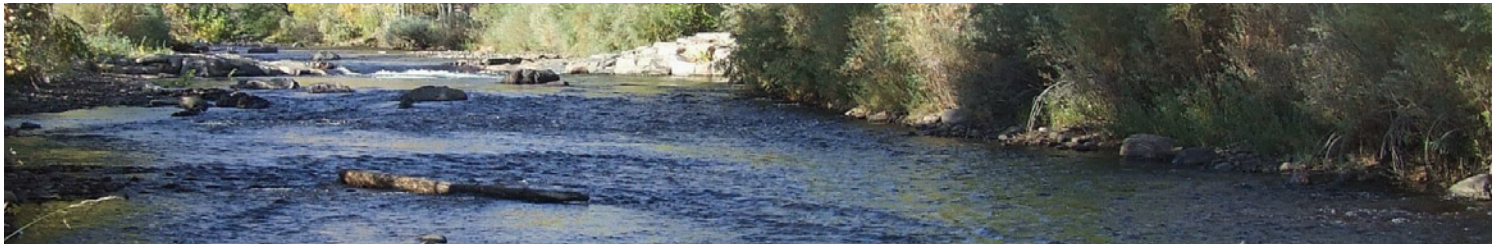




2021
CITY OF GOLDEN

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 and low intensity residential land use

- 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 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.



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://epa.gov/ground-water-and-drinking-water>.



Golden's Vidler Tunnel

One small but very critical part of Golden's water infrastructure is the Vidler Tunnel, which carries water from the Upper Blue River basin, under the Continental divide beneath Argentine Peak, to an old ghost town and mill site named Waldorf, and eventually into Clear Creek and down to Golden.

The tunnel, originally named the Horse tooth-Goodluck tunnel, was purchased by Rees Vidler in 1902 and it became the Vidler Tunnel.

The Vidler Tunnel has had a long history with several "repurposing" events through the years. It began in the early 1880s as a silver mine. When silver prices plummeted,

the mine, which was less than one quarter of the way through the mountain, was "repurposed" as a proposed railroad tunnel. Later, funding and demand for a railroad tunnel dried up. The tunnel which was now less than halfway through the 1.5 mile wide Argentine Peak was again "repurposed" as an Automobile tunnel and work continued the bore through the mountain. Once again, funding dried up for the proposed automobile tunnel and work stopped for several years. In 1911 the proposal was made by Rees Vidler to again "re-purpose" it as a water tunnel.

The Vidler Tunnel Water Company was formed in 1952 and still operates out of

Nevada today. The tunnel and collection system were finally completed in 1968 and water flowed through in 1969.

Golden acquired several water rights associated with the Vidler tunnel in the late 1970s and then acquired the actual tunnel and collection system from the Vidler Tunnel Water Company in 2000 along with some other water rights.

Golden uses these water rights for several of our obligations that cannot be met by water that is tributary to the South Platte River. The Vidler Tunnel water is only about 10% of the water Golden uses annually, but it is an essential part of our water portfolio.

2021 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 2021 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 Kerry Major at 303-384-8182.

Organic/Inorganic	Sample Date	Average	Range Found	MCL	MCLG	No Violations	Common Sources
Barium, ppm	Yearly	0.03	0.03 - 0.03	2	2		Natural erosion
Fluoride, ppm	Yearly	0.33	0.33 - 0.33	4	4		Natural erosion
Nitrate, ppm	Yearly	0.1	0.1 - 0.1	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	1.45	1.02 - 1.97	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. 48 samples were taken in 2021.

Radionuclides	Sample Date	Average	Range Found	MCL	MCLG	No Violations	Common Sources
Combined Radium (226 & 228) pCi/L	2020	1.6	1.6 - 1.6	5	n/a		Erosion of natural deposits
Gross Alpha Particles pCi/L	2020	0.2	0.2 - 0.2	15	n/a		Erosion of natural deposits
Combined Uranium pCi/L	2020	<1.0	<1.0 - <1.0	20	n/a		Erosion of natural deposits

Summary of Turbidity Sampled at the Entry Point to the Distribution System

Contaminant	Sample Date	Level Found	TT Requirement	TT Violation	Typical Sources
Turbidity (Measure of the cloudiness of water. It is a good indicator of the effectiveness of our filtration system)	November	Highest single measurement: 0.145 NTU	Maximum 1 NTU for any single measurement	No	Soil Runoff
Turbidity	December	Lowest monthly percentage of samples meeting TT requirement for our technology: 100%	In any month, at least 95% of samples must be less than 0.3 NTU	No	Soil Runoff

