



Groundwater is the largest freshwater store in the water cycle, with more than one-third of the water used worldwide originating from underground aquifers^{3,4}. In recent decades, the increased use of groundwater for human consumption and irrigation has resulted in groundwater lowering in large parts of the world⁵.

Crises of water quality and quantity are intimately linked with climate change. The impact mainly comes from extreme events of flooding and drought and is compounded by existing inequalities. Water extremes affected by climate already contribute to the migration and displacement of millions of people and could further global migration crises.

A water shortage is coming to the Northwest. Climate models predict the Northwest will receive more annual precipitation, but less of it will fall as snow. This jeopardizes fish and farms during dry summer months.

Climate Change: What does it mean to the safety of your well water?

By Lilly Anderson, MPH, DAFH Director, September 30, 2021



Do you live on a property that uses a well to provide drinking water? If so, you could be at increased risk for exposure to toxins and pollutants as we enter our rainy season. Almost 23% of Oregonians rely on domestic wells as their primary source of drinking water¹. Domestic wells can become contaminated by both natural and man-made causes. Natural chemical or mineral contaminants may include radon and arsenic. Contaminants introduced by human activity include pesticides, chemicals and harmful bacteria. Exposure to well water contaminants can lead to short or long-term health effects. While everyone in the household may not be affected, vulnerable populations, such as children, the elderly, pregnant women and immuno-compromised individuals are particularly susceptible¹.

Recently, the US has experienced a series of extreme weather events that impacted groundwater quality for the lives of

millions of people by affecting the water quality in domestic wells. The worst-case estimate for 2019 was up to 250,000 domestic wells were affected by flooding and contaminated ground water². In the US, over 100,000 lifetime cancer cases are attributed to drinking water contaminants³.

The wellbeing of populations is strongly linked to the availability of water sources⁶. Climate change will have profound effects on the water cycle by increased precipitation, evaporation and soil moisture with increased temperatures⁷. While the cycle will be intensified with more evaporation and precipitation, the extra precipitation will not be distributed evenly around the globe, and many parts of the world will see major alterations in the timing of wet and dry seasons⁷. Although the most noticeable impacts of climate change will be fluctuations in surface water level and quality, the greatest concern among water managers is the potential decrease in both quantity and quality of groundwater reserves.

Climate change influences groundwater systems in several ways. Rising global temperatures increase evaporation demands over land and limits the amount of water available to replenish groundwater stocks. Elevated temperatures also have complex effects on groundwater quality by altering the biological, chemical and physical water characteristics⁸. Changes in groundwater chemistry can act as a catalyst and increase the biodegradation of pollutants. Increased temperatures can also affect the solubility of gases and solids, allowing more substances to become fluid and enter water supplies. Finally, increased temperatures also change the porosity and permeability of the bedrock surrounding water sources, making them more vulnerable to contaminants⁸.

Oregon is not subject to the devastating impacts of hurricanes, but heavy rains are common and can produce high volumes of stormwater runoff, flash flooding or floods from swollen creeks, rivers and reservoirs that can persist from days to weeks, even months⁹. Floods create high volumes of water flow over areas that are normally dry land, allowing contaminants to travel with the floodwater as it courses and accumulates over the landscape. Contaminant laden floodwater can inundate domestic wells, entering through casings and caps, and the force can disrupt or damage the well, directly introducing contaminants⁹. The principal concern is the possibility of well contamination from floodwaters carrying pathogens, but older wells, and wells less than 50 feet

deep and those located near surface waters, can be contaminated from underground water sources as well¹⁰.

Another significant issue is the affect flooding has on septic systems. Septic systems are typically not damaged by flooding, but drainage fields can become filled with water and unable to work properly. Also removing flood debris by vehicles may damage drain fields, tanks and distribution boxes². With continued, intense rainfall and flooding, the water level of an aquifer may rise. If the groundwater level rises to or near ground surface, it can hydraulically connect to a septic system and wick contaminated water into the aquifer².

So, what can you do to keep you, your family, pets and livestock safe from well water contaminants?

- Have your wells tested, especially wells used to provide drinking water.
- Locate and update your well log. Check with the OSU Well Water Program for more information about well logs.
- Locate and properly disable any abandoned wells on your property.
- Check your septic system for any possible failures.
- Clean areas around well heads and caps to eliminate any surface sources of pollutants.

References

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¹⁰Arizona DEQ Fact Sheet. <https://legacy.azdeq.gov/function/forms/fact.html>