

ENVIRONMENTAL QUALITY

Overview

Public and personal health is directly related to where we live, work, and play. The quality of our environment has a direct influence on human health and disease. The goal of environmental health is to assess, correct, control, and prevent environmental issues that may negatively affect the health of present and future generations.

This report focuses on air quality, water quality (recreational and drinking), food (see *Communicable Disease*), and contact with chemicals. By focusing on these issues, many preventable illnesses caused by environmental factors can be avoided. Other long-term issues include global climate change, preservation of habitats, and overall sustainability. All of these could have large impacts on our environmental health over time.

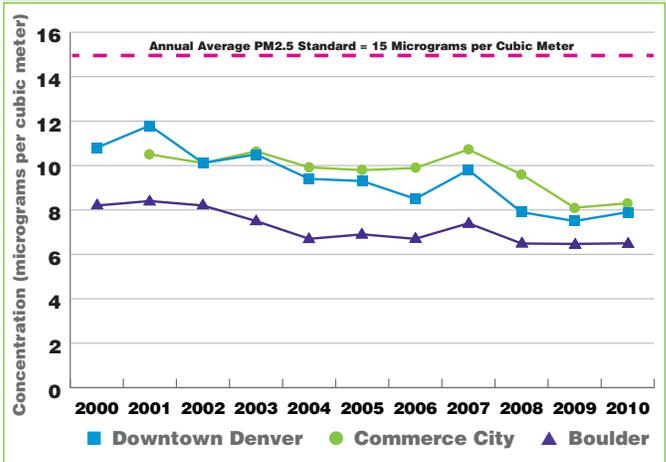
Air Quality

Air quality measures include ozone (a gas) and fine particulate matter (small particles). These contribute to respiratory illness, cardiovascular disease, and other diseases. Air pollution comes from a variety of sources. Stationary sources include factories, power plants, refineries, and dry cleaners. Mobile sources include cars, buses, planes, trucks, and trains. Other naturally occurring sources are windblown dust and wildland fires. Since 2005, Denver has actively attempted to reduce carbon dioxide emissions and the effects of climate change.⁶³

Air pollution in the Denver metropolitan area is both a local and regional issue. Pollutants emitted in one location impact air quality near the source as well as many miles downwind. The Denver metropolitan area is classified as not having met the standards for ozone levels. Ambient air quality standards (AAQS) define clean air and are established to protect even the most sensitive individuals in Denver communities (FIGURES 1 AND 2). In Denver, air pollution from motor vehicles is the main source of ambient air exposures. Many recent studies link proximity to high traffic roads with adverse health effects in children and adults.⁶⁴

FIGURE 1

Fine Particulate Matter (PM2.5) Trends METRO DENVER, 2000 - 2010

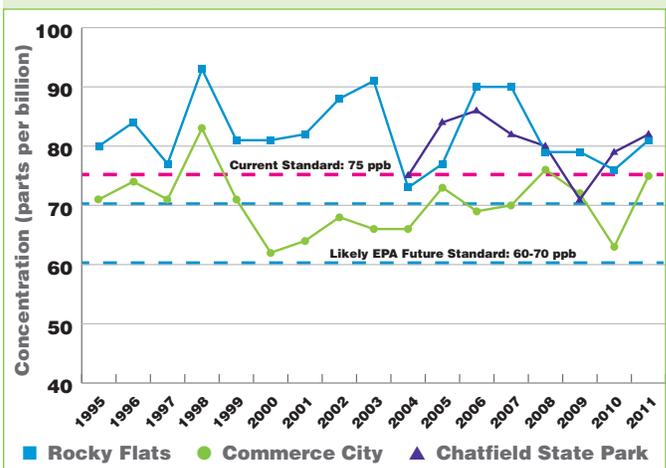


Fine particulate matter (particulate matter sized 2.5 micrometers or less [PM2.5]) levels have declined in Denver over the past decade. Pollution controls on cars, trucks, buses and power plants as well as cleaner fuels have helped reduce these levels.

SOURCE: Air Pollution Control Division's Technical Services Program, Colorado Department of Public Health and Environment

FIGURE 2

8-Hour Average Ozone Trends METRO DENVER, 1995 - 2011



This graph shows the metro Denver 8-hour average ozone trends at select sites. Reductions in ground level ozone have been difficult. Current efforts focus on reducing ozone-forming chemical emissions.

SOURCE: Air Pollution Control Division's Technical Services Program, Colorado Department of Public Health and Environment



Cost Facts

Emissions control programs focus on air pollution from factories and cars. These programs already provide air quality and health benefits. These benefits will grow over time as programs take their full effect. In 2020, the Clean Air Act Amendments are projected to prevent 230,000 early deaths. Over \$2 trillion of economic benefits will be gained from reduced premature deaths associated with air pollution.⁶⁷

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Water Quality

Water can expose people to illness by viruses, bacteria, or parasites. Water also may contain other chemicals or metals. Waterborne illnesses range from mild gastroenteritis to life-threatening disease. Illnesses caused by water are often under-reported due to lack of awareness. Local health departments work to educate their residents on ways to prevent such illnesses.

Local water bodies, like the South Platte River, are used by the public as recreational gathering places. Denver Environmental Health tracks the levels of *E. coli* bacteria in the water to protect recreational users (FIGURE 3).⁶⁵ *E. coli* is a large and diverse group of bacteria. Most strains of *E. coli* are harmless, but others can make people sick. Often, *E. coli* is used to determine if water is safe for drinking or swimming and whether other pollutants are present.

Healthy Homes and Lead Exposure

Housing conditions may also affect health. There are an estimated six million substandard housing units nationwide.¹⁴⁰ Health and safety concerns are related to substandard housing. Families may be exposed to lead, allergens, carbon monoxide, mold, pesticides, and radon. As with other health issues, some populations are disproportionately affected by health and housing concerns.

