

Report to the Public 2020-2021



COLORADO

Air Quality Control Commission

Department of Public Health & Environment



COLORADO

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Glossary of Terms

Commission	Air Quality Control Commission
Division	Air Pollution Control Division
ATR	Automatic Traffic Recorder
AIR	Automobile Inspection and Readjustment Program
CO ₂	Carbon dioxide
CO	Carbon monoxide
CAA	Clean Air Act
CDPHE	Colorado Department of Public Health and Environment
CDOT	Colorado Department of Transportation
CLEAR	Colorado Low Emission Automobile Regulation
CRS	Colorado Revised Statutes
DM/NFR	Denver Metro/Northern Front Range
EPA	Environmental Protection Agency
GWP	Global warming potential
GHG	Greenhouse gas
HFC	Hydrofluorocarbon
LEV	Low Emission Vehicle
MACT	Maximum Achievable Control Technology
CH ₄	Methane
µg/m ³	Micrograms per cubic meter
NAAQS	National Ambient Air Quality Standards
NEI	National Emissions Inventory
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO	Nitric oxide
NO ₂	Nitrogen dioxide
N ₂ O	Nitrous oxide
NO _x	Oxides of nitrogen
O ₃	Ozone
NO _y	Reactive oxides of nitrogen
PM	Particulate matter
PM _{2.5}	Particulate matter less than or equal to 2.5 microns in aerodynamic diameter
PM ₁₀	Particulate matter less than or equal to 10 microns in aerodynamic diameter
ppb	Parts per billion
ppm	Parts per million
PPACG	Pikes Peak Area Council of Governments
PCTF	Pneumatic Controller Task Force
RACT	Reasonably Available Control Technology
RAQC	Regional Air Quality Council
SHER	Statewide Hydrocarbon Emissions Reduction
SIP	State Implementation Plan
SO ₂	Sulfur dioxide
VOC	Volatile Organic Compound
ZEV	Zero Emission Vehicle

Message from the Chair

As the Chair of the Air Quality Control Commission, it is my pleasure to begin this annual report with a brief message to the public. As has been done in the past, I will start by thanking our stakeholders and the interested public for the time and effort you have given to this volunteer commission to help inform our decision-making. Despite the challenging times we live in, the public has made it clear that air quality is of exceptional importance to the people of Colorado.

We recognize that some of the air quality problems in the state are out of our control, such as the influx of wildfire smoke, but that does not mean we should not do as much as we can to control pollution sources within our jurisdiction through the authority granted to us by the legislature. Many of our efforts over the past year have focused on reducing emissions of greenhouse gasses in an effort to meet the ambitious goals set by House Bill 19-1291 and more recently House Bill 21-1266, and we will continue to look at ways to reduce emissions of ozone precursors and other harmful air pollutants.

As a pulmonologist, I see the effects of air pollution on my patients with lung disease. As a parent, I share concerns with many families about the impacts of air pollution on the lungs of our children. Although I am proud of the progress we are making in Colorado to address air pollution and limit these health effects, I recognize the urgency of continuing to address this crucial area through a combination of community engagement, stakeholder outreach and meaningful control measures.

The following are just a few of the policy matters the commission has undertaken in the past year to address air quality issues in Colorado:

- Establishing new rules to reduce haze protected areas in Colorado, such as national parks and wilderness areas, from human-made sources of pollution;
- Establishing deadlines by which coal fired power plants in Colorado must cease operation;
- Tightening emission standards for light-duty vehicles to reduce ozone;
- Phasing out the manufacture and use of hydrofluorocarbons, a highly potent greenhouse gas;
- More meaningfully engaging communities that are disproportionately impacted by pollution and other socioeconomic and environmental factors and establishing a climate equity framework for stakeholder engagement; and
- Refining the state's greenhouse gas inventory and establishing a roadmap to meet the state's greenhouse goals.

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, including from upstream and midstream sources;
- Establishing GHG regulation and policy as directed by HB 19-1261 and HB 21-1266, including continuing stakeholder outreach regarding the most effective ways to meet state goals as well as collaboration with other commissions and state agencies to reduce GHG emissions;
- Further engaging with those communities that are disproportionately impacted by air pollution and climate change; and
- Continuing to improve the state's GHG inventory for better tracking of progress.

I hope this report proves useful and informative to you. Please remember that we are all in this together, and only through collective action, collaboration, and cooperation can we address the pressing air quality matters before us.



Anthony N. Gerber, MD, Ph.D.
Colorado Air Quality Control Commission Chair

Introduction

Colorado Revised Statute (C.R.S.), 25-7-105(5) directs the Air Quality Control Commission to prepare and make available to the public a report prior to its annual joint October meeting with the state board of health. The following information is required to be included in the report:

1. A description of the pollution problem in each of the polluted areas of the state, described separately for each such area;
2. To the extent possible, the identification of the sources of air pollution in each separate area of the state, such as motor vehicles, industrial sources, and power-generating facilities;
3. A list of all alleged violations of emission control regulations showing the status of control procedures in effect with respect to each such alleged violation; and
4. Stationary industrial sources permitting information as follows:
 - a. The total number of permits issued;
 - b. The total number of hours billed for permitting;
 - c. The average number of hours billed per permit; and
 - d. The number of general permits issued.

In Colorado, state agency schedules typically follow the state fiscal year period of July-June. For consistency, this report focuses on information for state fiscal year July 1, 2020 - June 30, 2021. According to Air Pollution Control Division records, Colorado's first annual air quality report on file dates back to 1965, making this the 56th report. For decades, the report served as the main written source of annual air quality information for the public. Now, a vast amount of air quality data and information is available to anyone with access to the internet and audio and web conference meeting options have increased opportunities for stakeholder participation. In response to the novel coronavirus (COVID-19) pandemic, the Commission and Division began to conduct meetings as remote meetings only using virtual platforms in March 2020. The Commission held one in-person meeting since then, the annual Commission retreat in June 2021 in Craig. The Commission will continue to conduct meetings remotely until further notice and will update their website as the situation changes.

The past year was marked by unusual air quality conditions around the world due to the COVID-19 pandemic, and regionally due to wildfire smoke impacts in the western US. As stay-at-home orders were implemented throughout the world in spring 2020, the resulting decrease in traffic and industrial activity reduced emissions of some air pollutants and correspondingly improved air quality. In many places, the halt of movement and industry resulted in clearer skies and reduced pollution levels. However, these decreases were short lived. According to Colorado Department of Transportation Automatic Traffic Recorder counts from 105 locations throughout Colorado, the greatest decrease in traffic volume occurred in March, April, and May 2020. Traffic counts for the year decreased by approximately 13% compared to counts in 2019. As COVID-19 restrictions were lifted, traffic volumes steadily increased, with volumes in May and June 2021 surpassing those in May and June 2019.¹ The 2020 wildfire season was one of the worst seasons on record for several western states. Three of the five largest wildfires in Colorado's history occurred in 2020, blanketing much of the state in smoke for extended periods.

¹Colorado Department of Transportation, Online Transportation Information System, Traffic Data Explorer, <https://dtdapps.coloradodot.info/otis/TrafficData>

Summer 2021 brought Colorado numerous days with high ozone and wildfire smoke transported from further west, emphasizing the need to continue efforts to reduce emissions.

This report provides information regarding Commission and Division activities, using the following structure:

- Major air pollutants: overview of the six criteria air pollutants, hazardous air pollutants (HAPs), greenhouse gases (GHGs), and regional haze.
- Major initiatives: overview of major activities, including environmental justice planning, ozone (O₃) reductions, GHG emission reductions, oil and gas emission reductions, Regional Haze planning, Low Emission Vehicle (LEV) and Zero Emission Vehicle (ZEV) Programs.
- Regional air quality: overview of air pollution sources and control measures for each of the eight air quality planning regions in Colorado.
- Air quality data: description of the Division's air quality monitoring, modeling, forecasting and data resources available to the public.
- Summary of regulations: summary of the Commission's air quality regulations.
- Stationary source permit information: summary of the number of Construction and Title V permits issued by the Division.
- Enforcement report: summary of enforcement actions of the Division.
- Roles of government and the public: overview of government activities and suggested practices to improve air quality in your community.

Commissioner:	Resident of:	Term expires:
Randy Ahrens	Broomfield	January 31, 2023
Gary Arnold <i>Vice Chair</i>	Englewood	January 31, 2023
Tony Gerber, MD, Ph.D. <i>Chair</i>	Denver	January 31, 2024
Chuck Grobe	Craig	January 31, 2023
Elise Jones	Boulder	January 31, 2022
Jana Milford, Ph.D., J.D.	Boulder	January 31, 2022
Michael Ogletree <i>Secretary</i>	Thornton	January 31, 2023
Martha Rudolph	Denver	January 31, 2024
Curtis Rueter	Westminster	January 31, 2024

Commission Staff

Jeremy Neustifter, Administrator and Technical Secretary
Theresa Martin, Program Coordinator

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 (CAA), 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, known as National Ambient Air Quality Standards (NAAQS) 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 measures air pollution levels lower than the national standard, it is called an attainment area; areas that don't meet 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 CAA [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 (PM), ground-level ozone, carbon monoxide (CO), sulfur dioxide (SO₂), nitrogen dioxide (NO₂), and lead (Pb). In addition to criteria pollutants, another class of regulated air pollutants is "toxic air pollutants." Toxic air pollutants, also known as hazardous air pollutants (HAPs), are those that are known or suspected to cause cancer or other serious health or environmental effects. GHGs, such as carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and hydrofluorocarbons (HFCs) 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. The major initiatives section of this report discusses steps being taken in Colorado to address GHG emissions.

The Colorado Air Pollution Control Division (Division) maintains a statewide monitoring network for all criteria pollutants as required by the CAA 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](#).

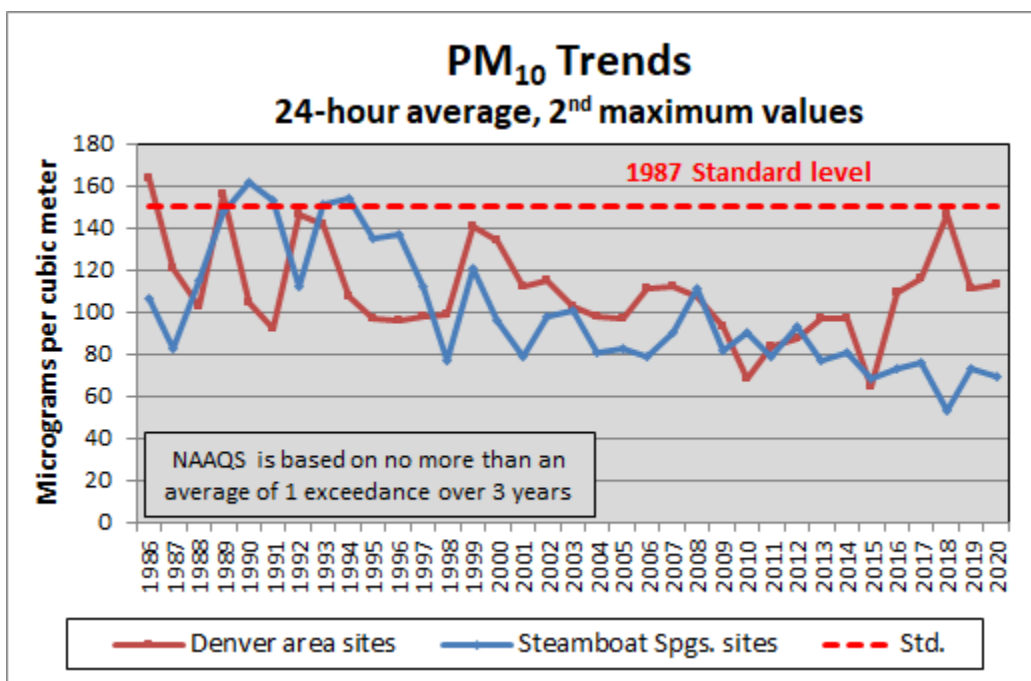
Major air pollutants - particulate matter

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. Currently, the Division monitors PM₁₀ at 15 locations. In Colorado, the majority of PM₁₀, about 85 percent, is from fugitive dust sources, including agriculture, construction, and paved and unpaved roads, according to the EPA's 2017 National Emissions Inventory (NEI). Trends are shown in the graph for the maximum concentration by year for all Denver metro area monitors, to provide a large city perspective, and for the 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 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) level more than once per year on average over a three-year period.

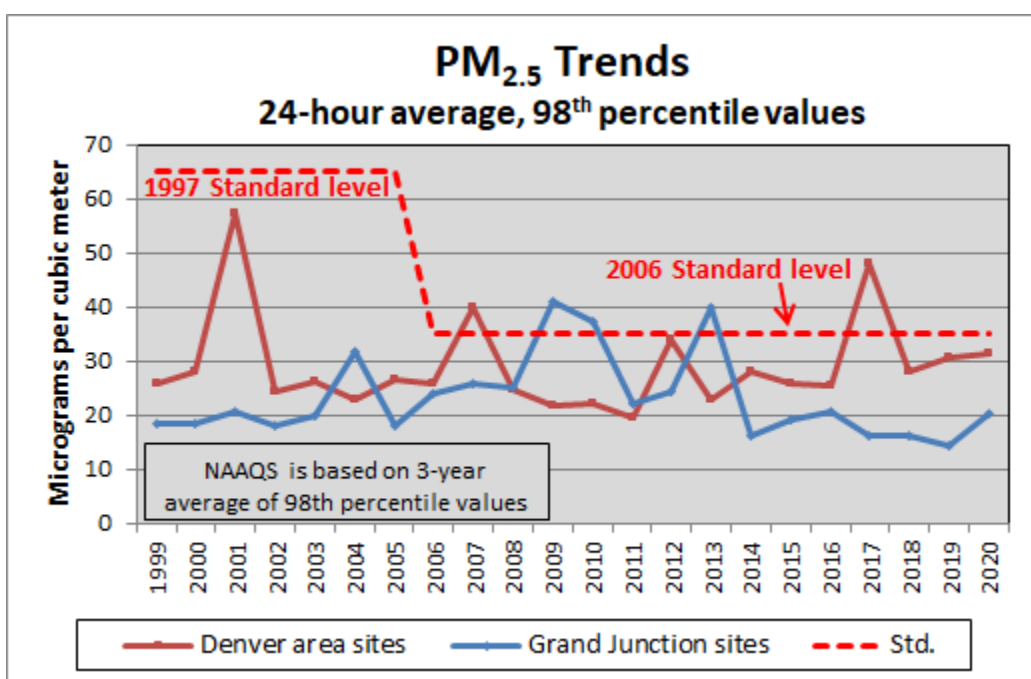
There are seven PM₁₀ maintenance areas in Colorado: Aspen, Canon City, the Denver Metropolitan area, Lamar, Pagosa Springs, Steamboat Springs, and Telluride. In September 2020, Cañon City became the first PM₁₀ maintenance area in Colorado to complete its 20-year maintenance period. The Pagosa Springs and Telluride PM₁₀ maintenance areas both completed their maintenance periods on August 14, 2021. Assuming they continue to attain the standard, as is expected, the Denver metropolitan PM₁₀ maintenance area will complete its maintenance period on October 16, 2022, the Aspen PM₁₀ maintenance area on November 16, 2023, the Steamboat Springs PM₁₀ maintenance area on November 24, 2024, and the Lamar PM₁₀ maintenance area on November 25, 2025. All of the control measures and requirements contained in each maintenance area plan must be complied with until the state submits, and EPA approves, a revision to the plan consistent with the anti-backsliding requirements of the CAA. The Division is consulting with EPA on next steps for Colorado's maintenance areas that have reached 20-years of maintenance.

