



2022

# Water Quality Report

INFORME DE CALIDAD DE AGUA

 DENVER WATER



# WHAT IS THIS REPORT?

The Environmental Protection Agency requires public water suppliers that serve the same people year-round (community water systems) to provide consumer confidence reports to their customers. These reports are also known as annual water quality reports. This report summarizes information regarding water sources used, any detected contaminants, compliance and educational information.

## 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% surface water that originates in sources throughout 3,100 square miles of watersheds on both sides of the Continental Divide.

## Mountain water sources

Denver Water'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 then sent to the metro area through a complex system of streams, canals and pipes to be treated.



After treatment, drinking water is fed by both gravity and pumps to a system of underground, clean-water reservoirs before continuing to your home or business. More than 4,000 miles of pipe carry water to Denver Water customers.

## Source water assessment

The Colorado Department of Public Health and Environment 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 last stop for the water before it is treated. The potential sources of contamination that may exist are: EPA areas of concern; permitted wastewater discharge sites; above ground, underground and leaking storage tank sites; solid waste sites; existing or abandoned mine sites; other facilities; commercial, industrial and transportation activities; residential, urban recreational grasses; quarries, strip mines and gravel pits; agriculture; forests; septic systems; oil and gas wells and roads.

The Source Water Assessment Report provides a screening-level evaluation of potential contamination that could occur. It does not mean that the contamination has or will occur. We can use this information to evaluate the need

to improve our current water treatment capabilities and prepare for the future contamination threats. This can help us ensure that high-quality drinking water is delivered to your homes.

For general information or to obtain a copy of the report, please visit [wqcdcompliance.com/ccr](http://wqcdcompliance.com/ccr). The report is located under "Guidance: Source Water Assessment Reports." Search the table using 116001, Denver Water Board, or call Denver Water Customer Care at **303-893-2444**.

## Información importante acerca de la calidad del agua

Para recibir la versión en español del Informe de Calidad de Agua de 2022 de Denver Water, llame a Servicio al cliente al **303-893-2444** o visite [denverwater.org/2022CalidadDeAgua](http://denverwater.org/2022CalidadDeAgua).





4,000

square miles in the collection system

5

mountain reservoirs

3,000

miles of pipe to carry water

# DENVER WATER'S SYSTEM

## Devoted to water quality

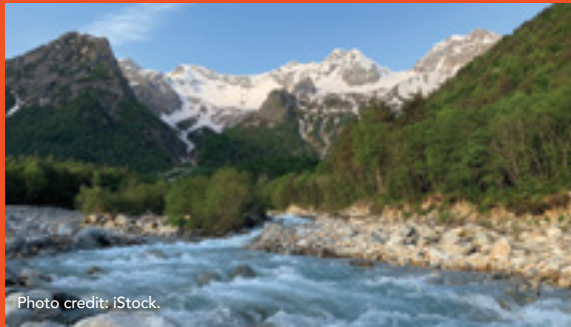
Devoted to water quality, Denver Water proudly serves high-quality water to 1.5 million people in the city of Denver and many surrounding suburbs. Since 1918, we have expertly planned, developed and operated a complex system that provides clean, safe, great-tasting water. Denver Water is a public agency funded by water rates, new tap fees and the sale of hydropower, not taxes. We are Colorado's oldest and largest water utility — Denver Water has a total water service area of approximately 300 square miles.

Denver Water serves 25% of the state's population with less than 2% of all the water used in the state. The natural environment is our lifeline, and we help protect it by promoting wise water use. We take our water quality very seriously. Last year we collected more than 55,000 samples and conducted more than 200,000 tests to ensure our water is as clean and safe as possible. Denver Water is required by state and federal law to monitor for — and provide this report on — regulated contaminants in drinking water.

Denver Water also goes above and beyond these requirements to monitor for additional compounds in drinking water. This information is available on our website at [denverwater.org/TreatedWater](https://denverwater.org/TreatedWater).

