



2023 Annual Water Quality Report

Drinking Water Quality Data from 2022

CITY OF *Salem*
AT YOUR SERVICE
Public Works Department
APWA ACCREDITED AGENCY



To our valued customers,

I am pleased to present the 2023 Annual Water Quality Report. The report contains important information about your drinking water, including where it comes from, how it's treated, and what, if any, contaminants it may contain. The Environmental Protection Agency (EPA) mandates many sections of the report; however, the City of Salem prides itself in providing a thorough report that is available to our customers.

In 2022, the City of Salem drinking water met or surpassed every public health requirement—more than 120 drinking water standards—set by the Oregon Health Authority and the EPA.

Recent investments in Salem's drinking water included the construction of a state-of-the-art ozone treatment system located at the Geren Island Water Treatment Facility and a new Aquifer Storage and Recovery Well Facility located in Woodmansee Park in South Salem. These new facilities provide additional treatment capabilities.

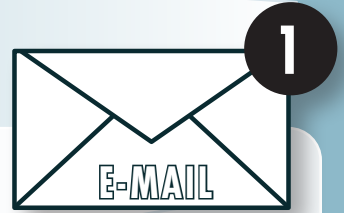
Water is the most valuable natural resource in the world today, and the City of Salem is fortunate to have a high-quality, reliable, and abundant source. It is easy to take this precious resource for granted until you learn about other areas of the United States and the world that are experiencing challenges with their water supply. It takes a robust treatment process, operations and maintenance of hundreds of miles of underground water mains, pump stations, reservoirs, and dedicated staff to deliver water to each residential customer for less than a penny a gallon.

As always, the City of Salem strives to deliver high-quality water to your tap, as well as provide prompt service to our valued customers. For more information about Salem's drinking water, please visit www.cityofsalem.net.

Respectfully,
Dwayne Barnes



Utility Operations Manager
City of Salem Public Works Department
503-588-6311



Annual Water Quality Report Continues to Be Delivered Electronically

The City of Salem continues to provide the Annual Water Quality Report via electronic delivery to Salem water customers. Electronic delivery allows for faster access and significantly reduces printing and mailing costs.

Printed copies are available at the Salem Civic Center or you can request one be mailed to you by calling (503) 588-6311.



The average person uses around 90 gallons of water per day, and around 32,850 gallons a year.

Important Information Regarding Drinking Water

Drinking water, including bottled water, may reasonably be expected to contain at least a small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses as a health risk. More information about contaminants and potential health effects can be obtained by calling the U.S. Environmental Protection Agency (EPA) Safe Drinking Water Hotline at 1-800-426-4791. You can also submit questions on the EPA Safe Drinking Water Act Hotline webpage.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised persons such as a person with cancer undergoing chemotherapy, a person who has undergone an organ transplant, 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.

The EPA and Centers for Disease Control guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline at 1-800-426-4791.



Please Share!

If you are a manager or owner of a business or multi-family dwelling, please share this report with your employees or residents.

For additional copies, please call the City of Salem Public Works Dispatch at 503-588-6311.

Español?

Este documento contiene información sobre su agua potable y su fuente. Si desea recibir una copia de este documento en español, llame al Despacho de Obras Públicas de la Ciudad de Salem al 503-588-6311 y solicite un informe de calidad del agua o visite nuestro sitio web www.cityofsalem.net/water.

This document contains information about your potable water and its source. If you would like to receive a copy of this document in Spanish, please call the City of Salem Public Works Dispatch at 503-588-6311 and ask for a water quality report or visit our website at www.cityofsalem.net/water

What the EPA Wants You to Know About Contaminants in Source Water

The sources of drinking water, both tap water and bottled water, include rivers, lakes, streams, ponds, reservoirs, springs, and groundwater wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals, and in some cases, radioactive materials, and can pick up substances resulting from the presence of animals or human activity.

Contaminants that may be present in any source water includes:

Sediments and turbidity, including loose dirt, topsoil, minerals, sand and silt from roads and highways, excessive removal of vegetation from grazing animals, forest practices, and farming practices.

Microbial contaminants, such as viruses and bacteria, which comes from sewage treatment plants, septic systems, agricultural livestock operations and wildlife.

Pesticides and herbicides, which may come from a variety of sources such as agriculture, road maintenance, individual homes and businesses, and urban stormwater runoff.

Organic chemical contaminants, including synthetic and volatile chemicals, which are by-products of industrial processes, petroleum processes, wood processes and mills, gas and fueling stations, auto and mechanical shops.

Inorganic contaminants, such as salts and metals, which can occur natural in the geology, or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas productions, mining, or agriculture.

Radioactive contaminants, which can be naturally occurring or be the result of oil and gas production, and mining activities.

In order to ensure that the drinking water from your tap is safe, the EPA has regulations that limit the amount of certain contaminants in the water provided by public water systems. This requires monitoring for these contaminants. Food and Drug Administration regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

Understanding Salem's Source Water Assessment

The City of Salem's source water assessment was originally completed in 2003 with assistance from the Oregon Department of Environmental Quality (ODEQ). In 2018, ODEQ completed an Updated Source Water Assessment to all drinking water providers in the state of Oregon. As required by the Federal Safe Drinking Water Act, the original assessment identifies sensitive areas where the water supply may be more vulnerable to impact by potential contaminant sources.

The North Santiam River is Salem's primary drinking water supply. The updated assessment provides additional detailed information to assist drinking water providers and their communities in implementing local drinking water protection efforts. This information may assist with supporting restoration projects that focus on goals such as improving water quality and watershed health within the North Santiam River Watershed.

Contaminants in Drinking Water

The City routinely tracks activities that may impact its drinking water source within the North Santiam River Watershed. The City works together with federal, state and local agencies, as well as researchers, nonprofits and individuals to explore watershed health and reduce negative impacts to the drinking water source. During the year, staff routinely collects water samples from the watershed, throughout the water treatment process at the Geren Island Water Treatment Facility, and at several locations within the distribution system. The City is committed to delivering safe and high-quality water to its customers.

Salem's original and updated Source Water Assessment reports are available on the City of Salem website at: www.cityofsalem.net/water. The reports are also available by calling Public Works Dispatch at 503-588-6311, or by emailing a request to water@cityofsalem.net.



Salem's Source for Drinking Water

For more than 80 years, the North Santiam River has served as the primary water supply for the City of Salem. This high-quality river source flows over 90 miles from the high ridges near Mt. Jefferson, through Detroit Reservoir and down toward the Mid-Willamette Valley where it meets with the Willamette River. The North Santiam River Watershed is an area of about 760 square miles that is surrounded primarily by private, state and national forest. It provides clean and pristine river water for many canyon communities along its route. Due to the river's high-quality water, it is suitable for a more natural filtering process called Slow Sand Filtration at the Geren Island Water Treatment Facility located near Stayton. The City of Salem has been using this process since the 1930s, while making improvements to the facility and processes over time.