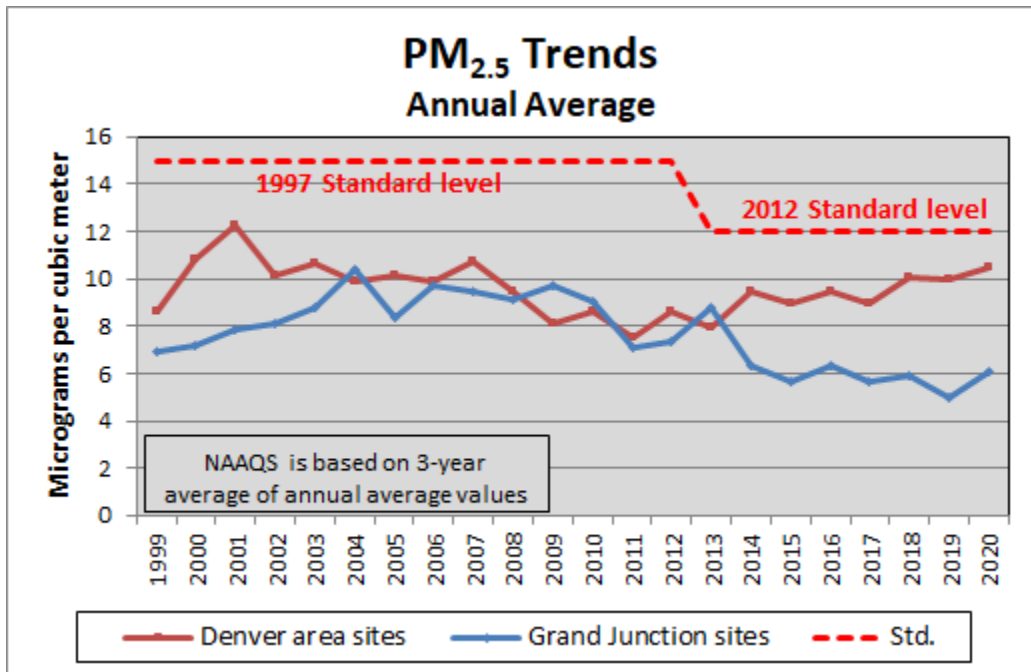


PM_{2.5}

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. Currently, the Division monitors PM_{2.5} at 16 locations. According to EPA's 2017 NEI, in Colorado about 49 percent of directly emitted PM_{2.5} is from fugitive dust sources while roughly 33 percent is from fire-related activities, such as prescribed fires, wildfires, and residential wood smoke. Much of the PM_{2.5} across the state 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 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 µg/m³. An area meets the annual standard if the annual average of 24-hour concentrations, averaged over three years is less than or equal to 12 µg/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. PM, primarily PM_{2.5}, affects visibility by altering the way light is absorbed and scattered in the atmosphere. With reference to climate change, some constituents of the ambient PM mixture promote climate warming (e.g. black carbon), while others have a climate cooling influence (e.g. nitrate and sulfate), thus ambient PM has both climate warming and cooling properties.²

Impacts in Colorado

All monitoring sites in Colorado meet the federal standards for both PM₁₀ and PM_{2.5} air pollution. However, the charts do show occasional exceedances of the 24-hour particulate standards in recent years. The exceedances shown in the charts 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. In addition, wildfire smoke can cause elevated levels of PM_{2.5} pollution in summer, as experienced in the past two seasons. When particle pollution reaches levels associated with adverse health impacts, the Division issues advisories encouraging citizens to minimize activities that cause emissions or limit their outdoor activities to reduce exposure.

² CARB, Inhalable Particulate Matter and Health (PM_{2.5} and PM₁₀), <https://ww2.arb.ca.gov/resources/inhalable-particulate-matter-and-health>

Major air pollutants - ground-level ozone

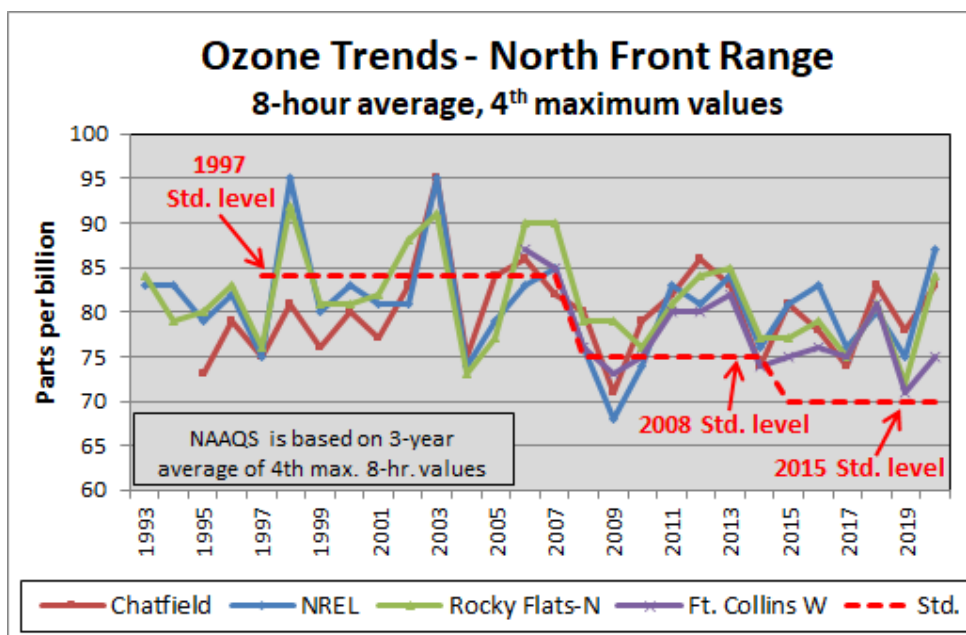
Ozone is formed through complex photochemistry involving volatile organic compounds (VOCs) and nitrogen oxides (NO_x) in the presence of sunlight. Ozone is not emitted directly. Instead, emissions of VOCs and NO_x from motor vehicles, industry, power plants, oil and gas production, and even vegetation contribute to ozone formation. Ozone is colorless and odorless at ambient concentrations. In the upper stratosphere, naturally occurring ozone helps protect the earth from ultraviolet radiation. While ozone is technically a GHG, the protective benefit of stratospheric ozone outweighs its contribution to the GHG effect and to global warming. The Division monitors ozone at 22 locations including sites in Evergreen and Platteville that were added in the past year.

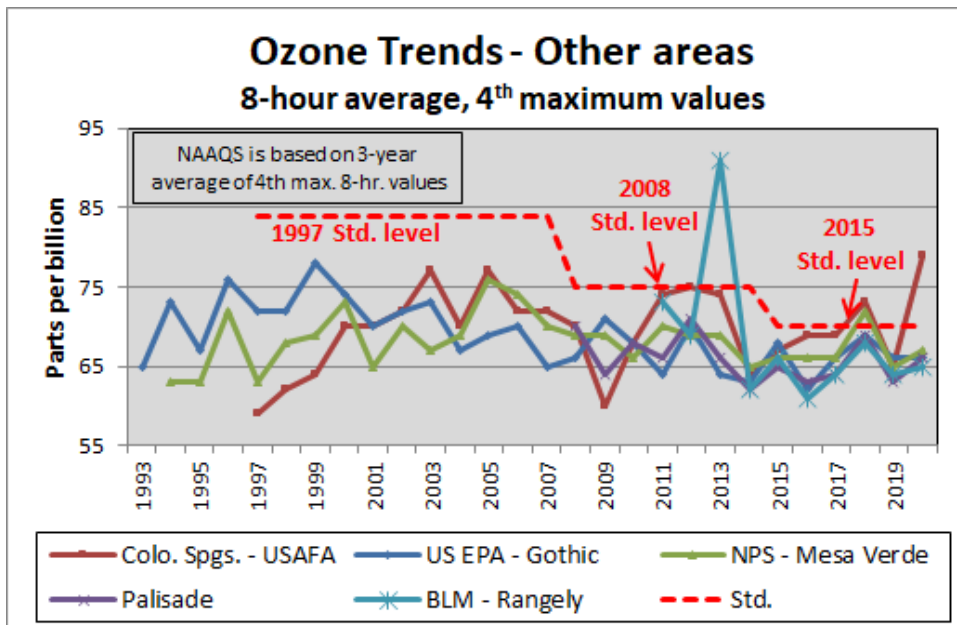
Health and Environmental Effects

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 vegetation and ecosystems, including forests, parks, wildlife refuges and wilderness areas. In particular, ozone harms sensitive vegetation during the growing season. In order to protect public health, NAAQS for ozone have been lowered over time as scientific understanding has advanced.

Impacts in Colorado

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 and there is snow cover. Ozone and its precursors are also transported into Colorado from other states and countries, and are exported from Colorado to states downwind. Ozone trends for the Denver Metro/North Front Range (DM/NFR) area and for other Colorado locations are shown in the pair of graphs below. The DM/NFR area violates the current ozone NAAQS, 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 (ppb) in 2008 and designated the DM/NFR 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 adopted revisions to the ozone SIP in November 2016, November 2017, and July 2018. In October 2015, the EPA adopted a more protective ozone standard of 70 ppb. In June 2018, the EPA finalized designations for the 70 ppb standard for all areas of Colorado, including classifying the DM/NFR area as a “marginal nonattainment area”. In 2019, the EPA reclassified the ozone nonattainment area from “moderate” to “serious” under the 2008 standard, with an effective date of January 27, 2020. In December 2020, the Commission adopted revisions addressing serious ozone nonattainment area SIP requirements. The SIP was submitted to EPA in March of 2021 following legislative approval. Due to ozone levels recorded during the period from 2018-2020, the area will be reclassified as “severe” under the 2008 standard and “moderate” under the 2015 standard in late 2021 or early 2022. Prior to late summer 2020 the area had been seeing a steady decrease in ozone design values over the last several years. High readings at the end of August 2020 and during the summer of 2021 have resulted in an increase in design values for 2020 and 2021. Both the 2008 and 2015 ozone standards are in effect and Colorado continues to plan accordingly. The major initiatives and regional air quality sections of this report provide additional information on efforts to reduce ozone and on ozone outside the DM/NFR area.

Major air pollutants - nitrogen dioxide

NO_x or oxides of nitrogen, comprise a group of highly reactive gases that contain nitrogen and oxygen in varying amounts. NO_x plays a major role in the formation of ozone, PM, haze and acid rain. NO_x is an “ozone precursor.” The majority of NO_x is nitrogen dioxide (NO₂) and nitric oxide (NO). Nitrogen dioxide is a reddish brown, highly reactive gas that is formed in the ambient air through the oxidation of nitric oxide. The major sources of man-made NO_x 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 and reactive oxides of nitrogen (NO_y) in select locations.

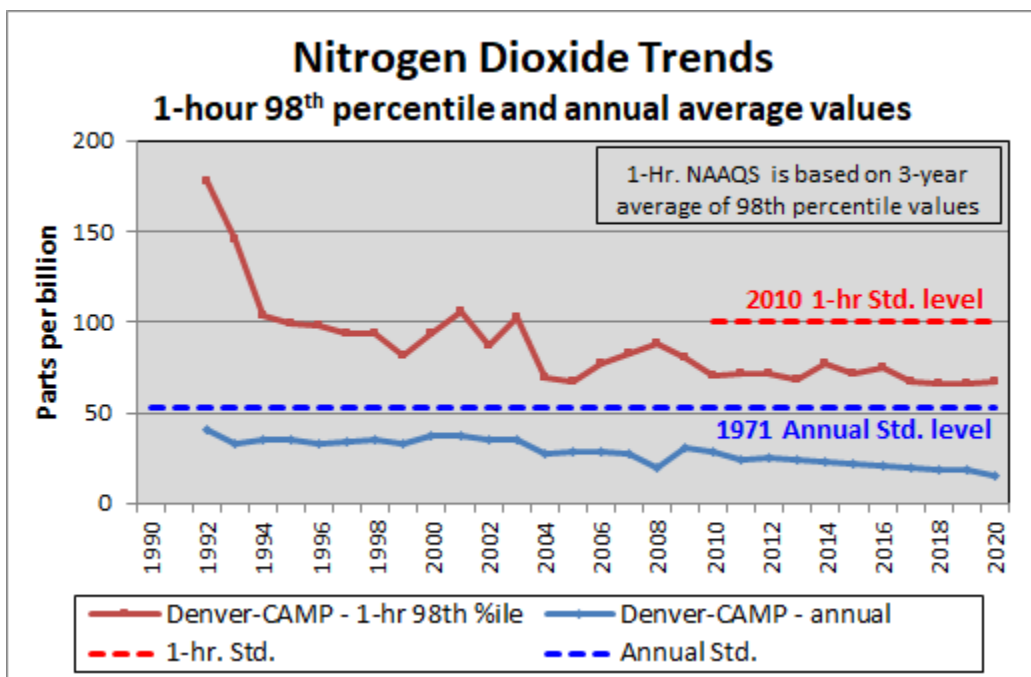
Health and Environmental Effects

NO_x reacts in the air to form ground-level ozone and fine particle pollution, which are associated with adverse health effects. Exposure to nitrogen dioxide 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 nitrogen dioxide at seven sites in Colorado: downtown Denver's CAMP station; Welby, just northeast of Denver; just southwest of downtown Denver near 8th Avenue and Interstate 25; just north of downtown Denver near the Interstate 25/Interstate 70 intersection; La Casa, in northwest Denver near Pecos Street and Interstate 70; at Rocky Flats, near Broomfield (installed in February 2019); and at the National Oceanic and Atmospheric Administration's Platteville Atmospheric Observatory location in Weld County (installed June 2020). All sites show nitrogen dioxide values that are below the National Ambient Air Quality Standards (NAAQS).

