

Utah Division of Air Quality 2012 Annual Report

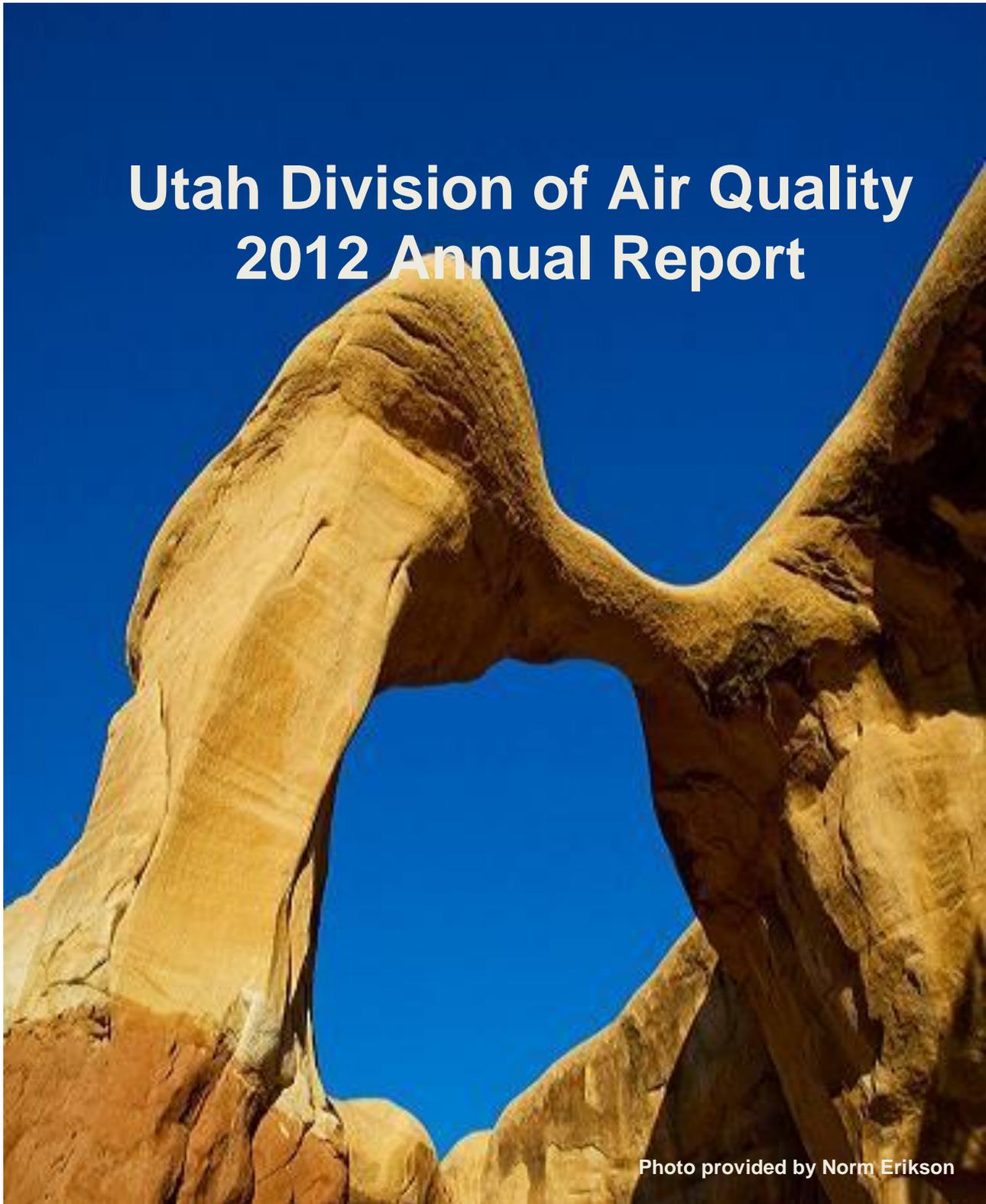


Photo provided by Norm Erikson

Division of Air Quality – 2012 Annual Report

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Acronyms

| | |
|--------------------------|---|
| AO | Approval Order |
| AHERA | Asbestos Hazard Emergency Response Act |
| ATLAS | Air Toxics, Lead-Based Paint, Asbestos and Small Business Environmental Assistance Section |
| AMS | Air Monitoring Section |
| BACT | Best Available Control Technology |
| CAA | Clean Air Act |
| CAP | Compliance Advisory Panel |
| CFR | Code of Federal Regulations |
| CO | Carbon Monoxide |
| CNG | Compressed Natural Gas |
| DAQ | Division of Air Quality |
| DEQ | Department of Environmental Quality |
| EPA | Environmental Protection Agency |
| GHG | Green House Gas |
| 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 |
| NOV | Notice of Violation |
| NO_x | Nitrogen Oxides |
| NSPS | New Source Performance Standard |
| NSR | New Source Review |
| O_3 | Ozone |
| PM | Particulate Matter |
| PM10 | Particulate Matter Smaller Than 10 Microns in Diameter |
| PM2.5 | Particulate Matter Smaller Than 2.5 Microns in Diameter |
| PPB | Parts Per Billion |
| PPM | Parts Per Million |
| SBEAP | Small Business Environmental Assistance Program |
| SCAN | Source Compliance Action Notice |
| SIP | State Implementation Plan |
| SO_2 | Sulfur Dioxide |
| SO_x | Sulfur Oxides |
| TSCA | Toxic Substances Control Act |
| TSP | Total Suspended Particles |
| UCAIR | Utah Clean Air Initiative |
| VOC | Volatile Organic Compounds |
| UAC | Utah Administrative Code |

NOTE

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

Introduction

The mission of the Utah Division of Air Quality (DAQ) is to protect public health and the environment from the harmful effects of air pollution. It is the responsibility of 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, 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. 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 empowers the Utah Air Quality Board to enact rules pertaining to air quality issues. The DAQ staff supports the Board in its policy-making role. Board membership provides representation from industry, local government, environmental groups, and the public, and includes 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 DAQ is the Board's Executive Secretary.

The Utah Air Quality Rules define the Utah air quality program. Implementation of the rules requires DAQ 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.

2012 Synopsis

This year, DAQ made great effort in fulfilling our mission to safeguard human health and quality of life while protecting and enhancing Utah's air quality. With an increasing population and industrial base and more stringent federal air quality standards, it has been a challenge to meet air quality objectives; however, in 2012 DAQ made significant progress in its continual efforts to improve air quality in the state.

Progress in the development of the State Implementation Plan (SIP) for PM_{2.5} was one of the more notable achievements of 2012. On December 14, 2009, the EPA identified the Provo, Salt Lake, and Logan Utah/Idaho areas as not meeting the federal health standard for PM_{2.5}, and directed the State of Utah to find ways to reduce wintertime pollution in those areas. The areas involved include Utah, Salt Lake, Tooele, Davis, Weber, Box Elder, and Cache counties. From June 2011 through 2012, DAQ met with stakeholders throughout the areas to identify strategies to bring Utah's PM_{2.5} non-attainment areas into compliance with the standard. The information gathered from these meetings has been used to develop Utah's new State Implementation Plan (SIP) for PM_{2.5}. This cumulative effort was essential in the development and submittal of the PM_{2.5} SIP for the Logan, UT-ID Nonattainment Area, which DAQ submitted to EPA in December. DAQ will continue to work with stakeholders and EPA to complete and submit plans for both the Salt Lake and Provo PM_{2.5} nonattainment areas.

The development of the PM_{2.5} SIP was but one of DAQ's achievements in 2012. The following is a brief list of other notable achievements of 2012:

- The DAQ-led 2011/12 multi-agency study to understand and improve wintertime ozone in the Uinta Basin continued, and valuable information was collected on emissions inventories and sources. The results of this study are outlined in this report.
- DAQ joined Governor Herbert's Clean Air Initiative (UCAIR) and continues to educate the public on how to voluntarily reduce air pollution.
- Utah's monitored concentrations for criteria air pollutants either stayed the same or continued their decreasing trends.

Air Quality Standards

The Clean Air Act (CAA) as last amended in 1990 requires EPA to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. The CAA established two types of air quality standards: primary and secondary standards. 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 against decreased visibility and damage to animals, crops, vegetation, and buildings.

Standards are composed of a numerical value and a form. 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, while Table 1 provides a brief description of each. The primary health standards are established by EPA 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 affected by the pollutant, the most sensitive portion of the population may be adversely affected. However, at levels above 1.5 times the standard, even healthy people will see adverse effects.

The DAQ monitors each of these criteria pollutants, as well as 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; VOCs and NO _x . | Can cause breathing problems, reduced lung function, asthma, irritated eyes, stuffy noses, 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 US until unleaded gasoline was mandated by the federal government. | Damages nervous systems, including brains, and causes digestive system damage. Children are at special risk. Some lead-containing chemicals cause cancer in animals. | Can harm wildlife. |

Ambient Air Quality in Utah

Utah’s Air Monitoring Network

The Air Monitoring Center operates a network of monitoring stations throughout Utah. The monitors are situated to measure air quality in both neighborhoods and industrial areas. Table 2 presents the monitoring station locations and monitored constituents.

Table 2. Utah Monitoring Network Stations

| Station | City | Address | CO | NO ₂ | Hg | O ₃ | PM10 | PM2.5 | SO ₂ | Pb | Met. |
|-----------------------|--------------|--------------------------|----|-----------------|----|----------------|------|-------|-----------------|----|------|
| Air Monitoring Center | SLC | 2861 W. Parkway Blvd. | | | X | | | | | | X |
| Antelope Island | None | North end of island | | | | | | | | | X |
| Badger Island | None | On Island | | | | | | | | | X |
| Beach | Lake Point | 1200 S. 12100 W. | | | | X | | | X | | X |
| Bountiful | Bountiful | 200 W. 1380 N. | | X | | X | X | X | X | | X |
| Brigham City | Brigham City | 140 W. Fishburn | | | | X | | X | | | X |
| Fruitland | Fruitland | 6200 S. 45000 W. | | X | | X | | | | | X |
| Harrisville | Harrisville | 425 W. 2250 N. | | | | X | | X | | | X |
| Hawthorne | SLC | 1675 S. 600 E. | X | X | | X | X | X | X | X | X |
| Hurricane | Hurricane | 150 N. 870 W. | | X | | X | | | X | | X |
| Lindon | Lindon | 30 N. Main St. | | | | | X | X | | | X |
| Logan | Logan | 125 W. Center St. | | X | | X | X | X | | | X |
| Magna | Magna | 2935 S. 8560 W. | | | | | X | X | X | X | X |
| North Provo | Provo | 1355 N. 200 W. | X | X | | X | X | X | | | X |
| N. Salt Lake | SLC | 1795 N. Warm Springs Rd. | | | | | X | | X | | X |
| Ogden #2 | Ogden | 228 East 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 | X | X | | X |
| Rose Park | SLC | 1354 W. Goodwin Ave. | | | | | | X | | | |
| Saltaire | None | 6640 W. 1680 N. | | | | | | | | | X |
| Spanish Fork | Spanish Fork | 312 W. 2050 N. | | | | X | | X | | | X |
| Syracuse | Syracuse | 4700 W. 1700 S. | | | | | | | | | X |
| Tooele | Tooele | 434 N. 50 W. | | | | X | | X | | | X |
| Vernal | Vernal | 6200 S 4500 W | | X | | X | | X | | | X |
| Washington Blvd. | Ogden | 2540 S. Washington Blvd. | X | | | | | | | | |
| West Jordan | West Jordan | 4540 W. 8700 S. | | | | | | | | | X |

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 (also shown in Figure 2) is an area that was once designated as nonattainment, and which subsequently demonstrated to EPA statistically that it will attain and maintain a particular standard for a period of 10 years. EPA must approve the demonstration.

