

2016 REPORT



The City and County of Broomfield is again pleased to provide you with our Annual Water Quality Report, summarizing water quality data collected from January 1 to December 31, 2016. The Colorado Department of Public Health and Environment requires all public water systems to inform consumers about their water sources, water treatment processes, and levels of regulated contaminants in drinking water distributed to consumers during the past calendar year. Much more information about Broomfield's drinking water may be obtained by visiting the Environmental Services page of Broomfield's web site: (www.broomfield.org) or by calling Laura Hubbard at 303-464-5606. Broomfield's water supply, treatment, and delivery professionals are committed to providing you with drinking water that is safe, pleasing and dependable.

You're Invited ...

We welcome your input on any water quality or service issue. Broomfield City Council provides opportunities for public input and meets on the 2nd and 4th Tuesdays of each month at 6:00 pm at the City and County Building, One DesCombes Drive. Notice of upcoming agendas is published in the Broomfield Enterprise, and is posted at the City and County Building and on our website at www.broomfield.org.

En Español

Este informe contiene información muy importante acerca de su agua potable. Haga que alguien lo traduzca para usted, o hable con alguien que lo entienda.

WATER AND YOUR FAMILY'S HEALTH

Drinking Water and Health

In order to ensure that tap water is safe to drink, the Colorado Department of Public Health and Environment prescribes regulations limiting the amount of certain contaminants in water provided by public water systems. The Food and Drug Administration regulations establish limits for contaminants in bottled water that must provide the same protection for public health.

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 the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the **EPA Safe Drinking Water Hotline (800-426-4791)**.

Special Health Concerns

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines 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)**.

Lead in Drinking Water and Its Effects on Children

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The City and County of Broomfield is responsible for providing high quality drinking water, but 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. 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 <http://www.epa.gov/safewater/lead>**.

Public Water Supply ID# C00107155

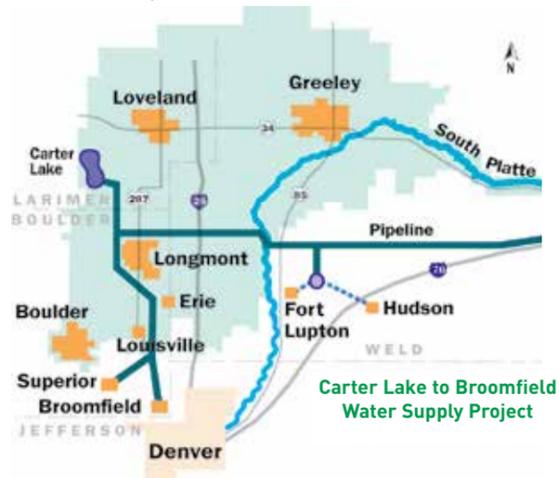


BROOMFIELD'S WATER SOURCES

Broomfield is fortunate to have two sources of high-quality drinking water – water treated at our Water Treatment Plant, and treated water purchased from Denver Water. The two sources are generally blended in the distribution system. All of Broomfield's drinking water, whether supplied by Broomfield or Denver Water, comes from surface water sources such as rivers, lakes, and reservoirs.

Denver Water may deliver treated water to its municipal customers from any of its three treatment facilities. Water supplying these facilities comes from Denver Water's extensive Moffat and South Platte River collection systems.

The water supply for Broomfield's treatment facility originates in the Colorado and Fraser Rivers west of the Continental Divide, and is delivered through the Northern Colorado Water Conservancy District's Colorado-Big Thompson (CBT) Project. On the eastern slope, Broomfield's water is stored in Carter Lake near Berthoud. From there, it is transported to Broomfield's Water Treatment Plant via a 33-mile pipeline, and stored in Matthew D. Glasser Reservoir, a small storage reservoir adjacent to the treatment facility.



Drinking Water Treatment Process

Broomfield's modern treatment facility, completed in 1997, is designed to treat 20 million gallons of water per day. Chemicals specially formulated for drinking water treatment are added to the raw water to remove particles, microorganisms and other contaminants. The water is then filtered to remove any remaining particles. Fluoride is added to help prevent tooth decay, and the treated water is disinfected with chloramines to inactivate bacteria and viruses and prevent harmful organisms from growing in the distribution system. Certified Water Treatment Operators monitor the treatment process continuously to ensure consistent quality and safety.

