



2014

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/links/EnvironmentalServices.

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 www.cdphe.state.co.us/wq/sw/swaphom.html or may be obtained by contacting the City of Golden Environmental Services Division at 303-384-8181.

Water Quality and Your Health

Testing for Lead and Copper in Drinking Water

Monitoring for lead and copper helps water system operators determine if their treatment techniques at the plant are providing water that remains at optimum quality all throughout the distribution system including reservoirs, tanks and pipes. Water treatment plant operators must ensure that the water coming out of your tap is the same as the water leaving the plant. Water can change as it travels through the system and can become “corrosive” at the wrong pH or if there are not enough dissolved solids in the water. This can cause lead and copper to leach from your household piping.

Lead and copper samples are taken at the treatment plant and out in the community at several designated sampling sites. You may be one of the 34 households we visit every three years.

Because lead and copper is tested out in the system, the EPA sets criteria at an “Action Level” (AL) rather than a “Maximum Contaminant Level” or MCL. An exceedance is determined by the highest concentration of either lead or copper that exceeds the AL in more than 10 percent of the samples tested. Any exceedance will automatically trigger changes in how the plant treats water. These may include installing additional treatment for corrosion control or even replacing some water mains.

Since the Lead and Copper Monitoring Rule went into effect in 1991, the City has not had a single exceedance for lead or copper. Water treated here has been carefully balanced before entering the system. As a result, the State of Colorado only requires Golden to monitor every three years. For more information on lead and copper in drinking water go to: <http://water.epa.gov/lawsregs/rulesregs/sdwa/lcr/index.cfm> or call the Water Quality Laboratory at 303-384-8181.

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.

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**.



2014 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 2014 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	5-16-14	0.28	n/a	2	2		Natural Erosion
Fluoride, ppm	4-4-14	0.66	n/a	4	4		Natural Erosion
Nitrate, ppm	1-16-14, 4-14-14	0.30	0.24 - 0.35	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	1.29	1.02 - 1.76	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 Disinfectant 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	2-3-2011	2.7	2.7 - 2.7	15	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 0.877 ntu	Maximum of 1.0 ntu at any time		

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 2014.

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	45.5	n/a	Total Tri range 21.6 - 62.5	80	n/a		By-product of Chlorination
Total Haloacetic Acids, ppb	quarterly - RAA	15.6	n/a	Total Halo range 5.91 - 21.2	60	n/a		By-product of Chlorination
Chlorine (free), ppm	throughout the year	n/a	0.77	0.53 - 1.01	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.

Other Monitoring Results *Monitored leaving the Water Treatment Plant*

Substance	Sample Date	Average	Range Found	MCL	SMCL	Common Sources
Alkalinity, ppm	weekly	37.5	21 - 48	n/a	none	Erosion of Natural Deposits
Chloride, ppm	quarterly	26	9.8 - 43.4	n/a	250 ppm	Erosion of Natural Deposits
Hardness, ppm	weekly	97	35 - 144	n/a	None	Erosion of Natural Deposits
Iron, ppm	1-22-14, 5-16-14, 12-16-14	0.006	<0.004 - 0.006	n/a	0.3 ppm	Erosion of Natural Deposits
Manganese, ppm	1-22-14, 5-16-14, 12-16-14	0.0071	0.0014 - 0.01	n/a	0.05 ppm	Treatment
pH, su	weekly	8.5	8.1 - 8.8	n/a	6.5 - 8.5 su	Treatment
Potassium, ppm	quarterly	2.9	1.6 - 3.8	n/a	None	Erosion of Natural Deposits
Sodium, ppm	quarterly	22.1	12 - 34	n/a	None	Erosion of Natural Deposits
Sulfate, ppm	quarterly	81	38 - 116	n/a	250 ppm	Erosion of Natural Deposits
(TDS), ppm	monthly	176	77 - 245	n/a	500 ppm	Erosion and Storm Water Runoff
Zinc, ppm	1-22-14, 5-16-14, 12-16-14	0.13	0.11 - 0.15	n/a	5 ppm	Erosion of Natural Deposits

Glossary of Terms and Definitions

90th Percentile:

The point at which 90 percent of all values fall at or below this level.

Action Limit (AL):

The concentration, which if exceeded, triggers a treatment modification. 90 percent of households tested must be below the AL.

CDC: Centers for Disease Control and Prevention

EPA: U.S. Environmental Protection Agency

FDA: U.S. Food and Drug Administration

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.

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 (MRDL):

The highest level of a disinfectant allowed in drinking water.

Maximum Residual Disinfectant Level Goal (MRDLG):

The level of drinking water disinfectant below which there is no known health risk.

n/a: - not applicable

NTU: nephelometric turbidity unit, used to measure water clarity.

pCi/L: picocuries per liter, used to measure radioactivity.

ppb: part per billion - corresponds to one inch in 16,000 miles.

ppm: part per million - corresponds to one inch in 16 miles.

Running Annual Average (RAA):

Annual average based on weekly, monthly or quarterly monitoring.

Secondary Maximum Contaminant Level (SMCL):

Non-enforceable levels that primarily affect the aesthetic quality of drinking water.

Secondary Maximum Contaminant Level Goal (SMCLG):

The desirable goal, but not enforceable.

su: standard units

Treatment Technique (TT):

A required process intended to reduce the level of a contaminant in drinking water instead of a MCL.

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

The City of Golden's Water Treatment Plant plans for routine maintenance and upgrades needed to keep the Plant functioning efficiently. Many of the planned projects identify opportunities to incorporate more advanced treatment techniques; especially when the current infrastructure is aging or obsolete. These upgrades are necessary to ensure that safe drinking water is continually supplied to Golden citizens and meets ever increasing regulatory requirements.

