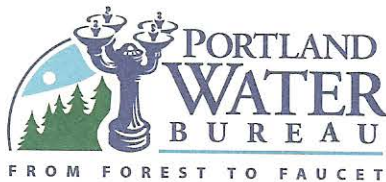


PORTLAND WATER BUREAU

2014 Drinking Water Quality Report





From the Administrator

I am pleased to share the 2014 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.

Like last year, you are likely reading the report online, rather than the traditional paper copy sent by mail. The Environmental Protection Agency recently changed the requirements to allow utilities to communicate this important information digitally. Customers are still able to request a paper copy, and can do so by calling 503-823-7525 or visiting www.portlandoregon.gov/water/reportrequest.

One thing you might note is that the Portland Water Bureau monitors Portland's drinking water for more than 200 regulated and unregulated contaminants. We are fortunate that Portland's water is some of the highest-quality drinking water in the world.

The Portland Water Bureau works diligently to protect this essential resource, and to preserve and enhance the system that delivers water to your home or business. I urge you to take a minute to look through this report; learn about your water system and some of what goes into delivering water to your tap.

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 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) – approximately ¼ to ½ a grain of hardness per gallon. 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 7.4 and 8.1.

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 cannot be seen, tasted or smelled. Radon has never been detected in the Bull Run surface water supply. In past years, radon has been detected at varying levels in Portland's groundwater wells. In 2013, a limited amount of groundwater was used during a short maintenance run. No data on radon was collected during that time. Based on the historical levels and limited amount of groundwater used, radon is unlikely to contribute to adverse health effects. For more information about radon, call the EPA's 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**.

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 **503-823-6926**, or visit the Water Bureau's website to learn more about the bureau or to leave a comment: www.portlandoregon.gov/water.

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, including pesticides and radioactive contaminants. All monitoring data in this report are from 2013. **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.

Guidelines from the Environmental Protection Agency and Centers for Disease Control and Prevention 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**.

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.

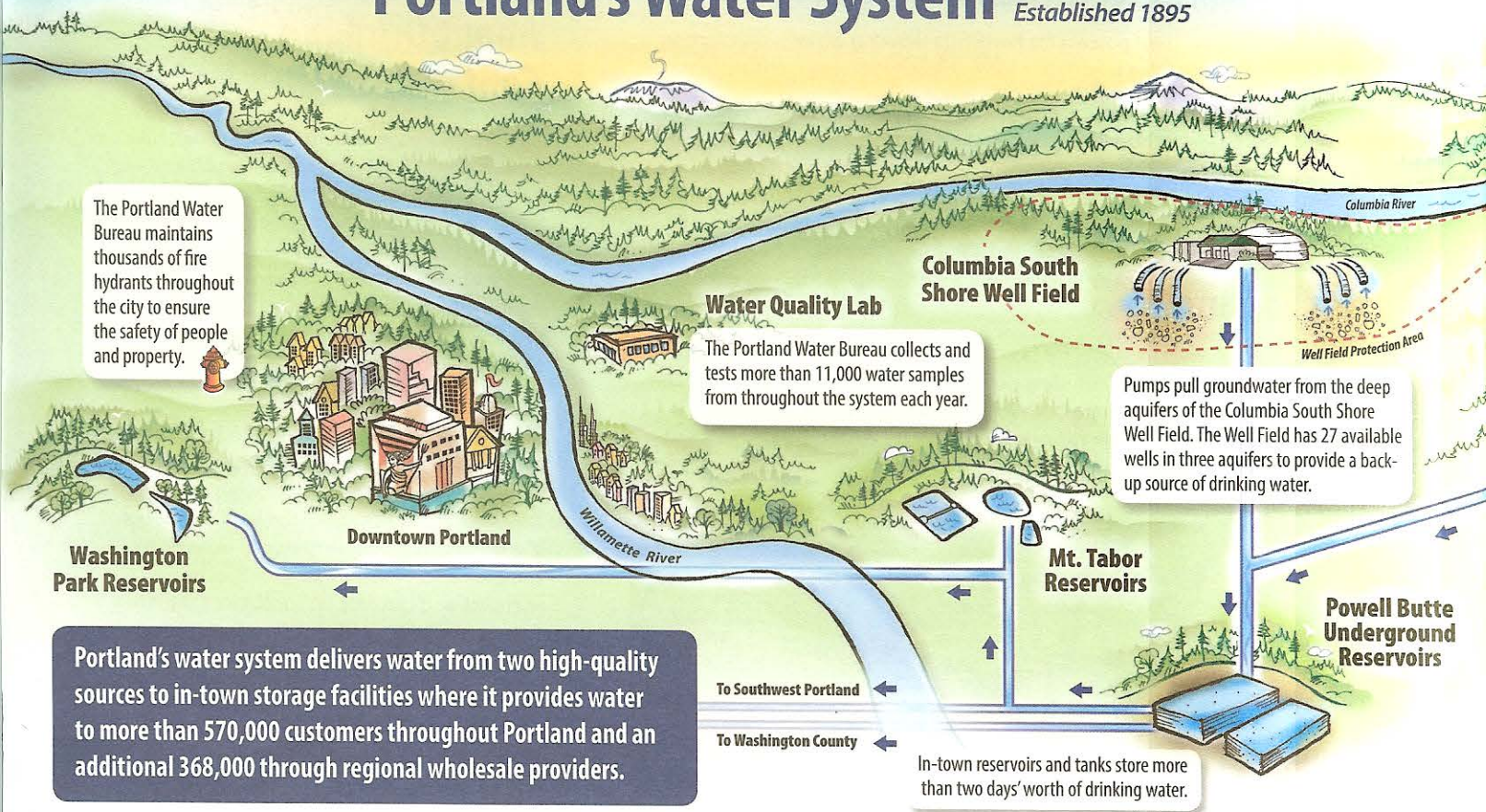
Pesticides and herbicides, which may come from a variety of sources such as farming, urban stormwater runoff and home or business use.

