

Utah Division of Air Quality 2018 Annual Report



UTAH DEPARTMENT *of*
ENVIRONMENTAL QUALITY

**AIR
QUALITY**

**Division of Air Quality – 2018
Annual Report**

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Acronyms

AO	Approval Order
AHERA	Asbestos Hazard Emergency Response Act
ATLAS	Air Toxics, Lead-Based Paint, and Asbestos Section
AMS	Air Monitoring Section
BACT	Best Available Control Technology
CAA	Clean Air Act
CFR	Code of Federal Regulations
CO	Carbon Monoxide
DAQ	Division of Air Quality
DEQ	Department of Environmental Quality
EPA	Environmental Protection Agency
HAPs	Hazardous Air Pollutants
MACT	Maximum Available Control Technology
$\mu\text{g}/\text{m}^3$	Micrograms Per Cubic Meter
Micron	One Millionth of a Meter
NAAQS	National Ambient Air Quality Standards
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NOI	Notice of Intent
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
NSPS	New Source Performance Standard
NSR	New Source Review
O ₃	Ozone
PB	Lead
PM	Particulate Matter
PM ₁₀	Particulate Matter Smaller Than 10 Microns in Diameter
PM _{2.5}	Particulate Matter Smaller Than 2.5 Microns in Diameter
PPB	Parts Per Billion
PPM	Parts Per Million
SBEAP	Small Business Environmental Assistance Program
SIP	State Implementation Plan
SO ₂	Sulfur Dioxide
SO _x	Sulfur Oxides
TSCA	Toxic Substances Control Act
TSP	Total Suspended Particles
UAC	Utah Administrative Code
UBWOS	Uinta Basin Wintertime Ozone Study
VOCs	Volatile Organic Compounds

NOTE

THIS REPORT IS INTENDED TO PROVIDE AN OVERVIEW OF UTAH'S AIR QUALITY PROGRAM. THIS REPORT IS PUBLISHED BEFORE END-OF-YEAR DATA CAN BE CERTIFIED AND MAY BE SUBJECT TO CHANGE.

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Introduction

The mission of the Utah Division of Air Quality (DAQ) is to safeguard human health and quality of life by protecting and enhancing the environment. It is the responsibility of the DAQ to ensure that the air in Utah meets health and visibility standards established under the federal Clean Air Act (CAA). To fulfill this responsibility, the DAQ is required by the federal government to ensure compliance with the U.S. Environmental Protection Agency's (EPA) National Ambient Air Quality Standards (NAAQS) statewide and visibility standards at national parks. The DAQ enacts rules pertaining to air quality standards, develops plans to meet the federal standards when necessary, issues preconstruction and operating permits to stationary sources, and ensures compliance with state and federal air quality rules.

The DAQ allocates a large portion of its resources to implementing the CAA. The Utah Air Conservation Act (Utah Code § 19-2) delegates rulemaking power to the Utah Air Quality Board (Board) to promulgate rules pertaining to air quality issues. DAQ staff supports the Board in its policy-making role. The Board is made up of nine members representing local government, environmental groups, the public, industry, and the Executive Director of the Department of Environmental Quality. The Board members have diverse interests, are knowledgeable in air pollution matters, and are appointed by the Governor with consent of the Senate. The Director of the DAQ is the Board's Executive Secretary.

The Utah air quality rules define the Utah air quality program. Implementation of the rules requires the DAQs interaction with industry, other government agencies and the public. The state air quality program is responsible for the implementation of the federal standards under the CAA, as well as state rules for pollution sources not regulated by the CAA.

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2018 Synopsis

The DAQ accomplished much in 2018 towards fulfilling our mission to safeguard human health and quality of life through improving the air quality throughout the state. With an increasing population, industrial base, and more stringent federal air quality standards, it has been a challenge to meet air quality objectives; however, 2018 proved to be a year in which we made great strides to ensure cleaner air in the years to come.

The following is a brief list of notable air quality achievements from 2018:

- Monitored data for the three PM_{2.5} nonattainment areas (NAA) shows a downward trend in the last few years. Through EPA's Clean Data Policy, they have granted the Logan NAA a Clean Data Determination for 2015-2017. Provo data shows attainment of the standard for 2014-2016 and 2015-2017, with a Clean Data Determination expected in 2019. Pending data validation for 2018, UDAQ will request a clean data determination for the Salt Lake City nonattainment area in 2019 for the 2016-2018 data set.
- Utah received approximately \$35 million from a nationwide settlement with VW for violations of the Clean Air Act. Utah's portion will help offset excess nitrogen oxides (NO_x) emissions from the approximately 7,000 VW, Audi, and Porsche vehicles in the state affected by the automaker's violations.
- DAQ, through \$9.5 million in Targeted Airshed Grants, helped residents, particularly low-income households, convert their woodstoves and fireplaces to cleaner-burning devices. The funding for woodstove conversions in the Salt Lake NAA was allocated on the first day DAQ began accepting applications. Voucher dollars for the Provo NAA were allocated within a week.
- The Utah Legislature approved \$500,000 in ongoing funding for air-quality research through the Science for Solutions Research Grant. This annual research funding will help DAQ improve its knowledge of the unique atmospheric and chemical conditions that contribute to air pollution in Utah. The legislature also approved \$100,000 funding for mobile monitoring data collection to improve scientific understanding of the spatial variability of the pollutants that contribute to the formation of PM_{2.5} and ozone.

Air Quality Standards

The CAA requires the EPA to set NAAQS for pollutants considered harmful to public health and the environment. The CAA establishes two types of air quality standards, primary and secondary. Primary standards are set to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly. Secondary standards are set to protect public welfare, including protection from decreased visibility and damage to animals, crops, vegetation, and buildings.

Standards are composed of a numerical value and a form (see Table 2). The form may be a statistical value, such as the 98th percentile calculation or a rolling average over a designated period of time that is then compared against the numerical value.

The EPA has established health-based NAAQS for six pollutants known as criteria pollutants. These are carbon monoxide, nitrogen dioxide, ozone, particulate matter, sulfur dioxide, and lead. Each of these pollutants is addressed in greater detail later in this chapter. Table 1 provides a brief description of each criteria pollutant and Table 2 provides a brief description of each criteria pollutant's primary and secondary standard. The EPA establishes the primary health standards after considering both the concentration level and the duration of exposure that can cause adverse health effects. Pollutant concentrations that exceed the NAAQS are considered unhealthy for some portion of the population. At concentrations between 1.0 and 1.5 times the standard, while the general public is not expected to be adversely affected by the pollutant, the most sensitive portion of the population may be. However, at levels above 1.5 times the standard, even healthy people may see adverse effects.

The DAQ monitors each of these criteria pollutants, as well as meteorological conditions and several non-criteria pollutants for special studies at various monitoring sites throughout the state.

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Table 1. EPA Designated Criteria Pollutants

Name	Sources	Health Effects	Welfare Effects
Carbon Monoxide (CO); a clear, colorless, odorless gas.	Burning of gasoline, wood, natural gas, coal, oil, etc.	Reduces the ability of blood to transport oxygen to body cells and tissues. May be particularly hazardous to people who have heart or circulatory (blood vessel) problems and people who have damaged lungs or breathing passages.	
Nitrogen Dioxide (NO₂) (one component of NO _x); smog-forming chemical.	Burning of gasoline, natural gas, coal, oil, and other fuels; Cars are also an important source of NO ₂ .	Can cause lung damage, illnesses of breathing passages and lungs (respiratory system).	Ingredient of acid rain (acid aerosols), which can damage trees, lakes, flora and fauna. Acid aerosols can also reduce visibility.
Ozone (O₃) (ground-level ozone is the principal component of smog).	Chemical reaction of pollutants; Volatile Organic Compounds (VOCs) and NO _x .	Can cause breathing problems, reduced lung function, asthma, irritated eyes, stuffy nose, and reduced resistance to colds and other infections. It may also speed up aging of lung tissue.	Can damage plants and trees; smog can cause reduced visibility.
Particulate Matter (PM₁₀, PM_{2.5}); dust, smoke, soot.	Burning of gasoline, natural gas, coal, oil and other fuels; industrial plants; agriculture (plowing or burning fields); unpaved roads, mining, construction activities. Particles are also formed from the reaction of VOCs, NO _x , SO _x and other pollutants in the air.	Can cause nose and throat irritation, lung damage, bronchitis, and early death.	Main source of haze that reduces visibility.
Sulfur Dioxide (SO₂)	Burning of coal and oil (including diesel and gasoline); industrial processes.	Can cause breathing problems and may cause permanent damage to lungs.	Ingredient in acid rain (acid aerosols), which can damage trees, lakes, flora and fauna. Acid aerosols can also reduce visibility.
Lead (Pb)	Paint (houses, cars), smelters (metal refineries); manufacture of lead storage batteries; note: burning leaded gasoline was the primary source of lead pollution in the U.S. until the federal government mandated unleaded gasoline.	Damages nervous systems, including the brain, and causes digestive system damage. Children are at special risk. Some lead-containing chemicals cause cancer in animals.	Can harm wildlife.

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Table 2. Ambient Air Quality Standards for Criteria Air Pollutants

Pollutant	Averaging Time	Primary / Secondary	Standard	Form
Ozone (O₂)	8 Hour	Primary and Secondary	0.070 ppm	Annual Forth-highest daily maximum 8-hr concentration, averaged over three years
Respirable Particulate Matter (PM₁₀)	24 Hour	Primary and Secondary	150 µg/m ³	Not to be exceeded more than once per year on average over three years
Fine Particulate Matter (PM_{2.5})	24 Hour	Primary and Secondary	35 µg/m ³	98 th percentile, averaged over three years
	Annual	Primary	12 µg/m ³	Annual mean, averaged over three years
		Secondary	15 µg/m ³	Annual mean, averaged over three years
Carbon Monoxide (CO)	1 Hour	Primary	35 ppm	Not to be exceeded more than once per year
	8 Hour	Primary	9 ppm	Not to be exceeded more than once per year
Nitrogen Dioxide (NO₂)	1 Hour	Primary and Secondary	100 ppb	98 th percentile of 1-hour daily maximum concentrations, averaged over three years
	Annual	Primary and Secondary	53 ppm	Annual mean
Sulfur Dioxide (SO₂)	1 Hour	Primary	75 ppb	98 th percentile of 1-hour daily maximum concentrations, averaged over three years
	3 Hour	Secondary	0.5 ppm	Not to be exceeded more than once per year
Lead (Pb)	Rolling 3 month average	Primary and Secondary	0.15 µg/m ³	Not to be exceeded

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Ambient Air Quality in Utah

Utah's Air Monitoring Network

The Air Monitoring Section (AMS) operates a network of monitoring stations throughout Utah. The monitors are situated to measure air quality in both neighborhoods and industrial areas. Table 3 shows the monitoring station locations and monitored constituents for stations operated in 2018.

Table 3. Utah Monitoring Network Stations

Station	City	Address	CO	NO ₂	Hg	O ₃	PM ₁₀	PM _{2.5}	SO ₂	Pb	Met.
Air Monitoring Center	SLC	2861 W. Parkway Blvd.			X						X
Antelope Island	None	North end of island									X
Bountiful	Bountiful	200 W. 1380 N.		X		X	X	X			X
Brigham City	Brigham City	140 W. Fishburn				X		X			X
Copperview	Midvale	8449 S. Monroe St.	X	X		X		X	X		X
Enoch	Enoch	3840 N. 325 E. Minersville Hwy.		X		X		X			X
Erda	Tooele	2163 West Erda Way		X		X		X			X
Escalante	Escalante	755 West Main				X					
Harrisville	Harrisville	425 W. 2250 N.		X		X					X
Hawthorne	SLC	1675 S. 600 E.	X	X		X	X	X	X		X
Herriman	Riverton	14058 Mirabella Dr.		X		X	X	X			X
Hurricane	Hurricane	150 N. 870 W.		X		X		X			X
Lindon	Lindon	30 N. Main St.	X	X		X	X	X			X
Magna*	Magna	9228 W. 2700 S.		X		X	X	X	X		X
Near Road*	Murray	4951 S. Galleria Dr.	X	X		X		X			X
Ogden #2	Ogden	228 E. 32nd St.	X	X		X	X	X			X
Price #2	Price	351 S. Weasel Run Rd.		X		X					X
Roosevelt	Roosevelt	290 S. 1000 W.		X		X		X			X
Rose Park	SLC	1354 W. Goodwin Ave.	X	X		X		X	X		X
Saltaire	None	6640 W. 1680 N.									X
Smithfield	Smithfield	675 W. 220 N.		X		X	X	X			X
Spanish Fork	Spanish Fork	312 W. 2050 N.		X		X		X			X
Vernal	Vernal	628 N. 1700 W.		X		X		X			X

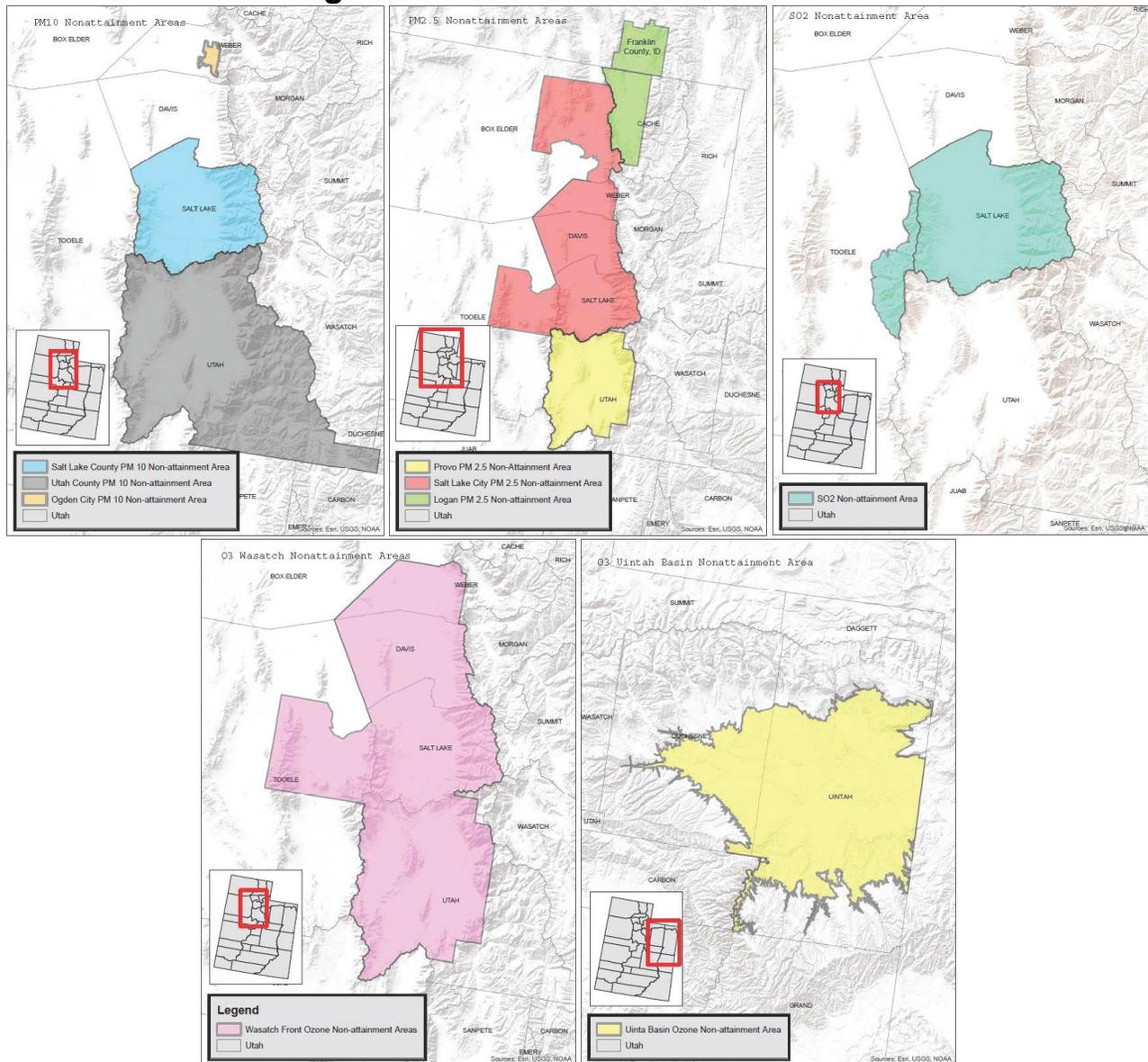
*Monitors came online between Dec 18/Jan 19. Data from these sites were not included in the 2018 monitoring data.

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NAAQS Nonattainment & Maintenance Areas

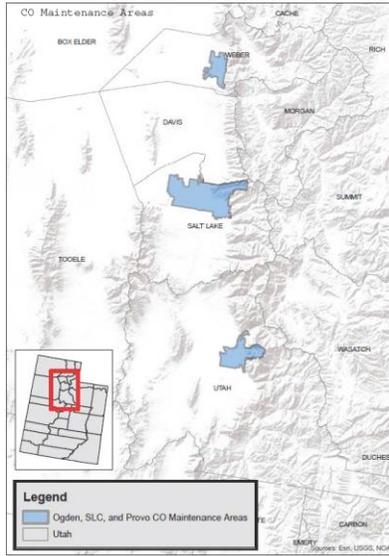
Areas that are not in compliance with the NAAQS are referred to as nonattainment areas. Figure 1 contains maps of the current nonattainment areas within the state. A maintenance area (Figure 2) is an area that was once designated as nonattainment, and which subsequently demonstrated to the EPA that it had and would continue to attain and maintain a particular standard for a period of at least 10 years.

Figure 1. Utah Nonattainment Areas



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Figure 2. Utah Maintenance Area



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Criteria Air Pollutants

Carbon Monoxide (CO)

Carbon monoxide is a colorless and odorless gas formed by the incomplete combustion of carbon-based fuel. Carbon monoxide is primarily produced from on-road motor vehicles. Other significant sources of carbon monoxide emissions are wood burning stoves and fireplaces. The remaining emissions come from industrial facilities, construction equipment, miscellaneous mobile sources and other types of space heating.

