2020
Water Quality Report
January 1, 2020 - December 31, 2020

BOZEMAN MT
Water Treatment Plant

www.bozeman.net

The City of Bozeman is Pleased to Present our 2020 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 2020.

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.

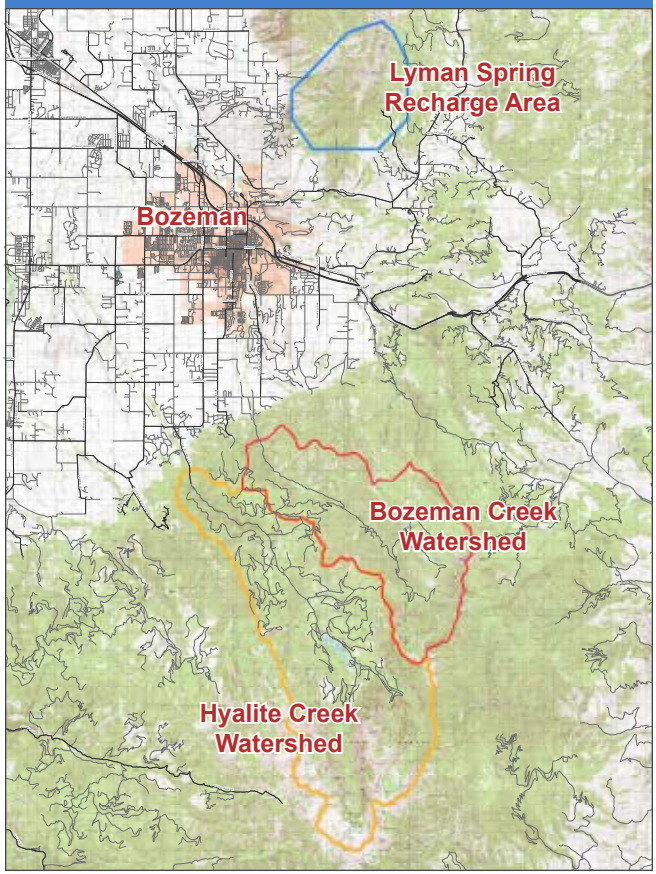
If you are a landlord or property manager, or know someone who is not billed directly, please share this report with your tenants and friends.

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.

Bozeman Watershed



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.

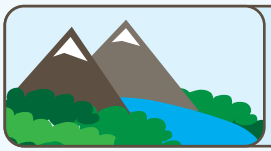
Sourdough Creek (Bozeman Creek)

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 mixed together 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 a very high quality of drinking water to Bozeman consistently.

Lyman Creek Treatment Process

Chlorine is added for disinfection.

Treated water is stored for use.

Distribution system

Fluoride is added for cavity prevention.

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:

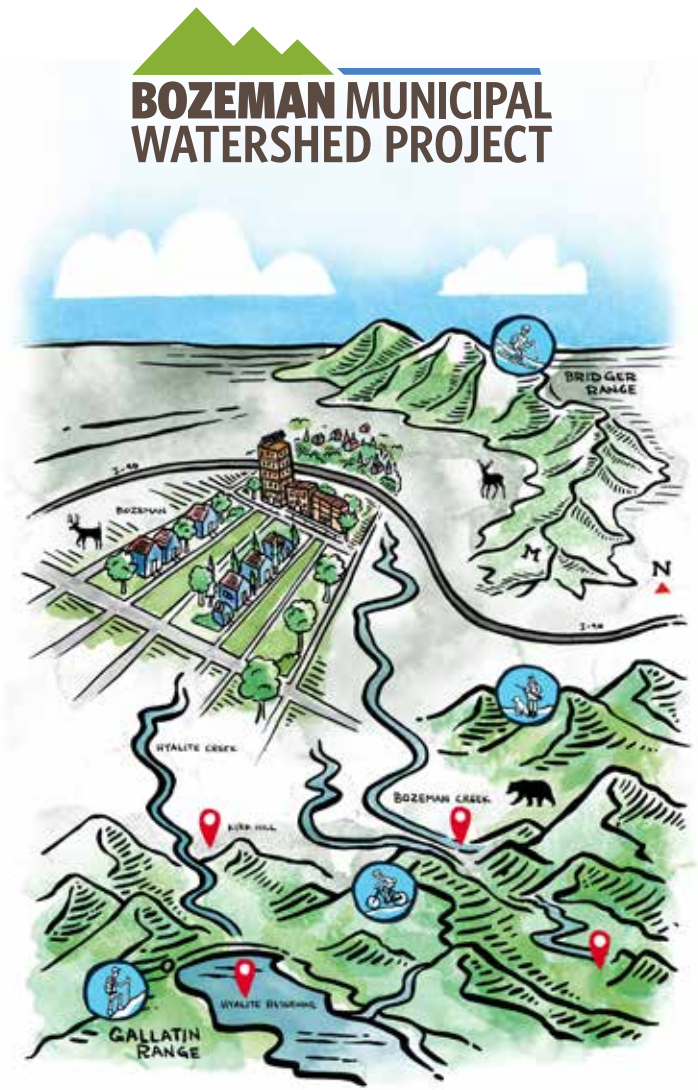
- ***Microbial contaminants*** such as viruses and bacteria that can come from sewage treatment plants, septic systems, agricultural operations, wildlife, and domestic animals.
- ***Inorganic contaminants*** such as salts and metals, which can be naturally occurring or result from urban storm runoff, 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.

Bozeman Municipal Watershed Project

The Bozeman Municipal Watershed Project is a cooperative effort between the Custer Gallatin National Forest and the City of Bozeman to maintain a high-quality, predictable water supply for Bozeman residents.

What is a watershed?

A watershed describes an area of land that contains a network of streams and rivers that all drain into a single body of water. In the Northern Gallatin Range that includes the mountains, valleys, and streams of Bozeman Creek and Hyalite Creek. 80% of Bozeman's drinking water comes from this watershed.



Where does our water come from?

100% of the City of Bozeman's municipal water comes from our National Forest land—80% from Hyalite and Bozeman Creeks and 20% from Lyman Creek in the Bridger Range.

The Northern end of the Gallatin Range not only provides the Bozeman community with its drinking water, it also is the most visited portion of the Custer Gallatin National Forest. In peak summer months, thousands of people hike, bike, fish, and more in Hyalite and Bozeman Creek each day.

What are threats to our watershed?

According to three different watershed assessments, ash and sediment from a severe wildland fire pose the most immediate threat to our municipal water supply.

The City of Bozeman water treatment plant has a peak capacity of 22 million gallons per day. If a severe wildland fire impacts our drinking water infrastructure we will only have about 2-3 days of treated water available for indoor use only.

How are we protecting our watershed?

We are using prescribed burning, thinning, and timber harvest to reduce wildland fuels which will reduce the risk of severe and extensive wildfire in the lower portions of Hyalite and Bozeman creeks. This work will also help to decrease the amount of debris that could clog our waterways and limit the amount of sediment and ash from entering our water treatment plant. While this project and work will not eliminate fire starts in our watershed, the project will reduce fire severity near the municipal water intakes and treatment areas and protect our water quality for Bozeman's growing population.

Both the City of Bozeman and the Custer Gallatin National Forest will be in clear and constant communication with the public before and during fuel reduction activities. Any temporary trail or road closures will be posted well in advance and the work will be performed as expeditiously as possible. www.bznwatershed.com

2020 Test Results

Listed in the tables on the following pages are all the contaminants *detected* in Bozeman's drinking water after treatment during the 2020 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.

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).

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.