In the summer of 2022, ozonation was added to the treatment process on a 24 hour – 7 day a week schedule. The ozone treatment system provides an added treatment barrier to ensure high quality water continues to be delivered to Salem water customers. This large improvement project created a more resilient drinking water system and will remove contaminants such as cyanotoxins and materials burned during wildfires.

During normal operations, North Santiam River water is diverted, ozonated, and filtered using the slow sand filtration process. Water is further disinfected by adding sodium hypochlorite (liquid chlorine), fluorosilicic acid (liquid fluoride) for fluoridation, and sodium carbonate (soda ash). Sodium carbonate adjusts the pH and minimizes the corrosion of lead and copper from household plumbing. From the treatment facility, the water is conveyed to Salem and distributed throughout the City's water distribution system.

The City has additional treatment barriers that can be used when water quality in the North Santiam River deteriorates. Additional treatment processes may include the addition of powdered activated carbon, also known as PAC, which causes contaminants in the raw water such as cyanotoxins to adsorb to the powdered carbon and settle out of the water column. Acetic acid can be added to act as a food source to keep the biological activity on the filters healthy. Chlorine residual can also be increased, which allows further destruction of any cyanotoxin that has made its way past filtration, then the boosted chlorine residual is reduced to normal operating levels prior to customer taps.

Furthermore, the City operates an Aquifer Storage and Recovery (ASR) system, located underground in south Salem, to store and recover finished water. During the winter months, when flows in the river are high and there is a low demand for water by customers, treated drinking water is injected into the ASR system. The water is stored in a naturally existing groundwater aquifer located 350 feet below Woodmansee Park. During the summer months, when the river is flowing low and customer water demand is high, water is pumped back to the surface, sampled for quality, and recovered from the ASR system. A newly completed facility treats recovered water with sodium hypochlorite (chlorine) for disinfection and caustic soda for pH adjustment and then conveyed to the distribution system.

Please visit the City's Water webpage, www.cityofsalem.net/utilities, for more details about Salem's treatment process.

Salem's Water System serves a population of over 212,643 daily from the North Santiam River.

Where Does Salem's Water Come From?

Salem's source water starts with a raindrop or snowflake that falls on the west side of the Cascade Range, near Mt. Jefferson and Three Fingered Jack. As that water moves downhill, it flows over land, through soil and rock to the mainstem of the North Santiam River. It is stored temporarily in Detroit and Big Cliff Reservoirs until it is released through the dam gates and flows downstream towards the canyon communities. A small portion of the river is diverted, treated and distributed to Salem water customers. For more information about the North Santiam Watershed, visit the City's website to take a virtual watershed tour.



2022 Water Quality Data from Geren Island Treatment Facility, Distribution System, and Salem Water Customers

Test	Date Tested	Unit	MCLG (MRDLG)	MCL (MRDL)	Detected Level	Range		Violation	Major Sources
						Lowest	Highest		
■ Inorganic									
Fluoride	2022	ppm	4	4	Average: 0.62	<0.20	0.82	NO	Erosion of natural deposits; water additive—promotes strong teeth
Copper	2022	ppm	1.3	AL = 1.3	0.021	One Sample Collected		NO	Corrosion of household plumbing systems
Nitrate	2022	ppm	10	10	0.36	One Sample Collected		NO	Runoff from fertilizer use; leaching from septic tanks; erosion of natural deposits
Nitrate-Nitrite	2022	ppm	10	10	0.36	One Sample Collected		NO	Runoff from fertilizer use; leaching from septic tanks; erosion of natural deposits
Barium ¹	2022	ppm	2	2	0.0020	One Sample Collected		NO	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Copper	Jan-June 2022	ppm	1.3	AL =1.3	90 th Percentile: 0.2760; Homes exceeding: 0	<0.034	0.520	NO	Corrosion of household plumbing systems
Lead	Jan-June 2022	ppb	0	AL-15	90 th Percentile: 8.2 Homes exceeding: 4	<0.0005	31.6	NO	Corrosion of household plumbing systems
Copper	July-Dec 2022	ppm	1.3	AL =1.3	90 th Percentile: 0.2760; Homes exceeding: 0	<0.030	0.391	NO	Corrosion of household plumbing systems
Lead	July-Dec 2022	ppb	0	AL-15	90 th Percentile: 8.2 Homes exceeding: 3	0.0005	45.2	NO	Corrosion of household plumbing systems
■ Microbiological									
Turbidity	2022	NTU	n/a	TT	100% of samples meet turbidity standards Average: 0.08	0.04	0.83	NO	Erosion and soil runoff
Total coliform	2022	no units	n/a	TT	1,443 samples collected	None	1 positive of 120 samples or 0.1%	NO	Naturally present in the environment
E. coli bacteria	2022	no units	0	Routine and repeat samples are total coliform-positive and either E. coli-positive or the water supplier fails to collect repeat samples following E. coli-positive routine sample or system fails to analyze total coliform-positive repeat sample for E. coli	E. coli bacteria were not detected	None	None	NO	Human and animal fecal waste
■ Disinfection By-products, By-product Precursors, and Disinfectant Residual									
Haloacetic acids	2022	ppb	0	60	Locational Running Annual Average: 28	18	38	NO	By-product of drinking water disinfection
Total Trihalomethanes	2022	ppb	0	80	Locational Running Annual Average: 29	20	47	NO	By-product of drinking water disinfection
Total Trihalomethanes ¹	2022	ppb	0	80	Entry Point: 6.3	12	19	NO	By-product of drinking water disinfection
Total Organic Carbon	2022	ppm	n/a	TT	Raw Water Annual Average: 0.96	0.87	1.1	NO	Naturally present in the environment
Chlorine Residual	2022	ppm	4	4	Entry Point Average: 1.43	1.02	2.77	NO	Remaining chlorine from disinfection process
Bromate	2022	ppb	0	10	10 Sample Collected	<1.0	1.1	NO	By-product of drinking water disinfection
■ Radioactive Constituents									
Gross Beta Particle Activity ¹	2020	pCi/L	40	50	4.2	One Sample Collected		NO	Certain minerals are radioactive and may emit forms of radiation known as photons and beta radiation. Some people who drink water containing beta particle and photon radioactivity in excess of the MCL over many years may have an increased risk of getting cancer.
■ Unregulated Constituents									
Sodium	2022	ppm		20 ²	7.0	One sample collected		NO	Erosion of natural deposits

