

Quality is the mission

FOUNDED AS an independent, municipal agency in 1918, Denver Water's goal always has been to produce a safe, dependable water supply and deliver it to metro homes and businesses at the lowest possible cost. Over the years, the water department has maintained a tradition of excellence that has kept pace with advancements in technology, increased public scrutiny and the intense demands of a growing city.

We've never violated a health standard. Since inception, the department has been treating and testing its water, and our findings always have been available to the public. This publication is Denver Water's annual summary of where your water comes from, what's in it, and how we treat, protect and deliver drinking water. We've also compared our test results with federal and state regulations, and we're pleased to report that Denver Water's record remains unblemished.

Denver Water hasn't faltered in its mission, in spite of impacts from the historic drought and wildfires on our watershed during the past several years. The department operates its reservoirs and dams to maximize best use of its supplies in terms of both quality and quantity. Denver Water continues with projects to prevent sediment from the fires reaching reservoirs as well as comprehensive testing of sources in the watershed by the Water Quality Lab.

All the department's facilities are under strict security, and we monitor Denver's water supply every step of the way. Analysts regularly take test samples at many remote sites and our caretakers watch over mountain sources to head off any problems long before they reach treatment plants in the city.

When you live in a semi-arid region and bring drinking water to more than a million people, you want to be certain there is enough to go around and that it is of the highest quality. That's a big job for Denver Water's 1,000 employees. Our Water Quality Lab keeps an eye on quality through both its field staff and data sent from 15 automated monitoring stations in the metro area. The Lab throughout 2003 conducted 40,639 microbiological and chemical tests from 11,996 samples. Denver Water treated 65.4 billion gallons of water last year, an average of 175 million gallons daily.

Esta información es importante. si no la pueden leer, necesitan que alguien se la pueda traducir. Información en español, llame al 303-893-2444.

Notes about water

ALL DRINKING WATER, including bottled water, might 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. Immunocompromised individuals – such as persons with cancer 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 of infections. 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 U.S. Environmental Protection Agency and the U.S. Centers for Disease Control guidelines on appropriate means to lessen the risk of infection by *cryptosporidium* and microbiological contaminants, call the EPA Safe Drinking Water Hotline at 1-800-426-4791.

SOURCES OF DRINKING WATER – both tap and bottled 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 and can pick up substances resulting from the presence of animals or from human activity. Contaminants that might be present in source water include:

MICROBIAL CONTAMINANTS, such as viruses and bacteria that may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife.

INORGANIC CONTAMINANTS, such as 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.

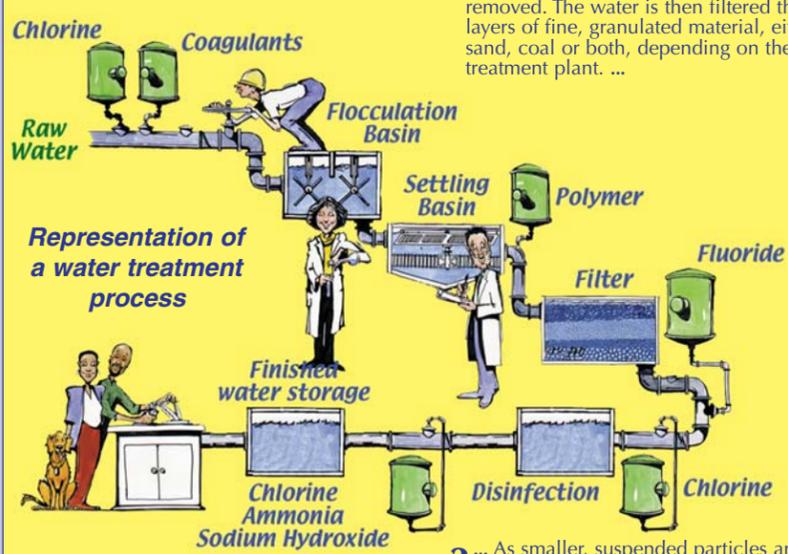
PESTICIDES AND HERBICIDES that may come from a variety of sources, such as agriculture, urban storm water runoff and residential uses.

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.

RADIOACTIVE CONTAMINANTS, which can be naturally occurring or be the result of oil and gas production and mining activities.

1 The treatment process consists of five steps – coagulation, sedimentation, filtration, corrosion control and disinfection. First, raw water from terminal reservoirs is drawn into mixing basins at our treatment plants, where we add alum and polymer. ...

