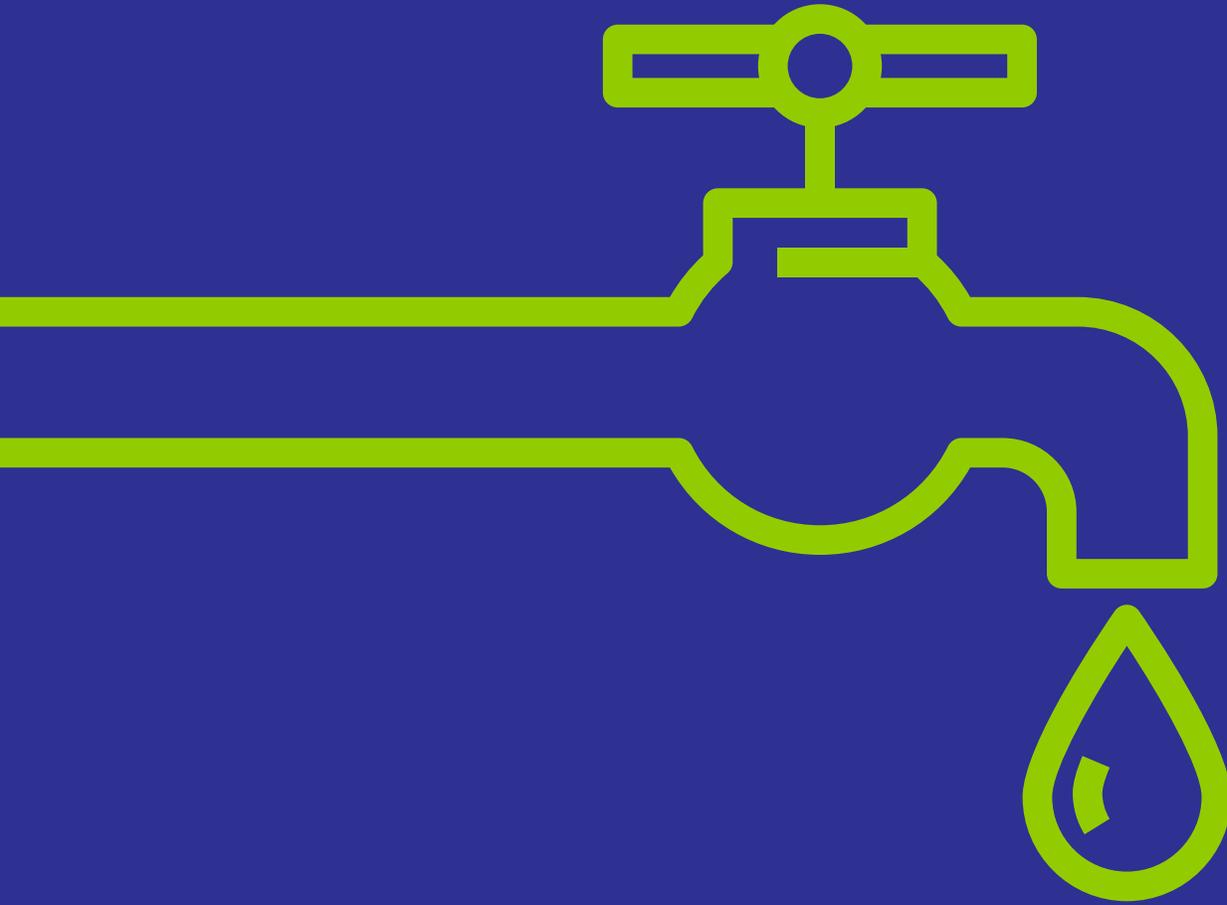




MICHIGAN STATE UNIVERSITY



PUBLISHED JUNE 2023

WATER QUALITY ANNUAL REPORT

INFRASTRUCTURE PLANNING AND FACILITIES

ipf.msu.edu



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Sources of drinking water

MSU's water system uses more than a dozen groundwater wells, each with pumping capacities ranging from 400 to 850 gallons per minute. Source water is closely monitored to ensure a high level of quality.

WHERE DOES MSU WATER COME FROM?

