CORVALLIS
ENHANCING COMMUNITY LIVABILITY

2021 WATER QUALITY REPORT

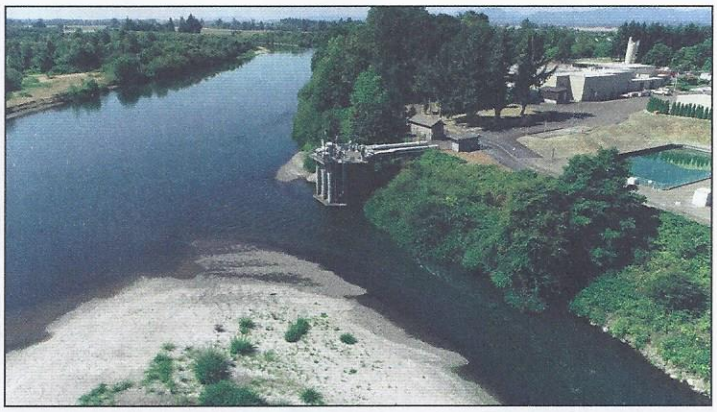
Important Information About the Water YOU Drink

Monitoring Data from 2020

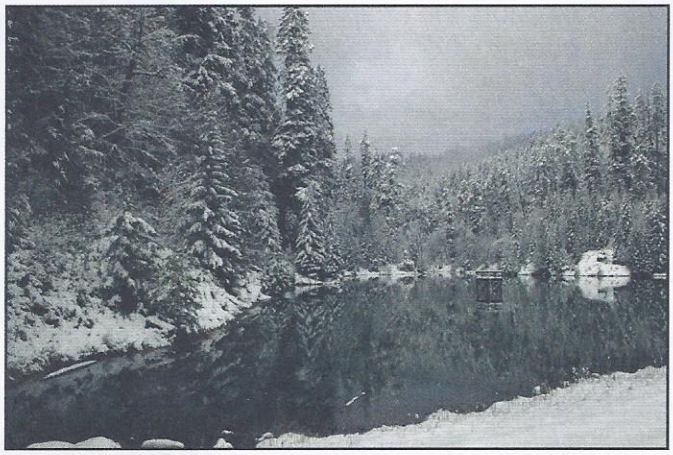
The Corvallis Water System consistently provides a reliable supply of high quality tap water that surpasses all state and federal drinking water quality requirements. The City of Corvallis strives to provide you with the best water possible. This report provides results of water quality monitoring for 2020.

Water Sources

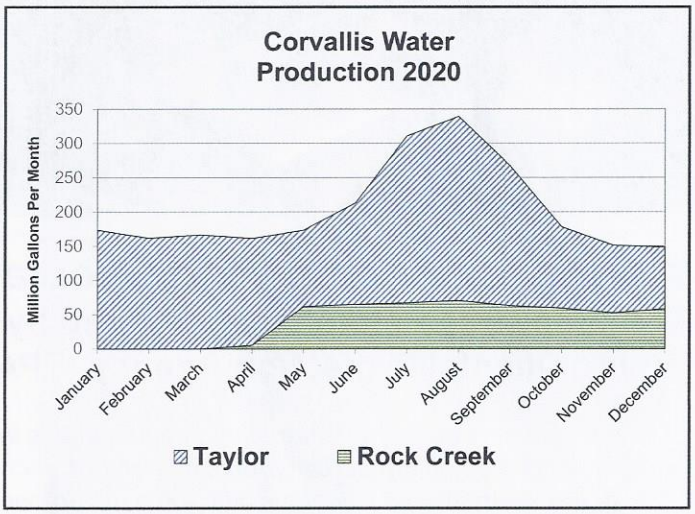
Corvallis drinking water comes from two surface water sources. Three creeks in the Rock Creek Watershed on the east flank of Marys Peak (north and south forks of Rock Creek as well as Griffith Creek) supply water for the Rock Creek Water Treatment Plant. The Willamette River supplies the Taylor Water Treatment Plant located in south Corvallis near Willamette Park.