Because motor vehicle emissions are the major source of carbon monoxide, the highest concentrations occur during morning and evening rush hours near high-traffic areas. The worst problems occur when there are large numbers of slow-moving vehicles in large parking lots, busy intersections, and traffic jams. Historically, as exhibited in the CAA, it was the EPA's presumption that all elevated carbon monoxide levels were the result of mobile source emissions, and a state had to go through a rigorous demonstration to prove otherwise. In Utah, areas of elevated carbon monoxide concentrations were always found near roadways. Carbon monoxide problems are greater in winter due to several factors: cold weather makes motor vehicles run less efficiently, wood burning, and other space heating take place, and temperature inversions trap carbon monoxide near the ground.

Standards

The EPA has developed two national standards for carbon monoxide. They are 35 ppm of CO averaged over a one-hour period, and 9 ppm of CO averaged over an eight-hour period. A violation of the NAAQS occurs with the second exceedance of either standard at a single location in a calendar year. Once a location is in violation, it is designated as a "nonattainment area." Three cities in Utah (Salt Lake City, Ogden, and Provo) were at one time designated as nonattainment areas for carbon monoxide. Due primarily to improvements in motor vehicle technology, Utah has been in compliance with the carbon monoxide standards since 1994 (see Figure 3 and Figure 4). Salt Lake City, Ogden, and Provo were successfully re-designated to attainment status in 1999, 2001, and 2006, respectively.

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Figure 3. Carbon Monoxide Second Highest 1-Hour Concentration

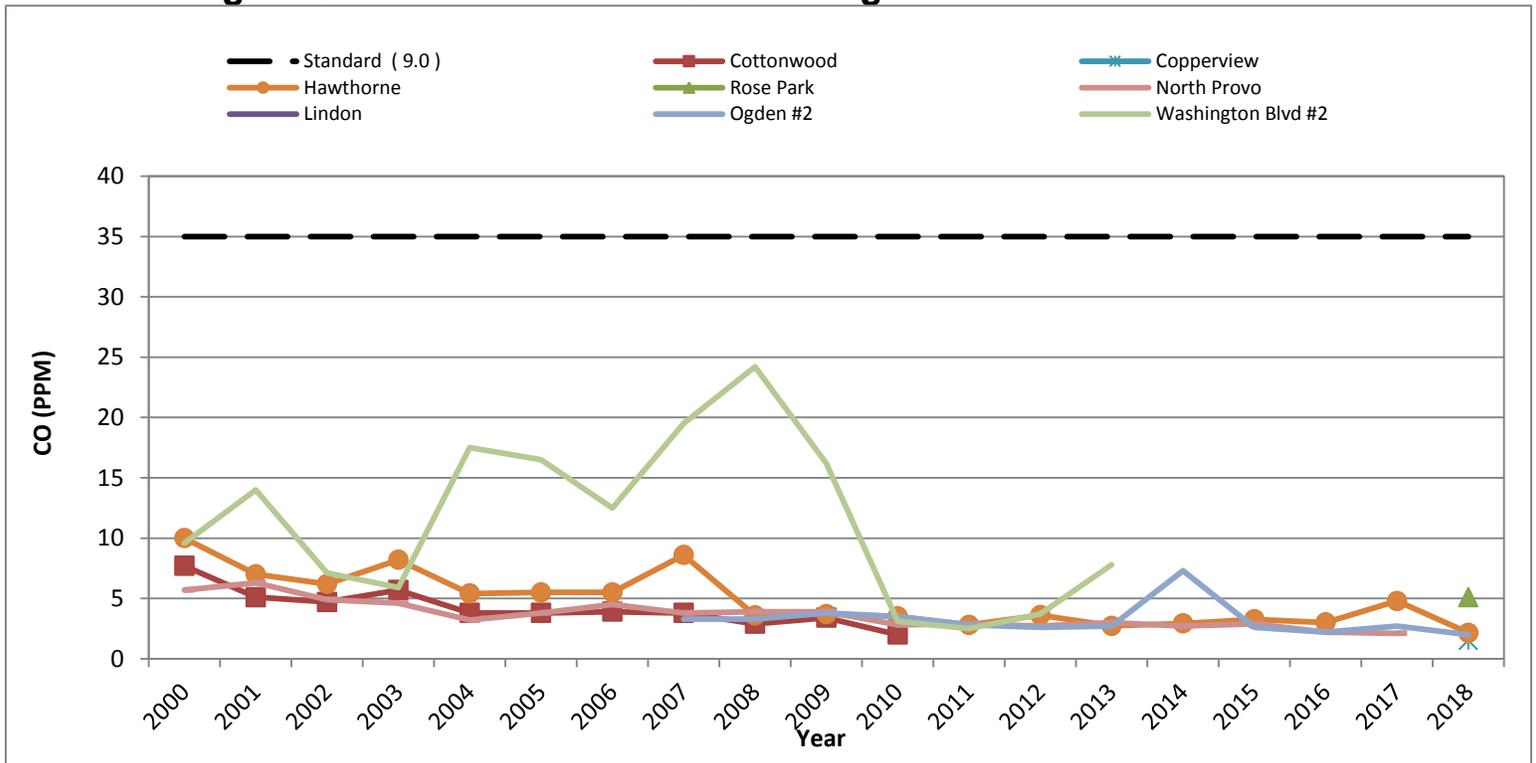
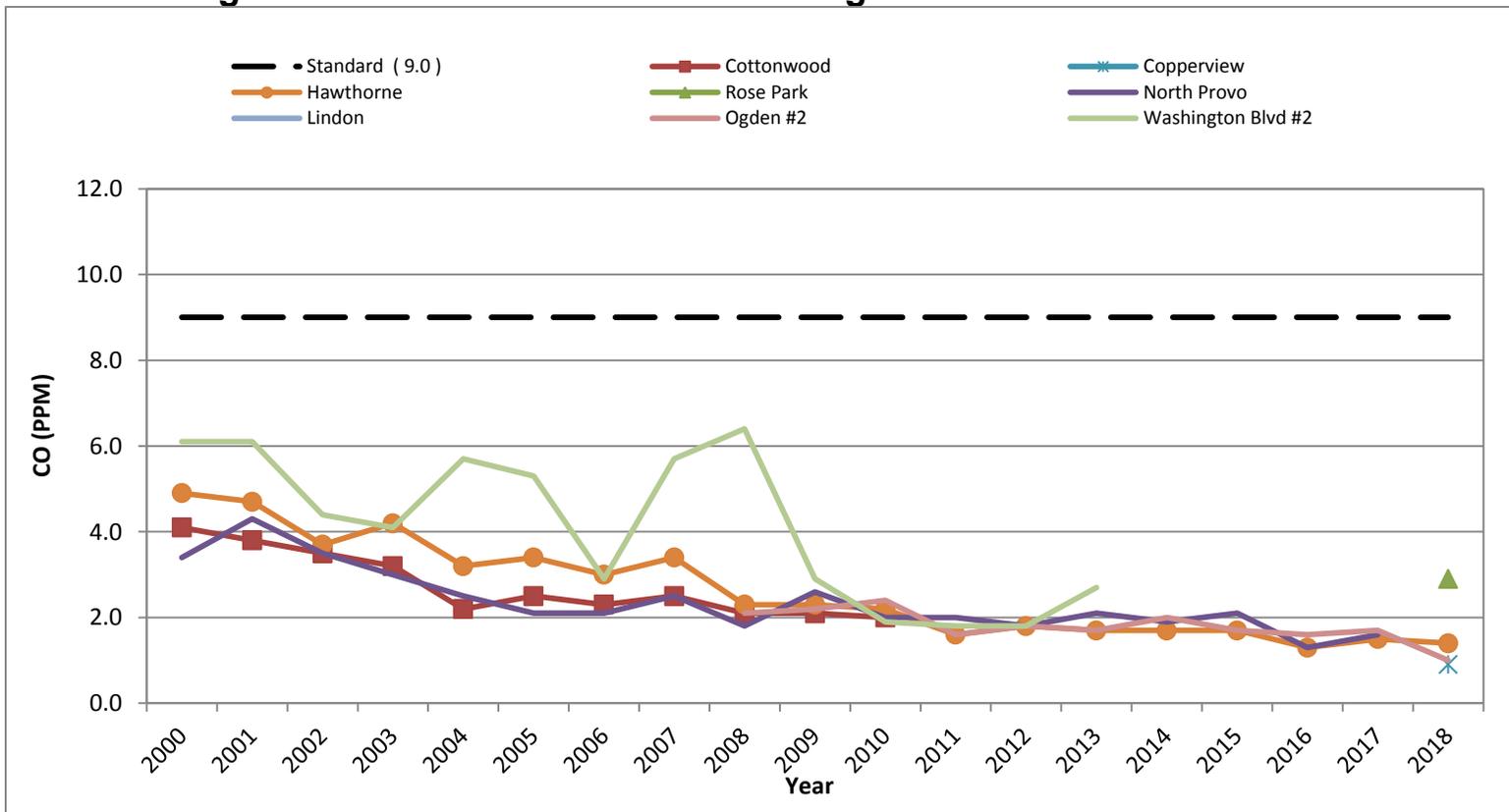


Figure 4. Carbon Monoxide Second Highest 8-Hour Concentration



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Nitrogen Dioxide (NO₂)

During high temperature combustion, nitrogen in the air reacts with oxygen to produce various oxides of nitrogen, or NO_x, a reddish-brown gas. One of the oxides of nitrogen, NO₂, is a criteria pollutant.

Oxides of nitrogen react with other air contaminants to form other criteria pollutants. In the summer along the Wasatch Front, and in the winter in the Uinta Basin, photochemical reactions between NO₂ and VOCs lead to the formation of ground-level ozone. In the winter, NO₂ reacts with ammonia to form fine particulate matter (PM_{2.5}). Both of these seasonal scenarios can result in increased pollution. Utah continues to struggle with both the ozone and particulate matter standards; and because of this, the DAQ is mindful of the trend in NO₂ emissions illustrated in Figure 5.

Standards

The EPA has developed two national standards for NO₂ – an hourly standard and an annual standard. The hourly standard is set at 100 ppb measured as the three-year average of the 98th percentile of the annual distribution of daily maximum one-hour average concentrations. Utah has never exceeded this standard.

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Figure 5. Three-Year Average Nitrogen Dioxide Hourly Averages (PPB)

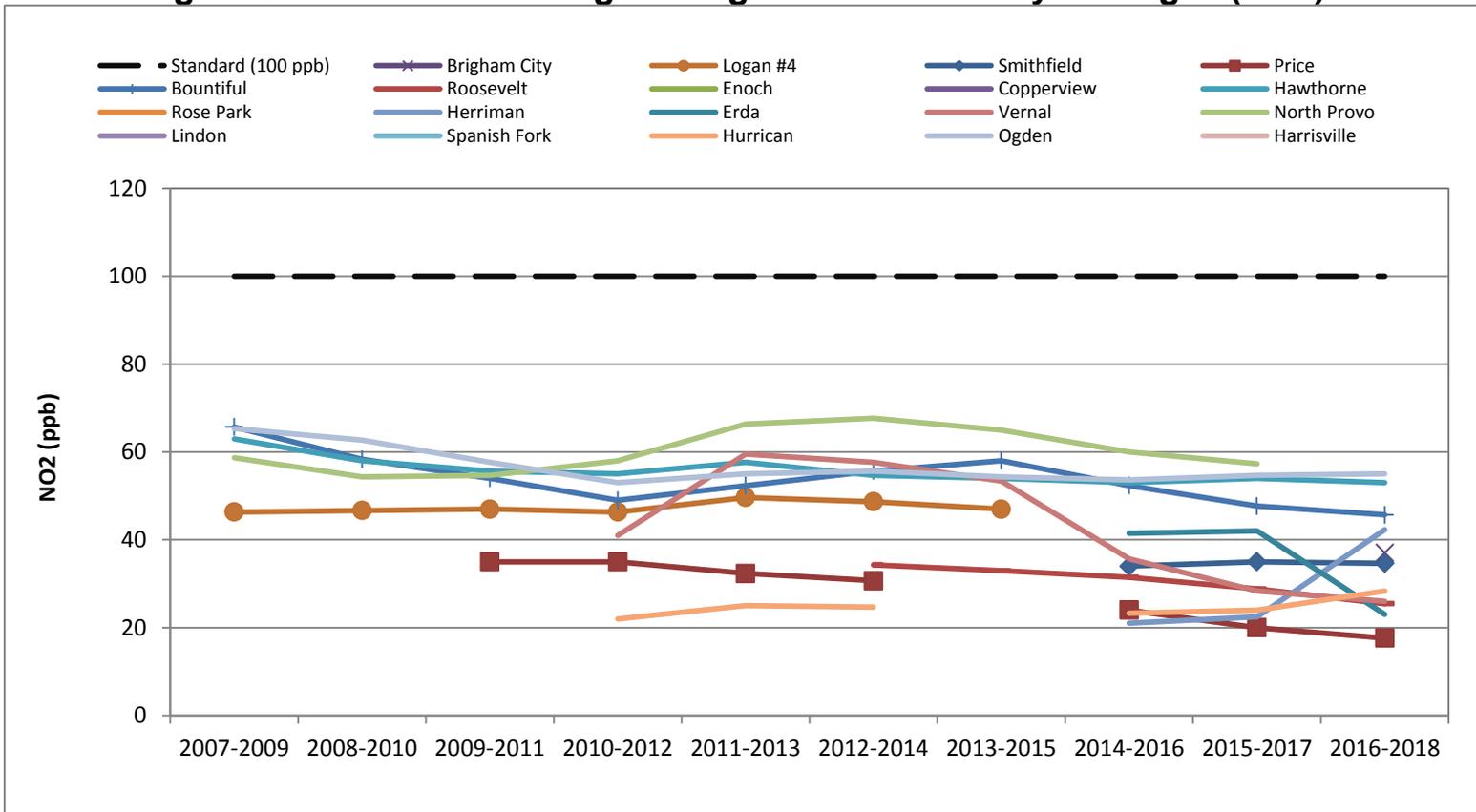
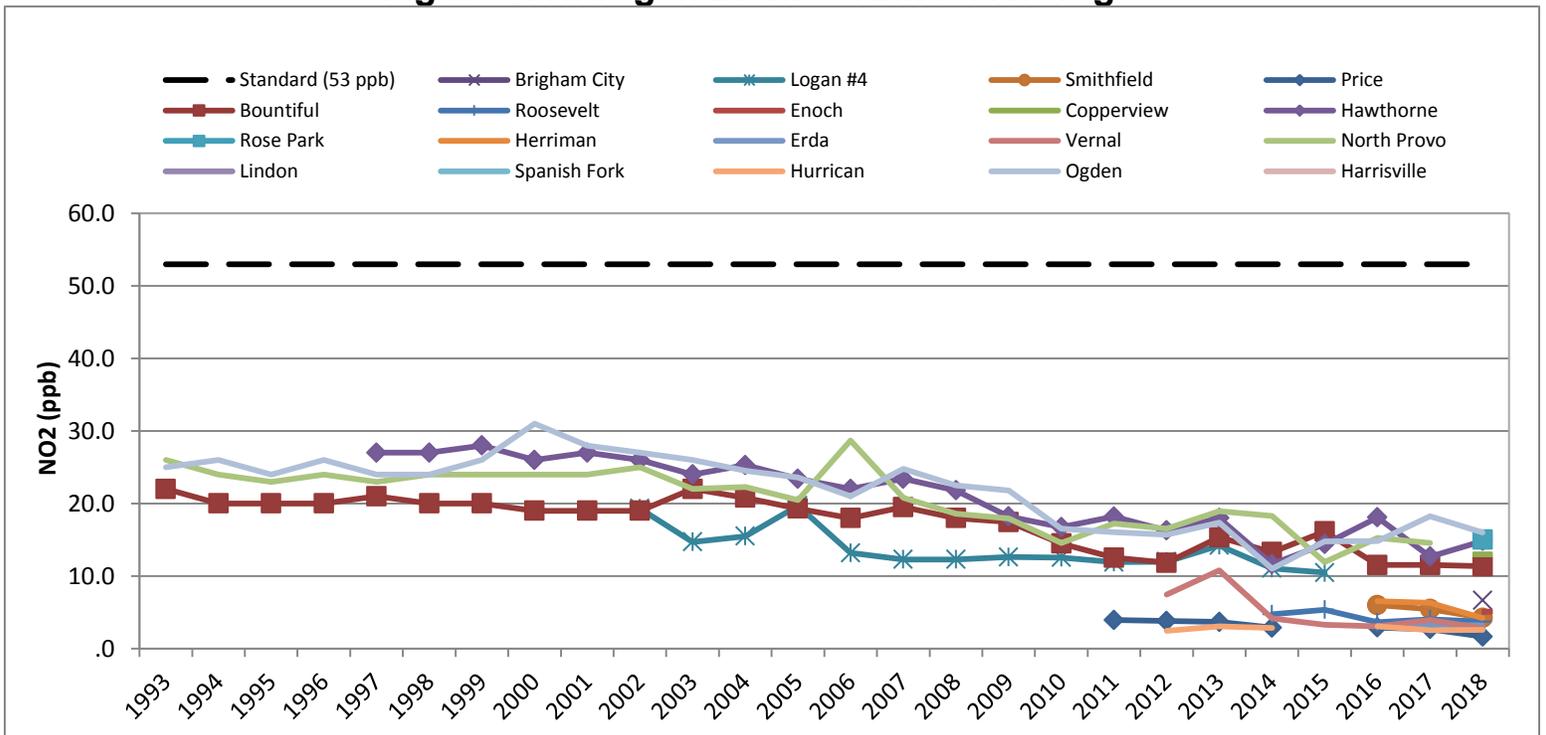


Figure 6. Nitrogen Dioxide Annual Averages



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The annual NO₂ standard of 0.053 ppm is expressed as an annual arithmetic mean (average) as seen on Figure 6. The DAQ monitors the concentrations of NO₂ at various locations throughout the state and has never observed a violation of the annual standard.

