2023
Water Quality Report
January 1, 2023 - December 31, 2023

BOZEMAN MT
Water Treatment Plant

www.bozeman.net

The City of Bozeman is Pleased to Present our 2023 Water Quality Report

(also called the Consumer Confidence Report)

We are proud to report that Bozeman's drinking water meets, or exceeds, all established federal and state water quality standards. The City of Bozeman Water Treatment Plant had zero violations in 2023.

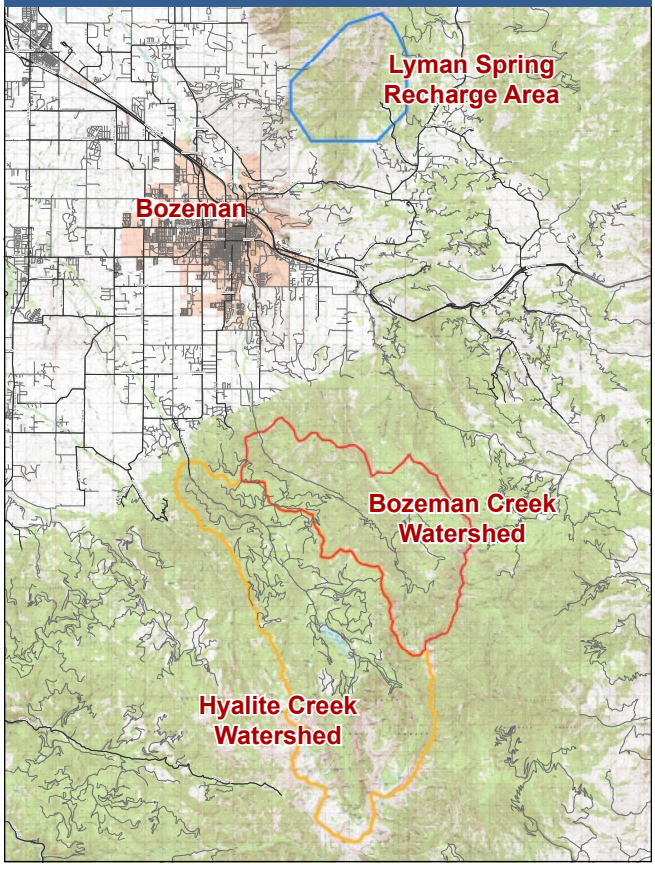
The report informs you about the quality of drinking water and services delivered to residents each day. It contains a list of all *detected* contaminants found in Bozeman's drinking water and information on the water sources. If you have any questions regarding this brochure, please call the City of Bozeman Water Treatment Plant Assistant Superintendent at 406-994-0501. This report is also available at the City of Bozeman website, www.bozeman.net/waterquality.

If you are a landlord or property manager, or know someone who is not billed directly, please share this report with your tenants and friends.

The City of Bozeman encourages all citizens to become active in protecting our water sources and to participate in the decisions affecting Bozeman's drinking water. The Bozeman City Commission meets Tuesday evenings at 6 p.m. at City Hall at 121 North Rouse Avenue.

Where Does Your Water Come From and How is it Treated?

The City of Bozeman drinking water is collected from two mountain ranges, and is treated in one of two water treatment plants. These facilities treat raw water supplied by Middle Creek, Middle Creek Reservoir (Hyalite Reservoir), Sourdough Creek, and Lyman Creek. All Middle Creek and Sourdough Creek water is treated at the water treatment plant located on Sourdough Canyon Road south of Bozeman. Lyman Creek water is treated at a plant northeast of town.



Middle Creek and Middle Creek Reservoir

Water from Middle Creek flows into Middle Creek Reservoir (Hyalite Reservoir) where it is stored. The water then flows down Hyalite Creek to the intake and is carried by pipeline to the water treatment plant.

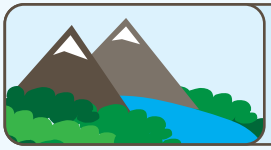
Sourdough Creek (Bozeman Creek)

Creek water is drawn from the watershed in Sourdough Canyon. No storage reservoir exists here since the breaching of Mystic Lake Dam in 1985. From the intake on Sourdough Creek, the water is carried by pipeline to the water treatment plant where it is mixed with Middle Creek water.

