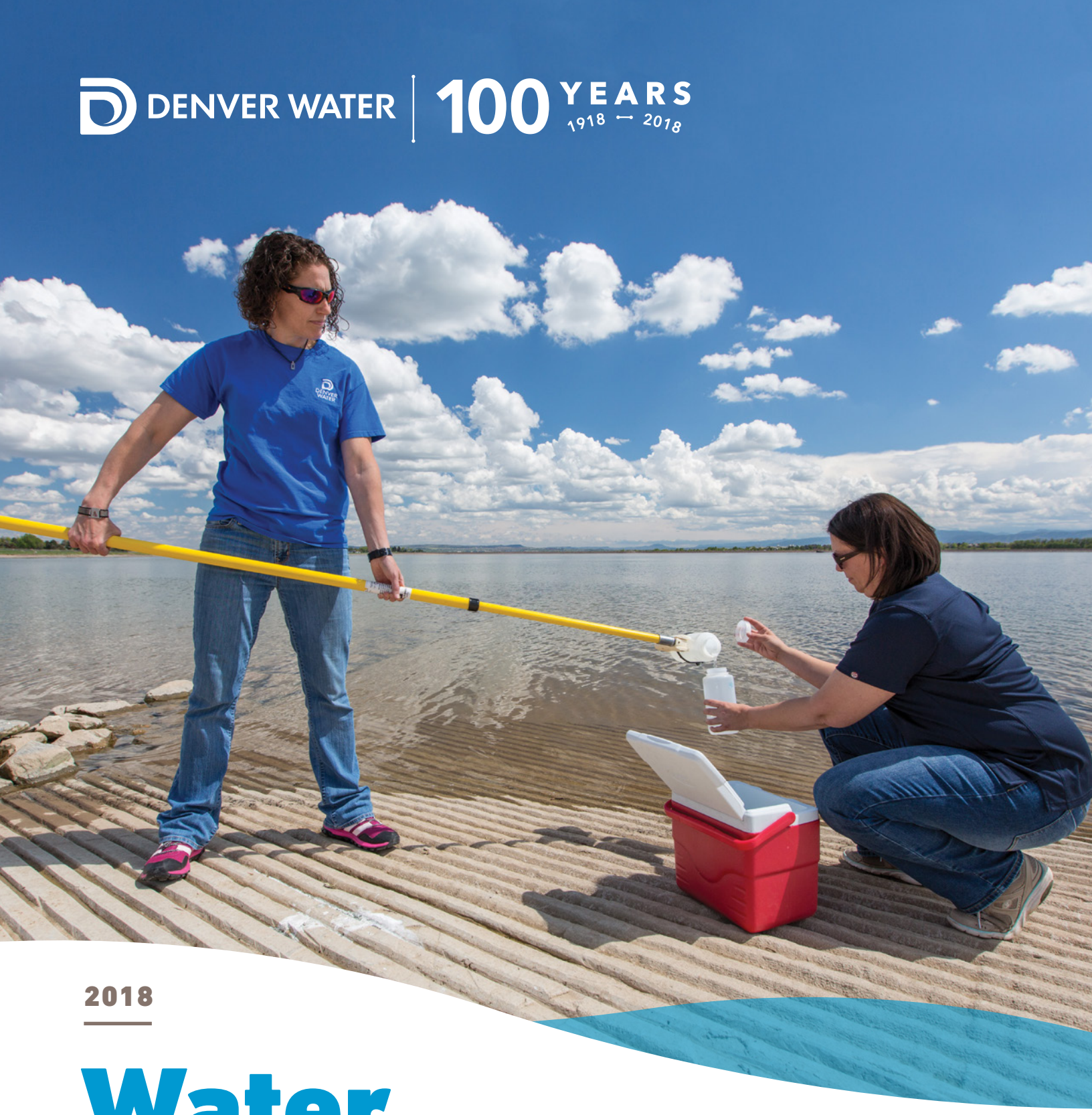
DENVER WATER | 100 YEARS 1918 — 2018



2018

# Water Quality Report

REPORTE DE CALIDAD DE AGUA

Completed in 1959, Williams Fork Dam & Power Plant sends water and electricity to the West Slope when Denver diverts water to the city. The dam backs up a reservoir that can store nearly 97,000 acre-feet of water.