Ozone (O₃)

Ozone is a clear, colorless gas composed of molecules of three oxygen atoms. Ground-level ozone can be inhaled and is considered a pollutant. Ground-level ozone should not be confused with the stratospheric ozone layer that is located approximately 15 miles above the earth's surface and shields the earth from cancer-causing ultraviolet radiation. Ground level ozone is formed by a complex chemical reaction involving VOCs and oxides of nitrogen in the presence of sunlight.



Ozone production is a year-round phenomenon. However, the highest ozone levels generally occur during the summer when strong sunlight, high temperatures, and stagnant meteorological conditions combine to drive chemical reactions and trap the air within a region for several days. There are unique circumstances where high ozone levels can occur during the wintertime. In Utah, wintertime ozone is associated with temperature inversions, snow cover, and solar radiation (sunlight). Research is on-going to better understand the chemical processes that lead to wintertime ozone production.

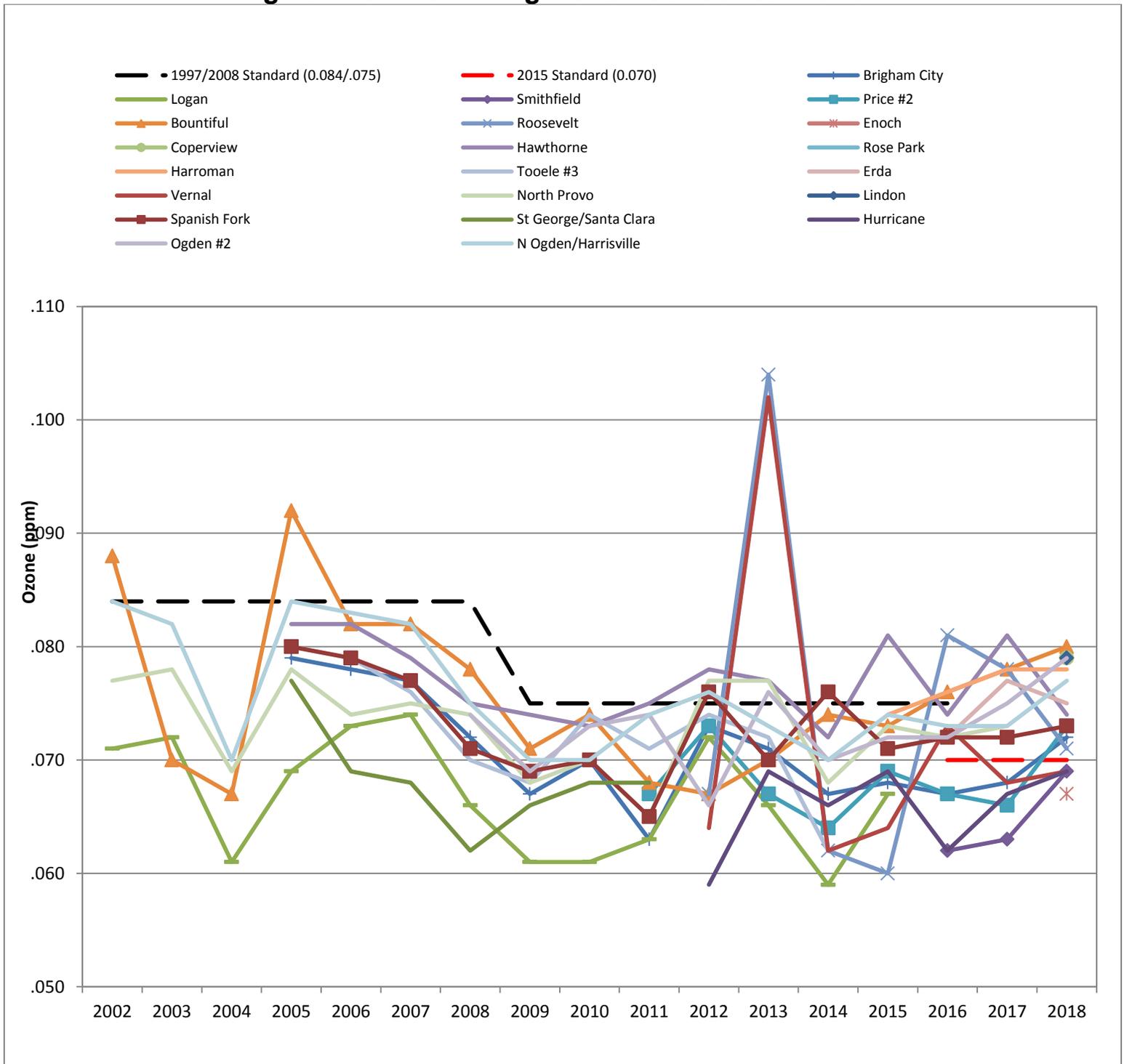
Some major sources for VOCs and NO_x are vehicle engine exhaust, emissions from industrial facilities, gasoline vapors, chemical solvents, oil and gas production, and biogenic emissions from natural sources, such as vegetative growth.

Standards

In October of 2016, the EPA strengthened the ozone NAAQS from 75 ppb to 70 ppb, based on a three-year average of the annual 4th highest daily eight-hour average concentration. Figure 7 shows the annual 4th highest eight-hour ozone concentrations, and Figure 8 shows how each area compares to the NAAQS with the three-year average of the 4th highest eight-hour ozone concentration. The heavy black dashed lines indicate the previous standard of 75 ppb. The heavy red dashed line indicates the current 70 ppb standard. Ozone monitors operated by the DAQ along the Wasatch Front show exceedances of the new standard in Weber, Davis, Salt Lake, and Utah Counties. There were also exceedances in Uintah County and Duchesne County during the winter. In 2016 the governor recommended that portions of the Wasatch Front and Uinta Basin be designated nonattainment, and that the rest of the state be designated attainment/unclassifiable. In August, 2018 the EPA designated portions of the Wasatch Front and Uinta Basin nonattainment for ozone.

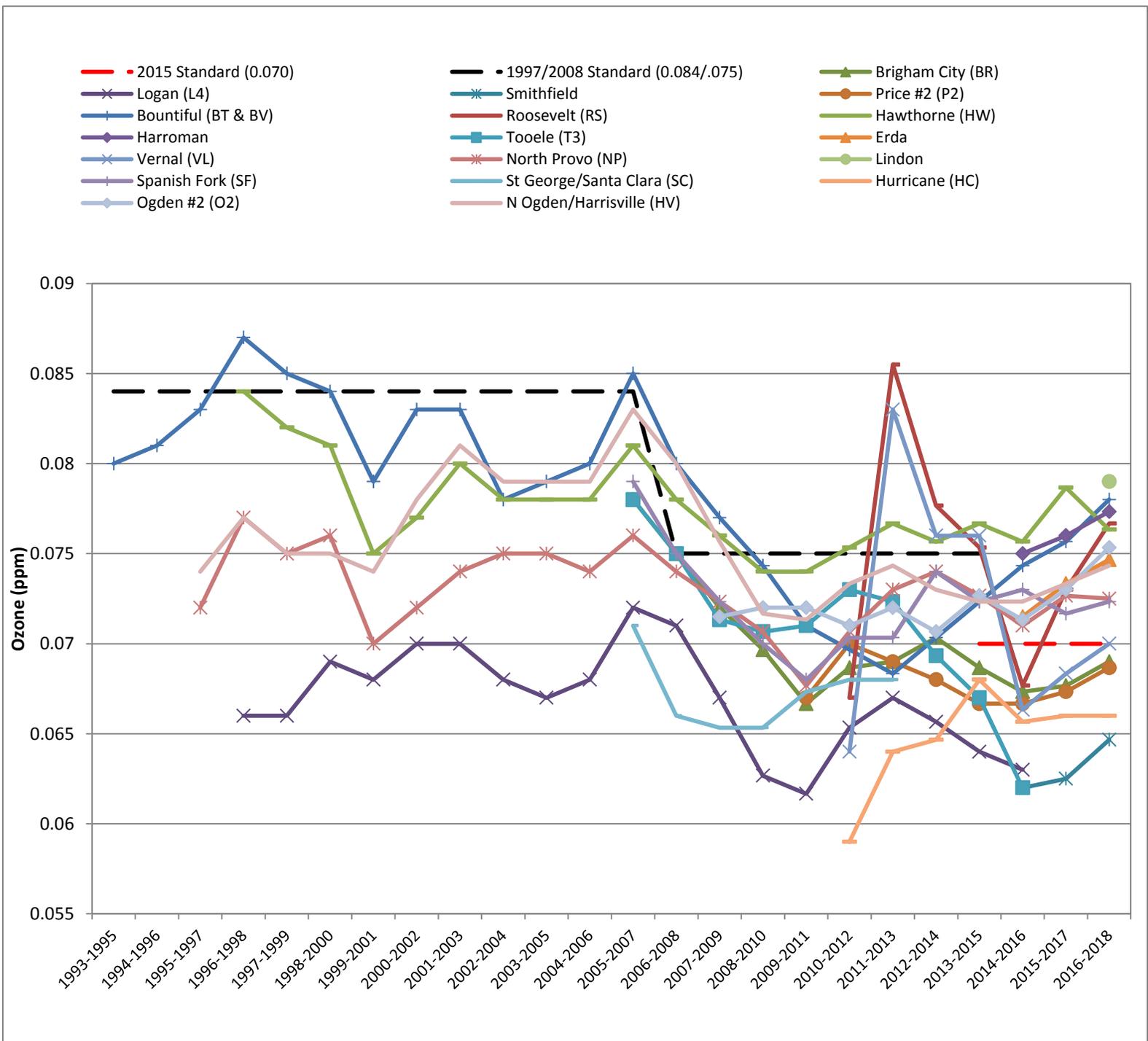
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Figure 7. Ozone 4th Highest 8-Hour Concentration



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Figure 8. Three-Year Average 4th Highest 8-Hour Ozone Concentration



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Particulate Matter (PM)

Regulated particulate matter is a complex mixture of extremely tiny particles of solid or semi-solid material suspended in the atmosphere and is divided into two categories: PM₁₀ and PM_{2.5}.

PM₁₀ is a particulate less than ten micrometers in diameter, which is about one-seventh the width of a strand of human hair. PM_{2.5}, or fine particulate, is a subset of PM₁₀ that measures 2.5 microns in diameter or less. The coarse fraction of PM₁₀, that which is larger than 2.5 microns, is typically made up of “fugitive dust” (sand and dirt blown by winds from roadways, fields, and construction sites) and contains large amounts of silicate (sand-like) material. Primary PM_{2.5} is directly emitted into the atmosphere from combustion sources such as fly ash from power plants, carbon black from cars and trucks, and soot from fireplaces and woodstoves. These particles are so small that they can become imbedded in human lung tissue, exacerbating respiratory diseases and cardiovascular problems. Other negative effects are reduced visibility and accelerated deterioration of buildings.

The majority of Utah’s PM_{2.5} is called secondary aerosol, meaning that it is not emitted directly as a particle, but is produced when gasses such as Sulfur Dioxide (SO₂), NO_x, and VOCs react with other gasses in the atmosphere, such as ammonia, to become tiny particles. Wintertime temperature inversions not only provide ideal conditions for the creation of secondary aerosols, they also act to trap air in valleys long enough for concentrations of PM_{2.5} to build up to levels that can be unhealthy. The smallest of particles that make up PM_{2.5} are major contributors to visibility impairment in both urban and rural areas. Along the Wasatch Front, the effects can be seen as the thick, brownish haze that lingers in our northern valleys, particularly in the winter. The DAQ currently operates PM₁₀ and PM_{2.5} monitors throughout the state to assess the ambient air quality with respect to the standards for both PM₁₀ and PM_{2.5}.

Standards – PM₁₀

The EPA established the 24-hour air quality standard for PM₁₀ in July 1987, and fixed it at 150 µg/m³. The standard is met when the probability of exceeding the standard is no greater than once per year for a three-year averaging period. In other words, four expected exceedances within a three-year period would constitute a violation. Salt Lake and Utah counties are officially designated as PM₁₀ nonattainment areas because of past difficulty with the 24-hour standard. Control strategies contained in the SIP promulgated in 1991 are responsible for the marked decrease in concentrations observed in the early 1990s. Ogden was also designated as a nonattainment area due to one year of high concentrations (1992), but was determined to be attaining the standard in January 2013.

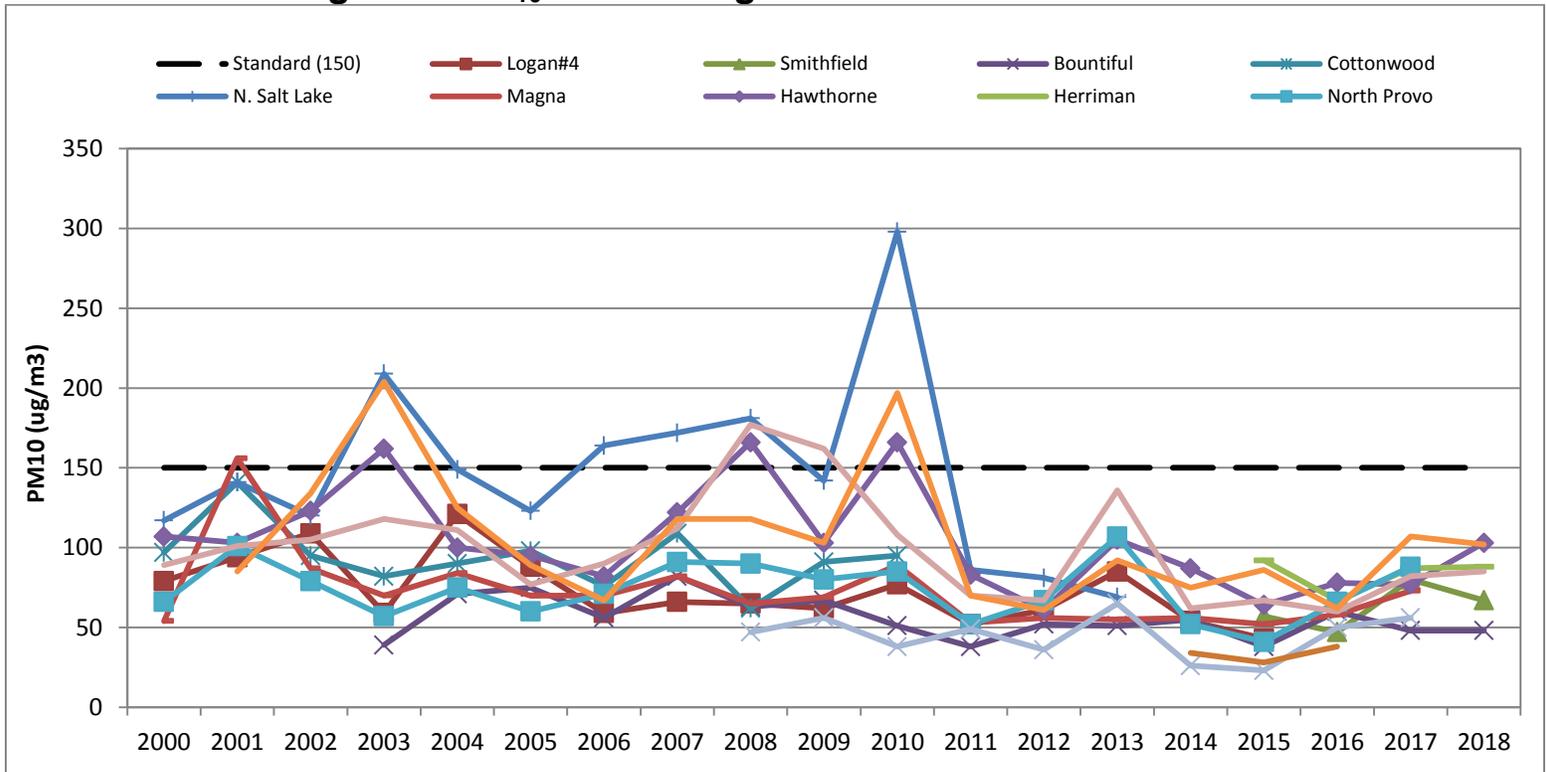
High values of monitored PM₁₀ sometimes result from exceptional events, such as from dust storms during high wind events and wildfires. This was the case in 2010, when Utah experienced an exceptional dust storm on March 30th, resulting in very high PM₁₀ values across the network. The DAQ has flagged data collected during exceptional events incurred from 2008 through 2011 and in 2015. Those events are currently under review for exclusion per the EPA Exceptional Event Rule. There were no exceptional events for high-wind or fire in 2016, 2017, or 2018.

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The statistical form of the standard essentially allows for one exceedance per year, regardless of how high the value may be. For this reason, it is often useful to look at the second highest value collected at a particular location.

Figure 9 shows the second highest 24-hour PM₁₀ concentrations recorded at each station since 2000. The heavy dashed line indicates the NAAQS.