Figure 1. Utah Nonattainment Areas

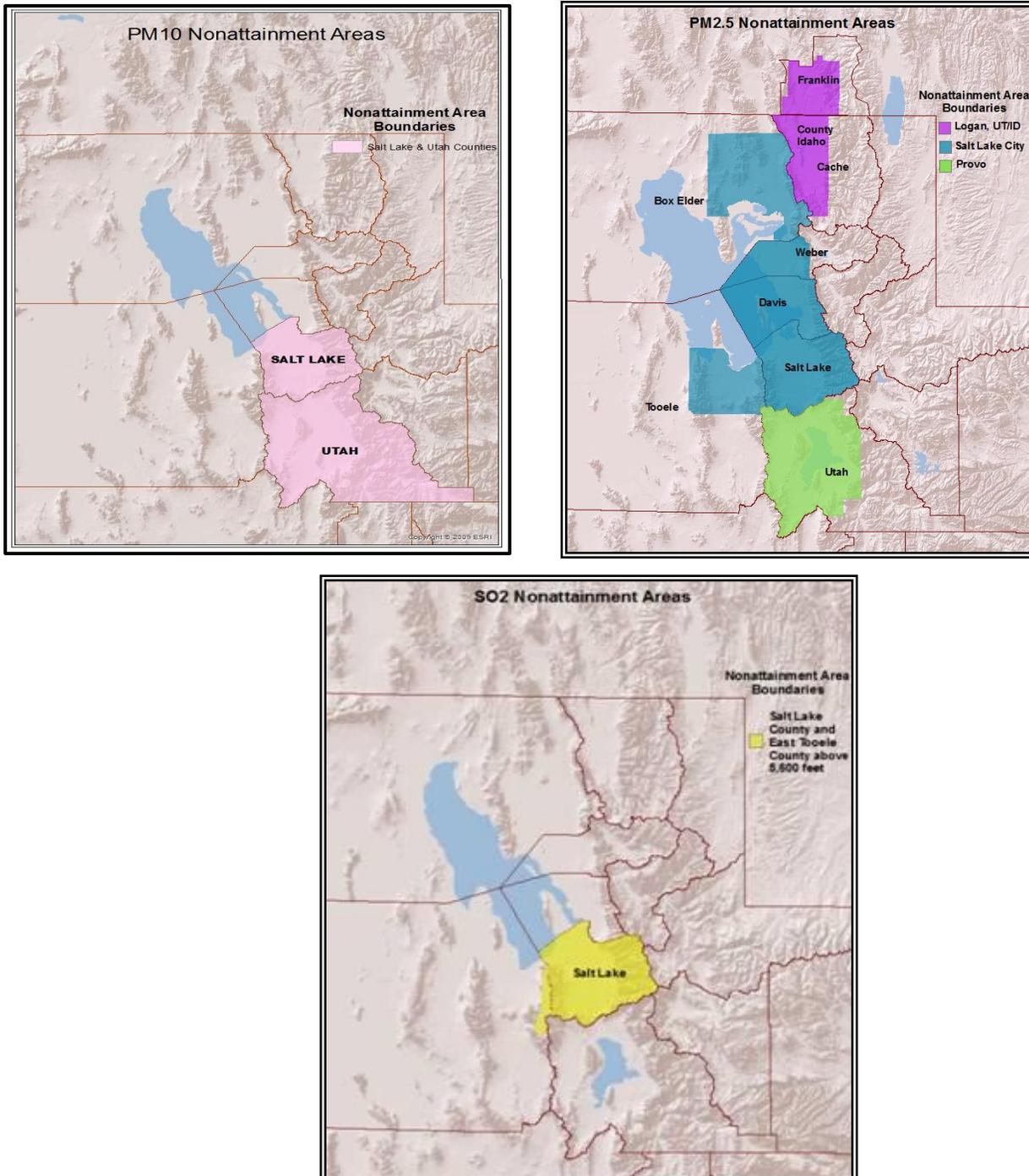
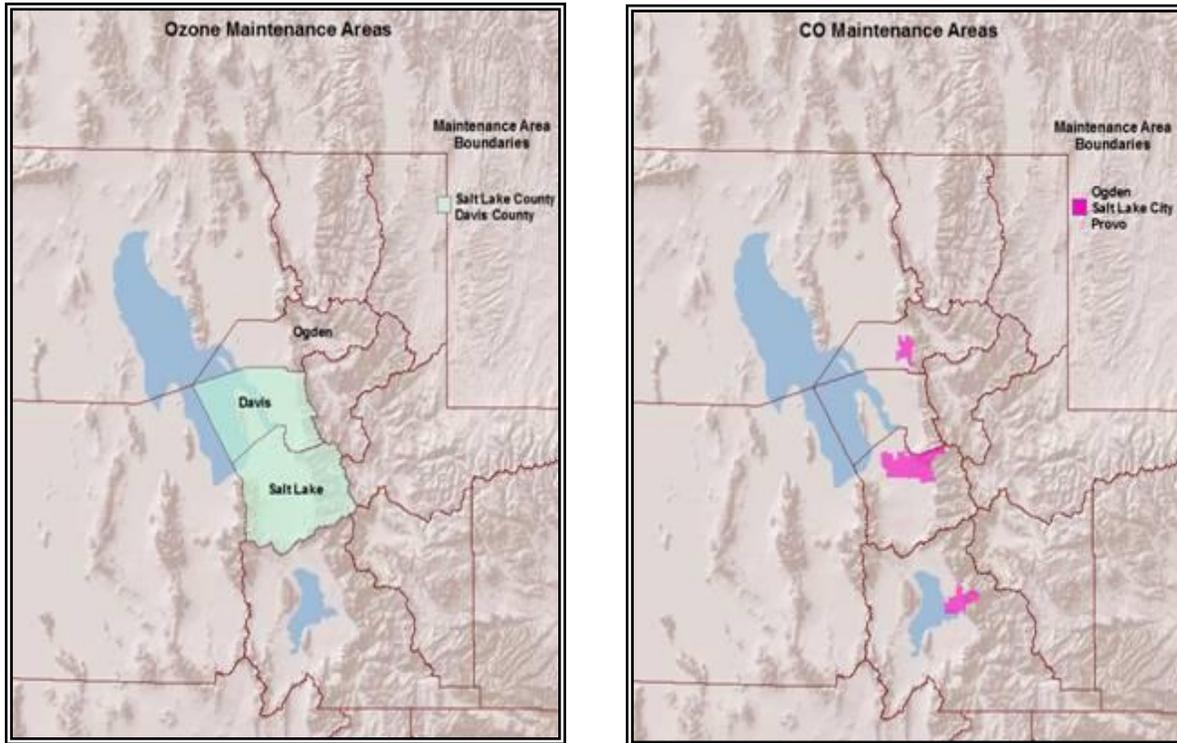


Figure 2 Utah Maintenance Areas



Criteria Air Pollutants

Carbon Monoxide (CO)

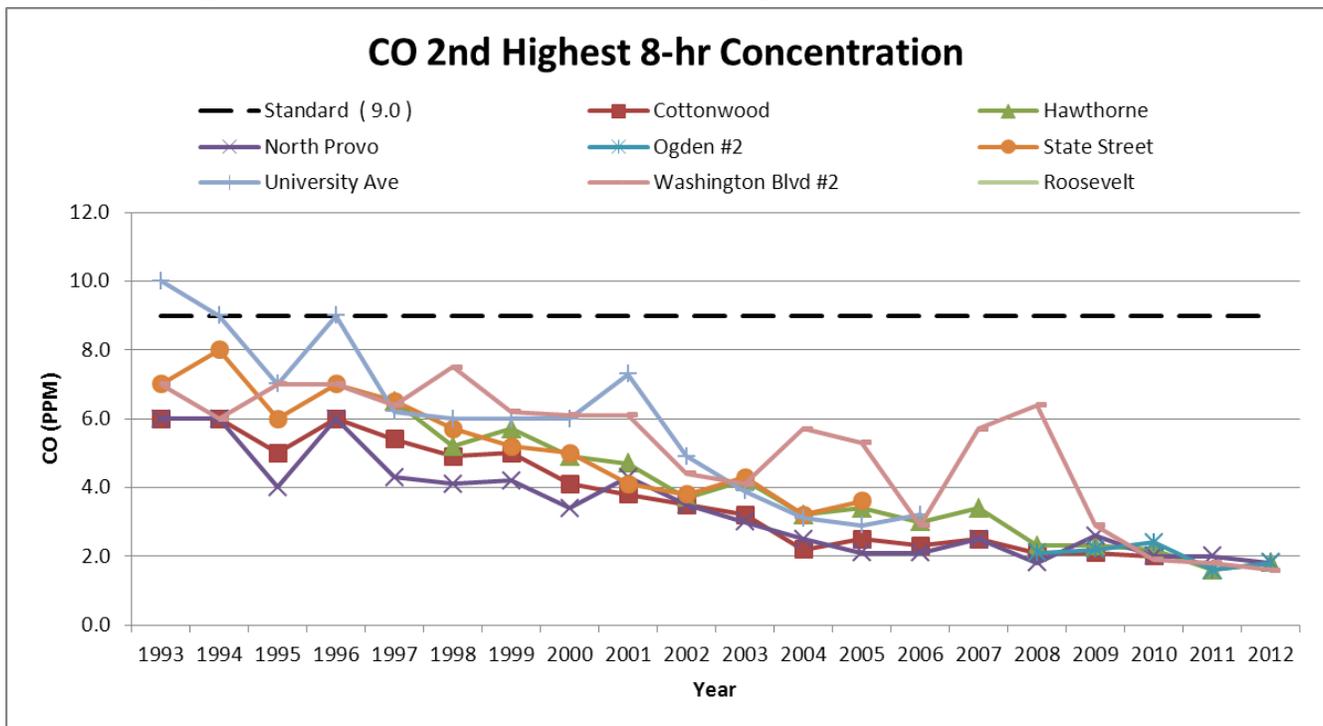
Carbon monoxide is a colorless and odorless gas formed by the incomplete combustion of carbon-based fuel. Carbon monoxide is primarily produced from on-road motor vehicle emissions. Other significant sources of CO emissions are wood burning stoves and fireplaces. The remaining emissions come from industrial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

Because motor vehicle emissions are the major source of CO, 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. 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 takes place in the winter, and cold weather temperature inversions trap CO near the ground.

Standards

EPA has developed two national standards for CO. 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 measures a second exceedance of either standard, it is considered to be in violation and becomes designated as a “nonattainment area.” Three cities in Utah (Salt Lake City, Ogden, and Provo) were at one time designated nonattainment areas for CO. Due primarily to improvements in motor vehicle technology, Utah has been in compliance with the CO standards since 1994. Salt Lake City, Ogden, and Provo were successfully re-designated to attainment status in 1999, 2001, and 2006 respectively.

Figure 3. Carbon Monoxide Second Highest 8-Hour Concentration



Nitrogen Dioxide (NO₂)

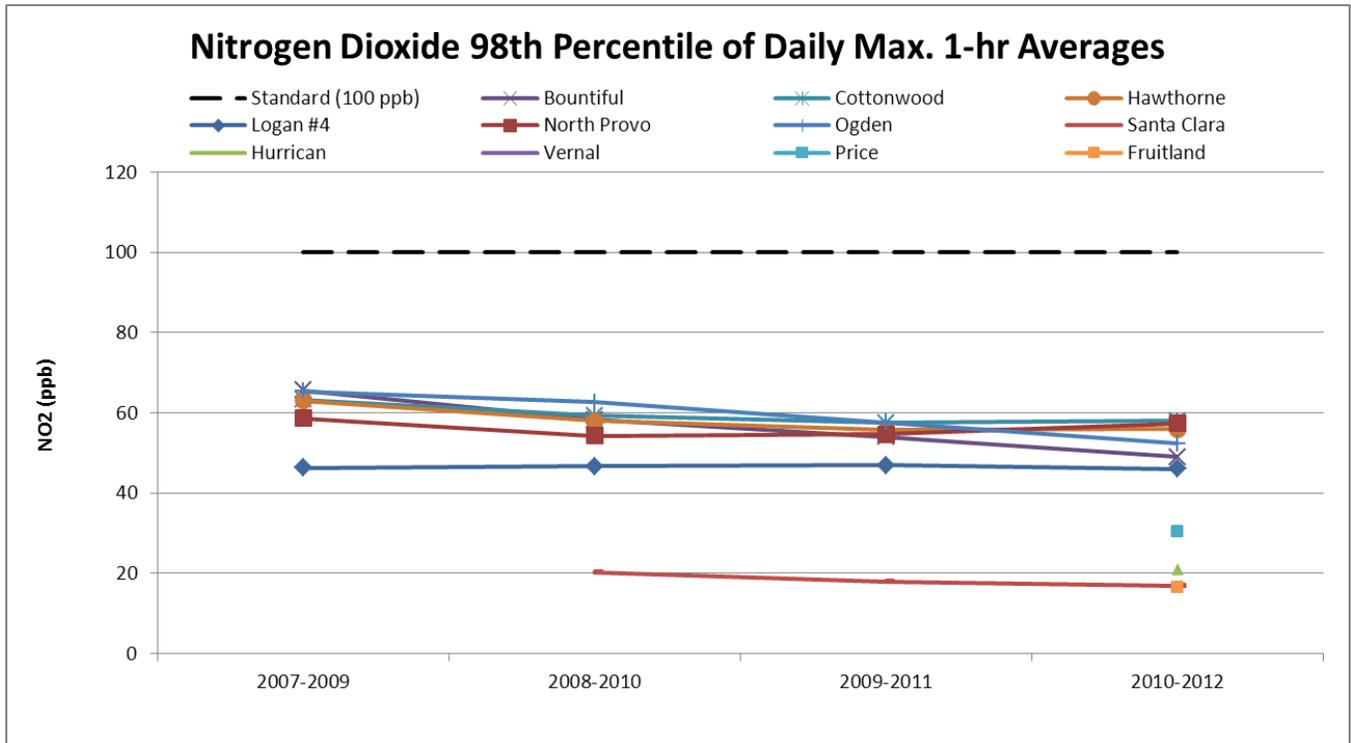
During high temperature combustion, nitrogen in the air reacts with oxygen to produce various oxides of nitrogen, or NO_x, a reddish-brown gas. One of the oxides of nitrogen, NO₂, is considered a criteria pollutant.

Oxides of nitrogen react with other air contaminants to form other criteria pollutants. In the summer, photochemical reactions between NO₂ and volatile organic compounds 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, DAQ is mindful of the trend in NO₂ emissions illustrated in Figure 4.

Standard

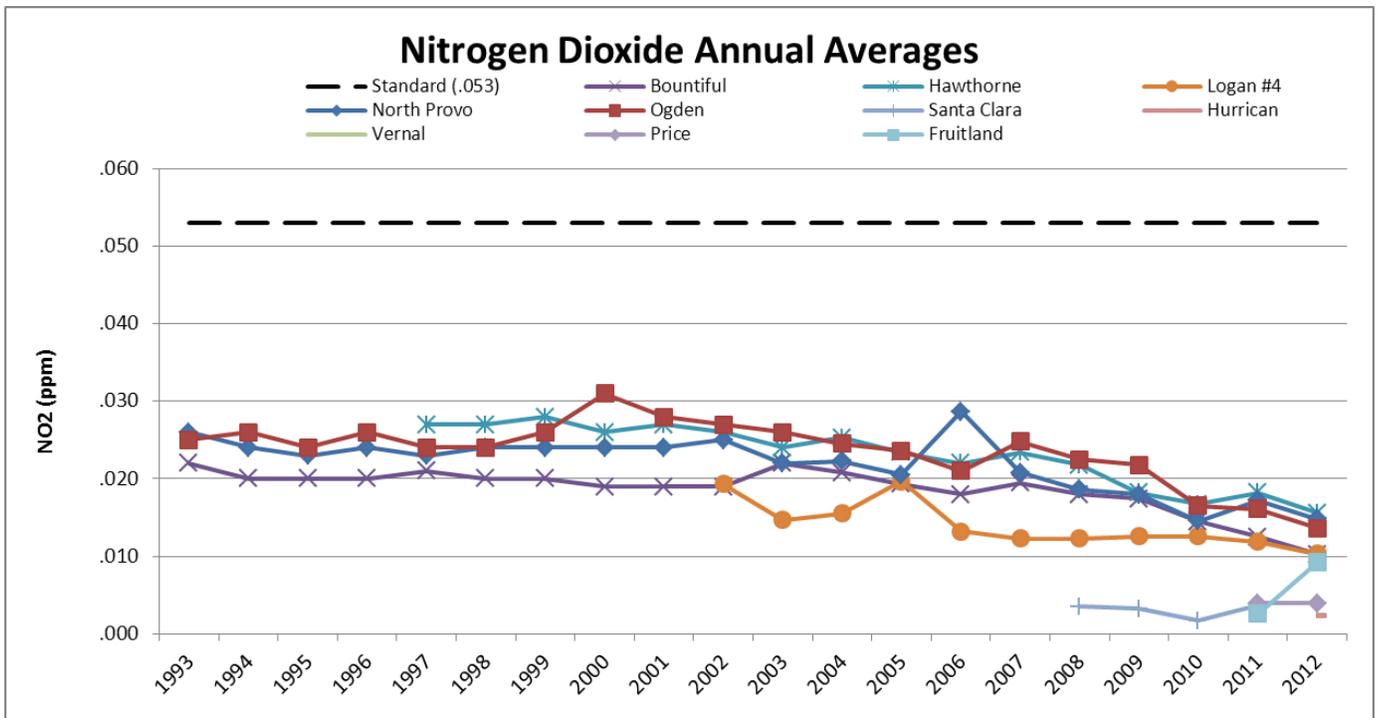
EPA has developed two national standards for NO₂—an hourly standard and an annual standard. The hourly standard is set at 0.1 ppm measured as the three-year average of the 98th percentile of the annual distribution of daily maximum one-hour average concentrations.