Monitored at consumer taps

Disinfection By-Products	Sample Date	Highest compliance value (LRAA)	Range of compliance values (LRAA)	Range of individual samples	Average of individual samples	MCL	MCLG	No Violations	Common Sources
Total Trihalomethanes, ppb	Quarterly	46.6	38.17 - 46.6	19.9 - 64.1	43.61	80	n/a		By-product of chlorination
Total Haloacetic Acids, ppb	Quarterly	10.97	9.7 - 10.97	3.8 - 17.4	10.61	60	n/a		By-product of chlorination

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

2021 Water Quality Monitoring Results

Disinfectants Sampled in the Distribution System

TT Requirement: At least 95% of samples per period (month or quarter) must be at least 0.2 ppm **OR**
If sample size is less than 40 no more than 1 sample is below 0.2 ppm. Sample size is 32.

Typical Sources: Water additive used to control microbes

Disinfectant	Sample Date	Highest	Average	Range Found	MCL	MCLG	No Violations	Common Sources
Chlorine (free), ppm	Throughout the year	1.59	1.13	0.47 - 1.59	MRDL 4	MRDLG 4	No Violations	Drinking water disinfectant

Lead and Copper	Sample Date	Concentration at 90th Percentile	Number of Exceedences at 90th Percentile	AL	No Violations	Common Sources
Lead, ppb	6/3/21 - 8/19/21	0	0	15	No Violations	Corrosion of household plumbing
Copper, ppm	6/3/21 - 8/19/21	0.02	0	1.3	No Violations	Corrosion of household plumbing

The City of Golden is now required to monitor for lead and copper at consumer taps once a year. 45 Golden households were sampled in 2021

Other Monitoring Results and Secondary Contaminants**

Monitored leaving the Water Treatment Plant

**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.

Substance	Sample Date	Average	Range Found	MCL	SMCL	Common Sources
Alkalinity, ppm	Weekly	44.7	23 - 57	n/a	None	Erosion of natural deposits
Chloride, ppm	Quarterly	45.5	16.3 - 86.8	n/a	250 ppm	Erosion of natural deposits
Hardness, ppm	Weekly	130	39 - 185	n/a	None	Erosion of natural deposits
Iron, ppm	Monthly	<0.01	<0.005 - <0.01	n/a	0.3 ppm	Erosion of natural deposits
Manganese, ppm	Monthly	0.013	<0.005 - 0.018	n/a	0.05 ppm	Treatment
pH, su	Weekly	8.7	7.4 - 9.3	n/a	6.5 - 8.5 su	Treatment
Potassium, ppm	Quarterly	2.8	1.6 - 3.8	n/a	None	Erosion of natural deposits
Sodium, ppm	Yearly	15.4	15.4 - 15.4	n/a	None	Erosion of natural deposits
Sulfate, ppm	Quarterly	86.4	36.2 - 122	n/a	250 ppm	Erosion of natural deposits
(TDS), ppm	Quarterly	269	113 - 397	n/a	500 ppm	Erosion and storm water runoff
Zinc, ppm	Quarterly	0.04	0.02 - 0.11	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.



Cyber and Physical Security Upgrades at Golden's Water Treatment Plant

In October 2018, the American Water Infrastructure Act (AWIA) was signed into law and made the most far-reaching changes to the Safe Drinking Water Act since the 1996 Amendments, with over 30 mandated programs. This law requires utilities serving more than 3,300 people to perform a risk and resiliency assessment as well as update their emergency response plan (ERP). The law specifies the components that the risk assessments and ERPs must address and establishes deadlines by which public water systems must certify to EPA the completion of both.

Golden's Water Treatment Plant (WTP) completed a physical and cyber security assessment of the plant in July 2020. Thanks to a proactive information technology (IT) department, the assessment showed a high rating for cyber security. Golden's IT team has always followed best business practices and knew cyber security for the applications that run the WTP were especially important to protect. The assessment showed the network was secure and there was little room for a cyber-attack. There were some additional cyber security measures that were recommended from the results of the assessment, but overall, the WTP was more secure than other water treatment facilities in America. Suggestions from the assessment have been implemented or plan to be implemented in 2022 to make the water plant cyber security systems even more robust. Along with cyber security upgrades, security policies and procedures were updated to better help water plant operators identify an outside intrusion into the water treatment network.