Figure 9. PM₁₀ Second Highest 24-Hour Concentration



Standards – PM_{2.5}

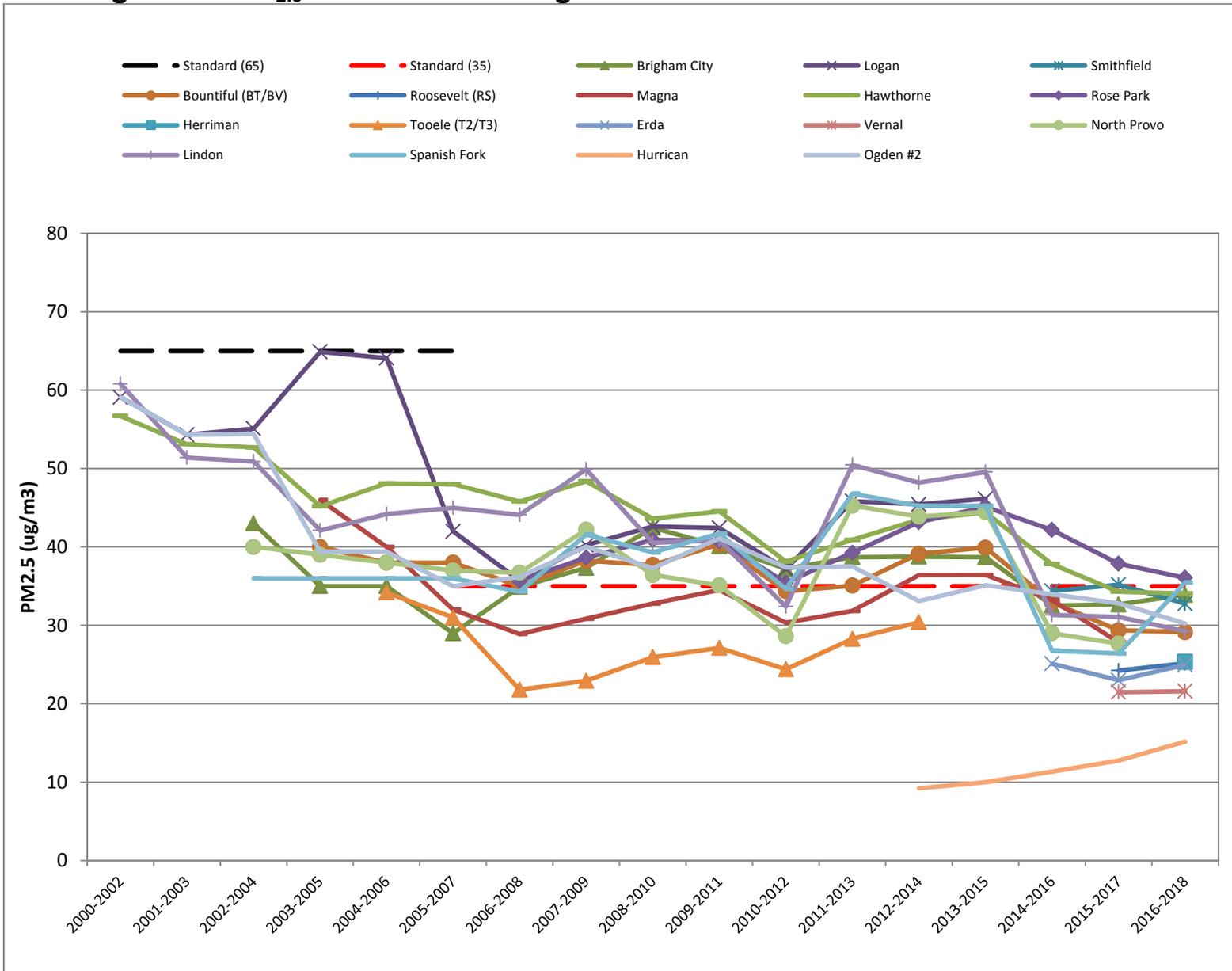
The EPA first established standards for PM_{2.5} in 1997, revised those standards in 2006, and revised them again in 2012. In 2006, the EPA lowered the 24-hour PM_{2.5} standard from 65 µg/m³ to 35 µg/m³. In 2012, the EPA lowered the annual standard from 15µg/m³ to 12µg/m³. Both standards are evaluated by considering monitored data collected during a three-year period. This minimizes the effects of meteorological variability.

The 24-hour standard is met when the average of 98th percentile values collected for each of the three years is less than or equal to 35 µg/m³. The 98th percentile concentration for each year is selected from all of the data recorded at a given monitor, such that the values of at least 98 percent of all that data are of a lower concentration. Figure 10 shows the three-year averages of the 98th percentile concentrations recorded at monitors throughout Utah. The figure shows that all monitors in Utah are in compliance with the 1997 standard. The three-year averages from 2016-2018 show that all monitors except Spanish Fork and Rose Park are in compliance with the 2006 standard. Both monitors are expected to fall below the standard

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once the EPA has concurred with wildfire-induced exceptional events that UDEQ has submitted.

Figure 10. PM_{2.5} Three-Year Average 98th Percentile 24-Hour Concentration



The annual standard is met when the three-year average of annual mean concentrations is no greater than 12 $\mu\text{g}/\text{m}^3$.

Figures 11 and 12 show that all locations are within the annual standard of 12 $\mu\text{g}/\text{m}^3$.

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Figure 11. PM_{2.5} Annual Mean Concentration

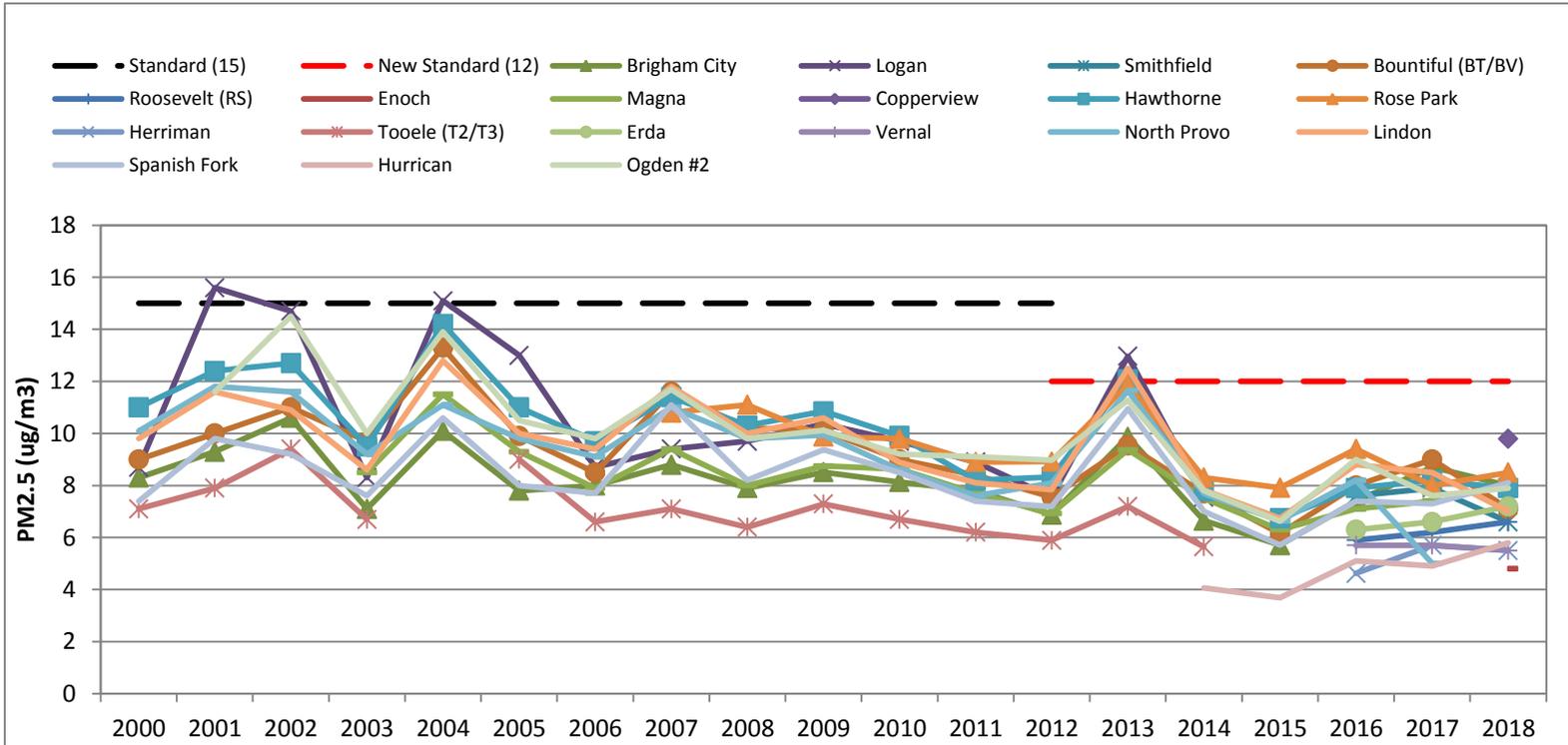
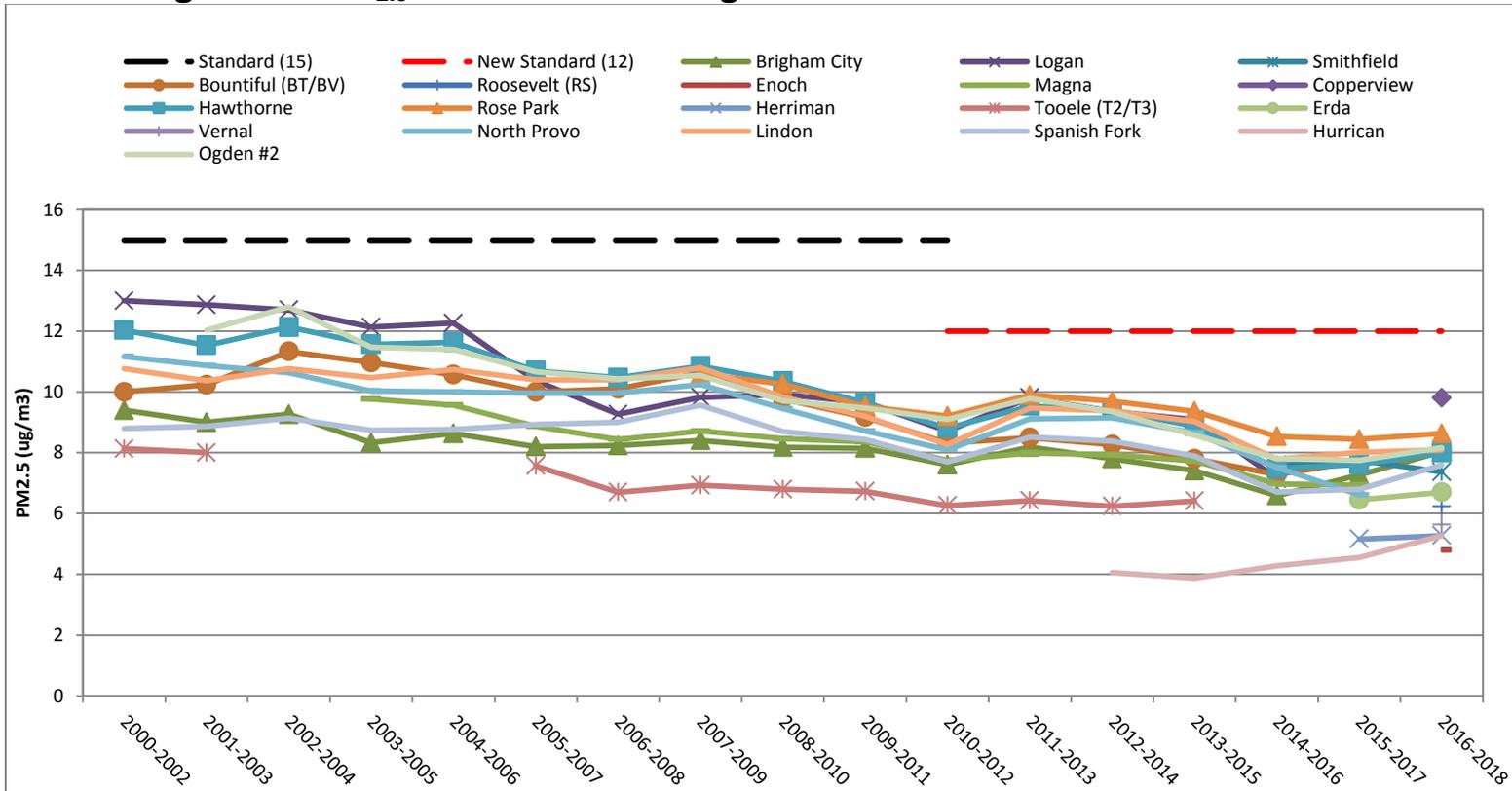


Figure 12. PM_{2.5} Three-Year Average of the Annual Mean Concentration



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Also illustrated in Figures 11 and 12 is a downward trend in the annual mean concentrations. This is interesting to note because trends in the annual averages are not as easily obscured by short term meteorology as are trends in the 24-hour values. This downward trend is likely also indicative of trends in 24-hour concentrations, absent the influence of year-to-year variability in the severity of wintertime cold pool conditions.

Sulfur Dioxide (SO₂)

Sulfur dioxide is a colorless gas with a pungent odor. In the atmosphere, sulfur dioxide is easily converted into sulfates, which are detected as particulates. It is also converted into sulfuric acid, the major acidic component of acid rain. It is emitted primarily from stationary sources that burn fossil fuels (mainly coal and oil) such as power plants and refineries. SO₂ is also a byproduct of copper smelting. Diesel fuel and, to a lesser extent, gasoline contain sulfur and are considered contributors to sulfur dioxide in the atmosphere.

Standards

The primary standard for SO₂ is a three-year average of the 99th percentile of the annual distribution of daily maximum one-hour average concentrations for SO₂, and in 2010 was set at a level of 75 ppb. The secondary standard is a three-hour standard of 0.5 ppm and is not to be exceeded more than once per year.

Throughout the 1970s, the Magna monitor routinely measured violations of the former 24-hour standard. Consequently, all of Salt Lake County and parts of eastern Tooele County above 5,600 feet were designated as nonattainment for original 1971 SO₂ standard. Two significant technological upgrades at the Kennecott smelter costing the company nearly one billion dollars resulted in continued compliance with the SO₂ standard since 1981. In the mid-1990s, Kennecott, Geneva Steel, the five refineries in Salt Lake City, and several other large sources of SO₂ made dramatic reductions in emissions as part of an effort to curb concentrations of secondary particulates (sulfates) that were contributing to PM₁₀ violations. While Utah submitted an SO₂ Maintenance Plan and re-designation request for Salt Lake and Tooele Counties to the EPA in April of 2005, EPA never took formal action on the request. DAQ is currently in the process of revising this maintenance plan and re-designation request to address the old standard.

Monitoring of SO₂ indicates that Utah's ambient air has been well within the federal health standards for decades. More recently, computer modeling indicated that the existing emissions limits of a few sources could potentially result in exceedances of the newer 2010 standard. DAQ has since worked with EPA and the above sources to either revise emissions limits to levels that would protect the areas in question or to establish new monitoring sites to verify the modeling.

On November 1, 2016, Governor Herbert submitted a recommendation to EPA that all areas of the state be designated as attainment for the 2010 SO₂ NAAQS. On January 9, 2018, EPA formally concurred with this recommendation and designated all areas of the state attainment/unclassifiable.

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Figure 13. Sulfur Dioxide Three-Year Average of 99th Percentile of Daily Maximum One-Hour Averages

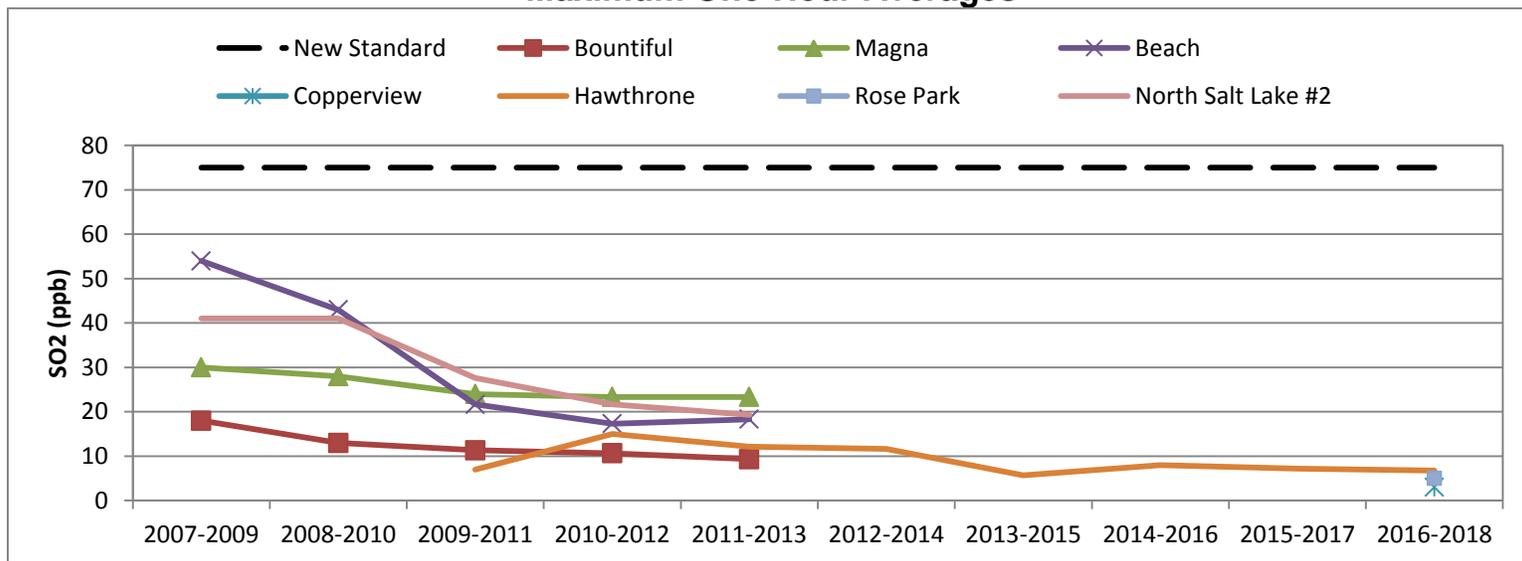


Figure 13 shows the most current measurements to compare against the primary SO₂, NAAQS of 75 ppb.

Lead (Pb)

Lead in the ambient air exists primarily as particulate matter in the respirable size range. Historically, the major source of lead emissions came from the burning of leaded gasoline. However, because leaded gasoline for automobiles was completely phased out in the U.S. by the end of 1995, lead from gasoline is no longer a significant problem. Currently, the primary source of lead emissions in Utah is the extraction and processing of metallic ores. Exhaust from small aircraft is another source of lead emissions in the state.