2022 Water Quality Data from Aquifer Storage and Recovery Wells

■ Inorganic									
Barium¹	2022	ppm	2	2	0.0022	One sample collected		NO	Discharge of drilling wastes; discharge from metal refineries; Erosion of natural deposits
Fluoride	2022	ppm	4	4	0.50	0.45	0.55	NO	Erosion of natural deposits; water additive—promotes strong teeth
Nitrate	2022	ppm	10	10	0.092	One sample collected		NO	Runoff from fertilizer use; leaching from septic tanks; erosion of natural deposits
Nitrate-Nitrite	2022	ppm	10	10	0.092	One sample collected		NO	Runoff from fertilizer use; leaching from septic tanks; erosion of natural deposits
Chromium	2022	ppb	100	100	1.2	One sample collected		NO	Discharge from steel and pulp mills; erosion of natural deposits
■ Disinfection By-Products, Byproduct Precursors, and Disinfectant Residual									
Haloacetic acids¹	2022	ppb	0	60	40.0	One sample collected		NO	By-product of drinking water disinfection
Total Trihalomethanes¹	2022	ppb	0	80	76.0	One sample collected		NO	By-product of drinking water disinfection
Total Organic Carbon¹	2022	ppm	n/a	TT	0.595	One sample collected		NO	Naturally present in the environment
■ Organic Constituents									
Hexachlorocyclopentadiene¹	2020	ppb	0	50	0.056	One sample collected		NO	Discharge from chemical factories
■ Unregulated Constituents									
Sodium	2022	ppm		202	9.1	7.2	11.0	NO	Erosion of natural deposits

¹The City of Salem is required to report any detected contaminant within the last five years.

³EPA advisory level only.

UNITS OF MEASUREMENT

Parts per Million (ppm)

One part per million is equal to one cup of food coloring in an Olympic size swimming pool.

Parts per Billion (ppb)

One part per billion is equal to one drop of food coloring in an Olympic size swimming pool.

Nephelometric Turbidity Unit (NTU)

The standard unit of measurement used in water analysis to measure turbidity in water samples.

Picocuries per Liter (pCi/L)

One part per billion of a curie per liter of water, used to measure radiation at very low levels.

DEFINITIONS

Maximum Contaminant Level Goal (MCLG)

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.

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.

Action Level (AL)

The concentration of a contaminant which, if exceeded, triggers treatment or other requirements a water system must follow.

Treatment Technique (TT)

A required process intended to reduce the level of a contaminant in drinking water.

Maximum Residual Disinfectant Level (MRDL)

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.

Maximum Residual Disinfectant Level Goal (MRDLG)

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.

Unregulated Contaminant Monitoring Rule Results

Round 4 (UCMR4) Detected Contaminant Results

The Unregulated Contaminant Monitoring Rule (UMCR) requires water providers nationwide to sample for unregulated contaminants once every five years. The EPA uses these sampling efforts to collect information about contaminants suspected to be present in drinking water, but which are currently not regulated by health based limits under the Federal Safe Drinking Water Act. The UCMR4 – fourth round of UMCR, requires monitoring for 30 chemical contaminants including cyanotoxins, metals, pesticides, brominated haloacetic acid (HAA) disinfection groups, alcohols, and semivolatile organic chemicals. More information about the UMCR is available from the Safe Drinking Water Hotline at 1-800-426-4791.

The City of Salem began Unregulated Contaminant Monitoring Rule – Round 4 (UCMR4) sampling in July 2018. The City completed biweekly sampling for cyanotoxins from July through October 2018. All other samples were collected quarterly in July 2018, October 2018, January 2019, and April 2019.

The table below lists only those unregulated contaminants which were detected during the 2018 and 2019 sampling events.

Detected Analyte	Date Tested	Unit	MRL ¹ (ppb)	Detected Level	Range	
					Lowest	Highest
Total Organic Carbon (TOC)	2018-2019	ppm	--	Average: 1.15	0.89	1.4
HAA5	2018-2019	ppb	--	Average: 30.97	1.3	51
HAABr	2018-2019	ppb	--	Average: 1.79	ND	3.5
HAA9	2018-2019	ppb	--	Average: 32.83	1.3	53

¹MRL is the UCMR Minimum Reporting Level



Round 5 (UCMR5) Detected Contaminant Results

The Unregulated Contaminant Monitoring Rule (UMCR) requires water providers nationwide to sample for unregulated contaminants once every five years. The EPA uses these sampling efforts to collect information about contaminants suspected to be present in drinking water, but which are currently not regulated by health based limits under the Federal Safe Drinking Water Act. The UCMR5 – fifth round of UMCR, requires monitoring for 29 per- and polyfluoroalkyl substances (PFAS) and lithium. More information about the UMCR is available from the Safe Drinking Water Hotline at 1-800-426-4791.

The City of Salem began Unregulated Contaminant Monitoring Rule – Round 5 (UCMR5) sampling in January 2023. Additional sampling at the entry point to the distribution system will occur in April, July, and October of 2023. UCMR5 samples will also be collected from the Aquifer Storage and Recovery Wells in November 2023 and May of 2024.

Analyte	Acronym	Results (ppb)	Minimum Report Level (ppb)
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	11Cl-PF30UdS	<0.0050	0.0050
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	9Cl-PF30NS	<0.0020	0.0020
4,8-Dioxa-3H-perfluorononanoic acid	ADONA	<0.0030	0.0030
Hexafluoropropylene Oxide Dimer Acid	HFPO-DA	<0.0050	0.0050
Perfluorobutanesulfonic acid	PFBS	<0.0030	0.0030
Perfluorodecanoic acid	PFDA	<0.0030	0.0030
Perfluorododecanoic acid	PFDoA	<0.0030	0.0030
Perfluoroheptanoic acid	PFHpA	<0.0030	0.0030
Perfluorohexanesulfonic acid	PFHxS	<0.0030	0.0030
Perfluorohexanoic acid	PFHxA	<0.0030	0.0030
Perfluorononanoic acid	PFNA	<0.0040	0.0040
Perfluorooctanesulfonic acid	PFOS	<0.0040	0.0040
Perfluorooctanoic acid	PFOA	<0.0040	0.0040
Perfluoroundecanoic acid	PFUnA	<0.0020	0.0020
Perfluorobutanoic acid	PFBA	<0.0050	0.0050
1H,1H,2H,2H-Perfluorodecanesulfonic acid	8:2 FTS	<0.0050	0.0050
1H,1H,2H,2H-Perfluorohexanesulfonic acid	4:2 FTS	<0.0030	0.0030
1H,1H,2H,2H-Perfluorooctane sulfonic acid	6:2 FTS	<0.0050	0.0050
Nonafluoro-3,6-dioxaheptanoic acid	NDDHA	<0.020	0.0200
Perfluoro (2-ethoxyethane) sulfonic acid	PFEESA	<0.0030	0.0030
Perfluoro-3-methoxypropanoic acid	PFMPA	<0.0040	0.0040
Perfluoro-4-methoxybutanoic acid	PFMBA	<0.0030	0.0030
Perfluoropentanoic acid	PFPeA	<0.0030	0.0030
Perfluoroheptanesulfonic acid	PFHpS	<0.0030	0.0030
Perfluoropentanesulfonic acid	PFPeS	<0.0040	0.0040
N-ethylperfluorooctanesulfonamidoacetic acid	NEtFOSAA	<0.0050	0.0050
N-methylperfluorooctanesulfonamidoacetic acid	NMeFOSAA	<0.0060	0.0060
Perfluorotetradecanoic acid	PFTA	<0.0080	0.0080
Perfluorotridecanoic acid	PFTDA	<0.0070	0.0070
Lithium	Li	<9.00	9.0000

¹MRL is the UCMR Minimum Reporting Level. A result is recorded as less than or "<" the MRL when analyte is not detected or detected at a concentration less than the MRL.

