

PORTLAND WATER BUREAU

2015 DRINKING WATER QUALITY REPORT



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From the Commissioner

Welcome to the Portland Water Bureau's annual Water Quality Report.

I have had the honor of serving as Commissioner in charge of the Water Bureau since June 2013. Each day, I continue to be awed by our visionary Bull Run water system – from forest to faucet.

As a Portland customer, you pay one penny for every 1.9 gallons of water you use. For that price, you get high-quality, safe drinking water, strong stewardship of our precious natural resources, responsible financial management (AAA bond rating), and more. That's good value for our ratepayers.

I am grateful to the dedicated and talented Water Bureau professionals who work hard every day to serve our nearly one million customers.

Nick Fish
Commissioner-In-Charge

From the Administrator

I am pleased to share the 2015 Drinking Water Quality Report with you. While this report is mandated by the federal government, the Portland Water Bureau prides itself in providing this comprehensive and accessible report.

This report provides our customers with important information about the quality of their drinking water. This report also showcases a number of notable aspects of our drinking water system. You will see that Portland is fortunate to have two extremely high-quality sources of drinking water that require only minimal treatment. Your drinking water is delivered to your tap almost entirely by gravity through an extensive distribution system of pipes, tanks and reservoirs. This is all made possible by our dedicated and certified staff that manage and maintain this system to preserve the drinking water quality as it travels over 26 miles from the Bull Run Watershed to your tap.

Throughout this process the Portland Water Bureau monitors Portland's drinking water for more than 200 regulated and unregulated contaminants to ensure that our system delivers high quality drinking water that meets or surpasses all state and federal standards.

If you have questions or comments about this report, please call the Water Line at 503-823-7525.

We welcome your interest in Portland's water system.

David G. Shaff
Administrator

Frequently Asked Questions About Water Quality

Is my water treated by filtration?

No. Neither the groundwater nor the Bull Run source water is filtered. The Bull Run source meets the filtration avoidance criteria of the Surface Water Treatment Rule. The State of Oregon approved Portland's compliance with these criteria in 1992. Portland continues to meet these criteria on an ongoing basis.

Does the Portland Water Bureau add fluoride to drinking water?

No. The Portland Water Bureau does not add fluoride to the water. Fluoride is a naturally occurring trace element in surface and groundwater. The U.S. Public Health Service and the Centers for Disease Control and Prevention consider the fluoride levels in Portland's water sources to be lower than optimal for the prevention of tooth decay. You may want to consult with your dentist about fluoride treatment to help prevent tooth decay, especially for young children.

Is Portland's water soft or hard?

Portland's water is very soft. The hardness of Bull Run water is typically 3-8 parts per million (ppm), or approximately ¼ to ½ a grain of hardness per gallon. For short periods of time Portland may supplement the Bull Run supply with groundwater. Portland's groundwater hardness is approximately 80 ppm (about 5 grains per gallon), which is considered moderately hard.

What is the pH of Portland's water?

The pH of Portland's drinking water typically ranges between 7.5 and 8.5.

Are sodium levels in Portland's drinking water affecting my health?

There is currently no drinking water standard for sodium. Sodium is an essential nutrient. Sodium in Portland's water typically ranges between 2 and 9 ppm, a level unlikely to contribute to adverse health effects.

Is there radon in Portland's drinking water?

Radon is a naturally occurring radioactive gas that you cannot see, taste or smell. Radon has never been detected in the Bull Run surface water supply. Radon is detected at varying levels in Portland's groundwater wells. In 2014, a limited amount of groundwater was used during a short maintenance run. Based on the historical levels of radon in groundwater combined with the limited amount of groundwater used, radon is unlikely to contribute to adverse health effects. See page 7 for more information about radon, or call the Environmental Protection Agency's (EPA) Radon Hotline **800-SOS-RADON** or www.epa.gov/radon/rnwater.html.

Who can I call about water quality or pressure concerns?

The Water Line, **503-823-7525**, can answer your questions and concerns about water quality or pressure. The Water Line is available Monday–Friday from 8:30 a.m.– 4:30 p.m. If you have an emergency after these hours, please contact the after-hours number at **503-823-4874**.

How can I get my water tested?

Contact the LeadLine at www.leadline.org or **503-988-4000** for information about free lead-in-water testing. For more extensive testing, private laboratories can test your tap water for a fee. Not all labs are accredited to test for all contaminants. For information about accredited labs, call the Oregon Health Authority, Oregon Environmental Laboratory Accreditation Program at **503-693-4122**.

