

Report to the Public 2018-2019



COLORADO

Air Quality Control Commission

Department of Public Health & Environment



Photo: The 33rd, San Rafael, Colorado



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Message from the Chair

Over my 41 years in Colorado, I've had the pleasure of serving the public in some capacity for 39 of them. From being the mayor of Hayden, to a Moffatt County Commissioner, and most importantly, a fly-fishing guide and shop owner, I have always found that I am happiest while serving the public's interest. So, it came as a great privilege to be appointed to this commission back in 2014, and I look forward to what lies ahead. As a resident of northwest Colorado and having long recreated in the outdoors, air quality is an important issue to me, and I have worked personally and professionally to ensure that the air we breathe is as clean as possible. Being a part of this commission has allowed me to understand the breadth and diversity of the air quality issues around the state. From wildfire smoke in the mountains, to vehicle exhaust in our cities, to the huge increase in oil and gas activities near where people live, I've learned that there are no simple solutions to these complex problems. That's why I'm proud to be a part of an air commission that has accomplished so much in recent years, and we could not have done it without the incredible efforts and cooperation of all our dedicated partners and stakeholders, especially the Air Pollution Control Division.

Air quality has greatly improved over the years, but we still have so much to do. Ozone issues still plague the Front Range, and greenhouse gas emissions are far too high. I'm happy to say, however, that the commission along with the staff of the Air Pollution control Division have undertaken a number of activities this past year to address many of our air quality challenges, including:

- Establishing a low emission vehicle standard and a zero emission vehicle standard for the state, which will reduce GHG emissions and ozone forming emissions considerably;
- Established reasonably available control technology requirements for major sources of NOx and VOCs in the nonattainment area;
- Adopted VOC content limits to reduce state-wide emissions from consumer products and architectural and industrial maintenance coatings;
- Hosted an air quality and health symposium with the Colorado School of Public Health;
- Holding its annual retreat in Lamar and soliciting public comment on regional air quality concerns. The Commission also toured a facility that makes Portland cement and a wind turbine tower manufacturer.

This coming year the commission will focus its attention on:

- Considering additional oil and gas measures to reduce VOC and methane emissions from the sector in accordance with the directives of SB 19-181
- Reducing NOx emissions from stationary engines, especially from those that are very high emitting;
- Improving the state's greenhouse gas inventory for better tracking of progress
- Collaboration with other commissions and state agencies to reduce greenhouse gas emissions to satisfy the legislative directives of HB 19-1261 and SB 19-096.

I hope this report proves useful and informative to you. Please remember that we all play a part in cleaning up the air quality where it needs improvement and preserving good air quality where it already exists. Now, let's get outside and enjoy this wonderful state and all it has to offer.

Chuck Grobe

Major air pollutants

There are many types of air pollution, from blowing dust to human-caused chemical emissions. As required by the Clean Air Act, the U.S. Environmental Protection Agency (EPA) has developed standards for six air pollutants that it calls "criteria pollutants" to protect the public's health and welfare. The standards indicate maximum allowable levels of regulated pollutants in the air. EPA reviews and revises the standards periodically as necessary as new information on health and environmental effects becomes available. If the air quality in a geographic area meets or measures less than the national standard, it is called an attainment area; areas that don't meet or exceed the national standard are called nonattainment areas. In order to improve air quality, states must draft a plan known as a State Implementation Plan (SIP) to improve the air quality in nonattainment areas. The SIP outlines the measures that the state will take to improve air quality. Once a nonattainment area meets the standards and additional redesignation requirements in the Clean Air Act [Section 107(d)(3)(E)], EPA will designate the area as a "maintenance area." A maintenance area must attain the standard for a 20-year period from the date of redesignation.

The six criteria pollutants are particulate matter, ground-level ozone, carbon monoxide, sulfur dioxide, nitrogen dioxide, and lead.

In addition to criteria pollutants, another class of regulated air pollutants is "toxic air pollutants." Toxic air pollutants, also known as hazardous air pollutants, are those that are known or suspected to cause cancer or other serious health or environmental effects.

Greenhouse gases (GHGs), such as carbon dioxide and methane, are pollutants that contribute to changes in our climatic environment. Climate change is an urgent concern, and Colorado, other U.S. states, cities and businesses, and countries around the world are undertaking steps to reduce GHG emissions and their impacts. In 2019, the State Assembly enacted four pieces of legislation related to the Commission's adopting rules to require GHG monitoring and reporting, strengthen GHG inventory development, and establish GHG emission reduction goals and targets, economy-wide. These bills are SB19-096, HB19-1261, SB19-236 and SB19-181.

Monitoring Pollutants

The Colorado Air Pollution Control Division (Division) maintains a statewide monitoring network for all criteria pollutants as required by the federal Clean Air Act and at times conducts special studies for criteria and toxic air pollutants. Monitors are placed in areas where emissions sources and modeling suggest that air quality could be most impacted.

The following provides more detail about certain criteria pollutants of concern in Colorado listed below. For additional details on all the criteria pollutants and Colorado air monitoring sites and data, see our [monitoring and data website](#), or the annual [Colorado Air Quality Data Report](#).

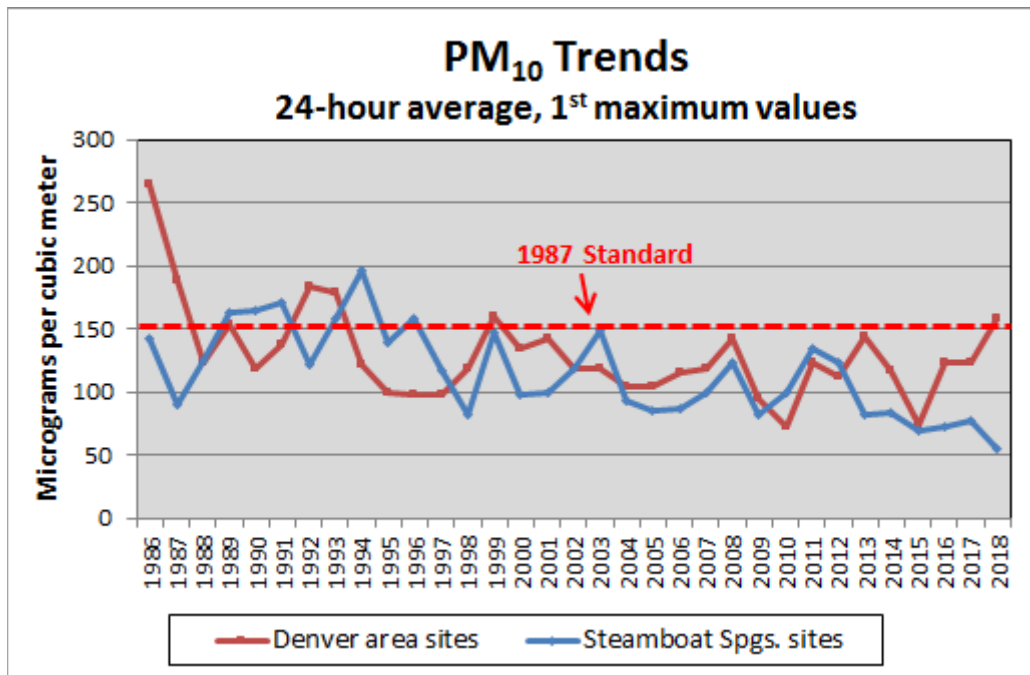
- Particulate matter.
- Ground-level ozone.
- Nitrogen dioxide.
- Sulfur dioxide.
- Carbon monoxide.
- Lead.
- Hazardous air pollutants.
- Greenhouse gases.
- Regional haze.
- More information.

Major air pollutants - particulate matter

Particles in the air are made up of a number of components, including inorganic ions (such as nitrate, sulfate, and aluminum), organic chemicals, carbon, metals, and soil or dust particles. Monitoring is performed for particles less than 10 microns in diameter (PM₁₀) and for particles less than 2.5 microns in diameter (PM_{2.5}). A micron is 1 millionth of a meter. A human hair is about 60-70 microns in diameter.

PM₁₀

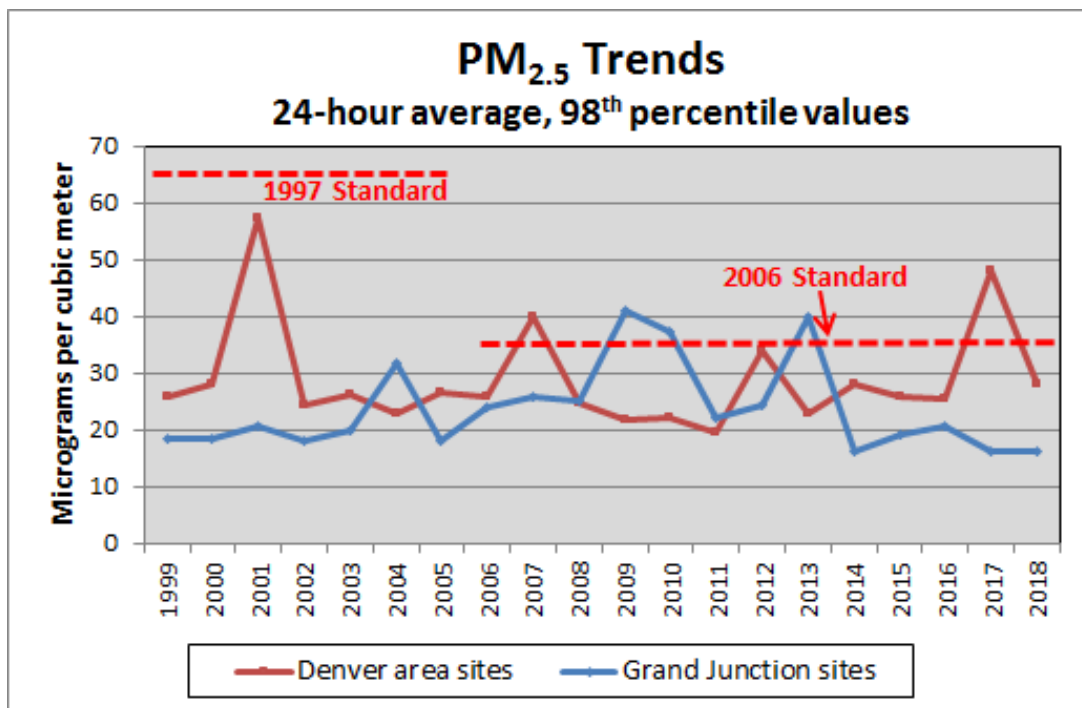
PM₁₀ consists of solid and liquid material up to 10 microns in size suspended in the atmosphere. In Colorado, the majority of PM₁₀, about 90 percent, is from fugitive dust sources, including agriculture, construction, and paved and unpaved roads, according to the EPA's 2014 National Emissions Inventory (NEI). Trends are shown in the graph below for the maximum concentration by year for all Denver metro area monitors, to provide a large city perspective, and for Steamboat Springs monitors, to provide a mountain ski town perspective. An area meets the 24-hour PM₁₀ standard if it does not exceed the 150 ug/m³ (micrograms per cubic meter) level more than once per year on average over a three-year period. There are seven PM₁₀ maintenance areas in Colorado: Aspen, Canon City, the Denver Metropolitan area, Lamar, Pagosa Springs, Steamboat Springs, and Telluride. In September 2020, Canyon City will be the first PM₁₀ maintenance area in Colorado to reach the end of its 20 year maintenance period.



PM_{2.5}

PM_{2.5} particles are a subset of PM₁₀. PM_{2.5} can be directly emitted from stack emissions, internal engine combustion, wildfires or fugitive dust sources, or it can form when gases emitted from power plants, industries, automobiles, and agriculture react in the air. In Colorado, about 63 percent of directly emitted PM_{2.5} is from fugitive dust sources while roughly 13 percent is from fire-related activities, such as prescribed fires, wildfires, and residential wood smoke, according to EPA's 2014 NEI.

Much of the PM_{2.5} in many urban and industrial locations is secondarily formed through atmospheric chemical reactions from other directly emitted pollutants, and is composed of sulfate, nitrate and ammonium compounds. Trends are shown in the graph below for the maximum concentration by year for all Denver metro area monitors, to provide a large city perspective, and for western slope community monitors. An area meets the 24-hour standard if the 98th percentile of 24-hour PM_{2.5} concentrations in one year, averaged over three years, is less than or equal to 35 ug/m³.



Health and Environmental Effects

If inhaled, PM₁₀ and PM_{2.5} particles can affect the heart and lungs and cause serious health effects, including respiratory problems, cancer and premature mortality. The environmental effects range from visibility degradation and vegetation damage to climate change.

Impacts in Colorado

All monitoring sites in Colorado meet the federal standards for both PM₁₀ and PM_{2.5} air pollution. However, particle pollution at times can cause localized air quality impacts resulting in adverse health impacts. The Division regularly issues advisories, encouraging citizens to minimize activities that cause emissions or encouraging citizens to limit exposure to poor air quality. In 2019, the Division launched a pilot program in partnership with county health departments to deploy low-cost, solar-powered PM monitors. The real-time PM data from these sensors will be used to provide timely and accurate air quality forecasts and advisories for smoke from wildfires by providing a gauge of PM trends in the immediate area.

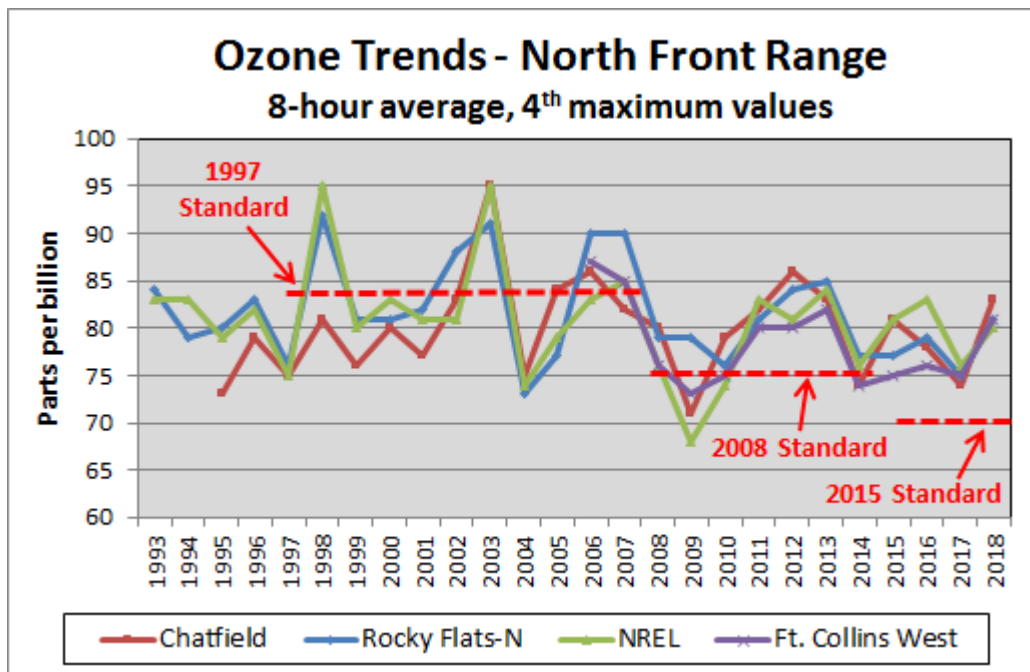
The charts do show occasional exceedances of particulate standards in recent years. These exceedances were related to winter temperature inversions that trap pollutants close to the ground or high winds that resulted in blowing dust. These exceedances do not result in violations because the standards are based on 3-year averages of monitored concentrations, and those averages are below the standards in these locations.