Willamette River intake and H. D. Taylor Water Treatment Plant



A winter day at the North Fork Reservoir which provides source water for the Rock Creek Water Treatment Plant



Note: The Rock Creek Plant was offline from January through March for maintenance

Water Production & Treatment

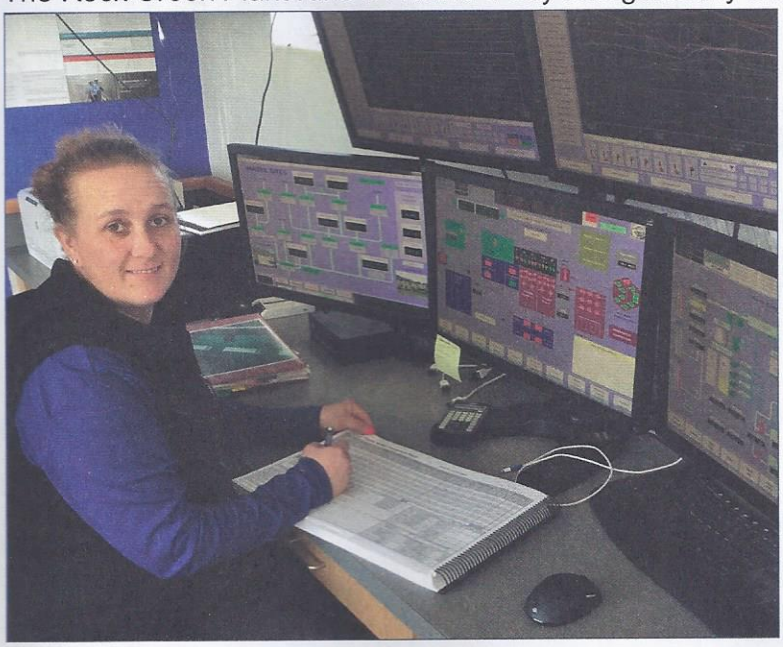
The City of Corvallis operates two water treatment plants -- Taylor and Rock Creek. Plant operations ensure that our water supply is safe. Plant staff monitor all of the treatment systems to assure all are working properly. The treatment plant operators are certified by the state to assure their technical competence.

OPERATORS ADJUST THE TREATMENT PROCESS TO OBTAIN THE HIGHEST QUALITY DRINKING WATER

The two plants treated approximately 2.45 billion gallons of water in 2020 -- about 30 million gallons less than 2019, and about 60 million gallons less than 2018. Even though the Rock Creek Plant was down part of the year, it supplied 21% of Corvallis drinking water (about 501 million gallons), and the Taylor Plant supplied the remaining 79% (about 1.9 billion gallons).

At peak production, the Rock Creek Treatment Plant can supply approximately 3 million gallons per day (MGD). The Rock Creek Plant was offline for maintenance from January through March. The Taylor Treatment Plant can supply 21 MGD.

The Rock Creek Plant runs 24 hours a day and generally shuts down one week per year to complete major maintenance activities such as cleaning the sedimentation basins.



Treatment Plant Operator Dawna Laetzsch monitors the treatment process to assure quality.

The Taylor Plant is a peaking plant and runs long enough each day to meet the water demand that Rock Creek can not supply.

Both the Rock Creek and the Taylor Plants are known as conventional water treatment plants. Water from the Rock Creek Watershed and the Willamette River undergoes the same treatment process.