Figure 4. Three year average Nitrogen Dioxide Hourly Averages (PPB)



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

Figure 5. Nitrogen Dioxide Annual Averages



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. It is this layer that shields the earth from cancer-causing ultraviolet radiation. Ground level ozone is formed by a complex chemical reaction involving volatile organic carbon compounds (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 and snow cover. Research is on-going to better understand the chemical processes that lead to ozone during these conditions. Some major sources for VOCs and NO_x are vehicle engine exhaust,

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emissions from industrial facilities, gasoline vapors, chemical solvents, and biogenic emissions from natural sources such as vegetative growth.

Standard

The current NAAQS for ozone is 0.075 ppm. The standard is based on a three-year average of the annual 4th highest daily eight-hour average concentration. EPA designated most of Utah as attainment/unclassifiable for ozone on April 30, 2012. Two counties in eastern Utah—Duchesne and Uintah—were designated unclassifiable because high ozone values had been recorded at survey monitors in the area during winter temperature inversions even though the three years of regulatory quality data that are needed to determine attainment of the standard had not yet been collected.

Figure 5 shows the eight-hour ozone concentrations by looking at the 4th highest annual concentration while Figure 6 presents the NAAQS threshold, which is the three-year average of the 4th highest eight-hour ozone concentration. The heavy red dashed lines indicate the current standard of 0.075 ppm while the heavy black dashed lines represent the former standard of 0.084 ppm. As can be seen from these graphs, ozone levels along the Wasatch Front continue to show attainment but are very close to the ozone standard.

Figure 6. Ozone 4th Highest 8-Hour Concentration

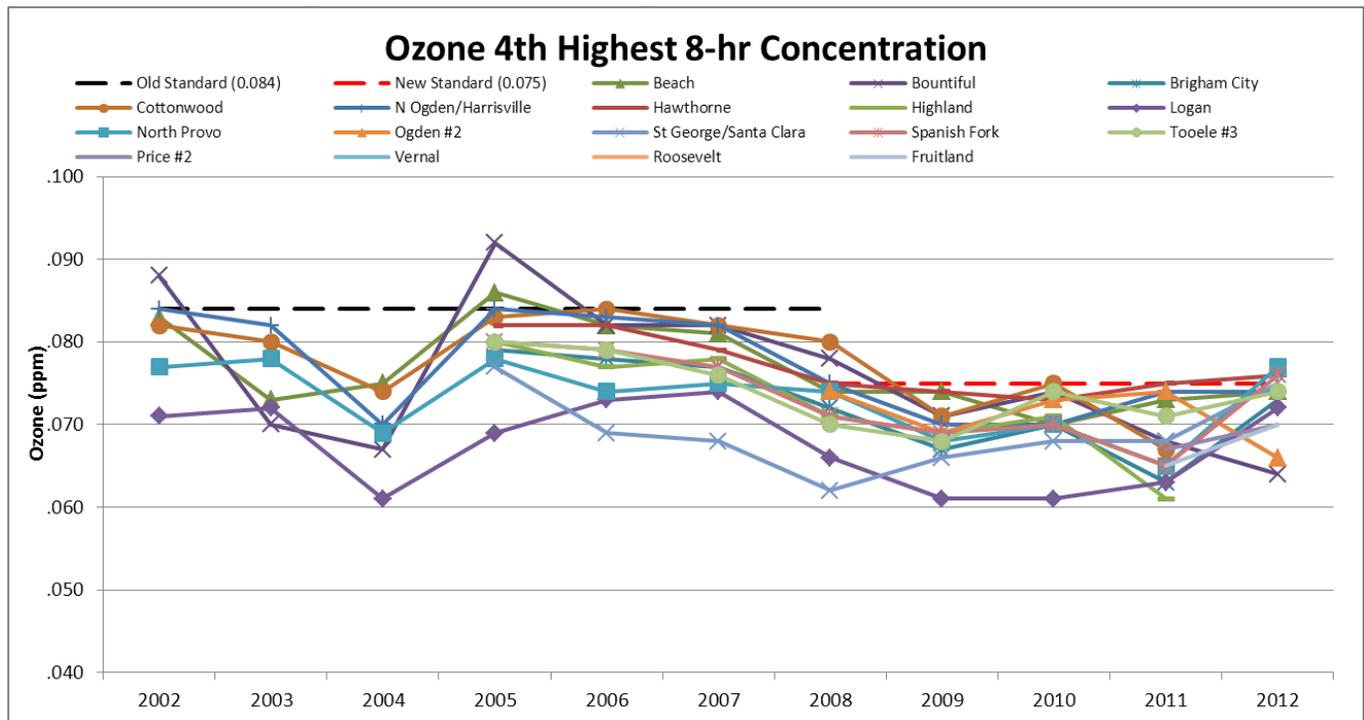
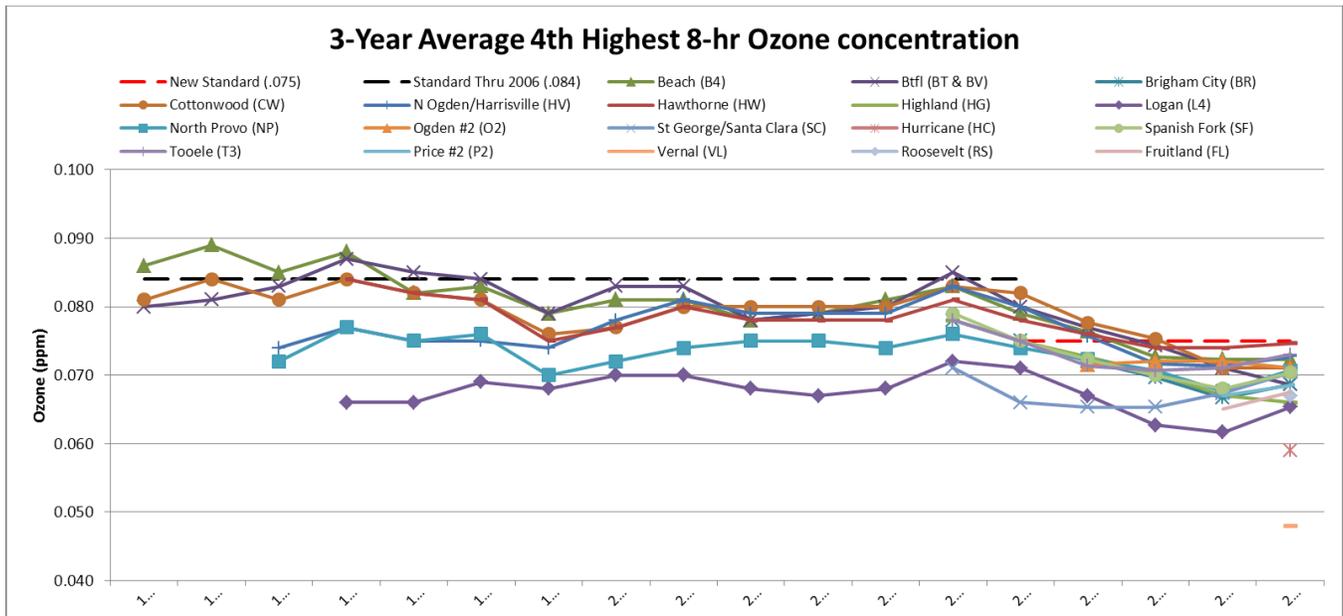


Figure 7. Ozone 3-year Average 4th Highest 8-Hour Concentration



Particulate Matter

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 particulate less than 10 micrometers in diameter, which is about one-seventh the width of a strand of human hair. PM₁₀ can lodge deep in the lungs and cause respiratory problems. 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.

PM_{2.5}, or fine particulate, is 2.5 micrometers in diameter or less. Primary PM_{2.5} is directly emitted into the atmosphere from combustion sources and includes fly ash from power plants, carbon black from cars and trucks, and soot from fireplaces and woodstoves.

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 SO₂ and NO_x, 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. 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. 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 24-hour air quality standard for PM₁₀ was established by the EPA in July 1987 and was set 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 exceedances within a three-year period would constitute a violation. Utah and Salt Lake counties are officially designated as PM₁₀ nonattainment areas because of past difficulty with the 24-hour standard. Control strategies contained in the State Implementation Plan 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, but was redesignated to attainment in January, 2013.

Figure 7 presents the second highest 24-hour PM₁₀ concentrations recorded at each station since 2000. The heavy dashed line indicates the NAAQS. High monitoring values sometimes result from exceptional events, such as high winds from dust storms and wildfires, as is the case for 2010, when Utah experienced an exceptional dust storm on March 30, resulting in very high PM₁₀ values across the network. Data collected during exceptional events in 2008 through 2011 have been flagged by DAQ and are currently under review for exclusion per the EPA Exceptional Event Rule. There were no exceptional events in 2012, high-wind or otherwise. The following graph includes the values influenced by exceptional events.

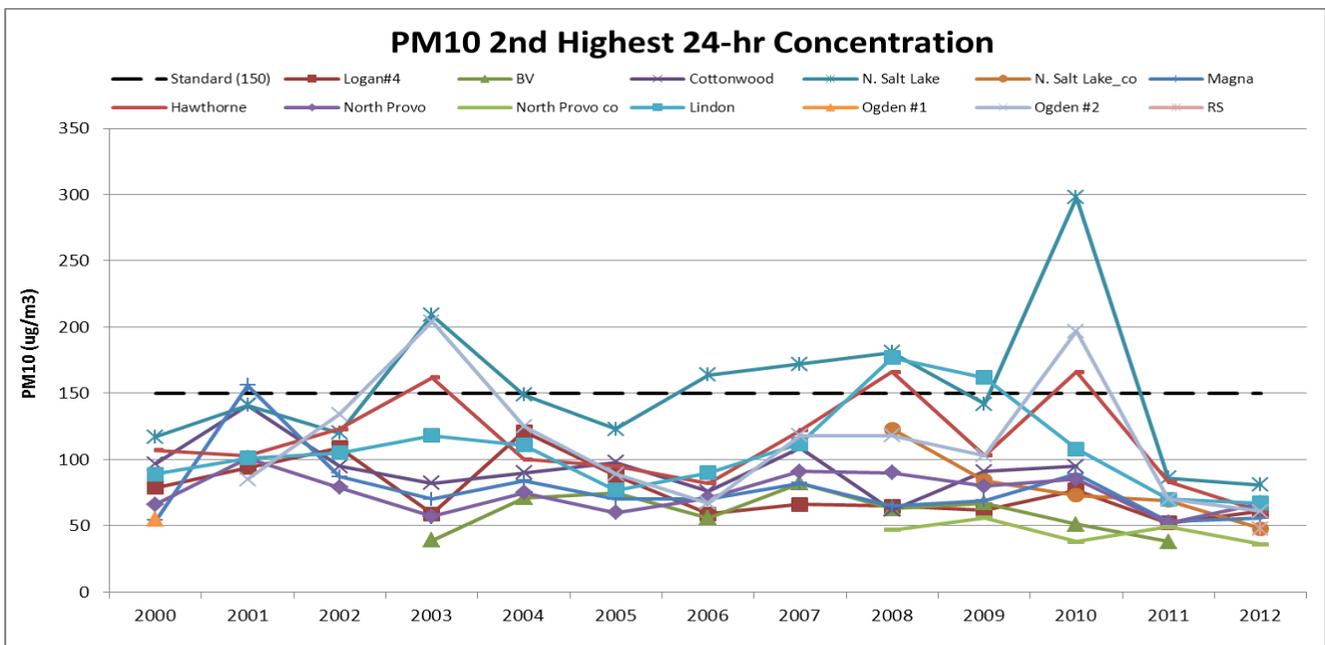
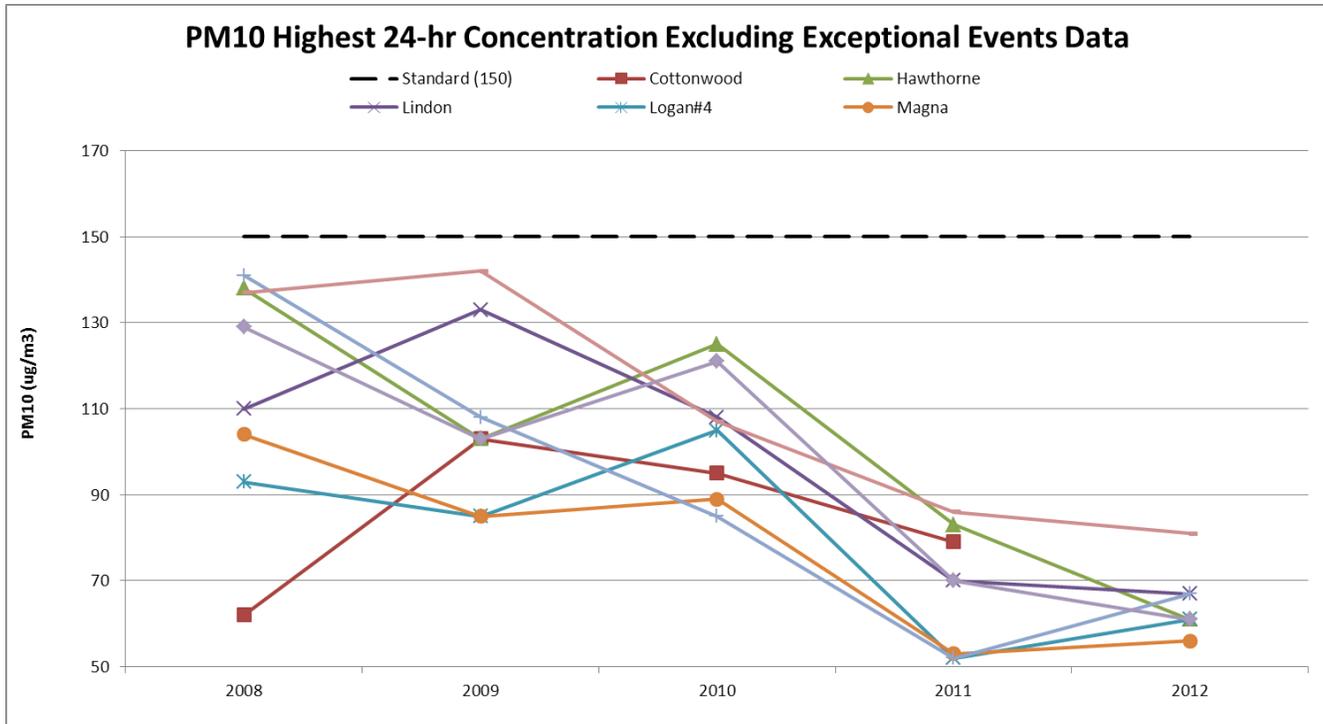


Figure 8. PM₁₀ Second Highest 24-Hour Concentration

By excluding data impacted by exceptional events, Utah has been in compliance with the PM10 NAAQS, as demonstrated in Figure 9.