2022 Lead and Copper Sampling Results

The addition of ozonation to the treatment process at the Geren Water Treatment Facility triggered an increase in lead and copper sampling in 2022. As such, the City conducted two consecutive 6-month rounds of sampling from Tier 1 homes. Assessments made in the 1990s identified 147 Tier 1 homes in Salem that met the qualifications for ongoing lead and copper sampling. Tier 1 homes, built between 1983 and 1985, are considered most at risk because of lead or lead-based plumbing components used during construction.

The first round of sampling occurred between January 1 and June 30, 2022. The City analyzed 109 samples from Tier 1 homes. Four homes had lead levels that exceeded the lead action level. None of the homes exceeded the copper action level.


The second round of sampling occurred between July 1 and December 31, 2022. The City analyzed 103 samples from Tier 1 homes. Three homes had lead levels that exceed the lead action level. Again, none of the homes exceeded the copper action level.

Based on the 2022 results, the Oregon Health Authority granted reduced lead and copper monitoring. The next

round of sampling will occur from June 1 – September 30, 2023. The City will need to analyze a minimum 50 samples for lead and copper to meet regulatory requirements. Lead and Copper data from 2022 is detailed in the water quality table.

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is mostly from materials and components in services lines and home plumbing. The City of Salem 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 your exposure is available from the Safe Drinking Water Hotline at 1-800-426-4791 or at www.epa.gov/safewater/lead.



The Oregon Health Authority granted a reduction in lead and copper monitoring based on the 2022 results. Beginning in 2023, the City will conduct lead and copper monitoring on a three year cycle. Samples will be collected from Tier 1 homes from June 1, 2023 through September 30, 2023.

A close-up photograph of a hand holding a clear glass under a white faucet. Water is flowing from the faucet into the glass. The background is blurred, showing a kitchen sink and a person's arm in a blue shirt.

Free Lead Testing for Salem Water Customers!

The City of Salem offers free lead testing to its water customers.

If you are concerned about the levels of lead in your home and would like to request a free test, please call the Water Quality Hotline at 503-588-6323.

Cyanotoxin Testing

Algae blooms are regularly observed in Detroit Reservoir from April or May through September or October. Algal blooms are a natural process. Blooms occur when there is significant algae growth in a short period of time due to optimal environmental conditions – such as light, warm water and nutrients. When stressed, some algal blooms can produce cyanotoxins as a defense mechanism. The City maintains a robust watershed monitoring program that monitors harmful algal blooms and cyanotoxins.

Oregon Health Authority drinking water regulations require testing of two cyanotoxins – Total Microcystins and Cylindrospermopsin annually from May 1 – October 31.

If the levels reach the Oregon Health Authority Health Advisory notification threshold, the City will issue an advisory and provide water quality updates on its website.

Cyanotoxin Test Results*												
Site Location	Test	Test Date	Unit	Health Advisory Level for Vulnerable Population	Health Advisory Level for All Population	Oregon DEQ Lab: Lowest Results	Oregon DEQ Lab: Highest Results	Willow Lake Lab ¹ Lowest Result	Willow Lake Lab ¹ Highest Result	Advisory Issued?	Advisory Type	Advisory Dates
Raw Water - North Santiam River: Middle Intake	Microcystin	May - October 2022	ppb	0.3	1.6	ND	ND	ND	ND	NO	None	None
	Cylindrospermopsin			0.7	3	ND	ND	ND	ND			
Finished Water - Entry Point: Aldersgate	Microcystin	May - October 2022	ppb	0.3	1.6	ND	ND	ND	ND	NO	None	None
	Cylindrospermopsin			0.7	3	ND	ND	ND	ND			

Notes: *The source of cyanotoxins are from a harmful algal bloom of cyanobacteria.

¹ Willow Lake Laboratory is an ORELAP accredited laboratory located at the City of Salem's Wastewater Treatment Facility. Willow Lake Laboratory can analyze samples quickly, often within 24 hours of receiving the sample.

DEFINITIONS

Harmful Algae Bloom means a dense colony of cyanobacteria that can rapidly multiply in surface waters when environmental conditions are favorable for growth.

Cyanobacteria are photosynthetic bacteria that share some properties with algae and are found naturally in freshwater and saltwater. Some species of cyanobacteria can produce toxins, which are known to be harmful to human health above certain concentrations.

Cyanotoxins means total microcystins and cylindrospermopsin produced by cyanobacteria.

ND refers to a non-detection meaning that the analytical result is less than the reporting limit for the analytical method being used to quantify the concentration.

Consuming water containing concentrations of cyanotoxins over the health advisory level for more than ten days may result in upset stomach, diarrhea, vomiting, as well as liver or kidney damage. Seek medical attention if you or your family members experience illness.

All daily water quality results of data collected during the year of 2022 specific to cyanotoxins are available on the City of Salem's website. For more detailed information on the monitoring program and the data results of cyanotoxins, please visit the City of Salem website under: www.cityofsalem.net/community/household/water-utilities/drinking-water-treatment/water-quality-testing-cyanotoxin.

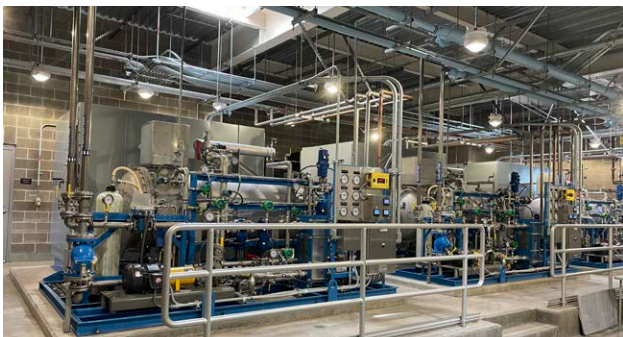


Significant Improvement Projects Completed to Build a More Resilient Water System

Frank Mauldin Ozone Treatment Facility

In April of 2022, the City of Salem began continual operation of the ozone treatment facility. The new ozone treatment facility is named after the late Public Works Director, Frank Mauldin, who led the department from 1988 to 2002 and wrote the locally known book “Sweet Mountain Water”.