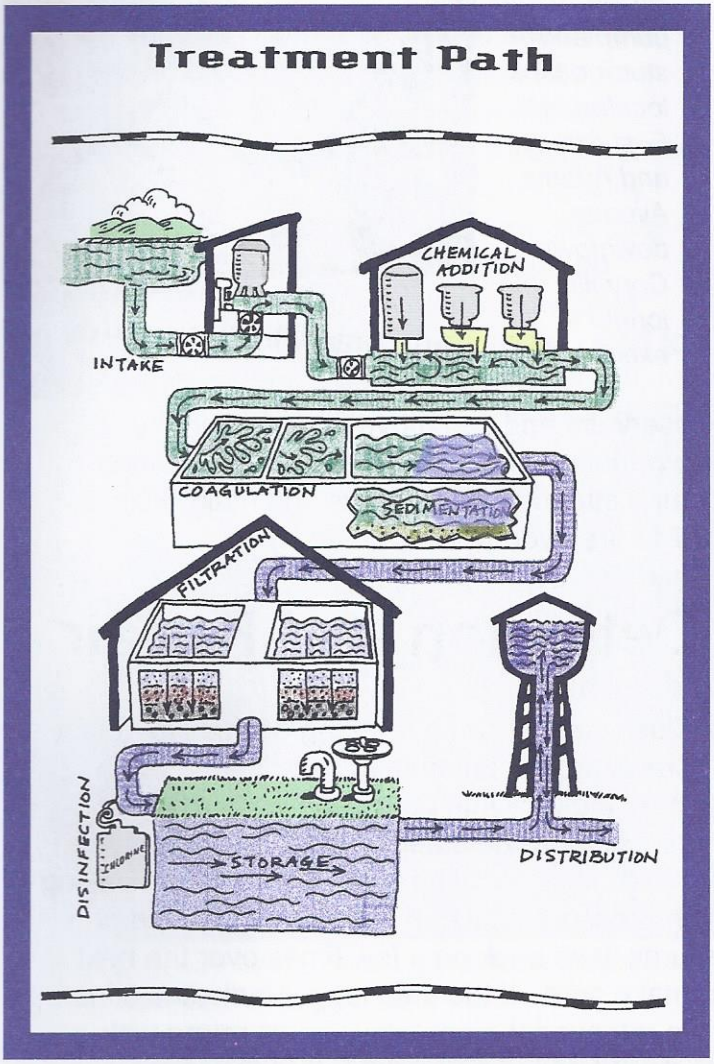
A Note for People With Special Health Concerns

The following statement is required by the United States Environmental Protection Agency (EPA):

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. Environmental Protection Agency (EPA) / Centers for Disease Control and Prevention (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

Conventional Treatment

First, aluminum sulfate (alum) and soda ash are added to untreated (raw) water. Alum makes impurities clump together (coagulate) into larger particles called floc, and soda ash adjusts the pH to the ideal range for treatment. The water is stirred to encourage floc particles to grow.



Water then flows to sedimentation basins. Floc is heavier than water, so it settles to the bottom (flocculates). Settled floc is removed from the basins as a sludge and disposed.

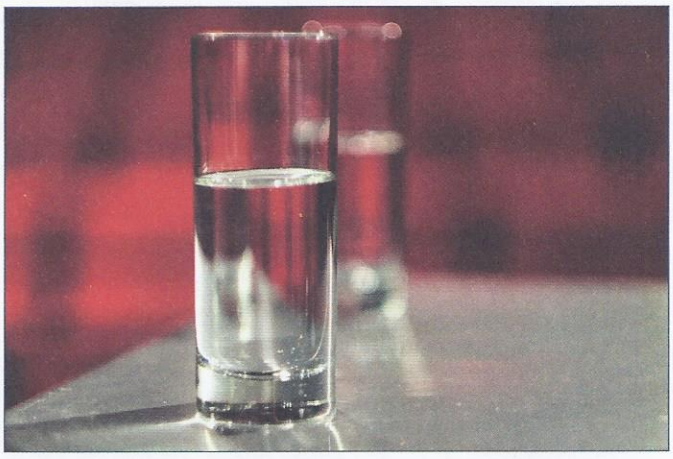
In the next treatment step, called filtration, clarified water passes through approximately three feet of layered media including carbon, sand, and garnet. The filters physically trap any remaining small particles in the water, and the carbon adsorbs organic and inorganic contaminants that might be present.

THE WATER TREATMENT PROCESS INCLUDES COAGULATION, FLOCCULATION, SEDIMENTATION, FILTRATION, AND DISINFECTION.

The Rock Creek Plant uses anthracite as a carbon source. The Taylor Plant uses granular activated carbon (GAC), which is more effective at removing any contaminants that might be present.

Chlorination is the final step; it disinfects the water, and the residual keeps water safe in the distribution system as it travels to your tap. Addition of fluoride helps prevent tooth decay. If needed, additional soda ash adjusts pH to control corrosion in the distribution system pipes. This finished water is pumped into the distribution system.