2020 System Test Results

CONTAMINANT	LOCATION	MIN	MAX	DETECTED LEVEL OR AVERAGE	UNITS	MCL	AL	MCLG	TYPICAL CONTAMINANT SOURCE
Trihalomethanes (THMs)						80			By-product of drinking water chlorination
	DBP1	10.00	27.00	20.00	ppb				
	DBP4	15.00	32.00	25.00	ppb				
Haloacetic Acids (HAA5s)						60			By-product of drinking water chlorination
	DBP1	9.90	18.00	14.48	ppb				
	DBP4	14.00	19.00	16.25	ppb				
Lead*	Distribution System		Zero Sites exceeded A.L.	5.0 (90th percentile)	ppb		15	0	Erosion of natural deposits; corrosion of household plumbing systems
Copper*	Distribution System		Zero Sites exceeded A.L.	0.067 (90th percentile)	ppm		1.3	0	Erosion of natural deposits; corrosion of household plumbing systems
Total Coliform	Distribution System		623	1 positive sample		<5% of samples/mo		0	Naturally present in the environment

*Lead has not been detected in Bozeman's source water. This sampling was done in August of 2018 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.

2020 Sourdough Test Results

	LOCATION	MIN	MAX	DETECTED LEVEL OR AVERAGE	UNITS	MCL	AL	MCLG	TYPICAL CONTAMINANT SOURCE
SOURDOUGH									
Native Fluoride	Plant Influent	0.00	0.20	0.07	ppm	4		4	Erosion of natural deposits
1st Service Fluoride	Distribution System	0.20	0.68	0.55	ppm	4		4	Erosion of natural deposits; water additive which promotes strong teeth
Turbidity **	Plant Effluent	0.013	0.034	0.018	NTU	TT= 1 NTU TT= 95% < 0.15 NTU			Natural result of soil runoff
Radium*** (Combined 226/228)	Entry Point 502			0.6 (+/-1.0)	pCi/L	5 pCi/L		0 pCi/L	Erosion of natural deposits
Gross Alpha***	Entry Point 502			2.0 (+/-1.7)	pCi/L	15 pCi/L		0 pCi/L	Erosion of natural deposits
Uranium***	Entry Point 502			0.0004	mg/L	0.03 mg/L		0 pCi/L	Erosion of natural deposits
UCMR4									
HAA5	DBP1	13.5	20.7	17.1	ppb	60			By-product of drinking water chlorination
HAA6Br	DBP1	0.86	1.21	1.04	ppb				By-product of drinking water chlorination
HAA9	DBP1	14.36	21.91	18.14	ppb				By-product of drinking water chlorination
HAA5	DBP4	15.1	23.0	19.05	ppb	60			By-product of drinking water chlorination
HAA6Br	DBP4	0.91	1.09	1.00	ppb				By-product of drinking water chlorination
HAA9	DBP4	16.01	24.09	20.05	ppb				By-product of drinking water chlorination
Manganese	Entry Point 502	<0.40	0.64	0.32	ppb	50			Erosion of natural deposits

ADDITIONAL WATER QUALITY INFORMATION						
Alkalinity	Plant Effluent	60.80	100.00	86.28	ppm	NA
Chloride	Plant Effluent	0.40	2.56	0.93	ppm	250
Free Chlorine	Plant Effluent	0.55	1.16	0.80	ppm	4 (MRDL)
Calcium Hardness	Plant Effluent	39.20	73.20	56.33	ppm	NA
Calcium	Plant Effluent	15.68	29.28	22.53	ppm	NA
Magnesium Hardness	Plant Effluent	18.00	36.40	27.47	ppm	NA
Magnesium	Plant Effluent	4.40	8.89	6.71	ppm	NA
Total Hardness	Plant Effluent	58.80	109.60	83.80	ppm	NA
Total Hardness (Grains)	Plant Effluent	3.43	6.40	4.89	Grains	NA
pH	Plant Effluent	8.01	8.81	8.52	SU	6.5-9.3
Sodium	Plant Effluent	3.34	7.77	5.73	ppm	20
Sulfate	Plant Effluent	1.00	4.00	2.42	ppm	500
Iron	Plant Effluent	0.000	0.030	0.015	ppm	0.3
Total Dissolved Solids	Plant Effluent	67.40	113.50	90.57	ppm	500
Dissolved Oxygen	Plant Effluent	8.80	13.80	10.93	ppm	NA
Aluminum	Plant Effluent	0.000	0.013	0.002	ppm	0.20
Phosphorus	Plant Effluent	0.017	0.300	0.149	ppm	
UV254 (Organics)	Plant Effluent	83.90	99.10	94.81	%T	NA

