Interesting Water Facts

There are over 58,900 community water systems in the United States processing more than 34 billion gallons per day.

The average residence in the United States uses 107,000 gallons of water a year.

It takes 62,600 gallons of water to produce one ton of steel.

It takes 101 gallons of water to make one pound of wool or cotton.

Water acts as a natural buffer against extreme or rapid changes in the earth's temperature.

It would take 219 million gallons of water to cover one square mile with one foot of water.

One gallon of water weighs 8.34 pounds.

When the weather is very cold outside, let the cold water drip from the faucet served by exposed pipes. Running water through the pipe - even at a trickle - helps prevent pipes from freezing.

Water is the second most common molecule in the universe. The most common is hydrogen gas, H_2.

There is ice on the poles of the moon, and on the poles of Mars and Mercury.

E. Detected Contaminants

Notes and Definitions for Tables 3-4:

AL (action level): The concentration of a contaminant that, if exceeded, triggers additional treatment or other requirements that a water system must follow.

Lead and Copper: The maximum level values reported for lead and copper represent the 90th percentile of the samples taken. Testing for these metals is only required every three years.

HAA5 (haloacetic acids): These are a group of chemicals that are formed when chlorine or other disinfectants used to control microbial contaminants in drinking water react with naturally occurring organic and inorganic matter in water. The regulated haloacetic acids, known as HAA5, are monochloroacetic, dichloroacetic, trichloroacetic, monobromoacetic, and dibromoacetic acids. The maximum level detected of HAA5 is the highest of the four quarterly running annual averages calculated during the year and is the basis of the MCL for these compounds.

Maximum Level Detected: The highest measurement detected for the contaminant during the year. For total THMs and HAA5 the maximum level detected is the highest of the four quarterly running annual averages during the year.

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.

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.

mg/L (milligrams per liter): Corresponds to one part in one million parts of liquid (parts per million, ppm).

MRDL (maximum residual disinfection level): The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary to control microbial contaminants.

MRDLG (maximum residual disinfectant level goal): The level of a 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 contamination.

N/A (not applicable).

ND (not detected): Laboratory analysis indicates that the constituent is not present.

NTU (nephelometric turbidity unit): A turbidity of approximately 5 NTU is barely noticeable by the average person.

pCi/L (picocuries per liter): A measure of radioactivity in water.

Range: The range of lowest to highest measurements detected for contaminants measured during the year.

THM (trihalomethane): These are a group of chemicals that are formed when chlorine or other disinfectants used to control microbial contaminants in drinking water react with naturally occurring organic and inorganic matter in water. The regulated trihalomethanes are bromodichloromethane, bromoform, chloroform, and dibromochloromethane. These compounds result from the disinfection of water with chlorine. The maximum level detected of THMs is the highest of the four quarterly running annual averages calculated during the year and is the basis of the MCL for these compounds.

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

µg/L (micrograms per liter): Corresponds to one part in one billion parts of liquid (parts per billion, ppb).

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E. Detected Contaminants (cont.)

Table 3a. Contaminant	Units	Vio-lation Y/N	Date of Sample	Maximum Level Detected (Range)	Regulatory Limit	MCLG	Likely Source of Contamination
Microbiological contaminants							
Turbidity	NTU	No	2019	0.061	TT=<1 NTU	N/A	Soil runoff.
Turbidity samples	% below MCL	No	daily	100% <0.3NTU	TT=95% of samples <0.3NTU	N/A	Soil runoff.
Disinfection By-Products							
Total THMs Site 1 Site 2 Site 3 Site 4	µg/l	No	2019	 64.0 (62.4-66.1) 48.6 (43.9-55.0) 54.4 (50.6-60.0) 54.2 (49.1-60.7)	MCL = 80 Running Annual Average	N/A	By-product of drinking water chlorination.
Total HAA5 Site 1 Site 2 Site 3 Site 4	µg/l	No	2019	 30.0 (24.3-38.0) 30.0 (27.6-35.0) 30.0 (25.4-37.0) 28.0 (23.0-35.0)	MCL = 60 Running Annual Average	N/A	By-product of drinking water chlorination.
Chlorine Residual	mg/l	No	2019	0.9 (0.5-1.1)	MRDL=4	N/A	Due to drinking water chlorina-tion.
Inorganics							
Barium	mg/l	No	12/10/19	0.023	MCL=2	2	Drilling wastes; discharge from metal refineries; erosion of natural deposits.
Chromium	mg/l	No	12/10/19	0.0012	MCL=0.10	N/A	Discharge from steel and pulp mills; erosion of natural deposits.
Copper	mg/l	No	2017	0.72 (0.007-10.0*)	AL=1.3	1.3	Household plumbing corrosion; erosion of natural deposits; wood preservatives.
Lead	µg/l	No	2017	2.8 (ND-150)	AL=15	0	Household plumbing corrosion; erosion of natural deposits.
Nickel	mg/l	No	12/10/19	0.00096	N/A	N/A	Discharge from steel and pulp mills, erosion of natural deposits.
Nitrate	mg/l	No	12/10/19	1.0	MCL=10	10	Fertilizer runoff; septic tank leaching; sewage; erosion of natu-ral deposits.
Sodium	mg/l	No	12/10/19	33	See Water Quality, Section C	N/A	Naturally occurring; road salt; animal waste; water softeners; water treatment chemicals.
Radioactive							
Radium-228	pCi/l	No	10/31/17	.907	MCL=5	0	Erosion of natural deposits.