2 ... That causes small particles to adhere to one another, making them heavy enough to settle into a basin from which sediment is removed. The water is then filtered through layers of fine, granulated material, either sand, coal or both, depending on the treatment plant. ...



4 ... Denver Water carefully monitors the amount of chlorine added to maintain quality of water at the farthest reaches of the system. Fluoride occurs naturally but is also added to treated water, and pH is maintained by adding alkaline substances to reduce corrosion in the distribution system and your home or business.

3 ... As smaller, suspended particles are removed, turbidity diminishes and clear water emerges. Finally, as protection against any bacteria and viruses that might remain, chlorine and ammonia are added before the water flows to underground reservoirs throughout the metro distribution system and into your home or business. ...

The Glossary

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. In addition to explanations included in the footnotes to our Water Quality Roundup and other features on the other side, below are definitions to some other key terms:

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 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.

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 equivalent to one drop of water in 55,000 gallons.

PICOCURIES PER LITER (pCi/L) AND 4MREM/YR: Measures of radioactivity. (See below.)

4MREM/YR: Four milliroentgen equivalent man/year. A maximum contaminant level standard based on dosage; about 50 picocuries per liter.

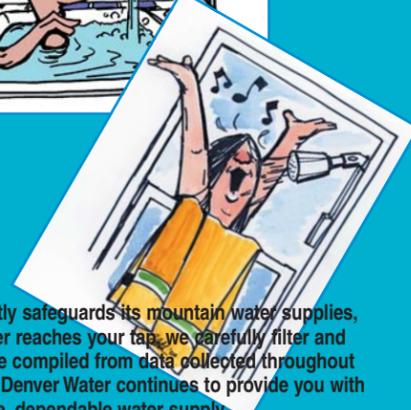
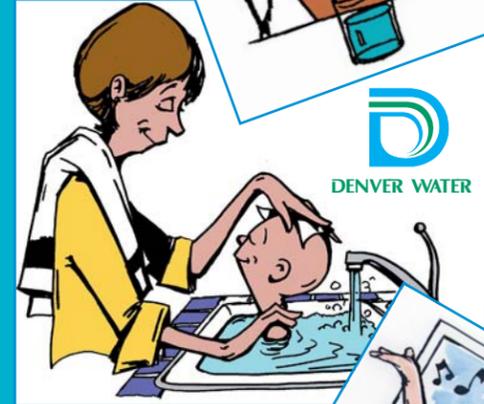
SECONDARY MAXIMUM CONTAMINANT LEVEL (SMCL): Non-enforceable, recommended limits for substances that affect the taste, odor, color or other aesthetic qualities of drinking water, rather than posing a health risk.

Maximum Residual Disinfectant Level (MRDL): Highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a 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 benefits of the use of disinfectants to control microbial contaminants.

DENVER WATER 2004

Water Quality REPORT



Denver Water vigilantly safeguards its mountain water supplies, and before the water reaches your tap, we carefully filter and treat it. This brochure compiled from data collected throughout 2003 is a look at how Denver Water continues to provide you with a safe, dependable water supply.

Visit us online at www.denverwater.org

Crypto & Giardia: The search goes on

Denver Water has tested for *Cryptosporidium* and *Giardia* in both raw and treated water for more than 15 years and has never detected a viable indication of either in drinking water.

Crypto and Giardia are microscopic organisms that, when ingested, can result in diarrhea, cramps, fever and other gastro-intestinal symptoms. Crypto and Giardia must be ingested to cause disease, and they can be spread through means other than drinking water.

Most people readily recover from the symptoms, which can cause more serious illness in people with compromised immune systems. The organisms are in many of Colorado's rivers and streams and come from animal wastes in the watershed. Crypto and Giardia are removed by effective filtration at the treatment plant. Disinfectants also kill Giardia.

Recycling's story: Purple pipes and prose

Denver Water constantly looks for ways to conserve and extend supplies. We don't expect to run out, but we're getting into the business of treating wastewater and recycling it to make sure we don't. With its new wastewater recycling treatment plant, Denver Water reclaims water it owns that used to be lost down the South Platte River, extending current supplies farther into the future.

The reclaimed water isn't up to drinking water standards, but is treated to a high, nonpotable quality suited for irrigation, industrial applications, lakes in parks and wildlife preserves. It's safe for incidental body contact for both humans and pets and there has never been a reported illness associated with intended uses of recycled water. Purple pipes and fixtures signal recycled water.

