
| Sioux City MSA Site | | | | |
| 31986 475th Ave, Union Co, SD ⁽⁶⁾ | 0 | 0 | 0 | 0.0 |
| <p>Notes and Explanations:</p> <p>(1) EPA AQS data retrieval 4/10/20. The PM₁₀ NAAQS is an exceedance-based standard with a 24-hour averaging time and 150 ug/m³ 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 ug/m³ or more. Sites with 3-year average of exceedances of 1.0 or less are in attainment with the NAAQS.</p> <p>(2) NAAQS History: The primary 24-hour NAAQS was initially set at 150 ug/m³ in 1987 and was retained at this level in the 1997, 2006 and 2012 PM NAAQS reviews.</p> <p>(3) Omaha NCore is a multi-pollutant monitoring site located at 4102 Woolworth Street.</p> <p>(4) The Council Bluffs, IA site is operated by the IA DNR</p> <p>(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.</p> <p>(6) The Union Co., SD site is operated by the South Dakota Department of Environment & Natural Resources</p> | | | | |

Nebraska 2020 Ambient Air Monitoring Network Plan and 5-Year Assessment
Appendix B: Comparison of Ambient Air Monitoring Data to NAAQS

Table B-5b: PM₁₀ – Annual Maximum 24-Hour Data ^{(1) (2)}

| Site | 2017 | 2018 | 2019 | 4 th Highest Value ⁽¹⁾ | % NAAQS |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|----------------------------------------------------|------------|
| Omaha MSA Sites⁽⁶⁾ | | | | | |
| Omaha NCore, 4102 Woolworth St. ⁽³⁾ | 63 | 64 | 52 | 56 | 37% |
| 2411 O St, Omaha | 47 | 55 | 43 | 44 | 29% |
| 19th & Burt Sts, Omaha | 51 | 51 | 40 | 44 | 29% |
| 3130 C Ave, Council Bluffs, IA ⁽⁴⁾ | 64 | 83 | 48 | 57 | 38% |
| Weeping Water City ⁽⁵⁾ | 67 | 67 | 50 | 62 | 41% |
| Sioux City MSA Site | | | | | |
| 31986 475th Ave, Union Co, SD ⁽⁶⁾ | 52 | 131 | 56 | 84 | 56% |
| <p>Notes and Explanations:</p> <p>(1) EPA AQS data retrieval 4/9/20. Year columns show annual maximum 24-hour average values of PM₁₀. NAAQS = 150 µg/m³, not to be exceeded more than once per year on average over 3 years, where exceedance is defined as a value of 155 µg/m³ or more. The 4th-highest 24-hour average value in the three-year period is shown for informal comparison to the NAAQS.</p> <p>(2) NAAQS History: The primary 24-hour NAAQS was initially set at 150 µg/m³ in 1987, and was retained at this level in the 1997, 2006 and 2012 PM NAAQS reviews.</p> <p>(3) Omaha NCore is a multi-pollutant monitoring site located at 4102 Woolworth Street.</p> <p>(4) The Council Bluffs, IA site is operated by the IA DNR</p> <p>(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.</p> <p>(6) The Union Co., SD site is operated by the South Dakota Department of Environment & Natural Resources</p> | | | | | |

Nebraska 2020 Ambient Air Monitoring Network Plan and 5-Year Assessment
Appendix B: Comparison of Ambient Air Monitoring Data to NAAQS

Table B-5c: PM₁₀ - Annual Average Data ⁽¹⁾

| Site | 2017 | 2018 | 2019 | 3-Year Average | % Old Std |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|----------------|-----------|
| Omaha MSA ⁽⁴⁾ | | | | | |
| Omaha NCore, 4102 Woolworth St. ⁽²⁾ | 21.7 | 18.6 | 17.7 | 19.3 | 39% |
| 2411 O St, Omaha | 22.4 | 23.1 | 20.7 | 22.1 | 44% |
| 19th & Burt Sts, Omaha | 20.6 | 20.9 | 18.8 | 20.1 | 40% |
| 3130 C Ave, Council Bluffs, IA ⁽³⁾ | 21.1 | 21.5 | 19.0 | 20.5 | 41% |
| Weeping Water City ⁽⁴⁾ | 20.0 | 17.3 | 15.7 | 17.7 | 35% |
| Sioux City MSA | | | | | |
| 31986 475th Ave, Union Co, SD ⁽⁷⁾ | 15.2 | 18.3 | 15.2 | 16.2 | 32% |
| Notes and Explanations: | | | | | |
| <p>(1) EPA AQS data retrieval 4/10/20. There is currently no NAAQS for the annual average PM₁₀ concentration. An annual average NAAQS of 50 µg/m³ was established in 1987, and then rescinded on December 18, 2006. Comparison to the rescinded NAAQS is provided for informational purposes only. Concentrations are in units of µg/m³.</p> <p>(2) Omaha NCore is a multi-pollutant monitoring site located at 4102 Woolworth Street.</p> <p>(3) The Council Bluffs IA site is operated by the IA DNR</p> <p>(4) 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.</p> <p>(5) The Union Co., SD site is operated by the South Dakota Department of Environment & Natural Resources.</p> | | | | | |

Nebraska 2020 Ambient Air Monitoring Network Plan and 5-Year Assessment
Appendix B: Comparison of Ambient Air Monitoring Data to NAAQS

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

| Site | 2017 | 2018 | 2019 | Design Value ⁽¹⁾ | % NAAQS |
|------------------------------------------------------------------|------|------|------|-----------------------------|---------|
| Omaha MSA & Montgomery Co., IA ⁽⁵⁾ | | | | | |
| Omaha NCore ⁽³⁾ | 21.0 | 19.5 | 17.0 | 19.2 | 55% |
| 9225 Berry St.; Omaha | 16.5 | 22.0 | 18.5 | 19.0 | 54% |
| 2912 Coffey Ave., Bellevue | 19.2 | 21.2 | 21.5 | 20.6 | 59% |
| 2242 Wright St., Blair | 15.9 | 20.8 | 17.9 | 18.2 | 52% |
| 3130 C Ave., Council Bluffs, IA ⁽⁴⁾ | 18.8 | 22.0 | 17.7 | 19.5 | 56% |
| Montgomery Co., IA (outside Omaha MSA) ^{(4) (5)} | 14.3 | 18.5 | 15.2 | 16.0 | 46% |
| Lincoln MSA | | | | | |
| 3140 N Street, Lincoln | 19.2 | 19.2 | 16.6 | 18.3 | 52% |
| Sioux City MSA | | | | | |
| 901 Floyd Blvd, Sioux City, IA ⁽⁴⁾ | 18.7 | 20.0 | 22.3 | 20.3 | 58% |
| 31986 475th Ave, Union Co, SD ⁽⁶⁾ | 14.5 | 15.5 | 16.5 | 15.5 | 44% |
| Other Nebraska Sites | | | | | |
| Grand Island Senior High | 14.7 | 18.6 | 16.1 | 15 | 43% |
| Scottsbluff | 24.1 | 17.6 | 12.3 | 18.0 | 51% |

Notes and Explanations:

- (1) EPA AQS data retrieval 4/10/20. 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/m³ NAAQS. Concentrations are in units of µg/m³. Annual values that do not meet completeness criteria are shown in red.
- (2) NAAQS History: The 24-hour PM_{2.5} NAAQS was initially established at 65 µg/m³ in 1997. It was lowered to 35 mg/m³ in 2006 and retained at the 35 µg/m³ level in 2012.
- (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

Nebraska 2020 Ambient Air Monitoring Network Plan and 5-Year Assessment
Appendix B: Comparison of Ambient Air Monitoring Data to NAAQS

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

| Site | 2017 | 2018 | 2019 | Design Value ⁽¹⁾ | % NAAQS |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|-----------------------------|---------|
| Omaha MSA & Montgomery Co., IA ⁽⁴⁾ | | | | | |
| Omaha NCore ⁽³⁾ | 9.6 | 8.3 | 6.8 | 8.2 | 69% |
| 9225 Berry St.; Omaha | 7.0 | 8.0 | 6.9 | 7.3 | 61% |
| 2912 Coffey Ave., Bellevue | 9.7 | 9.1 | 7.8 | 8.9 | 74% |
| 2242 Wright St., Blair | 6.7 | 7.6 | 6.6 | 7.0 | 58% |
| 3130 C Ave., Council Bluffs, IA ⁽⁴⁾ | 7.7 | 8.8 | 7.7 | 8.1 | 66% |
| Montgomery Co., IA (outside Omaha MSA) ^{(4) (5)} | 6.4 | 6.9 | 6.5 | 6.6 | 55% |
| Lincoln MSA | | | | | |
| 3140 N Street, Lincoln | 6.7 | 7.1 | 6.5 | 6.8 | 56% |
| Sioux City MSA | | | | | |
| 901 Floyd Blvd, Sioux City, IA ⁽⁴⁾ | 7.6 | 8.3 | 7.4 | 7.8 | 65% |
| 31986 475th Ave, Union Co, SD ⁽⁶⁾ | 6.4 | 6.3 | 5.8 | 6.2 | 51% |
| Other Nebraska Sites | | | | | |
| Grand Island Senior High | 6.0 | 6.2 | 5.0 | 5.7 | 48% |
| Scottsbluff | 7.6 | 6.3 | 4.8 | 6.2 | 52% |
| Notes and Explanations: | | | | | |
| (1) EPA AQS data retrieval 4/10/20. 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 that do not meet completeness criteria 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 and then lowered to 12 µg/m ³ in December 2012. | | | | | |
| (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 | | | | | |

Nebraska 2020 Ambient Air Monitoring Network Plan and 5-Year Assessment
Appendix B: Comparison of Ambient Air Monitoring Data to NAAQS

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

| Annual Maximum Rolling 3-Month Average Values ^{(1) (2)} | | | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|------|-------------------|---------|
| Site | 2017 | 2018 | 2019 | DV ⁽¹⁾ | % NAAQS |
| Fremont ⁽³⁾ | 0.042 | 0.024 | nd | 0.042 | 28% |
| Omaha NCore ⁽⁴⁾ | 0.003 | nd | nd | 0.003 | 2% |
| <p>Notes and Explanations:</p> <p>(1) Concentrations are in units of $\mu\text{g}/\text{m}^3$. The 3-month average NAAQS = $0.15 \mu\text{g}/\text{m}^3$. The DV or Design Value is the highest 3-month average in the last 3 years. Values from monitors with less than 3 years of data are shown in red.</p> <p>(2) NAAQS History: The initial NAAQS was promulgated in 1978 and was set at $1.5 \mu\text{g}/\text{m}^3$ calendar quarter average. In 2008, it was modified to $0.15 \mu\text{g}/\text{m}^3$ 3-month running average.</p> <p>(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 2020.</p> <p>(4) Lead monitoring at the Omaha NCore site was discontinued as of December 31, 2017, as discussed in the 2018 Network Plan</p> | | | | | |

Nebraska 2020 Ambient Air Monitoring Network Plan and 5-Year Assessment

Appendix C: 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.

