



2009

WATER QUALITY REPORT



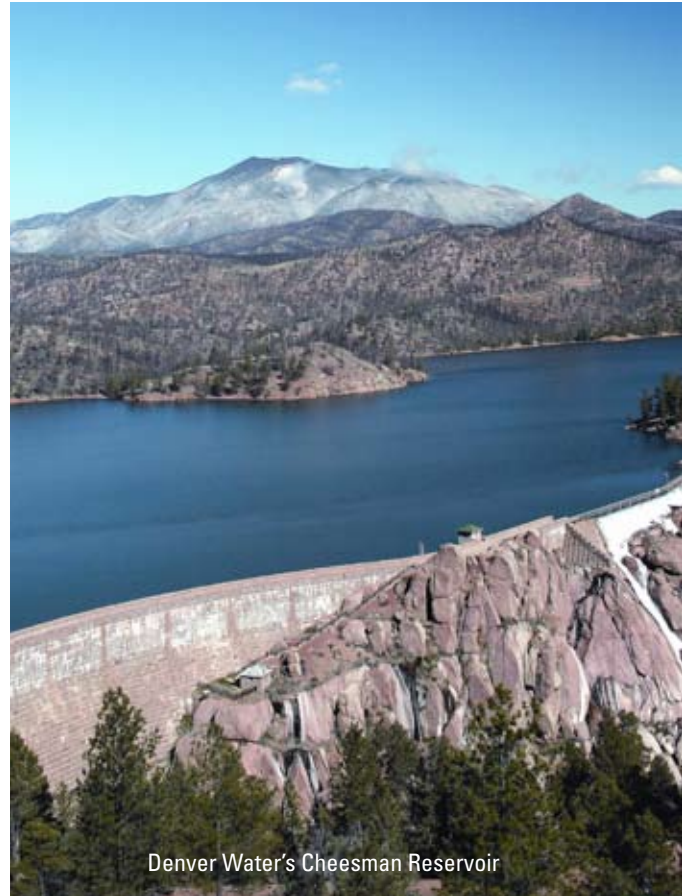
## WHERE DOES YOUR WATER COME FROM?

Denver's drinking water comes from rivers, lakes, streams, reservoirs and springs fed by high-quality mountain snow runoff. Denver Water's supply is 100 percent surface water that originates in sources throughout the watershed that encompasses 3,100 square miles on both sides of the Continental Divide.

## MOUNTAIN WATER SOURCES

Denver's water sources are the South Platte River and its tributaries, the streams that feed Dillon Reservoir, and the creeks and canals above the Fraser River. Denver Water stores its water in five mountain reservoirs: Antero, Eleven Mile Canyon, Cheesman, Dillon and Gross. From these reservoirs, the water is sent to one of three treatment plants in the city through a complex system of streams, canals and pipes.

After treatment, drinking water is fed by gravity and pumps to a system of underground clear-water reservoirs before continuing to your home or business. More than 2,700 miles of pipe carry water to Denver Water customers.



Denver Water's Cheesman Reservoir

## SOURCE WATER ASSESSMENT

The state health department has completed a source water assessment of the potential for contaminants reaching any of Denver Water's three terminal reservoirs at Strontia Springs, Marston and Ralston. The potential sources of contamination that may exist are: EPA Areas of Concern; Permitted Wastewater Discharge Sites; Aboveground, Underground and Leaking Storage Tank Sites; Solid Waste Sites; Existing/Abandoned Mine Sites; Other Facilities; Commercial/Industrial/Transportation; Residential, Urban Recreational Grasses; Quarries/Strip Mines/Gravel Pits; Agriculture; Forest; Septic Systems; Oil/Gas Wells and Road Miles. For more information on the report contact the Colorado Department of Public Health and Environment by calling 303-692-2000.



*The Denver Board of Water Commissioners meets at 9:15 a.m. on the second and fourth Wednesdays of each month at Denver Water, 1600 W. 12th Ave. Board sessions are open to the public.*

## THE TRADITION CONTINUES

Denver Water is Colorado's oldest and largest water utility. Established in 1918 when Denver residents purchased the water system from a private company, Denver Water serves 1.3 million people in the city of Denver and surrounding suburbs. It has a total water service area of approximately 300 square miles.