Tests of the water are conducted daily by the Water Quality Lab and plant operators before it is treated and after it is in the system. The results are submitted to the state health department and are available to the public through Denver Water.

The system serves customers along a corridor extending 10 miles from the plant north of the city to Washington Park. Xcel Energy's Cherokee power plant uses recycled water for cooling purposes. Three small parks, a school, the zoo and Park Hill and City Park golf courses apply recycled water for irrigation. City Ditch returns the recycled water northward by channeling it to the lakes in Washington Park and City Park for both irrigation and aesthetics. Expansion will include more customers, notably the Stapleton and Lowry development sites and the wildlife refuges at the Rocky Mountain Arsenal.

Our recycling system is a new water supply project. At full capacity in 2011, the plant will produce up to 17,660 acre feet of water a year, or enough to fill a small reservoir. That will free up enough resources to serve potable water to 35,000 households. When both phases of the \$164 million system are in place, the plant will be able to reclaim up to 5.5 billion gallons of water yearly.



DENVER WATER'S TREATED WATER QUALITY ROUNDUP

REGULATED AT THE TREATMENT PLANT

| Substance | Violation | Sampling Period | MCLG* | MCL* | Denver's Average | Range of Detections | Sources of Substances | Footnotes |
|--|-----------|-----------------|------------------|--|---|--|---|---|
| <i>Metals</i> Barium in parts per million (ppm) | No | Monthly | 2 | 2 | 0.044 | 0.015 - 0.053 | <i>Erosion of natural deposits; discharge of drilling wastes</i> | *MCLG and MCL: Maximum Contaminant Level Goal and Maximum Contaminant Level. ¹ PicoCuries per liter. ² Not applicable. ³ Equivalent dose. ⁴ Non-detect: Laboratory analysis indicates that the constituent was not present. ⁵ Two (2) is the Secondary Maximum Contaminant Level, which is not enforceable. Exceeding the Fluoride Secondary Maximum Contaminant Level of two milligrams per liter triggers public notification. ⁶ Treatment Technique: a required process intended to reduce the level of a contaminant in drinking water. |
| <i>Radiological</i> Beta/photon emitters in pCi/L ¹ | No | Quarterly | n/a ² | 4mrem/yr ³ Trigger Level 50 | 2.8 | n/d ⁴ - 4.1 | <i>Decay of natural and man-made deposits</i> | |
| Uranium in parts per billion (ppb) | No | Quarterly | n/a | 30 | n/d | n/d | <i>Erosion of natural deposits</i> | |
| <i>Inorganics</i> Fluoride in ppm | No | 6 times daily | 4 | 4 ⁵ | 0.91 | 0.21 - 1.77 | <i>Erosion of natural deposits; water additive that promotes strong teeth</i> | |
| Nitrate in ppm | No | Monthly | 10 | 10 | 0.26 | 0.07 - 0.47 | <i>Erosion of natural deposits; leaching from septic tanks, sewage</i> | |
| <i>Organics</i> Total Organic Carbon as removal ratio | No | Weekly | n/a | TT ⁶ | Lowest running annual removal ratio 1.10 1.26 1.18 | 0.53 - 1.93 Foothills Treatment Plant 1.01 - 2.21 Moffat Treatment Plant 0.89 - 2.58 Marston Treatment Plant | <i>Naturally present in the environment</i> | |

Información en español

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REGULATED IN THE DISTRIBUTION SYSTEM

| | | | | | | | | |
|---|----|----------------|-----|---|--|--|--|---|
| <i>Organic Disinfection By-Products (DBPs)</i> Total Trihalomethanes ¹ (TTHM) in ppb | No | Monthly | 0 | 80 | Highest RAA* 33 | 14 - 69 | <i>By-product of drinking water chlorination</i> | *Running Annual Average. ¹ Total Trihalomethanes: By-products of the disinfection process. ² Correction: Last year's report gave the range for Haloacetic Acids as 2.5 - 30. The actual range was 2.5 - 38. ³ Less than 5% positive in any month. ⁴ Maximum Residual Disinfectant Level (MRDL): 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. ⁵ Turbidity has no known health effects. However, turbidity can interfere with disinfection and provide a medium for microbial growth. |
| Haloacetic acids (HAA ₅) in ppb | No | Monthly | n/a | 60 | 20 | 7 - 58 ² | <i>By-product of drinking water chlorination</i> | |
| <i>Microbiological</i> Total Coliform as Absent or Present | No | Daily | 0 | 5% ³ | Highest monthly percentage 0.55% June '03 | 10 positive detects out of 6,242 samples, or 0.16% | <i>Naturally present in the environment</i> | |
| <i>Disinfectant</i> Chloramine as Cl ₂ in ppm | No | 12 times daily | n/a | MRDL as Cl ₂ ⁴ 4 | 1.22 | 0.14 - 2.04 | <i>Drinking water disinfectant used to kill microbes</i> | |
| Turbidity ⁵ in Nephelometric Turbidity Units | No | 12 times daily | n/a | TT | Highest Level in 2003 0.14 | Monthly samples less than 0.3 NTU 100% | <i>Soil runoff</i> | |