Reservoir	Capacity (acre-feet)	Percent of Total Capacity
Dillon	257,304	36.7
Eleven Mile Canyon	97,779	14.0
Williams Fork	96,822	13.8
Cheesman	79,064	11.3
Gross	41,811	6.0
Chatfield (Denver's portion)	28,709	4.1
Wolford Mountain (Denver's portion)	25,610	3.7
Antero	20,122	2.9
Marston	19,108	2.7
Ralston	10,776	1.5
Strontia Springs	7,864	1.1
Meadow Creek	5,370	0.8
South Complex	3,561	0.5
North Complex (current gravity storage)	3,495	0.5
Long Lakes	1,787	0.3
Platte Canyon	910	0.1
Soda Lakes (Denver Water's portion)	615	0.1
Total	700,707	100

# SOURCES OF DRINKING WATER



Sources of drinking water include rivers, lakes, streams, ponds, reservoirs, springs and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material. It can also 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, which 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 resulting from a variety of sources, such as agricultural and urban stormwater runoff, and residential uses.

## Organic chemical contaminants

Substances including synthetic and volatile organic chemicals, which are byproducts 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.



Photo credit: Denver Water.

## WATER AT A GLANCE

All drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. In order to ensure that tap water is safe to drink, the Colorado Department of Public Health and Environment's regulations set limits on the amount of certain contaminants in water provided by public water systems. The Food and Drug Administration sets limits for contaminants in bottled water to provide the same protection for public health.

More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline at [800-426-4791](tel:800-426-4791) or by visiting [epa.gov/ground-water-and-drinking-water](https://epa.gov/ground-water-and-drinking-water).

Some people may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised people, such as people with cancer undergoing chemotherapy, people who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly and infants, can be particularly at risk of infections. Those at risk should seek advice about drinking

water from their health care providers. Guidelines from the EPA and the Centers for Disease Control and Prevention on appropriate means to lessen the risk of infection by cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline, [800-426-4791](tel:800-426-4791).

### Lead in drinking water

Denver Water is committed to delivering safe water to our customers. The water we provide to homes and businesses is lead-free, but lead can get into the water as it moves through customer-owned water service lines and household plumbing that contain lead.

Service lines bring water into a home or building from Denver Water's main delivery pipe in the street. In Denver Water's experience, homes built prior to 1951 are more likely to have lead service lines. Homes built before 1987 may have lead solder connecting copper pipes in their plumbing. Faucets and fixtures made before 2014 do not meet today's "lead-free" requirements. Lead exposure can cause serious health problems, especially for pregnant women and young children.

To address this issue, Denver Water has launched the Lead Reduction Program,

which was approved in December 2019 by the Environmental Protection Agency and Colorado Department of Public Health and Environment.

### The Lead Reduction Program has five main components:

- Increasing the pH level to reduce the risk of lead from getting into drinking water from lead service lines or household plumbing.
- Developing and maintaining a publicly accessible inventory of all customer-owned lead service lines in Denver Water's service area. This interactive map is available at [denverwater.org/Lead](https://denverwater.org/Lead).
- Replacing all lead service lines in our service area with copper lines at no direct charge to the customer. Beginning in 2020, it will take 15 years to replace all the lead service lines in our service area and work will continue through 2035.
- Providing a free water pitcher and filters that are certified to remove lead to all customers suspected of having a lead service line until their line is replaced, and for six months after.
- Ongoing communication, outreach and education.

# HOW THE PROGRAM CAME TO BE

Since 1992, as part of the EPA's Lead and Copper Rule, Denver Water has monitored water quality in homes that have service lines or plumbing that contain lead.

Only once, in 2012, did test results from those homes indicate additional action was needed to protect public health, and Denver Water remains in compliance today. However, Denver Water is still required to implement the best method to reduce the risk of lead in tap water in homes with lead-containing plumbing or service lines.

Denver Water studied multiple treatment options from 2012 to 2017. Based on the results, the CDPHE in March 2018 required Denver Water to begin adding orthophosphate to the water it delivers in March 2020.

Although orthophosphate is effective at reducing lead levels, adding



phosphorous, a nutrient, into the wastewater and our streams and watersheds can, under the right conditions, set off a chain of problematic events, such as accelerating the growth of algae. With a desire to protect public health and regional water supplies, Denver Water conducted more research and participated in a comprehensive

stakeholder process that resulted in Denver Water requesting a variance from the EPA that met the Lead and Copper Rule's requirement that the proposed Lead Reduction Program Plan is "at least" as efficient at reducing lead levels as orthophosphate treatment.