Major air pollutants - ground-level ozone

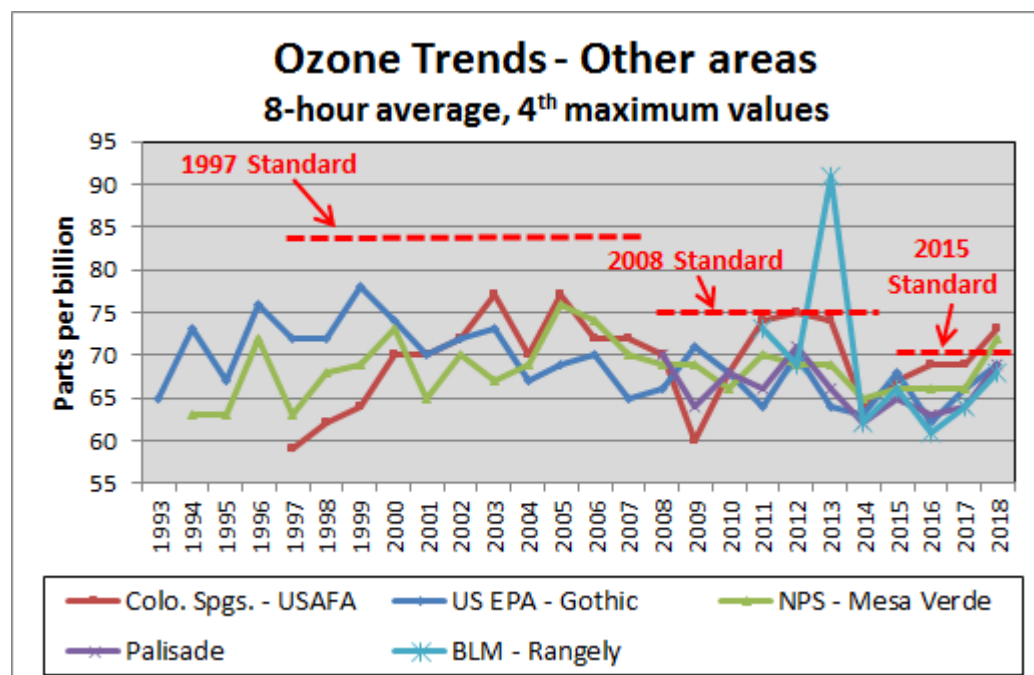
Ozone is formed through complex photochemistry involving volatile organic compounds (VOCs) and nitrogen oxides (NOx) in the presence of sunlight. Ozone is not emitted directly. Instead, emissions of VOCs and NOx from motor vehicles, industry, power plants, oil and gas production, and even vegetation contribute to ozone formation. Ozone is also transported into Colorado from other states and countries, and is exported from Colorado to states downwind.

Ozone is colorless and odorless at ambient concentrations. In the upper stratosphere, naturally occurring ozone helps protect the earth from ultraviolet radiation. Colorado's highest ground-level ozone concentrations usually occur in the summer when hot, low-wind days cause reactive pollutants to build-up and form ozone. However, high ozone events have been observed in some rural areas in winter where oil and gas production activities are concentrated in basins that can trap air pollution.

In addition to enforcing regulations that address ozone precursors, the Division and the Regional Air Quality Council (RAQC) regularly issue advisories, encouraging citizens to minimize activities that cause emissions and encouraging citizens to limit exposure to poor air quality. In 2017 the Division launched a Voluntary Emission Reduction Program with industry in the Denver Metropolitan North Front Range area. Program participants receive emails two to three days before a forecasted high ozone day. The program messaging emphasizes voluntary emissions reduction actions on the targeted high ozone days. Ozone trends are shown in the graph below for the four North Front Range area monitors that have historically recorded the highest concentrations in Colorado.



Ozone trends are also shown in the graph below for other areas of Colorado.



Health and Environmental Effects

Ozone can cause breathing difficulties and respiratory infections in the elderly, the young and those with pre-existing ailments such as asthma, and can cause premature mortality. Even healthy people who exercise or work outdoors can experience respiratory effects from ozone. Ground-level ozone can also have detrimental effects on plants and ecosystems.

Impacts in Colorado

Much of Colorado has attained and continues to attain federal ozone standards. While ozone levels have decreased over time, the standards have been lowered as well. However, the Denver Metropolitan and North Front Range areas violate these standards, despite continuing efforts to reduce emissions. The region violated the older, less stringent ozone standards from the 1970's through the 2000's. EPA tightened the ozone standard to an 8-hour average value of 75 parts per billion in 2008, then designated the region as a "marginal nonattainment area" for this standard in 2012. Unfortunately, the region still violates the 2008 standard and was bumped up to classification as a "moderate nonattainment area" by EPA in 2016. In response to the 2016 reclassification, the Commission approved revisions to the ozone State Implementation Plan in November 2016, November 2017, and July 2018. In October 2015, the EPA adopted a yet more stringent ozone standard of 70 parts per billion. In June 2018, the EPA finalized designations for the 70 ppb standard for all areas of Colorado, including classifying the Denver Metropolitan and North Front Range area as a "marginal nonattainment area". Both the 2008 and 2015 ozone standards are in effect, and Colorado continues to plan accordingly.

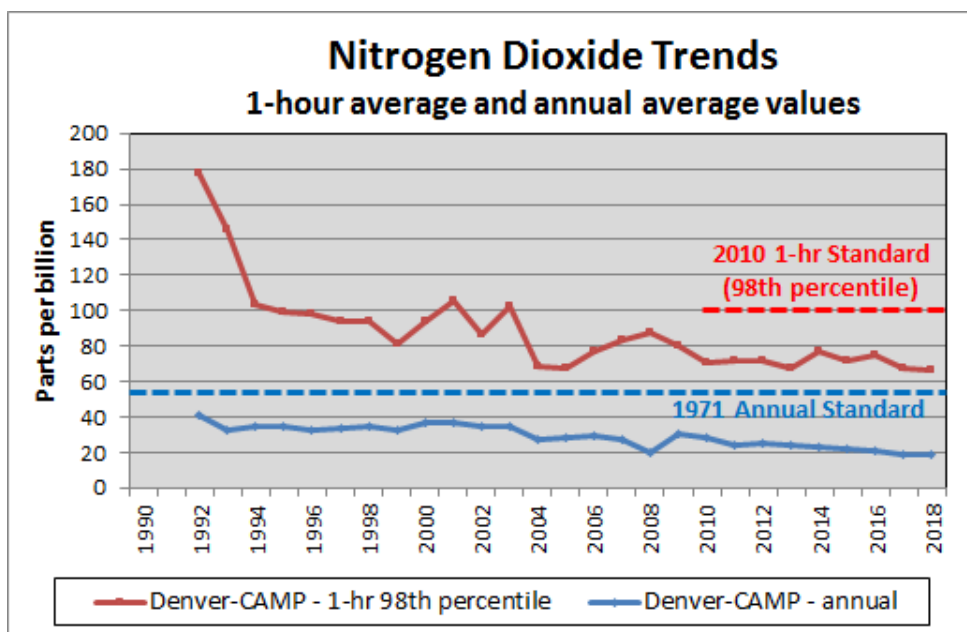
On June 4, 2018, Colorado submitted to EPA an exceptional events demonstration and request to extend the 2008 ozone attainment deadline for the Denver Metropolitan and North Front Range nonattainment area. On March 26, 2019, Governor Polis notified EPA to withdraw that request. As a result, the EPA is expected to reclassify the ozone nonattainment area from "moderate" to "serious" under the 2008 standard. This reclassification is anticipated to occur by December 2019, although the date may change.

In recent years, the Commission has taken a number of regulatory efforts to reduce ozone levels. In 2011, the Commission approved a plan for reducing regional haze that includes substantial nitrogen oxide (NOx) emission reductions that will improve ozone throughout the state. More than 35,000 tons per year of NOx reductions continue to occur throughout Colorado through these actions. In 2014, the Commission adopted new requirements to reduce hydrocarbon emissions from the oil and gas production sector that lead to ozone formation, securing 93,000 tons per year of VOC reductions. New federal motor vehicle emissions standards and Colorado's motor vehicle inspection and maintenance programs also help reduce precursors of ozone.

In July 2019, the Commission adopted VOC content limits to reduce state-wide emissions from consumer products and architectural and industrial maintenance coatings. Adoption of this rule may result in an estimated 10 tons per day reduction of VOC emissions in the Denver Metro/North Front Range ozone nonattainment area. Although a State Implementation Plan is not yet due for the 2015 70 ppb standard, the Division continues in partnership with the RAQC to explore both voluntary and regulatory measures to reduce precursor NOx and VOC emissions in the Denver Metropolitan and North Front Range areas. The Division is also exploring options to secure emission reductions state-wide that would benefit other areas in the state, including the Pikes Peak and Four Corners areas.

Major air pollutants - nitrogen dioxide

Nitrogen oxides (NOx) comprise a group of highly reactive gases that contain nitrogen and oxygen in varying amounts. NOx play a major role in the formation of ozone, particulate matter, haze and acid rain. NOx is an "ozone precursor." The majority of NOx is nitrogen dioxide (NO₂) and nitric oxide (NO). NO₂ is a reddish brown, highly reactive gas that is formed in the ambient air through the oxidation of NO. The major sources of man-made NOx emissions are high-temperature combustion processes such as those in automobiles, industrial engines and power plants. The Division monitors NO₂, for which there are primary and secondary air standards, as well as NO (nitric oxide) and NOy (reactive oxides of nitrogen) in select locations. Trends are shown in the graph below for the Denver metro area NO₂ monitor that has historically recorded the highest concentrations.



Health and Environmental Effects

NO_x reacts in the air to form ground-level ozone and fine particle pollution, which are associated with adverse health effects. NO₂ can directly increase respiratory problems, cause symptomatic effects in asthmatic individuals and increase susceptibility to respiratory infections. NO_x contributes to a wide range of environmental effects directly and, when combined with other precursors, to acid rain and ozone. Increased nitrogen in terrestrial and wetland systems can lead to changes in plant species composition and diversity. Alpine ecosystems such as those in Rocky Mountain National Park are especially sensitive to these over-fertilization effects. Nitrogen in lakes and streams can lead to eutrophication (a condition of excessive algae growth), and can lead to a severe depletion of dissolved oxygen and increased levels of toxins harmful to aquatic life. NO_x can also contribute to visibility impairment.

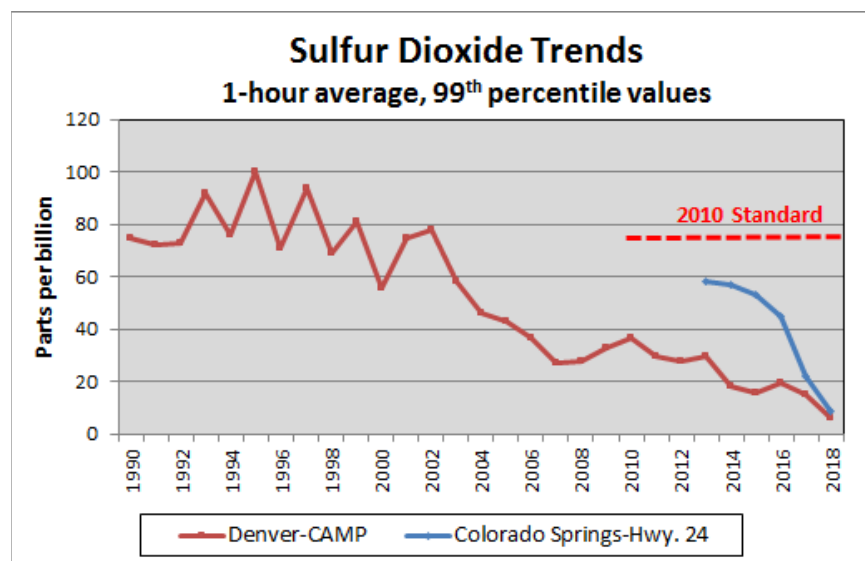
Impacts in Colorado

The Division monitors NO₂ at five sites in Colorado: downtown Denver's CAMP station; Welby, just north of Denver; just south of downtown Denver near 8th Avenue and Interstate 25; just north of downtown Denver near the Interstate 25/Interstate 70 intersection; and in northwest Denver near Pecos Street and Interstate 70. All sites show NO₂ values that are below the national ambient air quality standards. The Bureau of Land Management, Garfield County and the Southern Ute Indian Tribe also monitor NO₂ in Colorado and report their data to the EPA's Air Quality System database. These monitors also show levels below NO₂ standards.

Major air pollutants - sulfur dioxide

Sulfur dioxide (SO₂) is one of a group of highly reactive gases known as "oxides of sulfur," or sulfur oxides (SO_x). The largest sources of SO₂ emissions are from coal combustion at power plants and other industrial facilities. Smaller sources of SO₂ emissions include industrial processes, on- and off-road diesel vehicles, and the burning of high sulfur fuels by locomotives and non-road equipment. Furthermore, SO₂ is oxidized to form sulfate, in the form of sulfuric acid or ammonium sulfate. These compounds are major contributors to acid rain, as well as fine sulfate particles in the PM_{2.5} fraction, which degrade visibility and represent a human health hazard.

Trends are shown in the graph below for the Denver metro area monitor that has historically recorded the highest concentrations and for Colorado Springs, the other area in Colorado required to have a monitor. This area is near a coal-fired power plant.



Health and Environmental Effects

High concentrations of sulfur dioxide can result in temporary breathing impairment for asthmatic children and adults who are active outdoors. Short-term exposures of asthmatic individuals to elevated sulfur dioxide levels during moderate activity may result in breathing difficulties that can be accompanied by symptoms such as wheezing, chest tightness, or shortness of breath. Other effects that have been associated with longer-term exposures to high concentrations of sulfur dioxide, in conjunction with high levels of particulate matter, include aggravation of existing cardiovascular disease, respiratory illness, and changes in the lungs' defenses. The subgroups of the population that may be affected under these conditions include individuals with heart or lung disease, as well as the elderly and children.

Impacts in Colorado

Colorado does not have a history of violating health standards for sulfur dioxide. The historical concern in Colorado with sulfur dioxide has been associated with acid deposition and its effects on mountain lakes and streams, as well as the formation of fine aerosols. In 2010, EPA issued a new sulfur dioxide national ambient air quality standard of 75 parts per billion with a 1-hour averaging period, which was tightened from the previous 24-hour standard.

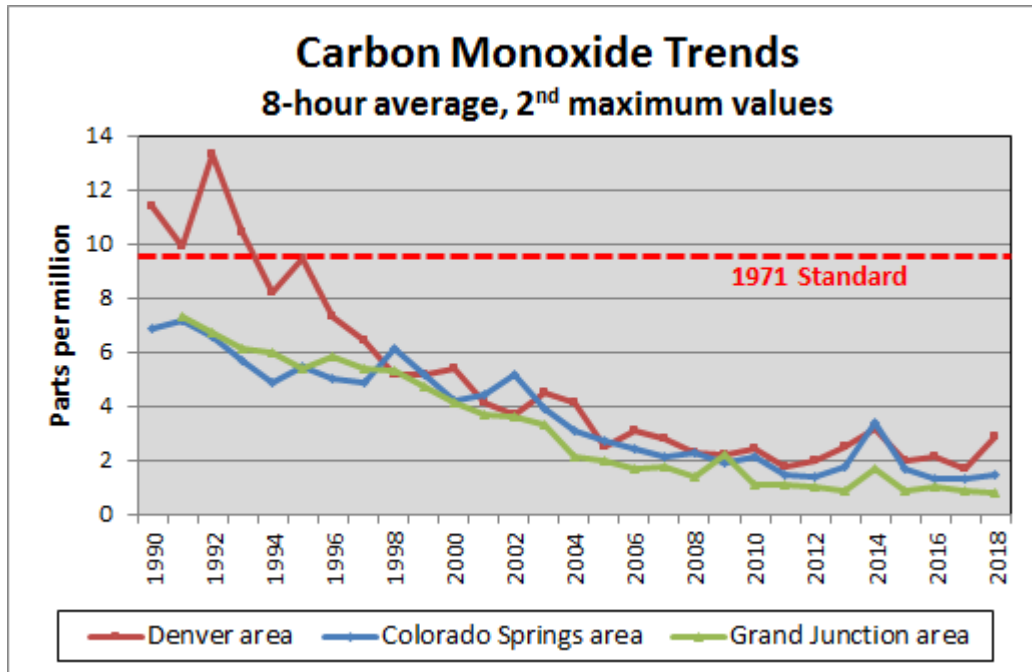
Historically, the site with the highest annual average of 1-hour average concentrations recorded by the Division monitors has been the Denver CAMP monitor, though the Welby site has been slightly higher in recent years. Since 1990, the 1-hour design value at the Denver CAMP monitor has declined from a high in 1992-1994 of 125 ppb to 9 ppb in 2016-2018. Due to concerns about SO₂ emissions from the Martin Drake power plant, the Highway 24 (Colorado Springs) site was outfitted with an SO₂ monitor in January of 2013. This site is below the standard with the 2016-2018 design value at 25 ppb.