The Bureau of Land Management, Garfield County and the Southern Ute Indian Tribe also monitor nitrogen dioxide in Colorado and report their data to the EPA's Air Quality System database. These monitors also show levels below nitrogen dioxide standards. Trends are shown in the graph below for the Denver metro area nitrogen dioxide monitor that has historically recorded the highest concentrations.



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 sulfur dioxide emissions are from coal combustion at power plants and other industrial facilities. Smaller sources of sulfur dioxide emissions include industrial processes, on- and off-road diesel vehicles, and the burning of high sulfur fuels by locomotives and non-road equipment. Furthermore, sulfur dioxide 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.

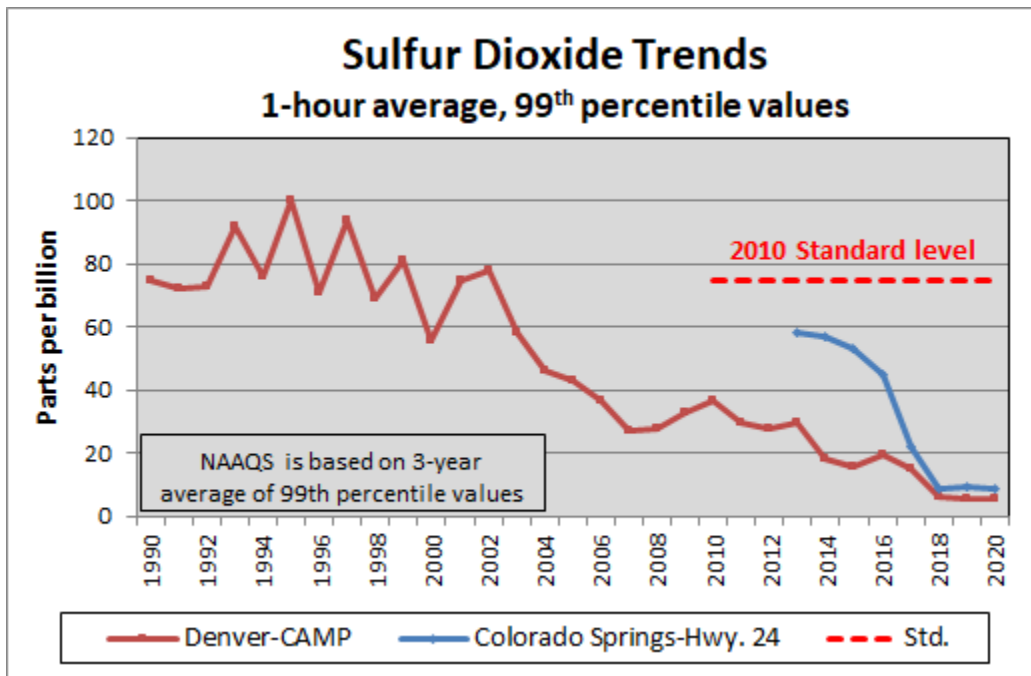
Health and Environmental Effects

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 PM, 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 NAAQS of 75 ppb with a 1-hour averaging period, which was tightened from the previous 24-hour standard. To attain the standard, the three-year average of the 99th percentile of daily maximum one-hour averages at each monitor within an area must not exceed 75 ppb. The Division currently monitors SO₂ at four locations. 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 7 ppb in 2019-2020. Due to concerns about sulfur dioxide emissions from the Martin Drake power plant, the Highway 24 (Colorado Springs) site was outfitted with a sulfur dioxide monitor in January of 2013. This site is below the standard with the 2018-2020 design value at 9 ppb.

Sulfur dioxide monitoring in Colorado Springs in 2020 and the first half of 2021 continues to show ambient concentrations that are well below the NAAQS. 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. In 2020 Colorado Springs Utilities announced that all coal-fired units at the Martin Drake plan will be retired by 2023.



Major air pollutants - carbon monoxide

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

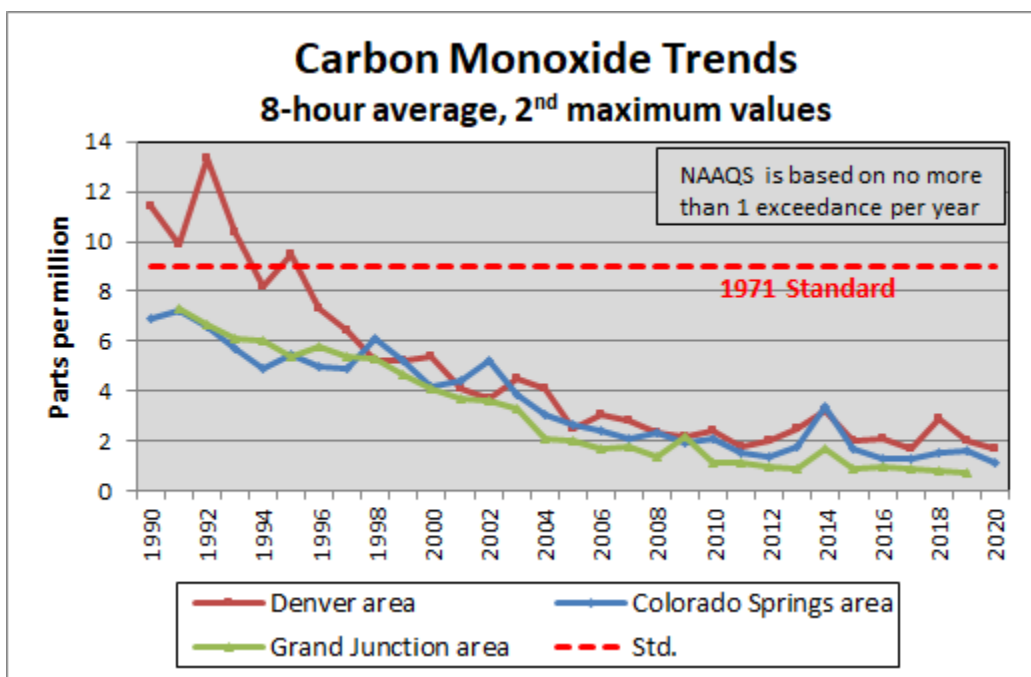
There are four carbon monoxide maintenance areas in Colorado: Colorado Springs, the Denver metropolitan area, Fort Collins, and Longmont. The Greeley and Colorado Springs carbon monoxide maintenance areas completed their 20-year maintenance periods in 2019. The Longmont carbon monoxide maintenance area completed its maintenance period on October 10, 2020. The Denver metropolitan area will reach its 20-year maintenance period on January 14, 2022. All of the control measures and requirements contained in each maintenance area plan must be complied with until the state submits, and EPA approves, a revision to the plan consistent with the anti-backsliding requirements of the CAA. The Division is consulting with EPA on next steps for these maintenance areas.

Health and Environmental Effects

Carbon monoxide affects the central nervous system by depriving the body of oxygen. The health effects of carbon monoxide 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 carbon monoxide concentrations have dropped dramatically since the early 1970s due to national vehicle emission controls. 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. The Division currently operates seven CO monitors. Trends are shown in the graph below for the maximum concentration by year for three large metropolitan areas across Colorado.



Indoor carbon monoxide 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 in the US are industrial metal processing, lead smelting and aviation gasoline. In 2008 the EPA revised the national standard for lead from 1.5 $\mu\text{g}/\text{m}^3$ to 0.15 $\mu\text{g}/\text{m}^3$.

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 installed 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 Centennial Airport 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 a component of PM₁₀ in Grand Junction at the National Air Toxics Trends site and also at three non-regulatory PM_{2.5} speciation sites in the Front Range.

Lead monitoring is required by EPA at one source-oriented State or Local Air Monitoring Station site located to measure lead concentration in ambient air resulting from each non-airport lead source which emits 0.50 or more tons per year based on the most recent NEI or other scientifically justifiable methods and data. The Rocky Mountain Bottling Company in Arvada was noted to have emissions listed at over 0.5 tons per year in the 2017 NEI. It was determined that they had used an incorrect emissions factor in their calculations that was 100 times too high. Thus, the source is actually well below 0.5 tons per year for lead emissions and monitoring is not required. [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 (HAPs), 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. Other listed air toxics include dioxin, asbestos, toluene, and metals such as cadmium, mercury, chromium, and lead compounds. Asbestos is a group of natural mineral fibers known for their strength and fire- and chemical-resistant properties. Asbestos has been mined and used in North America since the late 1800s. Due to this long legacy of use, asbestos is in thousands of building, industrial, and household products and substances.

The CAA 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 April 2020, when EPA revised the rule’s underlying cost benefit analysis³. 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.

On June 24, 2021, Governor Polis signed into law HB21-1189, Regulate Air Toxics. This law will advance the state’s air quality monitoring work by requiring fenceline monitoring as soon as 2023 at certain facilities emitting air toxics like benzene, hydrogen cyanide, and hydrogen sulfide. The law also provides funding to purchase a new mobile air monitoring van to perform community monitoring around the facilities.

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. Asbestos fibers are not harmful unless they are released into the air. When they are released, the fibers break down into tiny particles. When inhaled, the fibers collect in the lungs, causing scarring and inflammation. Asbestos is classified as a carcinogen (a cancer-causing substance). Exposure to asbestos can increase the risk of developing lung cancer, asbestosis, mesothelioma, scarring of the lung lining, pleural effusions, and cancer of the gastrointestinal tract, kidney and throat.

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. As discussed in the major initiatives section below, these emissions were addressed by Commission rulemaking in September, 2020.

³ EPA, Fact Sheet: Mercury and Air Toxics Standards for Power Plants, https://www.epa.gov/sites/default/files/2020-04/documents/fact_sheet_mats_an-rtr_final_rule.pdf

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. The “Emissions reductions from the oil and gas sources” section of this report discusses Commission actions related to SB19-181.

Asbestos was and still is used in building materials for a variety of reasons. Asbestos fibers are incredibly strong and have properties that make them resistant to heat, chemical damage and insulate against electricity, as well as adding durability to a product. Asbestos was added to thermal and acoustic insulation, fireproofing, roofing products and flooring. While six asbestos-containing product categories are subject to the 1989 EPA ban, EPA has no bans on other asbestos-containing products or uses. People who have worked directly with asbestos have the highest risk of developing asbestos-related diseases. In Colorado, certain remodel, renovation, and demolition activities are subject to asbestos regulations and requirements. See the asbestos general information link below for additional information.

Additional information:

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

Major air pollutants - greenhouse gases

GHGs warm the earth by absorbing energy and slowing the rate at which energy escapes to space; they act like a blanket insulating the earth. 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. Two key ways in which these gases differ from each other are their ability to absorb energy (their radiative efficiency) and how long they stay in the atmosphere (their lifetime).

The main GHGs are carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and fluorinated gases. Carbon dioxide enters the atmosphere through burning of fossil fuels (coal, natural gas, and oil), solid waste, trees and other biological materials, and also as a result of certain chemical reactions (e.g., manufacturing of cement). Carbon dioxide is removed from the atmosphere, or sequestered, when it is absorbed by plants as part of the biological carbon cycle. Methane is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices and by the decay of organic materials, such as the decay of waste in municipal solid waste landfills. Nitrous oxide is emitted during agricultural and industrial activities, combustion of fossil fuels and solid waste, as well as during treatment of wastewater. Fluorinated gases include hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF₆), and nitrogen trifluoride (NF₃). Fluorinated gases are synthetic, powerful GHGs that are emitted from a variety of commercial uses, consumer products and industrial processes. Fluorinated gases are sometimes used as substitutes for stratospheric ozone-depleting substances (e.g., chlorofluorocarbons). These gases are typically emitted in smaller quantities, but because they are potent GHGs, they are sometimes referred to as High Global Warming Potential (GWP) gases.

The GWP was developed to allow comparisons of the global warming impacts of different gases. Specifically, it is a measure of how much energy the emissions of 1 ton of a gas will absorb over a given period of time, relative to the emissions of 1 ton of carbon dioxide. The larger the GWP, the more that a given gas warms the earth compared to carbon dioxide over that time period. The time period usually used for GWPs is 100 years, although the GWP over 20 years is also commonly reported, especially for methane. GWPs provide a common unit of measure, which allows analysts to add up emissions estimates of different gases (e.g., to compile a GHG inventory), and allows policymakers to compare emissions reduction opportunities across sectors and gases.

Carbon dioxide, by definition, has a GWP of 1 regardless of the time period used, because it is the gas being used as the reference. Carbon dioxide remains in the climate system for a very long time. Carbon dioxide emissions can cause increases in atmospheric concentrations that will last for thousands of years. Methane is estimated to have a GWP of 25-36 over 100 years and a GWP of 72 - 84 over 20 years. Methane emitted today lasts about a decade on average, which is much less time than carbon dioxide, but methane also absorbs much more energy than carbon dioxide. The net effect of the shorter lifetime and high energy absorption is reflected in the GWP values. The methane GWP also accounts for some indirect effects, such as the fact that methane is a precursor to ozone, and ozone is itself a GHG. Nitrous oxide has a GWP 265-298 times that of carbon dioxide, for a 100-year timescale. Nitrous oxide emitted today remains in the atmosphere for more than 100 years, on average. Fluorinated gases are high-GWP gases because, for a given amount of mass, they trap substantially more heat than carbon dioxide. The GWPs for these gases can be in the thousands or tens of thousands.

Environmental Effects

Accumulation of GHGs in the atmosphere leads to rising temperatures, shifting snow and rainfall patterns, and can increase the intensity of weather 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.

Each GHG's effect on climate change depends on three main factors:

1. How much is in the atmosphere? Concentration, or abundance, is the amount of a particular gas in the air. Larger emissions of GHGs lead to higher concentrations in the atmosphere. GHG concentrations are measured in ppm, and even parts per trillion. One ppm is equivalent to one drop of water diluted into about 13 gallons of liquid (roughly the fuel tank of a compact car).
2. How long do they stay in the atmosphere? Each of these gases can remain in the atmosphere for different amounts of time, ranging from a few years to thousands of years. All of these gases remain in the atmosphere long enough to become well mixed, meaning that the amount that is measured in the atmosphere is roughly the same all over the world, regardless of the source of the emissions.
3. How strongly do they impact the atmosphere? Some gases are more effective than others at making the planet warmer and "thickening the Earth's blanket." Gases with a higher GWP absorb more energy, per pound, than gases with a lower GWP, and thus contribute more to warming Earth.