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.

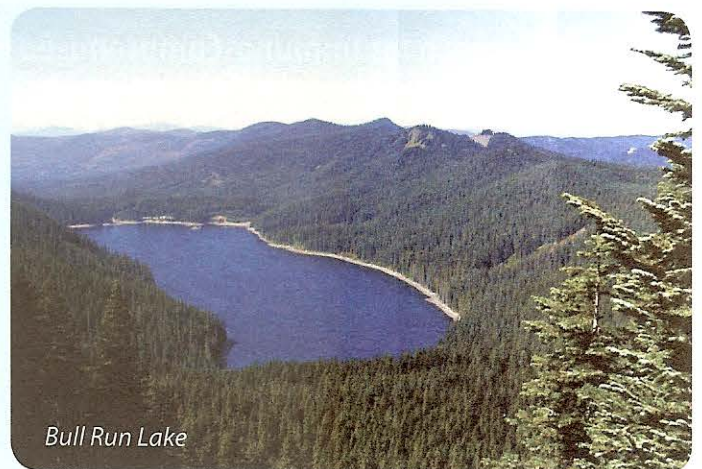
Portland's Water System Established 1895

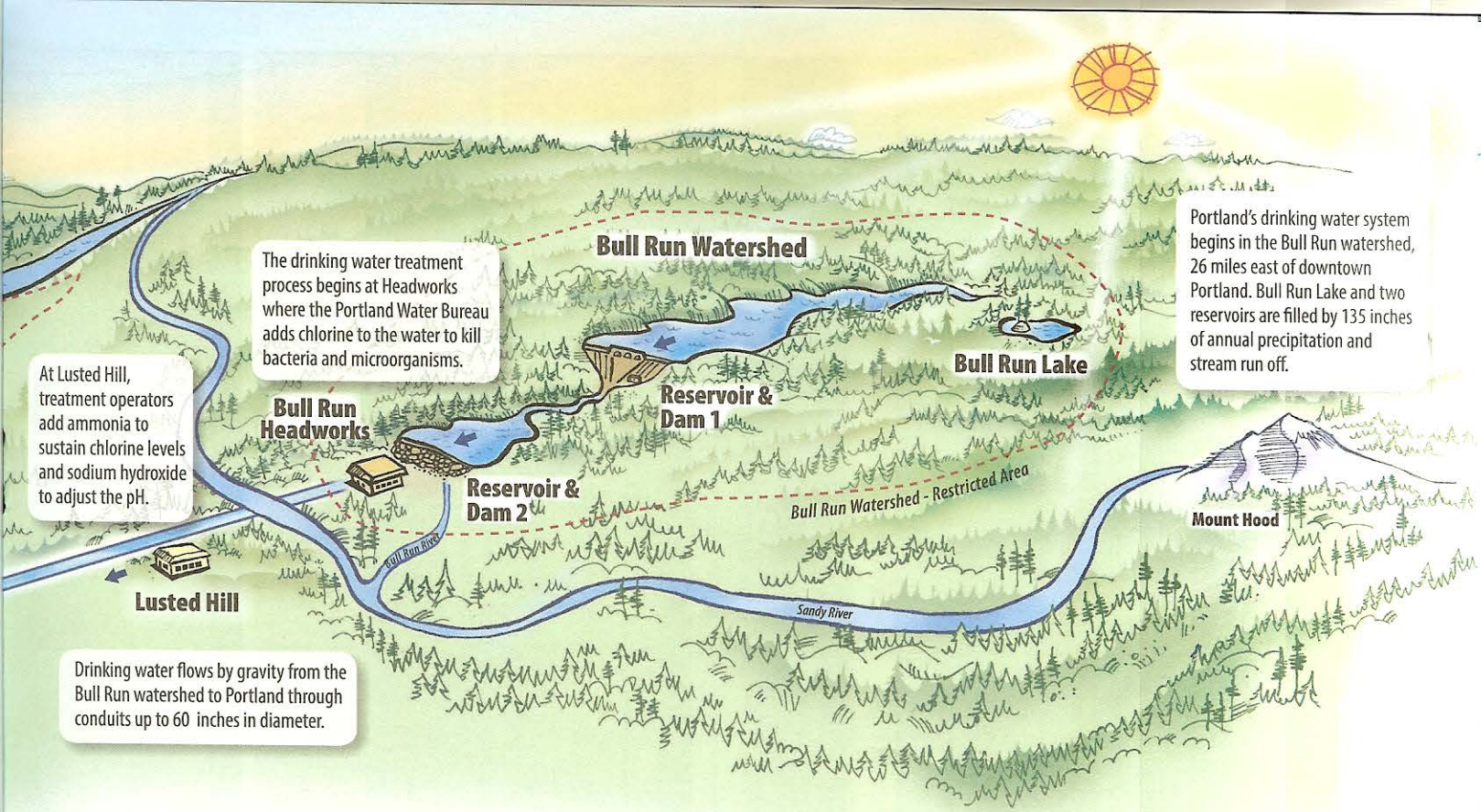


The Bull Run Watershed is a surface water supply within the Bull Run Watershed Management Unit located in the Mt. Hood National Forest. The watershed is Portland's primary drinking water source. The Bull Run watershed and Mount Hood are separated by a geological ridge, preventing Mount Hood snowmelt from reaching 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 this high-quality Bull Run water supply. The watershed has an area of 102 square miles, and typically receives 80-170 inches of rainfall a year. The heaviest rains occur from late fall through spring. Two reservoirs store water for use year-round, particularly during the dry summer months.

The watershed is used mainly for producing drinking water. Federal 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.

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 known 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 are present in the Bull Run supply at very low levels. The Bull Run 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 9 for more information. The Source Water Assessment report is available at www.portlandoregon.gov/water/sourcewaterassessment and by calling 503-823-7525.





The drinking water treatment process begins at Headworks where the Portland Water Bureau adds chlorine to the water to kill bacteria and microorganisms.

At Lusted Hill, treatment operators add ammonia to sustain chlorine levels and sodium hydroxide to adjust the pH.

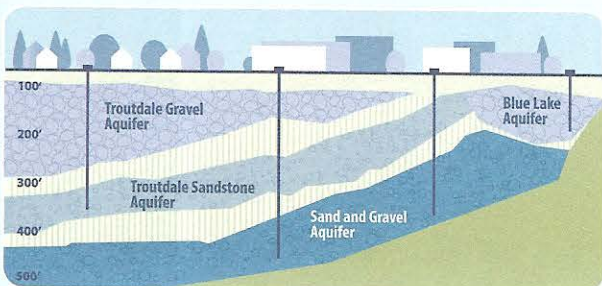
Portland's drinking water system begins in the Bull Run watershed, 26 miles east of downtown Portland. Bull Run Lake and two reservoirs are filled by 135 inches of annual precipitation and stream run off.