In order to better understand air quality impacts around the Martin Drake plant, Colorado Springs Utilities (CSU) collected on-site meteorological data that was completed at the end of January 2017. These data, which incorporate a better understanding of local weather phenomena, are included in a modeling protocol approved by the Division and EPA. Modeling was conducted under this protocol by CSU and AECOM and submitted to the Division. After internal review, the Division concluded that this modeling demonstrated attainment of the 1-hour SO₂ standard. SO₂ monitoring in Colorado Springs in 2018 and the first half of 2019 continues to show ambient concentrations that are well below the NAAQS.

Major air pollutants - carbon monoxide

Carbon monoxide (CO) is a colorless and odorless gas formed when carbon compounds in fuel undergo incomplete combustion. The majority of CO emissions to ambient air originate from mobile sources (i.e., transportation), particularly in urban areas, where as much as 85% of all CO emissions may come from automobile exhaust. CO can cause harmful health effects by reducing oxygen delivery to the body's organs and tissues. High concentrations of CO generally occur in areas with heavy traffic congestion. In Colorado, peak CO concentrations typically occur during the colder months of the year when automotive CO emissions are highest and nighttime temperature inversions are more frequent. Trends are shown in the graph below for the maximum concentration by year for three large metropolitan areas across Colorado.

There are four CO maintenance areas in Colorado: Colorado Springs, the Denver metropolitan area, Fort Collins, and Longmont. The Greeley CO maintenance area reached its 20 year maintenance period on May 10, 2019 and the Colorado Springs CO maintenance area will reach its 20 year maintenance period on October 25, 2019.



Health and Environmental Effects

CO affects the central nervous system by depriving the body of oxygen. The health effects of CO vary with concentration. These effects range from fatigue in healthy people and chest pain in people with heart disease at lower concentrations to impaired vision and coordination, headaches, dizziness, confusion, and nausea at much higher levels.

Impacts in Colorado

Outdoor CO concentrations have dropped dramatically since the early 1970s due to national vehicle emission controls. This change is evident in both the concentrations measured and the number of monitors that have exceeded the level of the 8-hour standard. In 1975, 9 of 11 (81%) state-operated monitors exceeded the 8-hour standard of 9 ppm. In 1980, 13 of 17 (77%) state-operated monitors exceeded the 8-hour standard. Since 1996, no state-operated monitors have recorded a violation of the 8-hour standard. The 8-hour annual maximum concentrations have declined from more than three times the standard in the late 1960s to about one quarter of the standard today.

Indoor CO poisoning still occurs, especially when home heating furnaces malfunction. These incidents can lead to deaths. It is important for people to install and maintain indoor CO detection monitors to prevent these tragic events. For more information, visit EPA’s website on [carbon monoxide’s impact on indoor air quality](#).

Major air pollutants - lead

The primary historical sources of lead air emissions have been from motor vehicles burning leaded gasoline, and certain industrial sources. Since the phase-out of leaded gasoline beginning in the 1970s, today's primary sources of lead air emissions are industrial metal processing, lead smelting and aviation gasoline. In 2008 the EPA revised the national standard for lead from 1.5 micrograms per cubic meter to 0.15 micrograms per cubic meter.

Health and Environmental Effects

Depending on the level of exposure, lead can adversely affect the nervous system, kidney function, immune system, reproductive and developmental systems, and the cardiovascular system. Lead exposure also affects the oxygen carrying capacity of the blood. Lead exposure leads to neurological effects in children and cardiovascular effects such as high blood pressure in adults. Infants and young children are especially sensitive, even to low levels of lead, which may contribute to behavioral problems and learning deficits.

Ecosystems near point sources of lead have demonstrated a wide range of adverse effects including losses in biodiversity, changes in community composition, decreased growth and reproductive rates in plants and animals, and neurological effects in vertebrates.

Impacts in Colorado

Since the phase-out of leaded gasoline, airborne lead levels monitored in Denver have decreased by more than 95 percent and are at or near the minimum levels of detection for laboratory equipment. A lead monitor was added at Centennial Airport in Arapahoe County in 2010 to meet new federal lead monitoring requirements at airports. Aviation fuel for piston-driven planes still contains lead. The monitor was removed in 2014 after showing low levels of detection. All stand-alone monitoring by the Division for lead was discontinued at the end of 2016 due to the very low levels being recorded. Lead is now only measured as PM₁₀ in Grand Junction as part of the measurements for the National Air Toxics Trends site and also a three non-regulatory PM_{2.5} speciation sites in the Front Range. [Lead paint](#) in older homes remains an issue. The Commission regulates certification and training programs for individuals and firms conducting lead paint abatement, and has work practice standards for these activities.

Major air pollutants - hazardous air pollutants

Hazardous air pollutants, also known as air toxics, are those pollutants that are known or suspected to cause cancer or other serious health effects. Examples include benzene, which is found in gasoline and released from oil and gas production activities; ethylene oxide, which is emitted from medical equipment sterilization facilities; perchloroethylene, which is emitted from some dry cleaning facilities; and methylene chloride, which is used as a solvent and paint stripper by a number of industries. Examples of other listed air toxics include dioxin, asbestos, toluene, and metals such as cadmium, mercury, chromium, and lead compounds. The Clean Air Act lists 187 air toxics and directs EPA to develop emissions standards for specific industries. These standards are called the National Emission Standards for Hazardous Air Pollutants (NESHAPS). NESHAPS are commonly addressed through maximum achievable control technology (MACT) requirements. MACT requirements are technology-based controls or practices for specific industries and are designed to reduce hazardous air pollutant emissions to the maximum achievable degree, taking into consideration the cost of reductions and other factors. After the EPA adopts a MACT standard at the federal level, the same standard is proposed for adoption at the state level by the Commission.

Air toxics also are reduced through other efforts such as automobile inspection and maintenance, ozone reduction measures to reduce volatile organic chemicals, the Colorado Clean Diesel Program, and pollution prevention in industries and communities statewide. In 2007, the Commission adopted a rule called “Colorado’s Utility Hg Reduction Program”, with the purpose of reducing mercury emissions from coal-fired power plants. This rule was developed in response to EPA’s Clean Air Mercury Rule, but sought greater mercury emission reductions, more quickly. This federal rule was later replaced by EPA’s Mercury Air Toxics Standards in 2012. However federal regulation of mercury from coal-fired power plants has continued to change over time, most recently in December 2018, when EPA revised the rule’s underlying cost benefit analysis¹. All of this highlights the value of Colorado having its own mercury standards that would remain in place regardless of any relaxation of the federal rule.

Health and Environmental Effects

People that experience prolonged exposure to toxic air pollutants at significant concentrations may have an increased chance of experiencing serious health effects. These health effects can include cancer, damage to the immune system, as well as neurological, reproductive, developmental, respiratory and other health problems. Some toxic air pollutants such as mercury can deposit onto soils or surface waters, where they are taken up by plants and ingested by animals, and eventually accumulated up through the food chain. Like humans, animals may experience health problems if exposed to sufficient quantities of air toxics over time.

Impacts in Colorado

In general, studies have shown that air toxics levels are similar in urbanized areas across the nation. People are exposed to air toxics primarily through transportation, as motorists or passengers, or as residents who live near major highways or industries. Several air monitoring studies of air toxics in Colorado have been conducted, including in Denver, Grand Junction, Pueblo, Platteville and Garfield County. These studies have found that air toxics levels are generally below EPA levels of concern, though locally higher levels may be found near sources, both in urban areas and rural areas.

An example of a source causing locally higher levels in rural areas is oil and gas development, which can have higher emissions during portions of the drilling and completions process, such as flowback. Currently, regulations adopted by the Commission do require more stringent controls on glycol dehydrators for oil and gas operations that are located near homes, but other aspects of air rules governing oil and gas operations are not tiered by proximity. Additional risk assessment studies are being performed in these areas to assess potential health impacts. Some of these assessments can be found on the [oil and gas investigations website](#). On April 16, 2019 Governor Jared Polis signed into law SB19-181, which directs the Commission to consider its rules to further minimize emissions from oil and natural gas emissions. See the section of this report on “Emissions reductions from the oil and gas sources” for additional information.

Additional information:

- [EPA National monitoring programs annual reports](#).
- [CDPHE air toxics and ozone precursor reports](#).
- [Garfield County reports](#).

¹ https://www.epa.gov/sites/production/files/2018-12/documents/fact_sheet_mats_proposal_12_2018final.pdf

Major air pollutants - greenhouse gases

Both natural and human emissions of GHGs absorb the sun's heat and trap that heat in the atmosphere. As atmospheric concentrations of these gases increase due to combustion of fossil fuels and other human activities, the Earth's climate is impacted. Actions taken by the Commission have helped to reduce GHG emissions. For example, the Regional Haze State SIP and 2016 revisions to that SIP incorporate significant reductions in GHG emissions from electrical generating units due to coal power plants retiring and/or repowering with natural gas. The Commission's February 2014 oil and gas requirements have significantly reduced methane emissions from the sector compared to what they would otherwise have been, and were the first set of state-required reduction strategies in the nation aimed at methane.

The Division developed a GHG Inventory for the State of Colorado in 2014. The inventory shows emissions estimates from all sectors in Colorado based on EPA's State Inventory Tool (SIT) Model. For the year 2020, Colorado's inventory projects carbon dioxide to make up approximately 74 percent of GHG emissions, methane to make up approximately 21 percent, with nitrous oxide and fluorinated gases contributing the balance (based on the global warming potential of each gas). The draft 2019 Colorado GHG Inventory is available on the Division's [Colorado greenhouse gas report website](#). The three largest sources of GHG emissions from human activities in Colorado are electric generation, transportation, and buildings (shown in the inventory as residential, commercial and industrial fuel use). Other categories of GHG emissions in Colorado include oil and gas exploration and development, agriculture, forestry, coal mining, other land use, and waste management including landfills. Again, four pieces of legislation will change the way Colorado addresses GHGs. SB19-096 is specific to GHG inventory development. HB19-1261 sets economy-wide emissions reduction goals. SB19-236, sets emission reduction goals and targets for electric generating units. SB19-181 is specific to the oil and natural gas sector. Each of these bills include specific roles for the Commission and Division. They also provide directives to other Colorado agencies and Commissions, requiring extensive coordination. Colorado is still in the process of developing an overall roadmap for planning to move forward on implementing these new laws.

Environmental Effects

Accumulation of GHGs in the atmosphere leads to rising temperatures, shifting snow and rainfall patterns, and is expected to increase the intensity of climate events such as floods, heat waves, and tropical storms. Glaciers, snowpack and sea ice are shrinking, oceans are rising, and droughts are longer and more intense in some areas.

Impacts in Colorado

A number of observed and projected climatic changes have been cited in Colorado and the Southwest. These changes include:

- Increasing temperatures and more frequent and severe droughts will likely worsen existing competition for water resources.
- Drought, wildfire, changes in species' geographic ranges, invasive species and pests will likely threaten native Southwest forests and ecosystems.
- Climate change may make it difficult for the Southwest's growing cities to attain air quality standards and meet energy and water demands.
- Climate change poses threats to the region's native peoples, infrastructure, agriculture, and recreational activities.

Federal permitting requirements for major sources of GHGs were established in 2011. Colorado has a similar GHG permitting program. Major sources may need to limit their emissions of GHG or implement emissions control equipment known as Best Available Control Technology.

Other regulations that prevent GHG emissions include the federal motor vehicle emissions and fuel mileage standards, regional haze requirements adopted in 2011 (i.e., some measures that would reduce emissions that contribute to visibility impairment will also reduce GHG emissions), and the oil and gas regulations adopted in February 2014 by the Commission. The state is acting at a time when the federal government is reversing course on GHG emissions. Under the previous administration, rules were adopted to require emissions reductions from power plants (the Clean Power Plan), from vehicles, and by reducing emissions from oil and gas drilling. Under the current administration, federal agencies have repealed the methane rules, and are currently in rulemaking processes to weaken the power plant and vehicle GHG emissions rules.

On July 11, 2017, Governor John Hickenlooper signed Executive Order D 2017-015, supporting a transition to Clean Energy in Colorado. CDPHE and other entities responded by supporting the early retirement of coal fired power plants, updating the Colorado Climate Plan, publishing an electric vehicle plan, and other actions. On June 18, 2018, Governor Hickenlooper signed Executive Order B 2018-006, Maintaining Progress on Clean Vehicles. As directed by the Executive Order, in November 2018 the Division proposed and the Commission promulgated the Colorado Low Emission Automobile Regulation (CLEAR), which adopts California Light Duty Vehicle emission standards for model year 2022 and beyond. This action maintains future progress in reducing emissions from light duty vehicles in the face of proposed regulatory rollbacks at the federal level. The Division estimates that compared to the proposed federal rollback, CLEAR will result in the reduction of approximately 30 million tons of GHG emissions over the lifetime of vehicles built for model years 2022 through 2031.

On January 17, 2019, Governor Jared Polis signed Executive Order B 2019 002: Supporting a Transition to Zero Emission Vehicles, which directed CDPHE to develop a rule to establish a ZEV program. The Commission has set an August 2019 hearing to consider adopting the California Zero Emission Vehicle (ZEV) rule for the 2023 model year and beyond. The projected emissions reductions associated with the ZEV rule include roughly 3.5 million tons of GHGs for vehicles built for model years 2023 through 2030. On April 16, 2019, Governor Polis signed into law SB19-181. This bill broadly addresses public welfare from the oil and gas sector. It gives express directives to the Commission to address methane and other hydrocarbons, as well as VOC and NOx from this sector, which can include reconsidering the Commission's current oil and gas rules as well as establishing new requirements. The Commission anticipates the first of many rulemakings addressing SB19-181 to be held later in 2019.

On May 30, 2019, Governor Polis signed into law HB19-1261, SB19-096, and HB19-1261. HB19-1261 established new GHG reduction goals of 26% by 2025, 50% by 2030 and 90% by 2050 (based on 2005 levels). The bill directs the Commission to develop cost-effective regulations to meet the targets. These regulations must track progress against these goals on an ongoing basis, with a report due to the General Assembly every odd-numbered year. SB19-096 directs the Commission to adopt a rule in June 2020, requiring GHG emissions monitoring and reporting, and separately to propose a rule by July 2020 to begin adopting emission reduction strategies in place to timely achieve the GHG reduction goals, taking into consideration other relevant laws and rules, as well as voluntary actions. SB19-236, among other things, establishes a new goal for qualifying retail electric power utilities to reduce GHG emissions by 80% by 2030, compared to a 2005 baseline. The respective goal for 2050 is 100% clean energy. For additional information on the impacts of climate change in Colorado, see the Colorado Water Conservation Board's [Climate Change in Colorado report](#) and the Colorado Department of Local Affairs funded studies of the [impact of climate change](#) on extreme heat events in the Front Range.

