



2016

CITY OF GOLDEN

Water Quality Report



The City of Golden is committed to providing its customers with safe and dependable drinking water. This is your annual summary of drinking water quality along with updated information about Golden's water treatment plant, water service lines and Clear Creek, our raw water supply. We hope you will find this report useful and welcome any comments you may have. The Environmental Services Division can be reached at 303-384-8181 or to learn more, go to www.cityofgolden.net/DrinkingWater.

Clear Creek – Our Mountain Water Source

Golden's drinking water source is predominantly snowmelt from Clear Creek and its tributaries. As it flows through the watershed, it dissolves naturally occurring minerals and, in some cases, radioactive materials from rock surfaces and the riverbed. Water quality in Clear Creek may also be influenced by rock or landslides, runoff from deciduous and evergreen forested areas, animal activity or by substances that are a result of human activity.

Contaminants that may be present in source waters include:

- Bacteria and viruses from wastewater treatment plants, individual septic systems, livestock operations and wildlife.
- Salts and metals from highway/road maintenance and construction

operations, mine waste piles, active and abandoned mines or mine cleanup sites, oil and gas production, farming and stormwater runoff.

- Organic contaminants, including synthetic and volatile organic chemicals which are by-products of industrial processes and petroleum production. They may also come from petroleum spills from gas stations, traffic accidents or leaking above ground or underground storage tanks.
- Radioactive contaminants that are naturally occurring or can be the result of mining activity or oil and gas production.
- Pesticides, herbicides and nutrients such as nitrogen and phosphorus from residential lawns, agricultural activities or stormwater runoff.

The Colorado Department of Public Health and Environment has provided consumers with a Source Water Assessment Report that is specific to Golden's raw water supply. The report is not an indication of the current quality of our water source but provides a screening level evaluation of potential impacts to Clear Creek and rates the possible susceptibility to those sources. Information from the report is available to Golden to develop and implement water management strategies in order to optimize treatment and protect the quality of our drinking water. The report is available online at <https://wqcdcompliance.com/ccr> or may be obtained by contacting the City of Golden Environmental Services Division at 303-384-8181.

Water Quality and Your Health

Facts on Lead in Drinking Water

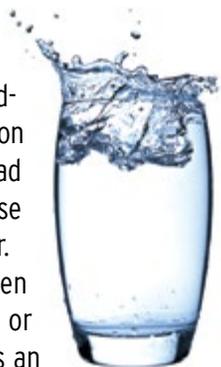
In drinking water, lead comes from lead service lines running from the water main in the street to the home and from plumbing inside the home. As a general rule for the U.S., lead service lines were installed until the mid-1950's. For the City of Golden, historic city ordinances document the installation of lead service lines starting in 1879 and ending in 1937. In addition to lead service lines, the EPA suspects homes built before the 1986 ban of lead-use in plumbing materials are more likely to have lead pipes, fixtures and solder.

Lead from these plumbing materials can leach into drinking water when water is corrosive. Corrosive water occurs when it has the wrong pH or when it does not contain enough dissolved solids. The City of Golden has an approved corrosion control program that prevents corrosive water from being sent out into the distribution system. We constantly monitor pH, alkalinity, hardness, temperature and various other water quality characteristics to ensure corrosion control is correctly and consistently implemented. The City also conducts lead and copper monitoring in the water distribution system to validate our corrosion treatment is adequate.

Lead and copper samples are taken at the plant and out in the community at several designated sampling sites. To select sites, we target homes that are likely to have or have lead plumbing materials. Using build date information and with citizen cooperation the City has previously collected samples from 34 households every three years. Sampling requirements from the state have changed as a consequence of the water quality events in Flint, MI. Starting in 2017, the City will be required to sample every year instead of every three years. Since the Lead and Copper monitoring rule went into effect in 1991, the City has not had a single exceedance for lead and copper. Water treated here has been carefully balanced before entering the system.

LEAD - WHAT YOU NEED TO KNOW

Young children and pregnant women are typically more vulnerable to lead in drinking water than the general population. It is possible that lead levels at your home may be higher than other homes in the community as a result of materials used in your home's plumbing. The City of Golden is responsible to provide you with high quality drinking water but cannot control the variety of materials used in water service lines and home plumbing components. You can minimize your exposure by flushing your tap for 30 seconds to 2 minutes before using water for cooking or drinking. If you are concerned about levels of lead in your home, you may wish to have your water tested. Information on lead in drinking water, testing methods and steps you can take to minimize your exposure is available from the Safe Drinking Water Hotline at 1-800-426-4791 or at www.epa.gov/safewater/lead.