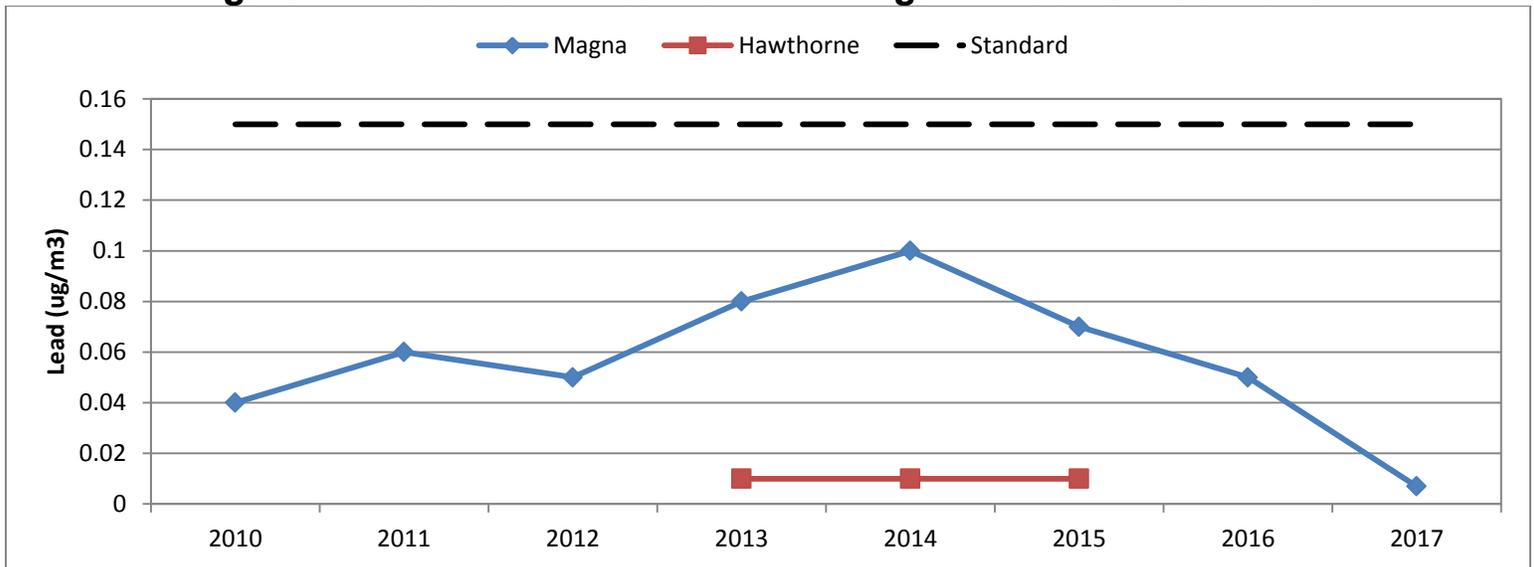
Utah has not exceeded the health standard for lead since the late 1970s, and the EPA authorized the discontinuation of lead monitoring in Utah in 2005; however, in both 2008 and 2010, the EPA set new monitoring requirements for lead. The DAQ resumed monitoring in 2010.

Standards

On November 12, 2008, the EPA strengthened the NAAQS for lead. The previous standard was a calendar quarter (three-month) average concentration not to exceed 1.5 µg/m³. The new standard is 0.15 µg/m³ as total suspended particles (TSP), measured as a three-month rolling average. The new standard included a new monitoring requirement, so the DAQ began lead monitoring again at the Magna station near the Kennecott copper smelter (See Figure 14). Data was collected from January 2010 through June 2017, at which time DAQ was able to demonstrate the likelihood of violating the standard was so remote, it would no longer be necessary to run the monitor. With EPA’s concurrence, the Magna lead monitor was shut down in June 2017.

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Figure 14. Lead Max Three-Month Average 24-Hour Concentration



Emissions Inventories

Every three years, the DAQ collects information about the quantity and characteristics of the various air pollutants released by all emission sources in the state. In addition to these triennial inventories, emissions information is also collected annually from the largest industrial sources. Finally, additional detailed inventories are prepared, as needed, for special projects such as SIP development to quantify emissions during specific seasonal air pollution episodes.

Once collected, the inventory information is reviewed, quality assured, analyzed, stored in the DAQ data system, and made available to the public. The DAQ uses this emissions information to review trends over time, as input data for air quality modeling analysis and as an indicator of the effectiveness of existing and projected control strategies. The emissions information is also compiled according to source type to provide billing information for the Title V operating permits program of the CAA. Both triennial and annual emissions inventory data is uploaded to the EPA's National Emissions Inventory (NEI) data system.

Sources of Air Contaminants

Emission inventories are typically organized into three types of sources: Point, Area, and Mobile.

Point sources are large, stationary industrial or commercial facilities such as power plants, refineries, and manufacturing facilities that emit more than 100 tons per year of a regulated pollutant or are on a list of sources the EPA has determined need to be tracked closely. Air pollutants released from these stationary sources are accounted for on a facility-by-facility basis. Because much of the Wasatch Front is now classified as Serious PM 2.5 Nonattainment, the threshold for classification as a "Point Source" has changed from 100 to 70 tons per year of regulated pollutants for this area.

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Mobile sources consist of emissions from non-stationary sources such as cars, trains, and aircraft. Mobile emissions are further broken down into on-road mobile and off-road mobile categories. On-road mobile sources primarily consist of personal and commercial cars and trucks, and contribute by far the largest part of the mobile source emissions. Off-road mobile sources consist of a diverse group of heavy construction equipment, small engines (lawnmowers and snow blowers), trains, and aircraft. Estimating emissions from mobile sources requires an understanding of the various emission characteristics of the many types of vehicles and model years that make up the fleet, an understanding of how and where they are driven, and the distances they travel. With this understanding, it is possible to see, for example, that on-road mobile sources produce about 36% of the annual pollution (NO_x, PM_{2.5} exhaust, and VOC) along the Wasatch Front, and although heavy-duty diesel vehicles currently account for only 3% of the vehicle miles travelled, they produce over 15% of the pollution. Mobile sources have historically been the largest source of emissions in the areas not meeting the NAAQS, but with the implementation of federal emissions standards, and the introduction of Tier III fuel in Utah, this will change over the next few years.

Area sources are generally much smaller stationary sources, and due to their greater number, are generally accounted for as a group. However, as the federal air quality standards become more restrictive, it is becoming necessary to start tracking emissions more closely from smaller industrial sources. Additionally, as mobile sources become cleaner, area sources are quickly becoming the largest source of emissions in areas not meeting the NAAQS. Home heating, agricultural burning and harvesting, construction, residential and commercial energy generation, wildfires, and biogenics (emissions from vegetation) are examples of other area source categories.

Triennial Emissions Inventory

Under current federal law, Utah is required to collect a statewide emissions inventory triennially.

The 2014 triennial inventory is the most recent statewide inventory available; the 2017 triennial data will be available in mid-2019, as soon as the quality has been checked, and used in the 2019 Annual Report. The 2014 triennial inventory covers over 360 individual point sources, 194 area categories, and 12 mobile on-road and off-road categories. Table 4 shows total emissions, by county, of the criteria pollutants, CO, NO_x, PM₁₀, PM_{2.5}, SO₂, and VOCs. Figure 15 shows the 2014 triennial emissions inventory in six pie charts, displaying the relative portion of emissions generated within source categories. Any changes in the data from the 2017 Annual Report reflect using actual, not projected, oil and gas data from the Uinta Basin.

The figures in the charts are statewide annual figures and should not be compared to the inventories used in the PM_{2.5} or other SIPs, which are seasonal and area specific. Biogenic and wildfire emissions produced from non-anthropogenic (non-human) natural activity of vegetation and wildfires are usually estimated as segments within the area source category but have been listed separately due to their unique nature and impact.

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Table 4. 2014 Triennial Inventory (tons/year)

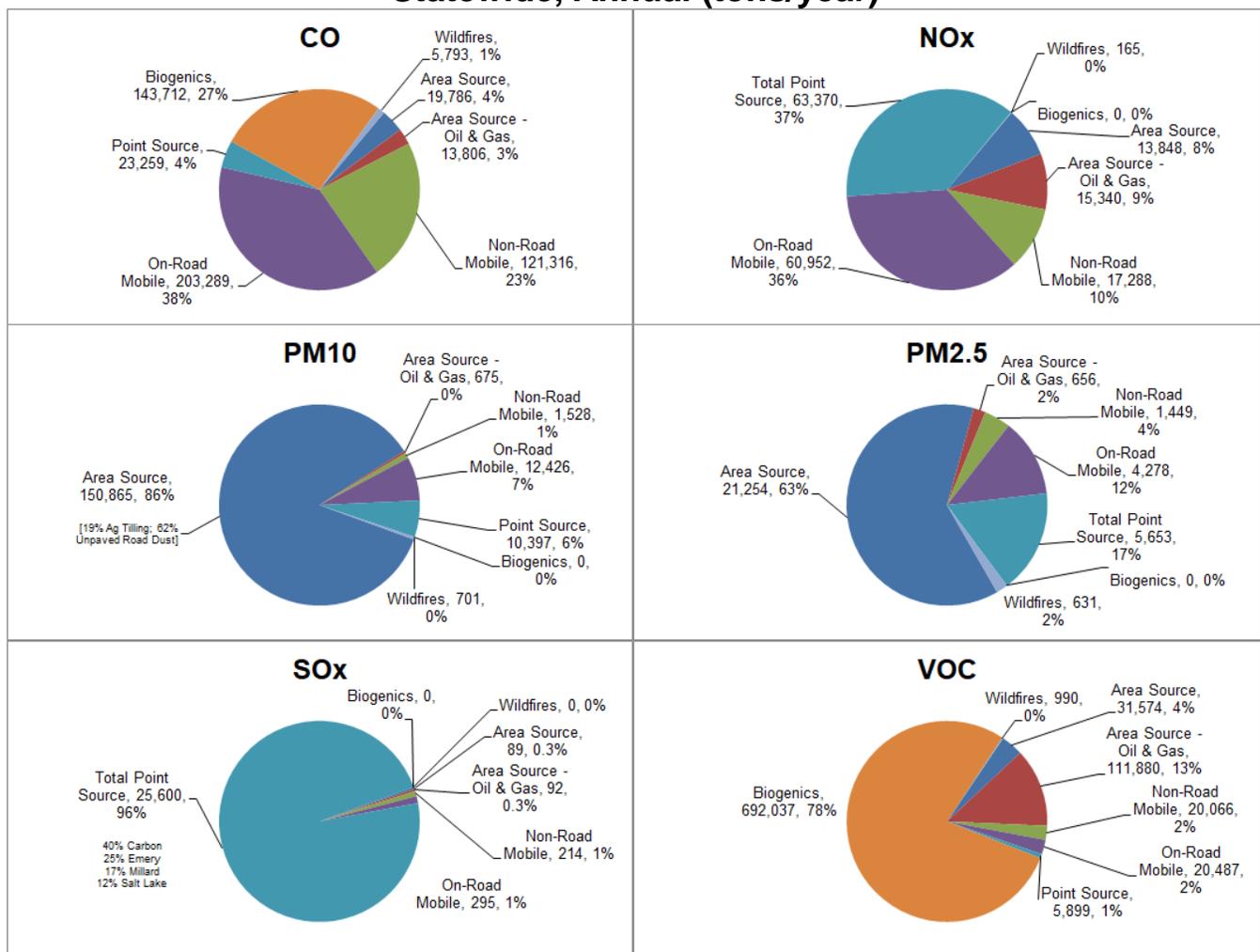
2014 Compiled by County	CO	NO_x	PM₁₀	PM_{2.5}	SO₂	VOC
Beaver	7,895.19	2,056.72	2,462.21	423.03	10.57	24,648.88
Box Elder	23,179.68	4,967.12	11,415.05	1,935.08	162.17	36,463.81
Cache	14,520.31	2,366.37	11,450.12	1,656.94	18.7	12,248.56
Carbon	8,044.71	6,317.57	4,928.45	865.95	10,333.80	17,013.71
Daggett	2,367.61	808.12	1,114.88	205.67	1.99	8,387.66
Davis	29,520.38	6,904.42	4,961.01	1,120.18	260.43	10,321.36
Duchesne	14,559.96	8,036.62	6,109.81	1,124.76	20.41	44,796.53
Emery	17,853.79	20,396.80	4,891.08	1,257.33	6,426.99	36,110.52
Garfield	12,690.14	651.12	2,192.98	386.56	3.94	44,292.64
Grand	14,330.09	3,159.08	1,623.78	365.41	22.55	41,005.02
Iron	15,462.15	4,294.98	6,511.00	1,012.32	21.41	35,454.38
Juab	10,822.32	2,454.86	3,085.20	734.54	15.15	26,534.67
Kane	12,490.57	855.74	1,549.96	240.23	12.4	43,634.90
Millard	23,894.22	29,182.02	7,828.37	2,529.86	4,436.47	50,887.90
Morgan	4,186.89	2,206.03	2,499.94	438.01	138.42	7,081.38
Piute	2,137.09	211.23	822.46	157.93	0.83	7,193.75
Rich	3,442.31	333.93	2,340.59	421.25	1.12	7,718.73
Salt Lake	106,538.85	25,789.73	18,363.67	4,731.30	3,254.40	29,242.95
San Juan	19,935.25	2,056.27	4,748.14	716.73	511.67	85,871.50
Sanpete	6,733.08	1,178.44	5,415.97	810.87	11.96	14,841.79
Sevier	9,052.85	2,011.97	7,513.34	1,102.19	34.43	16,857.38
Summit	11,538.84	4,223.60	7,778.49	1,110.83	113.79	18,720.44
Tooele	22,842.83	6,166.99	8,477.62	2,207.37	79.69	44,533.50
Uintah	20,100.07	9,787.50	9,820.65	1,951.22	46.58	100,553.37
Utah	48,891.22	12,674.62	15,018.74	2,720.10	218.32	28,448.37
Wasatch	6,185.47	1,178.89	4,153.41	626.82	6.71	12,456.48
Washington	30,365.34	5,532.63	10,894.25	1,600.16	37.16	43,902.15
Wayne	5,990.03	324.77	1,184.31	169.09	1.89	22,186.21
Weber	25,307.00	4,606.58	7,342.92	1,281.28	46.93	11,474.17
Total	530,878.26	170,734.73	176,498.39	33,903.02	26,250.85	882,882.68
<i>Portable Point Sources</i>	83.47	228.36	93.12	17.77	38.86	50.95
State Total	530,961.73	170,963.09	176,591.52	33,920.78	26,289.71	882,933.64

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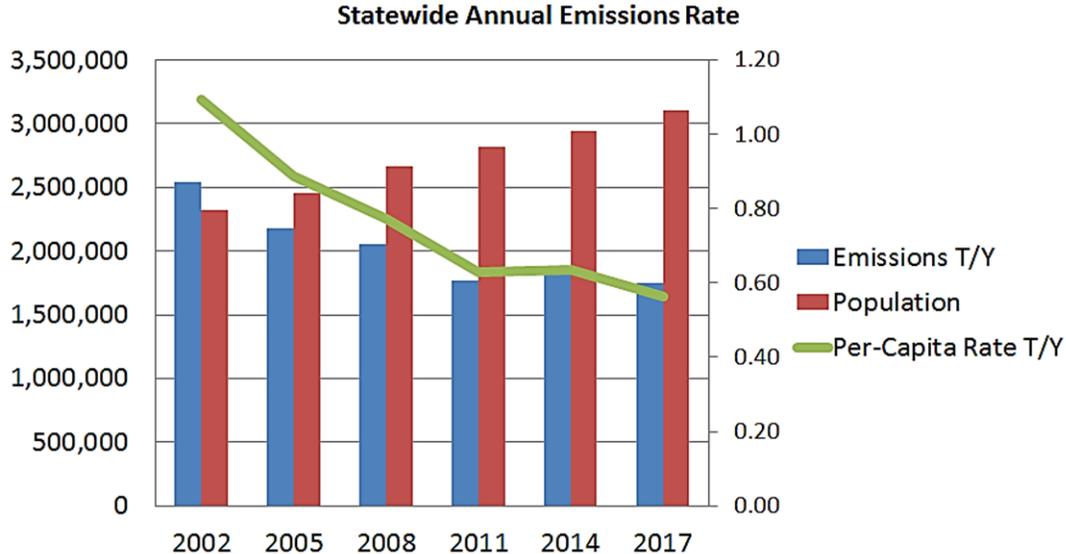
The triennial inventory for 2014 was collected and compiled through 2016 as EPA calculation methods for area categories were revised and supplied. The inventory as described in this report differs from that of the 2011 statewide inventory for several reasons:

1. Many of the 2014 area source calculations were re-edited using new calculation methods provided by the EPA,
2. Over 60 detailed categories supplemented or replaced the previous Oil and Gas production categories in the area source category;
3. Fewer wildfires occurred in 2014 than in 2011; and
4. On-road emissions reductions are seen with the increasing proportion of newer vehicles in the statewide fleet.
 - a. These emissions reductions are achieved as a result of EPA's Tier II emissions standards for newer vehicles.

Figure 15. 2014 Triennial Emissions Inventory by Source Category – Statewide, Annual (tons/year)



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Division Organization

The DAQ is divided into three branches: Planning, Compliance, and Permitting.