The water source for most of Michigan State University's East Lansing campus is groundwater drawn from the Saginaw aquifer. These underground water-bearing formations are continually replenished with water through the normal hydrologic cycle.

In Michigan and the Great Lakes Basin, we are fortunate to have an abundant supply of fresh water as compared with other areas of the world. The Great Lakes Basin contains 20 percent of the world's fresh water.

MSU's water system uses more than a dozen groundwater wells, each with pumping capacities ranging from 400 to 850 gallons per minute. MSU closely monitors the source water and the treated drinking water to ensure a high level of quality and safety is maintained. Once treated, the water is distributed to campus through a network of water mains, consisting of about 74 miles of pipes that range from 6 to 16 inches in diameter.

1855 Place, Jack Breslin Student Events Center, Brody Neighborhood, University Village and the Kellogg Hotel & Conference Center are supplied water by the East Lansing-Meridian Water and Sewer Authority.

For more information, refer to East Lansing-Meridian Water and Sewer Authority water quality report online:

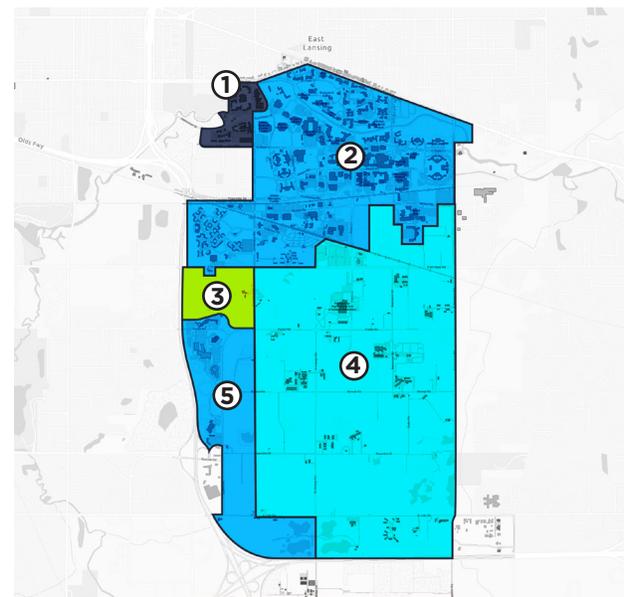
<https://www.cityofeastlansing.com/600/Annual-Water-Quality-Report>

Facilities along the southwest border of campus at Forest and Collins roads, including the Henry Center for Executive Development, are supplied water by the Lansing Board of Water and Light. For more information, refer to the Lansing Board of Water and Light water quality report online:

<https://www.lbwl.com/WaterQualityReport>

MSU East Lansing Water Distribution Systems

- 1 City of East Lansing Distribution System
- 2 Campus Distribution System
- 3 Forest Akers West
- 4 Wells Distribution System
- 5 Board of Water and Light Distribution System



JAN 1 - DEC 31, 2022

This table shows test results for substances that were found in MSU's drinking water. Results are not shown for substances that were tested for but not detected at or above the Maximum Contaminant Level (MCL).