If You Have Special Health Concerns:

Both public and bottled water supplies 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. However, some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised individuals such as persons undergoing chemotherapy, persons who have undergone organ transplants, those with HIV/AIDS or other immune system disorders and some elderly and infants can be particularly at risk for infection. These people should seek advice about drinking water from their health care providers. For more information about contaminants and potential health effects, or to receive a copy of the EPA/CDC guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium*, *Giardia* or other microbiological contaminants, call the EPA Safe Drinking Water Hotline toll free at **1-800-426-4791** or visit <http://water.epa.gov/drink/contaminants>.

2016 Water Quality Monitoring Results

The following tables contain the results of all substances that are regulated by State and Federal law that were detected in Golden's water during the 2016 monitoring period. Most of the monitoring performed by Golden's Environmental Services lab results in non detect levels allowing the City to perform reduced monitoring for substances that pose no risk to our system. Some of those results will show dates that may be more than a year old.

Detected Regulated Substances

Monitored leaving the Water Treatment Plant

For more information, call the Water Quality Lab at 303-384-8181.
Or contact Stephanie Crabtree at 303-384-8184.

Organic/Inorganic	Sample Date	Average	Range Found	MCL	MCLG	No Violations	Common Sources
Barium, ppm	Quarterly	0.03	0.016 - 0.04	2	2		Natural Erosion
Fluoride, ppm	Quarterly	0.61	0.52 - 0.68	4	4		Natural Erosion
Nitrate, ppm	Quarterly	0.3	<0.05 - 0.54	10	10		Fertilizer Run-off
*Total Organic Carbon (TOC), ratio (TOC, reported as a ratio, must remain above 1.0 for optimal water treatment.)	monthly - RAA	1.33	1.08 - 1.89	TT	TT		Naturally present in the environment

*Golden uses enhanced treatment to remove the naturally occurring organic compounds that can combine with disinfectants to form Disinfection By-Products. The ratio of TOC removal measures our compliance with this treatment technique.

Radionuclides	Sample Date	Average	Range Found	MCL	MCLG	No Violations	Common Sources
Combined Radium (226 & 228) pCi/L	2-3-2011	0.1	0.1 - 0.1	5	n/a		Erosion of natural deposits
Gross Alpha Particles pCi/L	3-23-2015	0.4	0.4 - 0.4	15	n/a		Erosion of natural deposits
Combined Uranium pCi/L	3-23-2015	<0.7	<0.7 - <0.7	20	n/a		Erosion of natural deposits

Turbidity	Sample Date	Result	Treatment Requirement	No Violations	Common Sources
Turbidity, NTU (Measure of the cloudiness of water. It is a good indicator of the effectiveness of our filtration system)	6 times per day	highest single reading 0.24 ntu	Maximum of 1.0 ntu at any time		Natural Run-off

Monthly averages must be less than 0.3 NTU for 95% of the time.
In Golden, 100% of all monthly averages were less than 0.3 NTU for 2016.

Monitored at consumer taps

Disinfection By-Products	Sample Date	Highest RAA	Average	Range Found	MCL	MCLG	No Violations	Common Sources
Total Trihalomethanes, ppb	quarterly RAA	63.4	37.73	Total Range 15.7 - 63.4	80	n/a		By-product of Chlorination
Total Haloacetic Acids, ppb	quarterly RAA	13.6	10.38	Total Range 7.2 - 13.6	60	n/a		By-product of Chlorination
Chlorine (free), ppm	throughout the year	n/a	0.8	0.5 - 1.1	MRDL 4	MRDLG 4		Drinking Water Disinfectant

Running Annual Average for THM's must be less than 80 ppb. Running Annual Average for HAA's must be less than 60 ppb.

Lead and Copper	Sample Date	Concentration at 90th Percentile	Number of Exceedences at 90th Percentile	AL	No Violations	Common Sources
Lead, ppb	2014	less than 1	0	15		Corrosion of household plumbing
Copper, ppm	2014	0.058	0	1.3		Corrosion of household plumbing

The requirement to monitor for lead and copper at consumer taps has been reduced to once every three years.
30 Golden households were sampled in 2011 and 34 were sampled in 2014. The City of Golden will start annual Lead and Copper sampling in the summer of 2017.