Major air pollutants - regional haze

Regional haze is a term for the veil of white or brown haze that obstructs vistas in many parts of the country, including areas of Colorado. The haze is caused by fine particles including sulfates, carbon, soil particles, ammonium and nitrates. These particles are produced by emissions from power plants, industrial sources, motor vehicles, fires, agricultural activities, and windblown dust and dirt. The particles are carried by the wind, sometimes for hundreds or even thousands of miles in the case of transcontinental transport of pollutants. The Division is developing Colorado's Regional Haze State Implementation Plan for the second 10-year planning period due to EPA by July 31, 2021. The Regional Haze rule requires Colorado submit a Long-Term Strategy that addresses regional haze visibility impairment at Colorado's 12 Class I areas and other Class I areas outside the State that may be affected by Colorado emissions. The Division is engaged with stakeholders to evaluate and determine emission reduction measures necessary to ensure Reasonable Progress as required by the Regional Haze Rule. September 2019, the Division provided a briefing to the Commission on Regional Haze including background of the process, technical changes since the first implementation period, and status of current and future work regarding the second implementation period.

Health and Environmental Effects

In our nation's scenic areas, the visual range is sometimes reduced substantially by air pollution. Colorado's most recent 5-year progress report, visual range in the Class I areas (national parks and wilderness areas) is improving. Some of the pollutants which form haze have also been linked to serious health problems and environmental damage. Exposure to very small particles in the air has been linked with respiratory illness, decreased lung function, and even premature death. Particles such as nitrates and sulfates contribute to acid rain formation. The deposition of reactive nitrogen compounds in the form of nitrate, ammonia, or ammonium can lead to over fertilization of alpine ecosystems such as those in Rocky Mountain National Park.

Impacts in Colorado

The federal Regional Haze Rule focuses on National Parks and Wilderness (Class I) Areas. Under the Clean Air Act, "Class I" area designations were given to 158 areas in existence August 1977 that included national parks greater than 6,000 acres and all national wilderness areas and memorial parks greater than 5,000 acres. Haze reduction in these areas will have the complementary effect of improving visibility and air quality throughout Colorado, including reducing nitrogen deposition at Rocky Mountain National Park. Nitrogen deposition has impacted the park including changes in the type and abundance of aquatic plant species, elevated levels of nitrate in surface waters, elevated levels of nitrogen in spruce tree chemistry, long-term accumulation of nitrogen in forest soils and a shift in alpine tundra plant communities favoring sedges and grasses over the natural wildflower flora. The Commission adopted the first 10-year Regional Haze SIP January 2011 with approved revisions November 2014 and December 2016. EPA approved the original plan October 2012 and approved revisions July 2018. The process included a detailed analysis of regional haze and its sources and established emissions controls for major industrial sources of haze. November 2015, the Commission adopted the first five-year regional haze progress report that provided data and analysis on improving visibility conditions at Colorado's twelve Class I areas. December 2016 the Commission approved revisions that require: 1) Craig Station Unit 1 to either retire by the end of 2025 or switch to natural gas, which they must cease burning coal by August 2021 and begin firing natural gas by August 2023 and 2) Nucla Station to retire by the end of 2022. EPA recently proposed to approve Colorado's first five-year progress report. The Division is partnering with other member states of the Western Regional Air Partnership (WRAP) and Federal Land Managers in the second 10-year Regional Haze SIP due to EPA July 2021.

Pollutant standards and health effects summary

Federal and state air quality standards, health effects, areas affected in Colorado, and control strategies can be found in the table below.

Pollutant	Health Effects	Areas Affected	State & Federal Standards	Strategies to Reduce Pollutants
<p>Particulate Matter: Tiny particles of solid or semi-solid material found in the atmosphere, often referred to as dust.</p> <p>It is classified according to size:</p> <ul style="list-style-type: none"> • TSP = total suspended particles • PM₁₀ = particles smaller than 10 microns in diameter PM_{2.5} = particles smaller than 2.5 microns in diameter 	<p>Particulate matter can reduce lung function, aggravate respiratory conditions and may increase the long-term risk of cancer or development of respiratory problems.</p>	<p>PM₁₀ exceedances can occur when high winds cause blowing dust. PM_{2.5} exceedances can occur due to wintertime air inversions.</p> <p>All of Colorado is in attainment for the PM_{2.5} standard and in attainment or maintenance for the PM₁₀ standard. The following areas are in maintenance for PM₁₀: Aspen, Canon City, Denver Metro Area, Lamar, Pagosa Springs, Steamboat Springs, and Telluride.</p>	<p>PM_{2.5} Standards</p> <ul style="list-style-type: none"> • Annual average standard must not exceed 12 micrograms per cubic meter averaged over three years • 24-hour standard is 35 micrograms per cubic meter for the 3-year average of the 98th percentile value <p>PM₁₀ Standards 24-hour standard of 150 micrograms per cubic meter cannot be exceeded more than once per year on average over three years.</p>	<p>Diesel Emissions Control Program, street sanding and street sweeping improvements, transportation planning, Basic and Enhanced Automobile Inspection and Maintenance Programs, new vehicle emission control equipment, travel reduction programs, residential burning controls, stationary source controls and pollution prevention programs, High Pollution Advisory Program, and power plant retirement.</p>
<p>Ozone: A highly reactive form of oxygen; it is not emitted directly from a source, rather it is formed from the reaction of pollutants with sunlight. Ground-level ozone (photochemical smog) should not be confused with stratospheric ozone - the protective ozone layer located in the upper atmosphere.</p>	<p>High concentrations of ozone can impair lung function; it may induce respiratory symptoms in individuals with asthma, emphysema or reduced lung function; it potentially can reduce immune system capacity; and it can act as an irritant to mucous membranes of eyes and throat.</p>	<p>All of Colorado is in attainment with both the 2008 and 2015 standards, except for the Denver/North Front Range 9-county area which is designated as a "moderate" non-attainment area under the 2008 standard and a "marginal" area under the 2015 standard.</p>	<p>An area will attain the standard when the 4th highest daily maximum 8-hour concentration, averaged over three years, is equal to or below 0.070 parts per million.</p>	<p>Automobile inspection and maintenance, new vehicle emission control equipment, gasoline transfer controls, low volatility gasoline, substitution of non-reactive hydrocarbons, solvent control and pollution prevention programs, stationary source controls including oil and gas equipment, VOC content of consumer products and architectural coatings, summertime ozone advisory program, power plant retirements.</p>
<p>Nitrogen Dioxide: A gas contributing to ozone production. It is a by-product of oxides of nitrogen emitted from combustion sources and motor vehicles.</p>	<p>Nitrogen dioxide can increase respiratory problems, cause mild symptomatic effects in asthmatic individuals and increase susceptibility to respiratory infections.</p>	<p>All of Colorado has met the standard.</p>	<ul style="list-style-type: none"> • Annual average standard: 0.053 parts per million • 1-hour standard: 100 parts per billion based on the 3-year average of the 98th percentile daily maximum values. 	<p>Colorado Air Quality Control Commission regulations control emissions of oxides of nitrogen from stationary sources, including engines, cement plants and power plants. Other strategies include motor vehicle emissions control equipment, and power plant retirements.</p>

Pollutant	Health Effects	Areas Affected	State & Federal Standards	Strategies to Reduce Pollutants
<p>Sulfur Dioxide: A colorless gas with a pungent odor at high concentrations; it is highly soluble with water and is a major contributor to "acid rain." It is emitted primarily from combustion sources.</p>	<p>Sulfur dioxide can aggravate an individual's respiratory tract, impair pulmonary functions and increase the risk of asthma attacks.</p>	<p>All of Colorado has met the standard, except for the areas surrounding the Pawnee Power Plant and the Martin Drake Power Plant, which have been designated as 'unclassifiable.'</p>	<ul style="list-style-type: none"> • 1-hour standard: 75 parts per billion based on the 3-year average of the 99th percentile daily maximum values • State standard: 3-hour average not to exceed 700 micrograms per cubic meter more than once in twelve months. 	<p>Colorado Air Quality Control Commission regulations control sulfur dioxide emissions from industry, new motor vehicle emission control equipment, power plant retirement.</p>
<p>Carbon Monoxide: A colorless, odorless and tasteless gas. It results from incomplete combustion; its major sources in urban areas are motor vehicle emissions and woodburning.</p>	<p>Carbon monoxide inhibits the body's ability to transport oxygen. Carbon monoxide can reduce a healthy person's ability to perform manual tasks, and it can affect pregnant women, fetuses, anemic individuals and persons with cardiovascular diseases.</p>	<p>No violations statewide since 1995. The following areas are in maintenance for carbon monoxide: Colorado Springs, Denver Metropolitan Area, Fort Collins, Greeley, and Longmont.</p>	<p>Two federal standards exist.</p> <ul style="list-style-type: none"> • 1-hour standard: 35 parts per million • 8-hour standard : 9 parts per million 	<p>Enhanced Automobile Inspection and Maintenance, ethanol fuels, transportation planning, travel reduction, residential burning controls, stationary source controls and pollution prevention, High Pollution Advisory Program, new vehicle emission control equipment.</p>
<p>Lead: Primarily an inhalable particulate; its primary source is small aircraft engines and metal processing. Ingestion is a primary route of exposure to lead-based paint.</p>	<p>Lead can impair an individual's production of hemoglobin; cause intestinal cramps, peripheral nerve paralysis, anemia and severe fatigue. Ingestion of lead is especially dangerous to children as it may impact the normal development of a child's brain. Elevated blood lead levels may result in intelligence quotient (IQ) loss, learning and behavior problems, developmental delays and lifelong mental and physical health issues.</p>	<p>All of Colorado has met the standard. Lead-based paint regulations apply to homes built prior to 1978. Pre-renovation education requirements apply to residential and child-occupied facilities</p>	<p>The federal lead standard is averaged across rolling three-month time periods. During any three months, the lead concentration is not to exceed 0.15 micrograms per cubic meter. Lead-based paint is defined as any paint containing more than one milligram per square centimeter of lead.</p>	<p>Lead gasoline phase out and stationary source controls. Colorado Air Quality Control Commission Regulation No. 19 Part A establishes requirements for lead-based paint abatement activities, including certification, inspection, and abatement requirements statewide. Regulation No. 19 Part B establishes pre-renovation requirements statewide.</p>
<p>Hazardous Air Pollutants: Pollutants known or suspected of causing cancer or other serious health effects.</p>	<p>Hazardous air pollutants can increase risk of cancer, sterility and nervous system disorders.</p>	<p>Statewide.</p>	<p>The National Emission Standards for Hazardous Air Pollutants regulate approximately 190 pollutants. These standards are delegated to the states to enforce.</p>	<p>Residential burning controls and state/local pollution prevention programs reduce the prevalence of hazardous air pollutants, state mercury reduction requirements, new vehicle emission control equipment, re-formulated low-benzene gasoline.</p>

Pollutant	Health Effects	Areas Affected	State & Federal Standards	Strategies to Reduce Pollutants
Asbestos: A mineral fiber found in many building materials and automobile brake linings.	Asbestos can cause respiratory problems and increase the risk of lung cancer. It can cause asbestosis - a scarring of the lung tissue which restricts breathing; it is also a known carcinogen and can increase the risk of lung cancer as well as cause intestinal cancers and mesothelioma - a cancer of the lining of the plural cavity.	Buildings where asbestos containing materials have been installed are the primary concern, particularly during renovation or demolition activities.	Materials containing greater than 1% asbestos are regulated. The state standard for asbestos is set at 0.01 fibers per cubic centimeter or 70 structures per square millimeter depending on the measurement method.	Colorado Air Quality Control Commission Regulation No. 8, Part B controls asbestos activities including certification, inspection and abatement requirements statewide.
Ozone-Depleting Compounds: Manufactured gases that destroy ozone once they reach the ozone layer. They have been used in refrigerants, foam blowing agents, industrial solvents, and aerosol spray propellants.	Exposure to ozone-depleting compounds in an unventilated area can cause respiratory problems. Destruction of the ozone layer may also increase rates of skin cancer and cataracts.	Motor vehicle and stationary source air conditioning systems and food refrigeration systems.	Clean Air Act Sections 608 and 609 establish requirements for leak repair and the handling and recovery of ozone-depleting compounds	Colorado Air Quality Control Commission Regulation No. 15 establishes registration, notification, reporting, and emissions control requirements statewide.

Major air pollutants - more information

[Air quality.](#)

Statewide monitoring data, current air quality, and forecasted air quality.

[Ozone.](#)

Current status of ozone levels, health effects, nonattainment status and ozone reduction efforts.

[Greenhouse gas/climate change.](#)

Information on Colorado's GHG regulations, EPA rules, and Colorado's GHG inventory.

[Regional Haze.](#)

Colorado's federally-approved Regional Haze Plan, which represents the status of regional haze, sources, and strategies that will reduce regional haze.

[Nitrogen deposition at Rocky Mountain National Park.](#)

Current status of nitrogen deposition and its impacts at the park including the planning documents that specify the reduction strategies in place.

Major initiatives

Ozone Reduction

The Denver Metropolitan and North Front Range nonattainment area is in the midst of a multi-year effort to reduce ground-level ozone concentrations to comply with federal ozone standards. The area was designated by the EPA as a "marginal" nonattainment area for the 75 parts per billion (ppb) ozone National Ambient Air Quality Standard in 2012. While ozone concentrations have improved over time, the region did not attain the 75 ppb standard by the July 20, 2015 attainment deadline so in July 2016 EPA reclassified the region as a "moderate" nonattainment area.

In response to the 2016 reclassification, the Commission approved changes to the State Implementation Plan (SIP) in November 2016, November 2017, and July 2018. The plan includes detailed technical analyses regarding the formation of ozone, future trends in ozone levels, strategies to reduce ozone, and other elements. In keeping with the SIP requirements, the Division has been working with external stakeholders to define Reasonably Available Control Technology (RACT) for some additional emission sources where RACT had not already been developed for the SIP. In July 2018, the Commission adopted categorical RACT requirements for stationary combustion equipment located at major sources of NO_x in the Denver Metropolitan and North Front Range nonattainment area. In October 2018, the Commission adopted categorical RACT requirements for breweries that are major source for VOCs in the Denver Metropolitan and North Front Range nonattainment area. In July 2019 the Commission adopted VOC content limits to reduce emissions from consumer products and architectural, industrial and maintenance coatings.

The EPA adopted a new ozone standard of 70 ppb in October 2015. In September 2016, the Commission adopted the recommendation that the nine-county Denver Metropolitan and North Front Range area be designated nonattainment with the new standard, based on monitoring data for 2013 - 2015. No other areas in the state were recommended for a nonattainment designation. In June 2018, the EPA finalized designations for all areas statewide, including classifying the Denver Metropolitan and North Front Range as a marginal nonattainment area, setting the stage for a new round of SIP revisions to adopt measures needed to meet the new 2015 standard. Meanwhile, the 75 ppb (2008) standard is still in place the Denver Metropolitan and North Front Range nonattainment is expected to be bumped up to a "serious" classification by December 2019. The Division, the Commission and the RAQC are working with external stakeholders to determine the best path forward to reduce emissions of ozone-causing pollutants, in a continued effort to protect public health and the environment. Existing regulatory programs continue to reduce emissions from power plants, oil and natural gas facilities, motor vehicles, and other sources. In 2018 the Division developed guidance for implementing an existing rule under the Emission Reduction Credit program to incentivize sources to shut down or modify high emitting sources to permanently reduce emissions. See the Division's [Emission Reduction Credit website](#) for additional information. The Division also issues ozone forecasts to alert sources in advance, encouraging them to voluntarily reduce their emissions on days when ozone is expected to be high. In addition, the Division, RAQC, and partner agencies are incentivizing reductions of ozone-causing pollutants using resources available through the Volkswagen settlement to fund the replacement of vehicles with newer and cleaner vehicles. The Division and the RAQC are also evaluating potential emission reductions from motor fuels and oil and gas sources.