# WHAT IS THIS REPORT?

**The U.S. Environmental Protection Agency requires public water suppliers that serve the same people year-round (community water systems) to provide consumer confidence reports to their customers. These reports are also known as annual water quality reports. This report summarizes information regarding water sources used, any detected contaminants, compliance and educational information.**

## Where does your water come from?

Denver's drinking water comes from rivers, lakes, streams, reservoirs and springs fed by high-quality mountain snow runoff. Denver Water's supply is 100 percent surface water that originates in sources throughout the watershed that encompasses 4,000 square miles on both sides of the Continental Divide.

## Mountain water sources

Denver Water's water sources are the South Platte River and its tributaries, the streams that feed Dillon Reservoir, and the creeks and canals above the Fraser River. Denver Water stores its water in five mountain reservoirs — Antero, Eleven Mile Canyon, Cheesman, Dillon and Gross. From these reservoirs, the water is then sent to one of three treatment plants in the city through a complex system of streams, canals and pipes.

After treatment, drinking water is fed by both gravity and pumps to a system of underground, clear-water reservoirs before continuing to your home or business. More than 3,000 miles of pipe carry water to Denver Water customers.

## Source water assessment

The state health department has completed a source water assessment of the potential for contaminants reaching any of Denver Water's three terminal reservoirs at Strontia Springs, Marston and Ralston. The potential sources of contamination that may exist are: EPA Areas of Concern; Permitted Wastewater Discharge Sites; Aboveground, Underground and Leaking Storage Tank Sites; Solid Waste Sites; Existing/Abandoned Mine Sites; other Facilities; Commercial/Industrial/Transportation; Residential, Urban Recreational Grasses; Quarries/Strip Mines/Gravel Pits; Agriculture; Forest; Septic Systems; Oil/Gas Wells and Road Miles. For more information on the report, contact the Colorado Department of Public Health and Environment by calling 303-692-2000.

## Información importante acerca de la calidad del agua

Para recibir la versión en español del Reporte de Calidad de Agua de 2018 de Denver Water, llame a Servicio al cliente al 303-893-2444 o visite denverwater.org/CalidadDeAgua.

# DENVER WATER'S SYSTEM

### Devoted to water quality

Denver Water proudly serves high-quality water to 1.4 million people in the city of Denver and many surrounding suburbs. Since 1918, we have expertly planned, developed and operated a complex system that provides clean, safe, great-tasting water. The utility is a public agency funded by water rates, new tap fees and the sale of hydropower, not taxes. We are Colorado's oldest and largest water utility — Denver Water has a total water service area of more than 360 square miles.

Denver Water serves 25 percent of the state's population with less than 2 percent of all the water used in the state. The natural environment is our lifeline, and we help protect it by promoting wise water use.

We take our water quality very seriously. Last year, we collected more than 35,000 samples and conducted more than 68,000 tests to ensure our water is as clean and safe as possible.

Denver Water vigilantly safeguards our mountain water supplies, and the water is carefully treated before it reaches your tap. This brochure provides data collected throughout 2017.


Denver Water's collection system covers about 4,000 square miles and extends into more than eight counties.

**Denver Water serves 25 percent of the state's population with less than 2 percent of all the water used in the state.**

## THE TREATMENT PROCESS

**The treatment process consists of five steps:**

**1 COAGULATION/FLOCCULATION:** Raw water from terminal reservoirs is drawn into mixing basins at our treatment plants where we add alum and polymer. This process causes small particles to stick to one another forming larger particles.

**2 SEDIMENTATION:** Over time, the now larger particles become heavy enough to settle to the bottom of a basin from which sediment is removed.

**3 FILTRATION:** The water is then filtered through layers of fine, granulated materials — either sand, or sand and coal, depending on the treatment plant. As smaller, suspended particles are removed, turbidity diminishes and clear water emerges.