Other Monitoring Results *Monitored leaving the Water Treatment Plant*

Substance	Sample Date	Average	Range Found	MCL	SMCL	Common Sources
Alkalinity, ppm	weekly	40.4	20 - 56	n/a	none	Erosion of Natural Deposits
Chloride, ppm	quarterly	29	14 - 48	n/a	250 ppm	Erosion of Natural Deposits
Hardness, ppm	weekly	115	34 - 168	n/a	None	Erosion of Natural Deposits
Iron, ppm	quarterly	0.008	0.004 - 0.013	n/a	0.3 ppm	Erosion of Natural Deposits
Manganese, ppm	quarterly	0.005	0.002 - 0.008	n/a	0.05 ppm	Treatment
pH, su	weekly	8.3	7.1 - 8.9	n/a	6.5 - 8.5 su	Treatment
Potassium, ppm	quarterly	2.8	1.5 - 3.8	n/a	None	Erosion of Natural Deposits
Sodium, ppm	quarterly	22.1	12.6 - 36	n/a	None	Erosion of Natural Deposits
Sulfate, ppm	quarterly	86.9	34 - 122	n/a	250 ppm	Erosion of Natural Deposits
(TDS), ppm	monthly	206	94 - 328	n/a	500 ppm	Erosion and Storm Water Runoff
Zinc, ppm	quarterly	0.08	<0.02 - 0.13	n/a	5 ppm	Erosion of Natural Deposits

Cryptosporidium in Raw Source Water

Contaminant Name	Year	Number of Positives	Sample Size
Cryptosporidium	2016	1	9

Cryptosporidium is a microbial pathogen found in surface water throughout the United States. Although filtration removes cryptosporidium, the most commonly used filtration methods cannot guarantee 100 percent removal. Our monitoring indicates the presence of these organisms in our source water and/or finished 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 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.



**If you have any questions, please contact the Water Treatment Plant
at 303-384-8187 or online at www.cityofgolden.net/WTP.**

Glossary of Terms and Definitions

- **Maximum Contaminant Level (MCL) –**
The highest level of a contaminant allowed in drinking water.
- **Treatment Technique (TT) –**
A required process intended to reduce the level of a contaminant in drinking water.
- **Action Level (AL) –**
The concentration of a contaminant which, if exceeded, triggers treatment and other regulatory requirements.
- **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 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 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 contaminants.
- **Violation –**
Failure to meet a Colorado Primary Drinking Water Regulation.
- **Formal Enforcement Action –**
Escalated action taken by the State (due to the risk to public health, or number or severity of violations) to bring a non-compliant water system back into compliance.
- **Variance and Exemptions (V/E) –**
Department permission not to meet a MCL or treatment technique under certain conditions.
- **Gross Alpha –**
Gross alpha particle activity compliance value. It includes radium-226, but excludes radon 222, and uranium.
- **Picocuries per liter (pCi/L) –**
Measure of the radioactivity in water.
- **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.
- **Compliance Value –**
Single or calculated value used to determine if regulatory contaminant level (e.g. MCL) is met. Examples of calculated values are the 90th Percentile, Running Annual Average (RAA) and Locational Running Annual Average (LRAA).
- **Average (x-bar) –**
Typical value.
- **Range (R) –**
Lowest value to the highest value.
- **Sample Size (n) –**
Number or count of values (i.e. number of water samples collected).
- **Parts per million = Milligrams per liter (ppm = mg/L) –**
One part per million corresponds to one minute in two years or a single penny in \$10,000.
- **Parts per billion = Micrograms per liter (ppb = ug/L) –**
One part per billion corresponds to one minute in 2,000 years, or a single penny in \$10,000,000.
- **Not Applicable (N/A) –**
Does not apply or not available.

In order to ensure that tap water is safe to drink, the Colorado Department of Public Health and Environment (CDPHE) prescribes regulations that limit the amount of certain contaminants in the treated water provided by public water systems such as Golden's. The Food and Drug Administration (FDA) sets similar limits for contaminants in bottled water that must provide the same protection for consumers. However, the regulations and testing requirements are much less stringent than for tap water



Meet the City of Golden Water Treatment Plant Operators

BRYNN GOE

Brynn is the Superintendent for the City of Golden Water Treatment Plant. Brynn has over fourteen year's water industry experience. Her background made her versed in operations, sampling, laboratory work, regulatory compliance, remote water quality management facility maintenance and water district management. Brynn continually adds to her top quality education and experience in the water treatment industry by staying up to date with licensing and training. Brynn enjoys hiking, biking, camping and fishing with her husband and 2 young children.