Sourdough Canyon Water Treatment Plant

A 22 million gallon per day (MGD) microfiltration membrane plant with robust pretreatment treats water from Sourdough and Middle Creek. This plant allows the City to meet increased service demands and comply with Environmental Protection Agency and Montana Department of Environmental Quality regulations.

Sourdough Creek Treatment Process



Water from Bozeman Creek and Hyalite Creek are combined and then enter the plant.

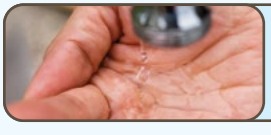
The treatment process starts with grit removal and addition of a flocculant. This combines with suspended particles to form "floc". It is mixed at progressively slower speeds.

The flocculated suspended particles and chemical settle out in the sedimentation basin. Inclined plate settlers speed up the settling process. The sludge that is formed is pumped to the solids handling processes.

The water is then pumped through strainers to remove particles and goes to the membranes.

The membranes have 6,350 fibers in each module and 124 modules in each rack. Each fiber has pores in them with a nominal pore size of 0.1 microns.

Chlorine is added for disinfection, sodium hydroxide is added for pH adjustment, and fluoride is added prior to going to the distribution system.



Distribution System

The membrane filtration plant consists of grit removal, flocculation and sedimentation to remove larger contaminants. The water then goes through 300 micron strainers to remove more contaminants. Membranes then filter the water through 0.1 micron pores of the membrane fibers. As final steps in the treatment process, sodium hypochlorite is added for disinfection, sodium hydroxide is added for pH adjustment and corrosion control, and fluoride is added for cavity prevention.

Raw water can vary during the year. It is affected by spring runoff, rainstorms, accidental spills, and landslides. The water treatment facility has the capacity to treat these varying conditions, thus provides consistent high quality drinking water to Bozeman.

Lyman Creek Treatment Process

Lyman Creek

Located in the southern foothills of the Bridger Mountains, this source is a fully enclosed spring and is classified as a groundwater source. The quality of this water varies little throughout the year. The water is captured underground and flows to the treatment plant via a pipeline.

Lyman Creek Water Treatment Plant

The water is treated with sodium hypochlorite for disinfection, is stored in a 5 million gallon tank, and fluoride is added as it leaves the tank for cavity prevention. (See Lyman Creek Treatment Process).

Source Water Assessment

Bozeman's watersheds are devoid of significant potential sources of contamination. The exception is the transportation corridor along Hyalite Creek, which has a very high susceptibility to contamination by transportation of chemicals, including vehicle fluids, on Hyalite Road.

The City of Bozeman's Source Water Delineation and Assessment Report is available for viewing at the Bozeman Public Library.

The Sourdough (Bozeman) Creek and Middle (Hyalite) Creek watersheds are very highly recreated areas. Cross country skiers, ice climbers, mountain bikers, hikers, dog walkers, fishermen, and rock climbers all use the watersheds on an almost daily basis.

What Are Water Contaminates?

The sources of drinking water for tap water and bottled water include rivers, lakes, streams, ponds, reservoirs, springs, and groundwater. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material. Water can also pick up substances resulting from animal or human activity. Contaminants that may be present in water prior to treatment include:

- ***Microbial contaminants*** such as viruses and bacteria that can come from sewage treatment plants, septic systems, agricultural operations, wildlife, and domestic animals.
- ***Inorganic contaminants*** such as salts and metals, which can be naturally occurring or result from urban storm 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 compounds, which are by-products of industrial processes and petroleum production. These contaminants may also come from gas stations, urban storm water runoff, and septic systems.
- ***Radioactive contaminants*** that can be naturally occurring or be the result of oil and gas production and mining activities.

Every Drop Counts

Bozeman is considered drought-prone and relies on snowpack for its water supplies. With shifting climate patterns, these supplies are likely to become less reliable. More moisture is predicted to arrive as rain instead of snow, and warmer temperatures are expected, leading to earlier peak flows and drier summers.

Without water conservation, Bozeman could be facing a water shortage within the next 10 years. The City's Water Conservation Program is dedicated to helping residents use water more efficiently, creating the single largest source of water for Bozeman's future.