TABLE OF DETECTS CAMPUS DISTRIBUTION SYSTEM

CONSTITUENT/UNITS OF MEASUREMENTS	MCL/AL	MCLG	AMOUNT IN MSU WATER	YEAR ¹	LIKELY SOURCES
Biological Constituents					
Total Coliform (% Positive Samples)	N/A	N/A	Number Detected: 0 Violation: None	2022	Naturally present in the environment
Inorganic					
Copper (ppm) ³ Round 1	AL= 1.30	N/A	.477 Range: ND-1.66 THREE samples exceeded the Action Level ⁴	Jan 1 -June 30, 2022	Corrosion of household plumbing systems; erosion of natural deposits
Lead (ppb) ³ Round 1	AL=15	N/A	2 Range: ND-87 THREE samples exceeded the Action Level ^{4,5}	Jan 1 -June 30, 2022	Lead service lines, corrosion of household plumbing including fittings and fixtures; Erosion of natural deposit
Copper (ppm) ³ Round 2	AL= 1.3	N/A	.050 Range: ND-.10 No samples exceeded the Action Level ⁴	July 1 -Dec 31, 2022	Corrosion of household plumbing systems; erosion of natural deposits
Lead (ppb) ³ Round 2	AL=15	N/A	0 Range: ND-0 No samples exceeded the Action Level ⁴	July 1 -Dec 31, 2022	Lead service lines, corrosion of household plumbing including fittings and fixtures; Erosion of natural deposit
Number of Lead Services ⁷	N/A	N/A	0 Lead Service Leads		N/A
Fluoride (Tap) (ppm)	4	4	0.46 Range: 0.23-0.67	2022	Naturally occurring hydrofluorosilicic acid. Numbers shown avg over 2019. Current recommended level at 0.7 per EPA and EGLE recommended dosage goal
Barium (ppm)	2	2	0.14 Range: 0.12-0.2	2020	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Disinfectants					
Chlorine (ppm) ⁵	4	4	Highest RAA: 1.43 Range: 0.22-1.79	2022	Water additive used to control microbes
Disinfectants By-Products					
Stage 2 Total Trihalomethanes (THMs) (ppb)	80	N/A	LRAA: 17.45 Range: 16.8-18.1	2022	By-product of disinfection
Stage 2 Total Haloacetic Acid (HAA5) (ppb)	60	N/A	LRAA: 13 Range: 13	2022	By-product of disinfection
Radionuclides					
Gross Alpha (pCi/L)	15	0	1.1 RANGE: 0.42- 1.61	2022	Erosion of natural deposits ⁷
Radium (pCi/L)	5	0	2.987 RANGE: 2.29-4.42	2022	Erosion of natural deposits ⁶
Unregulated Substance²					
Sodium (ppm) ²	N/A	N/A	22	2022	Erosion of natural deposits and runoff

¹Water quality regulations allow the monitoring of some substances less often than once a year because their concentrations are not expected to vary significantly from year to year.

²Unregulated substances are those for which the EPA has not established drinking water standards. The purpose of monitoring these substances is to assist the EPA in determining the occurrence of unregulated substances in drinking water and whether future regulation is warranted.

³90 percent of samples were at or below this level.

⁴Sample Fixtures were isolated and changed after receipt of sample results above action level.

⁵Chlorine does not have an associated MCL or MCLG. It is limited by a MRDLG which is defined on page 13. The levels shown are the MRDLG limit.

⁶Some people who drink water containing radium 226 or 228 in excess of the MCL over many years may have an increased risk of getting cancer.

⁷Certain minerals are radioactive and may emit a form of radiation known as alpha radiation. Some people who drink water containing alpha emitters in excess of the MCL over many years may have an increased risk of getting cancer.



Additional parameters

While not mandatory for State of Michigan reporting, we've compiled additional campus water quality parameters of interest for researchers, faculty, staff and students.

NORTH CAMPUS

MSU WATER REPORT			
PARAMETER	UNITS	YOUR WATER RESULTS	
		AVG. LEVEL DETECTED	RANGE
Chloride (ppm)	ppm	30.6	26-45
Hardness (calcium carbonate) ¹ (ppm)	ppm	453.8	419-528
Iron (ppm)	ppm	0.22	0-4.9
Nitrate as N (ppm)	ppm	ND	ND
Nitrite as N (ppm)	ppm	ND	ND
Sodium (ppm) ²	ppm	15	13-22
Sulfate (ppm)	ppm	110.5	82-167

¹May differ at tap due to residence time

UNREGULATED CONTAMINANT MONITORING RULE 4 (UCMR4)²

CONTAMINANT	AVG.	RANGE	MRL	YEAR
Bromochloroacetic Acid (ppb)	1.58	1.40-1.70	0.30	2020
Bromodichloroacetic Acid (ppb)	1.43	1.30-1.50	0.50	2020
Chlorodibromoacetic Acid (ppb)	0.33	0.31-0.35	0.30	2020
Dichloroacetic Acid (ppb)	4.00	3.60-4.30	0.20	2020
Trichloroacetic Acid (ppb)	4.30	3.80-4.60	0.50	2020

²Unregulated substances are those for which the EPA has not established drinking water standards. The purpose of monitoring these substances is to assist the EPA in determining the occurrence of unregulated substances in drinking water and whether future regulation is warranted.