SHAUN HOLLSTROM

Shaun is the Lead Operator for the City of Golden Water Treatment Plant, and has been with the City of Golden for over three years. Shaun is a Class A Water Operator. He graduated Phi Theta Kapa with Honors in Water Quality Management. Shaun is married and has two dogs and a cat. During his free time, he enjoys outdoor activities including skiing, surfing, hiking, spear fishing, biking, and basketball.

BRENT SWIFT

Brent is a Class C Water Operator and has been working for the City of Golden for one year. He was a high school and middle school math teacher before making the career change to water treatment. He lives with his wife and two dogs. In his free time, he enjoys going to sporting events and fishing.

CHRIS SHEPARD

Chris is a Class A Water Operator. He grew up in Massachusetts, where he earned his bachelor's degree in Environmental Studies from Clark University, and became a water treatment operator near his hometown. He moved to Colorado in 2013, and became an operator for



From left to right: Chris Shepard, Sal Ingenthron, Brent Swift, John Dorris, Gordon Darnell, Brian Gier, Shaun Hollstrom, and Brynn Goe.

Golden in early 2014. Chris and his wife enjoy spending much of their free time exploring all the beautiful public lands in Colorado and beyond. Chris estimates he has averaged about one new mountain summit and one new Colorado beer each week since arriving.

BRIAN GIER

Brian has a Class A Water Operator Certification, which is the top certification issued by the State of Colorado. He graduated with an AAS in Water Quality Management from Red Rocks Community College in 1995. Brian has almost twenty years in the water treatment profession, including ten years with the City of Golden. He enjoys traveling with his wife and cheering on the Broncos and Avalanche.

GORDON DARNELL

Gordon is a Class A Water Operator and has been with the City of Golden for nine years. He has over eighteen years of water treatment

experience. Gordon graduated from Red Rocks Community College with a degree in Water Quality Management. Gordon is known as the "super operator" and his favorite color is blue.

JOHN DORRIS

John is a Class A Water Operator and has a BS in Public Management from CSU-Global, and an AAS in Water Quality Management from Red Rocks Community College. He is a US Army veteran and family man, who lives in Lakewood with his wife, and three children. He enjoys music, literature, and exploring Colorado.

SAL INGENTHRONE

Sal is the City of Golden Water Treatment Plant Mechanic, and has been with the City of Golden for two years. Sal graduated from Red Rocks Community College with a degree in Water Quality Management. He is also a certified welder and has multiple years of experience in varying disciplines of construction.

Excess Nutrients Can Pose a Threat to Water Quality

When used on the lawn and garden, nutrients such as nitrogen and phosphorus can help plant growth. But when nutrients are used in excess of what plants require, the excess is washed into local streams by stormwater runoff and irrigation overspray. Excess nutrients can cause algae to grow in streams. This can lead to decreased oxygen necessary for the survival of fish and other aquatic organisms.

GRASS CLIPPINGS AND LEAVES CONTRIBUTE PHOSPHORUS

According to the Colorado State University Extension, the primary source of excess phosphorus in Colorado streams is from grass clippings and leaves. They suggest mowing in a direction to deposit clippings onto the lawn instead of the sidewalk or driveway where they are easily washed into the storm drainage system. Grass



clippings and leaves can be an excellent source of nutrients, as long as they're left on the lawn or composted and used in the garden.

ERODED SOIL IS ALSO A SOURCE OF PHOSPHORUS

Phosphorus can also come from soil particles. Maintaining landscaped areas and controlling erosion is another step

to prevent excess phosphorus from affecting water quality.

PREVENT WATER POLLUTION GreenCO and CSU Extension recommend:

- Test the soil and use plants adapted to conditions
- Apply the minimum amount of fertilizer, and follow the manufacturer's instructions
- To avoid runoff, properly irrigate and avoid fertilizer applications before heavy rain
- By fertilizing bluegrass lawns in the fall, you can delay fertilizing again until early summer
- Early summer fertilizer application can be avoided when clippings are left on the lawn
- Sweep up fertilizer that accidentally falls on impervious surfaces - streets, sidewalks, driveways

For more information, contact:



City of
Golden

PUBLIC WORKS DEPARTMENT
ENVIRONMENTAL SERVICES DIVISION

1445 10TH ST. GOLDEN, CO 80401
303-384-8181

www.cityofgolden.net/DrinkingWater

The City of Golden is an active member of the Upper Clear Creek Watershed Association - a management agency dedicated to protecting the water quality in Clear Creek.

INFORMACIÓN IMPORTANTE ACERCA DE LA CALIDAD DEL AGUA

Para recibir la versión en español del Reporte de Calidad de Agua de 2016 de City of Golden, visite www.cityofgolden.net/CalidaddeAgua.