Doing One Thing Makes a Difference

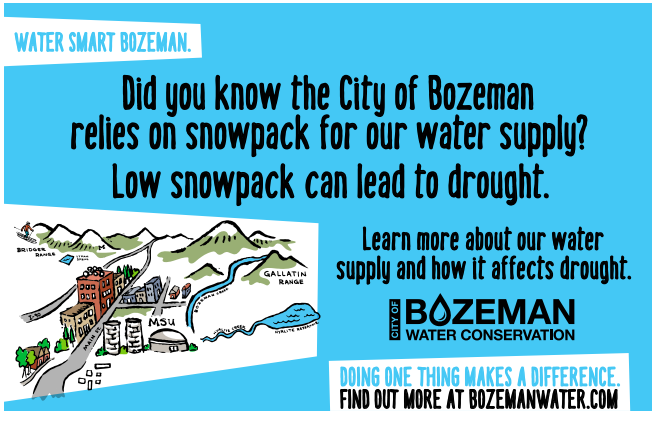
We need your help. In big ways and small, we can all do one thing to conserve Bozeman's limited water supplies.

Not Sure Where to Start?

The City offers a number of free resources and rebate incentives to help! Here are a few:

- Free high efficiency showerheads and faucet aerators
- Free fix-a-leak kits
- Free water use portal to track your water use and set efficiency goals
- Free sprinkler system assessments
- Four indoor rebate incentives—including high efficiency toilets and clothes washers
- Six outdoor rebate incentives—including high efficiency sprinkler products, drought tolerant plants, and turf removal.

To learn more about City of Bozeman water conservation resources and drought management, visit **www.bozemanwater.com.**



Definitions

Action Level (AL): The concentration of a contaminant which, if exceeded, triggers treatment, or other requirements, which a water system must follow. Ninety percent of samples must be at, or below, this level. Lead and copper are measured at the 90th percentile.

Maximum Contaminant Level (MCL): The highest level of a contaminant 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 contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

Maximum Residual Disinfection Level (MRDL): The highest level of disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants (4.0 mg/l).

Maximum Residual Disinfectant Level Goal (MRDLG): The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLG's do not reflect the benefits of the use of disinfectants to control microbial contamination (4.0 mg/l).

Nephelometric Turbidity Units (NTU): Level of turbidity in filtered water.

ppm: parts per million

ppb: parts per billion

pCi/L: Picocuries per liter (a measure of radioactivity)

uS/cm: microsiemens per centimeter

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

Running Annual Average (RRA): Average of the results for the most recent four quarters.

Locational Running Annual Average (LRAA): Average of the results for a location for the most recent four quarters.

UCMR4: Unregulated Contaminant Monitoring Rule #4. Sampled at each WTP entry point to the system and in the distribution system Disinfection Byproduct (DBP) sample sites.

Variances and Exemptions: State or EPA permission not to meet an MCL or a treatment technique under certain conditions.

2023 Test Results

Listed in the tables on the following pages are all the contaminants *detected* in Bozeman's drinking water after treatment during the 2023 calendar year. The Environmental Protection Agency (EPA) and the State of Montana Department of Environmental Quality (DEQ) require monitoring of over 80 contaminants. There is also additional information frequently requested in the Additional Water Quality Information Tables.

2023 System Test Results

	Location	Range		Your Water	Year Collected	MCL	AL	MCLG	Typical Contaminant Source
Trihalomethanes (THMs) (ppb)	DBP1	10.0	35.0	22.0	2023	80		N/A	By-product of drinking water chlorination
	DBP4	13.0	36.0	24.5					
	DBP5	11.0	38.0	22.5					
Haloacetic Acids (HAA5s) (ppb)	DBP1	9.8	22.0	17.5		60		N/A	By-product of drinking water chlorination
	DBP4	11.0	18.0	17.5					
	DBP5	9.9	22.0	17.7					
Total Coliform	Distribution System	720		0 positive samples		<5% of samples/mo		0	Naturally present in the environment
Free Chlorine (ppm)	Distribution System	0.21	0.96	0.63		4 (MRDL)		4 (MRDLG)	Water additive used to control microbes
Total Organic Carbon (ppm)	Raw Surface Water	1.00	5.50	1.98				N/A	Naturally present in the environment