Drinking Water Treatment

The first step in the treatment process for Portland's drinking water is disinfection using chlorine. Next, ammonia is added to form chloramines which ensure that disinfection remains adequate throughout the distribution system.

Finally, sodium hydroxide is added to increase the pH of the water to reduce corrosion of plumbing systems. This treatment helps control lead and copper levels at customers' taps, should these metals be present in commercial and household plumbing systems.

Water Testing

The Portland Water Bureau monitors for over 200 regulated and unregulated contaminants in drinking water. All monitoring data in this report are from 2014.

If a known health-related contaminant is not listed in this report, the Portland Water Bureau did not detect it in drinking water.



The Portland Water Bureau collects and analyzes more than 11,000 samples each year.

Special Notice for Immuno-Compromised Persons

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 people 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 at **800-426-4791**.

Public Involvement Opportunities

The Portland Water Bureau provides a variety of public information, public involvement and community outreach opportunities. If you have questions about Portland Water Bureau programs, public meetings or capital projects, please contact the Portland Water Bureau Public Information Group at **503-823-8064**, or visit the Water Bureau's website to learn more about the bureau or to leave a comment: www.portlandoregon.gov/water/.

What the EPA Says About Drinking Water Contaminants

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 Environmental Protection Agency's Safe Drinking Water Hotline at **800-426-4791** or at www.epa.gov/safewater.

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 in drinking water sources may include:

Microbial contaminants, such as viruses and bacteria, which may come from wildlife or septic systems.

Inorganic contaminants, such as salts and metals, which can occur naturally or result from urban stormwater runoff, industrial or domestic wastewater discharges or farming.

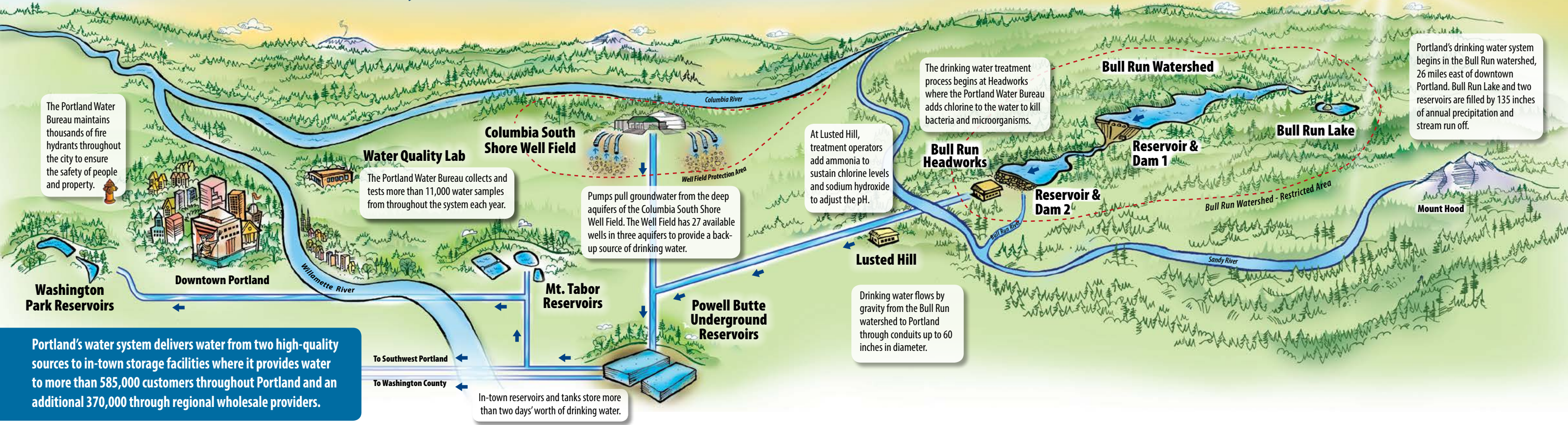
Pesticides and herbicides, which may come from a variety of sources such as farming, urban stormwater runoff and home or business use.

Organic chemical contaminants, including synthetic and volatile organic chemicals, which are byproducts of industrial processes, and can also come from gas stations, urban stormwater runoff and septic systems.

Radioactive contaminants, which can occur naturally.

In order to ensure that tap water is safe to drink, the EPA has regulations that limit the amount of certain contaminants in water provided by public water systems and require 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.

