



**CASCADE**  
GROUNDWATER ALLIANCE  
GRESHAM • ROCKWOOD

# GROUNDWATER SAFETY

## **Where does our groundwater supply come from?**

Rockwood Water and the City of Gresham pump groundwater from the Sand and Gravel Aquifer (SGA), the oldest (2 to 5 million years old) of the sedimentary aquifers in the Portland Basin.

Groundwater is fresh water from rain or melting ice and snow that soaks into the soil and is stored in the tiny spaces between rocks, particles of soil and sand much the same way that water fills a sponge. It is stored in and moves slowly through geologic formations called aquifers.

Aquifers are typically made up of gravel, sand, sandstone, or fractured rock, like basalt and limestone. The sedimentary aquifers in the Portland Basin consist primarily of sand and gravel, separated by layers of clay and siltstone.

Rockwood Water built its first groundwater well in 1926 and has used groundwater to supply or augment supply for 95 years. Gresham drilled Cascade Well #5 in 2008. Gresham and Rockwood Water have been in a partnership and using groundwater for more than 12 years to supplement the Portland wholesale water supply.

## **Where is the SGA?**

The SGA is the deepest and most extensive of the confined aquifers in the basin. The top of the aquifer is found at depths of between 450 feet to more than 1,400 feet below the surface at the locations of the existing and planned Gresham/Rockwood Water groundwater supply wells. The SGA extends north from the vicinity of the Clackamas River to the Lewis River in Clark County, Washington, and from east of the Sandy River to the Portland Hills.

## **How is the SGA replenished?**

Groundwater supplies are replenished (recharged) by rain, snow melt and water in streams that seeps down through tiny spaces beneath the land's surface. Groundwater in the SGA flows from higher elevations along the eastern and southern margins of the basin, towards the Columbia River and the Lewis River in northern Clark County.

## **Who else uses groundwater from the SGA?**

Several cities use groundwater from the SGA, and some also pump from other, shallower aquifers. Gresham and Rockwood Water, Fairview and Wood Village use SGA groundwater almost exclusively. The Cities of Troutdale, Portland and Vancouver pump from the SGA as well as shallower aquifers, as does Clark Public Utilities (CPUD). Over 1 million people in the Portland Basin drink water pumped from the SGA at least part of each year—including Gresham residents, who currently drink groundwater that supplements Portland water during times of high demand. While many jurisdictions use this aquifer, hydrogeologists have confirmed that the ultimate use of groundwater between Rockwood Water and Gresham is sustainable.

## **How is the SGA naturally protected from human-caused contamination?**

The SGA is the deepest of the aquifers in the Portland Basin. It is naturally protected by two extensive low-permeability clay and silt layers, called Confining Unit 1 (CU1) and Confining Unit 2 (CU2), which separate the SGA from shallower aquifers and the surface. Each of these confining units is between 50 and 200 feet thick across the Gresham/Rockwood Water area. The many supply wells in the SGA have remained free of human-caused contamination, in part because of these protections. In addition, wells will pull from a depth of 700-1400 feet below the ground, making surface-level contamination even more unlikely.

## **How do we know the water is safe to drink?**

As a public supplier of drinking water, we must abide by stringent regulations for potential contaminants. Public drinking water is regulated even more than the bottled water sold in stores. Regulations are set by the Environmental Protection Agency (EPA) and the Oregon Health Authority (OHA) under the Safe Drinking Water Act.

### **How do we know the water is safe to drink?**, continued from page 1

The City of Gresham and the Rockwood Water test for more than 300 regulated and unregulated substances in the groundwater, starting when each well is first constructed and before serving the water to any customers. Any substances that are detected in the water appear in our annual water quality report. Rockwood Water's latest report can be found at: [rwpud.org/water-quality/water-quality-report-2019/](http://rwpud.org/water-quality/water-quality-report-2019/). Gresham's latest report can be found at: [GreshamOregon.gov/Water-Quality](http://GreshamOregon.gov/Water-Quality).

Unregulated substances that we voluntarily test for include radon, per- and polyfluoroalkyl substances (PFAS) and manganese. EPA-regulated substances that are regularly tested for include volatile organic compounds (VOCs) such as perchloroethylene (PCE). This substance has not been detected in the aquifer used for drinking water, although it is one that the Rockwood Water and Gresham are monitoring for, and will mitigate if ever detected in the lower aquifer at levels harmful to health.