Lead and Copper									
Lead* (ppb)	Distribution System		Zero Sites exceeded A.L.	0.0 (90th percentile)	2022		15	0	Erosion of natural deposits; corrosion of household plumbing systems
Copper* (ppm)			Zero Sites exceeded A.L.	0.055 (90th percentile)			1.3	1.3	Erosion of natural deposits; corrosion of household plumbing systems

Water Quality Parameters									
Alkalinity (ppm)	Representative of the Lyman Water Source	131.0	160.0	144.7	2023	NA			
Calcium Hardness (ppm)		70.0	144.0	104.3		NA			
Specific Conductivity (uS/cm)		153.0	325.0	247.1		NA			
pH (SU)		7.18	8.63	7.88		6.5-9.3			
Temperature (Celsius)		9.7	20.6	13.5		NA			
Alkalinity (ppm)	Representative of the Sourdough & Hyalite Water Sources	62.0	124.3	88.5		NA			
Calcium Hardness (ppm)		44.8	105.0	64.5		NA			
Specific Conductivity (uS/cm)		76.5	205.7	151.3		NA			
pH (SU)		7.80	8.90	8.42		6.5-9.3			
Temperature (Celsius)		3.8	19.5	10.4		NA			

*Lead has not been detected in Bozeman's source water. This sampling was performed February through March of 2022 in accordance with EPA regulations. Lead and Copper are regulated over the entire distribution system (not by source), so these results were not repeated for the Lyman source. If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The City of Bozeman is responsible for providing high-quality drinking water, but cannot control the variety of 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 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline (1-800-426-4791) or at www.epa.gov/safewater/lead.

2023 Sourdough Test Results

	Location	Range		Your Water	Year Collected	MCL	AL	MCLG	Typical Contaminant Source
Sourdough Water Treatment Plant									
Native Fluoride (ppm)	Plant Influent	0.04	0.31	0.14	2023	4		4	Erosion of natural deposits
1st Service Fluoride (ppm)	Distribution System	0.34	0.89	0.56		4		4	Erosion of natural deposits; water additive which promotes strong teeth
Turbidity * (NTU)	Sourdough Plant Effluent	0.011	0.054	0.017		TT= 1 NTU TT= 95% < 0.15 NTU			Natural result of soil runoff
Nitrate + Nitrite (ppm)	Entry Point 502			<0.05		10 Nitrate 1 Nitrite		10 1	Runoff from fertilizer use; leaching from septic tanks; sewage; erosion of natural deposits
Arsenic (ppb)				0.492		10		0	Erosion of natural deposits; runoff from orchards
Radium (Combined 226/228) (pCi/L)				0.6 (+/-1.0)	2018	5		0	Erosion of natural deposits
Gross Alpha (pCi/L)				2.0 (+/-1.7)		15		0	Erosion of natural deposits
Uranium (pCi/L)				0.4		30		0	Erosion of natural deposits
Barium (ppm)				0.019	2021	2		2	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Additional Water Quality Information									
Alkalinity (ppm)	Sourdough Plant Effluent	63.50	107.20	85.62	2023	NA			
Chloride (ppm)		0.80	3.20	1.38		250			
Free Chlorine (ppm)		0.56	1.01	0.83		4 (MRDL)		4 (MRDLG)	Water additive used to control microbes
Calcium Hardness (ppm)		40.80	82.00	60.03		NA			
Calcium (ppm)		16.32	32.80	24.01		NA			
Magnesium Hardness (ppm)		16.00	36.80	25.64		NA			
Magnesium (ppm)		3.91	8.99	6.26		NA			
Total Hardness (ppm)		60.80	107.20	85.66		NA			
Total Hardness (Grains)		3.55	6.26	5.00		NA			
pH (SU)		8.24	8.86	8.49		6.5-9.3			
Sodium (ppm)		5.12	8.28	6.22		20			Erosion of natural deposits; Leaching
Sulfate (ppm)		1.00	6.00	2.75		500			
Iron (ppb)		0	40	15		300			
Total Dissolved Solids (ppm)		70.70	111.00	92.48		500			
Dissolved Oxygen (ppm)		6.20	13.50	9.91		NA			
Aluminum (ppb)		<8	31	<8		200			
Phosphorus (ppm)		0.000	0.170	0.094					
UV254 (Organics, %T)		83.8	100.0	94.1		NA			
UCMR4									
HAA5 (ppb)	DBP1	13.5	20.7	17.1	2020	60			By-product of drinking water chlorination
HAA6Br (ppb)		0.86	1.21	1.04					By-product of drinking water chlorination
HAA9 (ppb)		14.36	21.91	18.14					By-product of drinking water chlorination
HAA5 (ppb)	DBP4	15.1	23.0	19.05		60			By-product of drinking water chlorination
HAA6Br (ppb)		0.91	1.09	1.00					By-product of drinking water chlorination
HAA9 (ppb)		16.01	24.09	20.05					By-product of drinking water chlorination
Manganese (ppb)	Entry Point 502	<0.40	0.64	0.32		50			Erosion of natural deposits