Many indicators of water quality are monitored continuously during water treatment. Much of the monitoring is automated and computer-controlled. Information on pH, hardness, chlorine content, and turbidity allows operators to optimize the treatment processes to obtain the highest quality finished water for distribution to your tap.



Clean, clear, delicious drinking water

Water Distribution & Storage

Finished water is delivered through about 258 miles of water pipes, 7,220 control valves and stored in eight covered reservoirs. The reservoirs and pipes are interconnected with both water sources, so customers generally receive a blend of water from both water treatment plants.

The plants produce water at a fairly constant rate, but demand fluctuates. Reservoirs store up to 21 million gallons to ensure there is enough water available for everyone's needs and for fire protection. Ten pumping stations move water to the higher elevation storage where it flows by gravity to about 17,195 homes and businesses. Pumps provide water pressure to a few areas not served by gravity flow from reservoirs.

Historic water pump and storage tank located at First Street and Adams Avenue, downtown Corvallis (no longer in existence)

Water system operators monitor water levels in the reservoirs and can move water within the system and among the reservoirs to ensure the water remains fresh. Each reservoir is cleaned routinely to remove sediments and checked for structural integrity. Firefighters and maintenance crews flush water lines by periodically opening the 2,242 fire hydrants for a brief time.

Leak Detection and Repair

City staff use sophisticated listening devices to detect leaks. Crews deploy automated microphones with data loggers that activate during the early morning hours when little water is being used. The automated devices listen for the distinctive sound of water leaking from high-pressure pipes. If a leak is suspected, the device turns itself back on a few times over the next hour to make sure. If the data logger indicates a leak when it is retrieved the next day, crews return with another device called a correlator that can pinpoint where the leak likely is. Often a detected leak is a fire hydrant that was not closed completely. Other leaks require excavation and pipe repair. Once located, if repair is needed, crews dig down to the main and repair the leak. By proactively searching for smaller leaks, large, catastrophic failures can be reduced or avoided. Small leaks don't necessarily make it to the surface, and using leak detection technology reduces the cost of leak repair. This also saves customers the inconvenience of a water service disruption.

Save water and money;
identify and repair leaks at your home and office!

Water Quality & Testing

Drinking water is perishable. That is why the City of Corvallis takes steps to prevent water quality degradation from the time the water leaves the treatment plant until it gets to your tap.

Water Quality Analyst Gloria Zeller collects a sample from the distribution system.

Laboratory professionals take routine samples from sampling stations strategically located in the distribution system. Routine sampling lets the staff confirm that our water is free from harmful bacteria and that there is sufficient chlorine for continued disinfection throughout the system. Automated, continuous water quality monitoring stations also take real-time samples from the distribution system throughout the entire day, every day, all year long. The data are continuously relayed to water system staff to assist them in optimizing water quality.

Distribution system operator Kyle Krake flushes water lines to maintain water quality

Technicians routinely flush water mains to remove rust and sediment that might be trapped in the distribution system. Flushing also allows crews to make sure all the valves and fire hydrants are operating as they should. To help protect the environment, the chlorine is removed from this water before it is discharged into the storm drain system. The chlorine in the water could be harmful to aquatic life, and most storm drains discharge directly into Corvallis' urban streams.

Reporting Violations in 2020

The Corvallis Water System received five violations from the Oregon Health Authority in 2020. No health risks or water quality issues were associated with these violations, and the Corvallis Water System was quickly returned to compliance. All violations were from two instances where the City was late filing reports. The City completed all required testing on time; however, there was a delay sending the reports within the specified time frame.