UNREGULATED CONTAMINANTS¹

| | | | | | | | | |
|--|----|----------------|-----|----------------------------|-----------------|-------------|---|--|
| <i>Organic Disinfection By-Products (DBPs)</i> Bromodichloromethane in ppb | No | Monthly | n/a | n/a | Averages 8.0 | 0.8 - 13.0 | <i>Component of TTHM, by-product of drinking water chlorination (See chart above)</i> | ¹ Unregulated compounds are analyzed for consideration for future regulation. ² Secondary Maximum Contaminant Level is a recommended level and is not enforceable. |
| Chlorodibromomethane in ppb | No | Monthly | n/a | n/a | 2.5 | n/d - 4.2 | | |
| Chloroform in ppb | No | Monthly | n/a | n/a | 29.3 | 5.4 - 57.0 | <i>By-product of drinking water chlorination</i> | |
| Chloral hydrate in ppb | No | Monthly | n/a | n/a | 3.0 | 0.5 - 6.4 | | |
| Chloropicrin in ppb | No | Twice Annually | n/a | n/a | 0.6 | n/d - 1.0 | | |
| Cyanogen chloride in ppb | No | Annually | n/a | n/a | 10.3 | 6.3 - 18.0 | | |
| Haloacetonitriles (HAN) in ppb | No | Twice Annually | n/a | n/a | 1.2 | n/d - 3.1 | | |
| Halo ketones (HK) in ppb | No | Twice Annually | n/a | n/a | 1.2 | 0.5 - 2.4 | | |
| Total organic halides (TOX) in ppb | No | Annually | n/a | n/a | 181 | 143 - 234 | | |
| <i>Inorganics</i> Sulfate in ppm | No | Monthly | 250 | (SMCL) ² 250 | 60.4 | 16.1 - 75.3 | <i>Naturally present in the environment</i> | |
| Sodium in ppm | No | Monthly | n/a | n/a | 22.6 | 5.5 - 31.0 | | |

