

2023 EENR ESSAY CONTEST

The purity of different drinking water sources is often perceived inaccurately in North Carolina. Common drinking water sources include bottled water, tap water, and municipal water. Often, bottled water is considered purer than other drinking water sources. But this belief is inaccurate.

According to the United States National Library of Medicine, perceptions of bottled water's purity are challenged by the increasing number of incidents with bottled water. For example, according to the National Library of Medicine, one study found that all tap water in Cleveland, Ohio had a bacterial content under 3 colony-forming units per milliliter (CFUs/mL), while the range for bottled water was 0.01-4,900 CFUs/mL. The same study found that all tap water had the state's required fluoride content, while only 5% of the bottled water met this requirement. According to a study from the National Library of Medicine, incidents like this are largely due to the fact that bottled water is regulated by the U.S. Food and Drug Administration (FDA), while tap water is regulated by the U.S. Environmental Protection Agency (EPA). Although the FDA has specific inspection requirements for bottled water, bottled water plants are given low priority for safety inspections compared to food plants due to staff and financial restraints. In addition, the "nutrition facts" for bottled water generally only show limited information about the water.

Despite the fact that, in the U.S., bottled water is not necessarily safer than tap water, bottled water use is still extremely popular. In 2011, according to the National Library of Medicine, the U.S. consumed around 85 million bottles of water a day. This huge amount of bottled water consumption has a number of negative impacts. Often, plastic bottles are not recycled, and are a huge waste problem adding to landfill overload. In addition, according to the National Library of Medicine, water bottling plants often reduce or deplete groundwater aquifers and streams. This can not only damage ecosystems, but can also lead to the formation of dangerous sinkholes. The trade and transport of bottled water also contributes to pollution and emissions. Another problem with bottled water is that it is, on average, 500 to 1,000 times more expensive than tap water, according to the National Library of Medicine. This means that, for those in the U.S. who are less wealthy, drinking bottled water may be an unnecessary expense.

As far as municipal water, also known as tap water, the Safe Drinking Water Act requires the EPA to establish and enforce standards that public drinking water systems must follow. According to the EPA, during the first quarter of 2023 in North Carolina, 98% of the drinking water systems were in compliance with the EPA's standards. Although these statistics mean that municipal water is statistically more likely to be safe compared to bottled water, it is clear that it is not absolutely guaranteed that one's municipal water system is always in perfect compliance with EPA regulations.

Lead contamination may be one of the most damaging contaminants. Any lead at all in drinking water can be a serious problem, and the EPA has set the maximum contaminant level of lead in drinking water at zero as a result. Young children and fetuses are especially at risk when it comes to lead contamination. Even low levels of lead can have serious effects on a child's nervous system.

A drinking water contaminant especially prevalent in North Carolina specifically is per- and polyfluoroalkyl substances, or PFAS. These are man-made chemicals that are found in numerous consumer products, including pizza boxes and stain repellents, among many other things. They do not break down, so they accumulate in the environment over time. North Carolina is the third highest state for exposure, according to the National Library of Medicine. Exposure to PFAS can have health effects like cancer, cholesterol diseases, pregnancy-induced hypertension and preeclampsia, and thyroid disease, among others, according to the National Library of Medicine.

There are numerous other potential drinking water contaminants. According to the EPA, these can be physical, such as sediments and organic matter; chemical, such as bleach, pesticides, and metals; and radiological, such as uranium. The EPA continually regulates municipal water contaminants. However, if a person feels unsafe drinking their tap water, or believes their water may be contaminated, the EPA requires an annual water quality report by July 1 each year. A person can contact their water utility if they want a report, so they can check if their water is safe. In addition, water filters can usually be purchased at many stores for a relatively affordable price, which can reduce water contamination. Also, a list of certified laboratories that can test drinking water should be available from one's state or local drinking water authority. According to the EPA, testing water usually costs between \$20 and \$100. Or, a person could purchase a water testing kit, to personally test their water and ensure its safety. Testing water specifically at one's home may be especially helpful if one fears their home may have lead contamination. This is because, according to the Environmental Protection Agency, lead contamination can often come from lead pipes, faucets, and fixtures, which is especially prevalent in older homes. So if one checks their water system's overall quality, the lead contamination may not be caught if the lead fixtures are specifically in or near one's own home.

Another water source is private well water. Sometimes local health departments might test certain wells, but it is likely that homeowners with private wells will need to test their own wells. The EPA recommends testing private wells annually at least for total coliform bacteria, nitrates, total dissolved solids, and pH levels. If a person has a private well, and is able to consistently test their water quality, then private well water may be an effective and safe solution to the possibility of unclean drinking water. However, many people either do not have access to a private well or do not have the time or equipment to consistently check their own well water. In this case, in North Carolina, it is likely best to drink tap water.

The major drinking water sources in North Carolina include bottled water, municipal water, and well water. Municipal water is likely the best water source, but contamination is still a possibility. To ensure municipal water safety, one can use a filter, check their annual water quality report, pay a laboratory to test one's drinking water, or test one's water quality oneself. Whatever route one takes to procure drinking water, it is important to be mindful of potential contaminants, and avoid popular misconceptions about drinking water.

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