Population trends within Nebraska have remained fairly constant over the last 2 decades. This population dynamics analysis is updated through 2018 at the city level and 2019 at the county level.

U.S. Census Bureau & 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 2010. In addition, the US Census Bureau conducts annual surveys to provide annual population estimates for each interim year.

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 (CBSA) consist of one or more whole counties that center on an urban center of at least 10,000 people and 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 *urbanized area* (a densely settled territory delineated by the US Census Bureau that contains 50,000 or more people);
- Micropolitan Statistical Areas (MiSAs), which contain one or more *urban clusters* with a population of 10,000 to 49,999. (An *urban cluster* is a densely settled territory delineated by the US Census Bureau that contains at least 2,500 people, but fewer than 50,000 people);
- 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. Figure C-1 (below) shows the location and boundaries of MSAs and MiSAs in Nebraska as revised by the Office of Management and Budget in September 2018 based on the 2010 decennial census. 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

Most of the area of Nebraska is rural and used for agricultural production (farming and ranching). Conversely, most of the population of Nebraska (59%) resides in the Omaha and Lincoln MSAs, and 82% of the population resides within the boundaries of designated MSAs and MiSAs (see Table C-1). Even within the MSAs and MiSAs, agricultural usage is the predominant land use except for the two most densely populated counties of Douglas and Sarpy.

Nebraska 2020 Ambient Air Monitoring Network Plan and 5-Year Assessment

Appendix C: Population Dynamics

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

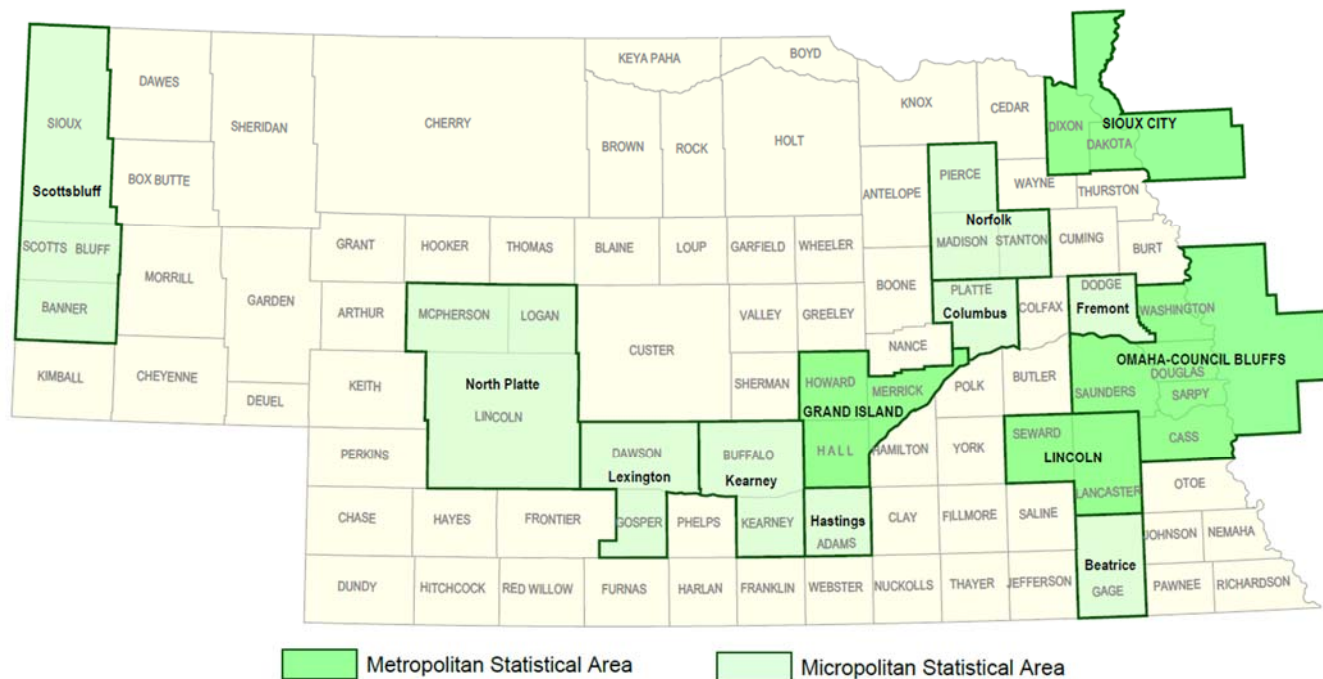


Table C-1 contains population and growth data pertaining to Nebraska’s 18 most populated counties in 2010, 2015 and 2019. The counties making up the lists for these years did not change and there were only minor changes in rank order during this time frame. These 18 counties include the most highly populated counties from each of the four MSAs and the nine MiSAs. This table illustrates the fact that the population of Nebraska is located predominantly in the core urbanized areas, a pattern that has not changed since 2000.

Table C-2 lists the top ten Nebraska counties with respect to 2019 population, population growth 2010 to 2015, and population growth 2010 to 2019. As shown in this table, the five most populated counties (Douglas, Lancaster, Sary, Hall and Buffalo counties) also have the largest population growth from 2010 to 2019, and they are also among the top eight counties for percent population growth. The 2019 population of these five counties accounts for 61.4% of Nebraska’s population, and their 2010 to 2019 annual population growth exceeds the population growth of the entire state by over 2,500 people per year (because 69 of Nebraska’s 93 counties lost population; see Table C-6).

Also shown in Table C-2, the three most populated and fastest growing counties (Douglas, Lancaster and Sary Counties) dominate within these categories with 55.6% of Nebraska’s residents living in these 3 counties and a combined annual population growth of 14,532 people per year. The 2010-2019 annual population growth in these three counties exceeds the population growth of the entire state by over 1,000 people per year (because 69 of Nebraska’s 93 counties lost population, see Table C-5).

Douglas and Sary Counties are in the Omaha-Council Bluffs MSA, which has the largest population of any urbanized area in the state (about 949,400 in 2019). These two counties have a combined population of approximately 758,500. This is 79.9% of the population in the entire MSA (including the IA counties) and 91.7% of the population within the Nebraska portion of the Omaha MSA. Both of these counties are highly urbanized, and along with Council Bluffs, IA form the urban core of the Omaha MSA. See Figure C-2 for additional population data for the Omaha MSA.

Lancaster County is in the Lincoln MSA and includes 95% of the Lincoln MSA population. The City of Lincoln is the urbanized core of the Lincoln MSA with a population of approximately 277,000 or 86% of the MSA population. See Figure C-3 for additional information on the Lincoln MSA.

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Population and population growth data for the Sioux City and Grand Island MSA's can be found in Figures C-4 and C-6.

Table C-3 provides population and population growth information on Nebraska's MiSAs.

Table C-4 provides population and population growth information on eight additional counties with populations greater than 10,000 and that are outside of the designated MSAs and MiSAs.

Table C-5 provides 2010 thru 2015 population and population growth data on all 93 Nebraska counties. The counties are ranked using their 2010 thru 2015 population growth with the fastest growing counties at the top of the table.

Table C-5 also has a column for population density which ranges from a high of 1,685 persons per square mile in Douglas County to less than one person per square mile in eight counties. There are also 49 counties (53% of Nebraska's 93 counties) with a population density of less than ten persons per square mile. This is indicative of the rural nature of most of Nebraska.

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Table C-1: Eighteen Most Populated Nebraska Counties, 2010, 2015 and 2019^{(a)(b)}