Portland's Water System Established 1895



The Bull Run Watershed is a surface water supply within the Bull Run Watershed Management Unit located in the Mt. Hood National Forest. The watershed is Portland's primary drinking water source. The Bull Run Watershed and Mount Hood are separated by a geological ridge, preventing Mount Hood snow and rain runoff from reaching the Bull Run River and Portland's water supply. Current regulations, and the availability of the Columbia South Shore Well Field, allow Portland to meet federal drinking water standards without filtering the high-quality Bull Run water supply. The watershed has an area of 102 square miles and typically receives 135 inches of precipitation per year. The heaviest precipitation occurs from late fall through spring. Two primary water supply reservoirs store water for use year-round, particularly during the dry summer months. Bull Run Lake provides additional supply storage but is only occasionally needed.

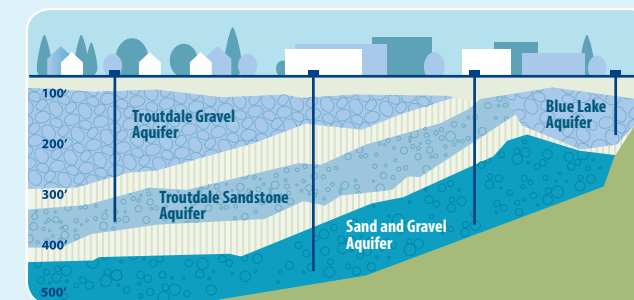
The watershed is mainly used for producing drinking water. Federal, state and local laws restrict public entry. No recreational, residential or commercial uses occur within its boundaries. The Portland Water Bureau carefully monitors water quality and quantity. The Oregon Health Authority Drinking Water Services regularly inspects the watershed and the related treatment and distribution facilities.

In 2003, the Portland Water Bureau completed a Source Water Assessment for the Bull Run water supply to comply with the 1996 Safe Drinking Water Act Amendments. The only contaminants of concern for the Bull Run water supply are naturally occurring microbial contaminants such as *Giardia*, *Cryptosporidium*, fecal coliform bacteria and total coliform bacteria. These organisms are found in virtually all freshwater ecosystems and may be present in the Bull Run water supply at very low levels. The Bull Run water supply complies with all applicable state and federal regulations for source water, including the 1989 Surface Water Treatment Rule filtration-avoidance criteria. The Portland Water Bureau is also operating under a variance for the treatment requirements for *Cryptosporidium*; see page 10 for more information. The Source Water Assessment Report is available at www.portlandoregon.gov/water/sourcewaterassessment and by calling 503-823-7525.



The Columbia South Shore Well Field provides high-quality drinking water from groundwater production wells located in three different aquifers. From July 1 through July 10, 2014, the Portland Water Bureau supplemented the Bull Run drinking water supply with approximately 120 million gallons of groundwater during the repair of a supply conduit and annual groundwater maintenance operation.

Portland's long history of groundwater protection in the Columbia South Shore dates back to the original development of the well field in the early 1980s. In June 2008, the State certified the most recent update of the Columbia South Shore Well Field Protection Program. This program, a collaborative effort of Portland, Gresham and Fairview, identified commercial and industrial activities as the most significant potential sources of contamination for groundwater. Together these cities regulate businesses in the groundwater protection area to prevent hazardous material spills that could seep into the ground. Public events such as Aquifer Adventure, Cycle the Well Field and Groundwater 101 educate local residents on how to help protect groundwater. To obtain a copy of Portland's Well Field Protection Program certification, which includes information on potential sources of contamination, call 503-823-7473. To read more about the program, find upcoming events, and learn how to help protect groundwater, visit the Portland Water Bureau's groundwater website at www.portlandoregon.gov/water/groundwater.



There are 27 usable wells capable of pumping water from three aquifers on the south shore of the Columbia River. The well field serves as a backup water supply during turbidity events, emergencies and when the bureau needs additional summer supply. The well field can produce up to 102 million gallons of water per day.

The Clackamas River Water District, City of Gresham, City of Lake Oswego, Rockwood Water People's Utility District, Sunrise Water Authority and Tualatin Valley Water District provide drinking water to some Portland customers who live near service area boundaries. Customers who receive water from these providers will also receive detailed water quality reports about these sources in addition to this report.