Emission Reductions from Oil and Gas Sources

To further reduce ground-level ozone, improve air quality, and comply with federal requirements, the Division, the Commission and the RAQC continued working with external stakeholders to identify further steps to reduce emissions from oil and natural gas sources beyond existing regulations. At the Commission's directive, the Division initiated and led the Statewide Hydrocarbon Emissions Reduction (SHER) stakeholder process and the Pneumatic Controller Taskforce over the 2018-2019 timeframe. The SHER Team evaluated topics including the frequency of LDAR inspections, transmission segment compressor emissions, and natural gas-driven and zero emission pneumatic controllers outside the Denver Metro/North Front Range. The Division will present SHER recommendations to the Commission by January 2020. The Pneumatic Controller Task Force completed a study of pneumatic controller emission reduction options in the Denver Metro/North Front Range nonattainment area. Recommendations from the task force will be provided to the Commission by May 2020. These provisions are expected to reduce VOC and GHG emissions.

On April 16, 2019 Governor Jared Polis signed into law SB19-181, which directs the Commission to consider its rules to further minimize emissions from oil and natural gas emissions. The Commission is also directed to review and promulgate rules around leak detection and repair standards and frequencies, inspection and monitoring of transmission lines and compressor stations, the installation of continuous methane monitors at facilities with large emissions potential and facilities in close proximity to occupied structures, and the use of pneumatic devices under appropriate circumstances that do not vent natural gas. The Division is currently working to fulfill the directives outlined in SB19-181, anticipating proposing related rule revisions to the Commission in September 2019, and requesting a hearing be set in December 2019. This proposal is anticipated to be the first rulemaking before the Commission in an anticipated series of rulemakings over the coming years to address this bill and other remaining legislation enacted in 2019, as well as secure reductions in VOC, NOx, and GHG emissions. The Commission anticipates that SHER Team and Pneumatic Controller Taskforce recommendations and associated rulemakings may have to be realigned in order to strategically inform Colorado's efforts to address the 2019 legislation. The work completed by these stakeholder processes will help the State move aggressively to meet the provisions of these bills. At the same time, both the Commission and Division are considering how to further solicit broader public input on how Colorado plans to address various bills enacted in the 2019 legislative session. This important process will be challenging given the breadth of issues, aggressive timelines, number of agencies and Commissions involved, and degree of public interest. More will come in the near future, in terms of an overall roadmap. In the meantime, the Commission and Division have begun coordinating with the Oil and Gas Conservation Commission specific to SB19-181.

Emission Reductions from Cannabis Sources

Colorado legalized medicinal marijuana November 2000 and recreational marijuana use December 2012. Not much is known about this sector or any potential air quality impacts from growing hemp and marijuana, or the processing of the plant. Both the growing operation and solvent extraction can emit highly reactive VOCs and may contribute to ozone formation. The Division worked in partnership with the City and County of Denver and industry leaders to identify and document air quality best management practices, design and implement an air emissions study, and build a benchmarking tool to anonymously allow sources to voluntarily compare metrics like solvent use, energy use, etc. with other similarly situated facilities. Air quality best management practices were developed during the summer of 2018 and are currently being updated. The testing protocol was finalized in 2018. The Division is currently testing at four different sources that have agreed to voluntarily participate in an emissions study. Study results are anticipated in early 2020. The benchmarking tool is being developed by a third party contractor.

Greenhouse Gas Emissions Reduction

The EPA finalized requirements for existing coal-fired power plants under the Affordable Clean Energy Rule on July 8, 2019. These requirements will result in lower levels of GHG emissions reductions than expected with the Clean Power Plan that was completed during the prior Administration. However, Colorado's efforts to reduce GHG emissions have accelerated in the face of the federal rollbacks. In 2019, the State Assembly enacted four pieces of legislation directing the Commission to adopt rules to require GHG monitoring and reporting, refine the state's GHG inventory, and establish GHG emission reduction goals and targets, economy-wide. These bills include SB19-096, HB19-1261, SB19-236 and SB19-181. Specifically, HB19-1261 and SB19-236 establish new economy-wide GHG reduction goals of 26% by 2025, 50% by 2030 and 90% by 2050 (based on 2005 levels), with reduction targets for qualifying retail electric power utilities of 80% by 2030 and 100% by 2050. Reductions must be cost-effective and take into consideration other relevant laws and rules, as well as voluntary actions.

In Colorado Springs, Martin Drake Power Plant Unit 5 retired in 2016. Cherokee Generating Station Unit 4, in Commerce City, stopped burning coal in 2017 and now fires natural gas. Three other units at Cherokee Generating Station retired from 2011 to 2016. In Boulder, Valmont Station Unit 5 retired in 2017. The Nucla Station will retire in 2020 and the Craig Station Unit 1 is scheduled to retire in 2025. These retirements and modifications, which are required by the Colorado Clean Air Clean Jobs Act and the Regional Haze SIP, will decrease GHG emissions from Colorado's electricity sector. Colorado has already set national precedent by implementing the first methane reduction rules for oil and gas sources in the country, which were adopted by the Commission in 2014.

In the 2017 rule adopted in response to EPA's Oil and Gas Control Technique Guidelines. The control measures will reduce VOC emissions from oil and gas sources, as well as additional GHG reductions. The Division, in a September 2017 letter to the Public Utilities Commission, expressed support for the Public Service Company of Colorado (PSCo) proposal to retire coal-fired units 1 and 2 at Comanche Generating Station. The Colorado Public Utilities Commission voted on August 27, 2018, to approve PSCo's electric resource plan. The retirement of these units will not only reduce sulfur dioxide and nitrogen oxide emissions by about 1,700 tons per year and 3,200 tons per year respectively, but will reduce GHG emissions by about 4,700,000 tons per year. The retired generating capacity will be replaced with a proposed mix of new wind, solar, and battery storage, and will use existing natural gas generation as capacity backup. As discussed below, the Commission also adopted emissions standards for new light and medium duty vehicles that will maintain progress in reducing GHG emissions from this important source category.

Diesel Emissions Settlement

The Division and its partner agencies are distributing \$68.7 million to incentivize emission reductions from diesel vehicles and diesel non-road engines. Colorado was allocated these funds from a nationwide court settlement after investigators discovered that Volkswagen, Audi, and Porsche violated the Clean Air Act and several other statutes by cheating on federal vehicle emissions tests. The funds were initially available to incentivize public and private fleets to replace older diesel trucks and buses, diesel equipment (such as generators, airport ground support equipment, or construction machinery), and diesel locomotives with electric powered (including zero emission vehicle supply equipment), alternative fuel, or cleaner diesel technology. January 17, 2019, Governor Jared Polis signed executive order B 2019 002: Supporting a Transition to Zero Emissions Vehicles which directs CDPHE to, "focus all remaining eligible investments on supporting electrification of transportation, including transit buses, school buses, and trucks." September 2019, CDPHE published an updated VW Beneficiary Mitigation Plan to reflect these changes. The program will provide ozone, public health, and climate benefits by reducing emissions of nitrogen oxides, carbon dioxide, and other pollutants by funding eligible projects from the transportation sector.

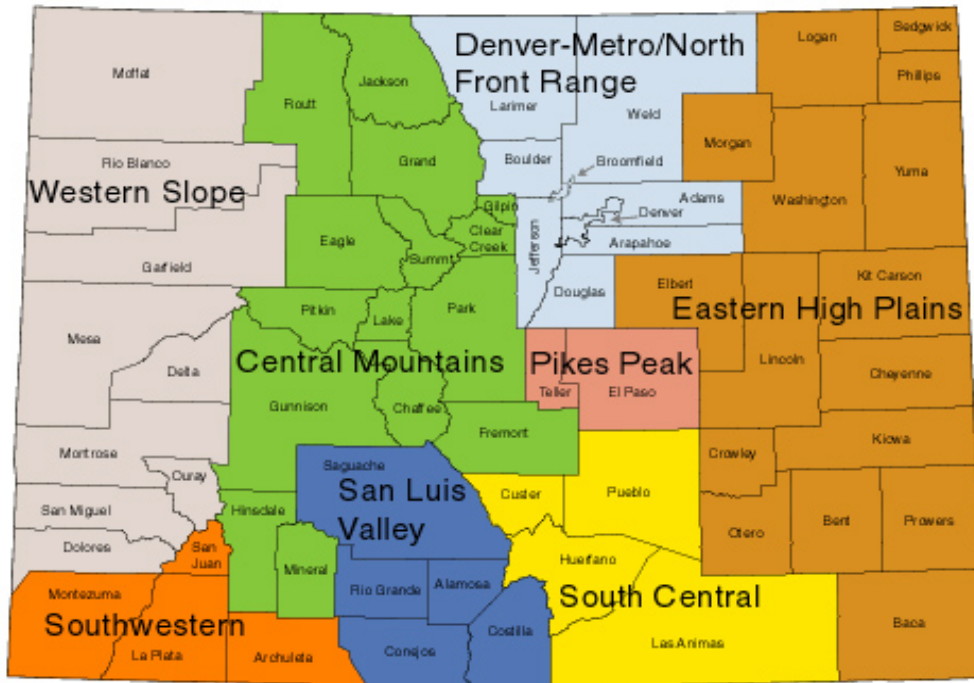
Low Emission Vehicle and Zero Emission Vehicle Programs

November 2018, the Commission adopted the Colorado Low Emission Automobile Regulation (CLEAR) program, requiring model year 2022 and later passenger cars and light- and medium-duty trucks to comply with California's emissions standards. These standards preserve progress that was required under joint federal-California standards that were adopted for these vehicles in 2012, and avoid any roll-back of these standards by the federal government. The rule has no effect on heavy duty trucks or non-highway equipment and includes no change to fuel-specifications. The Colorado Department of Transportation (CDOT), the Colorado Energy Office (CEO), the Alliance of Auto Manufacturers (AAM), and the Association of Global Automakers (GA) reached a consensus agreement on a proposed Zero Emission Vehicle (ZEV) regulation on July 29, 2019. This alternative proposal accelerates the availability of ZEV options for Colorado consumers beginning in January 2020, while also ensuring a smooth transition into the program for automakers. In August 2019, the Commission adopted the California ZEV rule for the 2023 model year and beyond.

Regional air quality

Areas of the state differ greatly from one another in landscape, weather, population, motor vehicle traffic, amount of industry and potential of wood smoke from residential fires, wildfires and controlled burns. This section of the report separates Colorado into eight regions to more clearly address each region's specific air quality conditions and activities.

State Air Quality Planning Regions



- Denver-Metro/North Front Range Region.
- Eastern High Plains Region.
- South Central Region.
- Pikes Peak Region.
- San Luis Valley Region.
- Southwest Region.
- Western Slope Region.
- Central Mountains Region.

Regional air quality - Denver-Metro/North Front Range

The Denver-Metro/North Front Range Region includes Adams, Arapahoe, Boulder, Broomfield, Denver, Douglas, Jefferson, Larimer and Weld counties. It includes the largest population area of the state, with 2.8 million people living in the seven-county Denver-metro area and another half-million living in the northern Colorado area of Larimer and Weld counties (according to the U.S. Census Bureau as of 2010). This area includes Rocky Mountain National Park and several wilderness areas.

In the past, the Denver-metropolitan area violated health-based air quality standards for ozone, carbon monoxide and fine particles. In response, the RAQC, the Division and the Commission developed, adopted and implemented air quality improvement plans to reduce each of the pollutants. Fort Collins, Longmont and Greeley were nonattainment areas for carbon monoxide in the 1980s and early 1990s, but have met the federal standards since 1995. Air quality improvement plans have been implemented for each of these communities.

The region presently complies with all National Ambient Air Quality Standards, except for ozone. The area has been exceeding the EPA's most recent ozone standards since the early 2000s, and in 2007 was formally designated as a "nonattainment" area. In 2012, the EPA designated the region as a "marginal" nonattainment area for the more stringent ozone standard adopted by EPA in 2008. Recently, the Denver Metro/North Front Range was "bumped-up" to a "moderate" nonattainment area classification for the 2008 ozone standard, which triggered the requirement to develop an updated ozone plan. This plan was adopted by the Commission in the fall of 2016. In the summer of 2018, the region exceeded federal standards at five monitoring sites, and is expected to be designated as a serious nonattainment area. The Ozone Trends - North Front Range graph, included in the Major Pollutants - Ground-Level Ozone section of this report, shows the downward trends at monitoring sites with the highest three-year average of annual 4th maximum 8-hour ozone concentrations in the Denver Metro/North Front Range nonattainment area.

In order to improve air quality and reduce harmful emissions from mobile sources in the Denver Metro/North Front Range, the Division and the Colorado Department of Revenue jointly administered the [Automobile Inspection and Readjustment \(AIR\) Program](#). Mobile source emissions constitute one of the larger categories of controllable emissions that contribute to summertime ozone concentrations and are the largest source of CO emissions in the metropolitan area. The AIR Program detects and requires repair of excessively emitting gasoline-powered vehicles, and is facilitated by an Inspection and Maintenance network that consists of 18 Air Care Colorado inspection stations throughout the Denver Metro/North Front Range. In 2017, the AIR Program inspected 1,028,305 vehicles, reducing 1.74 tons per day of ozone precursor emissions.

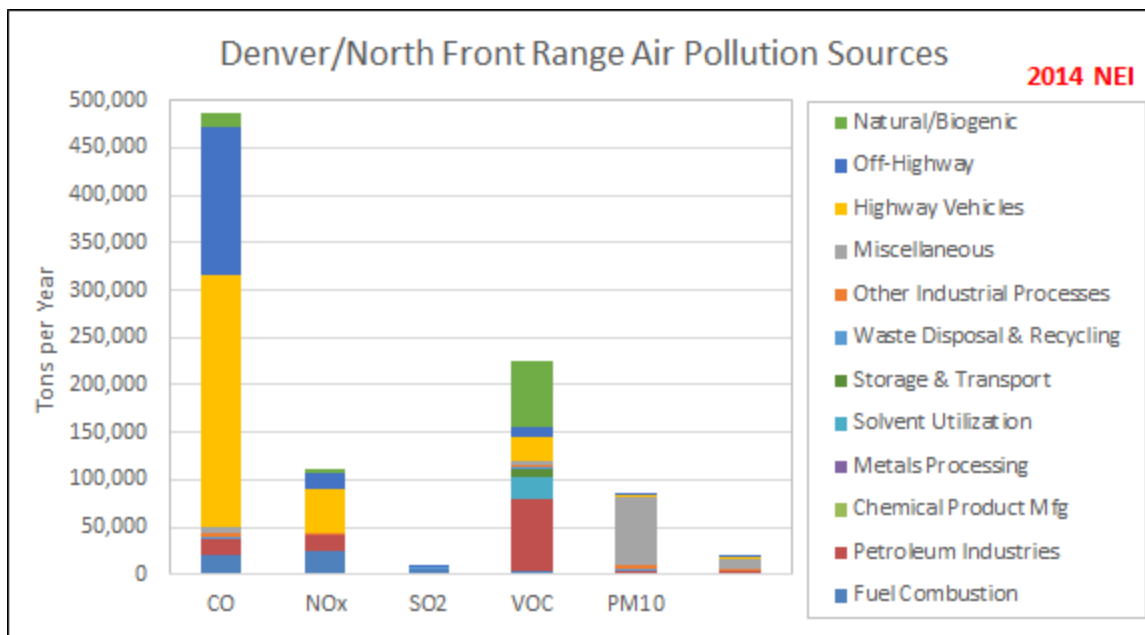
Rocky Mountain National Park has been and continues to be impacted by nitrogen deposition, causing changes to the alpine plant and aquatic environments. A nitrogen reduction plan is in place and progress is being tracked by the National Park Service, the Division, EPA and the Commission. For more information on this voluntary initiative, see the [Rocky Mountain National Park Initiative website](#).

Air Pollution Sources

- Motor vehicles.
- Road dust.
- Oil and gas production.
- Large commercial breweries.
- Petroleum refining.
- Asphalt production.
- Cement manufacturing.
- Sand and gravel operations.
- Glass bottle manufacturing.
- Area-wide remediation at Rocky Mountain Arsenal.
- Coal and natural gas power plants.