Specifically, a routine coliform report for the month of June was delayed, and the Surface Water Treatment Rule and the Corrosion Control reports for the month of October were delayed. The City submitted the reports and was returned to compliance

Primary Standards

(see glossary of abbreviations and definitions on page 11)

Results from different sites/times are averaged; range may be higher than maximum reported value

Treatment Plants

Taylor Treatment Plant data are not shaded. | Rock Creek Treatment Plant data are shaded

Parameter	MCL	MCLG	Maximum Reported	Range	Likely Source	Meets Regs?
Turbidity [1]	TT = 95% of samples < 0.3 NTU	N/A	0.03 NTU	0.01 - 0.05 NTU	Soil runoff and stream sediment	Yes
			0.04 NTU	0.02 - 0.05 NTU		
Fluoride [2]	4 mg/L	4 mg/L	0.81 mg/L	0.00 - 0.92 mg/L	Added to promote dental health	Yes
			0.75 mg/L	0.00- 1.03 mg/L		
TOC, Raw Water	TT = 4 mg/L	N/A	1.31 mg/L	1.03 - 2.10 mg/L	Naturally occurring carbon, often from leaves or other organics	Yes
			1.23 mg/L	0.60 - 2.29 mg/L		
TOC, Finished Water	TT = 2 mg/L	N/A	0.60 mg/L	0.37 - 0.87 mg/L		Yes
			0.70 mg/L	0.39 - 0.95 mg/L		

1. Turbidity has no health effects but can interfere with disinfection and provide a medium for microbial growth. "TT" means a treatment technique is required if the limit is exceeded.

2. Fluoride is added to City drinking water and has been since 1952. Known for its cavity-fighting benefits, fluoride is of special interest to parents with young children. See article on page 6.

Routine water quality testing and continuous water quality monitoring ensure a safe water supply for Corvallis.

Detected Levels of Secondary Standards

Monitoring From Treatment Plants

Parameter	MCL (non-enforceable)	Taylor Plant Reported	Rock Creek Plant Reported
Chloride	250 mg/L	3.2 mg/L	4.0 mg/L
Sulfate	250 mg/L	11.4 mg/L	8.0 mg/L
Alkalinity	n/a	35.3 mg/L	48.7 mg/L
Color	15 Color Units	5.0 Color Units	0.0 Color Units
Sulfate	250 mg/L	11.4 mg/L	8.0 mg/L
Hardness	250 mg/L	21.7 mg/L	44.4 mg/L
pH	6.5 - 8.5 pH units	7.3 - 7.5 pH units	7.2 - 7.7 pH units
MBAS (foaming agents) [3]	500 µg/L	53 µg/L	65 µg/L
Calcium	n/a	5.5 mg/L	11.8 mg/L
Sodium	n/a	14.0 mg/L	11.3 mg/L
Total Dissolved Solids	n/a	58.0 mg/L	81.0 mg/L

3. MBAS stands for Methylene Blue Active Substances. They are anionic surfactants and are used as foaming agents or detergents. MBAS can make water appear frothy or cloudy and give it a bitter taste when present in levels above the Secondary MCL.

Primary Standards

(see glossary of abbreviations and definitions on page 11)

Results from different sites/times are averaged; range may be higher than maximum reported value

Distribution System						
Parameter	**MCL**	**MCLG**	**Maximum Reported**	**Range**	**Likely Source**	**Meets Regs?**
Total Trihalo-methanes [4]	80 µg/L	0 µg/L	27.9 µg/L	13.8 - 33.8 µg/L	By-products of disinfection process	Yes
Haloacetic Acids [4]	60 µg/L	N/A	20.4 µg/L	7.6 - 31.8 µg/L	By-products of disinfection process	Yes
Copper [5]	Action level: 90% of homes tested have less than 1.3 mg/L	1.3 mg/L	90% of homes tested had less than 0.131 mg/L	No homes tested were above 1.3 mg/L	Corrosion of household plumbing	Yes
Lead [5]	Action level: 90% of homes tested have less than 15 µg/L	0 µg/L	90% of homes tested had less than 1.4 µg/L	No homes tested were above 15 µg/L	Corrosion of household plumbing	Yes

4. This test is performed on a quarterly basis at four locations in the distribution system most likely to have elevated levels (places in the distribution system where water is likely to have remained in the pipes longer).

5. This test is performed every three years (most recently in 2020) in homes most likely to test positive for lead and/or copper; if levels reach the action level in 10% of homes sampled, water providers must begin extra treatment. **Lead and copper have never been detected in the City's raw water sources.** During testing in 2020, 77% of homes tested had no lead detected. More information about lead and copper is on page 14.