Contaminants Detected in 2014

Regulated Contaminant	Minimum Detected	Maximum Detected	Maximum Contaminant Level (MCL), Treatment Technique or Maximum Residual Disinfectant Level (MRDL)	Maximum Contaminant Level Goal (MCLG) or Maximum Residual Disinfectant Level Goal (MRDLG)	Sources of Contaminant
Untreated Source Water from the Bull Run Watershed					
Turbidity	0.19 NTU	4.04 NTU	Cannot exceed 5 NTU more than 2 times in 12 months	Not Applicable	Erosion of natural deposits
Total Organic Carbon	0.81 parts per million	1.9 parts per million	Not Applicable	Not Applicable	Naturally present in the environment
Giardia	Not detected	One <i>Giardia</i> cyst in a 50 liter sample	Treatment technique required: Disinfection to kill 99.9% of cysts	Not Applicable	Animal wastes
Fecal Coliform Bacteria	Not detected	100% of samples had 20 or fewer bacterial colonies per 100 milliliters of water (1 sample had 9 bacterial colonies per 100 milliliters)	At least 90% of samples measured during the previous six months must have 20 or fewer bacterial colonies per 100 milliliters of water	Not Applicable	Animal wastes

Treated Drinking Water from Bull Run Watershed and Columbia South Shore Well Field Entry Points to the Distribution System					
NUTRIENTS					
Nitrate - Nitrogen	<0.01 parts per million	0.24 parts per million	10 parts per million	10 parts per million	Found in natural aquifer deposits; animal wastes
METALS AND MINERALS					
Arsenic	<0.50 parts per billion	1.46 parts per billion	10 parts per billion	0 parts per billion	Found in natural deposits
Barium	0.00072 parts per million	0.0107 parts per million	2 parts per million	2 parts per million	
Chromium (total) ¹	<0.50 parts per billion	0.2 parts per billion	100 parts per billion	100 parts per billion	
Copper	<0.00050 parts per million	0.00202 parts per million	Not Applicable	1.3 parts per million	
Fluoride	<0.025 parts per million	0.15 parts per million	4 parts per million	4 parts per million	
Lead	<0.05 parts per billion	0.15 parts per billion	Not Applicable	0 parts per billion	

¹ During the year, tests with varying method reporting limits (MRLs) were used to analyze chromium. The sample with a result of <0.50 ppb was analyzed by a test with a less sensitive MRL and is why the minimum appears to be greater than the maximum.

Treated Drinking Water from Points throughout the Distribution System of Reservoirs, Tanks and Mains					
MICROBIOLOGICAL CONTAMINANTS					
E. coli Bacteria	Not Detected	Three routine samples in May were <i>E. coli</i> positive	A routine sample and a repeat sample are total coliform positive and one is also <i>E. coli</i> positive	0 samples with detectable <i>E. coli</i> bacteria	Human and animal fecal waste
Total Coliform Bacteria	Not Detected	1.1% of samples in May (3 out of 278) had detectable coliform bacteria	5.0% of monthly samples with detectable coliform bacteria	0 samples with detectable coliform bacteria	Found throughout the environment

DISINFECTANT RESIDUAL					
Total Chlorine Residual Running Annual Average	1.69 parts per million	2.02 parts per million	4 parts per million	4 parts per million	Chlorine and ammonia are used to disinfect water
Total Chlorine Residual At Any One Site	<0.1 parts per million	2.72 parts per million	Not Applicable	Not Applicable	

DISINFECTION BYPRODUCTS					
Total Trihalomethanes					
Running Annual Average at Any One Site	21.5 parts per billion	29.6 parts per billion	80 parts per billion	Not Applicable	Byproduct of drinking water disinfection
Single Result at Any One Site	12.6 parts per billion	47.0 parts per billion	Not Applicable		

Haloacetic Acids					
Running Annual Average at Any One Site	4.2 parts per billion	37.0 parts per billion	60 parts per billion	Not Applicable	Byproduct of drinking water disinfection
Single Result at Any One Site	<2.0 parts per billion	70.0 parts per billion	Not Applicable		

Regulated Contaminant	90 th Percentile Values	Number of Sites Exceeding the Action Level	Lead and Copper Rule Exceedance	Maximum Contaminant Level Goal (MCLG)	Source of Contaminant
Lead and Copper Sampling at High-Risk Residential Water Taps					
Lead	14 parts per billion	9.6% of samples (11 out of 114) exceeded the lead action level of 15 parts per billion	More than 10% of the homes tested have lead levels greater than 15 parts per billion	0 parts per billion	Corrosion of household and commercial building plumbing systems
Copper	0.34 parts per million	0% of samples (0 out of 114) exceeded the copper action level of 1.3 parts per million	More than 10% of the homes tested have copper levels greater than 1.3 parts per million	1.3 parts per million	

Unregulated Contaminant	Minimum Detected	Average Detected	Maximum Detected	Source of Contaminant
Treated Drinking Water from Bull Run Watershed and Columbia South Shore Well Field Entry Points to the Distribution System				
Radon	310 picocuries per liter	310 picocuries per liter	310 picocuries per liter	Found in natural deposits
Sodium	2.93 parts per million	8.03 parts per million	21.6 parts per million	

See **Notes on Contaminants** on page 7 for more information.