Air Pollution Control Measures

- Automobile emissions inspection and maintenance program.
- Street sweeping.
- Controls on oil and gas production tanks, equipment and engines.
- Permitting program limiting emissions from industrial sources.
- Lime spray dryers to reduce sulfur oxide emissions from power plants.
- Baghouses to reduce particulate matter emissions from power plants.
- Non-selective catalytic reduction to reduce NOx at cement plants.
- At power plants, low NOx burners, fuel switching to natural gas and unit shutdowns.



Regional air quality - Eastern High Plains

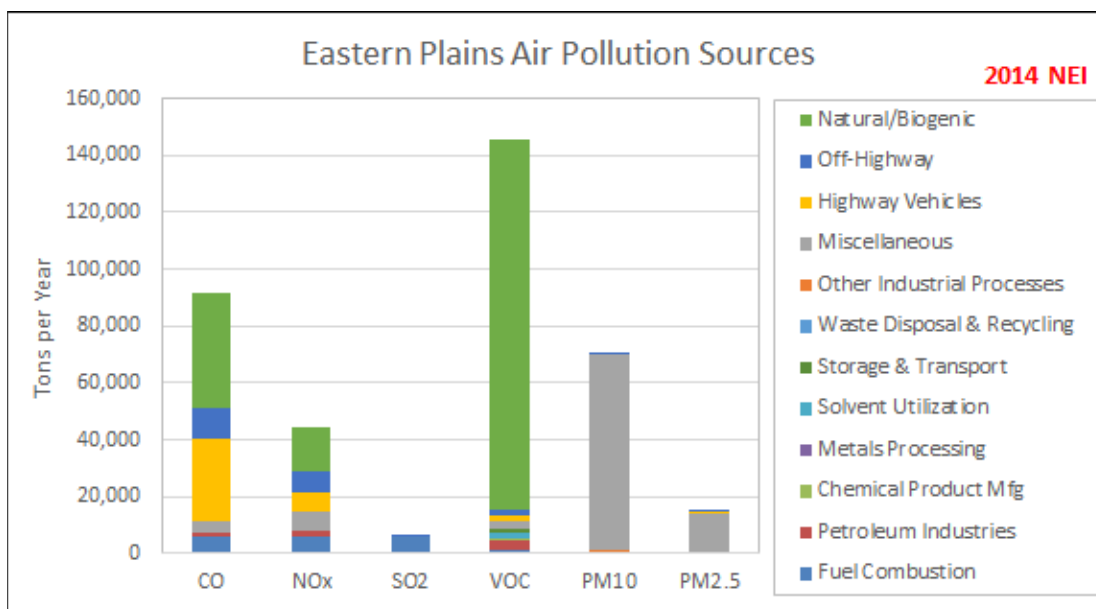
The Eastern High Plains region makes up 40 percent of Colorado's land area and encompasses the counties on the plains of eastern Colorado. The area is semi-arid and often windy. The area's population is approximately 157,000 according to 2010 U.S. Census Bureau estimates. Its major population centers have developed around farming, ranching and trade centers such as Sterling, Fort Morgan, Limon, La Junta and Lamar. The agricultural base includes both irrigated and dryland farming. All of the area complies with federal air quality standards.

Air Pollution Sources

- Motor vehicles.
- Windblown dust.
- Odors from confined animal feeding operations.
- Oil and gas production.
- Pawnee Power Plant near Brush.
- Western Sugar beet sugar processing in Fort Morgan.
- Cargill Meat packing plant in Fort Morgan.

Air Pollution Control Measures

- The 2018 mitigation plan for high wind events involving PM₁₀ in Prowers County which includes dust control measures for the area, was issued a determination of completeness by the EPA in April 2019, pursuant to 40 CFR 51.930(b)(3)(ii).
- State odor control regulation for hog farms.
- Statewide oil and gas emission controls.
- Scrubbers, baghouses, dust collectors and area dust suppression at Western Sugar.
- Lime spray dryer, low NOx burners, and selective catalytic reduction at Pawnee Power Plant.
- Low NOx burners, packed scrubber and flare device, along with other permit conditions to limit emissions at the Cargill meat packing plant.



Regional air quality - South Central

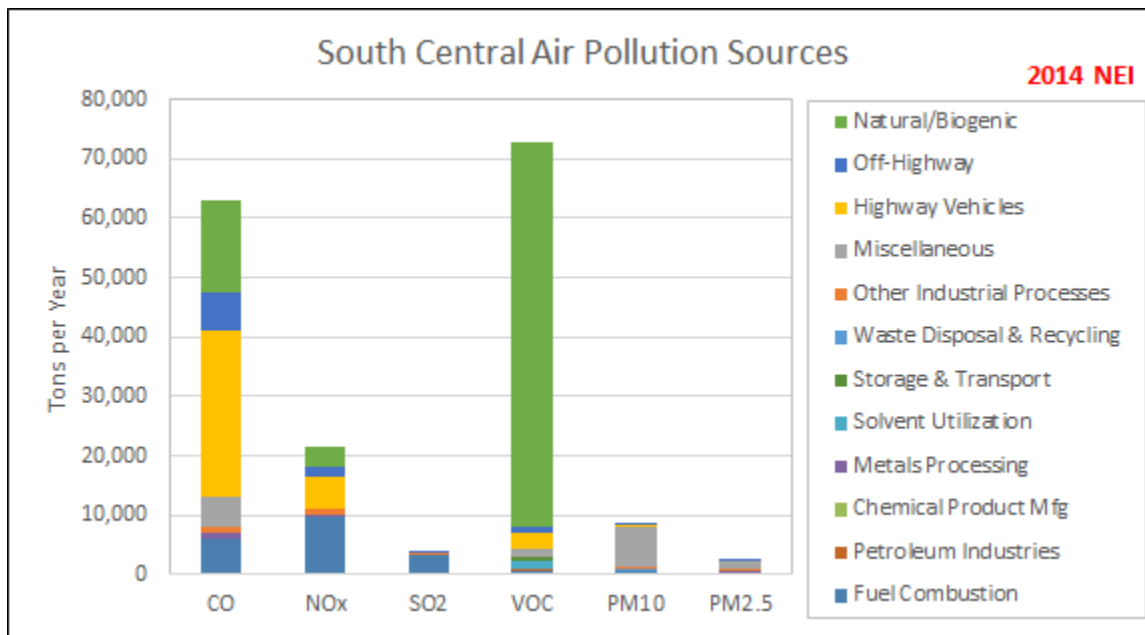
The South Central Region is comprised of Pueblo, Huerfano, Las Animas and Custer counties. Its population is approximately 184,800 according to 2010 U.S. Census Bureau estimates. Urban centers include Pueblo, Trinidad and Walsenburg. The region has rolling semi-arid plains to the east and is mountainous to the west. All of the area complies with federal air quality standards.

Air Pollution Sources

- Motor vehicles.
- Fugitive dust.
- The Comanche Power Plant near Pueblo.
- EVRAZ Rocky Mountain Steel Mills in Pueblo.
- GCC Rio Grande Cement Plant near Pueblo.
- Oil and gas production.
- Large natural gas compressor stations in Las Animas County.

Air Pollution Control Measures

- Local dust control plans.
- Selective catalytic reduction, low NOx burners, lime spray dryers and activated carbon mercury controls at Comanche Power Plant to reduce NOx, SO₂ and mercury emissions.
- Compliance actions, monitoring and mercury reduction program at EVRAZ Rocky Mountain Steel Mills.
- Statewide oil and gas emission controls.
- VOC controls on natural gas compressor stations.



Regional air quality - Pikes Peak

The Pikes Peak Region includes El Paso and Teller counties. The area has a population of approximately 626,200 according to 2010 U.S. Census Bureau estimates. Eastern El Paso County is rural prairie, while the western part of the region is mountainous. All of the area complies with federal air quality standards.

Air Pollution Sources

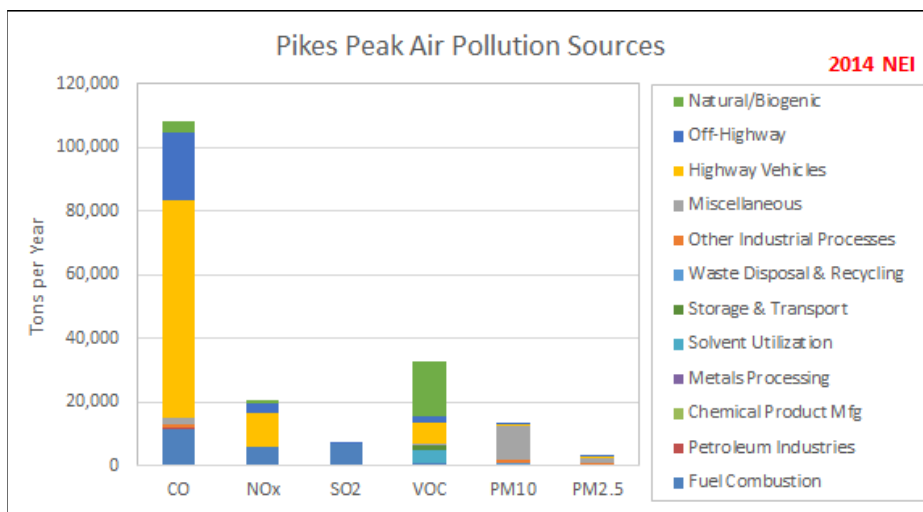
As in other urbanized areas in Colorado, pollutants in the Pikes Peak Region originate primarily from stationary and mobile sources.

- Motor vehicles.
- Road dust.
- Area dust from construction activities.
- The Drake and Nixon power plants and Fountain Valley Electric Generating Station.
- Sand and gravel operations.

Air Pollution Control Measures

- Street sweeping.
- Dust control plans.
- Flue gas desulfurization like systems and low NOx burners at power plants to control SO₂ and NOx emissions.
- Statewide oil and gas emission controls.

While the area is attaining both ozone standards, the Division is closely watching ozone levels in comparison to the 2015 70 ppb ozone standard. Many residents are concerned with potential health impacts from ozone and SO₂. The Division continues to work with the Pikes Peak Area Council of Governments' Air Quality Technical Committee in raising public awareness in and taking precautionary measures to reduce ozone levels. The Ozone Trends - Other Areas graph, included in the Major Pollutants - Ground-Level Ozone section of this report, shows ozone trends at the Colorado Springs U.S. Air Force Academy site. Assessment of the Drake power plant for its impact on the 1-hour SO₂ standard is ongoing. SO₂ monitoring of the plant's impact on SO₂ concentrations will continue into the future.



Regional air quality - San Luis Valley

Colorado's San Luis Valley Region is in the south central portion of Colorado and includes a broad alpine valley situated between the Sangre de Cristo Mountains on the northeast and the San Juan Mountains of the Continental Divide to the west. The valley is some 71 miles wide and 122 miles long, extending south into New Mexico. The average elevation is 7,500 feet. Principal towns include Alamosa, Monte Vista and Del Norte. The population is about 45,100 according to 2010 U.S. Census Bureau estimates. Agriculture and tourism are the primary economic activities.

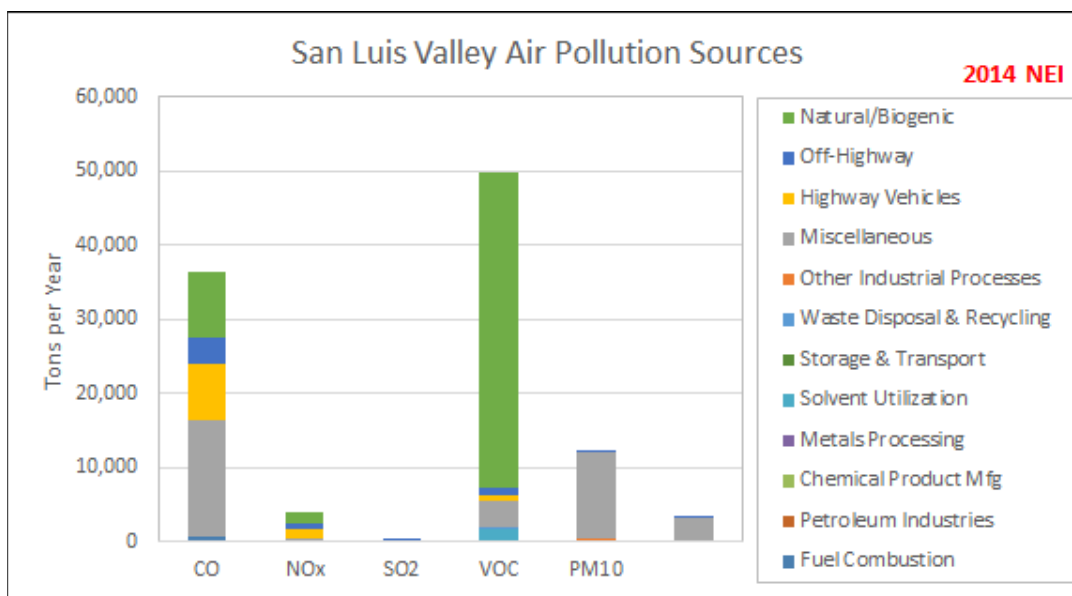
The valley is semiarid and croplands of potatoes, head lettuce and barley are typically irrigated. The valley is home to Great Sand Dunes National Park. The air quality planning region consists of Saguache, Rio Grande, Alamosa, Conejos and Costilla counties. All of the area complies with federal air quality standards.

Air Pollution Sources

- Blowing dust.
- Motor vehicles.

Air Pollution Control Measures

- The Alamosa Mitigation Plan for high wind events involving PM₁₀ was and was issued a determination of completeness by the EPA in April 2019, pursuant to 40 CFR 51.930(b)(3)(ii). The Plan includes the following elements:
 - Blowing dust advisories and forecasting.
 - Public outreach on dust mitigation.
 - Dust control measures, such as street sweeping, curtailing construction activities that disturb soil, applying water to disturbed soils, planting vegetation and wind breaks, reducing or postponing tilling and plowing.
- Regulatory dust control measures included in supporting documentation approved by EPA on multiple occasions (under exceptional events).



Regional air quality - Southwest

The Southwest Region includes the Four Corners area of Montezuma, La Plata, Archuleta and San Juan counties. The population of this region is about 89,800, according to 2010 U.S. Census Bureau estimates. The landscape includes mountains, plateaus, high valleys and canyons. Durango and Cortez are the largest towns, while lands of the Southern Ute and Ute Mountain Ute tribes make up large parts of this region. The region is home to Mesa Verde National Park, and tourism, agriculture, and energy development are dominant economic activities.

While all of the area complies with federal air quality standards, increased development including power plants, oil and gas wells, and population growth are contributing to air quality concerns. Ozone levels in the region are close to exceeding the 2015 70 ppb health-based national air quality standards for outdoor air. Many residents are concerned with potential health impacts from other pollutants. An overall haze can sometimes be seen in the skies, which impacts visibility. There are concerns for the ecosystem due to deposition of mercury and nitrogen. Responsible regulatory agencies are addressing these issues in order to effectively manage air quality. These agencies believe input from residents of the area is important in developing and implementing an effective management plan.

