

80% of Global Wastewater Released Into Environment Untreated

Analysis by [Dr. Joseph Mercola](#)

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STORY AT-A-GLANCE

- › Although the U.S. Clean Water Act was passed in 1972 to regulate pollution discharged into waterways, the past decades have left the U.S. water supply in serious trouble
- › According to the United Nations World Water Development Report, up to 80% of the global wastewater is dumped into the environment untreated
- › Using a high-quality filtration system reduces the amount of chlorine, toxins and chemicals to which you are exposed through your home water supply

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In 1972, the Clean Water Act¹ was passed to regulate pollution discharged into U.S. waterways, and to set standards for surface water. The Act is supposed to ensure clean water for swimming and fishing in the U.S., but after more than four decades of regulation and oversight, waterways are in serious trouble.

As tap water is extracted from these waterways, it may test positive for a large assortment of chemicals, including fluoride, radiation, heavy metals, agricultural runoff and disinfection byproducts.

Unfortunately, that's the short list. More than half of the 300-plus chemicals currently detected in U.S. drinking water are unregulated.² Almost every year red flags are raised across the U.S. over toxic drinking water, triggered by varying reasons.

Fish and other wildlife also demonstrate the ramifications of out-of-control water pollution, and there's cause to believe chemical pollution is affecting human health as well.

The sources of pollution are many, ranging from agricultural runoff and industrial releases to outworn pipes, firefighting foam and pharmaceutical drugs, and even the chemicals used during water treatment.

Amount of Untreated Wastewater Released Into the Environment Is Staggering

However, as polluted as the U.S. waterways have become, the global problem is even worse. According to the United Nations (U.N.) World Water Development Report released in March 2017:³

“Continuing ‘business as usual’ means allowing overwhelming neglect to worsen. It is estimated that well over 80% of wastewater worldwide (over 95% in some developing countries) is released to the environment without treatment. The consequences are alarming.”

As our waterways are connected, and pollution travels, this issue is not one confined to the area where the dumping occurs. **Water contaminated** with bacteria, nitrates, solvents and phosphates is being discharged from rivers and lakes into the oceans, with devastating results.⁴

For instance, the pod of Southern Resident Killer Whales,⁵ also called orcas, living in Puget Sound off the coast of Washington state, have been steadily declining. Without any new calves since 2012, the population of the pod has reached a dangerously low number of 78⁶ in 2014.

In one paper published in 2017,⁷ scientists detailed large growths of microbes in the whale's lungs, including antibiotic resistant bacteria and fungi, carrying a pathogenic risk to the already floundering whale population in the Sound.

The scientists believe much of the whale lung bacteria – collected from the orca's breath as they surfaced – is the result of human sewage.

"It is noteworthy that within 30 miles of the study area the city of Victoria, B.C., does not have a secondary sewage treatment facility, and instead discharges primary treatment product from the resident population of approximately 360,000 to the Salish Sea.

A correlation may exist between the lack of secondary treatment for sewage entering the Salish Sea and the presence of antibiotic resistant bacteria within ... breath samples," the scientists write.⁸

Contributions to Sea Sewage Being Made from Washington State

Secondary **sewage treatment** kills many more pathogens before being released into the rivers and oceans. However, while a regional sewage treatment plant is now planned for Victoria, B.C., there has not been one in place for decades. But it isn't only poorly planned sewage treatment that causes issues in the environment.

On February 9, 2017, power outages caused pumps taking effluent from the sewage plant in King County, Washington, to fail. This resulted in flooding in the plant that handles Seattle.

By the time the automatic gate shut off the incoming sewage, the damage to the plant was catastrophic.⁹ Fifteen million gallons of raw sewage flooded the plant, submerging light fixtures on the ceiling.

Hundreds of millions of gallons of raw sewage was also diverted to Puget Sound after the gate closed, as the flow was directed to an emergency bypass. Since the flood, 235 million gallons of untreated waste water and 30 million gallons of **raw sewage** have been dumped into Puget Sound – forcing the already endangered pod of killer whales, and thousands of other marine animals, to live and feed in polluted waters.

World Water Day Brings Attention to a Global Problem

Although an unfortunate occurrence, the Washington debacle is by no means unique. In 2017, charges were brought against a private wastewater treatment company for deliberately falsifying wastewater samples and tests that resulted in polluting groundwater near Boston, Massachusetts.¹⁰

In an attempt to focus attention on the necessity of freshwater, and protecting our water resources, the U.N. adopted a resolution in 1992, declaring March 22 World Day for Water.¹¹

The consequences of drinking polluted water are severe. **E. coli contamination** of the water supply in Walkerton, Ontario, in 2000 is one example of what can happen when individuals without proper formal training are placed in charge.¹²

A small, rural community of Walkerton, reliant almost exclusively on groundwater, fell victim to a devastating outbreak of E. coli after cow manure washed into a shallow water supply well.