Definitions

Action Level

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

Maximum Contaminant Level (MCL)

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 treatment technology.

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 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 contaminants.

Nephelometric Turbidity Units (NTU)

The unit of measurement of turbidity or cloudiness in water as measured by the amount of light passing through a sample.

Part Per Million (ppm)

One part per million corresponds to one penny in \$10,000 or approximately one minute in two years. One part per million is equal to 1,000 parts per billion.

Part Per Billion (ppb)

One part per billion corresponds to one penny in \$10,000,000 or approximately one minute in 2,000 years.

Picocuries Per Liter

Picocurie is a measurement of radioactivity. One picocurie is one trillion times smaller than one curie.

Treatment Technique

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

Notes on Contaminants

Turbidity

The Bull Run is an unfiltered surface water supply. The rules for public water systems have strict standards for unfiltered surface water supplies. Turbidity levels in unfiltered water must not exceed 5 NTU (nephelometric turbidity units) more than two times in a twelve-month period. The typical cause of turbidity is sediment suspended in the water. The sediment can interfere with disinfection and provide an environment for microbial growth. Large storm events can result in increased turbidity, causing the Portland Water Bureau to shut down the Bull Run system and serve water from the Columbia South Shore Well Field.

Total Organic Carbon

Total organic carbon is naturally found in water and can react with disinfectants to produce disinfection byproducts. The Portland Water Bureau monitors for total organic carbon as part of disinfection byproduct monitoring.

Giardia

Wildlife in the watershed may be hosts to *Giardia*, the organism that causes giardiasis. The Portland Water Bureau uses chlorine to control these organisms.

Fecal Coliform Bacteria

The presence of fecal coliform bacteria in source water indicates that water may be contaminated with animal wastes. The Portland Water Bureau uses chlorine to kill these bacteria.



The Portland Water Bureau monitors for more than 200 regulated and unregulated contaminants.

Nitrate - Nitrogen

Nitrate, measured as nitrogen, can support microbial growth (bacteria and algae). Nitrate levels exceeding the standards can contribute to health problems. At the levels found in Portland's drinking water, nitrate is unlikely to contribute to adverse health effects.

Arsenic, Barium, Chromium (total), Copper, Fluoride and Lead

These metals are elements found in the earth's crust. They can dissolve into water that is in contact with natural deposits. At the levels found in Portland's drinking water, they are unlikely to contribute to adverse health effects. There is no maximum contaminant level (MCL) for copper and lead at the entry point to the distribution system. Copper and lead are regulated at customers' taps. For more information see *Reducing Exposure to Lead* on page 8.

E. coli Bacteria

E. coli are bacteria that indicate that the water may be contaminated with human or animal wastes. The Portland Water Bureau uses chlorine to kill these bacteria. For more information see *May 2014 Boil Water Notice* on page 10.

Total Coliform Bacteria

Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other potentially-harmful bacteria may be present. The Portland Water Bureau uses chlorine to kill these bacteria.

Total Chlorine Residual

Total chlorine residual is a measure of free chlorine and combined chlorine and ammonia in our distribution system. Chlorine residual is necessary to maintain disinfection throughout the distribution system. Adding ammonia to chlorine results in a more stable disinfectant and helps to minimize the formation of disinfection byproducts.

Disinfection Byproducts

During disinfection, certain byproducts form as a result of chemical reactions between chlorine and naturally occurring organic matter in the water. These byproducts can have negative health effects. Trihalomethanes and haloacetic acids are regulated disinfection byproducts that have been detected in Portland's water. The disinfection process is carefully controlled to keep byproduct levels low.

Radon

Radon is a naturally occurring radioactive gas that cannot be seen, tasted or smelled. Radon was not detected in the Bull Run water supply. It has been detected at varying levels in Portland's groundwater supply. For information about radon, call the EPA's Radon Hotline (800-SOS-RADON) or www.epa.gov/radon/rnwater.html.

Sodium

There is currently no drinking water standard for sodium. Sodium is an essential nutrient. At the levels found in drinking water, it is unlikely to contribute to adverse health effects.

Reducing Exposure to Lead

Portland has removed all known lead service connections from its distribution system. Exposure to lead through drinking water is possible if materials in a building's plumbing contain lead. The level of lead in water can increase when water stands in contact with lead-based solder and brass faucets containing lead.