The *Planning Branch* is responsible for developing comprehensive plans to reduce air pollution and collecting and analyzing the data necessary to show the effectiveness of those plans. The Planning Branch is organized into three sections. The *Air Monitoring Section* is responsible for establishing and operating the monitoring network to gather and analyze data used to determine concentrations of ambient air pollutants, as well as meteorological conditions when those pollution concentrations occurred. The *Inventory Section* has the primary responsibility to collect and collate emissions inventories in order to understand the origins of the various contaminants detected in the air. This includes both historic inventories and projection inventories, reflecting current and proposed control strategies. The *Technical Analysis Section* refines and analyzes available emissions inventories and monitoring data, using computer models to evaluate the impacts of new and existing sources of air pollution and to understand the relationship between the emissions, meteorology, and pollutant concentrations measured in the air for past, current and future pollution episodes. The Planning Branch is also involved in identifying the air quality impacts of transportation issues, which include vehicle inspection and maintenance, clean fuels, and highway construction. The *Air Quality Policy Section* uses this information to develop SIPs in order to ensure that Utah's ambient air comes into and remains in compliance with the federal health standards. Additionally, the Air Quality Policy section coordinates all of the rule-making activities of the Division.

The *Compliance Branch* is responsible for ensuring that industries and residents comply with Utah's air quality rules and is comprised of three sections: *Major Source Compliance*, *Minor Source Compliance*, and *Air Toxics, Lead-Based Paint, and Asbestos Section (ATLAS)*. The Major and Minor Source Compliance Sections are responsible for ensuring that all Utah air

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quality regulatory requirements are met. This is done through inspections and enforcement actions. ATLAS is responsible for the regulation, under various EPA programs, of toxic air pollutants, also known as Hazardous Air Pollutants (HAPs). HAPs are those pollutants listed in the Federal Register that are known or suspected to cause cancer or other serious health problems. ATLAS is also responsible for the enforcement of federal and state regulations for preconstruction asbestos removal and a number of outreach and enforcement programs designed to reduce exposure to lead-based paint. Through the *Small Business Environmental Assistance Program (SBEAP)*, the Compliance Branch also assists small businesses in complying with state and federal regulations, including New Source Performance Standards (NSPS), National Emission Standards for Hazardous Air Pollutants (NESHAP), New Source Review (NSR), and Utah’s air quality rules. The SBEAP can advise small businesses on permitting requirements, emission calculations, technical issues, and pollution prevention techniques.

The *Permitting Branch* is responsible for issuing construction and operating permits to stationary sources that emit air pollutants, and is comprised of three sections: *Minor Source NSR*, *Major Source NSR*, and *Operating Permits*. Construction permits are issued to new or modified stationary sources of air pollution through the NSR program. Operating permits are issued on an ongoing basis through Title V of the CAA to “major” stationary sources.

Planning Branch

The *Planning Branch* is responsible for developing SIPs and administrative rules in order to ensure that Utah’s ambient air meets the federal health standards, even as our population and our economy continue to grow. These plans address a variety of air quality issues, but most often focus on areas of the state where the monitoring identifies air quality that is unhealthy for one or more of the criteria pollutants.



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In addition, the federal CAA requires transportation planning organizations to prepare information detailing the air quality impacts associated with improvements in the transportation infrastructure. These transportation plans must conform to the mobile source emission budgets used by the DAQ to develop the SIPs.

Status of Projects and Initiatives

Air Quality Research Projects

Legislative funding for air-quality research has provided DAQ with the resources to investigate the complex conditions that lead to high pollution levels during winter inversions and summer ozone episodes. Better understanding of the unique conditions that lead to poor air quality helps DAQ craft effective regulations, target emission sources, and apply appropriate emission-control technologies. In addition, this state funding is critically important for

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leveraging federal, state, private-sector sponsorships, and in-kind support for research initiatives.

In 2018, the Utah Legislature approved \$500,000 in ongoing funding for air-quality research through the Science for Solutions Research Grant. This annual research funding will help DAQ improve its knowledge of the unique atmospheric and chemical conditions that contribute to air pollution in Utah. The legislature also approved \$100,000 funding for mobile monitoring data collection to improve scientific understanding of the spatial variability of the pollutants that contribute to the formation of PM_{2.5} and ozone within the Salt Lake Valley.

Current Research Projects (FY 2019)

Eight air-quality research projects were funded for fiscal year (FY) 2019 by the state legislature through the Science for Solutions Research Grant.

- 1. Wasatch Front Ammonia and Chloride Observations (WaFACO)**

This study will collect ambient-air measurements to define the spatiotemporal behavior of atmospheric ammonia (NH₃) and hydrochloric acid (HCl) along the Wasatch Front during the winter and summer. Numerous studies, including the 2017 Utah Winter Fine Particulate Study (UWFPS), have shown ammonium nitrate to be the main component in PM_{2.5} particulate pollution during inversions along the Wasatch Front. Better understanding of ammonia behavior along the Wasatch Front and the possible influence of hydrochloric acid on the formation of wintertime PM_{2.5} and ozone will improve air-quality models used to develop targeted pollution controls to reduce seasonal air pollution.

- 2. Jordan Narrows Gap Ammonia Transport Study**

This study is a follow-up to the 2017 Utah Winter Fine Particulate Study (UWFPS). One of the outcomes of the UWFPS study was the need for a better understanding of ammonia sources and concentrations in the Salt Lake Valley, including improved understanding of the role of air-mass exchange and ammonia transport between the Salt Lake and Utah valleys. This study will provide key meteorological support during the 2018-2019 winter season for chemical observations that focus on the ammonia transport and air mass exchange between the Salt Lake and Utah Valleys.

- 3. Ammonia Emission Assessment from Diesel and Gasoline Engines under Utah-Specific Conditions**

The study will take tailpipe measurements for ammonia (NH₃) in on-road and laboratory settings for a variety of diesel and gasoline vehicles representative of Utah's vehicle fleet. This research will improve DAQ's understanding of the contribution of automobiles to ammonia emissions in Utah.

- 4. Aethalometer Study for Estimating Compliance with Wood-burning Ban**

Research studies continue to find wood burning to be a significant contributor to wintertime PM_{2.5} levels in Utah's PM_{2.5} Nonattainment Areas, even during periods with wood burning restrictions in effect. The University of Utah's Department of Chemical

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Engineering will collaborate with DAQ in a study to estimate the contribution of wood burning to wintertime PM_{2.5} levels using a different monitoring method. Scientists will collect aethalometer data from four stationary locations in the Salt Lake, Utah, and Cache valleys. Researchers will also collect mobile measurements in the Salt Lake Valley. Aethalometers measure the concentration of brown and black carbon particles suspended in the air. These data will also be used to assess compliance with wood-burning restrictions during the winter of 2018-2019.

5. TRAX Air-Quality Observation Project

TRAX light-rail trains provide a unique platform to capture spatial variations in ozone and PM_{2.5}. The three-year pilot program to test and evaluate the deployment of the sensors and real-time availability of the air-quality monitoring was a great success. The current study will install new, calibrated PM_{2.5} and ozone sensors on two TRAX light rail trains; deploy two, fixed PM_{2.5} sensors to establish a relationship between TRAX-based measurements and the Hawthorne monitor; provide online, real-time visualization of TRAX air-quality measurements; and offer a publicly-accessible archive of TRAX air-quality data.

6. Daily Wintertime PM_{2.5} Speciation at Hawthorne and Smithfield

DAQ will increase the frequency of speciation of wintertime PM_{2.5} filters to validate regulatory air-quality modeling. DAQ will conduct daily sampling at Hawthorne (Salt Lake County) and daily sampling at Smithfield (Cache County) during persistent inversion events.

7. Bountiful City Dichloromethane and Formaldehyde Source Apportionment Study

Researchers will conduct a source-apportionment study between December 2018 and January 2019 to determine the source of elevated levels of the toxic air pollutant dichloromethane (methylene chloride) and formaldehyde in Bountiful City. The study will use source apportionment methods on particulate samples to identify and quantify the sources of these air toxics. The study will also collect measurements of PM_{2.5} concentration and composition.

8. Composition of Volatile Organic Compound Emissions from Oil and Gas Wells in the Uinta Basin

DAQ is leading a new effort to improve estimates of the speciation of organic compound emissions from Uinta Basin oil and gas wells. Utah State University (USU) will work with DAQ to collect and analyze pressurized gas and liquid samples from oil and gas well separators and conduct data processing and analysis. Speciation of these gas emissions will help scientists identify the organic compounds in the samples and improve air-quality emissions modeling.

Success Story: Air Quality Research Roadmap (AiR²)

DAQ's first-annual Air Quality Research Roadmap (AiR²) conference provided air-quality researchers and scientists with a unique opportunity to discuss possible solutions to Utah's air-pollution challenges. Research scientists from local universities frequently partner with DAQ on air-pollution studies; AiR² provided the research and regulatory communities with a forum for

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prioritizing research topics and charting a course for future collaboration during the FY 2020 funding cycle and beyond.

Participants reviewed a draft list of potential current research priorities during two roundtable discussions. Scientists considered research objectives for a range of air-quality issues:

- PM_{2.5} chemistry and precursor gases
- Improve understanding of the complex chemical and physical processes that contribute to secondary PM_{2.5} formation.
- PM_{2.5} source contributions
- Quantify the proportion of organic mass in wintertime PM_{2.5} from wood smoke and other organic materials.
- Emission sources and their impact on ozone formation
- Improve understanding of the emission-source contribution to high ozone concentrations. Identify how various activities influence ozone formation in the Uinta Basin in the winter and the Wasatch Front in the summer.
- Air-exchange processes and pollutant transport
- Characterize how air-mass exchanges across the Great Salt Lake, Wasatch Front valleys/ canyons, and the upper and lower layers of the atmosphere affect the transport and mixing of the key precursors that form secondary PM_{2.5}.
- Air-quality modeling and emission inventory improvements
- Improved emission inventories to enhance the performance of air-quality modeling.
- Urban air pollutants and their effect on human health
- Assess the impact of urban growth and associated air-pollution on the health of local communities.
- The intersection of air quality and human behavior
- Improve understanding of the direct impacts of human behavior on air pollution, including the impact of outreach and education to affect behavior changes.

Participants brought up two areas of research during the group discussions that were added to the FY2020 Final Research Goals and Priorities:

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- Instrumentation and methods
Evaluate the benefits, efficacy, and limitations of portable air-quality sensors and their applicability for regulatory measurements.
- Exceptional events and their impact on air quality
Assess the impacts of exceptional events such as wildfires and dust events on ambient air quality.

Communication and support between researchers and regulators are vital to finding effective solutions to Utah's unique air-pollution challenges. The lively, thoughtful conversations at this year's AiR² meeting generated new ideas and fresh approaches to perennial air-quality problems. DAQ used this feedback from the research community to craft a request for proposals (RFP) for next year's round of projects.

PM₁₀ Maintenance Plans

In 1987, the EPA defined a size "indicator" of the suspended particles that were of concern to public health. These were "fine" particles with an aerodynamic diameter of ten microns or less, and this regulated subset of total suspended particles was called PM₁₀. Both Salt Lake and Utah Counties were out of compliance with the EPA's new 24-hour health standard for PM₁₀. In 1991, the Board developed a SIP for each area. Both SIPs were successful, and by 1996 both areas were found to be attaining the standard.

In 1997, the EPA replaced PM₁₀ as the indicator of fine particulate matter with a sub-set of particles having an aerodynamic diameter of only 2.5 microns or less. This would be known as PM_{2.5}. Both PM₁₀ and PM_{2.5} include a complex mixture of extremely small particles and liquid droplets. These particles can be emitted directly, as in smoke from a fire. Such particles are referred to as "primary" particulate. The particles can also form in the atmosphere when "precursor" gases such as SO₂, NO_x, VOCs, and ammonia undergo complex chemical reactions. The particles that form during these chemical reactions are referred to as secondary particulate. Secondary particulate is prominent during Utah's winter inversions.

The PM₁₀ standard for controlling fine particulate is less restrictive than the PM_{2.5} standard in Utah. However, the DAQ spent considerable effort developing what are called Maintenance Plans for Utah's three PM₁₀ nonattainment areas. These areas include the Salt Lake County, Utah County, and Ogden City nonattainment areas (see Figure 1). The plans use air modeling to demonstrate at least ten years of continued compliance with the PM₁₀ health standard. Ultimately, these plans will allow Utah to petition the EPA to de-list these areas as "nonattainment."

No additional emission controls were needed to demonstrate the ten years of compliance. Certainly though, the emission controls recently adopted by the Board to address PM_{2.5} will have a positive effect on PM₁₀ levels. The Maintenance Plans were completed in December of 2015, and they have been forwarded to the EPA. During 2016, DAQ worked with EPA to move those plans towards approval by EPA. EPA did not act on the maintenance plans in 2017 and 2018, but has indicated they will be a priority in 2019.

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Reclassification of Utah's PM_{2.5} Nonattainment Areas

In December of 2016, EPA proposed to determine that each of Utah's three nonattainment areas for PM_{2.5} had failed to demonstrate compliance with the 24-hour standard (35 µg/m³) as of the statutory attainment date of December 31, 2015. As a result, EPA has proposed re-classifying each of these areas from Moderate Nonattainment Areas to Serious Nonattainment Areas.

Such re-classification required Utah to revise its implementation plans. The new Serious Area Plans reach beyond the level of emission controls determined to be "reasonably available" which are presently included in Utah's Moderate Area SIPs, and achieve a level defined as the "best available."

Action to re-classify these areas was not unexpected. In fact, the Moderate Area SIPs for the Salt Lake City and Provo nonattainment areas demonstrated that it would be impracticable to attain by the statutory attainment date. The plan for the Logan nonattainment area did predict attainment by 2015. The EPA granted two one-year extensions to the moderate area attainment date for the Logan nonattainment area, extending the attainment date to December 31, 2017.

Reclassification of the Salt Lake City and Provo nonattainment areas became effective in June 2017 with an attainment date of December 31, 2019. The Serious Area plans for the Salt Lake City and Provo areas were due to EPA in December 2017, but inventory and modeling issues delayed the development of those plans.

The Salt Lake City nonattainment area plan was proposed to the Air Quality Board in the fall of 2018 and is expected to be approved by the board in early January of 2019. The plan includes a demonstration, including air quality modeling, that the area can likely attain the 24-hour PM_{2.5} standard by December 2019. It also includes provisions to ensure best available control measures and technologies throughout the nonattainment area.

Part of the technical work that underlies any SIP is the consideration of monitored air quality. Review of this data shows that the Provo nonattainment area, is in, fact attaining the 24-hour PM_{2.5} standard with its two most recent 3-year averages (2014 – 2016 and 2015 – 2017). This allows the EPA to apply a Clean Data Determination to the area, and effectively suspend many of the required serious SIP elements. Several elements that DAQ must still develop and submit include a base-year emissions inventory, provisions to ensure BACM / BACT, and new source review (NSR) provisions which specifically address PM_{2.5} as well as its precursors in the nonattainment area. DAQ completed each of these elements during the summer of 2018. All other Serious Area SIP elements will remain suspended until such time as the area is re-designated to attainment, after which such requirements would be permanently discharged; or, EPA determines that the area has re-violated the PM_{2.5} NAAQS, at which time Utah would need to submit these elements by a future date to be determined by the EPA. It is expected that the EPA will approve a Clean Data Determination for the Provo nonattainment area in 2019, followed by an attainment by attainment date designation.

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Effective October 19, 2018, the EPA determined that the Logan nonattainment area had in fact attained the 24-hour NAAQS as of its attainment date. This means that the nonattainment area remains classified as Moderate, and it will not be necessary to make SIP revisions to address any Serious Area planning requirements. EPA also used a Clean Data Determination to establish that any elements still outstanding from the Moderate Area SIP will also be suspended until such time as the area is re-designated to attainment or EPA determines that the area has re-violated the 24-hour PM_{2.5} NAAQS. A fully approved maintenance plan, including that the improvements in air quality are due to permanent and enforceable reductions in emissions, is the final element necessary for the EPA to consider a re-designation to attainment. UDEQ plans to submit a Logan nonattainment area maintenance plan to the EPA during 2019.

Inter-mountain West Data Warehouse (IWDW)

The EPA, under the National Environmental Policy Act, is mandated to document current air pollution levels and lessen current and projected adverse impacts through mitigation strategies. Localized monitoring in the inter-mountain area (western Colorado, eastern Utah, southwestern Wyoming, and northwestern New Mexico) has revealed degraded air quality in regard to ozone and NO_x, leading federal and state agencies to realize more information is needed as energy development in the region is considered. Because of a common need for a comprehensive set of air quality assessment tools, the stakeholders—EPA Region 8, the Bureau of Land Management, the USDA Forest Service, the National Park Service and the states of Utah, Colorado, Wyoming, and New Mexico are cooperating on the following activities:

- Expanding air quality monitoring in the study area to establish baseline conditions, track air quality trends, and evaluate the performance of air quality modeling systems;
- Creating and operating a robust, centralized data warehouse to store, manage and share data among state and federal agencies and industry to support air quality modeling and analysis; and
- Performing regional scale baseline air quality modeling of current conditions, which the impacts from proposed future projects can be evaluated against.

Utah has collected three years of air quality at the Price and Fruitland monitoring sites, both funded by the IWDW. Utah is currently under contract with the Bureau of Land Management (BLM) to operate BLM's monitoring station at Escalante. In addition, air quality data from the Vernal and Roosevelt monitoring sites have been provided for the project. Other activities on the project this year included providing support to the development of emissions inventories, review of the project work plan, and participating in the project oversight committee meetings. Work conducted under the IWDW is directly applicable to the ozone studies currently underway in the Uinta Basin.

Uinta Basin Ozone

Since 2005, the National Park Service has been measuring summertime ozone at the Dinosaur National Monument located near Vernal and, beginning in 2006, at the Colorado National Monument located near Grand Junction, CO. In 2009, the EPA began measuring year-round ozone at two sites on the Ute Indian Reservation, located near

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Redwash and Ouray. Data collected from the two tribal sites during the winter of 2010 indicated that high ozone levels are occurring in the Basin during the middle of winter. This finding was unexpected since ozone is normally an air pollutant that is formed during the summertime when there are high temperatures and bright sunshine.

In the winter of 2010/11, the Uinta Basin Impact Mitigation Special Services District (BIMSSD) funded a study conducted by Utah State University's Energy Dynamics Lab and the DAQ. Using data collected from 18 permanent and temporary air monitoring stations placed throughout the basin, researchers found elevated wintertime ozone concentrations throughout the basin during temperature inversion events when snow covered the ground. The highest values were found in the central basin area, with many exceeding the ozone NAAQS.