Ozone treatment provides an added layer of protection against harmful impacts to water quality caused by events such as algae blooms, severe weather events, and wildfires. Ozone is one of the strongest disinfectants used to treat water—even stronger than chlorine. Ozone ensures Salem has consistently high-quality water with improvement to its taste, removal of odors and protection against cyanotoxins.



South Salem Aquifer Storage and Recovery Well Facility

The City recently completed major improvements to its Aquifer Storage and Recovery (ASR) well facility located in Woodmansee Park, including a new treatment facility. The ASR wells located at this park provide supplementary drinking water during high-demand summer months or during emergencies. The ASR well system uses a large, natural underground reservoir, also known as an aquifer, which the City injects with treated drinking water during the winter months and then recovers when needed, usually during the dry summer months. Future expansion of this aquifer and improvements to the wells allows for increased storage of drinking water.





How Does Ozone Treatment Work?

Water from the North Santiam River flows through a roughing filter, which is used as an initial pre-filter process. The roughing filter removes cyanobacteria, which is a primary organism that is known to produce cyanotoxins, and other debris from the raw river water. Any cyanotoxins in the raw water will be destroyed by ozone treatment. The water is injected with ozone, which is created on-site by passing oxygen (O₂) through a microgap between two high voltage electrodes. Oxygen molecules are converted into oxygen radicals (O). Oxygen radicals react with O₂ to produce O₃. Ozone is highly unstable and reacts with impurities in the water.

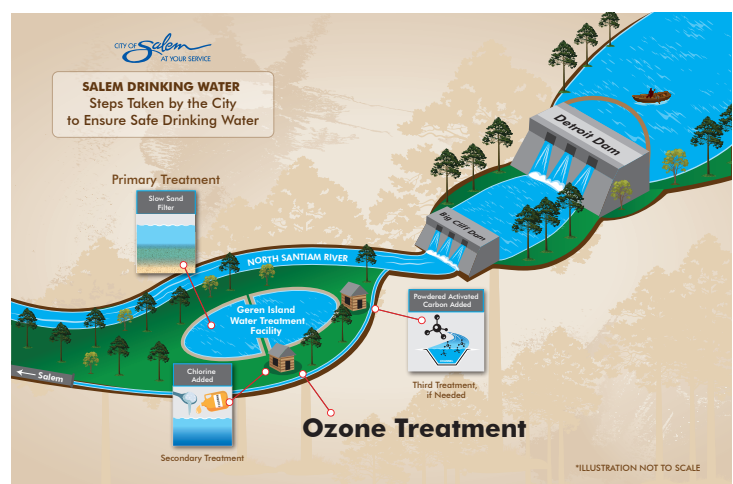
When the ozone treatment process is done, one hundred percent of the injected ozone is removed from the water. This water is then filtered a second time through slow sand filters which are comprised of a schmutzdecke (biological layer), gravel and sand to further remove contaminants. The water is then finally chlorinated, fluoridated, and treated with soda ash before conveyed to Salem for distribution. With ozone added to the drinking water treatment process, less chlorine can be used.

The City of Salem is also investing in a new additional groundwater system at the Geren Island Water Treatment Plant. Construction of a ranney groundwater collector well continues. This groundwater well will provide a second source of water at the water treatment facility that is protected from cyanobacteria, storm events and post-wildfires effects that impact the North Santiam River water quality.

Benefits of Ozone

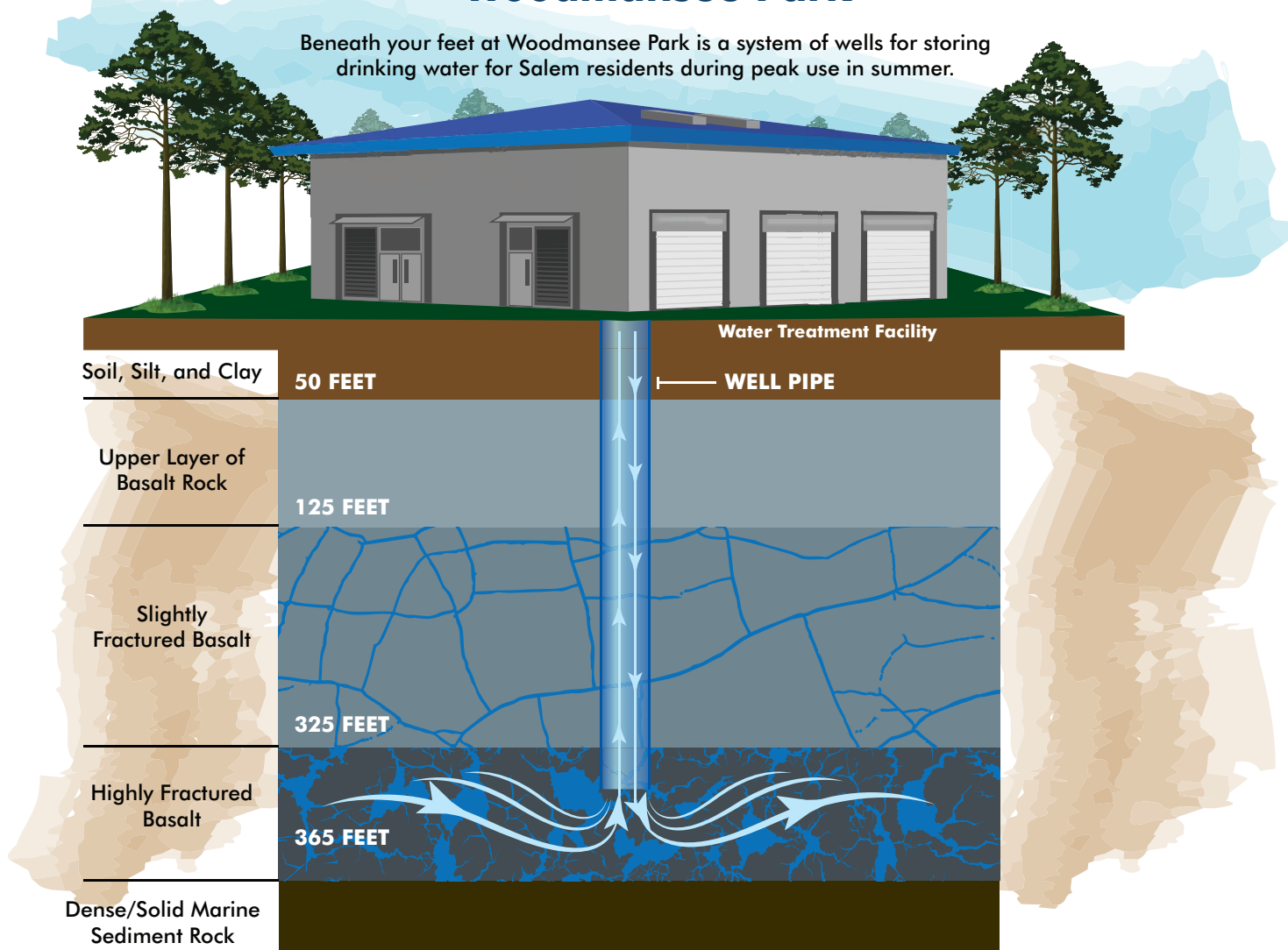
Ozone treatment offers many benefits:

- ▶ Destroys cyanotoxins
- ▶ Makes it easier to ensure safe drinking water
- ▶ Works well with the other treatment steps on Geren Island
- ▶ Produces good tasting water, year-round
- ▶ Reduces how much chlorine is needed
- ▶ No ozone is left in the water after it has done its job



Aquifer Storage and Recovery System at Woodmansee Park

Beneath your feet at Woodmansee Park is a system of wells for storing drinking water for Salem residents during peak use in summer.



Did You Know?




Treated North Santiam River water is injected into the aquifer during high flows in winter and stored below in an aquifer made from an ancient lava flow.



Geologists have identified the basalt rock as being part of the Columbia River lava that flowed through South Salem 17 million years ago.



The aquifer is like a large cavern filled with fractured basalt rock. Water is stored in the rocks, and can store over 700 million gallons of water.



Clean Streams CLEAR CHOICES

A City of Salem Initiative

There are many ways you can get involved in the City of Salem's Clean Streams Initiative and help protect stream water quality right from home.

- ▶ Join the Capital Canine Club by pledging to always pick up after your pet.
- ▶ Take the WE Pledge to reduce pollution and conserve water.
- ▶ Download a DIY guide for creating a rain garden on your property.
- ▶ Download the Clean Streams Superhero Activity book for youth.

You can find all of this and more on our website, www.CleanStreamsSalem.org.

You can also sign up for the monthly e-newsletter, Stream Currents, for water-related news, a Clean Streams tip of the month, and to keep up to date on city water-related projects.

Visit the website to sign up today - mailchi.mp/cityofsalem/cleanstreams.



Easy Ways to Conserve Water

Long, hot summers increase water demand as Salem's water customers use water for outdoor activities such as washing cars, watering lawns, filling pools, and cleaning outside areas. Salem water use nearly doubles in the summer and can peak at nearly 50 million gallons of water use per day! Here are some easy ways to help reduce your water use.

- ▶ Fix outdoor leaky faucets.
- ▶ Sweep sidewalks and patios instead of washing them down.
- ▶ Adjust sprinkler heads to avoid watering the sidewalk and driveway.
- ▶ Turn off the faucet while brushing your teeth.
- ▶ Fix broken sprinkler heads.
- ▶ Run the dishwasher only when full.
- ▶ Use a hose nozzle for outside watering activities.
- ▶ Your lawn only needs 1" of water per week to stay healthy and green.
- ▶ Run only full loads of clothes.
- ▶ Take shorter showers.
- ▶ Adjust your irrigation systems when weather is cooler and rainy.
- ▶ Take the WE Pledge to Help Protect Local Waterways.

You can pledge to conserve water, reduce stormwater pollution, increase recycling, reduce plastic waste, and more by taking the Clean Streams Initiative's WE Pledge. Together WE Pledge to keep stormwater clean, streams pollution free, and be good stewards of the environment. You can take the WE Pledge by visiting www.CleanStreamsSalem.org.



**Get a free
one-inch-per-week rain
gauge or a home water
audit booklet.**

**Call the Water Quality Hotline
at 503-588-6323,
or email: water@cityofsalem.net**



City Offers Free Conservation Kits to Salem Water Customers

Retrofitting existing fixtures can help reduce the amount of water used daily and save money on your utility bill. It also leaves more water in the river for wildlife and fish. The City offers free indoor and outdoor water conservation kits to Salem water customers. To request a free water conservation kit, please call the Water Quality Hotline at 503-588-6323, or email us at water@cityofsalem.net.

Salem Utility Customers Benefit from Bill Assistance Programs

Need assistance paying your City of Salem water, sewer, and stormwater utility bill?

We can help! The City has financial assistance programs for low-income households including a monthly bill discount, emergency payment assistance, and payment arrangements for qualifying residential customers.

The City partners with local service agencies to provide financial assistance to low-income households needing help paying their bill. For more information, visit www.cityofsalem.net/bill-assistance, call our Utility Customer Care Team at 503-588-6099, Monday through Friday, 8:00 a.m. to 5:00 p.m., or email UtilityBilling@cityofsalem.net.

Payment Arrangements

Need a little extra time to pay your current utility bill? You may be eligible to set up a payment arrangement that extends the due date of your current bill.

Emergency Utility Assistance Program

Experiencing a short-term need for help with your utility bill? You may be eligible for up to \$500 of assistance towards your current and past due utility bill every 12 months. This program is supported by donations from our customers and the community with matching funds from the City. To learn how you can help support the Emergency Utility Assistance Program visit www.cityofsalem.net/community/things-to-do/volunteer-get-involved/donate-to-emergency-utility-assistance-program.

Utility Rate Relief Program

Customers who are age 60 and older, or disabled, with a household income at or below 60% of State Median Income may be eligible for a monthly discount on the sewer portion of their City of Salem utility bill and may also qualify for discounts on their garbage bill.

Low-Income Household Water Assistance Program (LIHWA)

A federally funded program to help households pay their water, sewer, and stormwater utility bills. LIHWA assistance is a one-time payment paid directly to your utility provider on your behalf to turn services back on, prevent shutoff, and pay past due and current bills. The City of Salem partners with Mid-Willamette Valley Community Action Agency to provide LIHWA assistance to Salem customers.