Drinking water flows by gravity from the Bull Run watershed to Portland through conduits up to 60 inches in diameter.

The Columbia South Shore Well Field

provides high-quality drinking water from groundwater production wells located in three different aquifers. In 2013, over the course of 7 days beginning July 30, the Portland Water Bureau supplemented the Bull Run drinking water supply with approximately 30 million gallons of groundwater as part of an 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 2013

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	0.16 NTU	3.13 NTU	Cannot exceed 5 NTU more than 2 times in 12 months	Not Applicable	Erosion of natural deposits
Total Organic Carbon	0.76 parts per million	1.7 parts per million	Not Applicable	Not Applicable	Naturally present in the environment
Giardia	Not detected	2 <i>Giardia</i> cysts in 11.3 L	Treatment technique required: Disinfection to kill 99.9% of cysts	Not Applicable	Animal wastes
Fecal Coliform Bacteria	Not detected	99% of samples had 20 or fewer bacterial colonies per 100 milliliters of water (1 sample had 24 bacterial colonies per 100 milliliters and 1 sample had 27 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	10 parts per million Found in natural aquifer deposits; animal wastes

METALS AND MINERALS

Arsenic	<0.50 parts per billion	0 parts per billion
Barium	0.00091 parts per million	2 parts per million
Chromium (total)	<0.50 parts per billion	100 parts per billion
Copper	<0.00050 parts per million	1.3 parts per million
Fluoride	<0.025 parts per million	4 parts per million

Treated Drinking Water from Points throughout the Distribution System of Reservoirs, Tanks and Main Water Pipes

MICROBIOLOGICAL CONTAMINANTS

Total Coliform Bacteria	Not Detected	12% (45 out of 384) of samples in September had detectable coliform bacteria	Must not detect coliform bacteria in more than 5.0% of samples in any month	0% of samples with detectable coliform bacteria	Found throughout the environment
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DISINFECTANT RESIDUAL

Total Chlorine Residual Running Annual Average	1.3 parts per million	1.6 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	3.3 parts per million	Not Applicable	Not Applicable	

DISINFECTION BYPRODUCTS

Total Trihalomethanes

Running Annual Average at Any One Site	11 parts per billion	26 parts per billion	80 parts per billion	Not Applicable	Byproduct of drinking water disinfection
Single Result at Any One Site	11 parts per billion	42 parts per billion	Not Applicable	Not Applicable	

Haloacetic Acids

Running Annual Average at Any One Site	1.5 parts per billion	32 parts per billion	60 parts per billion	Not Applicable	Byproduct of drinking water disinfection
Single Result at Any One Site	1.5 parts per billion	61 parts per billion	Not Applicable	Not Applicable	

Regulated Contaminant

90th 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	16 parts per billion	12% (13 of 108) of samples 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	0.48 parts per million	0% (0 of 108) of samples 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

Sodium	2.8 parts per million	6.9 parts per million	17 parts per million	Found in natural deposits	
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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.

Part Per Million (ppm)

One part per million corresponds to one penny in 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.

Treatment Technique

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

Notes on Contaminants

Turbidity

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 (TOC) is naturally found in water and can react with disinfectants to produce disinfection by-products (DBPs). The Portland Water Bureau monitors for TOC to qualify for reduced DBP monitoring. Surface water systems are eligible for reduced DBP monitoring when DBP levels are $\leq 50\%$ of the MCL and TOC monitoring is ≤ 4.0 mg/L.

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.

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.



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

Arsenic, Barium, Chromium (total) and Fluoride

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.

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. During the month of September, coliforms were found in more samples than allowed and this was a warning of potential problems. For more information, see *Total Coliform Detections in September 2013* on page 10.

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.

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.

Lead and Copper

There is no maximum contaminant level (MCL) for lead or copper at the entry point to the distribution system. The main source of lead and copper is the corrosion of building plumbing. Lead and copper are tested at customers' taps where levels are the highest. Infants and children who drink water containing lead in excess of the action level could experience delays in their physical or mental development. Children could show slight deficits in attention span and learning abilities. Adults who drink this water over many years could develop kidney problems or high blood pressure. For more information, see *Reducing Exposure to Lead* on page 8.