Impacts in Colorado

In Colorado the top four sectors emitting GHGs are electricity generation, transportation, the combination of residential, commercial, and industrial heating with natural gas, and oil and gas exploration and development. Other significant sources of GHG emissions in Colorado include oil and gas exploration and development, agriculture, forestry, coal mining, other industrial processes, and waste management including landfills.

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 are already occurring and will 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. A warmer and drier climate is expected to lead to more frequent and more intense wildfires near or within populated areas. Wildfires release large amounts of smoke that contain thousands of individual compounds, including carbon dioxide, particulate matter, ozone precursors, and trace minerals. Direct emissions of toxic pollutants can affect first responders and local residents. In addition, the formation of other pollutants as the air is transported can lead to harmful exposures for populations in regions far away from the wildfires.⁴
- 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.

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. In August 2021 the Intergovernmental Panel on Climate Change released its Sixth Assessment Report that addresses the most up-to-date physical understanding of the climate system and climate change, bringing together the latest advances in climate, and combining multiple lines of evidence from paleoclimate, observations, process understanding, and global and regional climate simulations. The Sixth Assessment Report concludes that human-induced climate change is already affecting climate and weather extremes in every region across the globe. The Report also finds that prompt global action to reduce emissions can still limit future warming impacts and improve local air quality.⁵ For additional information on GHG emissions reduction planning in Colorado, see the major initiatives section of this report.

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.

⁴ NOAA, The Impact of Wildfires on Climate and Air Quality, <https://www.esrl.noaa.gov/csl/factsheets/csdWildfiresFIREX.pdf>

⁵ IPCC, 2021: Summary for Policymakers. In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S. L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T. K. Maycock, T. Waterfield, O. Yelekçi, R. Yu and B. Zhou (eds.)]. Cambridge University Press. In Press.

The CAA sets a national goal of remedying any impairment of visibility in 156 protected “Class I” areas across the country, including 12 national parks and wilderness areas located in Colorado. The federal Regional Haze Rule sets out planning requirements for states to make progress toward that goal. The Regional Haze rule requires Colorado to 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.

Health and Environmental Effects

In our nation's scenic areas, the visual range is sometimes reduced substantially by air pollution. Haze has been reduced due to pollution reductions resulting from many different CAA programs, including the Regional Haze program. As a result, visual range in the Class I areas is improving. In western parks and wilderness areas, the average visual range improved between 2000 and 2015.⁶ Some of the pollutants which form haze are also 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.

Impacts in Colorado

Colorado’s 12 mandatory Class I areas are:

- Black Canyon of the Gunnison National Park
- Eagles Nest Wilderness Area
- Flat Tops Wilderness Area
- Great Sand Dunes National Park
- La Garita Wilderness Area
- Maroon Bells-Snowmass Wilderness Area
- Mesa Verde National Park
- Mount Zirkel Wilderness Area
- Rawah Wilderness Area
- Rocky Mountain National Park
- Weminuche Wilderness Area
- West Elk Wilderness Area

Monitoring data for all 12 of these Class I areas through 2019 show improvements in visual air quality over the past two decades. As discussed in the major initiatives section, upcoming coal plant closures will further reduce emissions that impact these areas.

⁶ EPA, Regional Haze Storymap,
<https://epa.maps.arcgis.com/apps/Cascade/index.html?appid=e4dbe2263e1f49fb849af1c73a04e2f2>

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.</p> <p>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 µg/m³ averaged over three years • 24-hour standard is 35 µg/m³ for the 3-year average of the 98th percentile value <p>PM₁₀ Standards 24-hour standard of 150 µg/m³ 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 "serious" 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 ppm.</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 ppm • 1-hour standard: 100 ppb 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.</p> <p>Other strategies include motor vehicle emissions control equipment, and power plant retirements.</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.	Sulfur dioxide can aggravate an individual’s respiratory tract, impair pulmonary functions and increase the risk of asthma attacks.	All of Colorado has met the standard.	<ul style="list-style-type: none"> • 1-hour standard: 75 ppb based on the 3-year average of the 99th percentile daily maximum values • State standard: 3-hour average not to exceed 700 µg/m³ more than once in twelve months. 	Colorado Air Quality Control Commission regulations control sulfur dioxide emissions from industry, new motor vehicle emission control equipment, power plant retirement.
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.	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.	No violations statewide since 1995. The following areas are in maintenance for carbon monoxide: Colorado Springs, Denver Metropolitan Area, Fort Collins, Greeley, and Longmont.	Two federal standards exist. <ul style="list-style-type: none"> • 1-hour standard: 35 ppm • 8-hour standard: 9 ppm 	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.
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.	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.	All of Colorado has met the standard. Lead-based paint regulations apply to homes built prior to 1978 and child occupied facilities. Pre-renovation education requirements apply to pre 1978 housing	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 µg/m ³ . Lead-based paint is defined as any paint containing more than one milligram per square centimeter of lead.	Lead gasoline phase out and stationary source controls. Colorado Air Quality Control Commission Regulation Number 19, Part A establishes requirements for lead-based paint abatement activities, including certification, inspection, and abatement requirements statewide. Regulation Number 19, Part B establishes pre-renovation education requirements statewide.
Hazardous Air Pollutants: Pollutants known or suspected of causing cancer or other serious health effects.	Hazardous air pollutants can increase risk of cancer, sterility and nervous system disorders.	Statewide.	The NESHAPs regulate approximately 190 pollutants. These standards are delegated to the states to enforce.	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, reformulated low-benzene gasoline, and real-time fence monitoring at certain facilities.

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 airborne asbestos fibers 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 Number 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.	Statewide.	CAA Sections 608 and 609 establish requirements for leak repair and the handling of ozone-depleting compounds in motor vehicle and stationary source applications.	Colorado Air Quality Control Commission Regulation Number 15 establishes registration, notification, reporting, and emissions control requirements statewide.
Hydrofluorocarbons (HFCs): Manufactured fluorinated gases primarily used for cooling, refrigeration, foam, aerosol propellant, fire extinguisher agents, and cleaning solvent.	HFCs are potent GHGs that contribute to the increased GHG effect, increase of the average temperature on earth, which leads to climate change. Exposure to high concentrations of HFCs may severely affect the heart and cause respiratory problems.	Statewide.	CAA Sections 608 and 609 establish requirements for leak repair and handling of HFCs in motor vehicle and stationary source applications.	Colorado Air Quality Control Commission Regulation Number 22 establishes phase-out requirements of HFCs in manufacturing and end-use products in Colorado.

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

HB21-1266, Environmental Justice Act

On July 2, 2021, Governor Polis signed the Environmental Justice Act (HB21-1266) into law. This transformative bill adopts a whole of government approach to advancing environmental justice, with a particular focus on the Commission and Division. The bill creates an Environmental Justice Action Task Force to make recommendations to the legislature, governor, and CDPHE by November 2022 about specific policies and practices to advance environmental justice. It also creates an Environmental Justice Advisory Board to respond to specific policy matters referred by the governor and CDPHE, and to administer a new environmental justice grants program funded by revenues from air pollution penalties. Finally, the bill creates an environmental justice ombudsperson to serve as a liaison to disproportionately impacted communities, receive and resolve complaints related to environmental justice, and serve as a resource to CDPHE in its environmental justice efforts.

In addition to these broad, CDPHE-wide environmental justice efforts, the Environmental Justice Act includes many specific requirements and resources for the Commission and Division specifically. It requires the Commission to undertake a rulemaking to define disproportionately impacted communities, based on new statutory criteria--a process that is underway with the development of the new Colorado EnviroScreen Tool. Based on that definition, the Environmental Justice Act requires the Commission to conduct enhanced outreach and engagement efforts around key rulemaking and permitting decisions that impact disproportionately impacted communities. It also requires, and provides additional resources for, air quality modeling and monitoring for permitting decisions in disproportionately impacted communities. Last but certainly not least, the Environmental Justice Act provides resources and sets specific requirements to further CDPHEs' work on climate equity. Under the new law, the Commission is directed to adopt regulations to reduce GHG emissions from oil and gas operations and from industrial and manufacturing facilities. Those regulations must factor in impacts in disproportionately impacted communities so that climate equity is embedded in the Department's decision-making. Specifically, the law:

- Requires the inclusion of GHGs in the list of air pollutants required to be reported in an air pollutant emission notice (APEN) and the setting of fees for GHG emissions;
- Requires the Commission to adopt rules that apply to permits for sources of pollutants that cause or contribute to significant health or environmental impacts in disproportionately impacted communities;
- Encourages the Commission to pursue programs that incentivize early reductions of GHG emissions from electric utilities, with the aim of achieving reductions of 48% by 2025 and 80% by 2030, relative to 2005 levels;
- Directs the Division to prepare an annual report that indicates whether the GHG emission reduction requirements are being met, and if not, to develop and propose additional requirements to the Commission;
- Requires each wholesale generation and transmission electric cooperative to file with the PUC and the Division an electric resource plan that will achieve at least an 80% reduction of GHG emissions by 2030, relative to 2005 levels;
- Requires the Commission to adopt rules to reduce GHG emissions from oil and gas exploration, production, processing, transmission, and storage operations by at least 36% by 2025 and 60% by 2030, relative to 2005 levels;

- Requires the Commission to adopt rules to reduce GHG emissions from the industrial and manufacturing sector in the state by at least 20% by 2030, relative to 2015 levels;
- Requires that the Commission adopt a rule requiring the Division to develop a GHG accounting system as a prerequisite to the adoption of a GHG trading program, and;
- Requires that the economic impact analysis for GHG rules must include an analysis of the social cost of GHGs. The Division must make publicly available the data upon which its GHG forecast is based and requires that the forecast include at least one scenario that does not include emission reductions projected to occur pursuant to existing law.

Additional information about the Division's GHG reduction activities and climate equity efforts is included in the GHG Emissions Reduction section of this report.

Ozone Reduction Efforts

The Denver Metro/North Front Range (DM/NFR) 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 8-hour 75 ppb ozone NAAQS 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 adopted changes to the SIP in 2016, 2017, 2018 and 2019. The EPA adopted a new 8-hour ozone standard of 70 ppb in October 2015. In June 2018, the EPA finalized designations with respect to the new standard for all areas statewide, including classifying the DM/NFR as a marginal nonattainment area. In June 2020, the Commission adopted the emissions statement, emissions inventory, and SIP compliance certifications to be submitted to the EPA, satisfying the marginal nonattainment area requirements for the 2015 ozone standard.

Meanwhile, the 75 ppb (2008) standard is still in place and the DM/NFR nonattainment area was classified as a "serious" nonattainment area by EPA in January 2020. In December 2020, the Commission adopted revisions addressing serious ozone nonattainment area SIP requirements. In July 2021, the Commission adopted additional categorical RACT requirements for stationary combustion equipment located at major sources of NO_x in the DM/NFR nonattainment area and updated requirements for metal parts surface coating. The serious area attainment deadline was July 20, 2021 based on 2018 - 2020 ozone season data. Due to ozone levels recorded during 2018-2020, the area will be reclassified as "severe" under the 2008 standard and "moderate" under the 2015 standard in late 2021 or early 2022.

The Division, the Commission and the Regional Air Quality Council (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. The Division issues ozone forecasts to alert sources in advance, encouraging them to voluntarily reduce their emissions on days when ozone levels are expected to be high. 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, more efficient, and cleaner technologies. 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 GHG emissions, ground-level ozone and hazardous air pollution, the Division, the Commission and the RAQC continue 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 Task Force (PCTF) in 2018-2019. The SHER Team's efforts informed a 2019 rulemaking proposal. The PCTF completed a study of rates of improper operation for pneumatic controllers in the DM/NFR nonattainment area in June 2020. This study informed a rulemaking on pneumatic controllers that was completed in February 2021.

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. In December 2019, the Commission adopted a set of rules to start to minimize emissions from oil and gas operations state-wide. The rules included the elimination of a 90-day permitting deferral on new oil and gas facilities; increased leak detection and repair frequencies; and more stringent control requirements for storage tank emissions and emissions from the loadout of storage tanks to trucks. In September 2020, the Commission adopted changes to Regulation Number 7, addressing NOx emissions from engines greater than or equal to 1,000 horsepower, disposal wells, and pre-production operations, including a first of its kind regulatory program requiring air quality monitoring at pre- and early-production operations.

In February 2021, the Commission adopted changes to Regulation Number 7 addressing emissions from pneumatic controllers at well production facilities and natural gas compressor stations. These revisions will require operators to install non-emitting pneumatic devices at new facilities and retrofit some controllers at existing facilities. The new requirements built on the Division's work with the PCTF and SHER teams and adopted an alternative proposal to include existing facilities that was developed collaboratively by local government, conservation, and oil and gas industry stakeholders. Pursuant to HB19-1261, the Division kicked off a major initiative to secure reductions in emissions of GHG and other pollutants from oil and gas operations in November 2020 and has since held a series of public stakeholder and listening sessions. GHG emissions targets for the upstream oil and gas sector and for industrial operations in the oil and gas industry were enacted into statute in summer 2021. The Division anticipates bringing a regulatory proposal to secure these reductions to the Commission for consideration at a December 2021 rulemaking hearing. Additional information is included in the GHG Emissions Reductions section of the report.

Greenhouse Gas Emissions Reductions

Colorado's 2019 and 2021 legislative sessions produced significant new directives to the Commission and Division for addressing GHGs. On May 30, 2019, Governor Polis signed into law SB19-096 and HB19-1261,⁷ 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. HB19-1261 establishes new GHG reduction goals of 26% by 2025, 50% by 2030 and 90% by 2050 (based on 2005 levels) and directs the Commission to develop cost-effective regulations to meet these goals. Related, SB19-236 establishes a new goal for qualifying retail electric utilities⁸ to reduce GHG emissions 80% by 2030, compared to a 2005 baseline.

⁷ Included in the Air Pollution Prevention and Control Act at 25-7-140, C.R.S and 25-7-102 and 103, C.R.S.

⁸ Xcel Energy is the only "qualifying" electric utility meeting this definition, but other utilities are allowed to voluntarily submit CEPs to the PUC under the legislation.