| 2010 | | | 2015 | | | 2019 | | | | | |
|------|--------------|------------------------|------|--------------|---------------------------|------|--------------|---------------------------|--------------|------------------|---------------------|
| Rank | County | Census 2010 Population | Rank | County | Estimated 2015 Population | Rank | County | Estimated 2019 Population | % State Pop. | Cum. % State Pop | MSA Or <i>MiSA</i> |
| 1 | Douglas | 517,110 | 1 | Douglas | 549,029 | 1 | Douglas | 571,327 | 29.5 | 29.5 | Omaha-Council Blfs |
| 2 | Lancaster | 285,407 | 2 | Lancaster | 306,096 | 2 | Lancaster | 319,090 | 16.5 | 46.0 | Lincoln |
| 3 | Sarpy | 158,840 | 3 | Sarpy | 175,173 | 3 | Sarpy | 187,196 | 9.7 | 55.7 | Omaha-Council Blfs |
| 4 | Hall | 58,607 | 4 | Hall | 61,132 | 4 | Hall | 61,353 | 3.2 | 58.9 | Grand Island |
| 5 | Buffalo | 46,102 | 5 | Buffalo | 48,578 | 5 | Buffalo | 49,659 | 2.6 | 61.4 | <i>Kearney</i> |
| 6 | Scotts Bluff | 36,970 | 6 | Dodge | 36,567 | 6 | Dodge | 36,565 | 1.9 | 63.3 | <i>Fremont</i> |
| 7 | Dodge | 36,691 | 7 | Scotts Bluff | 36,245 | 7 | Scotts Bluff | 35,618 | 1.8 | 65.2 | <i>Scottsbluff</i> |
| 8 | Lincoln | 36,288 | 8 | Lincoln | 35,501 | 8 | Madison | 35,099 | 1.8 | 67.0 | <i>Norfolk</i> |
| 9 | Madison | 34,876 | 9 | Madison | 34,999 | 9 | Lincoln | 34,914 | 1.8 | 68.8 | <i>North Platte</i> |
| 10 | Platte | 32,237 | 10 | Platte | 32,876 | 10 | Platte | 33,470 | 1.7 | 70.5 | <i>Columbus</i> |
| 11 | Adams | 31,364 | 11 | Adams | 31,567 | 11 | Adams | 31,363 | 1.6 | 72.1 | <i>Hastings</i> |
| 12 | Cass | 25,241 | 12 | Cass | 25,421 | 12 | Cass | 26,248 | 1.4 | 73.5 | Omaha-Council Blfs |
| 13 | Dawson | 24,326 | 13 | Dawson | 23,892 | 13 | Dawson | 23,595 | 1.2 | 74.7 | <i>Lexington</i> |
| 14 | Gage | 22,311 | 14 | Gage | 21,715 | 14 | Saunders | 21,578 | 1.1 | 75.8 | Omaha-Council Blfs |
| 15 | Dakota | 21,006 | 15 | Saunders | 20,949 | 15 | Gage | 21,513 | 1.1 | 77.0 | <i>Beatrice</i> |
| 16 | Saunders | 20,780 | 16 | Dakota | 20,550 | 16 | Washington | 20,729 | 1.1 | 78.0 | Omaha-Council Blfs |
| 17 | Washington | 20,234 | 17 | Washington | 19,917 | 17 | Dakota | 20,026 | 1.0 | 79.1 | Sioux City, IA |
| 18 | Seward | 16,750 | 18 | Seward | 16,994 | 18 | Seward | 17,284 | 0.9 | 80.0 | Lincoln |
| | Nebraska | 1,826,341 | | Nebraska | 1,891,277 | | Nebraska | 1,934,408 | | | |

Footnotes: (a) The population data used in this table were obtained from the U.S. Census Bureau in March 2020.
 (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 13 of Nebraska’s MSAs/MiSAs are represented in this list.
- Over half of the people in Nebraska (55.7%) live in the 3 most populated counties, and 80% live in the 18 most populated counties.
- The same counties were in the top 18 throughout this period, with only minor changes in ranking.

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Table C-2: Top Ten Nebraska Counties for 2019 Population, 2010-2015 Population Growth, and 2010-2020 Population Growth

| 2019 Population | | | | Population Growth 2010-2015 | | | | | Population Growth 2010-2019 | | | | |
|------------------|------------------|---------------------------------|--------------------|-----------------------------|------------------|---------------------------------|---------------------------------|------------------|-----------------------------|------------------|---------------------------------|---------------------------------|------------------|
| R a n k | County | Estimated 2019 Population | % State Pop. | R a n k | County | Estimated 2015 Population | Pop. Growth 2010- 2015 | % Pop. Growth | R a n k | County | Estimated 2019 Population | Pop. Growth 2010- 2019 | % Pop. Growth |
| 1 | Douglas | 571,327 | 29.5 | 1 | Douglas | 549,029 | 31,919 | 6.2 | 1 | Douglas | 571,327 | 54,217 | 10.5 |
| 2 | Lancaster | 319,090 | 16.5 | 2 | Lancaster | 306,096 | 20,689 | 7.2 | 2 | Lancaster | 319,090 | 33,683 | 11.8 |
| 3 | Sarpy | 187,196 | 9.7 | 3 | Sarpy | 175,173 | 16,333 | 10.3 | 3 | Sarpy | 187,196 | 28,356 | 17.9 |
| 4 | Hall | 61,353 | 3.2 | 4 | Hall | 61,132 | 2,525 | 4.3 | 4 | Buffalo | 49,659 | 3,557 | 7.7 |
| 5 | Buffalo | 49,659 | 2.6 | 5 | Buffalo | 48,578 | 2,476 | 5.4 | 5 | Hall | 61,353 | 2,746 | 4.7 |
| 6 | Dodge | 36,565 | 1.9 | 6 | Platte | 32,876 | 639 | 2.0 | 6 | Platte | 33,470 | 1,233 | 3.8 |
| 7 | Scotts Bluff | 35,618 | 1.8 | 7 | Seward | 16,994 | 244 | 1.5 | 7 | Cass | 26,248 | 1,007 | 4.0 |
| 8 | Madison | 35,099 | 1.8 | 8 | Adams | 31,567 | 203 | 0.6 | 8 | Saunders | 21,578 | 798 | 3.8 |
| 9 | Lincoln | 34,914 | 1.8 | 9 | Colfax | 10,717 | 202 | 1.9 | 9 | Seward | 17,284 | 534 | 3.2 |
| 10 | Platte | 33,470 | 1.8 | 10 | Cass | 25,421 | 180 | 0.7 | 10 | Washington | 20,729 | 495 | 2.4 |
| | Nebraska | 1,934,408 | 100 | | Nebraska | 1,934,408 | 64,936 | 3.6 | | Nebraska | 1,934,408 | 108,067 | 5.9 |

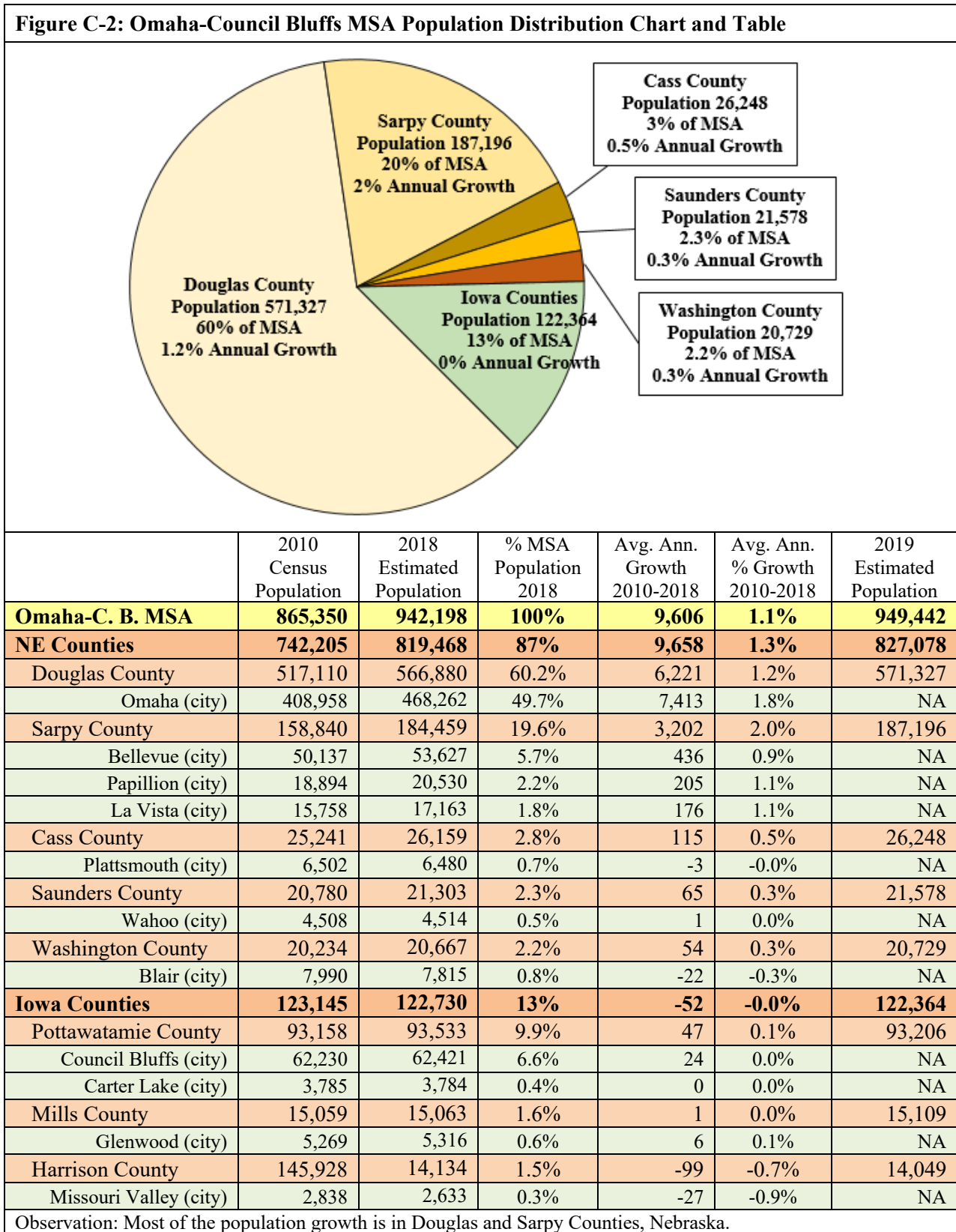
Observations from the data above and from additional data in Table C-2:

- (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 annualized % growth.
- (2) The five most-populous counties in Nebraska (**Buffalo, Douglas, Hall, Lancaster, and Sarpy**) include 61.4% of the state’s 2019 population.
- (3) These five most-populous counties also were the counties with the highest population growth from 2010 to 2015 and 2010 to 2019. The aggregate population growth 2010-2019 in these five counties was 122,559, which was 113% 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 20,121 people).
- (4) Nebraska’s three most populous counties (Douglas, Lancaster, and Sarpy), have a total population of 1,077,613, or 55.6% of the state population. These three counties also had the highest percentage population growth of any Nebraska counties.

The population data used in this table were obtained from the U.S. Census Bureau in March 2020.