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 may wish to 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, more than 10 percent of homes exceeded the lead action level. As a result of exceeding the action level, the Portland Water Bureau has been informing customers and encouraging them to follow the easy steps to reduce exposure to lead in water (see sidebar).

If you are concerned that your home tap water may have lead, call 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 anyone, 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.

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

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. 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.

2013 Results of *Cryptosporidium* Monitoring at the Raw Water Intake

Number of Samples	Total Volume	Detections
244	5,825.4 L	None

In 2013, 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 2013 (October 1, 2012 – September 30, 2013) and can be found at www.portlandoregon.gov/water/2013BRTVReport.

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



Bull Run Reservoir 1

Developments in Water Quality

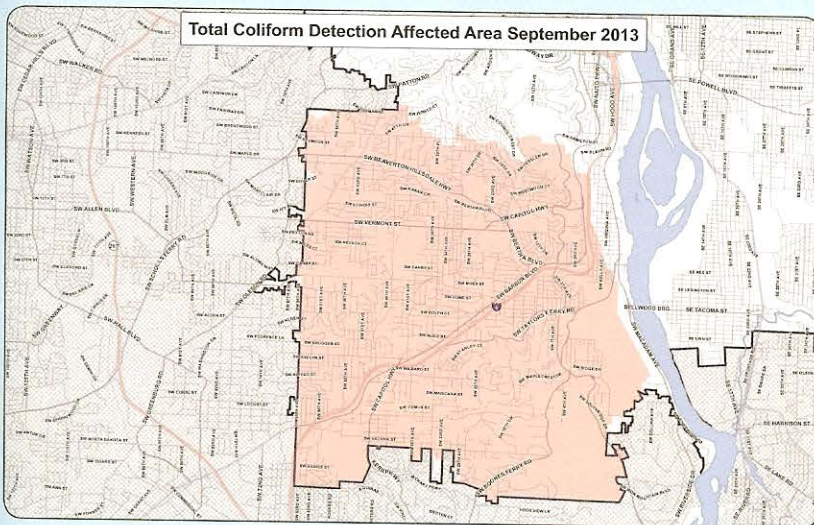
Total Coliform Detections in September 2013

The Portland Water Bureau routinely monitors for drinking water contaminants. This monitoring includes regular testing throughout the system for bacteria. During the month of September 2013, the Portland Water Bureau tested 384 samples for bacteria. Forty-five of these samples tested positive for 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. Coliforms were found in more samples than allowed and this was a warning of potential problems. The majority of the coliform detections were limited to an area of SW Portland that affected approximately 17,500 households and businesses. These detections occurred after a routine water quality sample collected from SW 27th Avenue and Nevada Court on September 17, 2013, was positive for total coliforms. Follow-up samples collected in the area were also positive for total coliforms. All samples were negative for *E. coli*. As a result of the detections, the Portland Water Bureau mailed a notice to all customers in the affected area.

Even after a thorough investigation, the Portland Water Bureau was unable to identify any sources of contamination or any operational issues in this area. It appears the issue was the result of unusually warm water combined with a decrease in demand. Warm, slow-moving water results in decreased disinfectant residuals. A disinfectant residual is the amount of disinfectant left in the system after the water has traveled from the treatment facility. Lower disinfectant residuals can lead to an increase in bacterial activity.

To improve the disinfection residual, the Portland Water Bureau increased the amount of disinfectant added when it treats the water. In addition, the Portland Water Bureau performed high-velocity flushing to remove sediments and organic matter from the pipes in this area. This further increased the disinfection residual and brought in fresh, cool water. Follow-up testing on October 22 did not detect any bacteria. Continued monitoring and testing in this area, as well as the entire drinking water system, indicates that these actions were effective in resolving this issue.

The Portland Water Bureau continues to regularly monitor the distribution system, including this effected area in southwest Portland.