That plan became the Lead Reduction Program, which is now underway. Learn more about this effort and the program at [denverwater.org/Lead](https://denverwater.org/Lead).

If you are concerned about lead, you can request to have your water tested. Denver Water customers can request a free lead test kit at [denverwater.org/Leadtest](https://denverwater.org/Leadtest).

Information on lead in drinking water, testing and steps to minimize exposure is available from the Safe Drinking Water Hotline at **1-800-426-4791**, at [epa.gov/safewater/lead](https://epa.gov/safewater/lead) and at [denverwater.org/Lead](https://denverwater.org/Lead).

## HOW TO MINIMIZE YOUR EXPOSURE TO LEAD

If you have a water service line or interior plumbing that contains lead, you can take the following actions to reduce your household's risk of exposure.

### Flush

If water has not been used in the property for a few hours, such as first thing in the morning or when coming home from work, run cold water from the kitchen or any bathroom faucet for five minutes. You can also run the dishwasher, take a shower or do a load of laundry to help flush water in your home's internal plumbing before drinking, cooking or preparing infant formula.



### Replace old fixtures

Replace faucets and indoor plumbing with "lead-free" components. Faucets and fixtures installed prior to 2014 do not meet today's requirements for "lead-free" fixtures.



### Clean aerators

A faucet aerator is a small screen added to the end of a faucet to mix air with water to reduce the flow of water coming from the faucet. Remove and clean the aerators on your faucets, as they may have trapped particles from your old lead service line.



### Maintain filters

Follow the manufacturer's maintenance schedule for the filtration system you have, including water pitchers, faucet-mounted filters, under-sink filter or refrigerator filters. The results of your water quality test may help to determine if you still wish to continue using a filter. Boiling the water does not remove lead.



You can find instructional videos on flushing and filter use at [denverwater.org/Lead](https://denverwater.org/Lead).

# IS THERE A PRESENCE OF CRYPTOSPORIDIUM AND GIARDIA?

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

Crypto and giardia are microscopic organisms that, when ingested, can cause diarrhea, cramps, fever and other gastrointestinal symptoms. Crypto and giardia are usually 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 is also killed by disinfection.

## THE TREATMENT PROCESS

### 1 COAGULATION/ FLOCCULATION

Raw water is drawn into mixing basins at our treatment plants where we add alum and polymer. 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

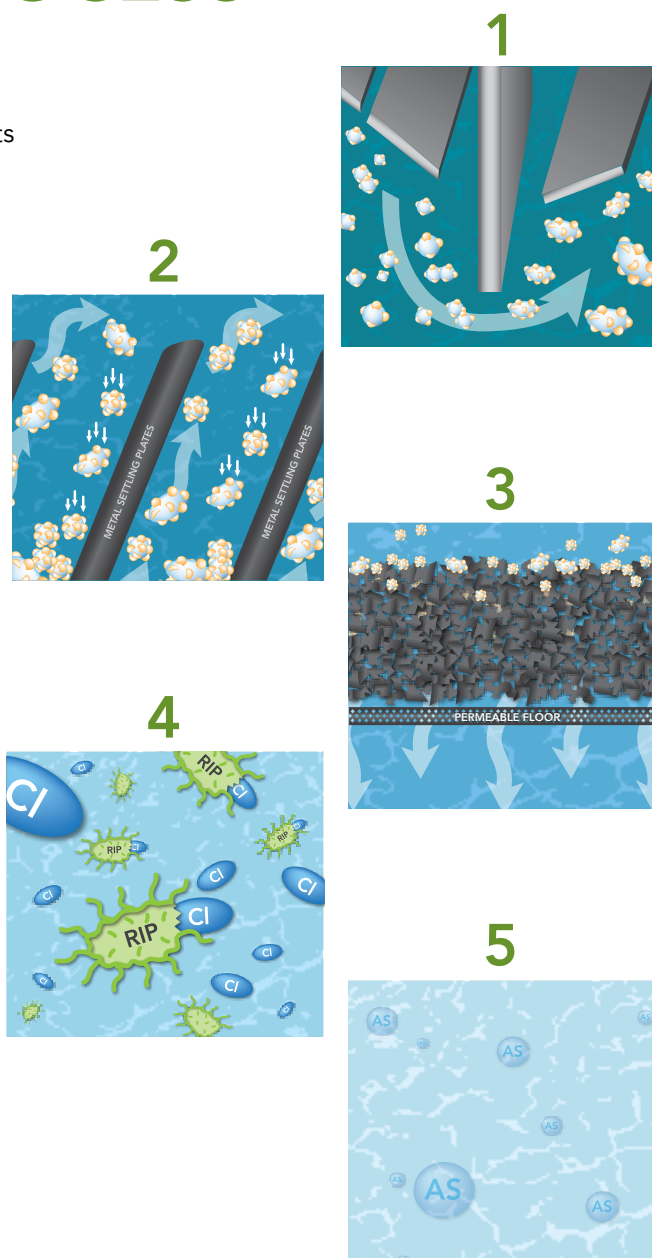
The water is then filtered through layers of fine, granulated materials — either sand, or sand and coal, depending on the treatment plant. As smaller, suspended particles are removed, turbidity diminishes and clear water emerges.

