



2018
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 predominately 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, and can pick up substances resulting from the presence of animals or from human activity. Contaminants that may be present in source water include:

- **Microbial contaminants:** viruses and bacteria 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 storm water runoff; industrial or domestic wastewater discharges; oil and gas production, mining, or farming.
- **Pesticides and herbicides:** may come from a variety of sources, such as agriculture, urban storm water runoff, and residential uses.
- **Radioactive contaminants:** can be naturally occurring or be the result of oil and gas production and mining activities.
- **Organic chemical contaminants:** including synthetic and volatile organic chemicals, which are byproducts of industrial processes and petroleum production, and also may come from gas stations, urban storm water runoff, and septic systems.

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

Drinking water sources are susceptible to contamination from a wide variety of natural and man-made origins. Potential contaminant sources for Golden include anything likely to manufacture, produce, use, store, dispose, or transport regulated and unregulated contaminants of concern. These sources are divided into discrete or dispersed sources.

Discrete contaminant sources generally include facility-related operations from which the potential release of contamination would be confined to a relatively small area.

Potential discrete contaminant sources in our source water area have been identified as:

- Environmental Protection Agency (EPA) Superfund sites
- EPA abandoned contaminated sites
- EPA hazardous waste generators
- EPA chemical inventory/storage sites
- Permitted wastewater discharge sites
- Aboveground, underground, and leaking storage tank sites

- Solid waste sites
- Existing/abandoned mine sites

Dispersed contaminant sources generally include broad-based land uses and miscellaneous sources from which the potential release of contamination would be spread widely over a relatively large area.

Potential dispersed contaminant sources in our source water area have been identified as:

- Commercial/industrial/transportation
- High intensity and low intensity residential

- Urban recreational grasses or fallow
- Quarries/strip mines/gravel pits
- Row crops
- Pasture/hay
- Deciduous, evergreen, and mixed forests
- Septic systems
- Oil/gas wells
- Road miles

The CDPHE 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 <http://wqcdcompliance.com/ccr> or may be obtained by contacting the City of Golden Environmental Services Division at 303-384-8181.





Guanella Reservoir.

Water Quality and Your Health

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 for providing 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>.

City of Golden Water Resources Specialist Will Stambaugh Wins 2018 Colorado APWA Award

For most of its history, the City of Golden has outsourced water rights accounting and operations of our water storage and trans-basin diversion facilities. While this functioned well for many years, it limited Golden's personal connections with other water users on Clear Creek, and resulted in some delayed and avoided maintenance on these water assets.

Will Stambaugh came to Golden with strong technical and mechanical skills that made him an ideal fit for overseeing pump stations, diversion structures, and their automation. Will had an interest in our far-flung water facilities and saw the opportunity of bringing more of these activities in-house. Will's technical experience allowed him to show management that using advanced technology in isolated locations was possible. The City's solar powered radio communication network array on existing tanks and reservoirs is just one of the multiple advances that Will championed over the last fifteen years.

The list of accomplishments that can be attributed to Will's leadership is long; but in general, he upgraded our water facilities by improving maintenance and reinvestment, and added automated



Closing drain valve in May at Vidler.

communications to diversion and storage facilities, which allowed us to be more responsive to State water rights administrators and transparent to other water users. He also developed professional relationships that have improved the City's credibility on issues related to water rights and use.

Will's efforts created a new department and increased internal knowledge that helps the water utility operate more effectively and protects water related

assets. In addition, Will educated City staff about water rights and storage so that they do a better job managing both.

Will Stambaugh is the Water Resource Specialist and holds Level 4 certifications in Water Distribution, Wastewater collection, and a D Certificate in Water Treatment. He has a degree in Mechanical Engineering plus extra course work in Environmental Science. He has worked for Golden for 17 years and enjoys canoeing, backpacking, and music.

2018 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 2018 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 | Monthly | 0.039 | 0.02 - 0.05 | 2 | 2 | | Natural erosion |
| Fluoride, ppm | Yearly | 0.7 | 0.7 - 0.7 | 4 | 4 | | Natural erosion |
| Nitrate, ppm | Yearly | 0.2 | 0.2 - 0.2 | 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 | 1.32 | 1.00 - 1.95 | 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 | 7-12-2017 | <1.1 | <1.1 - <1.1 | 15 | n/a | | Erosion of natural deposits |
| Combined Uranium pCi/L | 7-12-2017 | <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 0.991 ntu in Dec. 2018 | Maximum of 1.0 ntu at any time <i>Turbidity must be less than 0.3 NTU for 95% of measurements taken each month.</i> | | |