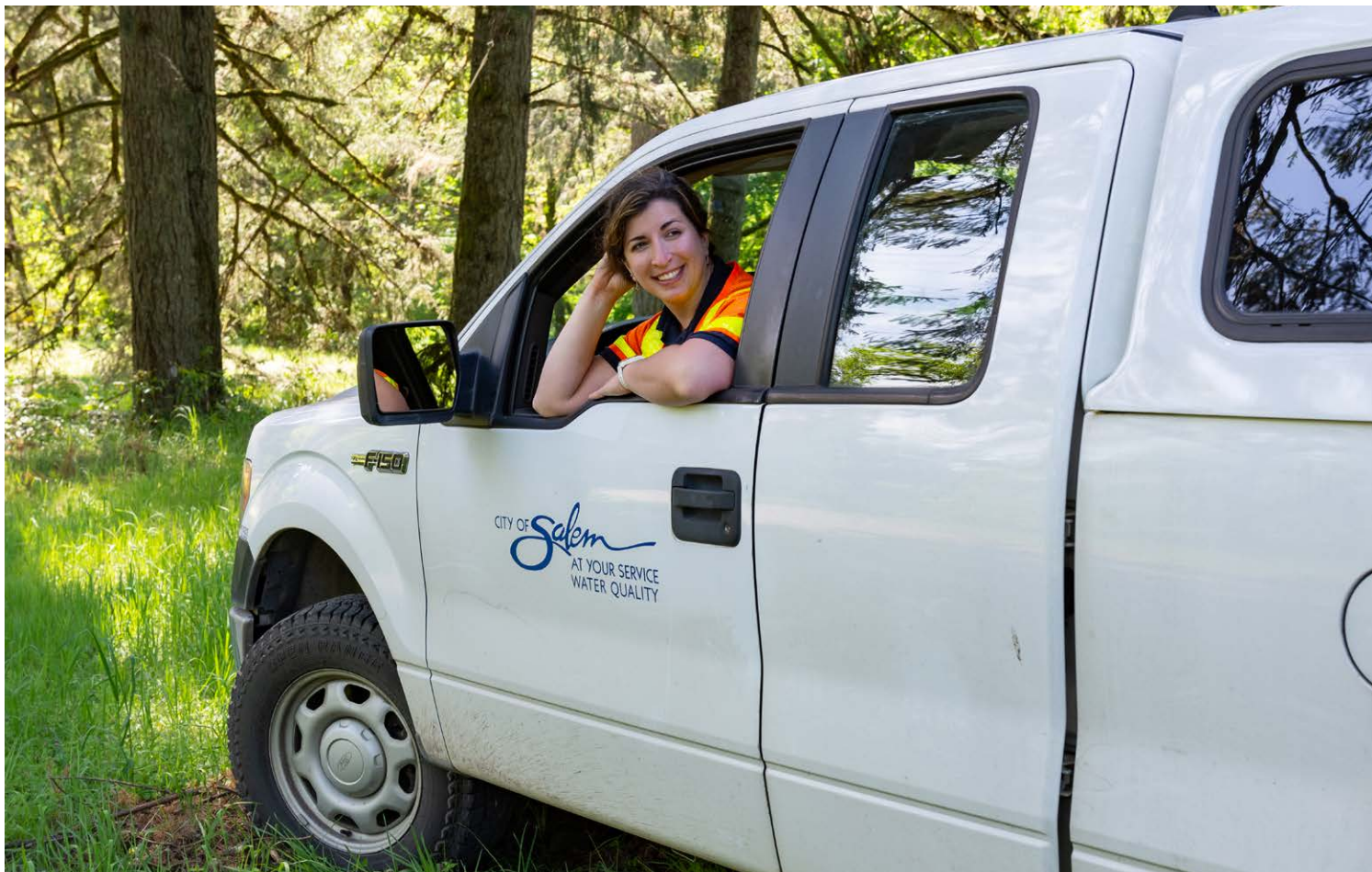
Ways to Get Involved

Salem City Council

Salem City Council is the policy-making body for Salem's water system. Meetings are held to allow Council to conduct business, make decisions in a public forum, and formulate policy. These meetings also provide an opportunity for you to give input on issues and policies under consideration by the City. The Council meets on the 2nd and 4th Monday of each month at 6 p.m. In December, the Council meets on the 1st and 2nd Monday at 6 p.m. You can now attend Salem City Council meetings both in-person and remotely. You can access meeting agendas online and learn more about how you can participate in a Council meeting. Watch the Council meetings live on CCTV, channel 21, with replays during the week, stream the meeting live on Facebook or YouTube or in archive form online. Feel free to call at 503-588-6255 or visit www.cityofsalem.net/city-council for more information.

North Santiam Watershed Council

The North Santiam Watershed Council (NSWC) is a 501(c3) non-profit made up of local volunteers who act together to provide opportunities for stakeholders to cooperate in promoting, improving, and sustaining the health and economy of the North Santiam River Watershed and its communities. This organization facilitates large and small-scale restoration projects and hosts project tours, tree plantings, and river clean-ups. Each year, the NSWC receives a grant from the City to help with operational costs and tree plantings. The NSWC hosts virtual meetings that are open to the public and are held every 3rd Tuesday of each month (except December) at 6 p.m. via Zoom. Feel free to call 503-930-8202 if interested in participating in a meeting or visit www.northsantiam.org for more information.





The 2020 Labor Day Fires: Post Fire Recovery Continues

On September 7, 2020, a rare wind event caused a small fire, known as the Beachie Creek Fire, to explode in size from 500 acres to over 130,000 acres in a matter of hours (U.S.F.S Information Incident System). The Lionshead Fire, located east of the Beachie Creek fire burned through the Warm Springs Reservation and Mount Jefferson Wilderness. Eventually the two fires merged and burned almost 400,000 acres, and over 50% of the North Santiam Watershed. Post fire recovery has focused on rebuilding the North Santiam Canyon communities.

Wildfires can negatively impact water quality during while the fire is burning and for years following the fire. Increased flooding and erosion can have both short- and long-term impacts on water quality. Erosion can increase turbidity in the river. Heavy rainfall events in burned areas of the watersheds can cause contaminants such as heavy metals, major ions, carbon and nutrients to enter downstream water supplies. Various agencies such as the US Forest Service and NOAA actively monitor intensity of precipitation events to forecast risks of flooding within the burned areas. Immediately following the 2020 fires, the City conducted additional water quality monitoring in the North Santiam River. See the data in the Post Wildfire Monitoring Results table.

The City continues to partner with groups, organizations and agencies who are actively involved with recovery in the North Santiam Canyon, the affected communities, and the surrounding impacted landscape. Experts collaborate and share valued knowledge to help understand the short and long-term impacts of wildfire and guidance on how to rebuild a stronger North Santiam Watershed.

Post Wildfire Monitoring Results - 2021

Primary Drinking Water Standards

		EPA Standard	Detected Level
Inorganic Chemicals			
Barium (dissolved)	mg/L	2	0.0022
Barium (total)	mg/L	2	0.0023
Copper (dissolved)	mg/L	1.3	0.019
Copper (total)	mg/L	1.3	0.02
Nitrate	mg/L	10	0.15

Secondary Drinking Water Standards and other Parameters

Alkalinity	mg/L	n/a	29
Bicarbonate Alkalinity	mg/L	n/a	35
Calcium (total)	mg/L	n/a	5
Calcium (dissolved)	mg/L	n/a	4.5
Dissolved Organic Carbon	mg/L	n/a	0.72
Specific Conductance	µmho/cm	n/a	80
Total Hardness	mg/L	250	17
Magnesium (total)	mg/L	n/a	1.2
Magnesium (dissolved)	mg/L	n/a	1.1
Orthophosphate as P	mg/L	n/a	0.01
Orthophosphate as PO ₄	mg/L	n/a	0.031
Silica	mg/L	n/a	14
Sodium	mg/L	n/a	9.4
Strontium (total)	mg/L	4	0.01
Strontium (dissolved)	mg/L	4	0.01
Total Dissolved Solids	mg/L	500	53
Total Organic Carbon	mg/L	n/a	0.83

Primary Drinking Water Standards: legally enforceable standards and treatment techniques to protect public health.