Figure 9. PM10 Highest 24-Hour Excluding Exceptional Events



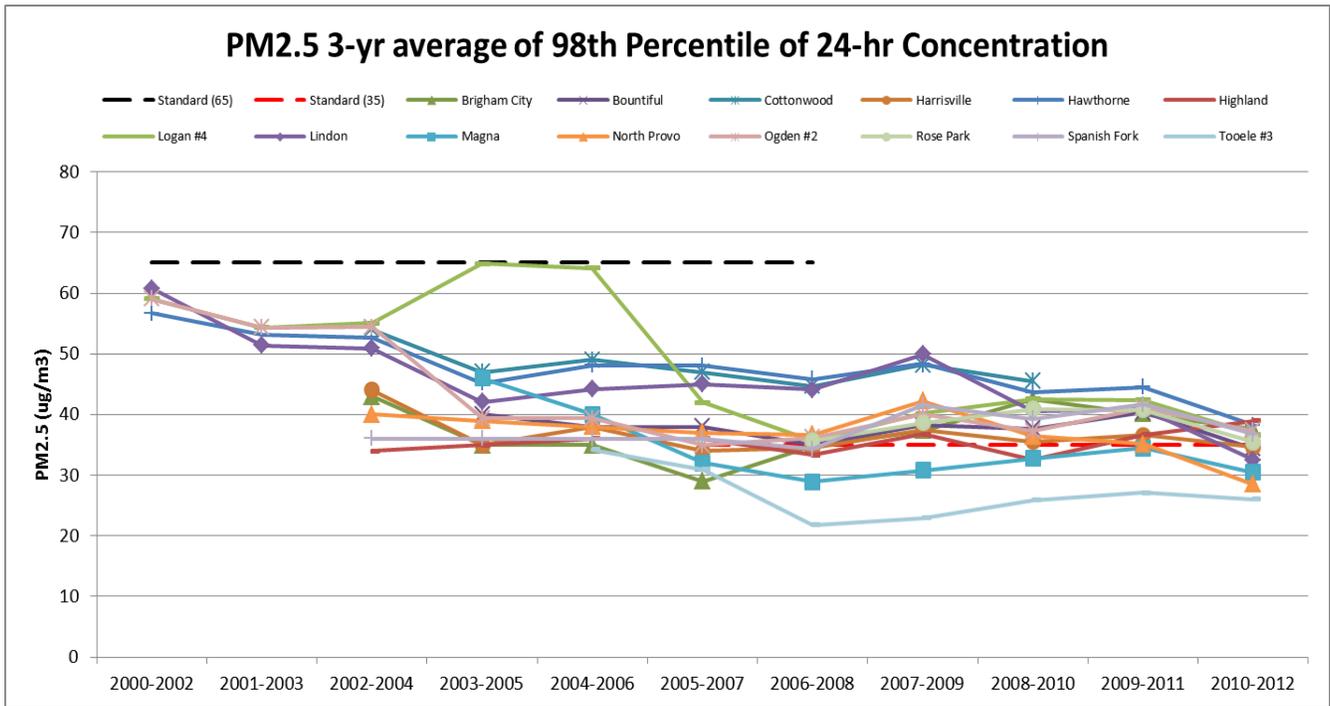
Standards – PM_{2.5}

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

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 9 presents the three-year averages of the 98th percentile concentrations at Wasatch Front monitors. The following graph shows that Utah was in compliance with the 1997 standard but is not in compliance with the revised standard.

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Figure 10. PM2.5 Three-year Average 98th Percentile 24-Hour Concentration



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

Figure 11. PM2.5 Annual Mean Concentration

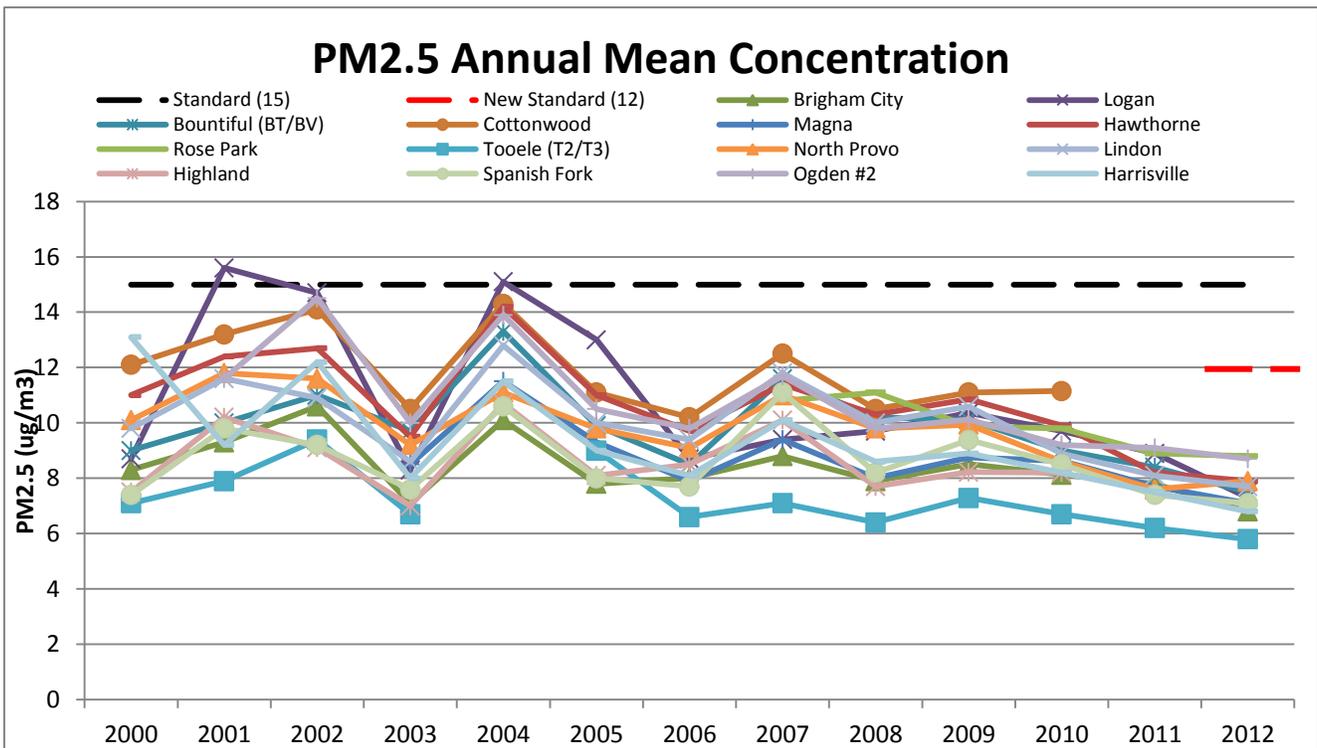
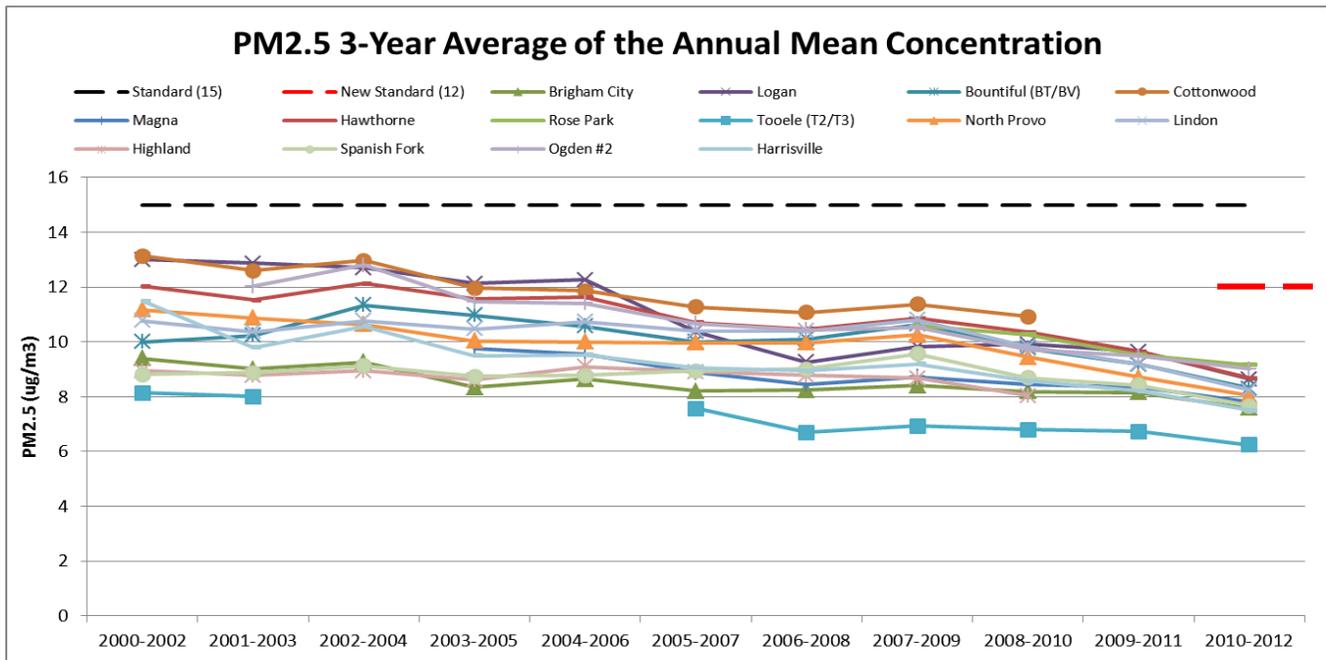


Figure 12. Three Year Average PM2.5 Annual Mean Concentration



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

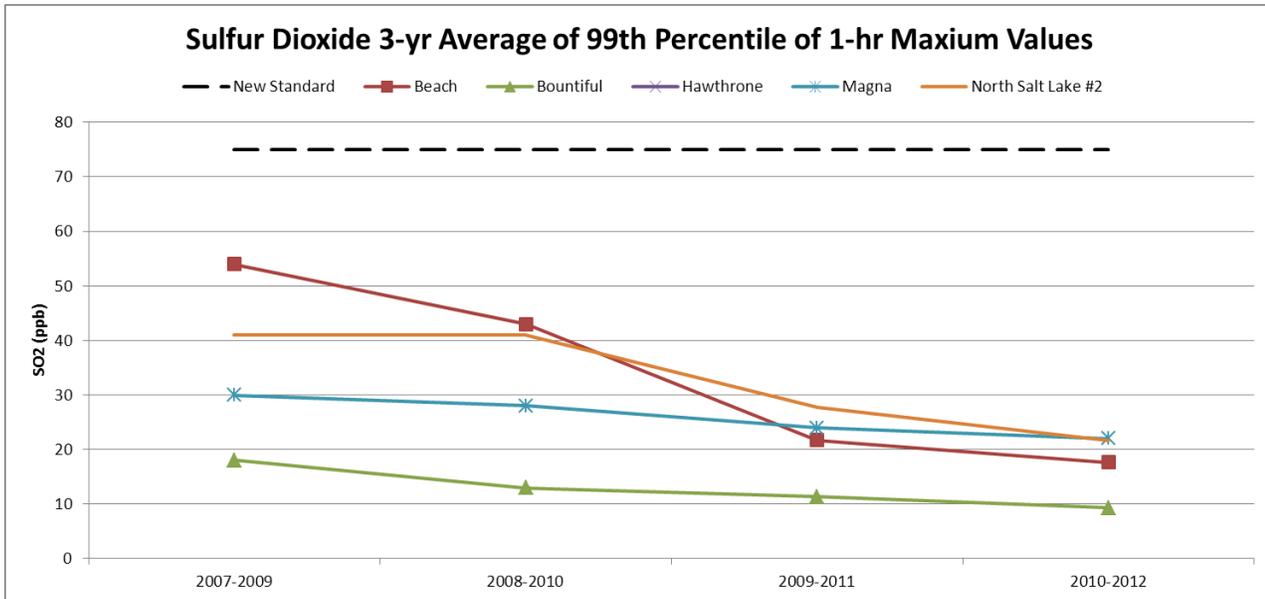
In 2010, EPA revoked the 24-hour and annual standards and established a new three-year average of the 99th percentile of the annual distribution of daily maximum one-hour average concentrations for SO₂ at a level of 75 ppb.

DAQ has situated its monitors near the largest sources of SO₂ (Kennecott Utah Copper and the five refineries along the Wasatch Front). Throughout the 1970s, the Magna monitor routinely measured violations of the 24-hour standard. Consequently, all of Salt Lake County and parts of eastern Tooele County above 5600 feet were designated as nonattainment for SO₂. Two significant technological upgrades at the Kennecott smelter have resulted in continued compliance with the SO₂ standard since 1981. In the mid 1990s, Kennecott, Geneva Steel, the five refineries, and several other large sources of SO₂ made dramatic reductions in emissions as part of an effort to curb concentrations of secondary particulate (sulfates) that were contributing to PM₁₀ violations. Utah submitted an SO₂ Maintenance Plan and re-designation request for Salt Lake and Tooele Counties to EPA in April of 2005. Measurements

of SO₂ under the former standards and the new standard indicate that Utah’s ambient air has been well within the federal health standards for decades.