Monitored at consumer taps

| Disinfection By-Products | Sample Date | Highest | Average | Range Found | MCL | MCLG | No Violations | Common Sources |
|-----------------------------|---------------------|---------|---------|-------------------------|--------|---------|---------------|-----------------------------|
| Total Trihalomethanes, ppb | Quarterly | 62.9 | 39.5 | Total Range 27.2 - 62.9 | 80 | n/a | | By-product of chlorination |
| Total Haloacetic Acids, ppb | Quarterly | 12.2 | 9.14 | Total Range 6.6 - 12.2 | 60 | n/a | | By-product of chlorination |
| Chlorine (free), ppm | Throughout the year | n/a | 0.8 | 0.59 - 1.04 | 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 | 6/5/18 - 9/13/18 | 0.6 | 0 | 15 | | Corrosion of household plumbing |
| Copper, ppm | 6/5/18 - 9/13/18 | 0.05 | 0 | 1.3 | | Corrosion of household plumbing |

Starting in 2017, The City of Golden is now required to monitor for lead and copper at consumer taps once a year. 32 Golden households were sampled in 2014 and 33 were sampled in 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 | 22 - 55 | n/a | none | Erosion of natural deposits |
| Chloride, ppm | Quarterly | 31.9 | 13.3 - 55.2 | n/a | 250 ppm | Erosion of natural deposits |
| Hardness, ppm | Weekly | 116 | 40 - 165 | n/a | None | Erosion of natural deposits |
| Iron, ppm | Monthly | 0.001 | < 0.01 - 0.005 | n/a | 0.3 ppm | Erosion of natural deposits |
| Manganese, ppm | Monthly | 0.005 | < 0.005 - 0.02 | n/a | 0.05 ppm | Treatment |
| pH, su | Weekly | 8.3 | 6.9 - 9.0 | n/a | 6.5 - 8.5 su | Treatment |
| Potassium, ppm | Quarterly | 2.8 | 1.6 - 3.5 | n/a | None | Erosion of natural deposits |
| Sodium, ppm | Yearly | 34.3 | 34.3 - 34.3 | n/a | None | Erosion of natural deposits |
| Sulfate, ppm | Quarterly | 85.4 | 40.9 - 110.3 | n/a | 250 ppm | Erosion of natural deposits |
| (TDS), ppm | Quarterly | 247 | 135 - 331 | n/a | 500 ppm | Erosion and storm water runoff |
| Zinc, ppm | Monthly | 0.05 | 0.011 - 0.137 | n/a | 5 ppm | Erosion of natural deposits |

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.
- **Health-Based –**
A violation of either a MCL or TT.
- **Non Health-Based –**
A violation that is NOT a MCL or TT.
- **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.
- **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 Ecoli MCL violation has occurred and/or why total coliform bacteria have been found in our water system on multiple occasions.
- **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.



Water Treatment Plant Electrical Upgrade

In 2017, plans were made to replace the electrical system at the water treatment plant. The electrical system was nearing the end of its service life and the main Motor Control Center (MCC) needed to be replaced. During this process, we recognized some unique challenges that did not exist when the main MCC was first installed. The location of this MCC was physically constrained and no longer met building code requirements for this kind of equipment. In addition, the existing MCC was below the current flood elevation. The recommendation was to install the new main MCC in a new building manufactured for this purpose and placed adjacent to the sedimentation basin. In addition to meeting building code and flood elevation requirements, the plan allowed the new equipment to be installed and tested while the existing equipment remained in service. This overall approach minimized disruption to the water plant and the residents of Golden.



The new power distribution center building was put in place in February 2018. All 3-phase electrical wiring was replaced and the project was complete in April 2018. The water treatment plant has two other MCC's, one for raw water pump operations and one for finished water pump operations. Both of those

MCC's were replaced in the last five years, making the main MCC replacement project the final piece to a total electrical system upgrade for the water treatment plant. These replacement projects provide reliable power operations and flawless transfer to emergency power operations when needed.