Fulfilling compliance with the 80% reduction requirement must be demonstrated through filing of a Clean Energy Plan with the Public Utility Commission, with the GHG reduction being verified by the Division. The Division, at the direction of the Commission, is also tasked with tracking progress towards and making recommendations on meeting these goals on an ongoing basis, with a report due to the General Assembly every odd-numbered year. The Division is anticipated to brief the Commission on the first of these progress reports in the Fall 2021, for submission to the General Assembly by December 2021. In October 2020 the Commission adopted a resolution including sector-specific emission reduction targets to ensure GHG reduction goals are met.⁹ As discussed earlier, HB21-1266, reinforces these GHG goals and bolsters reduction requirements for the electric utility, oil and gas, and industrial segments of the economy.

On June 24, 2021, Governor Polis signed into law HB21-1286 and SB21-264. HB21-1286, Energy Performance for Buildings, seeks to reduce the carbon footprint of buildings by requiring building benchmarking (tracking energy usage) and performance standards for building energy usage. Rulemaking and enforcement activities will be conducted by the Commission and the Division. SB21-264, Adopt Programs Reduce GHG Utilities, aims to improve the energy efficiency of buildings. It requires gas utilities to file a plan demonstrating how the utility will meet set GHG reduction targets. The utilities can achieve the reductions through tools like energy efficiency, hydrogen, and recovered methane. The bill directs the Commission to adopt rules concerning recovered methane, including that from inactive coal mines, by February 1, 2023.

To chart a path for reducing GHG emissions, state agencies along with the consulting firm E3 developed and modeled scenarios to project GHG emissions and evaluate strategies for meeting reduction targets. These scenarios have been developed with engagement of the public as well as other agency boards and commissions. On January 14, 2021, Colorado released its final GHG Roadmap. In September 2021 the Commission was briefed by the Colorado Energy Office and Division on Roadmap updates. Additional information is available on the [Colorado Energy Office's GHG Pollution Reduction Roadmap website](#).

Regulation Number 22

In May 2020, the Commission adopted Air Regulation Number 22. Part A establishes an economy-wide GHG reporting rule for Colorado. Part B establishes phase-out dates for HFCs from aerosol propellants, chillers, foams and stationary refrigerants, and will include future mitigation requirements for other GHGs. The reporting rule fills gaps in the current federal GHG reporting rules and provides the state with better data for its GHG inventory. Colorado's adoption of the HFC phase-out rules in Regulation Number 22 made it the first member of the Climate Alliance states¹⁰ to adopt the model framework they developed for phasing out these potent greenhouse gases. As part of the development of Regulation Number 22, the Climate Change Unit also began identifying and engaging Colorado communities that are disproportionately impacted by climate change and/or the regulatory actions of the Commission to reduce GHGs. The Climate Change Unit, with assistance from the Climate Equity Advisory Committee, developed a [Climate Equity Framework](#) for identifying and engaging these disproportionately impacted Colorado communities. The Climate Unit provided an update to the Commission on these efforts in September 2021.

⁹ Air Quality Control Commission, Resolution to Ensure Greenhouse Gas Reduction Goals Are Met, <https://drive.google.com/file/d/155LCi4kjAFpybQxiNFxggP5IduKDqiBZ/view?usp=sharing>

¹⁰ U.S. Climate Alliance states are committed to implementing policies that advance the goals of the Paris Agreement, aiming to accelerate new and existing policies to reduce GHG emissions and promote clean energy deployment.

The Climate Equity Framework:

- Provides key principles to help ensure the state's response to climate change considers equity every step of the way;
- Shares best practices in outreach and engagement with marginalized communities;
- Outlines a plan for stakeholder engagement for GHG reduction rulemakings;
- Provides a set of questions to help consider potential equity impacts of implementing rules, and;
- Features a [Climate Equity Dataviewer](#) component that will help focus and prioritize outreach and engagement efforts, as well as consider potential impacts by ranking and mapping layers of data sets that represent the criteria for disproportionately impacted communities defined by HB19-1261.

The Climate Equity Community Subcommittee will be comprised of community members who have an interest in climate change and equity issues. The Subcommittee is expected to have its first meeting in October of 2021 and they will meet regularly to discuss upcoming GHG reduction rule concepts, outreach and engagement plans, and other relevant climate equity-related items.

Clean Energy Plan Verification and Supplemental Data

As part of the requirements set out in SB19-236 for utilities to submit Clean Energy Plans to the PUC, the Division, in consultation with the Commission, is charged with determining if the plan will meet the mandated emission reductions by 2030. In 2019 and 2020 the Climate Unit facilitated a stakeholder process with utilities and NGOs to develop guidance on the criteria by which Clean Energy Plans will be evaluated. In January 2021, the Commission adopted a resolution to support the Division's Clean Energy Plan guidance.¹¹ The Clean Energy Plan guidance document and associated emissions verification workbook was published in March 2021. Many of these same stakeholders also worked with the Climate Change Unit in a separate but related stakeholder process to develop the supplemental data form requirements for electric utilities required as part of the Regulation Number 22, Part A, GHG reporting rules. The supplemental data forms will track the flow of imported electricity as well as compliance with Clean Energy Plans once approved by the PUC.

GHG Emissions and Energy Management and Audit Program for Manufacturing

The Division is developing a regulation for GHG Emissions and Energy Management for Manufacturers in Colorado (GEMM) under the authority of HB19-1261 and HB21-1266. The rule would require that energy intensive trade exposed facilities utilize a third party to conduct an audit every five years (starting in 2022) to ensure that the best technology to save energy and control GHG emissions is in use. Those facilities that are determined to be using the best technology to control emissions will be required to reduce an additional 5 percent of their emissions. The Commission is expected to consider the GEMM proposal during its October 2021 meeting. Other industrial and manufacturing facilities will be subject to additional reductions requirements in a second phase of rulemaking.

¹¹ Air Quality Control Commission, Resolution to Support Air Pollution Control Division Clean Energy Plan Guidance, <https://drive.google.com/file/d/1wUsdlUTgpPjw5cLmEFagc0l0iyqSNRV1/view?usp=sharing>

GHG Inventory

As part of the 2019 legislative session's suite of requirements on GHGs, the Division is directed to update the statewide GHG inventory no less frequently than every two years.¹² The inventory must include a forecast of GHG emissions for the state in years 2025, 2030, 2035, 2040, and 2045, along with, in the initial inventory, a recalculation of the 2005 baseline emissions. For comparative purposes, the inventory will include multiple GWP values (e.g. GWP values for shorter time horizons for short-lived climate pollutants such as methane). The Division published a draft inventory in line with these new criteria for initial release in January 2021, soliciting public comments through March 31, 2021. For the year 2020, Colorado's draft 2021 inventory estimates carbon dioxide to make up 64.8 percent of GHG emissions, methane to make up 28.4 percent, with nitrous oxide and fluorinated gases contributing 6.7 percent (based on the 100-year GWP of each gas). The largest sources of GHG emissions from human activities in Colorado are electricity generation, transportation, fuel combustion to heat buildings and provide heat for industrial processes, and oil and gas exploration and production. The draft 2021 Colorado GHG Inventory is available on the Division's [Colorado GHG Inventory website](#) and the referenced projections are included in Exhibit ES 4 and ES 6 on page 7 and 9 of the report. In September 2021 the Division provided a briefing on the GHG Inventory, including an update on GHG reporting and data gathering. The Division is also developing a GHG Dashboard to track activities impacting GHG emissions within the state. The GHG Dashboard will provide frequently updated information on metrics such as oil and gas production, vehicle miles traveled, and zero emission vehicle sales. The Dashboard is expected to be completed before the end of 2021.

Oil and Gas GHG Reduction Effort

The Division is developing a new regulatory program to reduce GHG emissions from oil and gas operations, to help achieve the reductions required under HB19-1261 and HB21-1266, and as specified in the Commission's resolution to ensure GHG reduction goals are met. The targets include oil and gas sector GHG reductions of 36% by 2025 and 60% by 2030, based on a 2005 baseline. The Division initiated a stakeholder process in November 2020 and has since held a series of public meetings to inform the regulatory proposal. The Division is considering the following strategies: limits on emissions intensity (emissions per unit oil and gas production) for upstream operations, a program for reducing midstream GHG emissions, and additional direct regulation including control requirements or emissions standards for certain equipment and/or processes. The Division anticipates bringing its proposal to the Commission for consideration at a December 2021 rulemaking hearing. See the Division's Oil and Gas Roadmap Stakeholder Process website for additional information.¹³

Other Actions

GHG emissions reduction initiatives for the transportation sector are discussed in the next section. Additionally, other regulatory actions taken by the Commission, while not directly aimed at addressing climate change, will also reduce GHG emissions. For example, the Regional Haze actions discussed below incorporate significant reductions in GHG emissions from electrical generating units due to coal power plants retiring and/or repowering with natural gas.

¹² SB-096; 25-7-140(2)(a)(II).

¹³ APCD, Oil and Gas Roadmap Stakeholder Process, <https://cdphe.colorado.gov/oil-and-gas-greenhouse-gas-roadmap-stakeholder-process>

SB21-260 and Transportation Emissions Reductions

Based on the state's draft 2021 GHG inventory, transportation became the largest single sector of GHG emissions in Colorado in 2020, surpassing electric power production. Light-duty or passenger vehicles account for 62% of all transportation emissions. In 2018, the Commission adopted California's emissions standards for new light duty vehicles sold in Colorado, effective with the 2022 Model Year. Further action was taken in 2019 when the Commission adopted the Zero Emissions Vehicle (ZEV) rule, requiring auto manufacturers to make increasing numbers of electric and other zero emissions vehicles available for sale in Colorado starting with the 2023 Model Year. The GHG Roadmap includes several new strategies for reducing transportation emissions and sets a goal of a 40% reduction in GHG emissions from transportation by 2030 to help achieve the statewide emission reduction targets established in HB19-1261. Transportation emissions are also a significant contributor to ozone formation in the DM/NFR. According to recent modeling, transportation is projected to be the top contributor to ozone formation at most ozone monitors in the DM/NFR.¹⁴ In October 2021, the Commission will discuss transportation emission reduction strategies to inform a resolution on the Commission's role in these efforts. Building from the work of the RAQC and local transportation management associations, the Division proposed the Employee Traffic Reduction Program (ETRP) as a potential GHG reduction and air quality improvement strategy. ETRP was adapted from transportation demand management strategies that have been implemented to decrease single occupancy vehicle trips to and from worksites for decades in various cities, counties, and states throughout the U.S. The Division's stakeholder process for ETRP was perhaps its most extensive stakeholder effort ever, including two mass mailings to large employers, five large public listening sessions (offered in English and Spanish), six public meetings, two workshops on equity considerations, and numerous small meetings with chambers of commerce, environmental groups, local governments, and community members. Ultimately, the Division withdrew the ETRP proposal due to concerns among some of the business community and others, and is currently working with its partners to develop a voluntary ETRP.

SB21-260 Sustainability of the Transportation System

On June 17, 2021, Governor Polis signed into law SB21-260, Sustainability of the Transportation System. This landmark bill is expected to provide a funding stream of \$5.3 billion over the next decade for transportation infrastructure, including multi-modal transportation and vehicle electrification. In fact, the bill creates the second largest funding stream in the United States for transportation electrification. As part of the larger funding package administered in conjunction with the CDOT and the Colorado Energy Office, CDPHE will oversee the Clean Fleet Enterprise, a fund that collects fees assessed on rideshares and retail deliveries and that is used for incentivizing and supporting the use of zero emission vehicles and other clean fleet technologies by owners and operators of motor vehicle fleets. SB21-260 also directs the Transportation Commission of Colorado to adopt procedures and guidelines requiring CDOT to implement relevant rules and regulations to help achieve statewide GHG reduction targets. Originally anticipated to be considered by the Air Quality Control Commission, CDOT proposed a GHG Transportation Planning Standard before the Colorado Transportation Commission in August 2021. The rule would require CDOT and MPOs to determine the total GHG emissions expected from future transportation projects and take steps to ensure that GHG emission levels do not exceed set GHG reduction amounts. The rule includes interagency consultation requirements, including provisions for the Division to review and verify technical data contained in applicable planning documents. If adopted, the rule will become effective in early 2022, and the benefits of this standard are estimated to be the equivalent of burning 169 million fewer gallons of gasoline or taking approximately 300,000 cars off the road for a year.

¹⁴ Regional Air Quality Council, 2023 Ozone Source Apportionment Modeling Results by Monitor, https://raqc.egnyte.com/dl/4BCs9rZaC1/Modeling_Results_by_Monitor.pdf_

Motor Vehicle Emissions Inspection Program

In August 2021, the Commission adopted revisions to Regulation Number 11, Motor Vehicle Emissions Inspection Program. The revisions tighten the emissions standards or “cutpoints” used to test vehicle emissions as they undergo dynamometer-based IM240 emissions testing. The IM240 emissions test is part of the emissions inspection program that motor vehicles older than twelve model years old must undergo every two years (1982 and newer) prior to vehicle registration in the Front Range Automobile Inspection and Readjustment (AIR) Program area. Updating vehicle emissions standards will improve the effectiveness of the current vehicle emissions inspection program by increasing the program’s ability to detect and have repaired high emitting vehicles that contribute to the area’s air quality. It is projected that ozone precursor emissions will be reduced by over one ton per day, improving air quality. At the same time, the Commission adopted updates to Regulation 20, the Colorado Low Emissions Automobile Regulation (CLEAR) in August 2021 to maintain alignment with California rules, as required under the Clean Air Act, Section 177.

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 CAA 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 ZEV supply equipment), alternative fuel, or cleaner diesel technology. On 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.” In 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 NO_x, carbon dioxide, and other pollutants by funding eligible projects from the transportation sector. To date, over \$30 million in funds has been awarded to applicants throughout Colorado. A complete list of awardees and project details can be found on the VW settlement funding awardees webpage.

Regional Haze

The federal Regional Haze Rule focuses on National Parks and Wilderness (Class I) Areas. Under the CAA, “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. Covered areas include 12 national parks and wilderness areas in Colorado. To help improve visibility conditions at these areas, the Commission adopted the first 10-year Regional Haze SIP in January 2011 with revisions in 2014 and 2016, and in 2015 adopted the first five-year regional haze progress report. The SIP revisions in 2016 required: 1) Craig Station Unit 1 to either retire by the end of 2025 or switch to natural gas, under which they must cease burning coal by August 2021 and begin firing natural gas by August 2023 (Craig Station Unit 1 will retire no later than December 31, 2025); and 2) Nucla Station to retire by the end of 2022 (Nucla Station retired early in 2019). EPA approved Colorado’s first five-year progress report in September 2019.