Figure 13 presents the most current measurements to compare against the new 75 ppb NAAQS.

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



Lead (Pb)

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

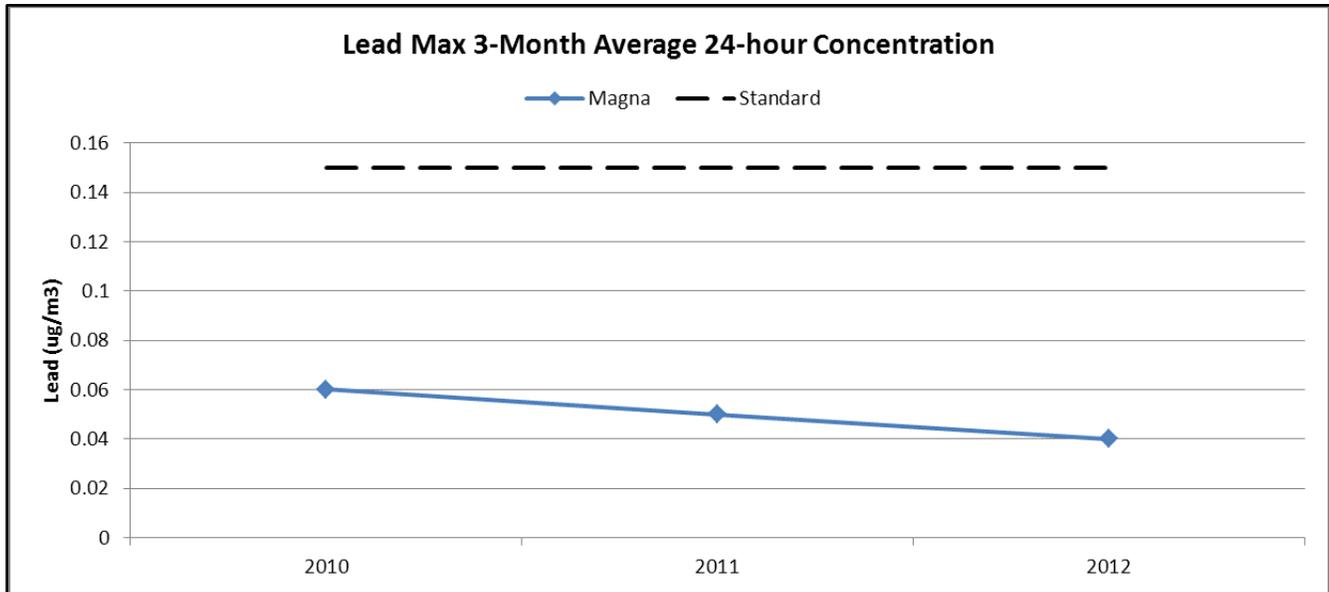
Utah had not exceeded the health standard for lead since the late 1970s, and EPA authorized the discontinuation of lead monitoring in Utah in 2005; however, in both 2008 and 2010, EPA set new monitoring requirements for lead. DAQ now monitors for lead at one point source site and one urban non-source monitoring location.

Standard

On November 12, 2008, 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 monitoring requirement, so DAQ began lead monitoring again at the Magna station near the Kennecott copper smelter. Additional monitoring

requirements established by EPA in December 2010 required monitoring for lead starting in 2011 at the Hawthorn monitoring station.

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



Emissions Inventories

Every three years, 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 larger industrial sources. Finally, more detailed inventories are prepared as needed for special projects 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. This emissions information is used by DAQ to review trends over time, as input data for air quality modeling analyses and as an indicator of the effectiveness of existing control strategies. The emissions information is also compiled according to source type to provide billing information for the Title V operating permits program. Both triennial and annual emissions inventory data is uploaded to 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, steel mills, and manufacturing facilities that emit more than 100 tons per year of a regulated

pollutant or are on a list of sources EPA has determined need to be tracked closely. Air pollutants released from these stationary sources are accounted for on a facility-by-facility basis.

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. In the future, pollution from sources of less than 100 tons per year will be tracked similarly to the large point sources. 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.

Mobile sources make up the third category in the inventory, and 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, as well as an understanding of how and where they are driven and the distances they travel.

The 2011 triennial inventory is the most recent state-wide inventory available. The triennial inventory covers over 440 individual point sources, 99 area source categories, and 12 non- and on-road source categories. Table 5 shows total emissions, by county, of the criteria pollutants, CO, NO_x, PM₁₀, PM_{2.5}, SO_x, and VOCs. Figure 12 presents the updated 2011 triennial emissions inventory in six pie charts, displaying the relative portion of emissions generated within source categories. 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.

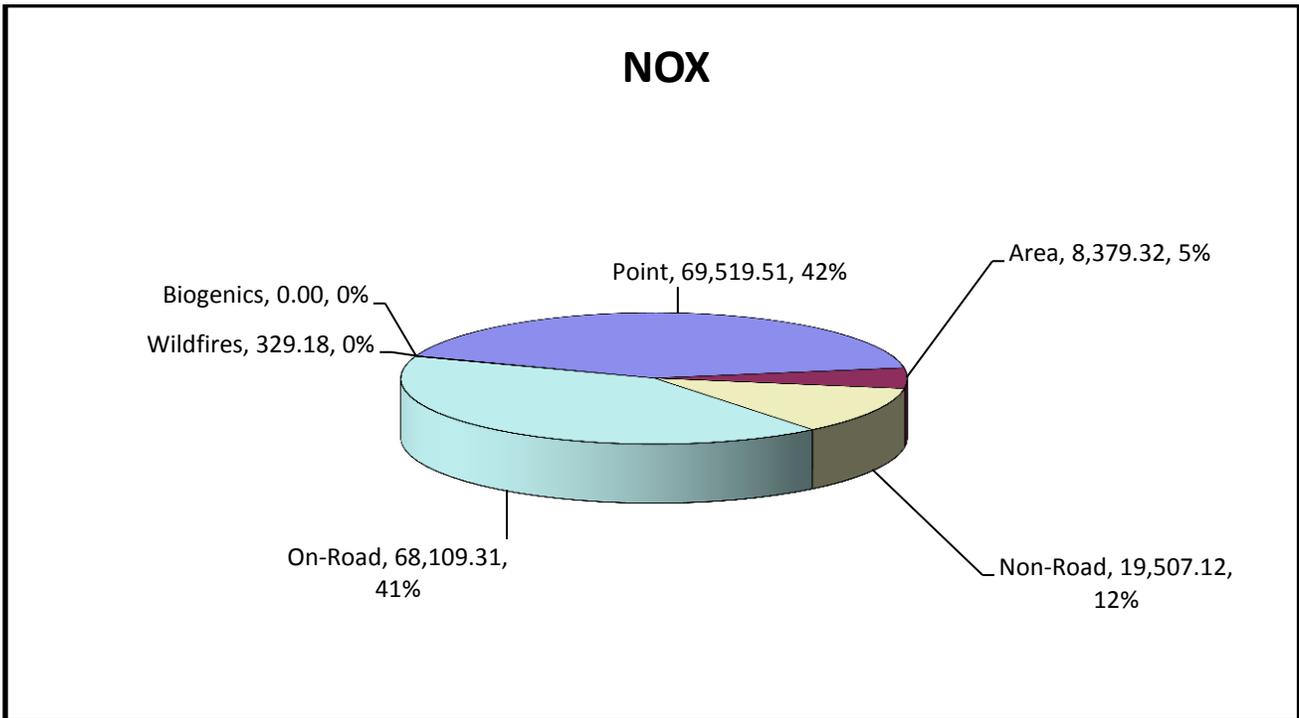
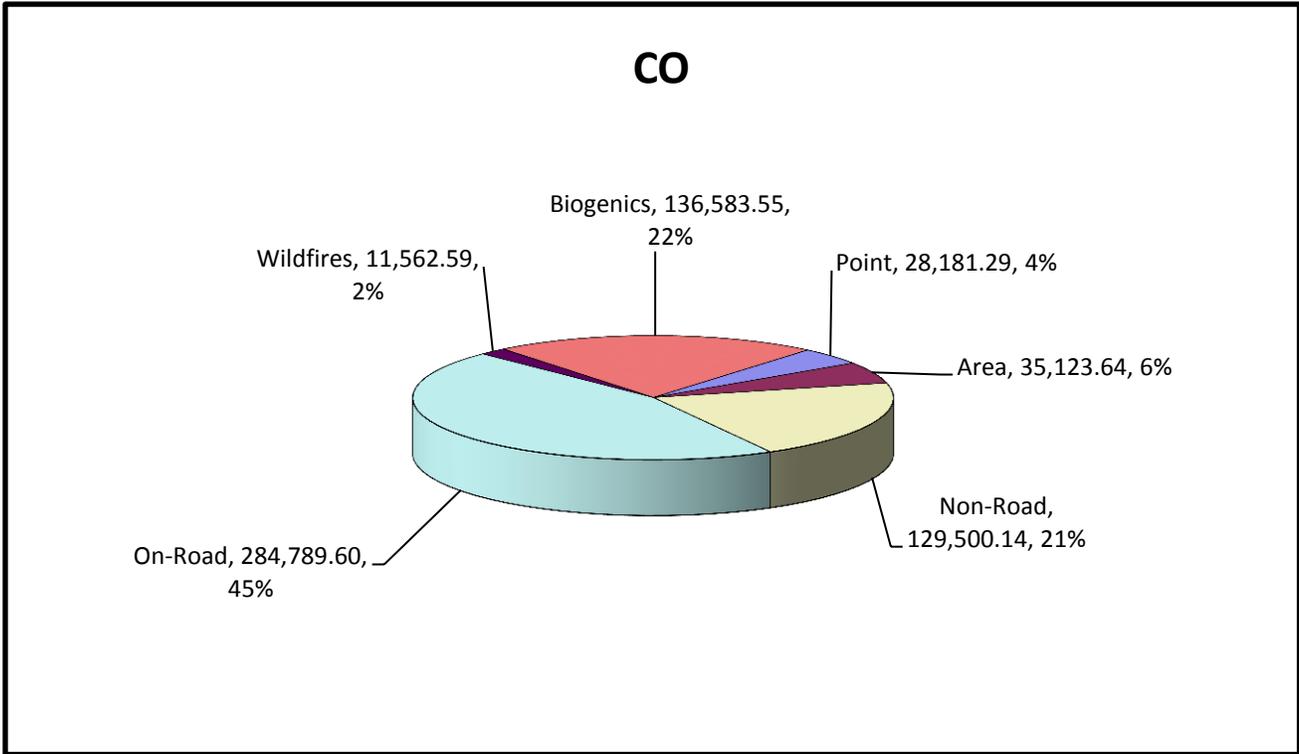
The triennial inventory for 2011 was collected and compiled in 2012.

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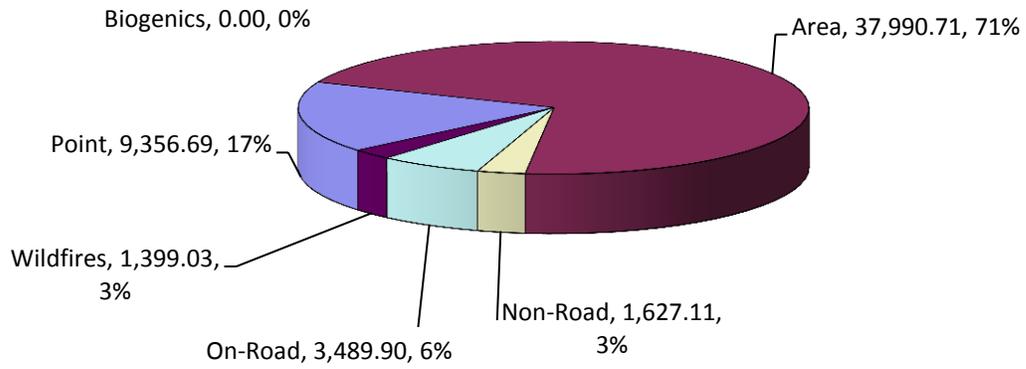
Table 3. 2011 Triennial Inventory (tons/year)

| | CO | NOX | PM10 | PM2.5 | SOX | VOC |
|--------------|--------------------|--------------------|-------------------|-------------------|-------------------|--------------------|
| Beaver | 9,068.640 | 1,401.796 | 865.789 | 227.163 | 77.631 | 31,264.756 |
| Box Elder | 36,212.741 | 5,407.642 | 3,926.511 | 1,789.577 | 146.845 | 39,198.980 |
| Cache | 21,791.944 | 3,280.105 | 2,053.824 | 666.607 | 68.504 | 17,344.320 |
| Carbon | 8,293.984 | 6,132.159 | 1,010.979 | 618.487 | 8,370.740 | 16,847.970 |
| Daggett | 3,205.019 | 1,010.436 | 184.656 | 52.216 | 2.387 | 14,177.519 |
| Davis | 36,171.832 | 8,751.841 | 1,175.588 | 698.987 | 463.416 | 14,503.871 |
| Duchesne | 9,659.661 | 3,220.226 | 1,457.387 | 382.471 | 17.960 | 24,253.874 |
| Emery | 21,686.845 | 21,511.124 | 1,792.626 | 678.873 | 7,243.353 | 32,123.164 |
| Garfield | 14,479.542 | 545.186 | 974.654 | 410.191 | 21.382 | 45,964.839 |
| Grand | 13,882.943 | 2,213.307 | 634.861 | 277.947 | 23.582 | 36,702.876 |
| Iron | 19,142.886 | 3,294.645 | 1,246.066 | 511.544 | 176.859 | 41,519.711 |
| Juab | 12,021.123 | 1,994.325 | 1,404.585 | 388.117 | 89.626 | 29,287.154 |
| Kane | 14,118.080 | 654.499 | 683.035 | 271.591 | 28.847 | 49,253.690 |
| Millard | 22,903.504 | 30,828.043 | 3,859.079 | 1,479.783 | 5,064.792 | 51,308.371 |
| Morgan | 5,153.355 | 2,140.977 | 414.123 | 107.439 | 380.257 | 10,206.379 |
| Piute | 5,760.764 | 158.969 | 259.519 | 82.979 | 7.660 | 13,317.648 |
| Rich | 6,327.845 | 275.048 | 669.164 | 221.347 | 8.102 | 10,690.241 |
| Salt Lake | 137,708.847 | 30,728.249 | 5,078.763 | 2,605.776 | 3,753.614 | 37,667.022 |
| San Juan | 19,324.038 | 1,590.896 | 5,468.718 | 1,354.840 | 56.711 | 65,357.056 |
| Sanpete | 8,488.723 | 992.693 | 943.237 | 237.583 | 87.936 | 19,370.304 |
| Sevier | 9,981.114 | 1,717.057 | 810.268 | 263.873 | 97.556 | 19,266.777 |
| Summit | 12,594.129 | 3,796.276 | 898.968 | 333.006 | 203.866 | 20,533.390 |
| Tooele | 25,968.282 | 6,130.658 | 3,844.296 | 1,798.069 | 222.731 | 42,814.120 |
| Uintah | 14,321.930 | 1,727.990 | 3,740.925 | 977.959 | 19.511 | 31,074.640 |
| Utah | 58,225.486 | 13,394.482 | 3,410.066 | 1,573.291 | 278.636 | 31,480.140 |
| Wasatch | 7,557.875 | 1,273.651 | 637.975 | 216.552 | 14.142 | 18,400.776 |
| Washington | 34,616.162 | 5,266.240 | 3,028.793 | 997.268 | 79.908 | 57,435.485 |
| Wayne | 6,279.904 | 209.308 | 2,267.444 | 472.000 | 31.241 | 24,821.316 |
| Weber | 30,793.611 | 6,196.617 | 1,121.537 | 535.971 | 113.645 | 13,466.176 |
| Total | 625,740.808 | 165,844.443 | 53,863.435 | 20,231.508 | 27,151.441 | 859,652.568 |