E. Detected Contaminants (cont.)

Table 3b.
Detected Unregulated Contaminants (from 2013 UCMR3 list on Page 8)

Contaminant	Units	**Violation Y/N**	Date of Sample	**Maximum Level Detected (Range)**	Regulatory Limit	MCLG	Likely Source of Contamination
Chlorate	µg/L	No	2013	277 avg	Unregulated	N/A	Chlorate ion is a known byproduct of the drinking water disinfection process, forming when sodium hypochlorite or chlorine dioxide are used in the disinfection process.
Hexavalent Chromium	µg/L	No	2013	0.017 avg	Unregulated	N/A	Hexavalent chromium can enter waterways through the erosion of natural deposits or from industrial discharges.
Chromium, Total	µg/l	No	2013	0.099 avg	Unregulated	N/A	Chromium is a metallic element found in rocks, soils, plants, and animals. It is used in steel making, metal plating, leather tanning, corrosion inhibitors, paints, dyes, and wood preservatives
Strontium, Total	µg/L	No	2013	74.4	Unregulated	N/A	Strontium occurs nearly everywhere in small amounts. Air, dust, soil, foods and drinking water all contain traces of strontium. Ingestion of small amounts of strontium is not harmful. However, high levels of strontium can occur in water drawn from bedrock aquifers that are rich in strontium minerals.

E. Detected Contaminants (cont.)

Table 3c.
Detected Unregulated Contaminants , UCMR4

Contaminant	Units	**Vio-lation Y/N**	Date of Sample	**Maximum Level Detected (Range)**	Regulatory Limit	MCLG	Likely Source of Contamination
Total Haloacetic Acids (HAA5)	µg/L	No	2019	23.7 avg	Unregulated	N/A	By-product of the drinking water disinfection process
Total Haloacetic Acids (HAA6Br)	µg/L	No	2019	3.76 avg	Unregulated	N/A	By-product of the drinking water disinfection process
Total Haloacetic Acids (HAA9)	µg/l	No	2019	27.5 avg	Unregulated	N/A	By-product of the drinking water disinfection process
Dichloroacetic Acid [2C]	µg/L	No	2019	9.16 avg	Unregulated	N/A	By-product of the drinking water disinfection process
Trichloroacetic Acid	µg/L	No	2019	14.6 avg	Unregulated	N/A	By-product of the drinking water disinfection process
Bromochloroacetic Acid [2C]	µg/L	No	2019	1.87 avg	Unregulated	N/A	By-product of the drinking water disinfection process
Bromodichloroacetic Acid	µg/L	No	2019	1.81	Unregulated	N/A	By-product of the drinking water disinfection process
Chlorodibromoacetic Acid	µg/L	No	2019	0.31	Unregulated	N/A	By-product of the drinking water disinfection process
Manganese	µg/L	No	2019	9.25	Secondary Standard	50	Runoff of natural sediment

UCMR4 parameters not detected: Monocholoracetic Acid, Monobromoacetic Acid, Dibromoacetic Acid, Tribromoacetic Acid, Germanium, BHA, o-Toluidine, Quinoline, 1-Butanol, 2-Methoxyethanol, 2-Propen-1-ol, alpha-BHC (alpha-Hexachlorocyclohexane), Chloropyrifos, Dimethipin, Ethoprop, Oxyfluorfen, Profenofos, Tebuconazole, Permethrin (total), Tribufos

As part of the **UCMR4,** testing was also performed for Cyanotoxins in 2018, but none were detected.