The assessments identified some physical security concerns at the water treatment plant. After the physical security assessment was complete, the suggestions were prioritized and the water plant staff, with the help of various vetted contractors, got to work beefing up the physical security. Multiple security cameras were installed around the outside and inside of the water plant, glass doors were better protected from intrusion



using coatings that stop the removal of the glass when shattered, doors previously left unlocked during business hours were changed to be always locked and additional fencing was put into place to keep intruders out. The holding ponds at the plant have always been able to be viewed by the public on the clear creek walking path, and the fencing around the holding ponds is planned to be replaced in 2022.

In June of 2021, water plant staff completed updates to the ERP, including how to handle natural disasters, cyber intruders and identifying critical water customers in the Golden system. It is safe to say that the WTP is more secure than it has ever been. Intruders can be detected almost immediately, and each water plant operator has a better understanding of how to handle cyber security.

Water Demand and 2022 Water Supply Outlook

LOOKING BACK

Multi-year drought conditions created collaborative momentum for all western states to preserve our water resources. Golden diverts all its water from one water source (Clear Creek), so it is important that the community does our part to reduce water use. In 2019, Golden updated its Sustainability goals to reduce total per capita water use in Golden by at least 15% by 2030. Golden's overall water consumption has steadily decreased over the last 20 years even though our population has steadily increased. Our total diversions from Clear Creek have dropped about 8% while our population has grown over 30%.

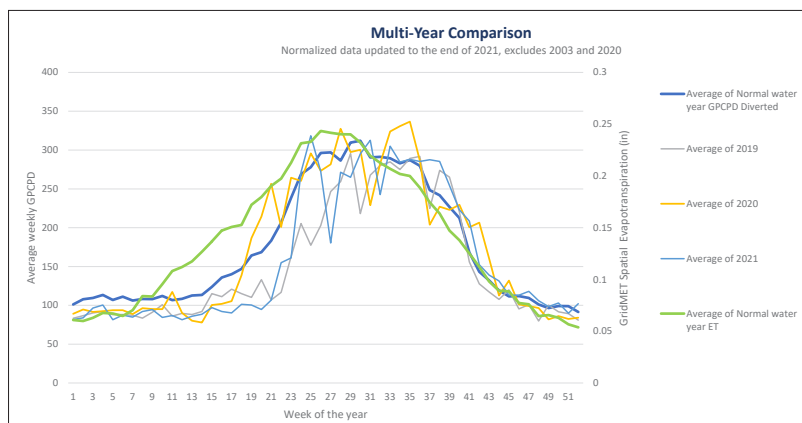
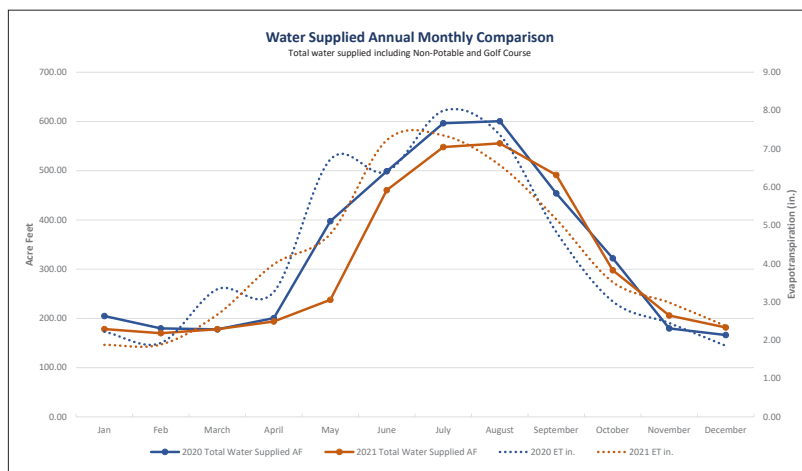
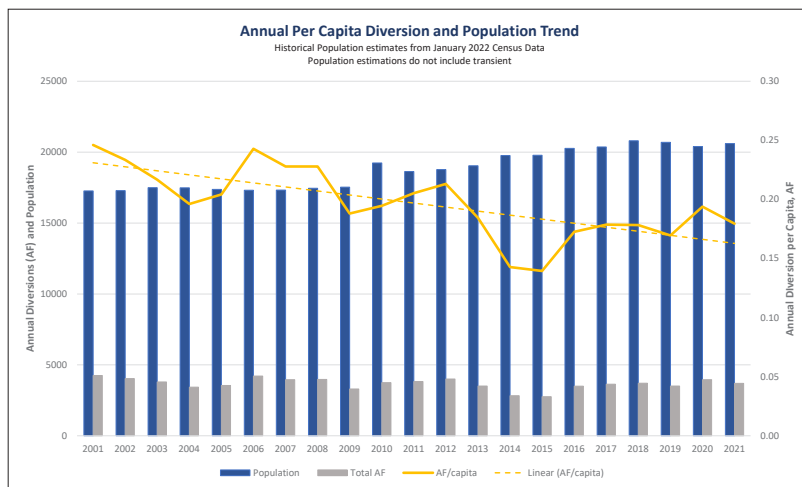
In 2021, Golden asked the community for voluntary restrictions due to most of the state being in a drought. Residential use did not see much of a decrease, but Golden's city parks saved over 9% compared to 2020, and the Golf Course succeeded in saving over 23%. The city accomplished this with only watering when necessary, following the voluntary restriction guidelines, and using controls that assist with monitoring.