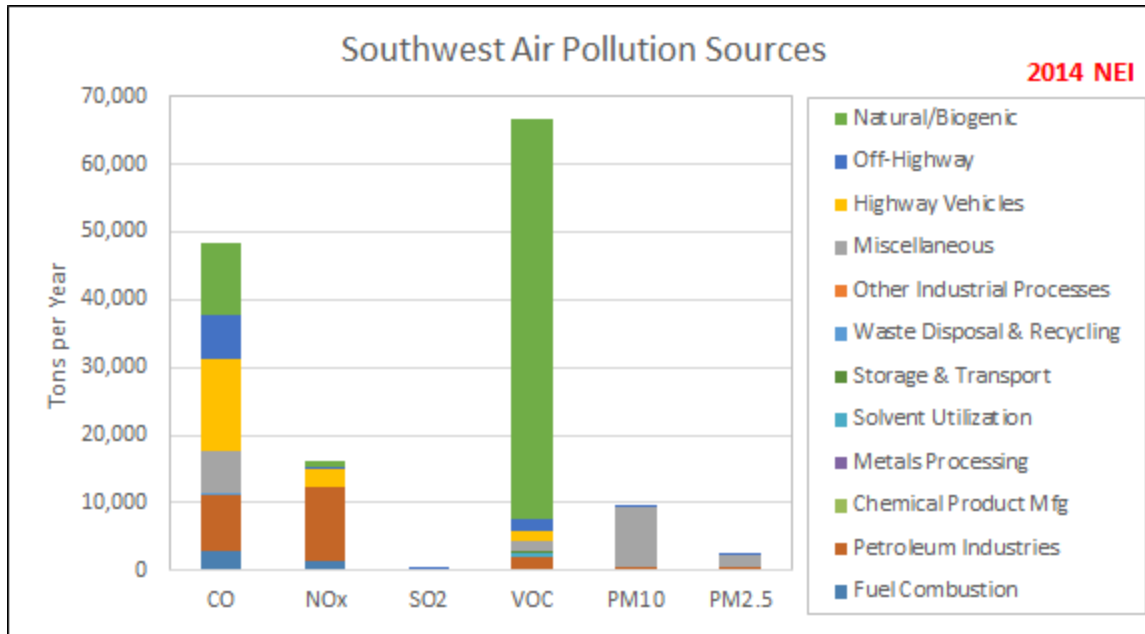
Air Pollution Sources

- Motor vehicles.
- Natural gas processing and transmission.
- Two coal-fired power plants in New Mexico.
- Gas field development in Colorado, Southern Ute Indian Reservation, and New Mexico.
- Wildfires.
- Durango & Silverton coal-fired steam locomotive tourist train.

Air Pollution Control Measures

The main air pollution control measures in this region include:

- Statewide oil and gas emission controls.
- Smoke management program.
- Durango Train Smoke Task Force.
- Tribal permitting and control of emission sources.
- Future closure and emissions reductions from controls at New Mexico power plants.
- Particulate matter control plan for Pagosa Springs includes: street sweeping and sanding controls, use of chemical deicers, and paving of dirt roads.
- The Four Corners Air Quality Group, a forum for individuals interested in air quality to meet, learn about current conditions, review progress on mitigation of air quality impacts, and generally contribute to clean air in the Four Corners area.
 - This group is convened by the states of New Mexico and Colorado and meets annually in the Four Corners area.
 - For more information visit the [Four Corners Air Quality Group home page](#).



Regional air quality - Western Slope

The Western Slope Region includes nine counties on the far western border of Colorado. A mix of mountains on the east, and mesas, plateaus, valleys and canyons to the west form the landscape of this region. Grand Junction is the largest urban area, and other cities include Telluride, Montrose, Delta, Rifle, Glenwood Springs, Meeker, Rangely and Craig. The population of this region is about 309,700, according to the 2010 U.S. Census Bureau estimates. Primary industries include ranching, agriculture, mining, energy development and tourism. Dinosaur and Colorado National Monuments are located in this region.

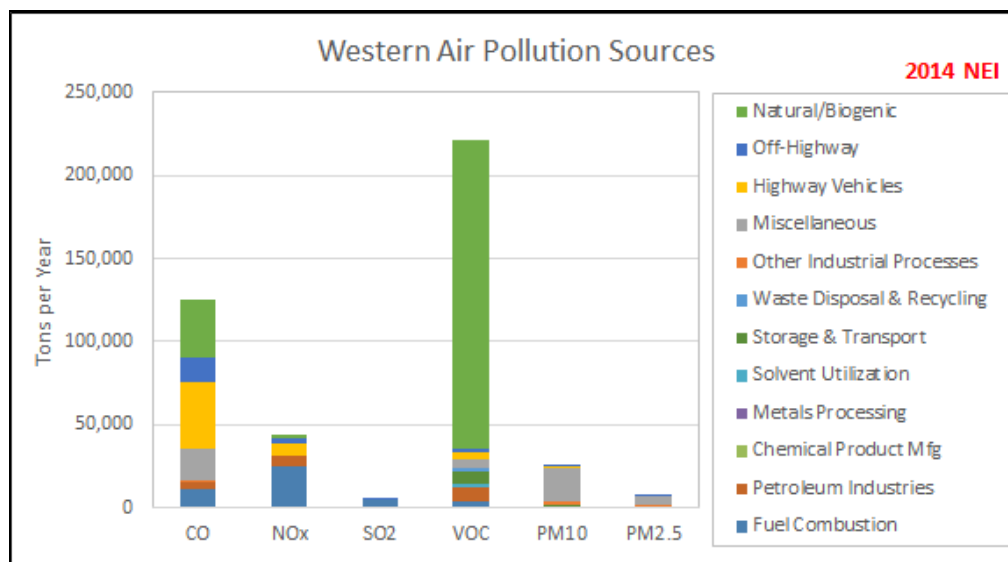
All of the Western Slope Region presently complies with federal air quality standards. However, elevated ozone levels were recorded in the Rangely area during the winters of 2010-2011 and 2012-2013 which resulted in violations of the 2008 ozone standard. The area has not experienced such elevated ozone concentrations since that time. The 3-year average (2015-2017) ozone concentration is below the 2008 National Ambient Air Quality Standard, so a “nonattainment designation” is not appropriate for Rangely. The Grand Junction area experiences elevated wintertime PM_{2.5} concentrations due to inversions, though the area has not violated the federal standard.

Air Pollution Sources

- Motor vehicles.
- Oil and gas development.
- Nucla and Craig coal-fired power plants.
- Coal mines in Delta, Rio Blanco and Moffat, and Montrose counties.
- Sand and gravel operations.
- Windblown dust.
- Wildfires.
- Prescribed fire.

Air Pollution Control Measures

- Future closure and emissions reductions from controls at Nucla and Craig power plants.
- Statewide controls on oil and gas production.
- Smoke Management Program for prescribed fire.
- Fugitive dust control plans.
- Particulate matter control plan for Telluride includes: wood-burning control measures, street sweeping and sanding controls, use of chemical deicers, and paving of dirt roads.
- For Rangely, oil and gas emissions control measures are being developed for production areas across the Utah state line, which are the major influence on elevated ozone concentrations in the area.



Regional air quality - Central Mountains

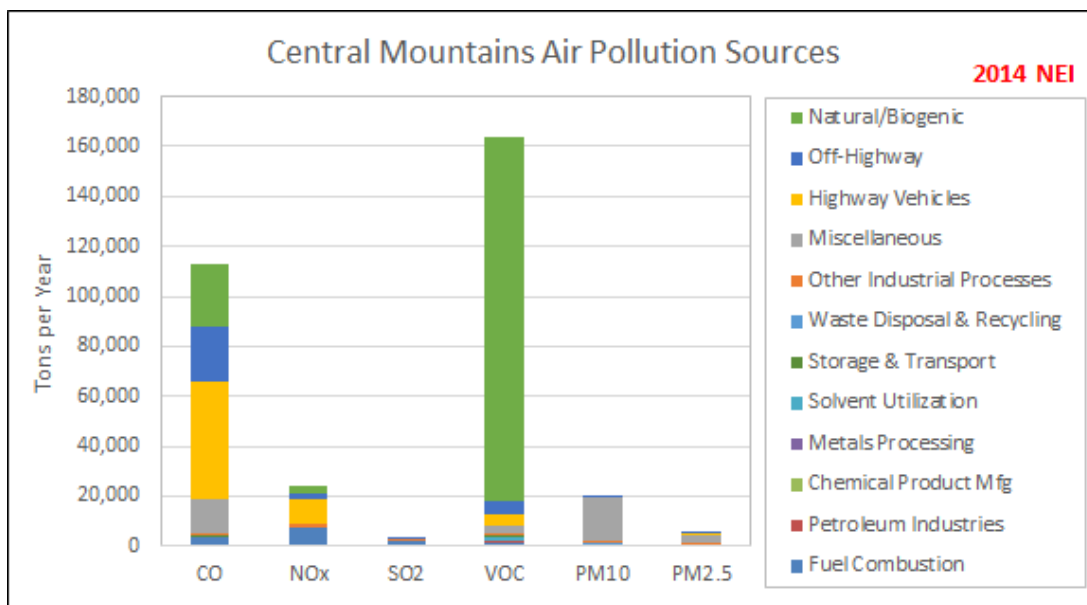
The Central Mountains Region consists of 15 counties in the central area of the state. The Continental Divide passes through much of this region. Mountains and mountain valleys are the dominant landscape. Leadville, Steamboat Springs, Cañon City, Salida, Buena Vista and Aspen represent the larger communities. The population of this region is about 256,800, according to 2010 U.S. Census Bureau estimates. Skiing, tourism, ranching, mining and correctional facilities are the primary industries. Black Canyon of the Gunnison National Park is located in this region, along with several wilderness areas. All of the area complies with federal air quality standards.

Air Pollution Sources

- Motor vehicles.
- Holcim Portland cement plant in Fremont County.
- Sand and gravel operations.
- Hayden power plant.
- Climax Molybdenum Mine.
- Coal mines in Gunnison County.
- Wildfires.
- Controlled burning.

Air Pollution Control Measures

- Power plants: dry limestone scrubbers to reduce SO₂ emissions, fabric filter baghouse to control particulate emissions, selective catalytic reduction at the Hayden plant by 2018 to control NO_x emissions, shutdown of the Black Hills Clark Station in 2013.
- Holcim Portland Cement plant: selective non-catalytic reduction emissions for NO_x reduction, wet limestone scrubbers for SO₂ reduction by 2018.
- Smoke management program for large controlled burns.
- Particulate matter control plans for Aspen, Cañon City and Steamboat Springs to control particulate matter through woodburning controls in each town, street sanding and sweeping controls in Aspen and Steamboat Springs, and traffic reduction measures in Aspen. Any industries located in these cities now or in the future must also comply with emission controls as part of state regulations.



Air quality data

A variety of air quality data is available to the public online.

[Air quality monitoring, modeling, forecasting and data.](#)

The Division's Technical Services Program website provides a variety of information related to air quality monitoring, forecasting, reports, modeling and emission inventories. All real-time air monitoring data are posted on an hourly basis from air monitoring sites across the state. Based on these data and predicted meteorology, air quality forecasts, alerts and advisories are posted for public notification. A variety of reports can be found as well as modeling information and information related to emissions of different pollutants in each county.

[Annual Air Quality Data Report.](#)

The Annual Air Quality Data Report provides a handy reference to the general public on air quality trends across the state and provides information on the different pollutants monitored and their potential health effects. This report is often used as a first step for data requests by the public or researchers looking to get more detailed information.

Summary of regulations

The following is a summary of the Commission's air quality regulations. For on-line access to complete regulations please see the [Air Quality Control Commission regulations website](#).

Procedural Rules

The rules that the Commission follows for its regular monthly meetings, public hearings, rulemaking hearings and adjudicatory hearings.

Air Quality Standards Regulation

This regulation establishes ambient air quality standards for the state of Colorado and dictates monitoring procedures and data handling protocols. It also defines nonattainment area boundaries for locations in the state which historically have violated federal and state air quality standards. In addition, the regulation contains the state's urban visibility standard and sets emission budgets for nonattainment areas.

State Implementation Plan Specific Regulation

This regulation defines specific requirements concerning air quality control strategies and contingency measures for nonattainment areas in the state.

Particles, Smoke, Carbon Monoxide and Sulfur Oxides

Regulation Number 1 sets forth emission limitations, equipment requirements and work practices (abatement and control measures) intended to control the emissions of particles, smoke and sulfur oxides from new and existing stationary sources. Control measures specified in this regulation are designed to limit emissions into the atmosphere and thereby minimize the ambient concentrations of particles and sulfur oxides.

Odor Control

Regulation Number 2 sets standards for allowable odor contaminants for different land-use areas in the state and outlines control measures that can be taken to bring violators into compliance.

Air Pollution Emission Notices and Permits

Regulation Number 3 requires air pollution sources to file Air Pollution Emission Notices. It also requires that new or modified sources of air pollution - with certain exemptions - obtain preconstruction permits. Very large facilities also are required to obtain operating permits.

Woodburning Controls

Regulation Number 4 requires new stove and fireplace inserts to meet federal certification in specified areas of the state.

New Source Performance Standards

Regulation Number 6 sets standards of performance for specific new stationary sources in Colorado. The regulation is designed to bring new sources into compliance with the U.S. Environmental Protection Agency's New Source Performance Standards. In addition, the regulation sets standards for new industries that are unique to Colorado for which the EPA has not yet set standards.

Volatile Organic Compounds Control

Regulation Number 7 controls the emissions of volatile organic compounds, primarily in the Denver-metro area. It sets standards and mandates controls for specific types of volatile organic compound sources.

Hazardous Air Pollutants Control

Regulation Number 8 sets forth specific work practices, emission control requirements and standards for hazardous air pollutants and asbestos.

Open Burning, Prescribed Fire and Permitting

Regulation Number 9 applies to all open burning activities throughout the state to control smoke and emissions from such fires. The regulation sets forth requirements for permitting including prescribed fires, controlled burns and significant users of prescribed fires.

Transportation Conformity

Regulation Number 10 defines the criteria the Commission uses to evaluate the consistency between state air quality standards/objectives, and transportation planning and major construction activities across the state, as defined in state implementation plans.

Motor Vehicle Inspection Program

Regulation Number 11 requires automobile emission inspection and maintenance programs to be implemented in specified areas of the state for gasoline-powered on-road vehicles. These programs apply to businesses, industry and the general public.

Diesel Vehicle Inspection Program

Regulation Number 12 defines the state's diesel-powered vehicle emission inspection and maintenance program for on-road vehicles.

Chlorofluorocarbons

Regulation Number 15 identifies the requirements to control emissions of ozone-depleting compounds from both stationary and mobile sources.

Street Sanding and Sweeping

Regulation Number 16 sets specification standards for street sanding material and street sweeping practices in the Automobile Inspection and Readjustment program area, and the Denver- metro fine particle nonattainment area.

Acid Rain Control

Regulation Number 18 sets forth the requirement for implementing the state's acid rain program. This program is adopted by reference from the federal program found in 40 C.F.R., Part 72 as in effect on Jan. 6, 1994.

Lead Based Paint

Regulation Number 19 defines the requirements for certifying lead abatement professionals and work practice measures.

Low Emission Vehicle Standards

Regulation Number 20 includes Low Emission Vehicle (LEV) standards for 2022 model year and later passenger cars and light- and medium-duty trucks.

Stationary source permit information

The following summarizes the number of permits issued and the hours billed by the Division for Construction permits and Title V permits from July 2018 - June 2019¹.

Actions	Construction Permits	Title V Permits
Total number of permits issued	1,707 construction permit actions	135 Title V permit actions ²
Total number of hours billed for permits	22,602 hours	10,147 hours ³
The average number of hours billed per permit	13.24 hours per permit	75.2 hours per permit action ⁴
The number of general permits issued	1,025 general permits	None

¹ The Division issues construction permits to authorize the construction of new facilities and the modification of existing facilities, and to allow their continued operation after they are built or modified. In some cases, the Division determines the proposed activities are exempt from construction permitting requirements. For the largest industrial sources, the Division also issues separate operating permits (sometimes referred to as Title V permits). These operating permits are issued after a facility is built and operating and incorporate all the air quality requirements that apply to the facility, along with enhanced monitoring, recordkeeping and reporting obligations.

² Number of permit actions issued and includes all permit types: Initial, Renewal, Significant, Minor, and Administrative. Some permit actions are combined (e.g. Minor Modification issued along with Renewal), thus the actual number of permit issuances will be lower than this amount.