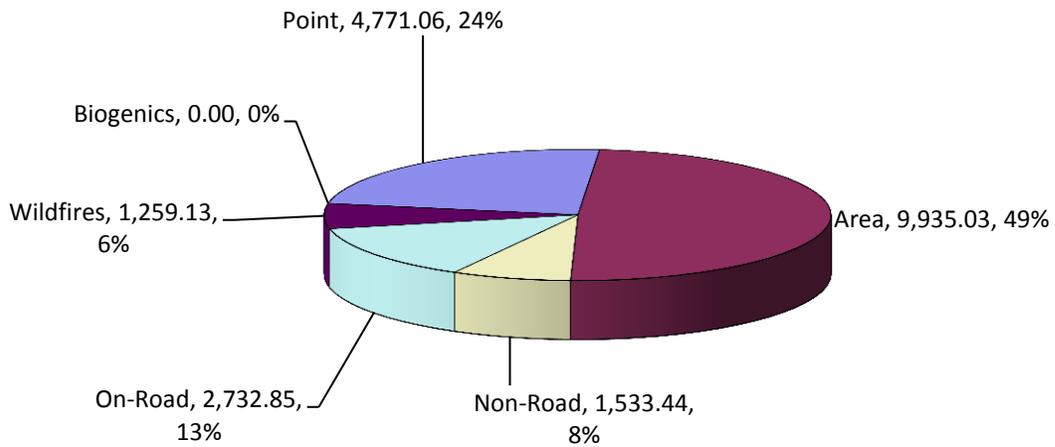
Figure 15. 2011 Triennial Emissions Inventory by Source Category—Statewide, Annual



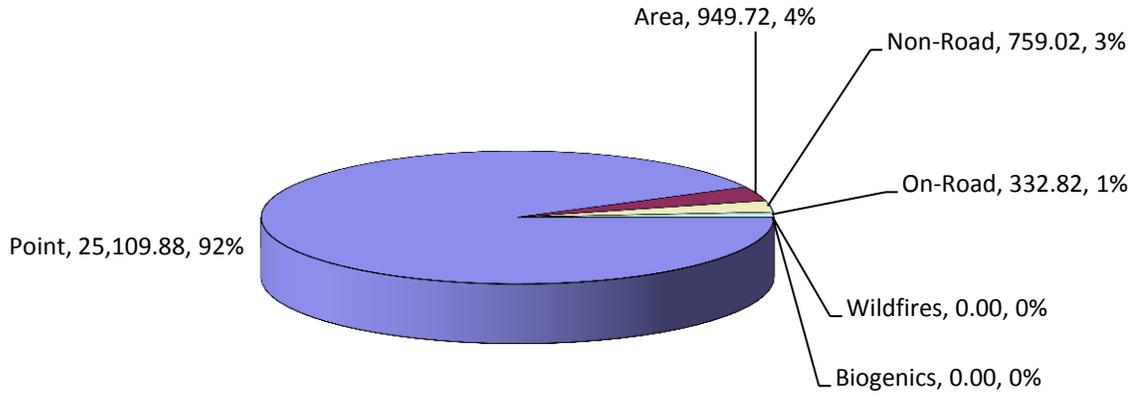
PM10



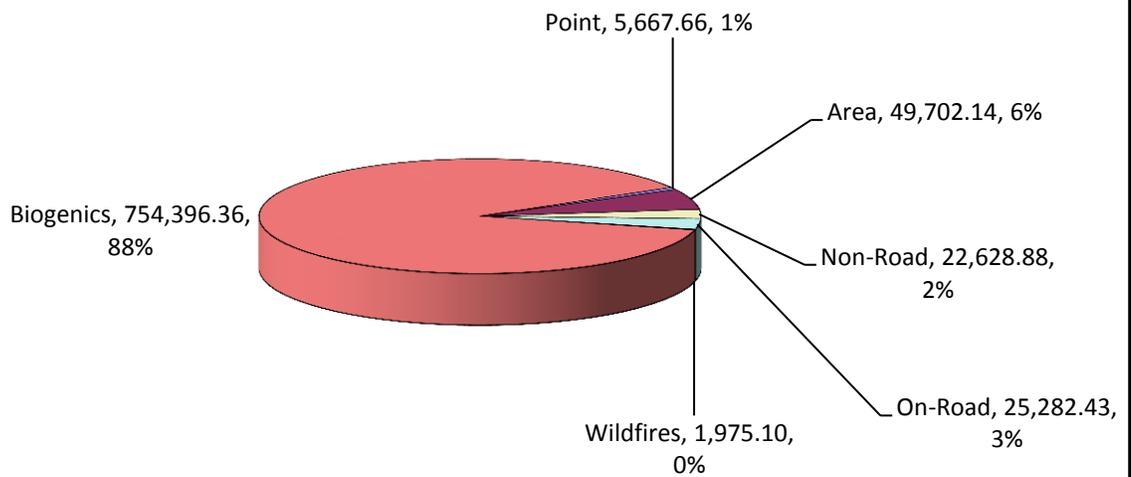
PM2.5



SOX



VOC



Division Organization

The Division of Air Quality is divided into three separate branches: Planning, Compliance, and Permitting. The *Planning Branch* is responsible for developing comprehensive plans to reduce air pollution and is comprised of three sections: Air Monitoring, Mobile Sources, and Technical Analysis. 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. Planning staff in the Mobile Sources and Technical Analysis sections routinely compile emissions inventories in order to understand the origins of the various contaminants detected in the air. They also use 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. 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. This information must be considered in the development of State Implementation Plans in order to ensure that Utah's ambient air remains in compliance with the federal health standards, even as our population and our economy continue to grow. Additionally, the Planning Branch coordinates all of the rule-making activities of the Division.

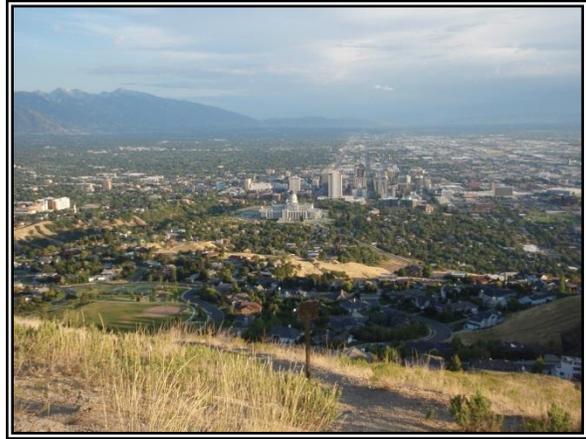
The *Compliance Branch* has responsibility for ensuring that industries and residents comply with Utah's air quality rules and is comprised of three sections: Major Source Compliance; Minor Source Compliance; and Air Toxics, Lead-Based Paint, Asbestos, and Small Business Environmental Assistance (ATLAS). The Major and Minor Source Compliance Sections are responsible for ensuring that all Utah air quality regulatory requirements are met. This is done through inspections and enforcement actions. The ATLAS section 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. The ATLAS section 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.

The *ATLAS* section 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 Small Business Environmental Assistance Program 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 New Source Review (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 State Implementation Plans (SIPs) and associated 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.



In addition, the 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. Therefore, most of the recent SIP revisions were undertaken with an additional goal of helping transportation planners adapt to an ever-growing population base and updated air quality health standards.

Status of Projects and Initiatives

Governor's 2012 Clean Air Campaign

The Utah Clean Air Partnership (UCAIR), Governor Herbert's statewide initiative to improve air quality in Utah, was launched on January 30, 2012. The initiative focuses on clean air partnerships with businesses, organizations and governments, education for Utah residents on air quality challenges and solutions, and resources and tools to reduce emissions.

On August 29, 2012, UCAIR registered with the state as a nonprofit organization. The new nonprofit brings together a diverse group of experienced partners to promote a wide range of strategies designed to improve air quality statewide. Guided by an eleven member board, the organization plans to launch a statewide public awareness campaign and establish a robust grants and loans program to provide seed money for businesses and governments wanting to reduce their emissions. UCAIR also proposes to develop broad-based voluntary reduction strategies that expand participation in the Salt Lake Chamber's Clean Air Champions, provide Best Management Practice resources for business and government, facilitate emissions reductions through permitting, and establish systems to measure and collect emissions reduction data. UCAIR will also encourage individuals to change behaviors that contribute to air pollution using UCAIR tools and resources.

DEQ has been providing staff support to UCAIR since spring 2012. The Division of Air Quality provides technical expertise and the Communications Office provides communication and

administrative support.UCAIR's acting executive director works in the DEQ Communications Office.

Fugitive Dust Plan Application Improvement Project

The DAQ unveiled the on-line fugitive dust control plan application in November 2011. Our goal was to increase awareness of our fugitive dust control rules found in Utah Air Quality Rule R307-309 and to improve the compliance rate with that rule. R307-309 requires a fugitive dust control plan for construction/demolition activities that are greater than ¼ acre in size and have the potential to create fugitive dust in a PM₁₀ or PM_{2.5} non-attainment area. Though this rule potentially affected hundreds of construction/demolition activities, before the unveiling of the on-line application, we would receive less than 35 fugitive dust control plans in a calendar year.

The fugitive dust control plan automated application process has been a huge success in the first year. Since the automated program went live in November 2011, over 725 plans have been processed. Feedback from DAQ customers has been overwhelmingly positive. Our target audience was increased by combining the fugitive dust control plan on-line application with the existing storm water permit application. Staff time to manage the fugitive dust control plan process has been decreased by automating the process. Not only has the automated application process made more people aware of the requirements to control fugitive dust, it has also had a positive impact on the air quality throughout Utah's non-attainment areas.

PM_{2.5}

One of the six "criteria" pollutants identified for regulation in the original CAA of 1970 was total suspended particulate (TSP). In 1987, EPA defined a size "indicator" of the suspended particles that were of concern to public health. These were particles with an aerodynamic diameter of ten microns or less, and this regulated subset of TSP was called PM₁₀. It includes a complex mixture of extremely small particles and liquid droplets that can be emitted directly, as in smoke from a fire, or it can form in the atmosphere from reactions of "precursor" gases such as sulfur dioxide and ammonia.

Further study of PM₁₀ has revealed a bi-modal size distribution. There are typically two distinct groups of PM₁₀ particles – those between 2.5 and 10 microns in diameter, and 2.5 microns and smaller. A growing body of health studies has led to the conclusion that it is the smaller of these particle groups that most severely impacts public health. In response to the findings, in 1997, EPA added a new indicator to the regulatory framework for particulate matter. PM_{2.5} is inclusive of particles having an aerodynamic diameter of 2.5 microns or less.

DAQ has monitored PM_{2.5} since 2000 and found that all areas within the state were in compliance with the 1997 standards. In September of 2006, EPA revised the standards for PM_{2.5}. While the annual standard remained unchanged at 15 µg/m³, the 24-hour standard was lowered from 65 µg/m³ to 35 µg/m³. At this new level, all or parts of five counties have collected monitoring data that is not in compliance with the 24-hour standard. This monitoring data, in conjunction with other considerations such as topography, population density, and

projected growth estimates has led to the establishment of three nonattainment areas for PM_{2.5} (see Figure 13). The EPA completed the administrative process of designating these areas on December 14, 2009. To address non-compliance, the state must prepare comprehensive plans (SIPs) to meet the revised standard in these areas within three years of EPA's final action. The monitoring data DAQ has been collecting since 2000 suggests that meeting this new standard will be one of our greatest challenges.

During this past year, DAQ finished laying the technical groundwork for the PM_{2.5} SIPs that will be prepared for the non-attaining areas in the state and tested various control strategies using the validated air quality model. DAQ held a lengthy series of stakeholder meetings throughout the nonattainment areas to identify potential control strategies that could be incorporated into the SIPs for the areas. It was the intent at the beginning of the process to prioritize the identified strategies and to use only those strategies that were necessary to meet the standard. The strategies not selected for inclusion in the SIP would be used for contingency measures, should the areas continue to exceed the standard. However, at



2012 PM_{2.5} Stakeholder Meeting

the end of the stakeholder process, it was discovered that, except in Cache County, implementation of all of the strategies identified would not result in attainment of the standard. Therefore, DAQ has continued working with stakeholders on an individual basis to identify and implement a suite of rules that have been adopted by the Air Quality Board to control PM_{2.5} and its precursors throughout the nonattainment areas.