We take our water quality very seriously. Last year we collected more than 13,000 samples and conducted nearly 47,000 tests to ensure our water is as clean and safe as possible.

Denver Water vigilantly safeguards its mountain water supplies, and before the water reaches your tap, it's carefully filtered and treated. This brochure provides data collected throughout 2008. Visit us online at [www.denverwater.org](http://www.denverwater.org).

## EN ESPAÑOL

Esta información acerca de su agua potable es importante. Si usted no puede leer esto en inglés, por favor pídale a alguien que le traduzca esta importante información o llame a Cuidado al Cliente al número 303-893-2444.

## DENVER WATER'S COLLECTION SYSTEM



### The treatment process consists of five steps:

- 1. Coagulation/flocculation** - Raw water from terminal reservoirs is drawn into mixing basins at our treatment plants where we add alum, polymer and sometimes lime and carbon dioxide. This process causes small particles to stick to one another, forming larger particles.
- 2. Sedimentation** - Over time, the now-larger particles become heavy enough to settle to the bottom of a basin from which sediment is removed.
- 3. Filtration** - The water is then filtered through layers of fine, granulated materials — either sand, or sand and coal, depending on the treatment plant. As smaller, suspended particles are removed, turbidity diminishes and clear water emerges.
- 4. Disinfection** - To protect against any bacteria, viruses and other microbes that might remain, disinfectant is added before the water flows into underground reservoirs throughout the distribution system and into your home or business. Denver Water carefully monitors the amount of disinfectant added to maintain water quality at the farthest reaches of the system. Fluoride occurs naturally in our water but also is added to treated water.
- 5. Corrosion control** - pH is maintained by adding alkaline substances to reduce corrosion in the distribution system and the plumbing in your home or business.

# WATER AT A GLANCE

**ALL DRINKING WATER** can reasonably be expected to contain small amounts of some contaminants. The presence of these substances in drinking water does not necessarily pose a health risk. Immunocompromised individuals—such as people who have undergone organ transplants, those with HIV-AIDS or other immune system disorders, and some elderly and infants can be particularly at risk of infections. These people should seek advice from their health care providers regarding the consumption of drinking water. For more information about contaminants and potential health effects, or to receive a copy of the U.S. Environmental Protection Agency and the U.S. Centers for Disease Control guidelines on appropriate means to lessen the risk of infection by cryptosporidium and microbiological contaminants, call the EPA Safe Drinking Water Hotline at 800-426-4791.

## Lead in Drinking Water

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water primarily is from materials and components associated with older service lines and home plumbing. Denver Water is responsible for providing high-quality drinking water, but it cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking.

## Is There a Presence of Cryptosporidium and Giardia?

Denver Water has tested for cryptosporidium (crypto) and giardia in raw and treated water since the 1980s. Since that time, Denver Water never has detected a viable indication of either in treated drinking water.

Crypto and giardia are microscopic organisms that, when ingested, can cause diarrhea, cramps, fever and other gastro-intestinal symptoms. Crypto and giardia usually are spread through means other than drinking water.

While most people readily recover from the symptoms, crypto and giardia can cause more serious illness in people with compromised immune systems. The organisms are in many of Colorado's rivers and streams and are a result of animal wastes in the watershed. At the treatment plants, Denver Water removes crypto and giardia through effective filtration, and giardia also is killed by disinfection.

## Pharmaceuticals in Drinking Water

Recent media reports have highlighted the presence of pharmaceuticals in municipal water supplies. Denver Water proactively participated in some of the earliest research projects looking for these compounds in a 2005 project with Colorado State University. The study was limited in scope and scale, but did detect trace amounts of antibiotics at part per trillion concentrations (one part per trillion is equivalent to one drop of water in twenty Olympic-size swimming pools).

Even the world's best scientists don't yet know what the presence of these substances in water means to human health. In fact, the testing technology is so new, most commercial labs are not equipped to analyze for these compounds yet. Consequently, the EPA has no current or proposed regulations for these substances. Denver Water has and always will strive to deliver the highest quality water to our customers. If future research indicates that certain substances should be removed from water, we will work to find the best method of removal.