If present, lead at elevated levels can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The Portland Water Bureau is responsible for providing high-quality drinking water, but cannot control the variety of materials used in plumbing components in homes or buildings. 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 drinking water, you can request a free lead-in-water test from the LeadLine. Information on lead in drinking water, testing methods and steps you can take to minimize exposure is available from the **LeadLine, 503-988-4000**, www.leadline.org or the Safe Drinking Water Hotline **800-426-4791**, www.epa.gov/safewater/lead.

People are exposed to lead in many other ways. In the Portland area, dust from paint in homes built before 1978 is the most common source of exposure to lead. Other sources include soil, pottery, traditional folk medicines or cosmetics, some sports equipment such as fishing weights and ammunition, and some occupations and hobbies.

Corrosion Treatment

The Portland Water Bureau's corrosion control treatment reduces corrosion in plumbing by increasing the pH of the water. Comparison of monitoring results with and without pH adjustment shows more than 50 percent reduction in lead and 80 percent reduction in copper at the tap with pH adjustment.

Water Testing

Twice each year the Portland Water Bureau and regional water providers in the Bull Run service area monitor for lead and copper in tap water from a sample group of more than 100 homes. These are homes in the Bull Run service area where the plumbing is known to contain lead solder, which is more likely to contribute to elevated lead levels. These houses represent a worst-case scenario for lead in water. Samples are collected after the water has been standing in the household plumbing for more than 6 hours. A Lead and Copper Rule exceedance for lead occurs when more than 10 percent of these homes exceed the lead action level of 15 parts per billion. In the most recent round of testing, less than 10 percent of homes exceeded the lead action level.

If you are concerned that your home tap water may have lead, contact the LeadLine for a free lead-in-water test kit and to learn ways to reduce your exposure to all sources of lead. This program is available to everyone, but targets testing the water in households most at-risk from lead in water. These are homes built between 1970 and 1985 with pregnant women or children ages six or younger in the home.



Easy steps to avoid possible exposure to lead in drinking water

▶ Run your water to flush out lead.

If the water has not been used for several hours, run each tap for 30 seconds to 2 minutes or until it becomes colder before drinking or cooking. This flushes water which may contain lead from the pipes.

▶ Use cold, fresh water for cooking and preparing baby formula.

Do not cook with or drink water from the hot water tap; lead dissolves more easily into hot water. Do not use water from the hot water tap to make baby formula.

▶ Do not boil water to remove lead.

Boiling water will not reduce lead.

▶ Consider using a filter.

Check whether it reduces lead – not all filters do. Be sure to maintain and replace a filter device in accordance with the manufacturer's instructions to protect water quality. Contact NSF International at **800-NSF-8010** or www.nsf.org for information on performance standards for water filters.

▶ Test your water for lead.

Call the **LeadLine** at **503-988-4000** to find out how to get a **FREE** lead-in-water test.

▶ Test your child for lead.

Ask your physician or call the **LeadLine** to find out how to have your child tested for lead. A blood lead level test is the only way to know whether your child is being exposed to lead.

▶ Regularly clean your faucet aerator.

Particles containing lead from solder or household plumbing can become trapped in your faucet aerator. Regular cleaning every few months will remove these particles and reduce your exposure to lead.

▶ Consider buying low-lead fixtures.

As of January 2014, all pipes, fittings and fixtures are required to contain less than 0.25% lead. When buying new fixtures, consumers should seek out those with the lowest lead content. For more information, visit www.portlandoregon.gov/water/lowlead.

LeadLine – 503-988-4000

Call the **LeadLine** or visit www.leadline.org for information about lead hazards, free lead-in-water testing, free childhood blood lead testing and referrals to other lead reduction services.

www.leadline.org

Developments in Water Quality

Unregulated Contaminant Monitoring Rule

The Unregulated Contaminant Monitoring Rule (UCMR) is an EPA regulatory tool that focuses on substances that are not yet regulated by current drinking water rules. Through the UCMR, the EPA gathers information about the presence and levels of these currently unregulated substances in drinking water. Approximately every five years, the EPA requires that water providers test for a list of substances. The EPA uses the results to determine the extent and level at which the listed substances are present in drinking water around the country. The results of the testing along with the potential health risks of the listed substances are evaluated by the EPA to determine if rules to regulate the substances are needed. This is the third time monitoring has been required under this program, and is referred to as UCMR3.

In 2014, the Portland Water Bureau tested for the current list of 21 unregulated substances as required by UCMR3. Testing was performed on a quarterly basis from the Bull Run source water and in the distribution system. The Columbia South Shore Well Field source water was also monitored during the July groundwater run. Of the 21 substances, 5 were detected in the source water and the distribution system.