JAN 1 - DEC 31, 2022

This table shows test results for substances that were found in MSU's drinking water. Results are not shown for substances that were tested for but not detected at or above the Maximum Contaminant Level (MCL).

TABLE OF DETECTS WELL DISTRIBUTION SYSTEM

CONSTITUENT/UNITS OF MEASUREMENTS	MCL	MCLG	AMOUNT IN MSU WATER	YEAR ¹	LIKELY SOURCES
Biological Constituents					
Total Coliform (% Positive Samples)	N/A	N/A	Number Detected: 2 Violation: None	2022	Naturally present in the environment.
Inorganic					
Copper (ppm) ³	AL= 1300	N/A	50 Range: ND-100 No samples exceeded the Action Level ⁴	2020	Corrosion of household plumbing systems; erosion of natural deposits
Lead (ppb) ³	AL=15	N/A	0 Range: ND-0 No sample exceeded the Action Level ⁴	2020	Lead service lines, corrosion of household plumbing including fittings and fixtures; Erosion of natural deposit
Number of Lead Services	N/A	N/A	0 Lead Service Leads		N/A
Fluoride (Natural) (ppm)	4	4	0.20 Range: 0 - 0.43	2022	Erosion of natural deposits; water additive which promotes strong teeth; discharge from fertilizer and aluminum factories
Nickel (ppm)	0.1	0.1	0.01 Range: 0-0.01	2020	Erosion of natural deposits
Barium (ppm)	2	2	0.19 Range: 0.09-0.19	2020	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Arsenic (ppb)	10	10	2.43 Range: 0-9.0	2020	Erosion of natural deposits; discharge from wood treatment; discharge from glass production ⁵
CONSTITUENT/UNITS OF MEASUREMENTS	MCL	MCLG	AMOUNT IN MSU WATER	YEAR ¹	LIKELY SOURCES
Radionuclides					
Radium (pCi/L)	5	0	1.915 Range: 1.68 - 2.19	2022	Erosion of natural deposits ⁶
Gross Alpha (pCi/L)	15	0	2.928 Range: -0.537 - 7.21	2022	Erosion of natural deposits ⁷
Unregulated Substance²					
Sodium (ppm) ²	N/A	N/A	13.8 RANGE: 6.4 - 54	2022	Erosion of natural deposits and runoff

¹Water quality regulations allow us to monitor some substances less often than once a year because their concentrations are not expected to vary significantly from year to year.

²Unregulated substances are those for which the EPA has not established drinking water standards. The purpose of monitoring these substances is to assist the EPA in determining the occurrence of unregulated substances in drinking water and whether future regulation is warranted.

³MSU tests lead and copper twice per year as required by MI EGLE.

⁴90th Percentile testing results were at or below the MCL level in accordance with regulations.

⁵While your drinking water meets EPA's standard for arsenic, it does contain low levels of arsenic. EPA's standard balances the current understanding of arsenic's possible health effects against the costs of removing arsenic from drinking water. EPA continues to research the health effects of low levels of arsenic, which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems.

⁶Some people who drink water containing radium 226 or 228 in excess of the MCL over many years may have an increased risk of getting cancer.

⁷Certain minerals are radioactive and may emit a form of radiation known as alpha radiation. Some people who drink water containing alpha emitters in excess of the MCL over many years may have an increased risk of getting cancer.

IMPORTANT WATER QUALITY NOTICES

Vulnerability of sub-populations - 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 from infections.

These people should seek advice about drinking water from their health care providers. EPA/CDC (Centers for Disease Control and Prevention) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the EPA's Safe Drinking Water Hotline (800-426-4791) or at www.epa.gov/safewater.

Contaminants and their presence in water - 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 EPA's Safe Drinking Water Hotline (800-426-4791) or at www.epa.gov/safewater.