In the winters of 2012 through 2014, cooperating agencies, including the BLM, the EPA, Western Energy Alliance, and the UBIMSSD, coordinated by the DAQ, embarked on a multi-winter effort to study and address ozone levels in the Basin. The goal of the Uinta Basin Wintertime Ozone Study (UBWOS) was to understand how ozone is formed in the Basin during wintertime inversion conditions and to implement appropriate and effective strategies for mitigating high ozone levels in order to avoid nonattainment. Researchers from the National Oceanic and Atmospheric Administration (NOAA), several university research groups, the EPA, and the DAQ worked together to study ozone formation in the basin during wintertime inversion conditions. The study concluded that:

- Ozone formation is associated with stable meteorological conditions, snow cover, and sunshine.
- NO_x comes from hot combustion sources, and the highest levels are in the oil production areas and population centers.
- VOC comes from oil and gas production with the highest levels in the gas production areas.
- There is very high year-to-year variation in ozone levels due to variation in meteorological conditions.
- Elevated ozone coincided with elevated levels of VOCs and NO_x, which are the primary chemical precursors of ozone formation.
- Complex patterns of light winds within the Basin appear to produce an east-west "sloshing" of air that contributes to intra-basin mixing of ozone and ozone precursors.
- Chemical reactions during these winter episodes differ greatly from summer ozone formation in urban areas.
- Aromatic VOCs such as toluene and xylene contribute in secondary formation of wintertime ozone pollution in the Basin; therefore, VOC control measures focused on these types of VOCs will be particularly effective.
- Formaldehyde (HCHO) and other aldehydes are the dominant radical sources needed for ozone formation and are important chemical species to control.

Further information on the UBWOS and wintertime ozone in the Uinta Basin can be found on the DAQ web site at: <http://www.deq.utah.gov/locations/U/uintahbasin/index.htm>.

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In 2016 a study was initiated to investigate possible sources of fugitive emissions from sources in the Uinta Basin. The Storage Tank Emissions Pilot Project (STEPP), using a \$150,000 appropriation from the Utah Legislature, is a joint endeavor with DAQ, the Bingham Research Center and Tri-County Health Department to evaluate potential storage tank fugitive emissions. With cooperation from oil and gas producers, the STEPP evaluated a representative sample (448) of the 2,350 well sites located on state regulated lands for leaks from tank systems through a methodical and organized process utilizing infrared cameras, Geographic Information System equipment, and Google High-Resolution Imagery.

As a follow-up on to the STEPP, further funding provided by the legislature in 2017 allowed the purchase of an infrared (IR) camera to support the establishment of a lending program in the Basin. This program, established in fall 2017, provided professional training and certification for use of the IR camera to oil and gas producers. The camera has been placed in Vernal, UT, where the lending of the camera will be managed by Utah State University personnel. By locating the camera in Vernal, oil and gas businesses in the area are able to assess potential leaks at their facilities with little to no costs to the companies. As the 2016 study indicated, there are many potential leaks from operating equipment, by providing access to the IR camera, there is a greater opportunity to understand leaking equipment, improve response, and repair potential leaks. The IR camera is a great tool available to improve the air quality in the Basin.

In 2018 the Uinta Basin was officially designated as an ozone nonattainment area August 3, 2018, with a marginal classification. This will require attainment of the 2015 ozone standard by August 3, 2021. Information gathered from the 2017 oil and gas emission inventory will be vital to understanding emissions that contribute to ozone formation in the Basin. Continuing use of research funding led to an aerial helicopter study of oil and gas sources on both Indian and state lands combined with ground observations in the winter/spring of 2018. This was a corporative study between the Ute Tribe, BLM, UDAQ and EPA and provided further understanding of where potential emissions from oil and gas production equipment can originate. Additionally a study into the composition of VOC emissions from oil and gas wells in the Basin began in the fall of 2018 and should be available in the spring/summer of 2019. This study will improve UDAQs oil and gas emission inventory and photochemical modeling work.

In the fall of 2018 a stakeholder workgroup was organized for the Basin with representation from the Ute tribe, local government officials, federal agencies, state agencies, environmental advocates, academia and the oil and gas industry. The goal is to provide a mechanism for the exchange of knowledge, communication of regulatory status or changes, discussion of voluntary emission controls during the wintertime ozone season and explore solutions to high ozone incidents. The UDAQ will continue to focus on understanding how ozone is formed during wintertime inversions and the most effective control technologies that can be applied to help achieve the ozone standard in the Basin.

Utah Clean Diesel Program

In 2018, the Environmental Protection Agency (EPA) awarded nearly \$2.4 million to the Utah Clean Diesel Program for a heavy-duty diesel truck replacement



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program. Class 5-8 diesel trucks that operate a minimum of 50 percent of their time in Utah's nonattainment areas may be funded up to 25 percent for new replacement trucks.

Retiring engine model years 1998-2006 diesel trucks that are currently operational and have a minimum of three years remaining in their useful life and replacing them with new trucks that meet the most stringent emissions standards can achieve approximately 71 to 90 percent reductions in NO_x, 97 to 98 percent reductions in PM_{2.5}, and 89 to 91 percent reductions in VOCs, according to the EPA Emissions Standards for Heavy-Duty Highway Engines and Vehicles.

A separate allocation of clean diesel funding for participating states offers approximately \$760,967, a combination of 2017 and 2018 funds, for the replacement of diesel school buses to all-electric school buses. VW Settlement funding of \$507,311 will provide added funding for this project for a total of \$1,268,278.

Over \$17 million in federal grants have been awarded through the Utah Clean Diesel Program since 2008, resulting in thousands of tons from diesel emissions and over a million gallons of diesel fuel have been reduced.

Transportation Conformity

Several Metropolitan Planning Organizations (MPOs) are responsible for developing, producing, and adopting Metropolitan (or Regional) Transportation Plans (MTP or RTP) and Transportation Improvement Programs (TIP) within the state. The MPOs include Cache MPO (CMPO), Dixie MPO, Mountainland Association of Governments (MAG), and the Wasatch Front Regional Council (WFRC). MPOs located in nonattainment and/or maintenance areas have the responsibility to ensure that the current MTP and TIP conform to the Utah SIP through a process known as transportation conformity. The Federal Highway Administration and Federal Transit Administration review the conformity determinations along with the MTP and TIP in consultation with the EPA to ensure that the relevant planning and air quality regulations have been adequately addressed.

CMPO, MAG, and WFRC demonstrated conformity to the SIP for the Plans and TIPs for their respective areas.

CMPO established conformity for the 2040 RTP in August of 2017 and the 2019-2024 TIP in August 2018 for Cache County, Utah portion of the PM_{2.5} moderate nonattainment area.

MAG established conformity for the amended 2040 RTP in July 2015 and the 2019-2024 TIP in August 2018 for the Provo\Orem City CO maintenance area and for the Utah County PM₁₀ and PM_{2.5} moderate nonattainment area.

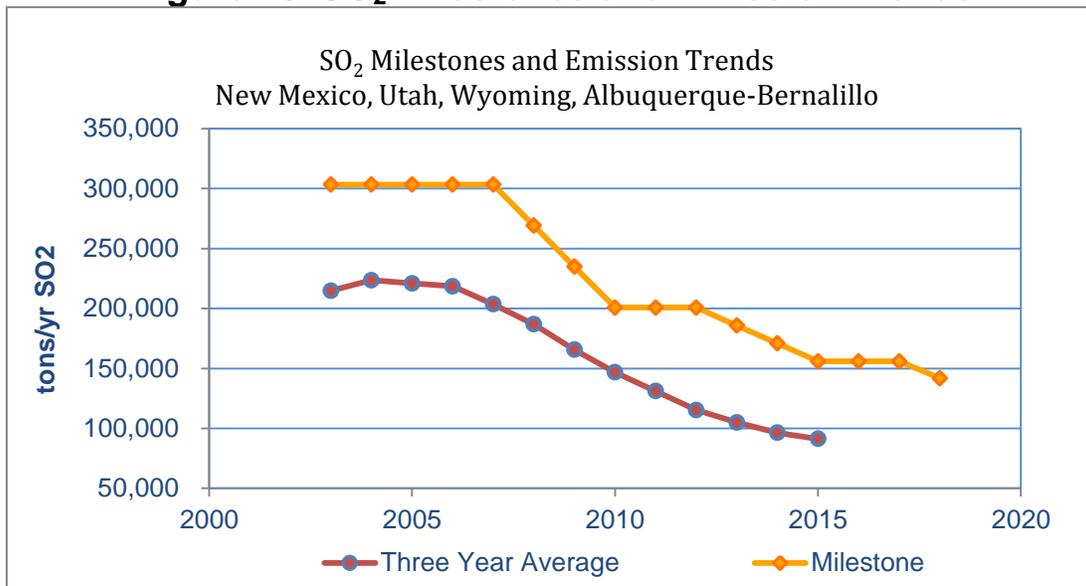
WFRC established conformity for the 2018-2023 TIP in September 2017 and amended the 2040 RTP in August of 2018 covering the Salt Lake City and Ogden City CO maintenance areas, the Salt Lake County and Ogden City PM₁₀ nonattainment areas, and the Salt Lake PM_{2.5} moderate non-attainment area including all or portions of Box Elder, Davis, Salt Lake, Weber, and Tooele Counties.

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Regional Haze SIP

Utah's Regional Haze Plan includes regional targets for SO₂ emissions, with a backstop-trading program to ensure that the emission reduction goals are achieved. Each year, the states participating in the program compile an inventory of SO₂ emissions and then compare the emissions to the milestones established in the plan. The regional three-year average emissions for 2014, 2015, and 2016 were 90,591 tons, 42% below the milestone. The emissions are far below the milestone due to the early installation of emission controls at power plants and other emission sources. The region has been well below the milestone every year of the Regional Haze program as shown below. The 2017 milestone report will be submitted to the EPA in the spring of 2019.

Figure 16. SO₂ Milestones and Emission Trends



The Regional Haze Plan also includes a section addressing long-term strategies for reducing haze-causing emissions from stationary sources. In 2015, the Board approved an updated version of the stationary sources section called Alternative to BART (Best Available Retrofit Technology) that had been developed in close cooperation with staff and management from EPA Region 8. After a long review period, the EPA headquarters decided to disapprove portions of the plan and issue a Federal Implementation Plan (FIP) in its place. The Utah Attorney General's Office, PacifiCorp, and other entities challenged the disapproval in court. EPA is currently working with the DAQ and PacifiCorp to reconsider the decision.

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Ancillary Programs

Utah Air Quality Public Notifications

The DAQ provides air quality forecasting on its webpage for the current and next two days. The Air Monitoring Section (AMS) provides air pollution information based on the daily air quality status. The AMS data is used to determine the relationship of existing pollutant concentrations to the NAAQS. There is a three-tiered air quality alert system: unrestricted, voluntary action and mandatory action. This system is used to implement winter and summer controls on the use of solid fuel burning devices, fire places, and motor vehicles, and to advise the public and industrial sources to take action to reduce their pollution footprint during these events. The forecast call determines which restrictions are in place for a given county. In addition, the webpage advises the public as to current air quality conditions using the standard Air Quality Index (AQI) categories: good, moderate, unhealthy for sensitive groups, unhealthy and very unhealthy. Each advisory category listed on the webpage is accompanied by a health protection message that recommends actions affected groups can take to mitigate the effects of pollution on them and links to the AQI web site for further information. The AMS advisory is calculated for five major pollutants: ground-level ozone, particulate pollution (particulate matter), carbon monoxide, sulfur dioxide, and nitrogen dioxide. The outreach program information consolidated in the three-day forecast includes the Summer and Winter Control Programs and Choose Clean Air information.

The DEQ is also sponsoring an electronic mail server (Listserv). Subscribers are automatically notified by e-mail when unhealthy air pollution levels are forecast throughout Utah and when action alerts are issued.

The National Center for Automotive Sciences and Technology at Weber State University developed a mobile app called Utah Air for the DAQ. It provides similar information directly on smart phones and other mobile devices. The application is free and can be downloaded from both the Android and Apple app stores. As of January 2019, the application has been downloaded onto over 90,000 mobile devices.

Choose Clean Air

DEQ continues to emphasize the Choose Clean Air program and has developed an interactive website containing information about ways individuals can help improve air quality by making smart choices in their personal lives. The website can be found at <http://www.cleanair.utah.gov/>.

Winter Control Program (unrestricted, voluntary action, mandatory action)

This program originated with the PM₁₀ SIP, but was significantly strengthened in December 2012 to be much more proactive and less reactive. Now, instead of waiting until an area is exceeding a standard, action alerts are called when the DAQ meteorologists see that we are in the early building stages of an inversion that will likely lead to pollution concentrations at or above the trigger level of 25µg/m³. The program runs annually from November through early March. In addition to the burning restrictions, residents are encouraged to drive less and are directed to information on other ways they can reduce pollution.

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Summer Control Program (unrestricted, voluntary action, mandatory action)

Action days are announced whenever the probability of exceeding the ozone standard is forecasted to be high. High temperature and stagnant air masses contribute to this probability. Residents are encouraged to minimize driving whenever the ozone or PM standards are approached.

Vehicle Inspection/Maintenance Programs

Inspection/Maintenance (I/M) programs were adopted in the early 1980s as a required strategy to attain the ozone and carbon monoxide NAAQS. These programs were very effective in improving air quality. They have played an important role in reducing emissions that contribute to ozone and carbon monoxide. Their continued operation is necessary for the Wasatch Front to remain in attainment of these standards. The county health departments administer these programs.

The most recent I/M program to be implemented in Utah is in Cache County. The program was fully implemented on January 1, 2014, and is running smoothly. In 2017, Weber County implemented a revised I/M program that includes diesel vehicles. For diesels less than 14,000 lbs. GVW manufactured between 1998 and 2006, they perform a visual inspection to verify the vehicle's emission controls have not been tampered with. For 2007 and newer vehicles, they perform a full On-Board Diagnostics test. Weber County Health Department has found that about 20% of the tested vehicles are failing. During the 2018 General Legislative Session HB 101 passed which created a pilot program requiring Utah County to require a diesel emissions inspection program. This program will start on January 1, 2019 and continue until 2021.¹

Smoking Vehicles

Vehicles emitting excessive smoke contribute to poor air quality. To promote clean air, several local health departments operate smoking vehicle education and notification programs. There were two bills passed during the 2015 General Legislative Session that help enhance the smoking vehicle programs in the state:

- HB17 clarified that visible emissions from gas or certain diesel-powered vehicles are not allowed on Utah roads.
- HB110 gave the Utah Division of Motor Vehicles the authority to suspend a vehicle's registration if the vehicle does not meet air emissions standards.

The DAQ worked with the local health departments, Utah Division of Motor Vehicles, and Utah Highway Patrol to develop a method of enforcing these laws. People who spot a vehicle producing excessive smoke can report it through a statewide smoking vehicle hotline at 385-GOTSMOG(468-7664) or through their respective county health departments:

Cache County	435-792-6611
Davis County	801-546-8860
Salt Lake County	385-468-SMOG(7664)

¹ See Utah Code Section 41-6a-1642 (6) and (7)

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Utah County 801-851-SMOG(7664)
Weber County 801-399-7140

Salt Lake County Health Department applied for and was awarded a grant to create a statewide smoking vehicle hotline. This program created a single number (385-GOTSMOG(468-7664)) to report vehicle that have visible emission. Salt Lake County worked with the other local health departments to create and implement the program during 2018.

Heavy Duty Natural Gas Vehicle Tax Credit

During the 2015 General Session, the Utah Legislature approved a new tax credit for the purchase of a heavy-duty natural gas vehicle. Heavy duty is defined in the Utah Code as a commercial category 7 or 8 vehicle. The credit is limited to an aggregate annual amount of \$500,000.

The credit for tax year 2015, 2016, and 2017 is \$25,000 per qualified purchase; the credit for tax year 2018 is \$20,000 per qualified purchase; the credit for tax year 2019 is \$18,000 per qualified purchase; and the credit for tax year 2020 is \$15,000 per qualified purchase.

The credit went into effect retroactively on January 1, 2015. As of November 28, 2018, there have been 31 vehicles that have been approved for this tax credit, totaling \$725,000².

Wood Stove Conversion Program

In December 2017, the Environmental Protection Agency (EPA) awarded Utah over \$9.5 million in funding through a Targeted Airshed Grant to reduce pollution from woodstoves. The Division of Air Quality (DAQ) made this funding available in October 2018 to help residents, particularly low-income households, convert their woodstoves and fireplaces to cleaner-burning devices.

Originally scheduled as a five-year program, demand has outpaced funding, and the program will end well before the five-year mark. Funding for woodstove conversions in the Salt Lake Nonattainment Area (NAA) was allocated on the first day DAQ began accepting applications. Voucher dollars for the Provo NAA were allocated within a week.

The [stove conversion program](#) targets wood-burning devices in Utah's three nonattainment areas: Salt Lake, Provo, and Logan. The program covers Box Elder, Cache, Davis, Salt Lake, Tooele, Utah, and Weber counties. (Although EPA recently determined that Logan was in attainment for the 24-hour PM_{2.5} [National Ambient Air Quality Standards \(NAAQS\)](#), wood-burning remains a major contributor to particulate pollution in the Cache Valley. Woodstove conversions will help ensure the area maintains its attainment designation).

The airshed grant targets low-income households, with lower rebates offered to other households. Residents have four options:

² 19 for tax year 2015, totaling \$475,000; 5 for tax year 2016, totaling \$125,000; 5 for tax year 2017, totaling \$125,000.

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- Exchange an operational woodstove (including pellet) for a gas stove (natural gas or propane)
- Convert a fireplace to a gas fireplace (natural gas or propane).
- Exchange an operational uncertified woodstove for an EPA-certified woodstove
- Turn in an operational woodstove or insert for recycling.