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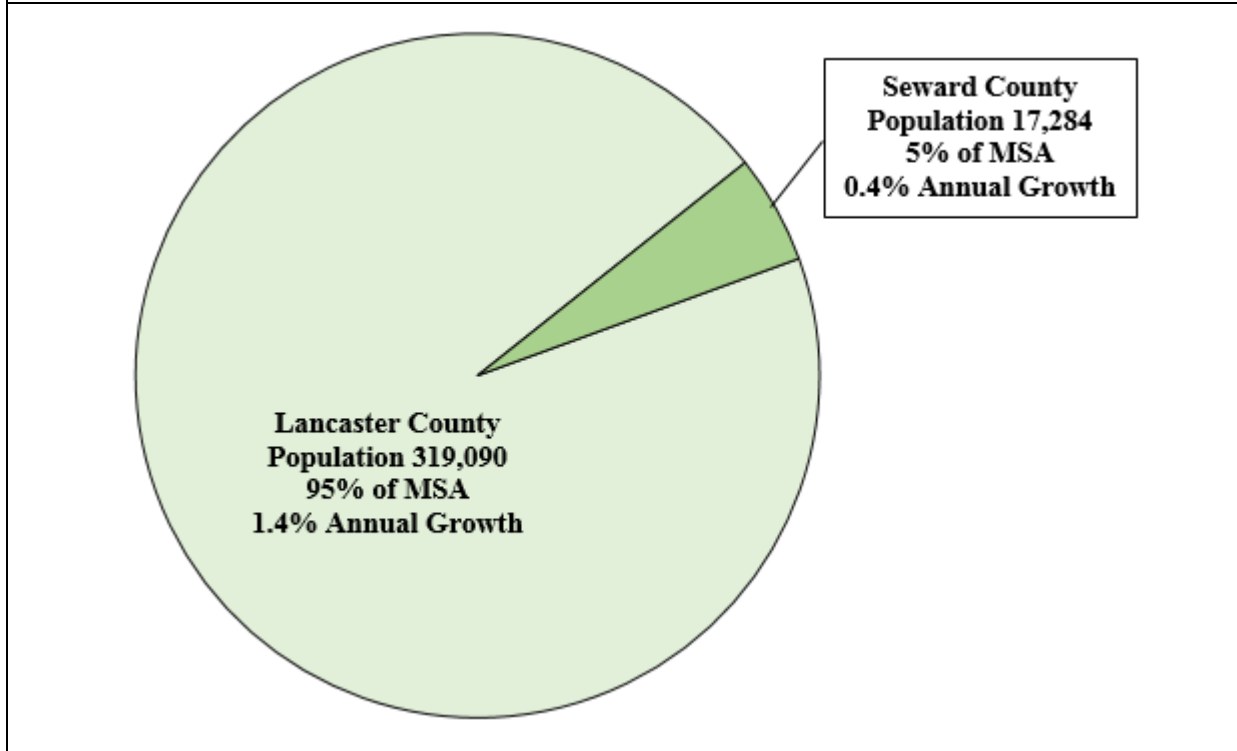
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Figure C-3: Lincoln MSA Population Distribution Chart and Table



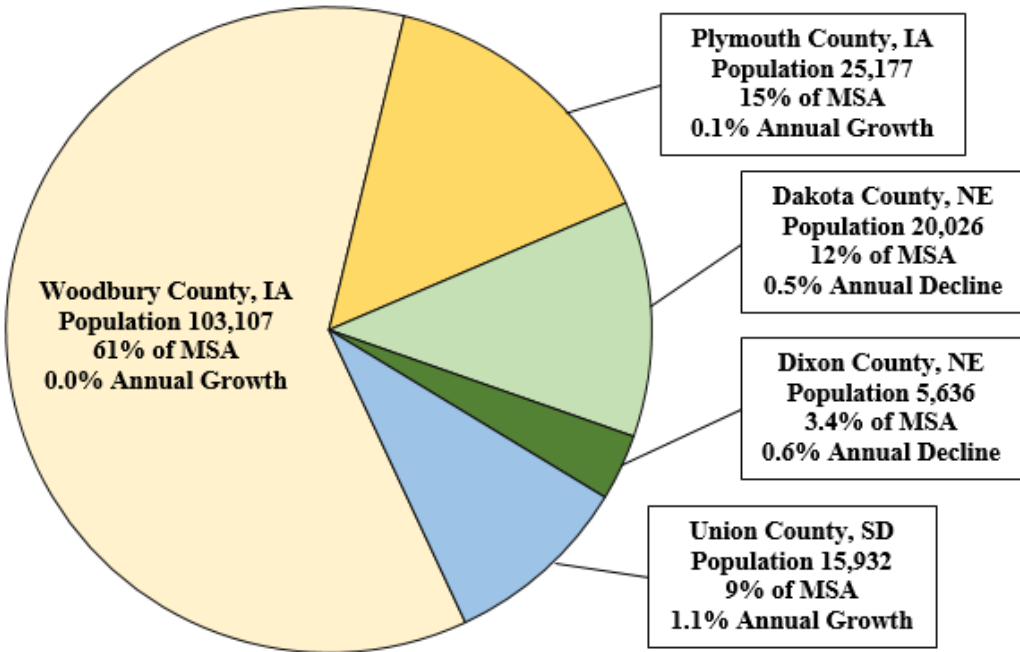
| | 2010 Census Population | 2018 Estimated Population | % MSA Population 2018 | Avg. Ann. Growth 2010-2018 | Avg. Ann. % Growth 2010-2018 | 2019 Estimated Population |
|--------------------|------------------------|---------------------------|-----------------------|----------------------------|------------------------------|---------------------------|
| Lincoln MSA | 302,157 | 334,590 | 100% | 4,054 | 1.3% | 336,374 |
| Lancaster County | 285,407 | 317,272 | 95% | 3,983 | 1.4% | 319,090 |
| Lincoln (city) | 258,379 | 287,401 | 86% | 3,628 | 1.4% | NA |
| Waverly (city) | 3,277 | 3,951 | 1.2% | 84 | 2.6% | NA |
| Seward County | 16,750 | 17,318 | 5% | 71 | 0.4% | 17,284 |
| Seward (city) | 6,964 | 7,220 | 2.2% | 32 | 0.5% | NA |

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

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Figure C-4: Sioux City MSA Population Distribution Chart and Table



| | 2010 Census Population | 2018 Estimated Population | % MSA Population 2018 | Avg. Ann. Growth 2010-2018 | Avg. Ann. % Growth 2010-2018 | 2019 Estimated Population |
|------------------------------|------------------------|---------------------------|-----------------------|----------------------------|------------------------------|---------------------------|
| Sioux City MSA | 168,563 | 169,045 | 100% | 60 | 0.0% | 169,878 |
| Iowa Counties | 127,158 | 127,634 | 76% | 60 | 0.0% | 128,284 |
| Woodbury County | 102,172 | 102,539 | 61% | 46 | 0.0% | 103,107 |
| Sioux City | 82,684 | 82,396 | 48.7% | -36 | -0.0% | NA |
| Sergeant Bluff (city) | 4,227 | 4,913 | 2.9% | 86 | 2.0% | NA |
| Plymouth County | 24,986 | 25,095 | 15% | 14 | 0.1% | 25,177 |
| Le Mars (city) | 9,826 | 9,996 | 5.9% | 21 | 0.2% | NA |
| Nebraska Counties | 27,006 | 25,792 | 15% | -152 | -0.6% | 25,662 |
| Dakota County | 21,006 | 20,083 | 12% | -115 | -0.5% | 20,026 |
| South Sioux City | 13,353 | 12,838 | 7.6% | -64 | -0.5% | NA |
| Dakota City | 1,919 | 1,866 | 1.1% | -7 | -0.3% | NA |
| Dixon County | 6,000 | 5,709 | 3.4% | -36 | -0.6% | 5,636 |
| Wakefield (city) | 1,451 | 1,381 | 0.8% | -9 | -0.6% | NA |
| South Dakota Counties | 14,399 | 15,619 | 9% | 153 | 1.1% | 15,932 |
| Union County | 14,399 | 15,619 | 9% | 153 | 1.1% | 15,932 |
| North Sioux City | 2,530 | 2,885 | 1.7% | 44 | 1.8% | NA |
| Elk Point (city) | 1,963 | 1,869 | 1.1% | -12 | -0.6% | NA |
| Beresford (city) | 2,005 | 1,992 | 1.2% | -2 | -0.1% | NA |

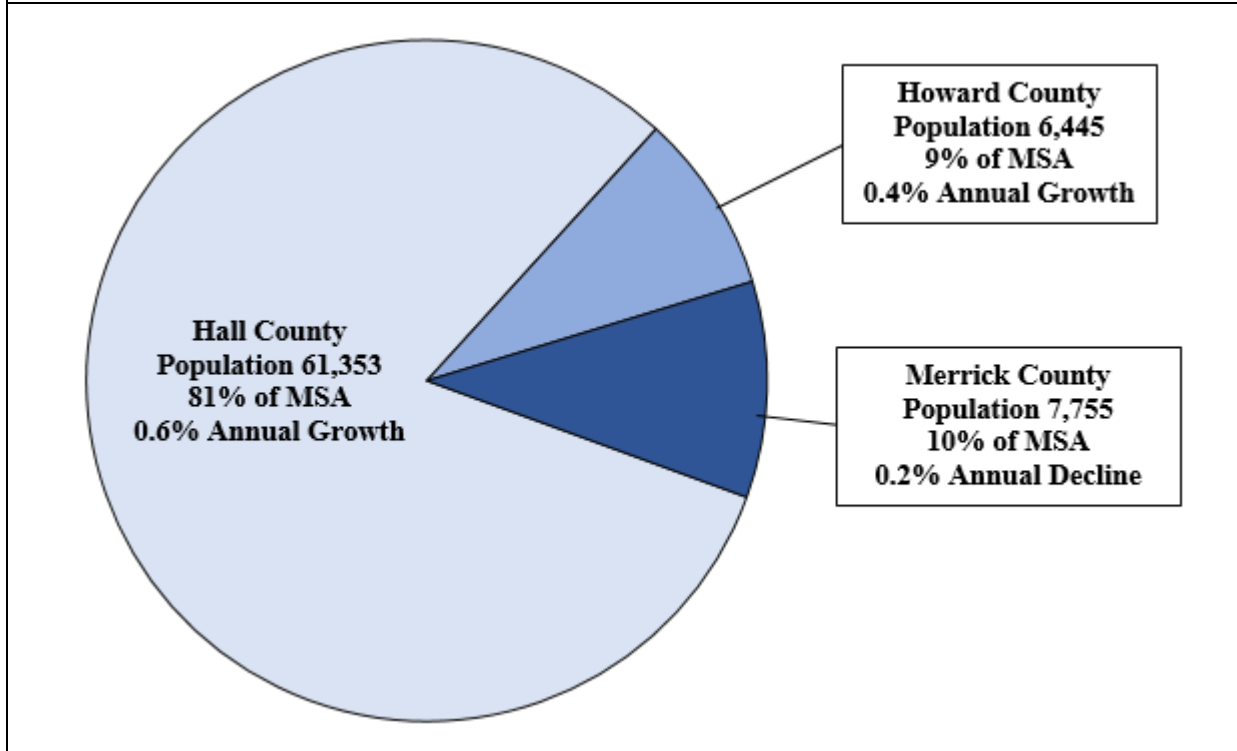
Observations:

- 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 2018. Growth occurred primarily in Union County, South Dakota, North Sioux City, South Dakota, and in Sergeant Bluff, Iowa. Populations declined in the Nebraska counties and cities in the Sioux City MSA.