***last collected in 2018 per EPA regulations

**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 0.034 NTU. Bozeman's average daily turbidity was 0.018 NTU.

2020 Lyman Creek Test Results

	LOCATION	MIN	MAX	DETECTED LEVEL OR AVERAGE	UNITS	MCL	AL	MCLG	TYPICAL CONTAMINANT SOURCE
LYMAN CREEK									
Native Fluoride	Plant Influent	0.09	0.30	0.18	ppm	4 ppm		4 ppm	Erosion of natural deposits
Nitrate + Nitrite	Entry Point 504			0.15	ppm	Nitrate -10 ppm Nitrite - 1 ppm		10 ppm 1ppm	Runoff from fertilizer use; leaching from septic tanks; sewage; erosion of natural deposits
Fluoride	Entry Point 504	0.28	0.76	0.54	ppm	4 ppm		4 ppm	Erosion of natural deposits; water additive which promotes strong teeth
Radium*** (Combined 226/228)	Entry Point 504			0.7 (+/-1.1)	pCi/L	5 pCi/L		0 pCi/L	Erosion of natural deposits
Gross Alpha***	Entry Point 504			3.1 (+/-2.5)	pCi/L	15 pCi/L		0 pCi/L	Erosion of natural deposits
Uranium***	Entry Point 504			0.0007	mg/L	0.03 mg/L		0 pCi/L	Erosion of natural deposits
ADDITIONAL WATER QUALITY INFORMATION									
Alkalinity	Plant Effluent	127.00	164.00	139.08	ppm	NA			
Chloride	Plant Effluent	0.18	1.13	0.57	ppm	250			
Free Chlorine	Plant Effluent	0.47	0.63	0.54	ppm	4 (MRDL)		4 ppm	
Calcium Hardness	Plant Effluent	98.00	122.00	104.50	ppm	NA			
Calcium	Plant Effluent	39.20	48.80	41.80	ppm	NA			
Magnesium Hardness	Plant Effluent	48.00	75.00	61.75	ppm	NA			
Magnesium	Plant Effluent	11.72	18.31	15.08	ppm	NA			
Total Hardness	Plant Effluent	158.00	178.00	166.25	ppm	NA			
Total Hardness (Grains)	Plant Effluent	9.23	10.40	9.71	Grains	NA			
pH	Plant Effluent	7.44	8.17	7.86	SU	6.5-9.3			
Sodium	Plant Effluent	0.90	3.12	1.41	ppm	20			
Sulfate	Plant Effluent	9.00	13.00	11.42	ppm	500			
Iron	Plant Effluent	0.00	0.02	0.01	ppm	0.3			
Total Dissolved Solids	Plant Effluent	141.00	154.70	149.20	ppm	500			
Turbidity (in NTU)	Plant Effluent	0.02	0.13	0.03	NTU	<1.0			
Dissolved Oxygen	Plant Effluent	6.70	8.70	7.93	ppm	NA			
Aluminum	Plant Effluent	0.000	0.004	0.001	ppm	0.20			
Phosphorus	Plant Effluent	0.040	0.190	0.099	ppm				
UV254 (Organics)	Plant Effluent	98.500	100.300	99.467	%T	NA			

***last collected in 2018 per EPA regulations

Water and Your Health

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 water poses a health risk. Some people may be more vulnerable to contaminants in drinking water than the public in general. Immunocompromised 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 from contaminants. These people should seek advice about drinking water from their health care providers.

More information about contaminants and potential health effects, or to receive a copy of the EPA and the US Center for Disease Control guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and microbiological contaminants, can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline at 800-426-4791.

For More Information

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