There are few projects that have the benefit of making the plant more efficient as well as improving the overall water quality, but one recent project did. In the winter of 2014/2015, plate settlers were added to the sedimentation basins. Plate settlers are used in the water treatment process to settle solids prior to filtration and disinfection. Solids are created by chemical additions and are removed by mechanical



methods. Previously, solids were removed primarily using gravity; a slow process rarely used in modern water treatment. With the addition of plate settlers, solids are removed more efficiently.

The new plate settlers have reduced the volume of chemical needed to remove solids during the treatment

process, while increasing the amount of solids removed prior to filtration. This has increased the efficiency of the filtration process by requiring less water to clean the filters. This upgrade has already proven to be a great investment to continue providing safe drinking water for the citizens of Golden long into the future.

*If you have any questions,
please contact the Water Treatment Plant at 303-384-8187.*

Water Supply and Demand Variability

Golden's water supply is extremely variable from year to year and month to month as is our demand for water.

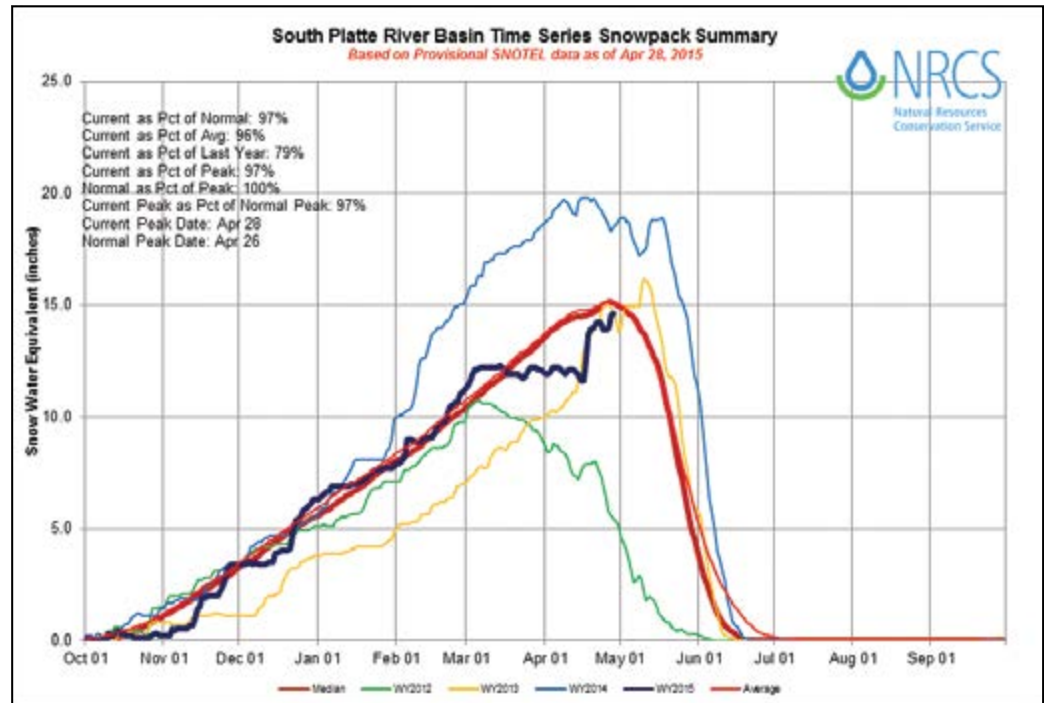
SUPPLY:

Virtually all of Golden's water originates as snow pack in the higher mountains. When planning our water operations we look at the Snow Water Equivalent (SWE) on or around the first of May every year compared to the annual average SWE.

While the normal variation is between 13" and 17" of snow, radical annual changes can happen any year.

Changing weather patterns affected by such factors as ENSO (El Nino Southern Oscillation) can create wide variation from month to month as well. 2012 started out with near normal SWE in early winter but by the beginning of May, SWE dropped to historically low levels. This is why Golden makes our Water Resource Plans based on early May SWE every year.

Due to Colorado's geography there can also be significant variability from basin to basin and Golden's water comes from both the South Platte and Colorado River basins. On March 1, 2014 the SWE in the South Platte Basin was 110% of normal while the SWE in the Colorado River



Basin was just above 90% of normal. Some years even though we have very little snow in Golden our water supply is just fine.

DEMAND:

Our demand for water is equally as variable as our supply. Summer and fall precipitation in the form of rain really only affects our demand for water. Our normal consumption in winter is only about 70 gallons per person per day (GPDP) but our normal peak demand in late summer is up to 300 GPDP. The annual GPDP is around 135. In 2014 due to a cool and wet summer and fall our annual GPDP was down to around 101.

MANAGING OUR WATER:

Fortunately Golden has spent decades developing our water storage and supply system which makes it possible to navigate the variability of our supply and demand.

With very senior water rights, trans-basin diversions and three reservoirs for storage, we can plan and execute strategies that will keep our water supply stable and safe for generations to come.

For more information contact Will Stambaugh, Golden Water Resource Specialist, 303-384-8189.

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. 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.



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

GRASS CLIPPINGS AND LEAVES CONTRIBUTE PHOSPHORUS

According to the Colorado State University Extension, the primary sources of excess phosphorus in Colorado streams are 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.

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/
LINKS/ENVIRONMENTALSERVICES

*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 2014 de City of Golden, visite
www.cityofgolden.net/links/CalidaddeAgua.