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Figure C-5: Grand Island MSA Population Distribution Chart and Table



| | 2010 Census Population | 2018 Estimated Population | % MSA Population 2018 | Avg. Ann. Growth 2010-2018 | Avg. Ann. % Growth 2010-2018 | 2019 Estimated Population |
|----------------------------------------|------------------------|---------------------------|-----------------------|----------------------------|------------------------------|---------------------------|
| Grand Island MSA ^(a) | 72,726 | 752,808 | 100% | 385 | 0.5% | 75,553 |
| Hall County | 58,607 | 61,607 | 81% | 375 | 0.6% | 61,353 |
| Grand Island (city) | 48,520 | 51,478 | 68% | 370 | 0.8% | NA |
| Howard County | 6,274 | 6,468 | 9% | 24 | 0.4% | 6,445 |
| St. Paul (city) | 2,290 | 2,349 | 3% | 7 | 0.3% | NA |
| Merrick County | 7,845 | 7,733 | 10% | -14 | -0.2% | 7,755 |
| Central City | 2,934 | 2,875 | 4% | -7 | -0.3% | NA |

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 2018 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.

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| Table C-3: Micropolitan Statistical Area (MiSA) Population Data: 2010 - 2019 | | | | | | | |
|-------------------------------------------------------------------------------------|---------------------|------------------------|---------------------------|-----------------|----------------------------|------------------------------|---------------------------|
| MiSA | Counties & Cities | 2010 Census Population | 2018 Estimated Population | Percent of MiSA | Avg. Ann. Growth 2010-2018 | Avg. Ann. % Growth 2010-2018 | 2019 Estimated Population |
| Kearney MiSA | | 52,591 | 56,159 | 100% | 446 | 0.8% | 56,154 |
| | Buffalo County | 46,102 | 49,615 | 88.3% | 439 | 1.0% | 49,659 |
| | Kearney (city) | 30,787 | 33,761 | 60.1% | 372 | 1.2% | NA |
| | Kearney County | 6,489 | 6,544 | 11.7% | 7 | 0.1% | 6,495 |
| Norfolk MSA | | 48,271 | 48,504 | 100% | 29 | 0.1% | 48,167 |
| | Madison County | 34,876 | 35,392 | 73.0% | 65 | 0.2% | 35,099 |
| | Norfolk (city) | 24,210 | 24,651 | 50.8% | 55 | 0.2% | NA |
| | Pierce County | 7,266 | 7,142 | 14.7% | -16 | -0.2% | 7,148 |
| | Stanton County | 6,129 | 5,970 | 12.3% | -20 | -0.3% | 5,920 |
| Scottsbluff MiSA | | 38,971 | 37,906 | 100% | -133 | -0.3% | 37,529 |
| | Scotts Bluff County | 36,970 | 35,989 | 94.9% | -123 | -0.3% | 35,618 |
| | Scottsbluff (city) | 15,039 | 14,733 | 38.9% | -38 | -0.3% | NA |
| | Gering (city) | 8,500 | 8,225 | 21.7% | -34 | -0.4% | NA |
| | Banner County | 690 | 730 | 1.9% | 5 | 0.7% | 745 |
| | Sioux County | 1,311 | 1,187 | 3.1% | -16 | -1.2% | 1,166 |
| North Platte MiSA | | 37,590 | 36,426 | 100% | -146 | -0.4% | 36,156 |
| | Lincoln County | 36,288 | 35,185 | 96.6% | -138 | -0.4% | 34,914 |
| | North Platte (city) | 24,733 | 23,814 | 65.4% | -115 | -0.5% | NA |
| | Logan County | 763 | 749 | 2.1% | -2 | -0.2% | 748 |
| | McPherson County | 539 | 492 | 1.4% | -6 | -1.1% | 494 |
| Fremont MiSA | | 36,691 | 36,791 | 100% | 9 | 0.0% | 36,565 |
| Part of Omaha CSA | Dodge County | 36,691 | 36,791 | 100% | 9 | 0.0% | 36,565 |
| | Fremont (city) | 26,397 | 26,509 | 72.1% | 16 | 0.1% | NA |
| Columbus MiSA | | 32,237 | 33,363 | 100% | 110 | 0.4% | 33,470 |
| | Platte County | 32,237 | 33,363 | 100% | 110 | 0.4% | 33,470 |
| | Columbus (city) | 22,111 | 23,274 | 69.8% | 112 | 0.7% | NA |
| Hastings MiSA | | 31,364 | 31,511 | 100% | 50 | 0.1% | 31,363 |
| | Adams County | 31,364 | 31,511 | 100% | 50 | 0.1% | 31,363 |
| | Hastings (city) | 24,907 | 24,822 | 87.8% | -52 | 0.0% | NA |
| Lexington MiSA | | 26,370 | 25,705 | 100% | -104 | -0.3% | 25,585 |
| | Dawson County | 24,326 | 23,709 | 92.2% | -90 | -0.3% | 23,595 |
| | Lexington (city) | 10,230 | 10,121 | 39.4% | -32 | -0.1% | NA |
| | Cozad (city) | 3,977 | 3,782 | 14.7% | -25 | -0.6% | NA |
| | Gothenburg (city) | 3,574 | 3,448 | 13.4% | -11 | -0.4% | NA |
| | Gosper County | 2,044 | 1,996 | 7.8% | -14 | -0.3% | 1,990 |
| Beatrice MiSA | | 22,311 | 21,493 | 100% | -79 | -0.5% | 21,513 |
| | Gage County | 22,311 | 21,493 | 100% | -79 | -0.5% | 21,513 |
| | Beatrice (city) | 12,459 | 12,274 | 57.1% | -49 | -0.2% | NA |

Observation: Five of these 9 MiSAs experienced population growth from 2010 to 2018: Kearney, Norfolk, Fremont, Columbus, and Hastings. No MiSA had an annual population gain greater than or equal to 1%.

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| Table C-4: Nebraska Counties Outside of MSAs and MiSAs with Populations Greater Than 10,000 | | | | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------------------|--------------------------|----------------------------|------------------------------|---------------------------|
| Counties & Cities | 2010 Census Population | 2018 Estimated Population | % County 2018 Population | Avg. Ann. Growth 2010-2018 | Avg. Ann. % Growth 2010-2018 | 2019 Estimated Population |
| Otoe County | 15,740 | 15,985 | 100% | 31 | 0.2% | 16,012 |
| Nebraska City | 7,289 | 7,275 | 45.5% | -2 | 0.0% | NA |
| Otoe County is adjacent to the Omaha and Lincoln MSAs. | | | | | | |
| Saline County | 14,200 | 14,350 | 100% | 19 | 0.1% | 14,224 |
| Crete (city) | 6,960 | 7,082 | 49.4 | 15 | 0.2% | NA |
| Saline County lies southwest of and is adjacent to the Lincoln MSA and is also adjacent to the Beatrice MiSA. | | | | | | |
| York County | 13,665 | 13,772 | 100% | 13 | 0.1% | 13,679 |
| York (city) | 7,766 | 7,866 | 57.1 | 13 | 0.2% | NA |
| York County lies between the Lincoln and Grand Island MSAs. | | | | | | |
| Box Butte County | 11,308 | 10,772 | 100% | -67 | -0.6% | 10,783 |
| Alliance (city) | 8,491 | 8,070 | 74.9% | -53 | -0.6% | NA |
| Alliance is the largest Nebraska city outside of an MSA or MiSA. Box Butte County is adjacent to the Scottsbluff MiSA. | | | | | | |
| Custer County | 10,939 | 10,840 | 100% | -12 | -0.1% | 10,777 |
| Broken Bow (city) | 3,559 | 3,534 | 32.6% | -3 | -0.1% | NA |
| Custer County is adjacent to the North Platte, Lexington, and Kearney MiSAs. | | | | | | |
| Red Willow County | 11,055 | 10,726 | 100% | -41 | -0.4% | 10,724 |
| McCook (city) | 7,698 | 7,551 | 70.4% | -18 | -0.2% | NA |
| Red Willow County is on the southwest border of Nebraska. | | | | | | |
| Colfax County | 10,515 | 10,881 | 100% | 46 | 0.4% | 10,709 |
| Schuyler (city) | 6,211 | 6,377 | 58.6% | 21 | 0.3% | NA |
| Colfax County lies between and adjoins the Columbus, Fremont, and Norfolk MiSAs. | | | | | | |
| Holt County | 10,435 | 10,178 | 100% | -32 | -0.3% | 10,067 |
| O'Neill (city) | 3,705 | 3,625 | 35.6% | -10 | -0.3% | NA |
| Atkinson (city) | 1,245 | 1,238 | 12.2% | -1 | -0.1% | NA |
| Holt County is in north-central Nebraska. | | | | | | |
| Observations: <ul style="list-style-type: none"> • Four of these eight counties experienced population growth between 2010 and 2018: 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 this threshold. • All counties in this list except for Red Willow and Holt are adjacent to MSAs and /or MiSAs. | | | | | | |