Sources of drinking water - The sources of drinking water (both tap water 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 may be present in source water include:

- Microbial Contaminants, such as viruses and bacteria, which 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 runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.
- Pesticides and Herbicides, which may come from a variety of sources such as farming, storm water runoff, residential or business.
- Organic Chemical Contaminants, including synthetic and volatile organics, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff and septic systems.
- Radioactive Contaminants, which can be naturally-occurring, or may be the result of oil and gas production and mining activities.

To ensure that tap water is safe to drink, the EPA prescribes regulations that limit 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.

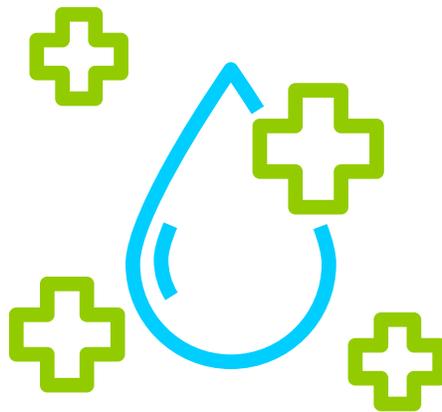
Lead and copper in drinking water - If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. Michigan State University is 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 have a lead service line, galvanized pipes previously connected to lead, or unknown but likely to be lead, it is recommended that you run your water for at least 5 minutes to flush water from both your home plumbing and the lead service line. 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 EPA's Safe Drinking Water Hotline at 1-800-426-4791 or at <http://www.epa.gov/safewater/lead>.

Infants and children who drink water containing lead could experience delays in their physical or mental development. Children could show slight deficits in attention span and learning abilities. Adults who drink water containing lead over many years could develop kidney problems or high blood pressure.

Copper is an essential nutrient, but some people who drink water containing copper in excess of the action level over a relatively short amount of time could experience gastrointestinal distress. Some people who drink water containing copper in excess of the action level over many years could suffer liver or kidney damage. People with Wilson's Disease should consult their personal doctor.





COMMON ABBREVIATIONS

AL (Action Level) - The concentration of a contaminant which, if exceeded, requires a water system to initiate a treatment process or other action.

ALG (Action Level Goal) - The level of a contaminant in drinking water below which there is no known or expected risk to health. ALGs allow for a margin of safety.

AVG (Average) - Regulatory compliance with some MCLs are based on a running annual average of monthly samples.

LRAA (Location Running Annual Average) - The average of sample analytical results from samples taken at a particular monitoring location during the previous four calendar quarters.

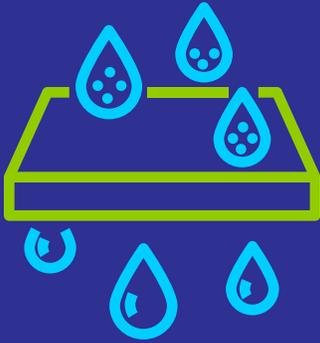
MCL (Maximum Contaminant Level) - The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available technology.

MCLG (Maximum Contaminant Level Goal) - 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.

MRL (Minimum Reporting Level) - The smallest measured concentration of a substance that can be reliably measured and reported by a laboratory using a given analytical method.

MRDL (Maximum Residual Disinfectant Level) - 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.

MRDLG (Maximum Residual Disinfectant Level Goals) - The level of 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.



COMMON ABBREVIATIONS

ND (Non-Detect) - Below analytical method detection limit.

NTU (Nephelometric Turbidity Units) - Unit of measurement for water clarity.

pCi/L (picocuries per liter or nanograms per liter ng/L) - A measure of radioactivity.

ppb (parts per billion or micrograms per liter mcg/L) - One ounce in 7,350,000 gallons of water.

ppm (parts per million or nanograms per liter ng/L) - One ounce in 7,350 gallons of water

ppt (parts per trillion or nanograms per liter ng/L) - One ounce in 7,350,000,000 gallons of water.

RAA (Running Annual Average) - A continuous averaging of four quarters of sampling.

SDWA (Safe Drinking Water Act) - A set of federally mandated regulations that ensures the quality and safety of water provided by public water systems.

TT (Treatment Technique) - A required process intended to reduce the level of contaminants in drinking water.

> - A symbol meaning "more than."

< - A symbol meaning "less than."



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