[www.denverwater.org](http://www.denverwater.org)

# WATER QUALITY DATA

## TERMS, ABBREVIATIONS & SYMBOLS

*Some of the terms, abbreviations and symbols contained in this report are unique to the water industry and might not be familiar to all customers. Terms used in the table are explained below.*

**Contaminant:** A potentially harmful physical, biological, chemical or radiological substance.

**Maximum Contaminant Level (MCL):** Highest level of a contaminant allowed in drinking water. MCLs are set as close to the Maximum Contaminant Level Goal as feasible using the best available treatment technology.

**Maximum Level Contaminant Goal (MCLG):** The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

**Action Level:** Concentration of a contaminant that, if exceeded, triggers treatment or other requirements that a water system must follow.

**Parts Per Million (ppm):** Equivalent to milligrams per liter. One ppm is comparable to one drop of water in 55 gallons.

**Parts Per Billion (ppb):** Equivalent to micrograms per liter. One ppb is comparable to one drop of water in 55,000 gallons.

**PicoCuries Per Liter (pCi/L):** Measures radioactivity.

**Turbidity:** A measure of suspended material in water. In the water field, a turbidity measurement (expressed in Nephelometric Turbidity Units) is used to indicate clarity of water.

**Secondary Maximum Contaminant Level (SMCL):** Nonenforceable, recommended limits for substances that affect the taste, odor, color or other aesthetic qualities of drinking water, but do not pose a health risk.

**Maximum Residual Disinfectant Level (MRDL):** Highest level of a disinfectant allowed in drinking water. There is convincing evidence that adding disinfectant is necessary to control of microbial contaminants.

### **Maximum Residual Disinfectant Level Goal**

**(MRDLG):** Level of a drinking water disinfectant below which there is no known or expected health risk. MRDLGs do not reflect benefit of the use of disinfectants to control microbial contaminants.

### **Sources of Drinking Water**

Sources of drinking water include rivers, lakes, streams, ponds, reservoirs and springs. As water travels over land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material. It also can pick up substances resulting from human activity and the presence of animals. Contaminants may include the following:

- **Microbial Contaminants** - viruses, bacteria and other microbes that may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife.
- **Inorganic Contaminants** - salts and metals that can be naturally occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.
- **Pesticides and Herbicides** - chemical substances that result from a variety of sources, such as agricultural and urban stormwater runoff and residential uses.
- **Organic Chemical Contaminants** - substances that include synthetic and volatile organic chemicals, that are by-products of industrial processes and petroleum production, and also may come from gas stations, urban stormwater runoff and septic systems.
- **Radioactive Contaminants** - substances that can be naturally occurring or be the result of oil and gas production and mining activities.