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| Table C-5: Population and Population Growth Data for Nebraska and Nebraska Counties Ordered by Population Growth 2010 to 2019^(a) | | | | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------------------|-------------------------------|-----------------------------|--------------------|----------------------------------------|
| Page 1 of 3 | | | | | | |
| R a n k | Nebraska | 1,826,341 | 1,934,408 | 108,067 | 5.9% | 25.0 |
| | County | Census 2010 Population | Estimated Population 7/1/2019 | Population Growth 2010-2019 | % Growth 2010-2019 | Population Density ^(b) 2019 |
| 1 | Douglas | 517,110 | 571,327 | 54,217 | 10.5% | 1684.7 |
| 2 | Lancaster | 285,407 | 319,090 | 33,683 | 11.8% | 377.2 |
| 3 | Sarpy | 158,840 | 187,196 | 28,356 | 17.9% | 756.8 |
| 4 | Buffalo | 46,102 | 49,659 | 3,557 | 7.7% | 50.9 |
| 5 | Hall | 58,607 | 61,353 | 2,746 | 4.7% | 111.2 |
| 6 | Platte | 32,237 | 33,470 | 1,233 | 3.8% | 48.9 |
| 7 | Cass | 25,241 | 26,248 | 1,007 | 4.0% | 46.4 |
| 8 | Saunders | 20,780 | 21,578 | 798 | 3.8% | 28.4 |
| 9 | Seward | 16,750 | 17,284 | 534 | 3.2% | 30.0 |
| 10 | Washington | 20,234 | 20,729 | 495 | 2.4% | 52.8 |
| 11 | Thurston | 6,940 | 7,224 | 284 | 4.1% | 18.2 |
| 12 | Otoe | 15,740 | 16,012 | 272 | 1.7% | 25.9 |
| 13 | Madison | 34,876 | 35,099 | 223 | 0.6% | 40.8 |
| 14 | Hamilton | 9,124 | 9,324 | 200 | 2.2% | 17.1 |
| 15 | Colfax | 10,515 | 10,709 | 194 | 1.8% | 25.7 |
| 16 | Howard | 6,274 | 6,445 | 171 | 2.7% | 11.2 |
| 17 | Thomas | 647 | 722 | 75 | 11.6% | 1.0 |
| 18 | Banner | 690 | 745 | 55 | 8.0% | 1.0 |
| 19 | Loup | 632 | 664 | 32 | 5.1% | 1.2 |
| 20 | Saline | 14,200 | 14,224 | 24 | 0.2% | 24.7 |
| 21 | York | 13,665 | 13,679 | 14 | 0.1% | 23.8 |
| 22 | Grant | 614 | 623 | 9 | 1.5% | 0.8 |
| 23 | Kearney | 6,489 | 6,495 | 6 | 0.1% | 12.6 |
| 24 | Arthur | 460 | 463 | 3 | 0.7% | 0.6 |
| 25 | Adams | 31,364 | 31,363 | -1 | 0.0% | 55.6 |
| 26 | Blaine | 478 | 465 | -13 | -2.7% | 0.7 |
| 27 | Logan | 763 | 748 | -15 | -2.0% | 1.3 |
| 28 | Keya Paha | 824 | 806 | -18 | -2.2% | 1.0 |
| 29 | Cherry | 5,713 | 5,689 | -24 | -0.4% | 0.9 |
| 30 | Wheeler | 818 | 783 | -35 | -4.3% | 1.4 |
| 31 | Chase | 3,966 | 3,924 | -42 | -1.1% | 4.4 |

Footnotes:
 (a) This table contains 2010 population and 2019 population estimates 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.

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| Table C-5: Population and Population Growth Data for Nebraska and Nebraska Counties | | | | | | |
|--------------------------------------------------------------------------------------------|---------------|-----------------------------------|----------------------------------------------|--------------------------------------------|-------------------------------|------------------------------------------------------|
| Ordered by Population Growth 2010 to 2019^(a) | | | | | | |
| R a n k | County | Census 2010 Population | Estimated Population 7/1/2019 | Population Growth 2010-2019 | % Growth 2010-2019 | Population Density^(b) 2019 |
| 32 | Harlan | 3,423 | 3,380 | -43 | -1.3% | 5.9 |
| 33 | Hayes | 967 | 922 | -45 | -4.7% | 1.3 |
| 34 | McPherson | 539 | 494 | -45 | -8.3% | 0.9 |
| 35 | Gosper | 2,044 | 1,990 | -54 | -2.6% | 4.3 |
| 36 | Hooker | 736 | 682 | -54 | -7.3% | 0.9 |
| 37 | Perkins | 2,970 | 2,891 | -79 | -2.7% | 3.3 |
| 38 | Garfield | 2,049 | 1,969 | -80 | -3.9% | 3.4 |
| 39 | Merrick | 7,845 | 7,755 | -90 | -1.1% | 15.6 |
| 40 | Valley | 4,260 | 4,158 | -102 | -2.4% | 7.3 |
| 41 | Pierce | 7,266 | 7,148 | -118 | -1.6% | 12.4 |
| 42 | Dodge | 36,691 | 36,565 | -126 | -0.3% | 67.4 |
| 43 | Frontier | 2,756 | 2,627 | -129 | -4.7% | 2.7 |
| 44 | Sioux | 1,311 | 1,166 | -145 | -11.1% | 0.6 |
| 45 | Hitchcock | 2,908 | 2,762 | -146 | -5.0% | 3.8 |
| 46 | Johnson | 5,217 | 5,071 | -146 | -2.8% | 13.5 |
| 47 | Deuel | 1,941 | 1,794 | -147 | -7.6% | 4.1 |
| 48 | Sherman | 3,152 | 3,001 | -151 | -4.8% | 5.3 |
| 49 | Phelps | 9,188 | 9,034 | -154 | -1.7% | 16.7 |
| 50 | Pawnee | 2,773 | 2,613 | -160 | -5.8% | 6.0 |
| 51 | Custer | 10,939 | 10,777 | -162 | -1.5% | 4.2 |
| 52 | Rock | 1,526 | 1,357 | -169 | -11.1% | 1.3 |
| 53 | Boyd | 2,099 | 1,919 | -180 | -8.6% | 3.5 |
| 54 | Greeley | 2,538 | 2,356 | -182 | -7.2% | 4.1 |
| 55 | Kimball | 3,821 | 3,632 | -189 | -4.9% | 3.8 |
| 56 | Brown | 3,145 | 2,955 | -190 | -6.0% | 2.4 |
| 57 | Polk | 5,406 | 5,213 | -193 | -3.6% | 11.8 |
| 58 | Stanton | 6,129 | 5,920 | -209 | -3.4% | 13.7 |
| 59 | Wayne | 9,595 | 9,385 | -210 | -2.2% | 21.2 |
| 60 | Nance | 3,735 | 3,519 | -216 | -5.8% | 7.9 |
| 61 | Garden | 2,057 | 1,837 | -220 | -10.7% | 1.1 |
| 62 | Sheridan | 5,469 | 5,246 | -223 | -4.1% | 2.1 |

Footnotes:
 (a) This table contains 2010 population and 2019 population estimates 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.

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Appendix C: Population Dynamics

| Table C-5: Population and Population Growth Data for Nebraska and Nebraska Counties Ordered by Population Growth 2010 to 2019^(a) | | | | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------|--------------|---------------------------|-------------------------------------|-----------------------------------|-----------------------|----------------------------------------------|
| Page 3 of 3 | | | | | | |
| R a n k | County | Census 2010 Population | Estimated Population 7/1/2019 | Population Growth 2010-2019 | % Growth 2010-2019 | Population Density ^(b) 2019 |
| 63 | Thayer | 5,228 | 5,003 | -225 | -4.3% | 8.7 |
| 64 | Franklin | 3,225 | 2,979 | -246 | -7.6% | 5.2 |
| 65 | Nemaha | 7,248 | 6,972 | -276 | -3.8% | 17.0 |
| 66 | Furnas | 4,959 | 4,676 | -283 | -5.7% | 6.5 |
| 67 | Cuming | 9,139 | 8,846 | -293 | -3.2% | 15.4 |
| 68 | Boone | 5,505 | 5,192 | -313 | -5.7% | 7.6 |
| 69 | Dundy | 2,008 | 1,693 | -315 | -15.7% | 1.8 |
| 70 | Webster | 3,812 | 3,487 | -325 | -8.5% | 6.1 |
| 71 | Red Willow | 11,055 | 10,724 | -331 | -3.0% | 14.9 |
| 72 | Keith | 8,368 | 8,034 | -334 | -4.0% | 7.2 |
| 73 | Clay | 6,542 | 6,203 | -339 | -5.2% | 10.8 |
| 74 | Nuckolls | 4,500 | 4,148 | -352 | -7.8% | 7.2 |
| 75 | Dixon | 6,000 | 5,636 | -364 | -6.1% | 11.7 |
| 76 | Holt | 10,435 | 10,067 | -368 | -3.5% | 4.2 |
| 77 | Knox | 8,701 | 8,332 | -369 | -4.2% | 7.3 |
| 78 | Butler | 8,395 | 8,016 | -379 | -4.5% | 13.6 |
| 79 | Antelope | 6,685 | 6,298 | -387 | -5.8% | 7.3 |
| 80 | Burt | 6,858 | 6,459 | -399 | -5.8% | 13.0 |
| 81 | Morrill | 5,042 | 4,642 | -400 | -7.9% | 3.2 |
| 82 | Fillmore | 5,890 | 5,462 | -428 | -7.3% | 9.5 |
| 83 | Cedar | 8,852 | 8,402 | -450 | -5.1% | 11.3 |
| 84 | Richardson | 8,363 | 7,865 | -498 | -6.0% | 14.2 |
| 85 | Jefferson | 7,547 | 7,046 | -501 | -6.6% | 12.2 |
| 86 | Box Butte | 11,308 | 10,783 | -525 | -4.6% | 10.0 |
| 87 | Dawes | 9,182 | 8,589 | -593 | -6.5% | 6.1 |
| 88 | Dawson | 24,326 | 23,595 | -731 | -3.0% | 23.2 |
| 89 | Gage | 22,311 | 21,513 | -798 | -3.6% | 25.0 |
| 90 | Dakota | 21,006 | 20,026 | -980 | -4.7% | 74.9 |
| 91 | Cheyenne | 9,998 | 8,910 | -1,088 | -10.9% | 7.5 |
| 92 | Scotts Bluff | 36,970 | 35,618 | -1,352 | -3.7% | 47.8 |
| 93 | Lincoln | 36,288 | 34,914 | -1,374 | -3.8% | 13.6 |
| Footnotes: | | | | | | |
| (a) This table contains 2010 population and 2019 population estimates 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. | | | | | | |

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Appendix D: 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 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 November 2014) 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}, PM₁₀, PM_{10-2.5} and Lead (Pb) monitors. Table D-1 summarizes the collocated sites in Nebraska. All PM and Pb sub-networks operated by DCHD, LLCHD and NDEE currently meet collocation requirements.