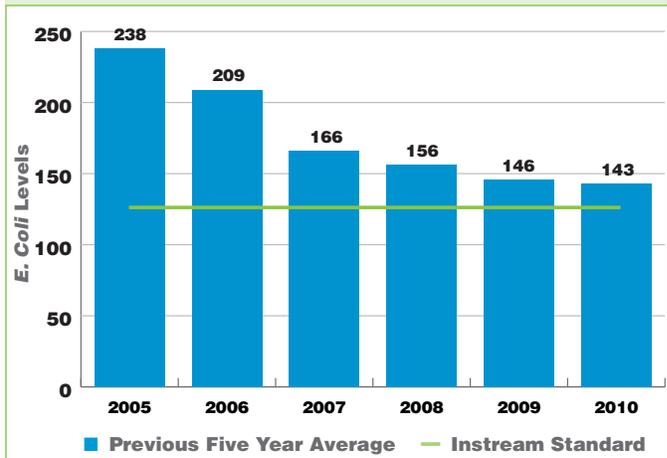
Deteriorating and chipping lead-based paint is often seen in older and less maintained houses. This is a common source of childhood lead exposure in Denver, as in many older cities. Health effects from lead exposure are a special concern for children under six years of age. The Centers for Disease Control and Prevention (CDC) has set a level of lead found in blood that is concerning, but has said there may be no 'safe' level.⁶⁶

Thus, preventing exposure is essential. Children from low income families, children of color, and those living in older housing are disproportionately affected by lead poisoning in the U.S. The map shows locations of Denver children with a blood lead test result greater than or equal to 5ug/dL (micrograms per deciliter) (FIGURE 4).



FIGURE 3

E. Coli Levels in the South Platte River DENVER, 2005 - 2010



During the summer, when recreational water use is greatest, river water samples are tested for *E. coli* bacteria every week. When *E. coli* levels are high, the City posts advisories at popular recreation spots to protect the health of users. While the mean levels (each averaged over 5 years) have dropped, additional progress must be made to achieve the stream standard.

SOURCE: Denver Department of Environmental Health

Local Story

Improving Water Quality in the South Platte River

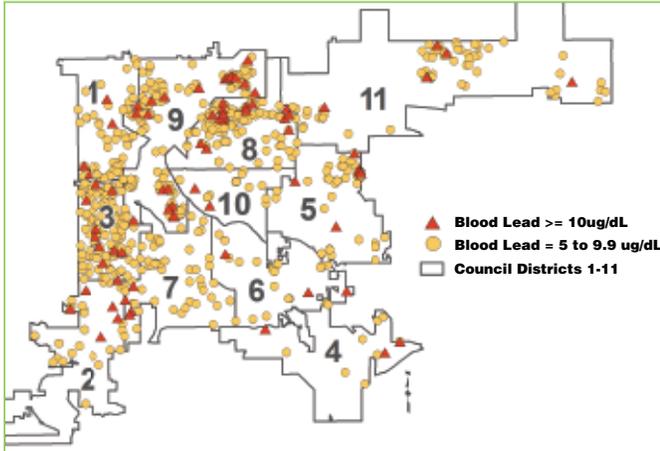
The South Platte River is a site that attracts recreational users, especially during the summer months. Multiple City and County of Denver agencies (Environmental Health, Public Works, and Parks and Recreation) are committed to improving water quality in Denver's

streams. These agencies focus on investigating, cleaning, and repairing nine priority storm sewer drainage basins. Discharging into the South Platte River, these basins contribute to pollution in the City's streams. Several basins have already shown marked improvement from these efforts.

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FIGURE 4

**Blood Lead Levels Children with a Result \geq 5ug/dL
DENVER, 2008 - 2010**



From 2008 to 2010, approximately 110 Denver children were reported as having blood lead levels of 10ug/dL or higher (the CDC level of concern). After testing, nearly 7% had elevated blood lead levels of 5ug/dL or greater.*Note: this map shows only individuals with levels of 5 ug/dL and above; testing is not done uniformly across Denver.

SOURCE: Environment Public Health Tracking Program, Colorado Department of Public Health and Environment

Comparison Story

Increasing the Efficiency of Buildings

Several U.S. cities have implemented energy conservation ordinances for residential or commercial buildings. This includes San Francisco, CA; Berkeley, CA; Boulder, CO; Burlington, VT; and New York, NY.⁶⁸ The goal is to increase the energy and water efficiency in buildings when they are sold or undergoing major remodeling. For example, an energy conservation code might require upgraded ceiling insulation, sealed and insulated furnace ducts, insulated water heaters and hot water pipes, weather sealing around exterior doors, and improved lighting and water efficiency. The ordinances typically contain a spending cap that is set as a percentage of the sales price or renovation. The costs of the energy upgrades are recovered by savings on utility bills. In Denver, much of the building inventory is over 30 years old. An energy conservation ordinance is one way to meet long-term energy and emissions goals.



Did You Know

- In a 2009-2010 survey, 8.5% of Denver County residents reported themselves as having asthma, up from 6.5% in 2007-2008.¹³
- Denver is an area of high risk for radon exposure. In a limited sample of Denver, this cancer-causing radioactive gas was found above EPA's action level (4 picocuries/L) in 44% of homes.⁶⁹
- Denver's Department of Environmental Health (DEH) has been collecting surface water and sediment samples from the streams and lakes in Denver for more than 40 years.
- Denver is an active partner in the Green and Healthy Homes Initiative, a collaborative effort designed to help make homes healthy, safe, and sustainable.⁷⁰