**4 DISINFECTION:** As protection against any bacteria, viruses and other microbes that might remain, disinfectant is added before the water flows into underground reservoirs throughout the distribution system and into your home or business. Denver Water carefully monitors the amount of disinfectant added to maintain quality of the water at the farthest reaches of the system. Fluoride occurs naturally in our water but is also added to treated water.

**5 CORROSION CONTROL:** pH is maintained by adding alkaline substances to reduce corrosion in the distribution system and the plumbing in your home or business.

# WATER AT A GLANCE

**All 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 that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline (800-426-4791).**

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 of 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

Since 1992, Denver Water has tested water inside homes within its distribution system considered at risk for lead and copper contamination, per EPA standards. Denver Water's source water, water leaving the treatment plants; and water in the distribution system have no detectable lead and trace levels of copper.

Lead can get into water through lead-containing household or building plumbing. Softened water is more aggressive toward household plumbing. Homes built before 1951 may have lead service lines, which are the pipes that connect the water main under the street to the home. Homes built before 1987 may have lead solder in their plumbing — lead solder was banned from use on domestic plumbing in 1986. Homes that do not fall within these two categories are at lower risk for lead contamination in the water.

Lead exposure can cause serious health problems, especially for pregnant women and young children. The most common sources of lead in drinking water are materials and components for service lines and home plumbing. Denver Water is responsible for providing high-quality drinking water, but cannot control the 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 up to a couple of minutes before using water for drinking or cooking.

If you are concerned about lead, you may wish to have your water tested. Information on lead in drinking water, testing and steps to minimize exposure is available from the Safe Drinking Water Hotline at 800-426-4791, at epa.gov/safewater/lead and at denverwater.org/Lead.

## Is There a Presence of *Cryptosporidium* and *Giardia*?

Denver Water has tested for *Cryptosporidium (Crypto)* and *Giardia* in both raw and treated water since the 1980s. Since that time, Denver Water has never detected a viable indication of either in the treated drinking water.

*Crypto* and *Giardia* are microscopic organisms that, when ingested, can cause diarrhea, cramps, fever and other gastrointestinal symptoms. *Crypto* and *Giardia* are usually spread through means other than drinking water.

While most people readily recover from the symptoms, *Crypto* and *Giardia* can cause more serious illness in people with compromised immune systems. The organisms are in many of Colorado's rivers and streams and are a result of animal wastes in the watershed. At the treatment plants, Denver Water removes *Crypto* and *Giardia* through effective filtration, and *Giardia* is also killed by disinfection.

If you are concerned about lead, Denver Water will test your water for free.

The Blue River above Dillon Reservoir in Silverthorne is one of many sources of Denver's drinking water.

## SOURCES OF DRINKING WATER

**Sources of drinking water include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material. It can also pick up substances resulting from human activity and the presence of animals. Contaminants may include the following:**

**Microbial contaminants**
— viruses, bacteria and other microbes 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**
— chemical substances resulting from a variety of sources, such as agricultural and urban storm water runoff, and residential uses.

**Organic chemical contaminants**
— substances including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and also may come from gas stations, urban storm water runoff, and septic systems.

**Radioactive Contaminants**
— substances that can be naturally occurring or be the result of oil and gas production, and mining activities.

# WATER QUALITY DATA

**Terms, Abbreviations and Symbols: Some of the terms, abbreviations and symbols contained in this report are unique to the water industry and might not be familiar to all customers. Terms used in the table are explained below.**

**Contaminant:** a potentially harmful physical, biological, chemical or radiological substance.

**Maximum Contaminant Level (MCL):** Highest level of a contaminant allowed in drinking water. MCLs are set as close to the Maximum Contaminant Level Goal as feasible using the best available treatment technology.

**Maximum Level Contaminant 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.

**Action Level:** Concentration of a contaminant, that if exceeded, triggers treatment or other requirements that a water system must follow.

**Parts Per Million (ppm):** Equivalent to milligrams per liter. One ppm is comparable to one drop of water in 55 gallons.

