Source water, **drinking water** or **potable water** is water safe enough to be consumed by humans or used with low risk of immediate or long term harm. In most developed countries, the water supplied to households, commerce and industry meets drinking water standards, even though only a very small proportion is consumed or used in food preparation. Typical uses (for other than potable purposes) include toilet flushing, washing and irrigation. The word potable came into English from the Late Latin *potabilis* meaning drinkable.

Although covering some 70% of the Earth's surface, most water is saline. Freshwater is available in almost all populated areas of the earth, although it may be expensive and the supply may not always be sustainable. Sources where water may be obtained include:

- Ground sources such as groundwater, hyporheic zones and aquifers.
- Precipitation which includes rain, hail, snow, fog, etc.
- Surface water such as rivers, streams, glaciers.
- Biological sources such as plants.
- The sea through desalination.
- Water supply networks.

If you live in a large metropolitan area, most of your drinking water probably comes from a surface source such as a lake, stream, river, or reservoir. Sometimes these sources are close to the community, and sometimes they are many miles away.

If you live in a small community or in an isolated area, it's more likely that your water originates underground and is pumped to the surface through a well. Ground water comes from natural underground formations, often consisting of sand or gravel that contains water. These formations are called aquifers.

The most efficient way to transport and deliver potable water is through pipes. Plumbing can require significant capital investment. Some systems suffer high operating costs. The cost to replace the deteriorating water and sanitation infrastructure of industrialized countries may be as high as $200 billion a year. Leakage of untreated and treated water from pipes reduces access to water. Leakage rates of 50% are not uncommon in urban systems. Parameters for drinking water quality typically fall under three categories:

1. Physical
2. Chemical
3. Microbiological

Physical and chemical parameters include heavy metals, trace organic compounds, total suspended solids (TSS), and turbidity. Microbiological parameters include Coliform bacteria, *E. coli*, and specific pathogenic species of bacteria (such as cholera-causing *Vibrio cholera*), viruses, and protozoan parasites.

Chemical parameters tend to pose more of a chronic health risk through buildup of heavy metals although some components like nitrates/nitrites and arsenic can have a more immediate impact. Physical parameters affect the aesthetics and taste of the drinking water and may complicate the removal of microbial pathogens.

Throughout most of the world, the most common contamination of raw water sources is from human sewage and human fecal pathogens and parasites. In 2006, waterborne diseases were estimated to cause 1.8 million deaths each year while about 1.1 billion people lacked proper drinking water. It is clear that people in the developing world need to have access to good quality water in sufficient quantity, water purification technology and availability and distribution systems for water. In many parts of the world the only sources of water are from small streams often directly contaminated by sewage.

In the United States, the Environmental Protection Agency (EPA) sets standards for tap and public water systems under the Safe Drinking Water Act (SDWA). The Food and Drug Administration (FDA) regulates bottled water as a food product under the Federal Food, Drug, and Cosmetic Act (FFDCA). Bottled water is not necessarily purer, or more tested, than public tap water. EPA has been concerned about current drinking water standards, and suggested in 2009 that regulations against certain chemicals should be tightened.

In 2010 the EPA showed that 54 active pharmaceutical ingredients and 10 metabolites had been found in treated drinking water. An earlier study from 2005 by the EPA and the Geographical Survey states that 40% of water was contaminated with nonprescription pharmaceuticals, and it has been reported that of the 8 of the 12 most commonly occurring chemicals in drinking water are estrogenic hormones.

Of the pharmaceutical components found in drinking water, the EPA only regulates lindane and perchlorate. In 2009, the EPA did announce another 13 chemicals, hormones, and antibiotics that could potentially be regulated. The decision on if they are sufficiently harmful to be regulated may not be decided upon until 2012 as it takes time for testing.

The 2014 chemical spill in the Kanawha Valley has brought attention to the vulnerability of our water supplies. There are still many questions to be answered and many more to be considered regarding more stringent regulations, better preparedness and more research regarding the effects of un-regulated or under-regulated chemicals.

Many communities protect their water customers by establishing an alternative water source. Then, if there is a toxic spill in the river that serves as the main water source, the water utility can draw from a different source, for example, a pond on a different river or stream, until the pollution has washed downstream past the water utility's intake.

Additional resources

1. Safe Drinking Water Act summary: https://www.epa.gov/laws-regulations/summary-safe-drinking-water-act
2. Source water protection: https://amwater.com/wvaw/water-quality/source-water-protection
3. WV Source Water Protection: https://www.wvdhhr.org/oehs/eed/swap/
4. U.S. Centers for Disease Control and Prevention. Atlanta, Georgia. Safe Water System: A Low-Cost Technology for Safe Drinking Water. Fact Sheet, World Water Forum Update. March 2006.