The Division is partnering with other states in the Western Regional Air Partnership (WRAP) and Federal Land Managers in development of the data and modeling products necessary for the second 10-year Regional Haze SIP that was due to EPA in July 2021. In December 2020 the Commission adopted new Regional Haze requirements under a new Regulation Number 23, and moved existing Regional Haze requirements previously in Regulation Number 3, Part F into Regulation Number 23. The Division split the Regional Haze rulemaking into two phases due to delayed completion of data products necessary to complete the SIP. The first phase formalized the announced retirement dates of some of the fossil fuel fired electric generating units in Colorado and secured over 30,000 tons of annual emissions reductions. The retirement dates adopted in phase 1 are as follows:

- Comanche Generating Station, Unit 1 no later than December 31, 2022, Unit 2 no later than December 31, 2025
- Martin Drake Power Plant, Units 6 and 7, no later than December 31, 2022
- Craig Generating Station, Unit 1, no later than December 31, 2025, Unit 2, no later than September 30, 2028, Unit 3, no later than December 31, 2029
- ColoWyo Coal Mine, no later than December 31, 2031
- Nixon Power Plant, Unit 1, no later than December 31, 2029
- Rawhide Generating Station, Unit 1, no later than December 31, 2029
- Cherokee, Unit 4, no later than December 31, 2028

The second phase of the rulemaking is evaluating 17 additional facilities for control strategies, and accounts for voluntary closure and fuel switching at two additional fossil electric generating facilities, pending Public Utilities Commission (PUC) approval. The Commission will consider the phase 2 proposal during its November 2021 meeting. Additional information and planning documents are available at the Division's Regional Haze website.

Air Quality Enterprise

On June 30, 2020, Governor Polis signed into law SB20-204, which creates a new Air Quality Enterprise to fund air quality research, including monitoring, modeling, and other assessments. This ground-breaking endeavor will provide stable and long-term funding for Colorado's world class air quality researchers to help the state tackle our most difficult air quality issues. The stakeholder process for the Air Quality Enterprise's fee rule began in the fall of 2020 and the Governor appointed Enterprise Board members in December 2020. The Board convened in January 2021 and a research community stakeholder process was initiated in the summer of 2021. The Air Quality Enterprise fee rule was adopted in June 2021. Criteria for fund usage are currently being developed, and the board is soliciting input from division staff, fee payers, disproportionately impacted community members, local public health agencies, environmental non-governmental organizations, and the research community.

Emission Reductions from Cannabis Sources

Colorado legalized medicinal marijuana November 2000 and recreational marijuana use December 2012. There are air quality impacts from the growing operations (odor) and solvent extraction operations (VOCs). The cultivation operations are considered “agricultural” and the agricultural production may be exempt from Air Quality Regulations unless emissions trigger a major source threshold or are needed to attain National Ambient Air Quality Standards. 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. Carbon filtration is the best available control technology for reducing VOC emissions from both cannabis cultivation and processing facilities. Processing facilities are subject to permitting requirements based on the amount of solvent lost to evaporation as VOC emissions; APCD has developed a guidance document for these sources.

For the Cannabis Cultivation VOC emissions study, the testing protocol was finalized in 2018, in 2019 the Division collected air quality samples at four different sources that agreed to voluntarily participate in an emissions study. The results of the collected samples were used to model the cannabis industry’s potential ozone impact in 2020 and results are expected to be published in 2021. The study found that even though cannabis cultivation facilities can have overwhelming nuisance odor impacts, based on samples collected and production rates they actually have a low VOC emissions rate, even at large high-volume production facilities. Additionally, the emissions profile lacked isoprene, a terpene commonly emitted from other plants that is highly reactive for ozone formation. The resulting low VOC emissions rate and the lack of isoprene from cannabis cultivation facilities sampled resulted in a very low to negligible impact on both ozone and PM_{2.5} formations in the DM/NFR nonattainment area.

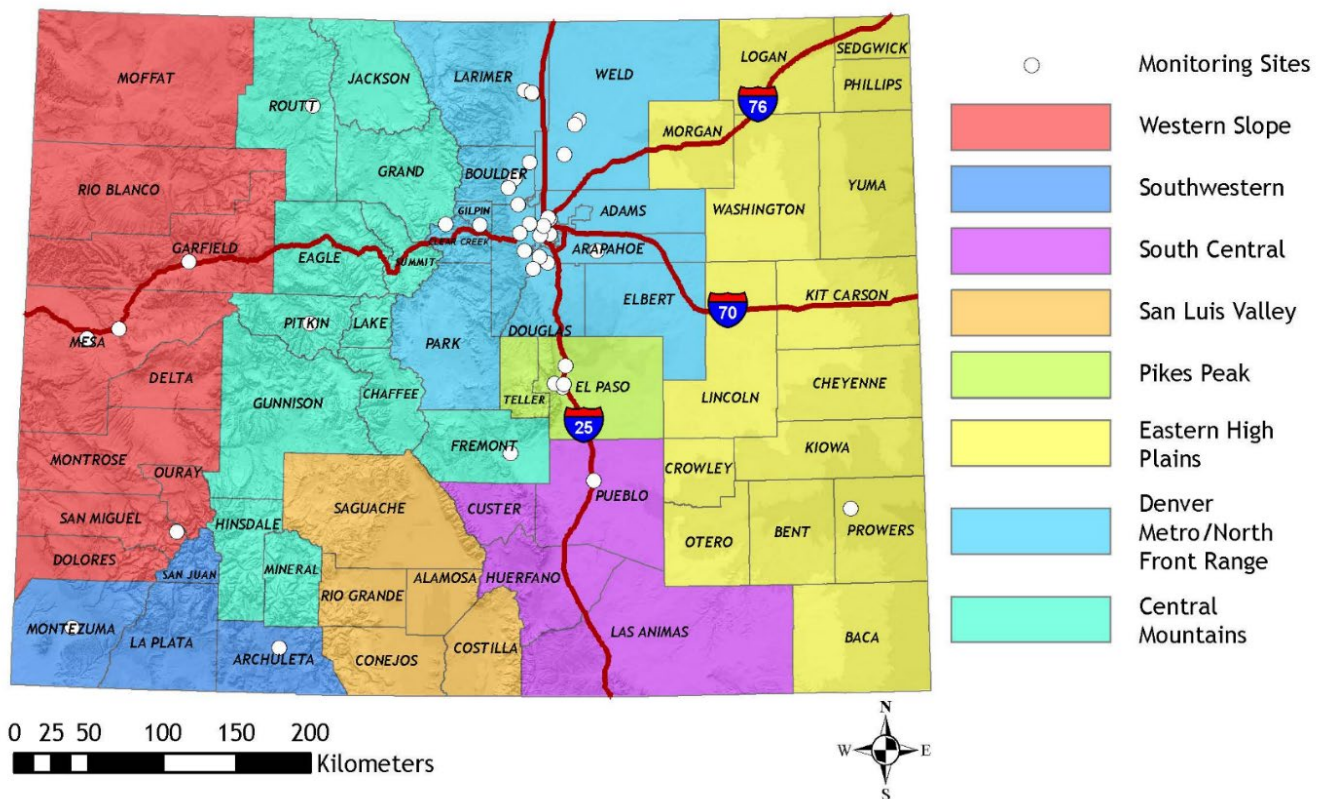
Asbestos and Lead-based Paint Rule Revisions

In 2020 the Division’s Indoor Environment Program held a series of stakeholder meetings as part of the process to review and revise Regulation Number 8, Part B, Asbestos Control. The proposed revisions include updating requirements for inspections, project designs, notifications, spill response, among other general updates. The Commission adopted the proposed revisions on January 22, 2021. In March 2021 the Indoor Environment Program kicked off its stakeholder process to revise Regulation Number 19, Lead-based Paint. Proposed revisions include updating regulatory language and lower clearance and lead dust hazard levels to reflect changes in federal regulations. The Commission is expected to consider the proposed revisions during its November 2021 meeting.

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 DM/NFR Region includes Adams, Arapahoe, Boulder, Broomfield, Clear Creek, Denver, Douglas, Elbert, Gilpin, Jefferson, Larimer, Park, and Weld counties. It includes the largest population area of the state, with 3.2 million people living in the seven-county Denver-metro area and nearly 700,000 living in the northern Colorado area of Larimer and Weld counties. According to the U.S. Census Bureau, the population in this area increased by 17.8% between 2010 and 2020.¹⁵ 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 NAAQS, except for ozone. Information on ozone trends and SIP planning is included in the major pollutants and major initiatives sections of this report.

In order to improve air quality and reduce harmful emissions from mobile sources in the DM/NFR area, 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 carbon monoxide 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 and roadside remote sensing devices throughout the DM/NFR. In 2020, the AIR Program inspected 966,436 vehicles, reducing 16.35 tons per day of ozone precursor emissions.

The Division completed its first airborne survey designed to monitor for methane and other emissions at major oil and gas sites in the Denver-Julesburg Basin in July 2021. The initial flights are the first of many scheduled for later in 2021. The aerial surveys will focus on areas north and northwest of Denver in Boulder, Adams, Weld and Larimer counties. The Division's aerial work will have four phases and will be supported by ground monitoring and inspections to verify data and to monitor emissions at smaller operations.

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. In July 2019, in response to the 2017 Milestone Report and failure to meet the milestone, the Commission issued a Resolution requiring increased visibility of the initiative as well as consideration of the impact on nitrogen deposition within the Park in related upcoming rulemakings such as Regional Haze, SB-181, oil and gas GHG, and Ozone. For more information on this voluntary initiative, see the [Rocky Mountain National Park Initiative website](#).

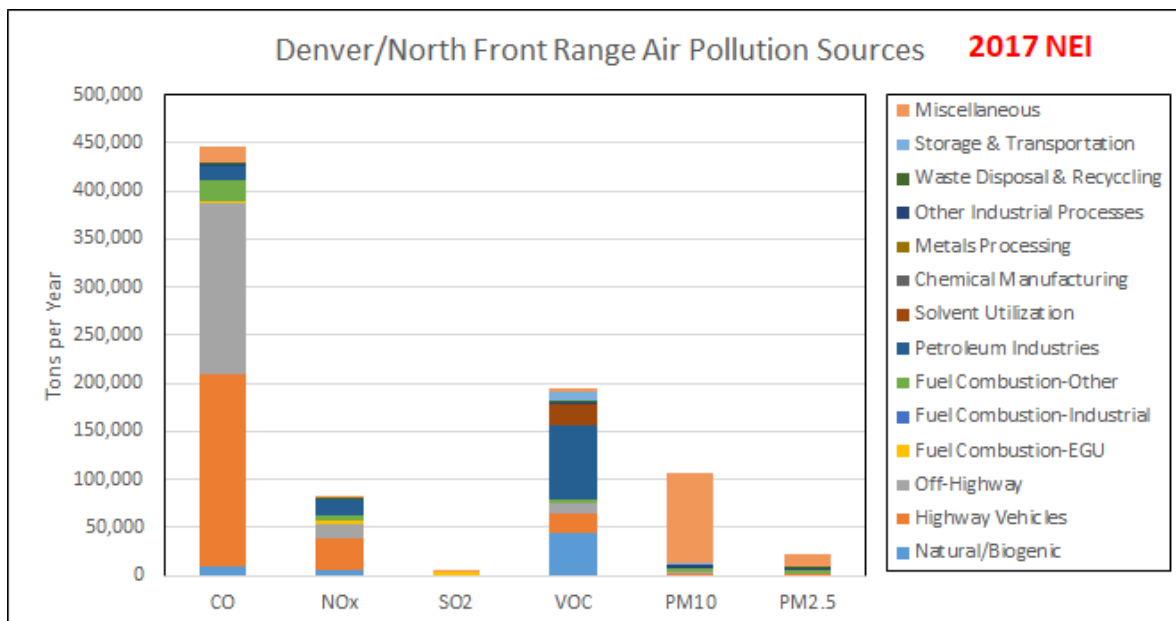
¹⁵ U.S. Census, County Population Totals: 2010-2020, <https://www.census.gov/programs-surveys/popest/technical-documentation/research/evaluation-estimates/2020-evaluation-estimates/2010s-counties-total.html>

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 PM emissions from power plants.
- Non-selective catalytic reduction to reduce NO_x at cement plants.
- At power plants, low NO_x burners, fuel switching to natural gas and unit shutdowns. Cherokee power plant, Unit 4 will be retired no later than December 31, 2028. Rawhide power plant, Unit 1 will be retired no later than December 31, 2029.



Regional air quality - Eastern High Plains

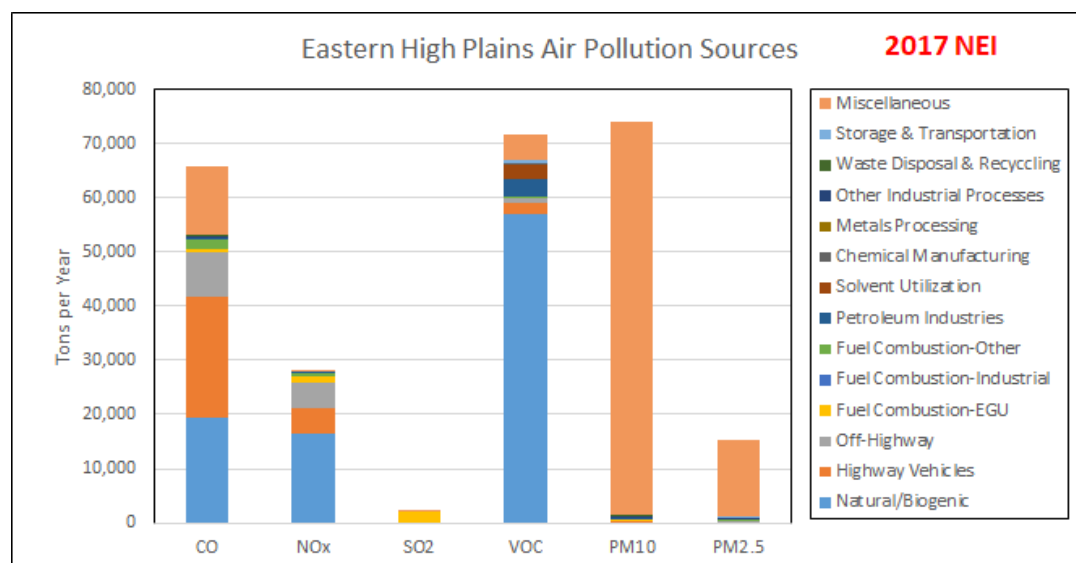
The Eastern High Plains region makes up 40 percent of Colorado's land area and encompasses the counties on the plains of eastern Colorado. The area is semi-arid and often windy. The area's population is 133,432 according to 2020 U.S. Census Bureau estimates. The population in this area decreased by 2.7% between 2010 and 2020. 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 NO_x burners, and selective catalytic reduction at Pawnee Power Plant. If approved by the PUC, Unit 1 will be converted to natural gas fuel by December 31, 2028.
- Low NO_x 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