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) or an alternatively approved method as defined in Appendix C. The network description tables in Appendix A of this network plan identify the monitoring 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.)

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Appendix D: Compliance Verification with 40 CFR Part 58

| Table D--1: Compliance Summary: Collocation Requirements of 40 CFR Part 58 Appendix A⁽¹⁾ | | | | | | | | |
|------------------------------------------------------------------------------------------------------------|-----------------------------------|------------------------------|---------------------------|--------------|--------------------|---------------------|--------------|--------------|
| Parameter | Method | Percent Collocation Required | NDEE/LLCHD ⁽²⁾ | | | DCHD ⁽²⁾ | | |
| | | | # of Sites | # Collocated | % Collocated | # of Sites | # Collocated | % Collocated |
| PM ₁₀ | Hi-Vol Sampler | 15% | 0 | 0 | na | 2 | 1 | 50% |
| PM ₁₀ | Sequential 2025 Sampler | 15% | 0 | 0 | na ⁽³⁾ | 0 | 0 | na |
| PM ₁₀ | Continuous Monitor | None | 1 | 0 | (4) | 1 | 0 | (4) |
| PM _{2.5} | Sequential 2025 Sampler | 15% | 1 | 1 | 100% | 2 | 1 | 50% |
| PM _{2.5} | Met One BAM Method ⁽⁵⁾ | 15% | 3 | 1 | 33% ⁽⁵⁾ | 2 | 1 | 50% |
| PM _{10-2.5} | Met One BAM Method | None | 0 | 0 | na | 1 | 0 | (6) |
| TSP-Lead | Hi-Vol Sampler | 15% except NCore | 1 | 1 | 100% | 0 | 0 | (7) |

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.

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

(3) The Weeping Water primary monitor was replaced with a MetOne BAM continuous monitor in June 2016, for which no collocation is required.

(4) Collocated monitors are not required for continuous PM₁₀ 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 PM₁₀. 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 PM₁₀ sampler. Collocated PM₁₀ samplers are not required in Appendix A for continuous PM₁₀ 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) TSP-Lead monitoring at the Omaha NCore site was discontinued 12/31/2017.

| Network Descriptions: | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NDEE Continuous PM ₁₀ : Weeping Water City (collocation not required) NDEE TSP-Lead: Fremont (collocated) LLCHD Sequential 2025 PM _{2.5} : Lincoln (collocated) NDEE & LLCHD MetOne BAM Continuous PM _{2.5} : Lincoln, Grand Island, and Scottsbluff | DCHD Hi-Vol PM ₁₀ : 19& Burt (collocated) and South Omaha DCHD Sequential 2025 PM _{2.5} : Berry St (collocated) & Blair DCHD MetOne BAM Continuous PM _{2.5} : NCore (collocated) & Bellevue DCHD MetOne BAM Continuous PM _{10-2.5} : NCore (collocation not required) |

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Appendix D: Compliance Verification with 40 CFR Part 58

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 ug/m³ to 12 ug/m³, 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 3 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 and Lincoln MSAs 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.

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An AirNow summary report for ozone and PM_{2.5} is emailed daily to an NDEE member. 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 fall of 2011, the 3-month average lead concentration at the Fremont site exceeded the NAAQS. EPA and Magnus Farley, the one known source, were notified. The data were discussed and presented to EPA for review. NDEE and the source conducted an on-site review of the facility and potential emission sources.

In 2012, NDEE continued to calculate daily and 3-month average lead monitoring data as the data became available and disseminated this information to Magnus Farley. High daily lead levels in May thru early July brought the 3-month average within 93% of the NAAQS, and these lead levels were discussed with Magnus Farley. Lower lead levels were seen beginning in July and continuing thereafter. The impact of this information exchange with the source is difficult to evaluate, but it may have played an important role in facilitating the source in remaining diligent with their control efforts.

The NDEE continues to inform Magnus Farley of lead levels as the data become available. Lead levels have remained in attainment with the current DV at 41% of the NAAQS. See Attachment B Table B-7 for 2016-2018 maximum 3-month average data.

- b. From September 2011 thru June 2012, the 46th & Farnam site recorded four (4) 24-hour average PM₁₀ values greater than the 150 $\mu\text{g}/\text{m}^3$ standard. The 46th & Farnam site was source-oriented with respect to Omaha Steel Castings Company, and the company had initiated a move to a new location in Wahoo, NE.

Douglas County Health Department notified Omaha Air Quality Control and Omaha Steel of the high values in a timely manner. Omaha Air Quality Control staff met with Omaha Steel to discuss potential PM₁₀ sources and controls. Omaha Steel proceeded with process-handling and housekeeping changes intended to reduce PM₁₀ emissions. These efforts were effective in reducing PM₁₀ levels. Omaha Steel completed their move to their new facility in 2014 and closed the 46th & Farnam facility.

- c. 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 4th highest values for sites in and around Nebraska as the ozone season progressed. Although the 4th 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).
- d. 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.

Beginning in early 2018, NDEE 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, during the 2018 and later spring burn seasons KDHE provided NDEE and local Nebraska air quality agencies with weekly summaries of burn activity in the Flint Hills and the resulting smoke impacts. KDHE issues predictions of fire activity and impacts for the upcoming week and more

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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 and 2019 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 D-2.a through D-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.

At this time there is no requirement or plan to develop an NCore site in Nebraska, other than the current site in Omaha.

Ozone (O₃) – (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 not a need for additional monitoring sites in less populated communities.

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Nitrogen Dioxide (NO₂) – (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 NO₂ monitoring outside the MSAs.

Sulfur Dioxide (SO₂) – (40 CFR Part 58 App. D Sec. 4.4) No sites required or operated.

There are no Part 58 requirements to operate SO₂ monitoring sites in non-MSA areas. However, pursuant to Part 51, Subpart BB, monitoring may be used to demonstrate attainment with the 1-hour SO₂ NAAQS. NDEE has no current plans for SO₂ monitoring in non-MSA areas. In December 2016, LLCHD began operating a source-oriented SO₂ monitor adjacent to Nebraska Public Power District's Sheldon Station near Hallam, NE in the Lincoln MSA. In January 2017, DCHD began operating a source-oriented SO₂ monitor adjacent to Omaha Public Power District's North Omaha Station in the Omaha MSA.

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 Farley in Fremont, Magnolia Metals in Auburn, and Nucor Steel in Norfolk.

Monitoring near Magnus Farley 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 included a proposal for no longer requiring lead monitoring near Magnolia Metals. The Auburn lead site was shut down in June 2016 in accordance with the 2015 Network Plan.

Thus only the Magnus Farley facility in Fremont currently 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 Farley facility remains suspended at this time until the alternative site can be established.

PM₁₀ Particulate Matter (40 CFR Part 58 App. D Sec. 4.6) No sites required. No sites operated.

There are no minimum PM₁₀ 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 2 operated.

States are required to operate a background site and a transport site for PM_{2.5}. Nebraska's background site is in Scottsbluff, and the transport site is in Grand Island.

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.

Prior to 2015, PAMS were only required in areas classified as serious, severe, or extreme non-attainment for O₃. No such areas exist in Nebraska at this time. On October 1, 2015 EPA revised the PAMS requirements in 40 CFR part 58 Appendix D. As part of the revision, EPA required 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 2019 estimated population of the Omaha-Council Bluffs MSA, where Nebraska's only NCore site is located, was 949,442 which is below the threshold requiring PAMS monitoring.

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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.