Source Water Protection

The best place to prevent or minimize contaminants is at the source! The State of Colorado has developed a Source Water Assessment & Protection (SWAP) program to provide information and encourage community-based source water protection and preventive management strategies to keep our water resources safe from future contamination. You may obtain a copy of the report by visiting www.colorado.gov and searching on 'source water assessment,' or by contacting Laura Hubbard at 303-464-5606.

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 future contamination threats. This can help us ensure that quality finished water is delivered to your home. In addition, the source water assessment results provide a starting point for developing a source water protection plan.

Contamination in our source water areas could possibly occur from discrete sources such as:

- Aboveground, underground and/or leaking storage tank sites (including gas and propane tanks)
- Existing/abandoned mine sites
- Other industrial/commercial facilities such as convenience stores, campgrounds, and motels

Land uses in our source water areas represent potential dispersed sources of contamination. These include commercial/industrial/transportation use, residential areas, fields, and forests. Septic systems, oil/gas wells and roads could also possibly contribute dispersed contaminants to our source water areas.

Water Conservation

In addition to protecting our source water, we can all increase our efforts to use water more wisely. To preserve this limited resource, Broomfield is asking its customers to closely follow the watering guidelines developed in cooperation with other Front Range communities. The guidelines are available on the Environmental Services web page at www.broomfield.org. These guidelines offer a common sense approach to using water as efficiently as possible. Efforts to use water efficiently now may postpone or eliminate the need for watering restrictions if the water storage reservoir levels decline. Broomfield is offering free indoor and irrigation audits, and rebates for toilets, irrigation controllers and irrigation heads to help residents and businesses achieve the desired long term water efficiency. Please visit www.BroomfieldRebates.com for audit information and rebate applications.



Drinking Water Contaminant Sources

Drinking water contaminants may occur naturally, or result from human activity. Contaminants may be present in the source water, introduced during the treatment process, or develop after the water leaves the treatment facility.

Source Water. The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the land surface or through the ground, it dissolves naturally-occurring minerals and other contaminants resulting from the presence of animals or from human activity. For example:

- **Microbial contaminants** such as viruses and bacteria may come from sewage treatment plants, septic systems, agriculture, livestock operations, household pets, and wildlife.
- **Inorganic contaminants** such as salts and metals 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** may come from sources such as agriculture, urban stormwater runoff, and residential uses.
- **Organic chemical contaminants**, including synthetic and volatile organic chemicals, can be byproducts of industrial processes such as petroleum production, or come from gas stations, urban stormwater runoff, and septic systems.
- **Radioactive contaminants** can be naturally-occurring or result from oil and gas production and mining activities.

Treatment Process. Some regulated substances are introduced during the water treatment process, or as a result of treatment. Examples include fluoride, disinfectants, and disinfection by-products.

After Treatment. After treatment, the interaction of treated water with water mains and household plumbing may contribute other substances, such as lead and copper, to consumers' tap water.



WATER QUALITY DATA

During 2016, Broomfield's Water Treatment staff and Certified Drinking Water Laboratory performed more than 25,000 tests for about 100 different regulated contaminants. The table below lists all the detected regulated drinking water contaminants that Broomfield water consumers could have received during the 2016 calendar year. Contaminants not reported in the table were not detected.

Terms, Abbreviations, and Symbols Used in This Report:

ppm – parts per million, or milligrams per liter (mg/L).
In dollars, 1 ppm = 1 cent in \$10,000

ppb – parts per billion, or micrograms per liter (µg/L).
In dollars, 1 ppb = 1 cent in \$10,000,000

pCi/L – picocuries per liter, a measure of the radioactivity in water.

Maximum Contaminant Level 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.

Maximum Contaminant Level (MCL) – The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

Violation – A failure to meet a Colorado Primary Drinking Water Regulation.

Range of Individual Samples – The lowest sample result to the highest sample result.

Average of Individual Samples – The sum of all sample results divided by the number of sample results.

Secondary Maximum Contaminant Level (SMCL) – A non-enforceable, recommended limit for a substance that affects the taste, odor, color or other aesthetic qualities of drinking water, rather than posing a health risk.

Maximum Residual Disinfectant Level (MRDL) – The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Maximum Residual Disinfectant 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 contamination.