*Turbidity has no health effects. However, turbidity can interfere with disinfection and provide a medium for microbial growth.The City of Bozeman's filtered water must be less than, or equal to 0.15 NTU in at least 95% of monthly measurements, and it can never exceed 1 NTU. The single highest measurement was 0.054 NTU. Bozeman's average daily turbidity was 0.017 NTU.

2023 Lyman Creek Test Results

	Location	Range		Your Water	Year Collected	MCL	AL	MCLG	Typical Contaminant Source
LYMAN WATER TREATMENT PLANT									
Native Fluoride (ppm)	Lyman Plant Influent	0.05	0.24	0.16	2023	4 ppm		4	Erosion of natural deposits
Nitrate + Nitrite (ppm)	Entry Point 504			0.174		10 Nitrate 1 Nitrite		10 1	Runoff from fertilizer use; leaching from septic tanks; sewage; erosion of natural deposits
Fluoride (ppm)		0.17	0.86	0.54		4		4	Erosion of natural deposits; water additive which promotes strong teeth
Radium (Combined 226/228) (pCi/L)				0.7 (+/-1.1)	2018	5		0	Erosion of natural deposits
Gross Alpha (pCi/L)				3.1 (+/-2.5)		15		0	Erosion of natural deposits
Uranium (pCi/L)				0.7		30		0	Erosion of natural deposits
Barium (ppm)				0.0258	2021	2		2	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Selenium (ppb)				0.74		50		50	Discharge from petroleum refineries; discharge from mines; erosion of natural deposits
ADDITIONAL WATER QUALITY INFORMATION									
Alkalinity (ppm)	Lyman Plant Influent	127.00	164.00	142.63	2023	NA			
Chloride (ppm)		0.35	0.93	0.58		250			
Free Chlorine (ppm)		0.44	0.68	0.54		4 (MRDL)		4 (MRDLG)	Water additive used to control microbes
Calcium Hardness (ppm)		96.00	119.00	101.22		NA			
Calcium (ppm)		38.40	47.60	40.49		NA			
Magnesium Hardness (ppm)		43.00	90.00	68.02		NA			
Magnesium (ppm)		10.50	21.98	16.61		NA			
Total Hardness (ppm)		158.80	188.00	169.23		NA			
Total Hardness (Grains)		9.28	10.98	9.89		NA			
pH (SU)		7.66	8.01	7.85		6.5-9.3			
Sodium (ppm)		0.73	3.86	1.59		20			
Sulfate (ppm)		9.00	14.00	11.25		500			
Iron (ppb)		0	40	20		300			
Total Dissolved Solids (ppm)		144.40	161.90	150.19		500			
Turbidity (NTU)		0.03	0.26	0.04		<1.0			
Dissolved Oxygen (ppm)		3.40	8.80	7.09		NA			
Aluminum (ppb)		<8	16	<8		200			
Phosphorus (ppm)		0.000	0.060	0.028					
UV254 (Organics, %T)		98.3	100.4	99.5		NA			

Water and Your Health

In order to ensure that tap water is safe to drink, EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. FDA regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

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 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 under going 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 for 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 Safe Drinking Water Hotline (800-426-4791).

For More Information

Jac Miller, Assistant Superintendent
City of Bozeman – Public Works, Water Treatment Plant
406-994-0501 • jacmiller@bozeman.net
www.bozeman.net

For a copy of this report in Spanish,
please visit www.bozeman.net/waterquality.

Para obtener una copia de este informe en español,
visite nuestro sitio web en www.bozeman.net/waterquality.

BOZEMAN MT
Water Treatment Plant

www.bozeman.net