UCMR3 Detections in 2014

Substance	Minimum Detected	Average Detected	Maximum Detected	Likely Source
Treated Drinking Water from Bull Run Watershed and Columbia South Shore Well Field Entry Points to the Distribution System				
Chlorate	<0.020 parts per million	0.60 parts per million	3.0 parts per million	Byproduct of drinking water disinfection
Chromium (total)	<0.2 parts per billion	<0.2 parts per billion	0.2 parts per billion	Found in natural deposits
Chromium-6	<0.03 parts per billion	0.031 parts per billion	0.048 parts per billion	
Strontium	0.010 parts per million	0.026 parts per million	0.074 parts per million	
Vanadium	0.27 parts per billion	0.84 parts per billion	2.9 parts per billion	
Treated Drinking Water from Points throughout the Distribution System of Reservoirs, Tanks and Mains				
Chlorate	<0.020 parts per million	<0.020 parts per million	0.029 parts per million	Byproduct of drinking water disinfection
Chromium (total)	<0.2 parts per billion	<0.2 parts per billion	0.24 parts per billion	Found in natural deposits
Chromium-6	<0.03 parts per billion	0.030 parts per billion	0.046 parts per billion	
Strontium	0.010 parts per million	0.015 parts per million	0.019 parts per million	
Vanadium	0.28 parts per billion	0.32 parts per billion	0.36 parts per billion	

Chlorate

Chlorate, a byproduct of the drinking water disinfection process, can form when sodium hypochlorite is used as a disinfectant. The current EPA health reference concentration indicates that ongoing exposure to chlorate at levels of more than 0.21 parts per million per day may lead to negative health effects. In July 2014, the level of chlorate from the Columbia South Shore Well Field groundwater treatment plant exceeded this level. The Portland Water Bureau is investigating the cause of this unusually high level. Unlike the Bull Run treatment plant, which uses gaseous chlorine for a disinfectant, the groundwater facility uses liquid hypochlorite. As hypochlorite ages, it can contribute chlorate to drinking water. As a result of the detections at the groundwater treatment plant, the Portland Water Bureau is implementing several changes in how hypochlorite is managed to minimize the levels of chlorate in drinking water. Since only a small amount of groundwater was served for a limited time period, the presence of chlorate is unlikely to contribute to adverse health effects.

Chromium (total) and Chromium-6

Chromium is a naturally occurring element found in rocks, animals, plants, soil and in volcanic dust and gases. Chromium can exist in a variety of forms, but is typically found in the environment and drinking water in two main forms: trivalent chromium (chromium-3) and hexavalent chromium (chromium-6). Chromium can transform from one form to another in water and soil, depending on the conditions present. Chromium-3 occurs naturally in the environment and is an essential human dietary nutrient. Chromium-6 is the more toxic form and is generally associated with industrial processes. Recent studies have shown that ingestion of drinking water or food containing chromium-6 may cause cancer in laboratory mice and rats. Total chromium (combined chromium-3 and -6) is currently regulated by the EPA at a maximum contaminant level of 100 parts per billion. At the very low levels detected in Portland's drinking water, chromium-6 is unlikely to contribute to adverse health effects.

Strontium

Strontium is a naturally occurring metal and is commonly found throughout the environment including in drinking water. Consumption of small amounts of strontium is not harmful. However, high levels of strontium can occur in water drawn from aquifers that are rich in strontium minerals. The current EPA health reference concentration indicates that ongoing exposure to strontium at levels of more than 4,000 parts per billion per day may lead to negative health effects. At the very low levels detected in Portland's drinking water, strontium is unlikely to contribute to adverse health effects.

Vanadium

Vanadium is a metal found in the earth's crust which can dissolve into water that is in contact with natural deposits. The current EPA health reference concentration for vanadium indicates that ongoing exposure to vanadium at levels of more than 21 parts per billion per day may lead to negative health effects. At the levels found in Portland's water, vanadium is unlikely to contribute to adverse health effects.

May 2014 Boil Water Notice

On May 23rd, 2014, the Portland Water Bureau issued a boil water notice that affected 670,000 people in the Portland area. All customers of the Portland Water Bureau and nine regional providers were advised to boil their tap water for one minute before consuming. The notice was issued in consultation with the Oregon Health Authority following three consecutive days of *E. coli*-positive results from routine drinking water samples at three different locations. While these bacterial detections did not violate any drinking water standards, they did indicate a potential health risk in the drinking water system.

During the boil water advisory, the Portland Water Bureau and other affected systems performed extensive water sampling. The results of more than 60 samples collected that day showed no bacterial detections. This indicated that there was no longer a health risk, and the advisory was lifted on the morning of May 24th as soon as the results were received.