**Parts per Billion (ppb):** Equivalent to micrograms per liter. One ppb is comparable to one drop of water in 55,000 gallons.

**PicoCuries per liter (pCi/L):** Measures radioactivity.

**Turbidity:** A measure of suspended material in water. In the water field, a turbidity measurement (expressed in Nephalometric Turbidity Units) is used to indicate clarity of water.

**Secondary Maximum Contaminant Level (SMCL):** Nonenforceable, recommended limits for substances that affect the taste, odor, color or other aesthetic qualities of drinking water, rather than posing a health risk.

**Maximum Residual Disinfectant Level (MRDL):** Highest level of a disinfectant allowed in drinking water. There is convincing evidence the addition of disinfectant is necessary for control of microbial contaminants.

**Maximum Residual Disinfectant Level Goal (MRDLG):** Level of a drinking water disinfectant below which there is no known or expected health risk. MRDLGs do not reflect benefit of the use of disinfectants to control microbial contaminants.



## REGULATED WATER CONTAMINANTS: WHAT IS IN THE WATER?

Data collected throughout 2017

| Regulated leaving the treatment plant (Entry Point to the Distribution System) | Units of Measurement | MCLG | Highest Levels Allowed (MCL) | Average Level Detected (Range of All Results) | Violation | Sampling Frequency | Sources of Contaminant |
|---|---|---|---|---|---|---|---|
| Aluminum | ppb | N/A | 50 - 200 (SMCL) | 30 (11-50) | No | Monthly | Erosion of natural deposits, water treatment chemical |
| Antimony | ppb | 6 | 6 | 0 (br-0.28) | No | Monthly | Discharge from petroleum refineries, fire retardants, ceramics, electronics, solder |
| Arsenic | ppb | 0 | 10 | 0 (br-1.2) | No | Monthly | Erosion of natural deposits, runoff from orchards, runoff from glass and electronics, solder |
| Barium | ppm | 2 | 2 | 0.03 (0.02-0.04) | No | Monthly | Erosion of natural deposits, discharge of drilling wastes |
| Beryllium | ppb | 4 | 4 | 0.0 (br-0.06) | No | Monthly | Discharge from metal refineries and coal-burning factories; Discharge from electrical, aerospace , and defense industries. |
| Cadmium | ppb | 5 | 5 | 0.0 (br-0.06) | No | Monthly | Corrosion of galvanized pipes, erosion of natural deposits, discharge from metal refineries, runoff from waste batteries and paints. |
| Chromium | ppb | 100 | 100 | 1 (br - 1.4) | No | Monthly | Discharge from steel and pulp mills, erosion of natural deposits |
| Copper | ppm | 1.3 | 1.0 (SMCL) | 0.001 (br-0.02) | No | Monthly | Erosion of natural deposits. |
| Mercury | ppb | 2 | 2 | 0 (br) | No | Monthly | Erosion of natural deposits; discharge from refineries and factories; runoff from landfills and croplands |
| Selenium | ppb | 50 | 50 | 0 (br-7) | No | Monthly | Discharge from petroleum and metal refineries; Erosion of natural deposits; Discharge from mines. |
| Thallium | ppb | 2 | 2 | (br-0.06) | No | Monthly | Erosion of natural deposits; discharge from refineries and factories; runoff from landfills and croplands |
| Uranium | ppb | zero | 30 | 0.4 (br-1.2) | No | Monthly | Erosion of natural deposits, mine drainage |
| Cyanide, Total | ppb | 200 | 200 (Regulated as Free CN) | 0 (br) | No | >Annually | Discharge from steel/metal factories; Discharge from plastic and fertilizer factories. |
| Gross Alpha | pCi/L | 0 | 15 | 0 (br) | No | Annually | Erosion of natural deposits, mine drainage |
| Beta Emitters | mrem/year | 4 | 4 (or 50 pCi/L) | 0 (br) | No | Annually | Erosion of natural deposits, mine drainage |
| Combined Radium (226 and 228) | pCi/L | 0 | 5 | 0 (br) | No | Annually | Erosion of natural deposits, mine drainage |
| Fluoride | ppm | 4.0 | 4.0 (2.0 is SMCL) | 0.7 (0.13-0.99) | No | Monthly | Erosion of natural deposits, water additive that promotes strong teeth, discharge from fertilizer and aluminum factories |
| Nitrate as N | ppm | 10 | 10 | 0.08 (0.02-0.18) | No | Monthly | Runof from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits |
| Nitrite as N | ppm | 1 | 1 | 0 (br) | No | Monthly | Runof from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits |
| 2,4-D | ppb | 70 | 70 | 0 (br-0.1) | No | Annualy | Runoff from herbicide used on row crops |
| Turbidity | NTU | N/A | TT ≤0.30 NTU in 95% of samples/month | Highest Turbidity Level for 2017: 0.15<br>Percentage of Samples <0.3 NTU: 100% | No | > Daily | Soil runoff |
| Total Organic Carbon | | N/A | TT | Compliance Description : Denver Water uses enhanced treatment to remove the required amount of natural organic material and/or demonstrates compliance with alternative criteria. | No | Weekly | Natural organic matter that is present in the environment |