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Tables D-2.a through D-2c: Minimum Monitoring Reviews for Each Nebraska MSA*

| Table D-2a: 40 CFR Part 58 Appendix D Review: Omaha-Council Bluffs MSA (MSA Population ~ 949,400) | | | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|----------------------------------------------|----------------------|
| 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 ≥ 85% of NAAQS (<i>See Design Values in Attachment B</i>). | 2 | 3 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 |
| NO₂ | 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 NO _x monitoring site. | 0 | 0 | Y |
| | Sec.4.3.3 | Area-Wide monitoring only required if CBSA ≥ 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 |
| SO₂ | Sec. 4.4 | The need for SO ₂ sites is based on the <i>Population Weighted Emissions Index</i> (PWEI). Omaha’s PWEI = 19,582, which falls within the 5,000 to 100,000 range requiring 1 site (see Table D-3 below for PWEI calculation data). The current network of two highest concentration sites and one NCore site exceeds the minimum requirements. | 1 | 3 Includes NCore | Y |
| | | Regional Administrator required monitoring: None at this time. | 0 | 0 | Y |
| Lead | Sec. 4.5 (a) | There are no sources emitting ≥ 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 |
| PM₁₀ | Sec. 4.6 Table D-4 | The Omaha MSA has a population between 500K – 1M and a medium PM ₁₀ concentration range with max values > 80% of NAAQS at 46 th & Farnam St Site in 2014 and 2015 and at the Weeping Water Farm site on four dates from 2014 to 2016. See Attachment B for PM ₁₀ data. | 2-4 | 4 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 (<i>See Design Values in Appendix B</i>). | 1 | 4 Includes NCore | Y |
| | Sec 4.7.2 | Continuous monitor required. | 1 | 1 @ 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 NO _x /NO _y 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} . | | | | | |

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Appendix D: Compliance Verification with 40 CFR Part 58

| Table D-2.b: 40 CFR Part 58 Appendix D Review: Lincoln MSA (Population ~ 336,400) | | | | | |
|------------------------------------------------------------------------------------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------|----------------------|
| 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 (<i>See Design Values in Attachment B</i>). | 0 | 1 | Y |
| CO | Sec. 4.2 | No minimum requirement | 0 | 0 | Y |
| NO₂ | 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 ≥ 1M (Lincoln MSA population < 1 M). | 0 | 0 | Y |
| | Sec. 4.3.4 | Regional Administrator required monitoring: none. | 0 | 0 | Y |
| SO₂ | Sec. 4.4 | The number of SO ₂ sites required is based on the <i>Population Weighted Emissions Index (PWEI)</i> . Lincoln’s PWEI = 909, which falls below 5,000 (see Table D-3 below for PWEI calculation data). Thus no sites are required. However, LLCHD began operating a source-oriented SO ₂ monitor near Hallam, NE in December 2016. | 0 | 1 | Y |
| | | Regional Administrator required monitoring: none. | 0 | 0 | Y |
| Lead | Sec. 4.5 (a) | There are no sources emitting ≥ 0.5 tpy of lead. | 0 | 1 | Y |
| | Sec. 4.5 (b) | Community-based monitoring not required. | 0 | 1 | Y |
| | Sec. 4.5 (c) | Regional Administrator required monitoring: none. | 0 | 0 | Y |
| PM₁₀ | 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 ≥ 85% of NAAQS. <i>The highest 24-hr value found during monitoring in Lincoln from 1988-98 was 102 µg/m³ or 68% of the NAAQS, and PM₁₀ concentrations have been declining in Nebraska since that time.</i> | 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 (<i>See Design Values in Appendix B</i>). | 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 |

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Appendix D: Compliance Verification with 40 CFR Part 58

| Table D-2.c: 40 CFR Part 58 Appendix D Review: Sioux City MSA (Population ~ 169,900) * | | | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--------------------------|----------------------|
| 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 says that for MSAs of this size 1 ozone site is required if the DV \geq 85% of the NAAQS. There is one ozone monitor in the MSA located in a rural area of Union County, SD. The 3-year Design Value from this Union County site is 64 ppb or 91% of the NAAQS. <i>Nebraska has no current plans to install a second ozone monitor in the Sioux City MSA.</i> | 1 | 0 | Y See comment |
| CO | Sec. 4.2 | No minimum requirement. | 0 | 0 | Y |
| NO₂ | 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 |
| SO₂ | Sec. 4.4 | The number of SO ₂ sites required is based on the <i>Population Weighted Emissions Index (PWEI)</i> . Sioux City MSA's PWEI = 1,676, which falls below the 5,000 to 100,000 range requiring 1 site (see Table D-3 below for PWEI calculation data). <i>One site exists in the MSA in Union County, SD.</i> | 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 |
| PM₁₀ | Sec. 4.6 Table D-4 | The Sioux City MSA population is between 100K – 250K and PM ₁₀ levels are < 80% of NAAQS (<i>See Design Values in Attachment B</i>). | 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. (<i>See Design Values in Appendix B</i>). | 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. | | | | | |

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Appendix D: Compliance Verification with 40 CFR Part 58

| Table D-2.d: 40 CFR Part 58 Appendix D Review: Grand Island MSA (Population ~ 75,550) | | | | | |
|----------------------------------------------------------------------------------------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------|----------------------|
| 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 |
| NO₂ | 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 ≥ 1M (Grand Island MSA population < 1 M) | 0 | 0 | Y |
| | Sec. 4.3.4 | Regional Administrator required monitoring: none | 0 | 0 | Y |
| SO₂ | Sec. 4.4 | <i>Population Weighted Emissions Index</i> (PWEI) = 53, which falls below 5,000 (see Table D-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 ≥ 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 |
| PM₁₀ | 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 (<i>See Design Values in Appendix B</i>) | 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 is Nebraska’s transport site. | | | | | |

Nebraska 2020 Ambient Air Monitoring Network Plan and 5-Year Assessment

Appendix D: Compliance Verification with 40 CFR Part 58

| Table D-3: Population Weighted Emissions Index (PWEI) Data for Nebraska Core Based Statistical Areas (CBSAs) ^{(a) (b) (c)} Page 1 of 2 | | | | | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------------------------|------------------------------------------|---------------|--------------------------------------------|-------------------------|---------------|
| CBSA | County | Population 7/1/19 ^(c) | SO ₂ Emissions (tons/year) | | SO ₂ Emissions (% Change) | PWEI ^{(a) (b)} | |
| | | | 2014 EI | 2017 EI | | 2014 EI | 2017 EI |
| Omaha MSA | Douglas | 571,327 | 11,514 | 8,980 | -22% | 25,460 | 19,582 |
| | Sarpy | 187,196 | 60 | 267 | 345% | | |
| | Cass | 26,248 | 1,279 | 749 | -41% | | |
| | Saunders | 21,578 | 37 | 46 | 24% | | |
| | Washington | 20,729 | 32 | 63 | 97% | | |
| | Pottawattamie, IA | 93,206 | 13,808 | 10,430 | -24% | | |
| | Mills, IA | 15,109 | 22 | 30 | 36% | | |
| | Harrison, IA | 14,049 | 64 | 60 | -6% | | |
| | Totals | 949,442 | 26,816 | 20,626 | -23% | | |
| Lincoln MSA | Lancaster | 319,090 | 3,446 | 2,628 | -24% | 1,173 | 909 |
| | Seward | 17,284 | 41 | 73 | 78% | | |
| | Totals | 336,374 | 3,487 | 2,701 | -23% | | |
| Sioux City MSA | Woodbury, IA | 103,107 | 13,473 | 9,316 | -31% | 2,302 | 1,676 |
| | Plymouth, IA | 25,177 | 27 | 331 | 1126% | | |
| | Dakota | 20,026 | 25 | 138 | 452% | | |
| | Dixon | 5,636 | 12 | 29 | 142% | | |
| | Union, SD | 15,932 | 12 | 50 | 317% | | |
| | Totals | 169,878 | 13,549 | 9,865 | -27% | | |
| Grand Island MSA ^(d) | Hall | 61,353 | 1,552 | 622 | -60% | 123 | 53 |
| | Howard | 6,445 | 29 | 27 | -7% | | |
| | Merrick | 7,755 | 50 | 52 | 4% | | |
| | Totals | 75,553 | 1,631 | 701 | -57% | | |
| Observation: The EPA's emission inventory data indicates that SO ₂ emissions from all 4 of Nebraska's MSAs decreased 13% to 55% from 2011 to 2014. | | | | | | | |
| Footnotes at bottom of page 2 of this table. | | | | | | | |

Nebraska 2020 Ambient Air Monitoring Network Plan and 5-Year Assessment

Appendix D: Compliance Verification with 40 CFR Part 58

| Table D-3 (continued): Population Weighted Emissions Index (PWEI) Data for Nebraska Core Based Statistical Areas (CBSAs) ^{(a) (b) (c)} <small>Page 2 of 2</small> | | | | | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------------------------------|------------------------------------------|---------------|---------------------------------------------|-------------------------|------------|
| CBSA | County | Population 7/1/18 ^(c) | SO ₂ Emissions (tons/year) | | SO ₂ Emissions (%) Change) | PWEI ^{(a) (b)} | |
| | | | 2014 EI | 2017 EI | | 2014EI | 2017 EI |
| Kearney MiSA | Buffalo | 49,659 | 75 | 137 | 83% | 4 | 9 |
| | Kearney | 6,495 | 5 | 16 | 220% | | |
| | Totals | 56,154 | 80 | 153 | 91% | | |
| Norfolk MiSA | Madison | 35,099 | 16 | 102 | 538% | 8 | 16 |
| | Pierce | 7,148 | 29 | 37 | 28% | | |
| | Stanton | 5,920 | 126 | 188 | 49% | | |
| | Totals | 48,167 | 171 | 327 | 91% | | |
| Hastings MiSA | Adams | 31,363 | 3,186 | 2,604 | -18% | 100 | 82 |
| Scottsbluff MiSA | Banner | 745 | 1 | 1 | 0% | 8 | 8 |
| | Scotts Bluff | 35,618 | 201 | 224 | 11% | | |
| | Sioux | 1,166 | 22 | 1 | -95% | | |
| | Totals | 37,529 | 224 | 226 | 1% | | |
| North Platte MiSA | Lincoln | 34,914 | 24,594 | 21,346 | -13% | 889 | 772 |
| | Logan | 748 | 1 | 4 | 300% | | |
| | McPherson | 494 | 3 | 2 | -33% | | |
| | Totals | 36,156 | 24,598 | 21,352 | -13% | | |
| Fremont MiSA | Dodge | 36,565 | 2,262 | 1,032 | -54% | 83 | 38 |
| Columbus MiSA | Platte | 33,470 | 405 | 516 | 27% | 14 | 17 |
| Lexington MiSA | Dawson | 23,595 | 68 | 114 | 68% | 2 | 3 |
| | Gosper | 1,990 | 6 | 11 | 83% | | |
| | Totals | 25,585 | 74 | 125 | 69% | | |
| Beatrice MiSA | Gage | 21,513 | 34 | 93 | 174% | 1 | 2 |

Footnotes:

(a) Population Weighted Emission Index (PWEI) = (CBSA Population) x (SO₂ Emissions (tpy))/1,000,000.

(b) SO₂ 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 7/1/2019 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.