After the boil water notice was lifted, the Portland Water Bureau conducted a thorough investigation to attempt to determine the cause of the positive detections. The result of the investigation was inconclusive. At the same time, the Multnomah County Health Department Communicable Disease Services program conducted an incident investigation for evidence of a health outbreak. The Health Department's investigation concluded that there was no detectable increase in gastrointestinal illness as a result of the bacterial detections in the water.

The Portland Water Bureau continues to routinely monitor the drinking water system for potential bacterial contamination, testing over 240 water samples per month. The public will be notified if future results show a potential health risk.

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Bull Run Treatment Variance

In March 2012, the Oregon Health Authority (OHA) issued the Portland Water Bureau a variance from the state and federal drinking water rules requiring the treatment of raw water from the Bull Run Watershed for the parasite *Cryptosporidium*. A variance is state permission not to meet an MCL or a treatment technique under certain conditions. A state may grant a variance if a water system demonstrates that the required treatment is not necessary to protect public health because of the nature of the water system's raw water source. OHA issued Portland Water Bureau the treatment variance for *Cryptosporidium* based on substantial data and analyses presented in the *LT2 Treatment Variance Request* for the Bull Run drinking water source. The Portland Water Bureau is the only system in the United States to have received a variance to the treatment requirements for *Cryptosporidium* based on the high quality of its raw water and therefore does not provide treatment for *Cryptosporidium*.

As a result of the treatment variance, the following are among the state-mandated conditions that must be met in order to maintain the variance:

Watershed Protection: The Portland Water Bureau must maintain or strengthen all existing legal and operational protections for the Bull Run watershed, monitor the watershed on a routine basis in an effort to eliminate unauthorized entry, maintain strict controls for sanitary facilities, implement field inspections and monitor tributaries and wildlife scat in the watershed.

Raw Water Intake Monitoring: The Portland Water Bureau must conduct regular ongoing monitoring for *Cryptosporidium* where raw water first enters the drinking water system at least two days each week. If *Cryptosporidium* is detected in any one sample, the Portland Water Bureau must begin a much more intensive monitoring program to demonstrate whether the *Cryptosporidium* concentration is less than 0.075 oocysts per 1,000 liters of water. Additional detections of *Cryptosporidium* during this period of monitoring could result in OHA revoking the variance.

Reporting and Notification: The Portland Water Bureau must report the results of watershed and raw water monitoring to OHA. Any detections of *Cryptosporidium* must be reported to OHA within 24 hours. The Portland Water Bureau must notify the public through its website and issue a press release in the event of a *Cryptosporidium* detection at the raw water intake. The results of watershed field inspections and tributary and wildlife scat monitoring must be reported to OHA annually. The Portland Water Bureau must also notify OHA of any circumstances that may impact the conditions of the variance.

The treatment variance is valid for a period of 10 years from the date it was issued. OHA may revoke the variance if the conditions of the variance are not met.

2014 Results of *Cryptosporidium* Monitoring at the Raw Water Intake

Number of Samples	Total Volume	Detections
241	5,399.7 L	None

In 2014, there were no detections of *Cryptosporidium* during Raw Water Intake Monitoring. The most recent monthly intake reports can be found at www.portlandoregon.gov/water/BRTVIntakeReports.

The most recent annual *Bull Run Treatment Variance Watershed Report* summarizes the results of watershed field inspections and monitoring of tributaries and wildlife scat for Water Year 2014 (October 1, 2013 – September 30, 2014) and can be found at www.portlandoregon.gov/water/2014BRTVReport.

Additional information on Portland Water Bureau's treatment variance can be found at www.portlandoregon.gov/water/treatmentvariance.




1120 SW Fifth Avenue / Room 600
Portland, Oregon 97204

Commissioner Nick Fish
Administrator David G. Shaff



Bull Run Lake in the Bull Run Watershed.
Credit: Roman Johnston.

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CONTACT INFORMATION

Portland Water Bureau

1120 SW Fifth Avenue/ Room 600
Portland, Oregon 97204

www.portlandoregon.gov/water

Public Water System #4100657

Portland Water Bureau

Customer Service: 503-823-7770

Portland Water Bureau

Water Line: 503-823-7525

FOR ADDITIONAL INFORMATION

Oregon Health Authority –

Drinking Water Services: 971-673-0405

[http://public.health.oregon.gov/
HealthyEnvironments/DrinkingWater/
Pages/index.aspx](http://public.health.oregon.gov/HealthyEnvironments/DrinkingWater/Pages/index.aspx)

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