The rules adopted include a significant strengthening of the solid fuel burning restrictions. Previously, the rule applied only to wood burning in Utah, Salt Lake, Davis, and Weber counties, allowed burning in EPA Certified devices if there were no visible emissions, and required that mandatory no-burn periods would be called at the 35 µg/m³ standard. The new rules apply throughout the nonattainment areas to all solid-fuel burning devices, do not allow any burning in any device, including EPA Certified devices, and allows the DAQ to call a mandatory no-burn period whenever DAQ predicts that an inversion is forming, but no later than when ambient concentrations of PM_{2.5} reach 25 µg/m³.

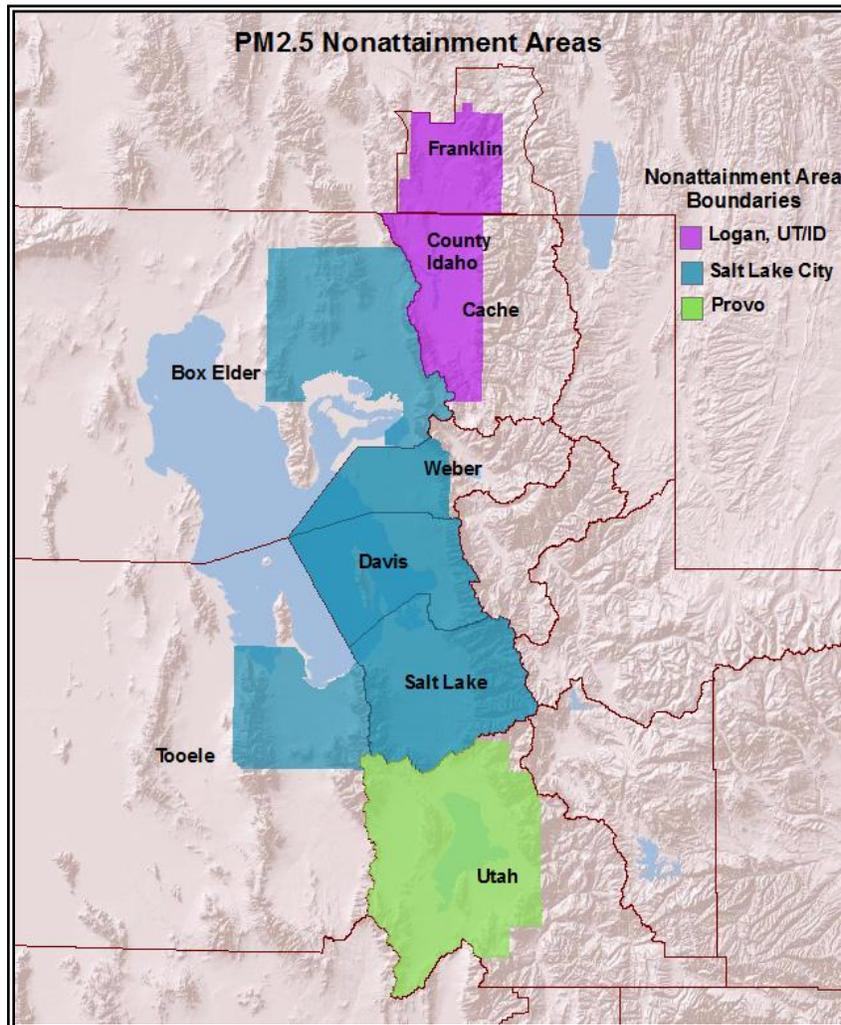
Air plans for each of the three nonattainment areas were proposed for public comment in September, even though the plans for two Wasatch Front nonattainment areas lacked sufficient controls to achieve compliance with the standards. In December, the Utah Air Quality Board approved a SIP for the Logan, UT-ID Nonattainment Area, and it was delivered to the EPA. The most significant control strategy contained in that plan was a requirement for the implementation of a vehicle inspection/maintenance program in Cache County.

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DAQ will continue to work with EPA and other stakeholders on the remaining SIPs. The most critical portion of those plans yet to be addressed is the application of Reasonable Available Control Technology (RACT) to industrial sources in those areas. The process of identifying RACT is continuing, and DAQ expects to complete the other two plans early this summer.

In 2012 EPA again revised the NAAQS for PM_{2.5}, this time lowering the annual standard from 15 µg/m³ to 12 µg/m³. Monitoring data indicates that there are no areas within the state that would be out of compliance with this new standard (see Figure 10). DAQ will make a recommendation to the EPA concerning its area designations in December of 2013.

Figure 16. PM_{2.5} Nonattainment Areas



Three-State Pilot Project

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 three-state area (western Colorado, eastern Utah, and southwestern Wyoming) 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, Bureau of Land Management, USDA Forest Service, National Park Service and the states of Utah, Colorado, and Wyoming 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 analyses; and
- ❖ Performing regional scale baseline air quality modeling of current conditions against which the impacts from proposed future projects can be evaluated.

Utah has completed the second year of air quality data collection at the Price and Fruitland monitoring sites, both funded by the Three-State Pilot Project. In addition, air quality data from the Vernal and Roosevelt monitoring sites have been provided to the project. Other activities on the project this year include providing support to the development of emissions inventories, review of the project workplan, and participating in the project Steering Committee meetings. Work conducted under the Three-State Pilot Project will be directly applicable to the ozone studies currently underway in the Uintah Basin.

Uinta Basin Ozone

Since 2005, the National Park Service has been measuring summertime ozone at Dinosaur National Monument, located near Vernal Utah, and beginning in 2006 at Colorado National Monument, located near Grand Junction, CO. In 2009, the Environmental Protection Agency (EPA) began measuring year-round ozone at two sites on the Ute Indian Reservation, located near Redwash and Ouray. The official air quality levels for the Uintah Basin are currently in compliance with the ozone NAAQS. However, 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 high temperatures and bright sunshine are occurring.

In the winter of 2010/11, the Uintah Basin Impact Mitigation Special Services District funded a study conducted by the Energy Dynamics Lab and Utah State University. Using data collected from 18 temporary and permanent 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 2011, cooperating agencies, including the BLM, EPA, Western Energy Alliance, Uintah Impact Mitigation Special Service District, coordinated by the State UDEQ, embarked on a long-term effort to address ozone in the Uintah Basin. The goal of this effort is 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. Funding for a winter study in 2011/12 was secured, and researchers from the National Oceanic Administration, several university research groups, EPA, and the Department of Environmental Quality worked together to understand how ozone is formed in the Basin during wintertime inversion conditions. Although no temperature inversion/snow events occurred and ozone levels remained low, much valuable information was collected on emissions inventories and sources. Study conclusions include the following:

- Ozone associated with stable meteorological conditions, snow cover, and sunshine
- Chemical precursors to ozone formation are NO_x and VOC.
- NO_x comes from hot combustion sources, highest levels in the oil production areas and population centers.
- VOC comes from oil and gas production with the highest levels in the gas production areas.
- Methanol measured at concentrations that could significantly enhance ozone formation.
- There is very high year-to-year variation in ozone levels due to variation in meteorological conditions.
- Analysis of historical climatology for meteorological conditions conducive to ozone formation suggests about one in two winters would produce ozone levels higher than the federal standard.

A winter study is under way for the winter of 2012/13 because the meteorological conditions (snow cover and temperature inversions) exist and elevated ozone has developed. This study will involve the same researchers as last year's study, and the purpose is to:

- Understand the meteorological patterns and boundary layer fluctuations that isolate ozone and precursor emissions at the surface
- Establish the important chemistry pathways that lead to winter ozone formation and identify the controlling reactants
- Characterize the horizontal and vertical distribution of precursor emissions coming from sources in the basin
- Track long-term trends in ozone and its precursors in conjunction with oil and gas development and emissions changes

Side Bar: **Uinta Basin 2013 Winter Ozone Study**

- **What:** The Utah Division of Air Quality is coordinating the *Uintah Basin 2013 Winter Ozone Study* this winter starting in the month of January and continuing through February when the highest likelihood of temperature inversions, snow cover, and elevated ozone levels are expected.
- **Why:** The Study is needed to understand how ozone is formed in the Basin during wintertime inversion conditions. What are the chemical pathways that are unique to the Basin's wintertime situation? The answer to this question is critical to implementing appropriate and effective strategies for mitigating high ozone levels.
- **Who:** The Study is a joint effort of world-class atmospheric researchers from the National Oceanic and Atmospheric Administration's (NOAA) Chemical Sciences and Global Monitoring Divisions, University of Colorado – Institute of Arctic and Alpine Research, Utah State University, University of Utah, and Utah Department of Environmental Quality. This is by far the largest and most complex air quality study ever conducted in the State of Utah.
- **Cost:** The Study is broadly supported financially by numerous agencies, including the Uintah Basin Impact Mitigation Special Service District, Western Energy Alliance, Bureau of Land Management - Utah Office, and Environmental Protection Agency – Region 8. The contribution total is approximately \$1.6 million. All of the research organizations have also made significant in-kind equipment contributions to this study.
- **Research:**
 1. Track long-term trends in ozone and its precursors in conjunction with oil and gas development and emissions changes.
 2. Understand the meteorological patterns and boundary layer fluctuations that isolate the ozone and precursor emissions at the surface.
 3. Intensive atmospheric chemistry studies to understand the chemical pathways and the limiting formation precursors.
 4. Characterize the horizontal and vertical distribution of precursor emissions coming from sources in the basin.
- **Goal:** Identify effective, appropriate mitigation strategies that can be implemented to reduce the chemical precursors to wintertime ozone formation in the Basin. Protect the health and economic base of local citizens.

Utah Clean Diesel Program

The Utah Clean Diesel Program, a clean air initiative that started in 2008, has been a successful collaboration between state and federal agencies, county and municipal governments, community and non-profit organizations, and industry groups. Over \$5.6 million in state and federal grants have helped 48 small businesses, 31 school districts, and one municipality purchase cleaner and more fuel efficient equipment for their operations, reducing emissions by over 25,000 tons and saving over 1.3 million gallons of diesel fuel over the life of the fleets—nearly \$5 million worth of fuel savings.



The following projects have been completed to date:

- 2008: The Clean Diesel School Bus Project retrofitted over 1,200 diesel-powered school buses throughout the state with emission control devices that are aimed to protect children and operators from harmful air pollutants emitted by the school bus's diesel engine. This project also replaced 27 older buses with new buses that meet a more stringent set of emissions standards.
- 2009: The Clean Diesel Trucking Project installed auxiliary power units on 52 long-haul trucks. These units reduce fuel consumption and diesel emissions by providing climate control and electrical power for the truck's sleeper cab and engine block heater during driver's downtime. These devices use 80-90 percent less fuel than the truck's main engine.
- 2009: The Clean Diesel Agriculture Project installed auxiliary power units on 32 trucks that support farm-based activities. This project also provided partial funding to repower and replace 31 pieces of diesel equipment with cleaner, more fuel efficient machinery.
- 2010: Funding was provided to the City of North Salt Lake for repowering five city maintenance vehicles that are used as snow plows during the inversion season. These vehicles were converted from older, diesel engines to newer, compressed natural gas engines.
- 2011: Three small businesses were awarded funds to replace equipment with upgraded technologies that meet higher emissions standards. Large construction equipment was replaced with new, and an old box truck used to transport fruit to farmers markets along the Wasatch Front was repowered with a cleaner engine.

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In 2012, the Utah Division of Air Quality teamed up with the Utah Department of Transportation to retrofit 20 state maintenance vehicles that operate as snow plows during the inversion season with Diesel Oxidation Catalysts (DOC). These trucks operate in Box Elder, Cache, Davis, Salt Lake, Tooele, and Uintah counties. Over 37 million vehicle miles are traveled per winter weekday in these counties in which 69.4 tons of emissions are emitted from heavy-duty vehicles on these days. The DOCs are calculated to reduce PM by 20%, HC by 50%, and CO by 40%.



The grant will also provide assistance to Utah State University for replacing a 1998 diesel shuttle bus with a 2012 Compressed Natural Gas (CNG) shuttle bus. The new CNG shuttle bus will be powered by an engine that will reduce NOx by 50%, PM by 95%, and HC by 50%.

The Utah Clean Diesel Program continues to evolve with awards of nearly \$1 million with participants matching over \$2 million of their own resources. The program is based on partnerships with a variety of sectors, including education, agriculture, trucking, and construction to provide cleaner and more efficient transportation and equipment alternatives to Utah communities.

Clean Fuels and Vehicle Technology Grant and Loan Program

The Utah Clean Fuels and Vehicle Technology Grant and Loan Program (Grant and Loan Program), funded through the Clean Fuels and Vehicle Technology Fund, provides grants to assist businesses and government entities in covering 50% of the cost of converting vehicles to operate on a clean fuel; 50% of the incremental cost of purchasing Original Equipment Manufacturer (OEM) clean fuel vehicles; the cost of retrofitting diesel vehicles with U.S. Environmental Protection Agency (EPA)-verified diesel oxidation catalysts, diesel particulate filters, or closed crankcase ventilation systems; and matching funds to another grant for the purchase of clean fuel refueling equipment.



The Grant and Loan Program also provides loans for the cost of converting vehicles to operate on a clean fuel, the incremental cost to purchase OEM clean fuel vehicles, retrofitting diesel vehicles with EPA-verified diesel oxidation catalysts, diesel particulate filters, or closed crankcase ventilation systems; and the purchase of clean fuel refueling equipment. Repayment schedules are allowed up to 10 years interest free for government entities, whereas rates for private sector vehicles shall be made at an interest rate equal to the annual return earned in the state treasurer's Public Treasurer's Investment Fund.

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UDAQ solicits applications annually to help promote clean fuel projects statewide. A combined total of \$250,000 in grants and \$250,000 in loans may be awarded every year. Successful projects may receive up to \$100,000 for a grant and \$100,000 for a loan with a minimum of \$5,000 per project. Fleet operators may include up to 100 vehicles in each application.

In March of 2012, the Utah Division of Air Quality announced awards for successful projects that include the purchase of a compressed natural gas (CNG) refuse vehicle for Allied Waste, two CNG glass recycling vehicles for Momentum Recycling, a CNG street sweeper and aerial truck tower for Salt Lake City, Corporation, a Liquefied Natural Gas (LNG) dispenser for Transfuels, LLC, CNG refueling equipment for Uintah Gas Fireplace & BBQs, and four CNG transit buses for the University of Utah.

The application period for the 2013 awards opened in October, 2012, and closed December, 2012. Ten applications were received for review. Successful projects will be announced in March, 2013.