Treatment Technique (TT) – A required process intended to reduce the level of a contaminant in drinking water.

Turbidity – Turbidity is a measure of the cloudiness of the water. It is measured in "Nephelometric Turbidity Units," or NTU.

Locational Running Annual Average (LRAA) – An average of monitoring results for the previous 12 calendar months at a specific sampling location.

Action Level (AL) – The concentration of a contaminant, which if exceeded, triggers treatment or other requirements a water system must follow.

N/A – Not Applicable

ND – Not Detected

BR – Below the Reportable level

Minimum Reporting Level (MRL) – The lowest concentration that can be reliably reported using a particular analytical method.

What's the bottom line?

Last year, as in years past, your tap water met or surpassed all EPA and Colorado health standards for drinking water. We're pleased to report that **Broomfield's system has never violated a Maximum Contaminant Level or any other regulatory requirement.** Although some regulated contaminants were detected, the levels were far below the health-protection limits established by EPA.

Other water quality questions?

Our 2016 monitoring results for other water quality characteristics that may be of interest are reported in the table below. These may affect water's taste, smell or appearance. Water hardness may affect how much detergent we use. For more information about water quality concerns or this report, please call Laura Hubbard at **303-464-5606**, or the Water Treatment Plant at **303-464-5600**.

Secondary and Unregulated Water Quality Characteristics

Constituent	Units	Recommended Limit (if any)	Range in Distribution System (Minimum - Maximum)
Secondary Constituents (Recommended Limit is the SMCL)			
Aluminum	ppm	0.05 - 0.2	0.008 - 0.026
Chloride	ppm	250	4.7 - 34
Copper	ppm	1	0.002 - 0.11
Fluoride	ppm	2	0.57 - 0.94
Iron	ppb	300	ND
Manganese	ppb	50	ND - 17
pH	Std. Units	6.5 - 8.5	7.3 - 8.2
Silver	ppm	0.1	ND
Sulfate	ppm	250	13 - 49
Total Dissolved Solids	ppm	500	57 - 210
Zinc	ppm	5	ND - 0.007
Unregulated Constituents			
Alkalinity (as CaCO ₃)	ppm	N/A	26 - 88
Hardness (as CaCO ₃)	ppm	← 50 = "soft" → 150 = "hard"	15 - 99
	grains per gallon	← 3 = "soft" → 8.8 = "hard"	0.9 - 5.8
Calcium	ppm	N/A	2.7 - 29
Magnesium	ppm	N/A	1.2 - 8.8
Potassium	ppm	N/A	0.64 - 1.9
Sodium	ppm	N/A	8.5 - 24

Monitoring for Long Term 2 Revisions to the Enhanced Surface Water Treatment Rule

This mandated EPA program requires surface water systems to perform monthly monitoring of raw water supplies for certain microbial pathogens over a period of 24 months. In 2016, Cryptosporidium was detected in 4 of 38 samples collected from Denver Water's raw water supplies.

Cryptosporidium is a microbial pathogen found in surface water throughout the United States. Although filtration and conventional water treatment removes Cryptosporidium, the most commonly-used filtration methods cannot guarantee 100 percent removal. Denver Water's raw water monitoring indicates the presence of these organisms in their source water. Current test methods do not allow us to determine if the organisms are dead or if they are capable of causing disease. Ingestion of Cryptosporidium may cause cryptosporidiosis, an abdominal infection. Symptoms of infection include nausea, diarrhea, and abdominal cramps. Most healthy individuals can overcome the disease within a few weeks. However, immuno-compromised people, infants and small children, and the elderly are at greater risk of developing life-threatening illness. We encourage immuno-compromised individuals to consult their doctor regarding appropriate precautions to take to avoid infection. Cryptosporidium must be ingested to cause disease, and it may be spread through means other than drinking water. Cryptosporidium has never been detected in Broomfield's or Denver Water's finished drinking water.

DETECTED CONTAMINANTS TABLE: What's in Broomfield's water?