Secondary Drinking Water Standards: non-enforceable guidelines for contaminants that cause aesthetic or cosmetic effects.



Profiler Deployed on Detroit Reservoir

The City of Salem uses a pontoon vertical profiling system to monitor water quality conditions at the Detroit Reservoir log boom. The profiler houses a YSI EXO sonde that moves down through the water column at set depths to measure several water quality parameters. The YSI EXO sonde measures water temperature, conductance, turbidity, total chlorophyll (indicator of algae), phycocyanin (indicator of cyanobacteria), dissolved oxygen, pH, and fluorescing dissolved organic matter. This data is used to monitor changing water quality conditions and can be used to detect early formation of algae blooms.

Want to learn more?

US EPA

Safe Drinking Water Hotline

1-800-426-4791

www.epa.gov

Oregon Health Authority

Drinking Water Program

971-673-0405

public.health.oregon.gov/HealthyEnvironments/DrinkingWater
(Salem's ID# 00731)

City of Salem Public Works Department

City of Salem Website

www.cityofsalem.net

Water Quality Hotline

503-588-6323

water@cityofsalem.net

Water Conservation Hotline

503-588-6323

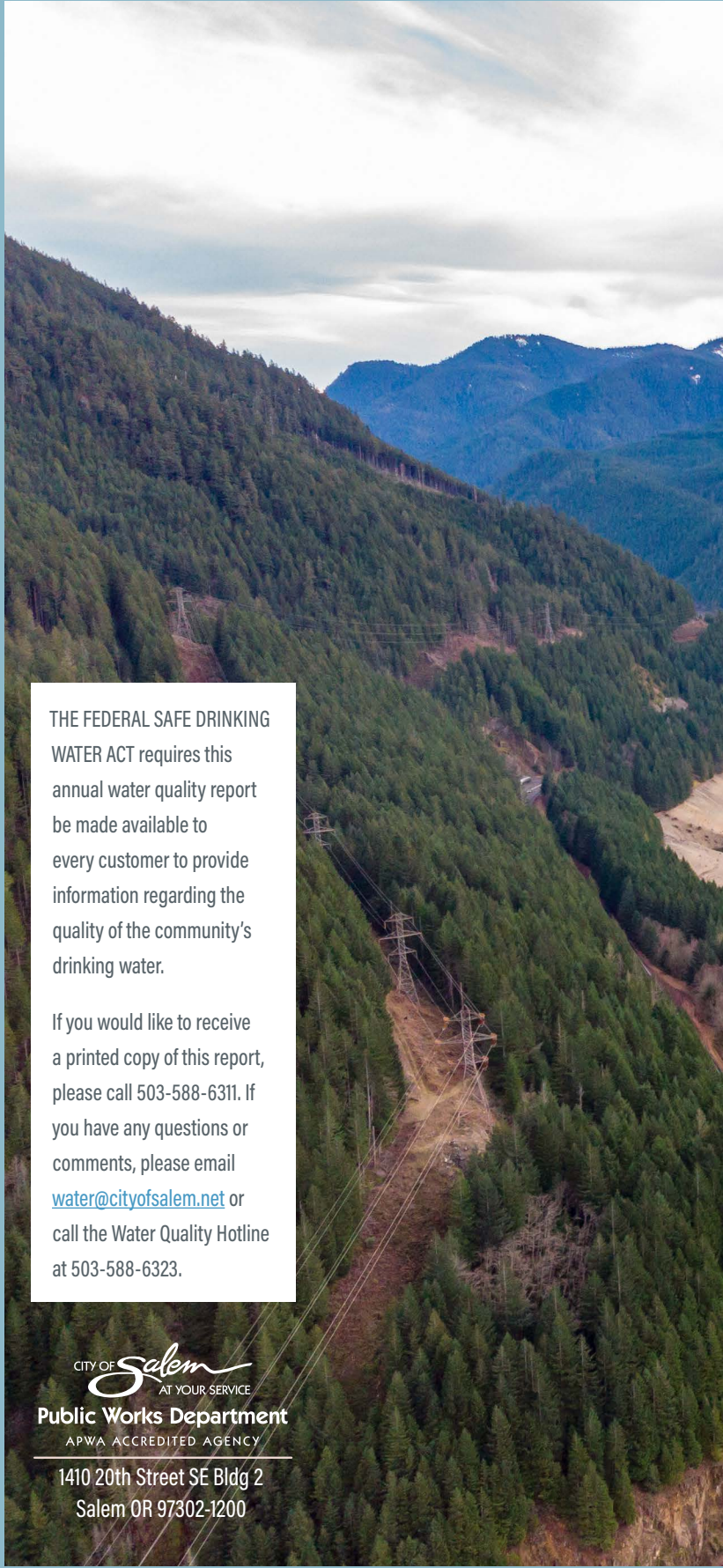
water@cityofsalem.net

Water Outreach and Education Program

To arrange a classroom presentation, field trip, or community service project, call 503-588-6211

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It is the City of Salem's policy to assure that no person shall be discriminated against on the grounds of race, religion, color, sex, marital status, familial status, national origin, age, mental or physical disability, sexual orientation, gender identity, and source of income, as provided by Salem Revised Code Chapter 97. The City of Salem also fully complies with Title VI of the Civil Rights Act of 1964, the Americans with Disabilities Act of 1990, and related statutes and regulations in all programs and activities. Special accommodations are available, upon request, for persons with disabilities or those needing sign language interpretation or languages other than English. To request accommodations or services, please call 503-588-6211.

An aerial photograph of a steep, forested mountain slope. Several high-voltage power lines with metal towers run diagonally across the frame from the upper right towards the lower left. The forest is dense with green trees, and the sky above is overcast with grey clouds.

THE FEDERAL SAFE DRINKING WATER ACT requires this annual water quality report be made available to every customer to provide information regarding the quality of the community's drinking water.

If you would like to receive a printed copy of this report, please call 503-588-6311. If you have any questions or comments, please email water@cityofsalem.net or call the Water Quality Hotline at 503-588-6323.

CITY OF *Salem*
AT YOUR SERVICE
Public Works Department
APWA ACCREDITED AGENCY

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