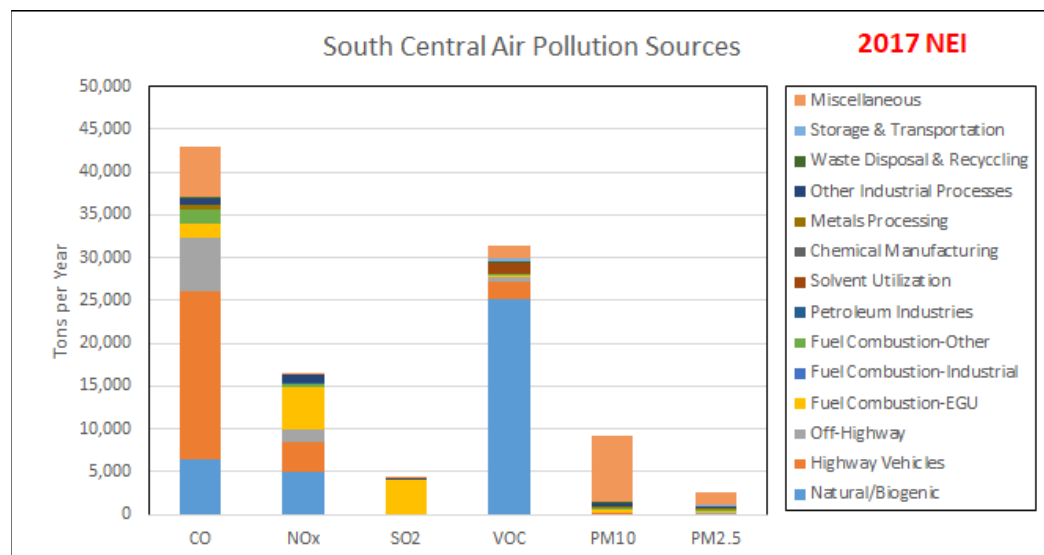
The South Central Region comprises Pueblo, Huerfano, Las Animas and Custer counties. Its population is 196,309 according to 2020 U.S. Census Bureau estimates. Urban centers include Pueblo, Trinidad and Walsenburg. The population in this area increased by 5.6% between 2010 and 2020. The region has rolling semi-arid plains to the east and is mountainous to the west. All of the area complies with federal air quality standards. Ozone monitoring will begin at a new site in the city of Pueblo in the next year. Site selection is underway by the Division.

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 NO_x burners, lime spray dryers and activated carbon mercury controls at Comanche Power Plant to reduce NO_x, sulfur dioxide and mercury emissions. Unit 1 will be retired no later than December 31, 2022, and Unit 2 will be retired no later than December 31, 2025.
- Selective non-catalytic reduction and fabric filter baghouses at GCC Rio Grande Cement Plant.
- Low-NO_x burners, fuel restrictions, fugitive dust control plan, 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 753,839 according to 2020 U.S. Census Bureau estimates. The population in the area increased by 15.8% between 2010 and 2020. 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.

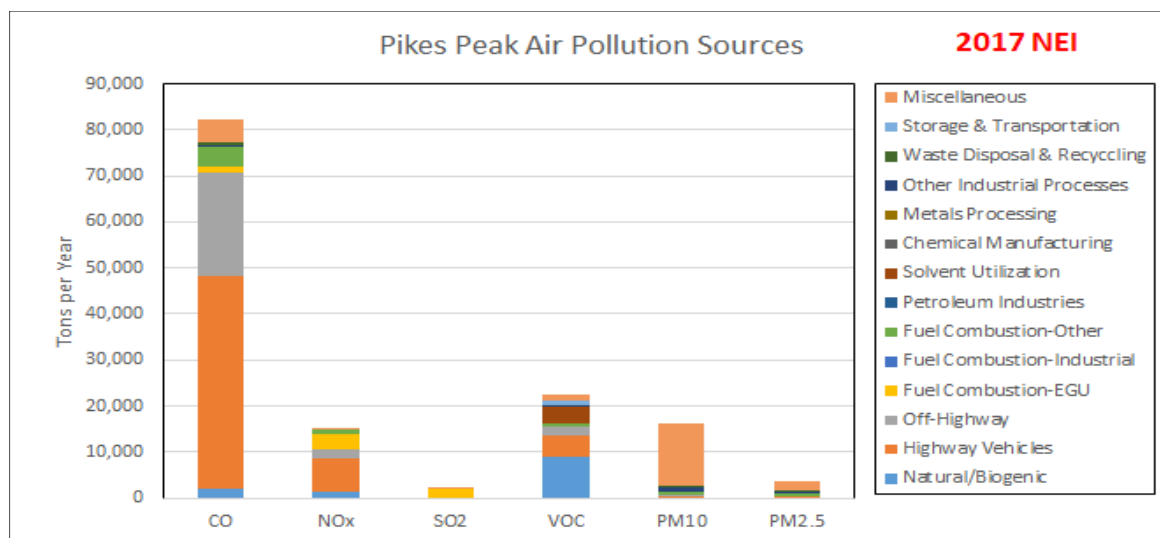
- Motor vehicles.
- Road dust.
- Area dust from construction activities.
- The Drake and Nixon power plants and Fountain Valley Electric Generating Station.
- Sand and gravel operations.

Air Pollution Control Measures

- Street sweeping.
- Dust control plans.
- Flue gas desulfurization systems and low NO_x burners at power plants to control sulfur dioxide and NO_x emissions. Martin Drake Power Plant, Units 6 and 7 will be retired no later than December 31, 2022. Nixon Power Plant, Unit 1 will be retired no later than December 31, 2029.
- 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 sulfur dioxide. The Division continues to work with the Pikes Peak Area Council of Government (PPACG) Air Quality Technical Committee in raising public awareness and taking precautionary measures to reduce ozone levels. In 2020, PPACG committed to the EPA Ozone Advance Program. The Ozone Advance Program supports states, tribes, and local governments that want to take proactive steps to keep their air clean by promoting local, voluntary actions to reduce ozone. PPACG submitted its Ozone Advance Plan to EPA in January 2021. The plan identifies outreach and education, data collection, and administrative tasks that PPACG will take action on.¹⁶ 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.

¹⁶ U.S. EPA, Pikes Peak Region Ozone Advance Plan, https://www.epa.gov/sites/default/files/2021-01/documents/co_pikes_peak_2020_path_forward.pdf



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 46,478 according to 2020 U.S. Census Bureau estimates. The population in the region increased by 2.1% between 2010 and 2020. Agriculture and tourism are the primary economic activities.

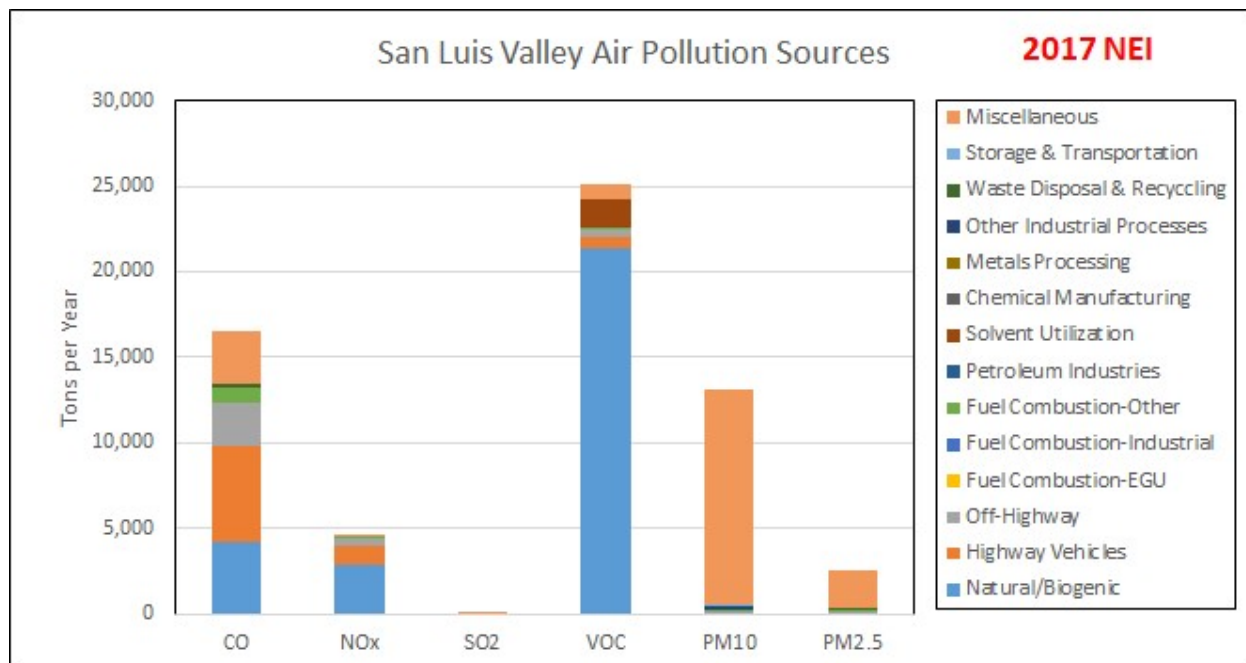
The valley is semiarid and croplands of potatoes, head lettuce and barley are typically irrigated. The valley is home to Great Sand Dunes National Park. The air quality planning region consists of Saguache, Rio Grande, Alamosa, Conejos and Costilla counties. All of the area complies with federal air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

Air Pollution Sources

- Blowing dust.
- Motor vehicles.

Air Pollution Control Measures

- The Alamosa Mitigation Plan for high wind events involving PM₁₀ was 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 97,916, according to 2020 U.S. Census Bureau estimates. The population in this region increased by 9.1% between 2010 and 2020. 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.

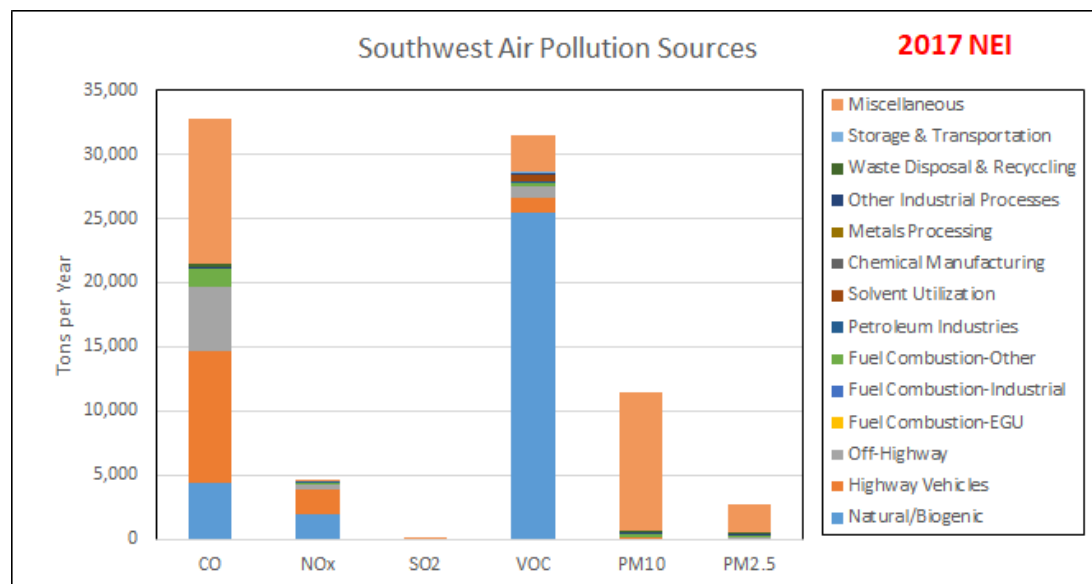
Air Pollution Sources

- 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 Narrow Gauge Railroad 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.
- The Durango & Silverton Narrow Gauge Railroad began converting its coal-fired steam locomotives to oil-burning steam engines and diesel locomotives in 2019. In 2021, the railroad had its first coal-free season in its entire 140-year history.
- Tribal permitting and control of emission sources.
- Future closure and emissions reductions from controls at New Mexico power plants.
- PM₁₀ 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.¹⁷



¹⁷ New Mexico Environment Department, Four Corners Air Quality Group, <https://www-archive.env.nm.gov/air-quality/fcaqg/>

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 325,046, according to the 2020 U.S. Census Bureau estimates. The population in this region increased by 5.3% between 2010 and 2020. Primary industries include ranching, agriculture, mining, energy development and tourism. Dinosaur and Colorado National Monuments are located in this region.

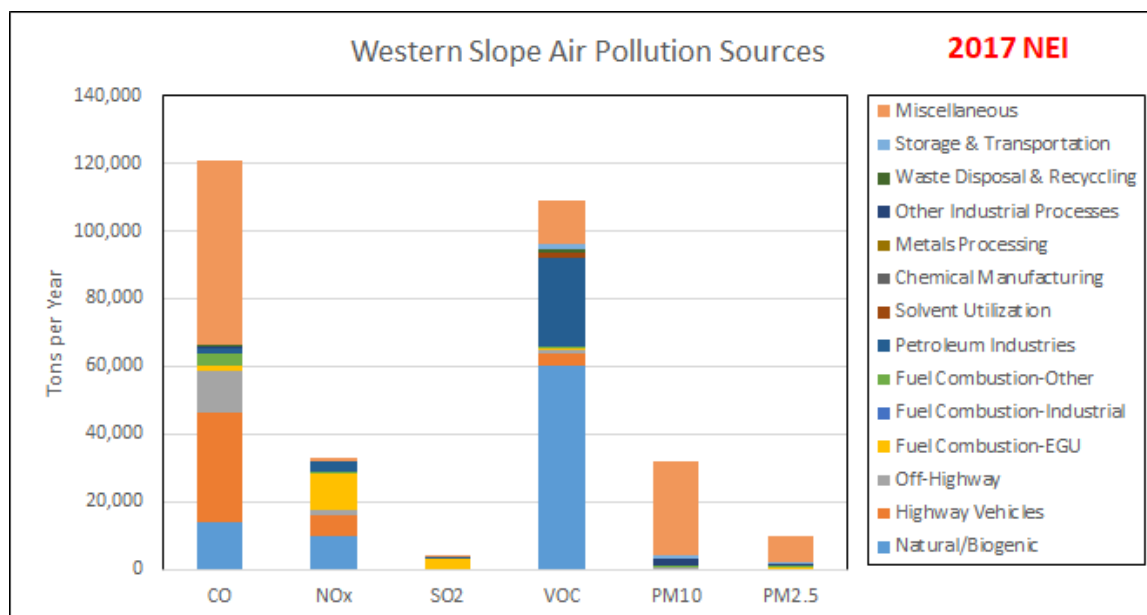
All of the Western Slope Region presently complies with federal air quality standards. However, elevated ozone levels were recorded in the Rangely area during the winters of 2010-2011 and 2012-2013, which resulted in violations of the 2008 ozone standard. The area has not experienced such elevated ozone concentrations since that time. The 3-year average (2015-2017) ozone concentration is below the 2008 NAAQS, 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.
- Craig coal-fired power plant.
- Coal mines in Delta, Rio Blanco and Moffat counties.
- Sand and gravel operations.
- Windblown dust.
- Wildfires.
- Prescribed fire.