Since 2008, the Utah Division of Air Quality has awarded a total \$981,658 in grants and \$366,667 in loans to 16 different entities. Projects have included the conversion of cars, trucks, and shuttle buses to natural gas as well as the purchase of natural gas refuse trucks, freight trucks, transit buses, street sweepers, aerial truck towers, glass recycling vehicles, and refueling stations.

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 of Utah. 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 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.

The CMPO established conformity for the 2035 MTP in June 2011 and 2013-2018 TIP in August 2012 for the conformity demonstration completed for the for Cache County, Utah and Franklin County, Idaho PM_{2.5} nonattainment area.

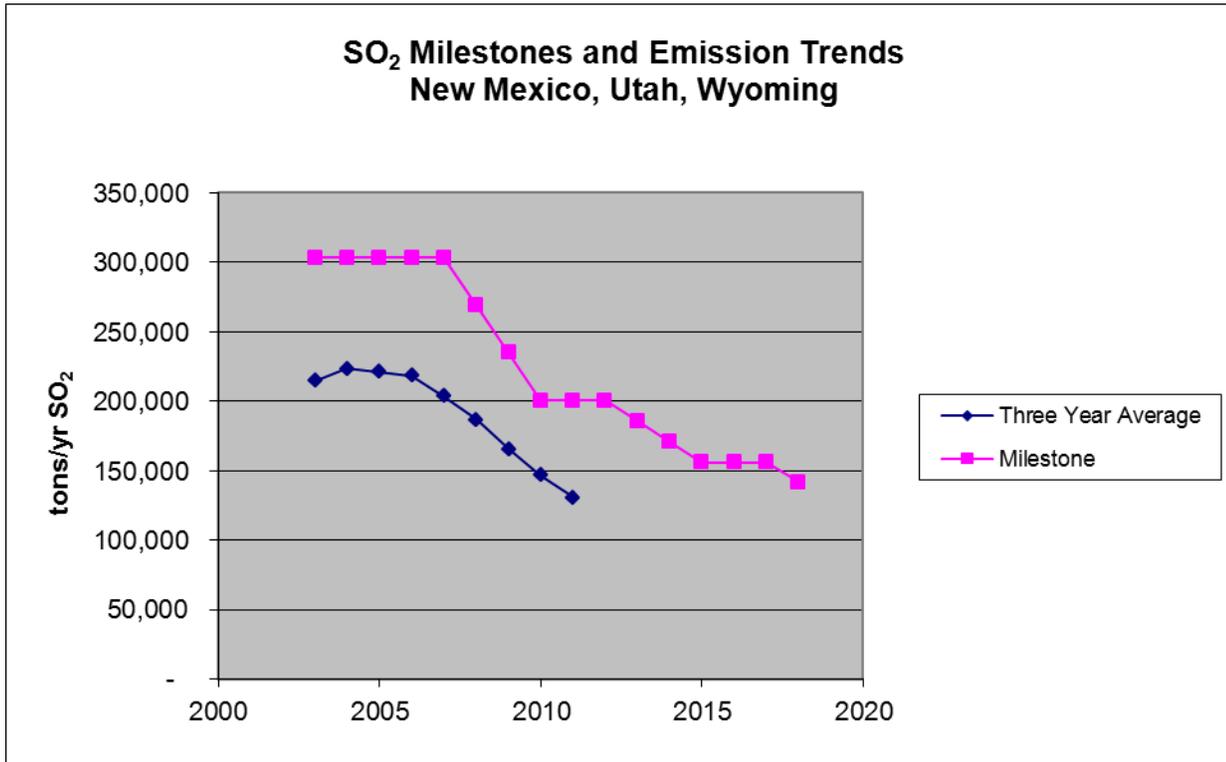
MAG established conformity for the 2040 MTP in June 2011 and 2012-2017 TIP in July 2011 for the Provo\Orem City CO maintenance area and for the Utah County PM₁₀ and PM_{2.5} nonattainment area.

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WFRC re-established conformity for the amended 2040 RTP and 2013-2018 TIP in August 2012 for the Salt Lake City and Ogden City CO maintenance areas, the Salt Lake County and Ogden PM₁₀ nonattainment area, 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.

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 emissions in 2011 were 117,976 tons—35% 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 2011 milestone report has been completed, and will be submitted to EPA in the spring of 2013.



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. In 2012, DAQ participated in a TeleHealth broadcast that was aired on the effects of ambient air quality and asthma in Utah.

Ancillary Programs

Utah Air Quality Public Notifications

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. 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 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 for the Wasatch Front.

Choose Clean Air

DEQ has developed an interactive source of information about ways individuals can help improve air quality by making smart choices in their personal lives.

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

This program originated with the PM₁₀ SIP, but was significantly strengthened in December, 2012. The program runs annually from November through early March. In addition to the burning restrictions, residents are encouraged to drive less and industry is encouraged to optimize operating conditions.

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 and 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. These programs are administered by the county health departments.

UDAQ recently modified Section X of the Utah State Implementation Plan (SIP) to update the vehicle inspection and maintenance programs in Utah. Utah's inspection and maintenance programs have been modified to take advantage of improved vehicle technology and testing analyzers. As a result of the new technology, the current I/M programs are more effective than the former programs.

On December 5, 2012, the Utah Air Quality Board adopted SIP Section IX. A.23, which requires Cache County to implement a motor vehicle emission inspection and maintenance program by December 14, 2013. UDAQ will work closely with Cache County officials in identifying and developing a cost-effective I/M program while achieving the desired air quality outcomes.

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. People who spot a vehicle producing excessive smoke can report it through their respective county health departments:

| | |
|------------------|--------------------|
| Cache County | 435-792-6611 |
| Davis County | 801-546-8860 |
| Salt Lake County | 385-468-SMOG(7664) |
| Utah County | 801-851-SMOG(7664) |
| Weber County | 801-399-7140 |

Utah Clean Fuel Tax Credit

The Utah Clean Fuel Tax Credit was established in 1992. The intent of this program is to provide an incentive for taxpayers to buy a clean fuel vehicle or convert their vehicles to run on electricity, natural gas, or propane. In order for a taxpayer to claim this nonrefundable credit, they must completely fill out tax form TC-40V and provide required documentation to the Utah Division of Air Quality. UDAQ approved the most clean fuel tax credits for tax year 2008, with 1,500 approved credits. Since then, the number has decreased to 485 approved for tax year 2009, 512 for tax year 2010, 547 for tax year 2011 and as of December 18, 288 for tax year 2012.

The credit may only be taken once per vehicle. UDAQ, along with DTS, developed a web application that allows a taxpayer to search the clean fuel tax credit database to ensure that a specific vehicle has not already received the tax credit. This web application can be found online here: <http://www.cleanfuels.utah.gov/vinsearch.html>.

Because of the rising cost of gasoline and the lower price of natural gas in Utah, many individuals were interested in converting their vehicles to run on natural gas. However, there were a limited number of EPA approved conversion kits available for consumers to choose

from. To help expand the number of EPA conversion kits available, UDAQ worked with the EPA to promulgate a new compliance program that enables conversion manufacturers to satisfy EPA emissions requirements in a more streamlined way. EPA put this new program into effect on April 8, 2011 and has had a dramatic impact on the number of conversion kits that are available. The number of available conversion kits has increased from 32 available EPA certified conversion kits in 2008 to 663 available approved EPA conversion kits in 2012.

Summer Ozone

In March and May, DAQ established twenty temporary ozone and meteorological monitoring sites in mountain valleys adjacent to the Wasatch Front, Tooele Valley, and in rural areas of western Utah. Ozone was monitored at these sites through September. The project goals were to determine the extent of a potential ozone non-attainment area along the Wasatch Front and in mountain valleys to the east, to determine the location of highest ozone in Tooele Valley, to understand regional transport of ozone and to determine background levels of ozone in rural areas of Utah. These data will be used in the SIP development process.



Permitting Branch

The DAQ Permitting Branch is responsible for implementing state and federal air permitting programs that are intended to regulate air emissions from new and modified stationary sources that emit air contaminants. Permits are legally enforceable documents that specify construction limitations, emission limits, and how the emissions source must be operated. Permit limits can be emission limitations 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.



The branch issues two types of permits. New Source Review (NSR) permits, also known as Approval Orders, 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. The Operating Permits Section issues the Title V Operating Permits to the larger “major” stationary sources in the state, as required in Title V of the Federal Clean Air Act. There are approximately 100 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 Approval Order (AO) before it is allowed to begin construction. For nonattainment areas that are not in compliance with the NAAQS, NSR 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, NSR assures that new emissions do not significantly worsen air quality. These processes are outlined in our state and federal rules.

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 nonattainment areas, state-of-the-art technology is known as lowest achievable emissions rate (LAER). For areas in attainment of the NAAQS, 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 both the cost and environmental benefits of the control equipment while LAER technology takes into account only environmental benefits.

The general public and EPA are given an opportunity to review the proposed approval order before it is issued. The criteria indicating which sources must obtain an approval order are specified in the Utah Air Quality Rules. Potential applicants are encouraged to contact DAQ prior to submitting the necessary paperwork. In the EPA fiscal year 2012 (7/1/11 to 6/30/12), the NSR section issued 215 AOs along with numerous supporting or other documents.

Operating Permits

Congress created Title V of the Clean Air Act 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, federal New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAP), and Maximum Available Control Technology (MACT). Like the approval orders, 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 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.

During the last year, the Operating Permits section issued multiple initial permits and permit modifications coordinating extensively with the NSR Section. The Operating Permit has a life of only five years (as opposed to the AO that does not expire), and during the last year the section issued a significant number of permit renewals. These renewal permits are complex, and care must be taken to ensure that new federal requirements for the Compliance Assurance Monitoring Rule (CAM) and any other new requirements (such as new MACT Standards) are included.

Compliance Branch

The Major Source Compliance, Minor Source Compliance, and the Air Toxics, Lead-Based Paint, Asbestos and Small Business Environmental Assistance (ATLAS) 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 all stack tests and CEMS, and any associated enforcement. The Minor Source Compliance Section is responsible for inspections and report/plan reviews at small to medium-sized facilities, fugitive dust control, abrasive blasting, residential solid fuel burning, gasoline transport/filling station vapor recovery, open burning, and any associated enforcement.

Table 4. Major and Minor Source Compliance Summary

| TASK | 2012 |
|--------------------------------------|-------------|
| Source Inspections | 454 |
| On-site Stack Test/CEM Audits | 153 |
| Stack Test/CEM Reviews | 571 |
| Temporary Relocations Accepted | 94 |
| Fugitive Dust Control Plans Accepted | 679 |
| Miscellaneous Inspections | 76 |
| Complaints Received | 207 |
| VOC Inspections | 23 |
| Warning Letters | 18 |
| Notices of Violations | 0 |
| Compliance Advisories | 44 |
| Settlements | 33 |
| Total Inspections | 706 |
| Penalties Assessed | \$80,723.60 |

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

The ATLAS section determines compliance with specific regulations involving asbestos, lead-based paint, and area sources of air pollutants that are not required to have DAQ Approval Orders but are subject to Maximum Achievable Control Technology (MACT), Title 40 Code of Federal Regulations (40 CFR) Part 63 [Utah Administrative Code (UAC) R307-214-2] requirements.

The following programs are the responsibility of the ATLAS Section:

National Emission Standards for Area Source Categories

Sources that are required to comply with 40 CFR Part 63 Subpart M *National Perchloroethylene Air Emission Standards for Dry Cleaning Facilities MACT* or the 40 CFR Part 63 Subpart N *National Emission Standards for Chromium Emissions from Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks MACT* and are not required to have DAQ Approval Orders are inspected by the ATLAS Section.

Lead-Based Paint

Toxic Substances Control Act (TSCA) Title IV, 40 CFR Part 745 (UAC R307-840, 841, and 842). Under this program, ATLAS deals with the accreditation of training programs, certification of individuals and firms, work practices for lead-based paint activities, and lead-based paint outreach activities.

Asbestos in Schools

TSCA Title II Asbestos Hazard Emergency Response Act (AHERA), 40 CFR Part 763 (UAC R307-801-4). Under this program, ATLAS deals with the approval of training providers, certification of individuals and companies, inspections of school buildings, and inspections of asbestos abatement in schools.

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 for structures, review of alternate work practices, inspection of asbestos abatement projects, demolition of structures, and asbestos outreach activities.

Table 4. ATLAS Activity Summary

| TASK | 2012 |
|--|-------------|
| MACT Inspections | 27 |
| Asbestos NESHAP Inspections | 251 |
| AHERA (School Asbestos) Inspections | 209 |
| Asbestos State Rules (Only) Inspections | 37 |
| Asbestos Notifications Accepted | 1535 |
| Asbestos Telephone Calls | 4847 |
| Asbestos Individual Certifications | 815 |
| Asbestos Company Certifications | 111 |
| Asbestos Alternate Work Practices | 56 |
| Lead Based Paint Inspections | 95 |
| Lead Based Paint Abatement Notifications | 0 |
| Lead Based Paint Telephone Calls | 976 |
| Lead Based Paint Letters Prepared & Mailed | 973 |
| Lead Based Paint Courses Reviewed | 0 |
| Lead Based Paint Individual Certifications | 267 |
| Lead Based Paint Company Certifications | 149 |
| Notices of Violations | 0 |
| Compliance Advisories | 109 |
| Warning Letters | 67 |
| Settlement Agreements | 22 |
| Penalties collected | \$21,907.50 |
| Total Inspections | 619 |

Enforcement Actions

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

- A. 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).
- B. Warning Letter – a notification sent to violators to resolve minor, first-time violations.
- C. 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.
- D. 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.
- E. 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. 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 the extremely rare instance where the aforementioned enforcement actions fail to resolve a compliance issue, procedures are in place for Air Quality Board hearings/administrative law judge review or formal judicial action. Environmental criminal cases are referred to the appropriate law enforcement agency.

Small Business Environmental Assistance Program

The Small Business Environmental Assistance Program (SBEAP) helps small businesses understand and comply with state air quality rules. The SBEAP provides “plain language” educational information to help small sources learn about the many air quality requirements. The SBEAP also provides on-site assistance with process evaluation, compliance assistance, and pollution prevention techniques. A toll-free telephone hotline number (1-800-270-4440) provides access to SBEAP services 24 hours a day/seven days a week.