### **How will water be treated?**

**Disinfection:** Cascade groundwater pumped from our current wells is disinfected using Sodium Hypochlorite, which inactivates microbial pathogens. Ammonia is added afterwards to match Portland's disinfection method. Once the Cascade Groundwater system is expanded, ammonia won't be used. Sodium Hypochlorite produces a chemical called free chlorine, which will be the only chemical used in the disinfection process in the future.

**Future manganese treatment:** Manganese can cause aesthetic impacts (staining of fixtures and laundry) and may be regulated by the EPA in the future. It will be reduced by a process called oxidation, precipitation, and adsorption. Groundwater will be chlorinated using Sodium Hypochlorite (described above), which is called oxidation. This causes the manganese, which is dissolved, to precipitate and become a solid. The manganese is then removed from the water by high pressure filters through adsorption, where the precipitate sticks to the surface of the filters.

**Corrosion control:** We are testing groundwater to determine whether additional treatment will be needed for corrosion control. Typically, the pH and alkalinity of water is adjusted to prevent lead and copper in the pipes of older homes from dissolving into the water.

### **What about radon?**

Radon is present in most groundwater sources, and the EPA estimates that drinking water contributes only about 1 to 2 percent of the radon present in indoor air. There is currently no federally enforced drinking water standard for radon; however, the EPA has proposed radon regulation that would establish different limits for radon levels in drinking water, depending on whether the State or local community has implemented an EPA-approved program to reduce radon levels in indoor air. The proposed rule would limit drinking water radon levels to 300 pCi/l if no indoor air program is implemented, or 4,000 pCi/l in combination with an indoor air program. If the proposed regulation is adopted, it is likely that Oregon's Radon Awareness Program would qualify as an approved program.

The most recent radon concentrations measured at our wells were 200-400 pCi/l. Groundwater from the wells is pumped directly to our reservoirs where it comes in contact with air. Since radon readily transfers to air from water, the concentrations measured at the source are greatly reduced after treatment, and storage in our reservoirs, before distribution to customers. For example, radon concentrations in water at the Bella Vista Reservoir are reduced to about 10 percent of the concentrations measured at the wells.

### **What are we doing to protect the SGA from contamination?**

Gresham has developed a nationally-recognized Groundwater Protection Program, which incorporates parts of the Gresham and Rockwood Water service areas. This program mitigates surface-level contamination. Again, due to the depth of the aquifer and natural geologic barriers, contamination of drinking water due to surface spills is highly unlikely.

There are currently 57 businesses that we regulate in the City of Gresham boundaries. Those businesses are chosen because they use chemicals that could have known health risks. 21 of them are located in the Columbia South Shore Well Field Protection Area north of I-84. 36 of them are located south of I-84 in the Cascade Well Field Protection Area.

With the expansion of the groundwater system, Gresham staff expects to conduct initial site visits at up to 364 additional businesses in the Gresham area to determine their compliance with the groundwater protection program. The number of businesses needing follow up to become compliant is expected to decrease to approximately 185 after these initial visits and after working with businesses over the next four years, staff expects the number to fall to under 100.

## **What are we doing to protect the SGA from contamination?, continued from page 2**

The program is based on:

- Building a trust-based relationship with businesses—offering a “helping hand.”
- Providing training and a clear understanding of why the program exists along with regulations and their application. This leads to a high success/compliance rate.
- Building positive relationships has improved compliance dramatically over the years we have been running the program.
- Providing assistance, both technical and equipment (spill supplies and signs). Businesses note this is a huge benefit.
- Enforcement is available for businesses that refuse to work with the program.

## **What if contaminants are found in the future?**

Rockwood Water/Gresham's drinking water protection strategy is multi-tiered:

1. We draw from the deepest, least vulnerable aquifer using wells designed to take full advantage of the natural geologic barriers.
2. We have implemented a comprehensive source water protection program to reduce the potential for human contamination to affect the aquifer (and shallower aquifers too).
3. Existing and proven regulatory programs and technologies would be used to address spills at the surface or in shallower aquifers before they reach the SGA. In the unlikely event of contamination, these proven and existing programs and technologies would be used to contain and remove contaminants before they reach the wells, or at the wellhead, if needed.

## **Summary**

Our water is safe to drink and meets all drinking water standards set by the EPA and OHA under the Safe Drinking Water Act. We will continue to monitor and protect our valuable resource. Gresham residents will continue to have access to an annual water quality report that transparently describes, in detail, our water quality and results of testing. Notice of this report is published on all communications channels, including the GRESHAM newsletter mailed to all households in the city.

## **MORE INFORMATION/QUESTIONS**

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06/09/21