G. Major Modifications Completed 2019

- Particle counters installed in the Water Filtration Plant to further optimize treatment.
- Conductivity meters installed in the Water Filtration Plant to monitor effect of road salts in Fall Creek.
- uV-254 analyzers that had been installed in the Water Filtration Plant further optimized removal of organics from the treatment process and a related disinfection by-product level prediction model was developed and implemented.
- Additional concrete inspections completed at the Water Filtration Plant. New concrete access structures constructed on the sedimentation basins.
- Computer network improvements made to increase security.
- New technologies piloted for the Engineering School's AguaClara Program.
- Miscellaneous improvement projects completed throughout the water distribution system and treatment process.

H. Future Projects and Capital Improvements 2020

- New sluice gates will be installed on the sedimentation basins.
- Miscellaneous improvement projects will be constructed throughout the water distribution system including implementation of a valve exercising program.
- Distribution system improvements needed for the North Campus Residential Expansion will continue to be implemented.
- Concrete repairs to basins and tanks at the Water Filtration Plant will be completed.
- Additional improvements to the equipment used for the disinfection process at the Water Filtration Plant will be designed and installed.
- Piloting new technologies for the Engineering School's AguaClara Program will continue.
- Additional computer network security improvements and hardware will be upgraded.

I. Water Conservation

Ground water levels remained normal and creek and stream flows throughout the region remained slightly above normal in 2019. Nevertheless, water conservation is very important to protecting our natural resource. You, too, can play a role in conserving water at work and at home by becoming conscious of the amount of water you are using and by looking for ways to use less whenever you can. It is not hard to conserve water. The following are some ideas that you can apply directly in your own facility or home:

- Use your water meter to detect hidden leaks. Turn off all taps and water using appliances, then record the meter reading and check the meter after 15 minutes. If it registers usage, you have a leak.
- The bathroom accounts for 75 percent of the water used inside the home.
- Put 10 drops of food coloring in your toilet tank. If the color shows up in the bowl without flushing, you have a leak to repair.
- It is common to lose up to 100 gallons a day from a toilet leak. Fix it, and you save more than 30,000 gallons a year.
- If every American home installed low-flow faucet aerators, the United States would save 250 million gallons of water a day.
- Do not hose down your driveway or sidewalk. Use a broom to clean leaves and other debris from these areas. Using a hose to clean a driveway can waste hundreds of gallons of water.
- Water your lawn only when it needs it. If you step on the grass and it springs back up when you move, it doesn't need water. If it stays flat, it does.
- Fix leaks as soon as they are found. A dripping faucet with a 1/16 inch stream wastes 100 gallons of water per day. Please contact your facility manager if you notice leaking water.
- Saving water can lower your power bills by reducing your demand for hot or pumped water. These few simple steps willpreserve the resource for future generations and also save up to 30% on your bill.

J. Security

Generally, security threats to the local water systems have consisted of primarily minor vandalism and property damage. However, our security efforts focus to a high degree on the much less likely, but more serious, threat of intentional contamination of the water supply and cyber attacks. We have performed security assessments of the entire system and updated our Emergency Response Plans and Vulnerability Assessments to cover the possibility of terrorism and attacks, including cyber attacks. Weaknesses in procedures have been corrected and improvements to increase the security of the infrastructure have been undertaken. Local police are aware of the security needs of the water system and have maintained increased patrolling of our facilities. Your awareness and reporting of suspicious activity throughout the system is appreciated.

Cornell Water Links

[Drinking Water Home]

[Lead Information]

[Past Water Quality Reports]

[Distribution System]

K. Source Water Protection

The New York State Health Department is in the process of developing a Source Water Assessment Report for select surface drinking water sources in the state. When a report for our source is completed, we will review and provide a summary. If the report becomes available in 2020, a summary will be posted on our website and provided in next year's Annual Drinking Water Quality Report.

Work has begun to revise the Fall Creek Watershed Rules and Regulations, however a broader effort to revise/develop Rules and Regulations for the entire Cayuga Lake Basin are being explored in conjunction with the Tompkins County Water Resources Council and other local water purveyors.

We hope you and your family are staying safe and healthy at this difficult time. We want to assure you we are working hard to provide safe and reliable drinking water to the Cornell campus and surrounding community. During this time our staff is still conducting essential work, including collecting routine monitoring samples, monitoring the treatment, inspecting our facilities, reading meters, conducting important routine maintenance, and emergency repairs. Our staff is vital to keeping the water system operational. Please help keep them safe by following workplace guidelines!

Thank you for your continued cooperation!

Cornell University Water

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