### 4 DISINFECTION

As protection 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 quality of the water at the farthest reaches of the system. Fluoride occurs naturally in our water but is also added to treated water, when needed, to achieve public health levels.

### 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.



# REGULATED WATER CONTAMINANTS: WHAT IS IN THE WATER?

Data collected throughout 2021

Denver Water routinely monitors for contaminants in drinking water according to federal and state laws. The following tables show all detections found in the period of Jan. 1 through Dec. 31, 2021 unless otherwise noted. The state of Colorado requires Denver Water to monitor for certain contaminants less than once per year because the concentrations of these contaminants are not expected to vary significantly from year to year, or the system is not considered vulnerable to this type of contamination. Therefore, some of our data, though representative, may be more than one year old. Violations and formal enforcement actions, if any, are reported in the next section of this report.

Inorganic Contaminants Sampled at the Entry Point to the Distribution System									
Chemical Parameters	Year	Sampling Frequency	Average	Range	Unit of Measure	MCL	MCLG	MCL Violation	Typical Sources
Antimony	2021	Monthly	BRL	BRL	ppb	6	6	No	Discharge from petroleum refineries, fire retardants, ceramics, electronics, solder.
Arsenic	2021	Monthly	BRL	BRL	ppb	10	0	No	Erosion of natural deposits; runoff from orchards, runoff from glass, electronics, solder.
Barium	2021	Monthly	34.0	18.0-42.9	ppb	2,000	2,000	No	Erosion of natural deposits; discharge of drilling wastes.
Beryllium	2021	Monthly	BRL	BRL	ppb	4	4	No	Discharge from metal refineries and coal-burning factories; discharge from electrical, aerospace and defense industries.
Cadmium	2021	Monthly	BRL	BRL	ppb	5	5	No	Corrosion of galvanized pipes; erosion of natural deposits; discharge from metal refineries; runoff from waste, batteries and paints.
Chromium	2021	Monthly	0.03	BRL-1	ppb	100	100	No	Discharge from steel and pulp mills; erosion of natural deposits.
Mercury	2021	Monthly	BRL	BRL	ppb	2	2	No	Erosion of natural deposits; discharge from refineries and factories; runoff from landfills and croplands.
Selenium	2021	Monthly	BRL	BRL	ppb	50	50	No	Discharge from petroleum and metal refineries; erosion of natural deposits; discharge from mines.
Thallium	2021	Monthly	BRL	BRL	ppb	2	0.5	No	Erosion of natural deposits; discharge from refineries and factories; runoff from landfills and croplands.
Uranium	2021	Monthly	BRL	BRL	ppb	30	0	No	Erosion of natural deposits; mine drainage.
Fluoride	2021	Monthly	600	410-840	ppb	4,000 (2,000 is SMCL)	4,000	No	Erosion of natural deposits; water additive that promotes strong teeth; discharge from fertilizer and aluminum factories.
Nitrate as N	2021	Monthly	70	BRL-200	ppb	10,000	10,000	No	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits.
Nitrite as N	2021	Monthly	BRL	BRL	ppb	1,000	1,000	No	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits.
Nickel	2021	Monthly	0.38	BRL-2.2	ppb	N/A	N/A	No	Discharge from industrial uses such as transportation, chemical industry, electrical equipment and construction.
2,4-D	2021	Annually (Foothills WTP)	BRL	BRL	ppb	70	70	No	Runoff from herbicide used on row crops.