Microbiological Testing of Corvallis Drinking Water

The City of Corvallis tests for microbiological contamination in the water distribution system and also in the raw water sources that supply the water treatment plants. During 2020, City staff collected and tested 781 routine samples from the distribution system. One sample tested positive for total coliform; however, repeat sampling did not confirm the presence of coliforms. No *E. coli* were found.

The following substances were tested for and ***not detected*** in Corvallis drinking water:

Synthetic Organic Chemicals

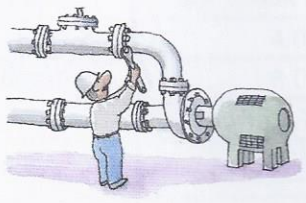
2,4-D
2,4,5-TP (Silvex)
Bis-(2-ethylhexyl) adipate
Alachlor (Lasso)
Atrazine
Benzo-(a)-pyrene
BHC-gamma Lindane
Carbofuran
Chlordane
Dalapon
Dibromochlorpropane (DBCP)
Dinoseb
Dioxin [7]
Diquat dibromide
Endothall
Endrin
Ethylene dibromide (EDB)
Glyphosate
Hepthachlor epoxide
Heptachlor
Hexachlorobenzene
Hexachlorocyclopentadiene
Methoxychlor
Pentachlorophenol
Bis-(2-ethylhexyl) phthalate
Picloram
Polychloronated biphenyls (PCBs)
Simazine
Toxaphene
Vydate (Oxamyl)
3-Hydroxycarbofuran
Aldicarb
Aldicarb sulfoxide
Aldicarb sulfone
Aldrin
Butachlor
Carbaryl
Dicamba
Dieldrin
Methomyl
Metolachlor
Metribuzin
Propachlor

Inorganic Chemicals

Aluminum
Antimony
Arsenic
Asbestos [8]
Barium
Beryllium
Cadmium
Chromium
Copper
Cyanide
Iron
Mercury
Nickel
Nitrate
Nitrite
Selenium
Silver
Thallium
Zinc

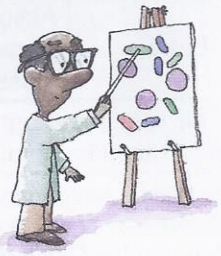
Volatile Organic Chemicals

1,1-Dichloroethylene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
1,2-Dichloroethane
1,2-Dichloropropane
1,2,4-Trichlorobenzene
1,2-Dichlorobenzene
1,4-Dichlorobenzene
Benzene
Carbon Tetrachloride
Monochlorobenzene
Cis-1,2-Dichloroethylene
Ethylbenzene
Methylene chloride
Methyl-tert-butyl-ether
Styrene
Tetrachloroethylene
Toluene
Total Xylenes
Trans-1,2-Dichloroethylene
Trichloroethylene
Vinyl chloride
Dibromochloromethane
Bromoform
Chloromethane
Bromomethane
Chloroethane
2,2 Dichloropropane
1,1-Dichloropropene
1,1-Dichloroethane
Dibromomethane
Trans-1,3-Dichloropropene
1,3-Dichloropropane
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
1,2,3-Trichloropropane
Bromobenzene
2-Chlorotoluene
4-Chlorotoluene
1,3-Dichlorobenzene



Microbiological and Radiological

Total coliform bacteria



E. coli bacteria
Alpha particles [9]
Radium 226 [9]
Radium 228 [9]
Combined Uranium [9]

7. Because there are no bleached pulp mills upstream from the Rock Creek Plant, the City of Corvallis was granted a waiver for dioxin testing from that plant. Water from the Taylor Plant is tested for compliance every three years. The last required sample was in 2020. In 2000, the City of Corvallis began testing voluntarily for dioxin twice every year, and dioxin has not been detected in any samples. The last sample was taken in August 2020.
8. A waiver has been granted by the Oregon OHA-DWP for the testing of asbestos. The waiver was based on no risk of asbestos in the source water and the absence of asbestos pipe in the City's water distribution system.
9. Radionuclides are tested once every six years. The last sample was taken in August, 2020.