Air Pollution Control Measures

- Early 2019 closure of Nucla power plant that was scheduled for 2022.
- Future closure and emissions reductions from controls at the Craig power plant. Unit 1 will be retired no later than December 31, 2025, Unit 2 will be retired no later than September 30, 2028, and Unit 3 will be retired no later than December 31, 2029.
- ColoWyo coal mine is set to retire no later than December 31, 2031.
- Statewide controls on oil and gas production.
- Smoke Management Program for prescribed fire.
- Fugitive dust control plans.
- PM₁₀ 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 12 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 241,886, according to 2020 U.S. Census Bureau estimates. The population in this region increased by 7.1% between 2010 and 2020. 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.

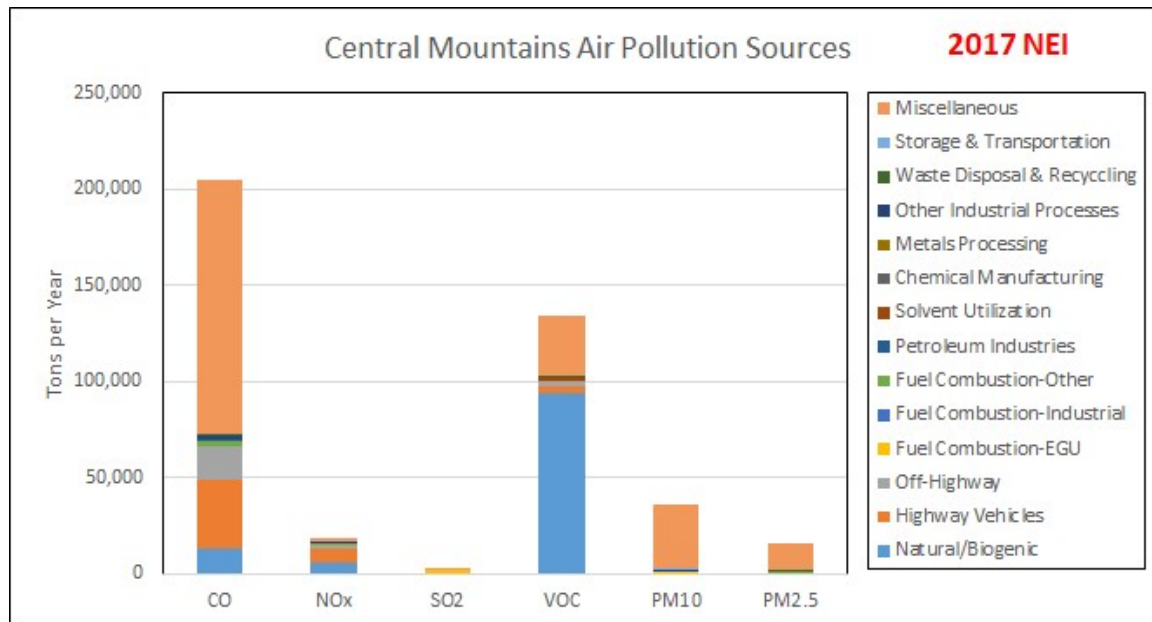
Air Pollution Sources

- 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 sulfur dioxide emissions, fabric filter baghouse to control particulate emissions, selective catalytic reduction at the Hayden plant by 2018 to control NO_x emissions. If approved by the PUC, Hayden Unit 1 will be retired no later than December 31, 2028, and Unit 2 will be retired no later than December 31, 2027.
- Holcim Portland Cement plant: fabric filter baghouses, selective non-catalytic reduction emissions for NO_x reduction, wet limestone scrubbers for sulfur dioxide reduction by 2018.
- Smoke management program for large controlled burns.

- PM₁₀ control plans for Aspen, Cañon City and Steamboat Springs to control PM 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 VOCs, 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 permits lead paint abatement projects in pre1978 housing and child occupied facilities to ensure appropriate engineering controls are used.

Low and Zero Emission Vehicle Standards

Regulation Number 20 includes LEV standards for 2022 model year and later passenger cars and light- and medium-duty trucks, and ZEV standards for 2023 model year and later passenger cars and light-duty trucks.

Control of Volatile Organic Compounds from Consumer Products and Architectural and Industrial Maintenance Coatings

Regulation Number 21 reduces emissions of VOCs from consumer products and architectural and industrial maintenance coatings.

Greenhouse Gas Reporting and Emission Reduction

Regulation Number 22 includes requirements for the reporting of certain GHG emissions and the phase-out of HFCs in manufacturing and end-use in products.

Regional Haze Limits

Regulation Number 23 includes Best Available Retrofit Technology (BART) and Reasonable Progress (RP) requirements to reduce emissions of visibility impairing pollutants.

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 2020 - June 2021¹.

Actions	Construction Permits	Title V Permits
Total number of permits issued	1,925 construction permit actions	104 Title V permit actions ²
Total number of hours billed for permits	18,753 hours	7,872 hours ³
Average number of hours billed per permit	9.74 hours per permit	75.69 hours per permit action ⁴
Number of general permits issued	1,330 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 Compliance and Enforcement and Stationary Sources Programs regulate stationary sources, including oil and gas, open burning, dust, and odors. The enforcement process can vary for each case, depending on the circumstances and time frame at issue. The Division uses both formal and informal enforcement to address issues of noncompliance. Upon discovery of a violation in which enforcement action is recommended, the Division will draft and send a Compliance Advisory (CA) or Notice of Violation (NOV) to notify the source of these noncompliance issues. The CA/NOV includes a statement that the company should contact the Division to discuss the noncompliance issues. Upon discussing the issue internally and with the company, program staff will decide whether to dismiss the violation, issue a warning letter, proceed with settlement discussions or proceed with a unilateral Compliance Order (Order). Most of the cases are settled prior to issuance of an Order. Program staff work with alleged violators to ensure that the appropriate controls, included in the applicable regulation, are followed.

The Asbestos Unit regulates companies involved in the abatement of asbestos. Building owners and schools also are affected by asbestos control rules. In regulating schools, the Asbestos Unit inspects schools and school districts and might issue Notices of Noncompliance (NONs) which require 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. The Asbestos Unit is not legally required to, but typically does issue a Notice of Alleged Violation (NOAV) at the onset of an enforcement action. After a NOAV conference is held, the Asbestos Unit issues a warning letter, dismisses the action, Compliance Determination and/or attempts to reach an Early Settlement Agreement. The Asbestos Unit works with alleged violators to ensure that the appropriate control procedures, under the requirements in Regulation Number 8, Part B, are followed. Following summarizes enforcement actions of the Division. A full enforcement report is available at: [Stationary sources enforcement action reports](#).

Enforcement Summary July 2020 - June 2021

Actions	Stationary Sources: Oil & Gas Sources	Stationary Sources: Non-Oil & Gas Sources	Asbestos Unit	CFC Unit	Lead Unit
Warning Letters	59	17	9	0	0
Compliance Advisories	38	67	n/a	n/a	n/a
Notices of Violation	4	0	n/a	n/a	n/a
Notice of Alleged Violation (NOAV)	n/a	n/a	16	0	0
Notices of Noncompliance (schools only)	n/a	n/a	17	n/a	n/a
Close Out Letters (schools only)			8	n/a	n/a
Compliance Orders	0	2	n/a	n/a	n/a
Compliance Orders on Consent	16	23	n/a	n/a	n/a
Early Settlement Agreements	22	40	6	0	0
Compliance Determination	n/a	n/a	3	0	0
Dismissal	n/a	n/a	1	0	0
AQCC Hearings	0	0	2	0	0

Enforcement Report Glossary of Terms

Close Out Letter (COL): Issued to a school or district after an inspection if they are in compliance or come into compliance to close the case.

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 ensuring 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.

Colorado Air Quality Control Commission

The Commission is a Governor-appointed, 9-member citizen body, confirmed by the Senate, and authorized by the Colorado General Assembly to oversee Colorado's air quality program according to the Colorado Air Pollution Prevention and Control Act. 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;
- consumer products and architectural industrial coatings use, and;
- GHG reporting and emission reduction requirements

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 CDPHE. The Division is organized into six specialized programs as described.

Office of Innovation in Planning

In January 2021, the division created the Office of Innovation in Planning (OIP) to support the Division's response to emerging issues. OIP will provide support for the Division's strategic plan, legislative actions, and other projects as needed. Currently, OIP is leading the effort to create a GHG reduction program for the oil and gas industry, as required by HB19-1261 and HB21-1266, as well as the AQCC's GHG resolution. In the future, OIP will provide technical and policy support and project management for innovative new programs within the Division.

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 AIR 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 25 percent of the eligible 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; developing policy; providing stakeholder and community-outreach; assisting small businesses comply with air quality regulations; identifying pollution prevention opportunities; providing public information; reviewing 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

Due to the sheer size and scope of the Stationary Sources Program, it was split into two new programs: the Oil and Gas Program and the Permitting Program. The Oil and Gas Program has a holistic approach to oversight of this industry in that it is directly responsible for the permitting and compliance oversight of the industry. The Oil and Gas Program also supports a variety of other initiatives across the Division (e.g., oil and gas-related rulemaking), across the Department (e.g., Oil and Gas Health Information and Response), and other agencies (e.g., Colorado Oil and Gas Conservation Commission). The Permitting Program of the Division handles all other stationary source permitting activities including Title V (some of Colorado’s largest sources of air pollution) and non-oil and gas minor source permitting, which includes a variety of industrial sources such as mining operations, landfills, bakeries, crematoria, etc.

Compliance and Enforcement Program

The Compliance and Enforcement Program aligns the inspection and enforcement functions of the Division. The Compliance Monitoring Unit inspects sources to determine their compliance with regulations and permit conditions. The Enforcement Unit addresses alleged violations of emissions control regulations. Sources found to be out of compliance with regulations and/or the conditions of their permits may be subject to enforcement actions and prescriptive remedies designed to return them to 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 personnel who work with asbestos or lead-based paint, reviews and issues permits for abatement and demolition activities and conducts regular inspections to ensure compliance. The program also reviews school asbestos management plans and conducts inspections of schools for compliance with applicable state and federal regulations. The program also provides information to the public on general indoor air quality issues.

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 CAA. The Commission's air quality management program incorporates the requirements of the federal CAA. 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. 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 National Environmental Policy Act 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 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 Southern Ute Indian Tribe and the state of Colorado created the Southern Ute Indian Tribe/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 (RAQC)

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 (NFRMPO)

The NFRMPO 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 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. 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 (DRCOG)

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. 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 they will not cause or contribute to a violation of the national air quality standards which requires detailed analysis of impacts of transportation projects and traffic on air quality.

Pikes Peak Area Council of Governments (PPACG)

As the federally-designated metropolitan planning organization for the Colorado Springs area, PPACG is responsible for developing and maintaining a regional, long-range transportation plan. The PPACG Air Quality Technical Committee reviews current and emerging air quality issues and develops plans to improve air quality.

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, 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. Use a new electric or battery-powered trimmer and leaf blower as the most earth-friendly alternative.

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.

Inspect for asbestos-containing materials and lead-based paint before you conduct renovation activities.

Replace gas stoves with electric or inductive stoves, which are more energy efficient and emit less indoor air pollution. Have appliances like refrigerators and air conditioning units disposed of properly so the refrigerants can be captured.

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.

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.

Take quick showers. They use less hot water than baths. Replacing your old showerhead with an EPA WaterSense showerhead can save the average family 2,700 gallons of water and more than 330 kilowatt hours of electricity per year.¹⁸

Insulate and Weatherstrip

Air that leaks through your home's envelope - the outer walls, windows, doors, and other openings - wastes energy and increases your utility costs. A well-sealed envelope, coupled with the right amount of insulation, can save homeowners an average of 15% on heating and cooling costs. In addition to savings, sealing leaks and adding insulation can improve the overall comfort of your home during the hottest and coldest times of the year; reduce noise from outside; result in less pollen, dust, and insects or pests entering your home; provide better humidity control, and; lower the chance for ice dams on the roof/eaves in snowy climates.¹⁹

¹⁸ EPA, WaterSense Showerheads, <https://www.epa.gov/watersense/showerheads>

¹⁹ Energy Star, Why Seal and Insulate?, https://www.energystar.gov/campaign/seal_insulate/why_seal_and_insulate

Close doors to unused rooms and don't heat or cool them. In the winter, set your thermostat to 68F while you're awake and set it lower while you're asleep or away from home. In the summer, set your thermostat to 78 degrees when you are at home and need cooling. Using a programmable thermostat, you can adjust the times you turn on the heating or air conditioning according to a pre-set schedule.

Explore replacing your furnace and air conditioner with air or ground source heat pumps to heat and cool your home with fewer emissions.

Reducing, Reusing, and Recycling

The most effective way to reduce waste is to not create it in the first place. Making a new product requires materials and energy. Raw materials must be extracted from the earth and the product must be fabricated and transported to wherever it will be sold. As a result, reduce and reuse are the most effective ways you can save natural resources, protect the environment, and save money.

Reduce and reuse basics include buying used, looking for products that use less packaging, buying reusable or disposable items, maintaining and repairing products, and borrowing, renting or sharing items that are used infrequently.

If it cannot be reused, 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. [Find your local public health agency contact information website](#).

Additional information

[Improving Indoor Air Quality](#)

[Mow Down Pollution Lawn Mower Exchange Program](#)

[Simple Steps. Better Air.](#)

[Colorado Air Quality Advisory Information and Email List Signup](#)

[Air Pollution Control Division Regulatory and Public Notice Email List Signup](#)