Secondary Contaminants Sampled at the Entry Point to the Distribution System*									
Chemical Parameters	Year	Sampling Frequency	Average	Range	Unit of Measure	MCL	MCLG	MCL Violation	Typical Sources
Sodium	2021	Monthly	20,100	9,100-28,800	ppb	N/A	N/A	No	Naturally occurring.

\*Secondary standards are non-enforceable guidelines for contaminants that may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor or color) in drinking water.

Summary of Turbidity Sampled at the Entry Point to the Distribution System							
Chemical Parameters	Year	Sampling Frequency	Level Found	Unit of Measure	Treatment Technique Requirement	Treatment Technique Violation	Typical Sources
Turbidity	2021	Daily	Highest single measurement: 0.2009 NTU (June, Marston Treatment Plant)	NTU	Maximum 1 NTU for any one single measurement.	No	Soil runoff
Turbidity	2021	Daily	Lowest monthly percentage of samples meeting TT requirement for our technology: 100%	NTU	In any month, at least 95% of samples must be less than 0.3 NTU.	No	Soil runoff

Turbidity has no health effects. However, turbidity can interfere with disinfection and provide a medium for microbial growth. Turbidity may indicate the presence of disease-causing organisms. These organisms include bacteria, viruses and parasites that can cause symptoms such as nausea, cramps, diarrhea and associated headaches.

Total Organic Carbon (Disinfection Byproducts Precursor) Removal Ratio of Raw and Finished Water*					
Chemical Parameters	Year	Frequency	Treatment Technique Requirement	Treatment Technique Violation	Typical Sources
Total organic carbon ratio	2021	Twice per month	**Denver Water uses enhanced treatment to remove the required amount of natural organic material and/or demonstrates compliance with alternative criteria.	No	Natural organic matter present in the environment.

\*\*Total organic carbon (TOC) has no health effects. However, total organic carbon provides a medium for the formation of disinfection byproducts including trihalomethanes (THMs) and haloacetic acids (HAA5s). Drinking water containing these byproducts in excess of the MCL may lead to adverse health effects, liver or kidney problems, or nervous system effects and may lead to an increased risk of getting cancer.

Disinfection Byproducts Sampled in the Distribution System									
Chemical Parameters	Year	Sampling Frequency	Average	Range	Unit of Measure	MCL	MCLG	MCL Violation	Typical Sources
Combined Radium (Ra-226 and Ra-228)	2021	6-9 years	0.92	BRL-2.1	pCi/L	5	0	No	Erosion of natural deposits, Mine drainage, Industrial or manufacturing discharges
Gross Alpha (excluding Uranium)	2021	6-9 years	0.77	0.5-1.0	pCi/L	15	0	No	Erosion of natural deposits, Mine drainage, Industrial or manufacturing discharges

Disinfection Byproducts Sampled in the Distribution System									
Name	Year	Sampling Frequency	Highest Locational RAA	Range	Unit of Measure	MCL	MCLG	MCL Violation	Typical Sources
Total Trihalomethanes (TTHM)	2021	Quarterly	28.9	26.6-35.7	ppb	80	N/A	No	Byproduct of drinking water disinfection.
Haloacetic Acids (HAA5s)	2021	Quarterly	16.2	13.2-20.4	ppb	60	N/A	No	Byproduct of drinking water disinfection.

Microbial Contaminants Regulated in the Distribution System									
Name	Year	Sampling Frequency	MCL	MCLG	Unit of Measure	Highest Monthly Percentage	Number of Positives	MCL Violation	Typical Sources
Total coliform (T. coli)	2021	Daily	No more than 5% positive per month	0	Present/Absent	0.26% (present T. coli), June 2021	2 out of 4,734 total samples (0.04%); 0 E. coli positive samples	No	Naturally present in the environment.