Glossary

Action Level	The concentration of a contaminant which, if exceeded, triggers a treatment technique or other requirement which a water system must follow.
Crypto-sporidium	A tiny organism commonly found in lakes, rivers, and streams that can cause the disease cryptosporidiosis. The disease can be transmitted by swallowing contaminated water or food, by person-to-person contact, or through other exposure routes. Symptoms include diarrhea, nausea, and stomach cramps.
E. coli bacteria	*Escherichia coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. See also ***Total Coliform***.
Giardia	*Giardia lamblia* is a tiny organism frequently found in lakes, rivers, and streams. Swallowing this organism in contaminated food or water, exposure from person-to-person contact, or other exposure routes may cause giardiasis. If not treated, *Giardia* can cause diarrhea, fatigue, and cramps.
Hardness	An indication of the amount of dissolved minerals in water. There are different scales of hardness, but the Environmental Protection Agency (EPA) uses the following scale: less than 75 mg/L = soft; 75-150 mg/L = moderately hard; 150-300 mg/L = hard; over 300 mg/L = very hard. The Oregon Department of Human Services Drinking Water Program requires that hardness not exceed 240 mg/L. Corvallis tap water is considered soft at 20 to 50 mg/L.
Inorganic Chemicals	Examples include metals, minerals, and salts.
MCL	***Maximum Contaminant Level*** 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. MCLs are set at stringent levels. A person would have to drink 2 liters of water every day at the MCL level for a lifetime to have a one-in-a-million chance of having the described health effect.
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.
NTU	***Nephelometric Turbidity Unit*** Unit of measure used to describe water clarity. The smaller the number, the clearer the water. See ***Turbidity.***
pCi/L	***Picocuries per liter*** a measure of radioactivity. One curie is the radioactivity of one gram of radium. There are a trillion (1,000,000,000,000) picocuries in one curie.
pH	Indicates whether a liquid is acidic or alkaline (basic). Acids have pH values below 7, and bases have pH values above 7. A pH value of 7.0 is considered neutral. Strong bases, like drain cleaners, are called *caustics*.
µg/L	***Micrograms per liter*** One µg/L is roughly equivalent to 1 part per billion. A one µg/L solution would be about one third of a teaspoon of sugar diluted in the indoor swimming pool at Osborn Aquatic Center. One part per billion is also equal to one second in about 32 years.
mg/L	***Milligrams per liter*** One mg/L is roughly equivalent to 1 part per million. A one mg/L solution would be about one teaspoon of sugar divided equally among about two dozen 55-gallon drums of water. One part per million is equivalent to one penny in ten thousand dollars.
Primary Standards	Legally enforceable standards issued by the U.S. Environmental Protection Agency. Primary standards limit the levels of specific contaminants that are allowed to be present in public drinking water supplies. Water that meets primary standards is considered safe to drink.
Secondary Standards	Non-enforceable guidelines regarding contaminants that may cause cosmetic effects such as tooth discoloration or aesthetic effects such as taste, color, or odor in drinking water.
SOC	***Synthetic Organic Chemicals*** Examples include herbicide and insecticide.
TOC	***Total Organic Carbon*** Carbon is a precursor to disinfection by-products.
Total Coliform	A group of bacteria that are naturally present in the environment and are used as an indicator that other potentially harmful bacteria may be present. See also ***E. coli***
Treatment Technique	A required process intended to reduce the level of a contaminant in drinking water. A treatment technique may be required by the US EPA or the Oregon Department of Human Services.
Turbidity	A measure of how cloudy water is – the smaller the number, the clearer the water. Turbidity has no health effects, however, it can interfere with disinfection and provide a medium for microbial growth. See ***NTU***.
Unregulated Contaminants	Contaminants that water providers are not required to test for. However, Corvallis tests for many unregulated contaminants, and to provide the most complete information for our customers, the City of Corvallis reports the incidence of these contaminants in the annual water quality report.
VOC	***Volatile Organic Chemicals*** Examples include petroleum-based chemicals, industrial by-products, and dry-cleaning solvents.