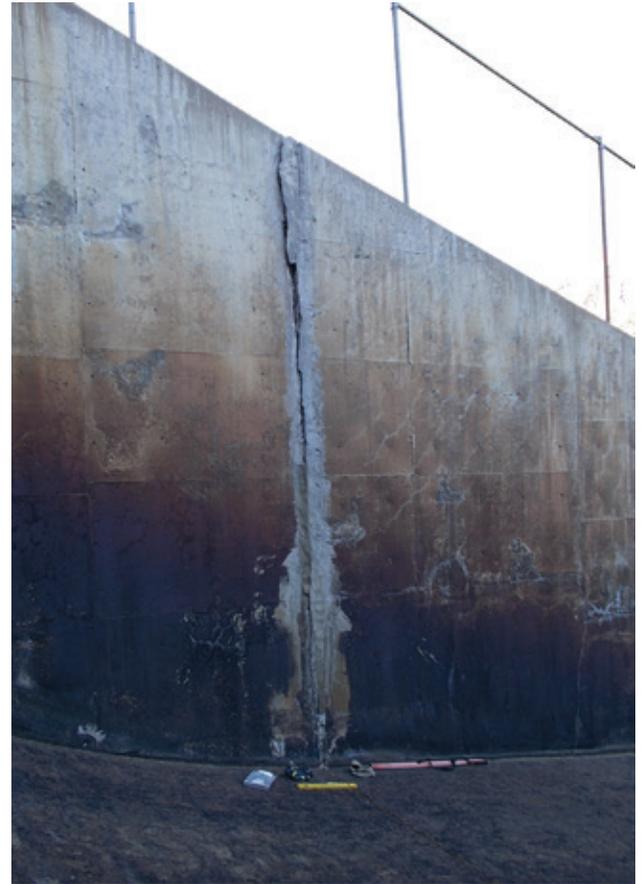
Spillway Mitigation at Lower Urad

Lower Urad Reservoir was constructed in the early 1960s. In May of 1988, Golden acquired Lower Urad from the Amax Mining Company as a water storage facility. It helped Golden get through the drought of 2002, and is a valuable part of our water source and supply infrastructure. It has a capacity of 250 Acre Feet and also has some potential as a hydroelectric generating facility.

Several years ago during a routine dam safety inspection, it was observed that the left wall of the spillway was beginning to fail. One section was slowly moving toward the spillway. It was grouted in 2008 to prevent moisture from causing more freeze/thaw damage, but eventually the wall began to move again.

Golden staff developed a plan to prevent further movement by bracing it against the right spillway wall, which is abutted against bed rock. The plan and drawings were submitted to the State Engineer's office for approval, and approval for construction was granted. The beam was constructed in the spring of 2018 and the very difficult job of installing it began in late summer of 2018.

The project was completed ahead of schedule and under budget. The result has been no further detectable movement or damage.



Failing expansion joint - URAD spillway



Installing brace at URAD spillway.



WHEN IT RAINS, IT DRAINS. AND IT HAS TO GO SOMEWHERE

Water from inside our homes goes to a wastewater facility for purification. But water from roofs, streets, and outdoor spigots goes untreated directly into storm drains – straight to our waterways – picking up all kinds of contaminants along the way!

DID YOU KNOW

Excess nutrients, specifically nitrogen and phosphorus, pollute stormwater run-off from urban areas, contributing to the third greatest cause of lake deterioration in the US.

DID YOU KNOW

The amount of phosphorus in grass clippings from mowing your lawn just once can produce up to **100 lbs.** of unwanted algae if it ends up in our lakes and ponds.

DID YOU KNOW

Just one pound of fertilizer over-application on the average lawn can equate to **34.2 lbs.** of excess algae growth in streams and lakes.

DID YOU KNOW

If dog owners don't clean up after their pooches, **390 million pounds** of poop can wash into our waterways every year just in Colorado! Dog waste contains 10% phosphates and 2% nitrates, contributing to algae growth.

DID YOU KNOW

Leaf "litter" and landscape trash accounts for **56%** of phosphorus in urban stormwater, not to mention clogging storm drains, causing potential flooding and increasing debris in our waterways.

DID YOU KNOW

When you wash your car in the driveway, you're washing about **120 gallons** of grime-filled water downstream. The soap, together with the dirt, grease and grime flows untreated into nearby storm drains, which runs directly into lakes and streams.

WHAT YOU CAN DO

Dispose Properly



- Compost or bag your leaves and lawn clippings
- Don't blow leaves or lawn clippings into the street
- Sweep up any spills or overspray of fertilizers on sidewalks or streets

Be Car Smart



- Use a commercial car wash, where water is recycled and sent to treatment facilities
- Wash your car on the lawn or gravel
- Dump your soapy bucket in the sink

Fertilize Efficiently



- Always follow the manufacturer's application recommendations. More isn't better!
- Fertilizing in the early fall promotes healthy root systems – leading to stronger, more resilient lawns and plants

Pick It Up & Pitch It



- Clean up dog waste and dispose properly



COLORADO STORMWATER COUNCIL

For more information and tips to preserve our waterways, visit colorado-stormwater-council.org



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 2018 de City of Golden, visite www.cityofgolden.net/CalidaddeAgua.