³ This represents the total number of hours billed during this time period. Title V permits are billed on a quarterly basis, thus the hours may not be associated with a permit issued during this time period, or may include time billed for hours worked outside the time period.

⁴ Total hours billed divided by total number of permits issued.

Enforcement report

The following summarizes enforcement actions of the Division. A full enforcement report for stationary sources of air pollution in Colorado is available at: [Stationary sources enforcement action reports](#).

Enforcement Summary July 2018 - June 2019

Actions	Stationary Sources: Oil & Gas Sources	Stationary Sources: Non-Oil & Gas Sources	Asbestos Unit	CFC Unit	Lead Unit
Warning Letters	16	25	6	0	0
Compliance Advisories	45	67	n/a	n/a	n/a
Notices of Violation	5	1	n/a	n/a	n/a
Notice of Alleged Violation (NOAV)	n/a	n/a	11	0	0
Notices of Noncompliance (schools only)	n/a	n/a	22	n/a	n/a
Compliance Orders	0	1	n/a	n/a	n/a
Compliance Orders on Consent	15	24	n/a	n/a	n/a
Early Settlement Agreements	23	41	2	0	0
AQCC Hearings	0	0	0	0	0

Glossary of Terms

Compliance Advisory (CA): The term Compliance Advisory or CA refer to a document through which the Division formally notifies a Source of alleged violations, per § 25-7-115, C.R.S.

Compliance Order (CO): If the Division determines that a violation or noncompliance did occur after a conference with the source, it may issue a compliance order. The order includes the final determinations of the Division regarding the violation or noncompliance, a summary of the proceedings at the conference, and an evaluation of the evidence considered by the Division in reaching its final determination of law.

Compliance Order on Consent (COC): A settlement agreement or express terms, mutually agreed upon in writing, between the recipient of an informal notice of noncompliance, compliance advisory or notice of violation, and the Division, resolving the discovered noncompliance issues.

Early Settlement Agreement (ESA): The settlement document utilized by the Division and source to resolve certain informally or formally initiated enforcement actions.

Notice of Alleged Violation (NOAV): The terms Notice of Alleged Violation or NOAV refer to a document through which the Division formally notifies a Source of alleged violations, per § 25-7-115, C.R.S.

Notice of Noncompliance (NON): Issued to a school and requires the school to take certain steps to come into compliance. If the school comes into compliance within the stated time period, the Division does not require the school to pay a civil penalty.

Notice of Violation (NOV): The terms Notice of Violation or NOV refer to a document through which the Division formally notifies a Source of alleged violations, per § 25-7-115, C.R.S.

Warning Letter: A written notification to a source that the Division has documented a violation that further recurrence could result in enforcement action being taken, but that no further enforcement action will result directly from the instant violation.

Roles of government and the public

Protecting air quality is a cooperative effort among many parties. Government agencies are responsible for assuring that air quality meets health and environmental standards. The public has an important role through lifestyle habits, consumer choices and energy usage.

More information about the government entities that address air pollution and actions individuals can take to improve air quality can be found in the Roles of the Government and the Public fact sheet below.

Roles of government and the public . . .

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Colorado Air Quality Control Commission

The Commission, among other responsibilities, develops and adopts a regulatory program to protect and improve air quality in Colorado. Typically, the Commission develops program requirements from concept through implementation. Much of the air quality management program currently is in place and has been adopted over time. The Commission occasionally considers new programs as needed to address specific problems along with modifications to existing programs. The Commission oversees the implementation of the air quality programs, and is responsible for hearing appeals of the Division's implementation of its programs through permit terms and conditions and enforcement actions.

Rules adopted by the Commission regulate air pollutant emissions from:

- stationary industrial sources, including oil and gas operations;
- gasoline cars and light-duty trucks;
- diesel vehicles;
- demolition of asbestos-containing structures;
- wood stoves;
- ozone-depleting compounds;
- commercial and agricultural activities that produce odors;
- structures containing lead-based paint;
- open burning and the use of prescribed fire, and;
- consumer products and architectural industrial coatings use.

The regulations seek to protect human health and reduce air pollution effects on crops, natural vegetation, and visibility impairment.

Commission meetings are typically conducted on the third Thursday of each month and may extend into the next day. The Commission usually meets in Denver, but also holds meetings in other cities around the state. The Commission encourages the public to attend meetings and provide input.

Air Pollution Control Division Programs

The Division is responsible for implementing the air quality management programs adopted by the Commission and acts as staff to the Commission in the regulatory development process. The Division is housed within the Colorado Department of Public Health and Environment. The Division is organized into five specialized programs, described below.

Mobile Sources Program

The Mobile Sources Program evaluates, investigates, and administers the requirements aimed at reducing emissions from vehicles. It conducts research, modeling and planning on the causes and effects of mobile source air pollution. The staff jointly administers the Automobile Inspection and Readjustment (A.I.R.) Program for gasoline vehicles in the Denver-metropolitan and North Front Range areas with the Colorado Department of Revenue. As part of the vehicle emissions inspection, the Mobile Sources Program is effectively using a remote sensing technology to “screen out” about 38 percent of the fleet from inspection at a centralized facility. The Mobile Sources Program also administers two separate diesel opacity inspection programs, one designed for large fleets and the other for individual diesel vehicles. The Mobile Sources Program operates vehicle technical centers to provide customer assistance to motorists failing emissions inspections. The center’s technicians are recognized experts in their field and contribute to ensuring that the motor vehicle repair industry has access to the latest technical information on vehicle emissions repair procedures and technology.

Planning and Policy Program

The Planning and Policy Program is responsible for a cross-section of air quality planning, policy, rulemaking, compliance assistance, education, and community outreach tasks. Included among the program’s responsibilities are: addressing climate change; developing plans to return areas with poor air quality to compliance with federal standards; developing regulations to support those plans; ensuring transportation plans are consistent with air quality requirements; policy development; providing community-outreach; assisting small businesses comply with air quality regulations; identifying pollution prevention opportunities; providing public information; environmental assessments; and providing air quality education in schools. The Planning and Policy Program coordinates the Division’s efforts addressing climate change, ozone planning, regional haze plan development and the Rocky Mountain National Park Initiative.

Stationary Sources Program

The Stationary Sources Program evaluates and develops permits for stationary sources such as gas stations, dry cleaners, auto finishers, electric utilities, mining operations, construction projects, and oil and gas development sites. More than 16,000 sources are registered in Colorado. Staff members inspect sources to determine their compliance with regulations and permit conditions, and maintain a computerized inventory of air pollution emissions in Colorado. Any sources found to be out of compliance with regulations and the conditions of their permits are subject to enforcement actions. Detailed enforcement information can be found in the Enforcement Report section of this report. The Stationary Sources Program is working to streamline permitting through the use of general permits and improve compliance by using self-certification programs in conjunction with traditional inspection programs. Compliance assistance and small business assistance programs emphasize pollution prevention to improve regulatory compliance.

Indoor Environment Program

The Indoor Environment Program provides technical assistance on indoor air pollutants. The program regulates the use of ozone-depleting compounds (chlorofluorocarbons), and permits the abatement of asbestos and lead-based paint. The Indoor Environment Program certifies abatement workers, reviews and issues permits for abatement and demolition activities and conducts regular inspections to ensure compliance. The program also reviews school asbestos management plans.

Technical Services Program

The Technical Services Program is responsible for the collection and analysis of ambient air quality data throughout the state. Particulate and gaseous monitors are operated in many Colorado communities to keep track of air quality trends, population exposure to pollutants and compliance with air quality standards. The program also is responsible for providing complex air quality modeling analysis to determine the impacts various sources of air pollution will have on air quality. Air quality forecasting is conducted statewide throughout the year for potential exceedances of standards, with a focus on winter high pollution season, summer ozone season, and impacts from wildfires and blowing dust. The program also manages smoke through a burn permit process and by working with fire managers to review and approve plans and practices for controlled burns.

Federal Government

The U.S. Environmental Protection Agency

The U.S. EPA has established a regulatory framework for states to follow under the Clean Air Act. The Commission's air quality management program incorporates the requirements of the federal Clean Air Act. The U.S. EPA provides Colorado with policy directives and guidance, oversight, and funding to assist with meeting federal requirements.

Federal Land Managers

Federal lands in Colorado are managed by various branches of the federal government, such as the Bureau of Land Management, the U.S. Forest Service, and the National Park Service. Major activities on these lands that impact air quality may come under review through the National Environmental Policy Act (NEPA). Examples of major activities may include highway transportation projects, military base expansions and activities, oil and gas development, and mining activities. Federal agencies must prepare environmental analyses for federal actions that affect the environment. Colorado is typically a cooperating agency in reviewing these actions, and the public has a role in commenting on such actions through the NEPA process. Alternatives are typically evaluated in the process before a final decision is made allowing the implementation of projects on federal lands.

Tribes

Tribes in Colorado have authority to protect and improve air quality on tribal lands. Colorado has established an effective, collaborative relationship with the Southern Ute Indian Tribe (SUIT) as the tribe works to develop and implement a comprehensive air quality management program. In fact, on March 2, 2012, the EPA approved the Tribe's Part 70 Program application giving the Tribe full authority to implement and administer its 40 CFR Part 70 Operating Permit Program for Title V sources within the exterior boundaries of the Reservation. The tribe also actively monitors air quality at a number of sites. An intergovernmental agreement signed in 1999 between the SUIT and the state of Colorado created the SUIT/State of Colorado Environmental Commission. It is dedicated to overseeing the development and implementation of a comprehensive and effective program for the protection of air quality throughout the Southern Ute Indian Reservation. The other tribe in Colorado, the Ute Mountain Ute, has not established an air quality program on its lands. The EPA implements and enforces federal air quality measures on this reservation.

Local Government

Counties and Municipalities

Many air quality programs are implemented at the county and municipal level. In some cases, the state contracts with counties to implement state programs related to air quality monitoring, inspections of pollutant sources, open burning, and the control of asbestos and chlorofluorocarbons.

Most municipalities in the Denver-metropolitan area have ordinances in place to enforce the state's burning restrictions in the winter. Several counties throughout the state have implemented their own indoor burning controls. Many local jurisdictions have ordinances to control open burning of trash and debris.

Many communities have established controls for fugitive dust and odor. These controls may include dust mitigation plans for construction activities, street sweeping, projects to pave or treat dirt roads, and inspection and enforcement provisions for odors. In addition to specific air quality efforts, many counties and municipalities have developed a variety of environmentally beneficial programs to reduce traffic, conserve energy and recycle.

Local Planning Agencies

Local planning agencies exist in several metropolitan areas. The agencies have a variety of functions, including air quality and transportation planning.

Regional Air Quality Control Council

The RAQC) was established in 1989 to serve as the lead air quality planning agency for the Denver-metropolitan area. The mission of the RAQC is to develop and propose effective and cost-efficient air quality planning initiatives with input from government agencies, the private sector, stakeholder groups, and citizens of the Denver-metropolitan region. Its primary task is to prepare state implementation plan elements that demonstrate and ensure long-term compliance with state and federal air quality standards and provide acceptable public health and environmental protections to those residing in the Denver-metropolitan area.

North Front Range Metropolitan Planning Organization

The North Front Range Metropolitan Planning Organization was established in 1988 as the metropolitan planning organization for the Greeley and Fort Collins areas. In 1993 the council was designated by the governor as the lead air quality planning organization for both of these areas. The council is responsible for providing input to the Commission and Division regarding mobile source emissions as they affect the development and implementation of the state implementation plan (SIP) for attainment of air quality standards. The council also provides input on emission reduction measures affecting the North Front Range region while providing planning oversight for transportation related air quality projects in the North Front Range region. Transportation projects must demonstrate that they will not cause or contribute to a violation of the national air quality standards.

Denver Regional Council of Governments

The Denver Regional Council of Governments (DRCOG) has been in existence for more than 50 years and focuses on a variety of quality of life planning priorities for a nine-county area. These issues include mobility, service to older adults, environmental concerns, planning for the future, public safety, and the provision of information for sound decision-making. In terms of air quality, DRCOG develops transportation plans that indicate the air quality impacts of transportation projects. The transportation plans must demonstrate that they will not cause or contribute to a violation of the national air quality standards. This process requires detailed analysis of the impacts of transportation projects and traffic on air quality.

Pikes Peak Area Council of Governments

The Pikes Peak Area Council of Governments (PPACG) is the metropolitan planning organization and lead air quality planning agency for the Colorado Springs urbanized area. The PPACG reviews current and emerging air quality issues, develops plans to improve air quality, and is responsible for development and implementation of the carbon monoxide maintenance plan (set to expire on October 25, 2019) to ensure the region meets federal carbon monoxide standards. The PPACG also develops transportation plans. The plans must demonstrate that they will not cause or contribute to a violation of the national air quality standards.

The Public

Everyone has an important part to play in reducing air pollution. Here are a few suggested ways you can make a difference in your own community.

On the Road

Drive a fuel-efficient and low-polluting vehicle. For the greatest emission reductions, consider an electric vehicle. Keep your car tuned up and tires inflated to the recommended pressure to increase mileage and reduce the need for refueling. Combine errands into one trip and shop close to home. Use alternative modes of transportation, including walking, biking, carpooling, taking public transit, and telecommuting. Refuel in the evening, so fuel vapors will not have a chance to “cook” into ozone. When refueling, stop at the click – when the nozzle clicks off. Don’t overfill or drip fuel. Fuel creates ozone-causing vapors as it evaporates.

Around the Yard

Wait until evening to mow when cooler temperatures create less ozone.

Use a new earth-friendly lawn mower – an electric- or battery-powered mower, a non-motorized push mower, or a new gasoline-powered mower. Maintain your mower to help it run cleaner – change the air filter, oil and spark plugs at least once each season. Keep the underside of the mower free of grass buildup.

Avoid using two-stroke gasoline-powered yard equipment, such as weed trimmers or leaf blowers, since they emit a disproportionate share of air pollution. Use a funnel to refuel equipment – avoid even small spills and drips.

Reduce lawn watering and fertilizing to discourage excessive lawn growth. Xeriscape to reduce lawn area, or change to native Western grasses to reduce the need for irrigation and mowing. Plant trees. Trees not only add oxygen, they reduce dust and act as natural heat controllers, providing shade in the summer and allowing sunlight in the winter.

Choose an alternative to charcoal grilling. Don’t use charcoal lighter fluids, which emit harmful vapors. Use an electric starter or charcoal chimney instead.

Around the House

Avoid solvent-based products, which have pollution causing vapors. Use water-based paint, stain and sealants. If you must use a solvent-based product, avoid using it on high ozone days or use it in the evening.

Avoid spray paints, most of which are solvent based. Very fine spray also can become airborne. Use paint brushes and rollers instead.

Tightly cap all solvents (gasoline, paint thinners, strippers, and degreasers) and store in a cool place to avoid evaporation. Plan major painting, stripping and refinishing projects for spring and fall to avoid summer heat and sun which react with vapors to create ozone pollution.

Avoid use of flammable household products, such as some floor wax, furniture polish, fabric cleaners and insect foggers, most of which contain solvents.

Don't burn wood, including in-home woodburning stoves or outdoor burning devices. If you must burn, use only EPA-certified devices for low emissions.

Conserve energy. If we use less energy power plants burn less coal and natural gas.

Insulate and Weatherstrip

Take quick showers. They use less hot water than baths. Close doors to unused rooms and don't heat or cool them. Keep your home cooler in the winter and warmer in the summer.

Turn off unused lights and appliances. Use LED or compact fluorescent lights instead of incandescent bulbs. Install solar panels on your house to produce emissions-free electricity.

Recycle everything you can (paper, glass, metal cans, aluminum and plastic). It takes less energy to recycle than to create new material.

Get involved

Get involved in your local government processes related to air pollution and offer your input.

Visit websites listed in this report to learn more about air pollution.

Pay attention to news reports about air pollution and follow the suggestions listed here on high pollution days.

Report problems. If you think you see an air pollution problem report it to your local or state agency.