Sampled at the Entry Point to the Distribution System											
Contaminant	Year	CCR Units	EPA Goal (MCLG)	Highest Level Allowed (MCL)	Average	Range of Individual Samples	MCL Violation?	Sample Date/Frequency	Typical Sources		
Antimony ¹	2016	ppb	6	6	0.05	ND - 0.08	No	Monthly	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder		
Arsenic ¹	2016	ppb	10	0	0.5	ND - 0.5	No	Monthly	Erosion of natural deposits, runoff from orchards; runoff from glass and electronics; solder		
Barium ¹	2016	ppm	2	2	0.03	0.02 - 0.04	No	Monthly	Erosion of natural deposits, discharge of drilling waste		
Chromium ¹	2016	ppb	100	100	0.6	ND - 1	No	Monthly	Discharge from steel and pulp mills; erosion of natural deposits		
Fluoride ¹	2016	ppm	4	4 (SMCL=2)	0.7	0.2 - 1.1	No	Monthly	Water additive to promote strong teeth, erosion of natural deposits		
Nitrate, as Nitrogen ¹	2016	ppm	10	10	0.1	ND - 0.2	No	Monthly	Fertilizer runoff, sewage, septic tank leachate		
Selenium ¹	2016	ppb	50	50	0.5	ND - 0.6	No	Monthly	Discharge from petroleum and metal refineries; erosion of natural deposits; discharge from mines		
Sodium (monitoring required, but no MCL) ¹	2016	ppm	N/A	N/A	15	7.5 - 20	N/A	Annually	Naturally present in the environment		
Uranium ¹	2016	ppb	0	30	0.5	ND - 1.4	No	Monthly	Erosion of natural deposits, mine drainage		
Gross Alpha ¹	2016	pCi/L	0	15	ND	ND - 1	No	Annually	Erosion of natural deposits, mine drainage		
Contaminant	Year	TT Requirement				Results			TT Violation?	Sample Date/ Frequency	Typical Sources
Turbidity ²	2016	Maximum of 1 NTU for any single measurement				Highest single measurement: 0.2 NTU			No	February 2016, every 4 hours	Soil runoff
	2016	Each month, at least 95% of samples must be less than 0.3 NTU				Lowest % of samples less than 0.3 NTU:100%			No	Every 4 hours	
Disinfectants	Year	Number of Samples Below Level	TT/MRDL Requirement			Number of Samples		TT/MRDL Violation?	Sample Date/Frequency	Typical Sources	
Chlorine/Chloramine	2016	0	TT=No more than 4 hours with a sample below 0.2 mg/L			1598		No	Every 4 hours	Water additive used to control microbes	
Sampled at the Treatment Facility											
Disinfection Byproduct Precursor	Year	Unit of Measure		TT Minimum Ratio	Average	Range of Individual Ratio Samples		TT Violation?	Number of Samples	Typical Sources	
Total Organic Carbon Ratio	2016	Ratio		1	1.5	1.34 - 1.73		No	12	Naturally present in the environment	
Sampled in the Distribution System ³											
Disinfection Byproduct	Year	CCR Units	MCLG	MCL	Highest Compliance Value (LRAA)	Range of Compliance Values (LRAA)		MCL Violation?	Number of Samples	Typical Sources	
Total Trihalomethanes (TTHM)	2016	ppb	0	80	25.7	19.6 - 25.7		No	32	Byproducts of chlorine disinfection of drinking water	
Haloacetic acids (HAA5)	2016	ppb	0	60	21.1	14.9 - 21.1		No	32		
Disinfectant	Year	CCR Units	EPA Goal (MRDLG)		Highest Level Allowed (MRDL)	Average	Range of Individual Samples	MRDL Violation?	Sample Date/ Frequency	Typical Sources	
Total Chlorine (chloramine)	2016	ppm	4		4.0	2.0	0.19 - 3.5	No	100 per month	Water additive used to control microbes	
Disinfectant	Year	TT Requirement			Results		Number of Samples Below Level	TT Violation?	Sample Date/ Frequency	Typical Sources	
Total Chlorine (chloramine)	2016	For any two consecutive months, at least 95% of each month's samples must be detectable (greater than 0.2 mg/L chlorine)			Lowest monthly percentage of samples meeting TT Requirement: February 2016: 99%		1 (0.19 mg/L)	No	February 2016: 100 samples per month	Water additive used to control microbes	
Microorganism Contaminant	Year	EPA Goal (MCLG)		Highest Level Allowed (MCL)		Results		MCL Violation?	Time Period	Typical Source	
Total Coliform (TC) Bacteria	2016	zero		Up to 5.0% of each month's samples are positive		Highest % of positive samples: 1.7%		No	March	Naturally present in the environment	
E. coli Bacteria	2016	zero		Routine sample and a repeat sample are TC positive, and one is also E. coli positive.		1 routine sample was positive		No	March	Human and animal fecal waste	
Sampled at the Consumer's Tap											
Lead and copper monitoring is only required every 3 years due to Broomfield's consistently low results. We monitor again in 2017.	Year	CCR Units	Action Level (AL) ⁴	90th Percentile	Sample Sites Above AL	Number of Samples	MCL Violation?	Sample Date/ Frequency	Typical Sources		
Lead	2014	ppb	15	4.5	Zero	36	No	8/6/14 - 9/12/14	Corrosion of household plumbing; erosion of natural deposits		
Copper	2014	ppm	1.3	0.18	Zero	36	No				