Disinfectants Sampled in the Distribution System*							
Name	Year	Results	Number of Samples Below Level	Frequency	Treatment Technique Violation	MRDL	Typical Sources
Disinfectant as Total Cl2	2021	Lowest period percentage of samples above 0.2 ppm: 100%	0	Daily	No	4.0 ppm	Drinking water disinfectant used to control microbial growth.

\*Treatment technique requirement: at least 95% of samples per period (month or quarter) must be at least 0.2 ppm.

Lead and Copper Sampled in the Distribution System								
Contaminant Name	Period	90th Percentile	Sample Size	Unit of Measure	90th Percentile Action Level	Sample Sites Above Action Limit	90th Percentile AL Exceedance	Typical Sources
Copper	1-6/2021	50	470	ppb	1,300	0	No	Corrosion of household plumbing; erosion of natural deposits.
Lead	1-6/2021	4.1	470	ppb	15	4	No	Corrosion of household plumbing; erosion of natural deposits.
Copper	7-12/2021	62	498	ppb	1,300	0	No	Corrosion of household plumbing; erosion of natural deposits.
Lead	7-12/2021	4.5	513	ppb	15	7	No	Corrosion of household plumbing; erosion of natural deposits.

# REGULATED WATER CONTAMINANTS: WHAT IS IN THE WATER?

## TERMS, ABBREVIATIONS AND 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.

### **action level**

Concentration of a contaminant that if exceeded triggers treatment or other requirements that a water system must follow.

### **average**

Typical value.

### **below reporting level (BRL)**

Below the reportable level for an analysis or below the lowest reliable level that can be measured.

### **compliance value**

Single or calculated value used to determine if a regulatory contaminant level is met. Examples of calculated values include average, 90th percentile, running annual average and location running annual average.

### **contaminant**

Potentially harmful physical, biological, chemical or radiological substance.

### **formal enforcement action**

Escalated action taken by the state to bring a noncompliant water system back into compliance.

### **health-based**

Violation of either a maximum contaminant level or treatment technique.

### **Level 1 Assessment**

A study of the water system to identify potential problems and determine (if possible) why total coliform bacteria have been found in our water system.

### **Level 2 Assessment**

A very detailed study of the water system to identify potential problems and determine (if possible) why an E. coli MCL violation has occurred and/or why total coliform bacteria have been found in our water system on multiple occasions.

### **locational running annual average (LRAA)**

The average of sample results for samples collected at a particular monitoring location during the most recent four calendar quarters.

### **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 contaminant level goal (MCLG)**

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.

### **maximum residual disinfection level (MRDL)**

Highest level of a disinfectant allowed in drinking water. There is convincing evidence that the addition of disinfectant is necessary for control of microbial contaminants.

### **maximum residual disinfection level goal (MRDLG)**

The level of a drinking water disinfectant, below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

### **nephelometric turbidity unit (NTU)**

Measure of the clarity or cloudiness of water. Turbidity in excess of 5 NTU is just noticeable to the typical person.

### **non-health-based**

A violation that is not a MCL or TT.

### **parts per billion (ppb)**

Equivalent to micrograms per liter. One drop in one billion drops of water.

### **parts per million (ppm)**

Equivalent to milligrams per liter. One drop in one million drops of water.

### **picocuries per liter**

Measure of radio activity in water.

### **range (R)**

Lowest value to the highest value.

### **running annual average (RAA)**

Average of the monitoring period for a year.

### **secondary maximum contaminant level (SMCL)**

Nonenforceable, recommended limits for substances that affect the taste, odor, color or other aesthetic qualities of drinking water rather than pose a health risk.

### **treatment technique**

Required process intended to reduce the level of a contaminant in drinking water.

### **turbidity**

Measure of suspended material in water. In the water field, a turbidity measurement, expressed in nephelometric turbidity units (NTU), is used to indicate clarity of water.

### **variance and exemptions**

Department permission not to meet maximum contaminant level or treatment technique under certain conditions.


### **violation**

Failure to meet a Colorado Primary Drinking Water Regulation.




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For more information on water quality,  
including opportunities for public participation, visit [denverwater.org](https://denverwater.org).

 DenverWater

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Denver Water's Public Water System Identification: CO0116001