# REGULATED WATER CONTAMINANTS: WHAT IS IN THE WATER?

Colorado Public Water System I.D. No. C0116001

Regulated at the treatment plant (Entry to the Distribution System)		MCLG	Highest Levels Allowed (SMCL)	Average Level Detected (Range of Values)	MCL Violation?	Sample Frequency	Possible Sources of Substances
Aluminum	ppb	N/A <sup>1</sup>	50 - 200 (SMCL <sup>2</sup> )	40 (nd <sup>3</sup> - 50)	No	Monthly	Erosion of natural deposits, discharge of drilling wastes, coagulant
Barium	ppm	2	2	0.037 (0.014 - 0.039)	No	Monthly	Erosion of natural deposits, discharge of drilling wastes
Manganese	ppb	N/A	50 (SMCL)	nd (nd - 7)	No	Monthly	Erosion of natural deposits, discharge of drilling wastes
Alpha particles	pCi/L	zero	15 pCi/L	nd (nd - 2)	No	Quarterly	Erosion of natural deposits, discharge of drilling wastes
Beta/photons emitters	pCi/L	zero	Trigger Level = 15 pCi/L	nd (nd - 4)	No	Quarterly	Erosion of natural deposits, discharge of drilling wastes
Uranium	µg/L	zero	30	nd (nd - 0.5)	No	Quarterly	Erosion of natural deposits, discharge of drilling wastes
Fluoride	ppm	4.0	4.0 (2.0 is SMCL) <sup>4</sup>	0.89 (0.10 - 1.45)	No	6 times daily at treatment plants	From erosion of natural deposits, water additive that promotes strong teeth
Nitrate as N	ppm	10	10	0.12 (0.05 - 0.19)	No	Monthly	Erosion of natural deposits
Total Dissolved Solids	ppm	N/A	500 (SMCL)	171 (61 - 187)	No	Monthly	Erosion of natural deposits
Sodium	ppm	N/A	N/A	19 (6 - 22)	No	Monthly	Naturally present in the environment
Sulfate	ppm	N/A	250 (SMCL)	52.7 (15.0 - 58.6)	No	Monthly	Naturally present in the environment
Turbidity <sup>5</sup>	NTU <sup>6</sup>	N/A	TT <sup>7</sup> Percentage of Samples <0.3 NTU=100%	Highest Turbidity Level for 2008 - 0.09	No	12 times daily at treatment plants	Soil runoff
Carbon Tetrachloride	ppb	zero	5	nd (nd - 0.8)	No	Monthly	Contaminant in the disinfectant
Total Organic Carbon <sup>8</sup>	Removal Ratio	N/A	TT	Lowest Running Annual Removal Ratio 1.03 (1.00 - 1.38) Foothills Treatment Plant 1.29 (1.00 - 1.61) Moffat Treatment Plant 1.06 (1.00 - 1.43) Marston Treatment Plant	No	Running Annual Average (RAA)	Naturally present in the environment from natural or man-made sources
Regulated in the Distribution System		MCLG	MCL	Average Level Detected (Range of Values)	Violation	Sampling Dates	Sources of contaminant
Total Trihalomethanes (TTHM) <sup>9</sup>	ppb	N/A	80	Highest RAA <sup>10</sup> : 33 (19 - 46)	No	Monthly	By-product of drinking water disinfection
Halocetic Acids	ppb	N/A	60	Highest RAA: 16 (11 - 31)	No	Monthly	By-product of drinking water disinfection
Total Coliform	Absent or Present	zero	No more than 5% positives per month	Highest monthly percentage: 0.24% in Feb. 2008	No	Daily	Naturally present in the environment
Chloramine	ppm	4	4	Number of positives out of number of samples for the year 3 out of 5,652 samples or 0.05%	No	Daily	Drinking water disinfectant used to kill microbes

Regulated at the Consumer's Tap <sup>11</sup>	Units of Measurements	MCLG	Action Level at the 90th Percentile	90th Percentile Value	No. of Samples Exceeding Action Level	Violation	Sampling Dates	Sources of Contaminant
Copper	ppm	1.3	1.3	0.35	1 out of 51	No	June - September 2008	Corrosion of household plumbing
Lead	ppb	zero	15	10.5	1 out of 51	No	June - September 2008	Corrosion of household plumbing

1 Not applicable.  
2 Secondary Maximum Contaminant Level (SMCL) is not enforceable.  
3 Non-detect: Laboratory analysis indicates that the contaminant was below the detection limit.  
4 Exceeding the Fluoride Secondary Maximum Contaminant Level of two milligrams per liter triggers public notification.  
5 Turbidity has no known health effects. However, turbidity can interfere with disinfection and provide a medium for microbial growth.  
6 Nephelometric Turbidity Units.  
7 Treatment Technique refers to the water treatment process used in the treatment plants that must be optimized to control the levels of these contaminants, such as corrosion control.  
8 The Disinfection By-Product Rule (DBPR) requires that utilities treat source water to remove a specific percentage of the Total Organic Carbon (TOC) content. TOC is a measure of natural and man-made organic (carbon-containing) material in water. TOC is considered a precursor of disinfection by-products. The more TOC removed, the less by-products are formed by disinfection. Utilities compare the TOC actually removed on any given day with the TOC that should have been removed. Compliance is based on the Running Annual Average (RAA) of these ratios.  
9 By-products of the disinfection process.  
10 RAA=Running Actual Average.  
11 Lead isn't found in Denver's treated water. However, lead might be present in the private plumbing of homes and businesses. Because Denver Water consistently has been below lead and copper Action Levels, the state health department permits reduced monitoring to once every three years. Figures in this report are from 2008; the next report will be released in 2011.

Last year the Water Quality Lab at Denver Water collected 13,445 water samples and conducted 9,712 microbiological and 37,227 chemical tests.

**To receive a copy of the 2008 Treated Water Quality Summary or to ask questions, please call Customer Service at 303-893-2444.**

*If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at [www.epa.gov/safewater/lead](http://www.epa.gov/safewater/lead).*