Unidirectional Flushing

Drinking water systems, especially unfiltered systems like Portland, need to routinely clean the network of pipes to improve water quality. Over time, very fine sediment and organic matter from the Bull Run settle out of the water and accumulate in the bottom of the pipes. While the sediments are generally harmless, they can react with the residual disinfectant, reducing its effectiveness. Additionally, sudden changes in the flow of water can disturb these sediments resulting in discolored water.

Cleaning out these sediments from the distribution system is done using a technique called Unidirectional Flushing (UDF). To perform a UDF, water in the pipes needs to flow at a high velocity. This is done through a system analysis to determine which valves to close to increase the flow of water in the area to be flushed. This high velocity water is then flushed out through a fire hydrant to remove the accumulated sediments.

As part of the preparation for UDF, Portland Water Bureau crews check and operate the valves in the area to be flushed to make sure they are functioning and in the proper position. Most flushing occurs Monday through Friday between 9:00 AM and 3:00 PM. The flushed water is dechlorinated and discharged into Portland's sewer system. To prevent sewer overflows, UDF is only done when little or no rain is falling. Therefore the majority of UDF work is done in the summer and fall.

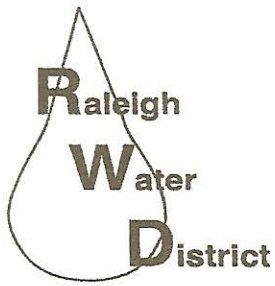


This summer the Portland Water Bureau is focusing on flushing SW Portland (roughly bounded by Hwy 26 on the north, I-5 on the south, SW Barbur Blvd on the east, and SW 50th Ave on the west) and NW Portland in the Northwest Heights area.

Residents should not be out of water during flushing. However, some residents in the immediate vicinity of the work may experience temporary discoloration of their water. This discoloration does not pose a health risk; however residents should check their water before washing any laundry.

Advice to customers: If a flushing crew is in your neighborhood, please do not run water in your home unless it's necessary. If you experience some discoloration in your water, turn on each cold water faucet in your home and allow it to run for several minutes or until the water is clear. If you experience ongoing water quality problems, please call 503-823-7525.

Additional advice for customers and more detailed maps of current flushing areas can be found at www.portlandoregon.gov/water/UDF.



RALEIGH WATER DISTRICT

5010 SW Scholls Ferry Road
Portland, Oregon 97225
503-292-4894



Before



After

The Portland Water Bureau is rebuilding the Key Station structures in the Bull Run Watershed. The Key Stations house stream-flow gages, water-quality sensors and sampling equipment used to monitor the four major streams that flow into the Bull Run Reservoirs. As part of this effort, the older sampling equipment at all four sites will be replaced with new sampling units that offer greater capabilities for targeted water quality monitoring during rainfall events.

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FOR ADDITIONAL INFORMATION

Oregon Health Authority – Drinking Water Services: 971-673-0405

<http://public.health.oregon.gov/HealthyEnvironments/DrinkingWater/Pages/index.aspx>

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ADDENDUM

WATER QUALITY REPORT 2014

Raleigh Water District participates in the joint monitoring program with the City of Portland. This joint monitoring program allows the District to use samples from Portland's system, to meet most of the monitoring requirements.

The following tables list the additional sampling that the District performed within our own system in 2013.

Regulated Contaminants					
Distribution System	Minimum Detected	Maximum Detected	MRDL	MRDLG	Source of Contaminant
Chlorine Residual	Not Detected	2.2 ppm	4 ppm	4 ppm	Chloramines are used to disinfect water.
Total Coliform Bacteria Raleigh Water District Distribution System	Not detected	Not detected	<u>MCL</u> Must not detect coliform bacteria in more than 5% of samples in any month.	<u>MCLG</u> N/A	Found throughout the environment
<u>Disinfection Byproducts</u> Total Trihalomethanes Running Annual Average of all sites. Single result at any one site.	11.23 ppb 21 ppb	14.7 ppb 37.8 ppb	80 ppb	<u>MCLG</u> Not Applicable	Byproduct of drinking water disinfection
<u>Haloacetic Acids</u> Running Annual Average of all sites. Single Result at any one site	10.83 ppb 16.6 ppb	11.28 ppb 26.7 ppb	60ppb	Not Applicable	Byproduct of drinking water disinfection

If you have any questions or comments about this report, please call Raleigh Water District at **503-292-4894**.