| Regulated in the Distribution System | Units of Measurement | MCLG | MCL | | Violation | Sampling Frequency | Sources of contaminant |
|---|---|---|---|---|---|---|---|
| Total Trihalomethanes (TTHM) | ppb | N/A | 80 | Highest locational RAA : 27 (14-33) | No | Monthly | Byproduct of drinking water disinfection |
| Haloacetic Acids ($HAA_5$) | ppb | N/A | 60 | Highest locational RAA : 17 (6-21) | No | Monthly | Byproduct of drinking water disinfection |
| Total Coliform | Absent or Present | zero | No more than 5% positive per month | Highest monthly percentage: 0.24% in July 2017<br>Number of postives out of number of samples for the year: 1 out of 4,836 samples or 0.02% | No | Daily | Naturally present in the environment |
| Disinfectant as Total $Cl_2$ | ppm | TT, (4 mg/L is MRDL) | | Lowest monthly percentage of samples meeting TT requirement of a detectable (greater than or equal to 0.2 ppm) residual: 99.5% in July 2017. For any two consecutive months, at least 95% of samples (per month) must have a detectable disinfectant level. Six out 4931 samples had a non-detectable residual in 2017. | No | Daily | Drinking water disinfectant used to control microbes |

| Regulated at the Customer's Tap | Units of Measurement | MCLG | Action Level at the 90th Percentile | 90th Percentile Value | No. of Samples exceeding Action Level | Violation | Sampling Dates | Sources of contaminant |
|---|---|---|---|---|---|---|---|---|
| Copper | ppm | 1.3 | 1.3 | 0.26 | 0 (317) | No | January-June | Corrosion of household plumbing |
| Lead | ppb | 0.0 | 15 | 10.3 | 15 (317) | No | January-June | Corrosion of household plumbing |
| Copper | ppm | 1.3 | 1.3 | 0.26 | 0 (476) | No | July-December | Corrosion of household plumbing |
| Lead | ppb | 0.0 | 15 | 10 | 21 (476) | No | July-December | Corrosion of household plumbing |

FOOTNOTES AND DEFINITIONS:

Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health.

Secondary Maximum Contaminant Levels (SMCL) are non-enforceable recommended limits for substances that affect taste, odor, color or other aesthetic qualities of drinking water, rather than posing a health risk.

"br" means below the reportable level for an analysis; the reportable level is the lowest reliable level that can be measured.

The Fluoride SMCL of 2 mg/L triggers notifying the public of the exceedance.

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

Nephalometric Turbidity Units (NTU).

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

Running Annual Average (RAA)

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

Note: One entry point sample resulted in 0.1 ppb of 2,4-D. Althought the MCL/MCGL is 70 ppb, Denver Water will be testing for this compound on a quarterly basis in 2018.

Maximum Residual Disinfectant Levels (MRDL).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For more information on water quality, including opportunities for public participation, visit **denverwater.org.**

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