WATER SUPPLY OUTLOOK 2022

Golden's water supply begins with snow deposits in the high country. For 2022 and at the time of writing this article, the snowpack in Golden's watershed is about 97% of normal, however that is subject to change as winter transitions into spring. Drought conditions remain in much of the State of Colorado. NOAA seasonal forecasts for May - July an increased probability of above average temperature and below average precipitation for much of Colorado.

Golden's reservoirs are full and spilling as of March 21, so Golden's storage supply is looking adequate for 2022. Going forward, Golden will continue to monitor summer irrigation use, and that its usage continues to decrease. We always ask residents to use their water wisely and efficiently.

Please refer to www.cityofgolden.net/live/sustainability-initiative/rebates/ to receive a smart irrigation controller rebate.



Water Quality - Make A Difference, From Your Own Backyard



YARD MAINTENANCE CAN IMPACT WATER QUALITY

The storm drainage system is designed to collect stormwater – rain and snowmelt – and release it directly to Clear Creek, untreated. Pollutants are transported in stormwater as rain and snowmelt travel across surfaces such as lawns, roads and parking lots, picking up substances such as fertilizers, pesticides, oil, and sediments before entering Clear Creek. Contaminants that enter the creek degrade the quality of our drinking water source and the quality of fish and wildlife habitats.

THE IMPACT

Lawn care and landscaping specifically, can lead to polluted stormwater runoff resulting in degraded water quality in Clear Creek. Nutrients - in the form of excess fertilizer, grass clippings, leaves, and soil - cause excessive algae growth when they're transported in stormwater runoff from the lawn and into waterways. Algae growth can rob fish and other aquatic organisms of the oxygen needed to survive. Simple practices help ensure a cleaner water source for years to come.

Lawn and Garden Care

- Leave grass clippings on the lawn - it can reduce the amount of nitrogen needed by 1/4 to 1/3.
- Sweep grass clippings from paved areas after mowing so they don't wash down the gutter.
- Control erosion from bare areas using mulch, native grass, terraces, or hardscaping.

- Cut, pull, or spot treat for noxious weeds to minimize herbicide use.
- If you live along a waterway, maintain a natural buffer, and avoid mowing or chemical applications immediately adjacent to the water's edge.

Watering

- Avoid overspray from irrigation. Excessive runoff wastes water and contributes to polluted runoff.
- Direct downspouts to garden beds, allowing rainwater to soak in where it's needed rather than run-off.
- Plant native plants that are naturally well-adapted to our conditions. They're more resilient and require less water, fertilizer, and other chemical inputs.



Fertilizing

- Have your soil tested to learn what nutrients, if any, are needed for your yard.
- Use compost instead of fertilizer. Compost has many benefits such as providing sufficient nutrients for your landscape as well as improving soil health.
- When used, apply the minimum amount of fertilizer and follow the manufacturer's instructions.
- Avoid fertilizer applications if rain is forecasted.
- 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 2021 de City of Golden, visite cityofgolden.net/media/CalidaddeAgua2021.pdf.