DAQ issues a rebate voucher for applications that meet the program requirements. Vouchers can be used at [DAQ-approved vendors](#) towards the purchase of a qualifying device.

Rebate Amounts for the Wood-smoke Reduction Program			
Option	Device change-out	Rebate amount	
		Low-income households	Non low-income households
1	Any woodstove/insert or open fireplace to natural gas- or propane-fueled stove/insert	\$3,800	\$2,800
2	Uncertified woodstove/insert to EPA-certified woodstove/insert	\$500	\$500
3	Bounty for destroying a woodstove	\$250	

Fine particulates (PM_{2.5}) from wood-burning contribute to respiratory and other health problems. While cars emit the majority of the precursor gases that form fine particulates, wood-burning emits these particulates directly into the air. Replacing an old, uncertified woodstove with an EPA-certified stove can reduce the amount of fine particulates emitted by 60 percent. Converting an uncertified woodstove to a natural-gas stove provides even greater benefits, reducing particulate pollution by 99.9 percent.

Response to the program has exceeded all expectations. Since the program began, DAQ has issued the following number of vouchers (by nonattainment area):

- Salt Lake: 754
- Provo: 611
- Logan: 597 (DAQ will issue additional vouchers as applications are received)

Residents within the Salt Lake and Provo NAAs can be placed on a waiting list for unclaimed/unused vouchers. The current wait list for the Salt Lake NAA is over 2,000. DAQ intends to apply for additional funding for the Salt Lake NAA to help meet the overwhelming demand.

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2018 Electric Snow Blower Exchange

In an effort to combat the winter inversions, DEQ, Rocky Mountain Power, andUCAIR partnered for the first annual 2018 Electric Snow Blower Exchange. The Exchange encouraged participants to turn in their operable, gas-powered snow blowers for a discounted electric blower, but also offered an opportunity for those who did not have a gas-powered snow blower to purchase a discounted electric snow blower. Those who turned in a gas-powered blower received a larger discount on their electric snow blower purchase than those who did not.

Four-hundred-thirty-two participants were randomly selected from a pool of over 12,000 registrations. Approximately 80% of participants turned in a gasoline snow blower for the deeper discount.

DEQ estimates that operating a typical four-stroke gasoline snow blower for one hour emits as much pollution as driving a new passenger car 339 miles.

The program is funded by DEQ's Clean Air Fund, Rocky Mountain Power, andUCAIR. The Clean Air Fund is made up of voluntary contributions from taxpayers.



Alternative Fuel Grant Program

During the 2015 General Session, the Utah legislature established a new grant program that would enable installers to seek a grant that would lower the price of a conversion to alternative fuel technology. Previously, the grant had been available only to the individual seeking the tax credit. The bill passed, but it did not include funding. A bill (HB 87) was passed during the 2016 General Session that provided \$150,000 to help fund the program. DAQ staff worked with stakeholders to develop rules that went into effect on September 8, 2016. As of November 28, 2018 DAQ has issued 23 grants totaling \$57,500.

Volkswagen (VW) Settlement

In 2015, the United States (U.S.) Environmental Protection Agency (EPA) issued two notices of violation of the Clean Air Act (CAA) to Volkswagen Group³ (Volkswagen or VW), the German automotive manufacturer. The EPA asserted that VW installed software that activated emissions controls only while undergoing emissions testing, but rendered certain emissions controls inoperative during normal driving conditions. Consequently, approximately 500,000

³ The Volkswagen Group collectively includes Volkswagen AG, Audi AG, Volkswagen Group of America, Inc., Porsche AG, and Porsche Cars North America, Inc. Notice of Violation from Phillip A. Brooks, EPA Air Enforcement Division to David Geanacopoulos and Stuart Johnson, Volkswagen Group of America, Inc. (September 18, 2015); Notice of Violation from Susan Shinkman, EPA Office of Civil Enforcement to David Geanacopoulos and Stuart Johnson, Volkswagen Group of America, Inc. and Joseph Folz and Walter J. Lewis, Porsche Cars North America, Inc. (November 2, 2015).

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2.0-liter diesel vehicles (models 2009 to 2015) and 90,000 3.0-liter diesel vehicles (models 2009-2016) sold across the U.S. emitted between 9 and 40 times the nitrogen oxides (NO_x) emissions allowed by federal law⁴.

Utah received approximately \$35 million from a nationwide settlement with VW for violations of the Clean Air Act. Utah's portion will help offset excess nitrogen oxides (NO_x) emissions from the approximately 7,000 VW, Audi, and Porsche vehicles in the state affected by the automaker's violations.

DEQ determined that these excess NO_x emissions contributed an estimated 351-1,556 tons of NO_x over the span of time they were operating in Utah. Approximately 70 percent of the affected vehicles are registered in the seven counties designated as nonattainment for particulate matter (PM_{2.5}) under the National Ambient Air Quality Standards.

Governor Herbert designated the Department of Environmental Quality (DEQ) as the lead agency to administer these monies. DEQ's responsibilities as lead agency include the development of an Environmental Mitigation Plan (EMP). DAQ invited the public to provide input on the EMP and worked with an advisory committee on recommendations.

The VW settlement included a prescribed list of categories for NO_x mitigation projects. DEQ crafted an Environmental Mitigation Plan (EMP) using these guidelines, input from the public, and recommendations from an advisory committee. Final selection of Eligible Mitigation Action (EMA) categories was based on the advisory committee's recommendations, public input, and DEQ goals:

- To achieve significant NO_x reductions that work toward fully mitigating the excess lifetime NO_x emissions from the non-compliant VW vehicles and contribute to the State's ongoing goal of reaching attainment of the NAAQS.
- To maximize the amount of emissions reductions for each dollar spent.
- To benefit areas in Utah that bear a disproportionate amount of the air pollution burden.
- To stimulate emerging vehicle technologies that result in long-term emissions benefits.
- To provide economic and health benefits to the citizens of Utah.

The plan focuses the \$35 million settlement funds on upgrades to government-owned diesel truck and bus fleets as well as the expansion of electric-vehicle (EV) charging equipment. Funding allocations are as follows:

- Class 4-8 Local Freight Trucks and School, Shuttle, and Transit Buses: 73.5 percent
- Light-Duty, Zero-Emissions-Vehicle Supply Equipment: 11 percent
- Administrative Costs: 8.5 percent
- Diesel Emission Reduction Act (DERA) options: 7 percent

⁴ EPA - Frequent Questions about Volkswagen Violations: <https://www.epa.gov/vw/frequent-questions-about-volkswagen-violations>.

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Applications for funding were available from October 1, 2018 to November 30, 2018. Only government entities as defined in Utah Code § 63G-7-102(4) and federal government agencies were eligible to apply.

Successful projects will be identified by Spring 2019.

Targeted Air Shed Grant

In January, 2018, EPA awarded over \$3 million to DEQ for reducing diesel emissions from local heavy-duty diesel trucks in the Logan, UT, PM_{2.5} Nonattainment Area. Over the next five years, public and private fleet owners may use funds for the early retirement of Class 5-8 local diesel trucks. The truck replacement projects are estimated to reduce emissions over 94 tons per year and over 1,790 tons over the lifetime of the projects.

Compliance Branch

The Compliance Branch is comprised of three sections: Major Source Compliance, Minor Source Compliance, and the ATLAS. These sections are responsible for ensuring compliance with all air pollution orders, permits, rules, and standards. This is accomplished through inspections, audits of stack tests and continuous emission monitoring systems (CEMS), plan and report reviews, accreditation and certification programs, compliance assistance/outreach activities, and, when necessary, enforcement actions.



Major and Minor Source Compliance

The Major and Minor Source Compliance sections are responsible for ensuring compliance at more than 2,000 facilities within the state. The Major Source Compliance Section is responsible for inspections and report/plan reviews for the large facilities, audits of stack tests and continuous emission monitoring systems, and any associated enforcement. The Minor Source Compliance Section is responsible for inspections and report/plan reviews at small to medium-sized facilities, audits, stack tests, fugitive dust control, abrasive blasting, residential solid fuel burning, gasoline transport/filling station vapor recovery, open burning, and any associated enforcement.

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Table 5 below summarizes the compliance activities of these two sections for 2018.

Table 5. Major and Minor Source Compliance Summary

TASK	2018
Source Inspections	601
On-site Stack Test/CEM Audits	90
Stack Test/CEM Reviews	299
Emission Reports Reviewed	119
Temporary Relocations Accepted	96
Fugitive Dust Control Plans Accepted	2116
Soil Remediation Report Reviews	34
Open Burn Permit Application Completed Online	2701
Miscellaneous Inspections	297
Complaints Received	200
Wood Burning Complaints	0
Breakdown Reports Received	5
Compliance Actions Resulting from a Breakdown	0
VOC Inspections	0
SCAN Warning Letters	30
Notices of Violation	5
Compliance Advisories	54
Settlements	
Total Inspections	23
Penalties Assessed	\$115,068.00

Air Toxics, Lead-Based Paint, and Asbestos Section (ATLAS)

ATLAS determines compliance with multiple regulations involving asbestos and lead-based paint (LBP). ATLAS is responsible for the following programs:

Lead-Based Paint

Toxic Substances Control Act (TSCA) Title IV, 40 CFR Part 745 and, Utah Administrative Code (UAC) R307-840, 841, and 842. Under this program, ATLAS performs regulatory oversight of training providers, regulated projects subject to the LBP Activities Rule and the LBP Renovation, Repair, and Painting Rule, certification of individuals and firms, and lead-based paint outreach activities.

Asbestos in Schools

TSCA Title II Asbestos Hazard Emergency Response Act (AHERA), 40 CFR Part 763 and, UAC R307-801-4. Under this program, ATLAS deals with the review and approval of AHERA

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Management Plans, performs inspections of buildings subject to AHERA, and inspections and asbestos abatement for structures subject to AHERA.

Asbestos NESHAP and State Asbestos Work Practices

40 CFR Part 61, Subpart M, UAC R307-214-1 and UAC R307-801. Under this program, ATLAS deals with the certification of individuals and companies, review of asbestos project notification forms, review of demolition notification forms, review of alternative work practice requests, inspection of asbestos abatement projects, demolition of structures, and asbestos outreach activities.

Table 6. ATLAS Activity Summary

TASK	2018
Asbestos NESHAP Inspections	336
Asbestos AHERA (School) Inspections	155
Asbestos State Rules (Only) Inspections	50
Asbestos Notifications Accepted	1891
Asbestos Telephone Calls	4712
Asbestos Individuals Certifications	1042
Asbestos Company Certifications	140
Asbestos Alternate Work Practices	114
Lead-Based Paint Inspections	71
Lead-Based Paint Abatement Notifications	19
Lead-Based Paint Telephone Calls	683
Lead-Based Paint Letters Prepared & Mailed	118
Lead-Based Paint Courses Reviewed	6
Lead-Based Paint Individual Certifications	180
Lead-Based Paint Firm Certifications	147
Notices of Violations	0
Compliance Advisories	178
Warning Letters	107
Settlement Agreements	42
Penalties Collected	\$76,024

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Utah Asthma Task Force

The Utah Asthma Task Force is a multi-agency task force to address the problem of asthma in Utah. The task force meets quarterly and has a number of projects currently underway in addition to the programs initiated under the State Asthma Plan. The Division toxicologist, a member of the ATLAS team, is a founding member of the Task Force. The Division supports the Task Force in the preparation of public announcements and media communication relating to the risks of asthma symptoms associated with air pollution.

Small Business Environmental Assistance 507 Program (SBEAP)

The Clean Air Act 507 Programs consist of three parts: a Small Business Ombudsman (SBO) to act as an advocate for small business, a Small Business Environmental Assistance Program (SBEAP) to provide technical support, and a Small Business Compliance Advisory Panel (CAP) to provide feedback and help identify small business issues. The SBEAP helps small businesses understand and comply with state environmental regulations including air quality rules. The SBEAP continues to assist small businesses by providing web resources, response to email and telephone inquiries and assistance with permitting through a pre-design program. The Small Business CAP remains active with meetings scheduled quarterly.

Enforcement Actions

The following enforcement actions may be taken depending on the magnitude of the alleged violation(s), prior compliance history, and degree of cooperation of an alleged violator:

- Compliance Advisory – a notification describing the alleged violation(s). The recipient is given opportunity to refute and/or provide further details regarding the alleged violation(s) prior to any further enforcement action. A Compliance Advisory is a discovery document and not a declaration of actual violation(s).
- Warning Letter – a notification sent to violators to resolve minor, first-time violations.
- Early Settlement Agreement – a less formal resolution of an alleged violation(s) in which the DAQ and the recipient agree in writing to specific actions taken to correct the alleged violation(s). Any stipulated penalties are discounted by 20% to encourage quick resolution. Supplemental Environmental Projects may be agreed to, to offset a portion of any cash payments for stipulated penalties. All collected penalties become part of the State General Fund.
- Notice of Violation and Order for Compliance – a formal, traditional declaration of a violation(s) which involves the Attorney General’s Office. The cited violation(s) become final after 30-days, unless formal appeal procedures are followed.
- Settlement Agreement - a resolution of a potential violation(s) in which the DAQ and the recipient agree to specific actions taken to correct the potential violation(s). No discounts of stipulated penalties are offered. The DAQ legal costs may also be included. Supplemental Environmental Projects may be agreed to, to offset a portion of any cash payments for stipulated penalties. All collected penalties become part of the State General Fund.

Most enforcement actions are resolved through Warning Letters or Early Settlement Agreements. In rare instances, Notices of Violations and Orders for Compliance are used. In

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the extremely rare instance where the aforementioned enforcement actions fail to resolve a compliance issue, procedures are in place for Board hearings/administrative law judge review or formal judicial action. Environmental criminal cases are referred to the appropriate law enforcement agency.

Permitting Branch

The DAQ Permitting Branch is responsible for implementing state and federal air permitting programs that are intended to control air emissions from new and modified stationary sources that emit air pollutants. Permits are legally enforceable documents that specify the size and number of allowable emission units, operational limits of permitted emission units and emission limits for each permitted source. Permitted emission limits can be emission limitations (mass or concentration) or surrogate limits such as production rates, hours of operation, fuel consumption, or a combination thereof. Opacity, the measure of opaqueness or transparency of emission plumes, is also a common metric used to both limit and measure source emissions. Permits include testing and monitoring requirements. The results of the tests and the monitoring data are used to determine if a source of air pollution is operating in compliance with the permit and the rules.

The branch issues two types of permits. New Source Review (NSR) permits, also known as Approval Orders (AOs), are pre-construction-type permits for new and modified sources of air emissions. These are issued by the New Source Review Sections and have been required in Utah since 1969. An Operating Permits Section issues the Title V Operating Permits to the “major” stationary sources in the state, as required in Title V of the federal CAA. There are currently 73 of these sources. Operating permits consolidate all air quality related requirements from numerous state and federal air quality programs into a single regulatory document. The purpose of an operating permit is to clarify for the permit holder, as well as DAQ compliance inspectors, the wide range of requirements applicable to any regulated source by placing those requirements into one consolidated document.

In addition, the branch processes a number of smaller actions such as de minimus determinations for NSR, name changes, tax exemption certificates for pollution control equipment purchases, and soil aeration approvals.

New Source Review

Any new or modified source of air pollution in Utah is required to obtain an AO before it is allowed to begin construction. For areas that are not in compliance with the NAAQS, an NSR permit assures that air quality is not further degraded from the existing levels by new emission sources. In areas that are in compliance with the NAAQS, an NSR permit assures that new emissions do not significantly worsen air quality. These processes are outlined in both state and federal rules.



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The application for an AO, called a notice of intent (NOI), is reviewed to make sure that the source installs appropriate state-of-the-art emission controls. For major sources in nonattainment areas, state-of-the-art technology is known as lowest achievable emissions rate (LAER). For areas in attainment of the NAAQS and for minor sources in nonattainment areas, state-of-the-art controls are known as the best available control technology (BACT). Both LAER and BACT are case-by-case determinations of control technology for a specific source. BACT takes into account the technical feasibility of implementing the control, the cost and the environmental benefits of the control equipment, while LAER technology takes into account only technological feasibility and environmental benefits.

The general public and the EPA are given an opportunity to review the proposed approval order before it is issued. The Utah Air Quality Rules specify the criteria indicating which sources must obtain an AO. The New Source Review permitting program issued 232 permits during FY2018. It took an average of 196 days to issue the permit from the submission of an application. Potential applicants are encouraged to contact the DAQ prior to submitting the necessary paperwork.

Operating Permits

Congress created Title V of the CAA in 1990. This Title requires states to issue an operating permit to the larger or “major” sources of air pollution within the state. Utah developed and submitted a program in 1994 and received approval from the EPA in 1995. Operating permits are legally enforceable documents issued to air pollution sources after the source has begun to operate. A primary purpose of the permit is to consolidate the applicable requirements from the many and varied air quality programs such as NSR permits, SIPs, federal New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAP), and Maximum Available Control Technology (MACT). Like the AOs, the general public is given an opportunity to review the draft operating permits before they are issued. In addition, the EPA has up to 45 days to review the proposed operating permit. The criteria indicating which sources must obtain an operating permit are specified in R307-415 of the Utah Administrative Code (UAC). As with the NSR permit or AOs, potential applicants are encouraged to contact the DAQ prior to submitting the necessary paperwork.

Another significant objective of the Title V program is to shift the compliance liability from the regulating agency to the permitted source. Each year, the source must certify that it is in compliance with all permit terms and conditions, or indicate non-compliance issues. False reports have criminal implications beyond the civil liabilities of other violations. In addition, sources must report the results of monitoring at least every six months. Permit provisions for monitoring, record keeping, and reporting are added or enhanced to assure compliance with the permit conditions and limits.

An operating permit has a life of only five years (as opposed to the AO that does not expire). These permits, both initially and upon renewal, are complex and care must be taken to ensure that federal requirements for the Compliance Assurance Monitoring Rule (CAM) and any other new requirements (such as new MACT Standards) are included.



AIR QUALITY