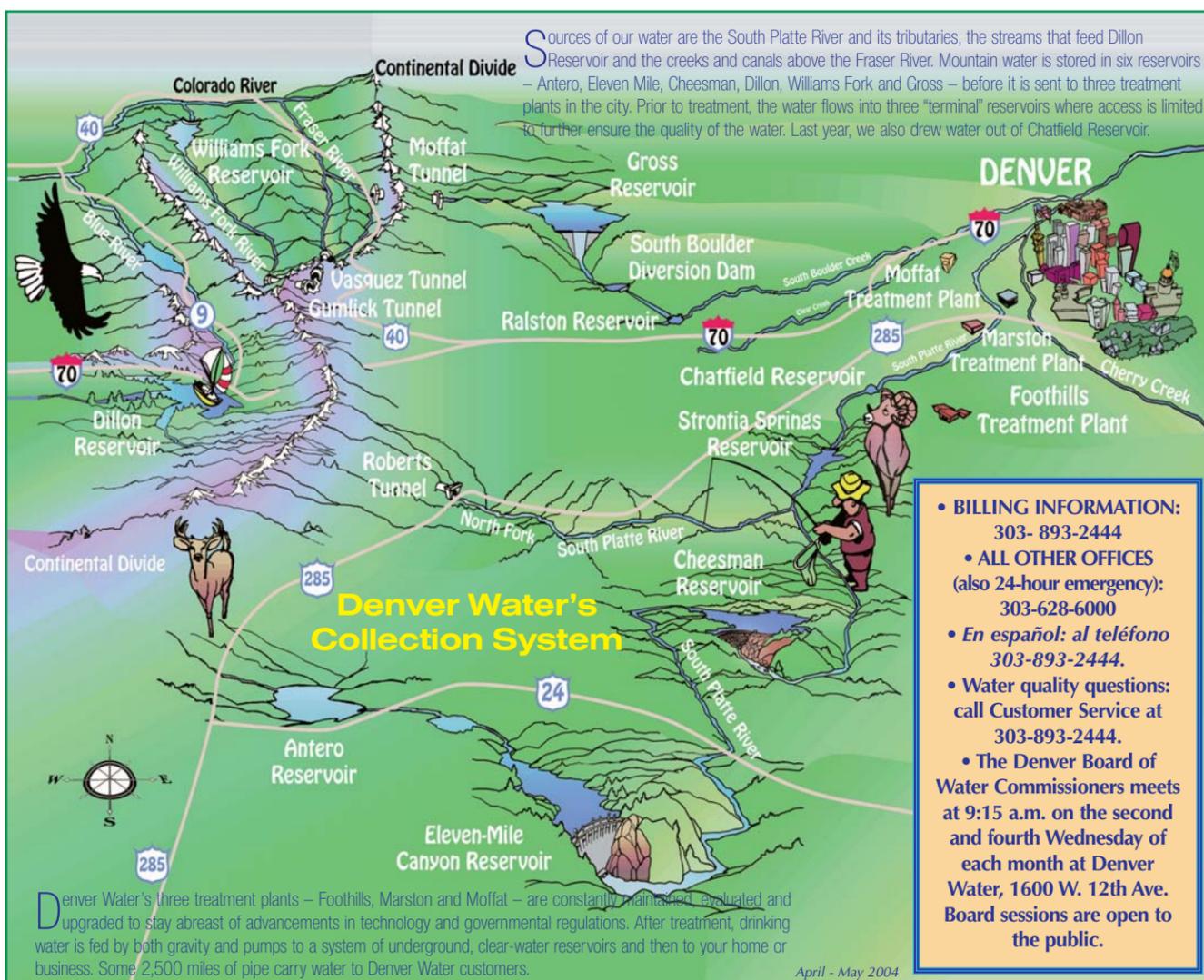
What's on this chart

The Water Quality Lab at Marston, key to our quality assurance program, last year ran 40,639 tests from 11,996 samples while looking for more than 200 possible contaminants, many of which aren't regulated or detected. As the charts on this page reflect, very few of these substances were found in the city's treated water, all were well below allowed levels and none represents a health concern. For a full list of 2003 test results, call Maria Rose at 303-628-5996.

REGULATED AT THE CUSTOMER'S TAP¹

| Substance | Violation | Sampling Period | MCLG | Action Level ² | 90th Percentile Value | No. of Samples Exceeding AL | Sources of Substances | Footnotes |
|---|-----------|-----------------|------|------------------------------|-----------------------|-----------------------------|--|---|
| <i>Inorganics</i> Lead in ppb | No | Triennially | 0 | At the 90th Percentile 15 | 9 | 1 out of 51 | <i>Corrosion of household plumbing</i> | ¹ Lead isn't found in Denver's treated water. However, it might be present in a home's or business's plumbing. Because Denver Water has consistently been below lead and copper Action Levels, the state health department permits reduced monitoring once every three years. The next sampling for lead and copper will be in 2005. The figures in this report are from 2002. |
| Copper in ppm | No | Triennially | 1.3 | 1.3 | 0.19 | 0 out of 51 | | |

² Action Level: Concentration of a contaminant that, if exceeded, triggers treatment or other requirements that a water system must follow.



More about lead

Infants and young children are typically more vulnerable to lead in drinking water than the general population. It is possible that lead levels at your home might be higher than at other homes in the community as a result of materials used in your home's plumbing. If you are concerned about elevated lead levels in your home's water, you might wish to have your water tested and flush your tap for 30 seconds to two minutes before using tap water. (Always use cold tap water for food and beverage preparation. Hot tap water can leach higher amounts of lead and other metals from plumbing or your hot water tank.) Additional information is available from the U.S. Environmental Protection Agency's Safe Drinking Water Hotline at 800-426-4791.

Fed by mountain runoff

Denver's drinking water comes from rivers, lakes, streams, reservoirs and springs fed by high-quality mountain snow runoff. The water comes entirely from surface sources over a watershed that covers 3,100 square miles on both sides of the Continental Divide. The farthest reaches of this system are more than 105 miles away, and the water is diverted and delivered to our treatment plants in the city by gravity through a complex system of streams, canals and pipes. Even though the water originates in pristine areas in the mountains, our strict quality control includes watershed protection. Denver Water employees who live and work throughout our watershed maintain continual surveillance of the water supply.