¹ Denver Water data. We report the maximum detected concentration that Broomfield water customers could have received, from either Broomfield or Denver Water sources.

² Turbidity has no health effects. However, turbidity can interfere with disinfection and provide a medium for microbial growth.

³ TTHM and HAA5 are regulated as a locational running annual average (LRAA), not a single value.

⁴ The Action Levels for lead and copper apply to the 90th percentile of all samples collected; 90% of the sample results must be below the Action Level.

DENVER WATER - WATER QUALITY MONITORING VIOLATION

In 2016, Denver Water's system violated a drinking water monitoring requirement by not testing in accordance with the required schedule. Broomfield did complete all drinking water monitoring in accordance with compliance schedules, but as a purchaser of Denver Water, Broomfield is required to notify our customers of the Denver Water monitoring violation. This was not a water quality violation. Although this situation did not pose a safety risk and does not require that you take immediate action, as our customers, you have a right to know what happened, what you should do and what has been done to correct this situation.

Drinking water suppliers are required to monitor drinking water for specific contaminants on a regular basis. Results of regular monitoring are an indicator of whether or not our drinking water meets health standards. From Jan. 1, 2013, to Dec. 31, 2016, Denver Water did not complete all monitoring for synthetic organic chemicals (SOCs) in accordance with compliance schedules.

What should I do?

There is nothing you need to do at this time.

What happened? What is being done?

The table below lists the contaminant Denver Water did not properly test for.

Contaminant	Required Sampling Frequency	Number of Samples Taken	When Samples Should Have Been Taken	When Samples Will Be Taken
SOCs*	Triennially	1 set	January 2013 to December 2016	2 nd Quarter 2017 and 3 rd Quarter 2017

The Colorado Department of Public Health and Environment required that Denver Water monitor water from its treatment plants for SOC's in the 2013 to 2016 time frame. The regulation requires Denver to collect two sample sets from each of their three Water Treatment Plant Effluents, each in different quarters during one of the three years. Denver Water is required to monitor 31 SOC compounds triennially. With the exception of two compounds (diquat and endothall), the remaining SOC compounds were monitored per the required schedule. Because the correct sampling frequency was not followed for diquat and endothall, this caused Denver Water to have an SOC monitoring violation per the Colorado Primary Drinking Water Regulations.

Denver Water has had an active monitoring program for more than 10 years and has not detected SOC's in their system in past compliance cycles. Denver Water's water met all drinking water standards. And the SOC's that were collected were all non-detect. This was not a water quality violation.

For more information, you can contact Customer Care at **303-893-2444** or **1600 West 12th Avenue, Denver, CO, 80204**.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand.

*SOC's:

Endrin, BHC-Gamma, Methoxychlor, Toxaphene, Dalapon, Diquat, Endothall, Di(2-Ethylehexyl) Adipate, Oxamyl, Simazine, Di(2-Ethylhexyl) Phthalate, Picloram, Dinoseb, Hexachlorocyclopentadiene, Carbofuran, Atrazine, Lasso, Heptachlor, Heptachlor Epoxide, 2,4-D, 2,4,5-TP, Hexachlorobenzene, Benzo(A)Pyrene, Pentachlorophenol, Total Polychlorinated Biphenyls (PCB), 1,2-Dibromo-3-Chloropropane, Ethylene Dibromide, Chlordane, Aldicarb, Aldicarb sulfoxide, Aldicarb sulfone