Five years later the system managers pleaded guilty to criminal charges. More than 2,300 people became ill, and seven died from the contamination, which was initially blamed on foodborne illness. People were then advised to drink more water to avoid dehydration. It was another three days before the water supply was suspected and a boil order was issued.

Each year in the U.S., there are an estimated 12 to 18 million cases of **waterborne illnesses**. According to professor of microbiology, Joan Rose, Ph.D., the answer to the problem would be a massive and costly investment in the infrastructure of the water supply:¹³

"... in the U.S. alone, it's estimated that what is needed is \$70 per person per day for 10 years. In developing countries it's far more. Access to clean water is a central stabilizing force in societies and lack of access destabilizes societies.

As a microbiologist, I believe that the provision of safe drinking water is the basic building block of a healthy and successful society.”

Should Wastewater Be Treated and Released or Reused?

The question of cost only grows each year the infrastructure remains unaddressed. The U.N. proposes that instead of dumping wastewater back into the environment, we harvest the nutrients and usable material before the water is treated and reused.

The argument for reusing wastewater is built on sustainability and reducing cost. The Blue Plains Advanced Wastewater Treatment Plant has already started the process, as seen in the video above. The World Water Development Report 2017 states:¹⁴

“Wastewater can also be a cost-efficient and sustainable source of energy, nutrients, organic matter and other useful by-products. The potential benefits of extracting such resources from wastewater go well beyond human and environmental health, with implications on food and energy security as well as climate change mitigation.

In the context of a circular economy, whereby economic development is balanced with the protection of natural resources and environmental sustainability, wastewater represents a widely available and valuable resource.”

Wastewater Could Be a Source of Reusable Phosphorus

One of the important resources found in wastewater is **phosphorus**. This mineral is an essential nutrient for plant growth, which is why many fertilizers include phosphorus. Unfortunately, the demand for the mineral is rising twice as fast as the population is growing. While widespread across the Earth, there are limited areas where it is found in concentrated form.

However, wastewater contains a significant amount, as phosphorus is one of the primary ingredients in detergents. Removing and reusing phosphorus from wastewater

would not only increase supply, but would also reduce the risk of algae blooms, which are becoming more common in lakes and rivers. As nutrient-dense phosphorus is dumped into waterways, **algae multiplies**, subsequently using up dissolved oxygen in the water and killing the fish.

The U.N. proposes that removing and recovering phosphorus, nitrogen and other nutrients from wastewater could prevent hyper-growth of plants in lakes and rivers and provide a unique business opportunity to recuperate a finite resource essential for agriculture.

Michigan Tracks E. Coli Water Contamination

Walkerton, Ontario, is not alone in their fight against E. coli in the groundwater and watersheds that provide drinking water for the community. In a unique attempt to track watershed water pollution threats, Michigan's Department of Environmental Quality produced an online tool that allows you to identify areas where water quality is impaired by E. coli contamination.¹⁵

E. coli is an indicator of fecal pollution from human or animal waste, and is an indicator of other pathogens in the water. The tool, Michigan E. coli Pollution and Solution Mapper,¹⁶ isn't intended to track immediate results of water contamination in rivers or beaches, but rather to indicate if the groundwater in your area has exceeded acceptable levels of E. coli in the past.

Joan Rose is a water quality expert at Michigan State University. She finds where there is fecal contamination, there are often harmful viruses. Rose warns that even boating in such waters is dangerous, saying:¹⁷

"We can find about 150 viruses in fecal pollution. We find viruses like hepatitis and salmonella. Even people boating on polluted waters can get sick. It can be ingested by touching the water, then touching the mouth or eye."

Symptoms of an E. coli infection may appear between one and four days after exposure and include abdominal cramping and sudden and severe diarrhea that may turn bloody,

loss of appetite, nausea and vomiting.¹⁸

Most healthy adults recover spontaneously with supportive care, but young children and the elderly are at risk of developing life-threatening kidney failure from the infection, or may succumb to significant dehydration.

Filtration at Home – More of a Necessity Than a Luxury

Since most water sources are severely contaminated, **filtering water** prior to use couldn't be more important. If you have well water, it is prudent to have it tested for contaminants. You can get local drinking water quality reports for public water supplies from the U.S. Environmental Protection Agency.¹⁹

If you live in a home or community with older water pipes, or near a military base or other sites that use PFC (perfluorinated chemicals)-laced firefighting foam, it is more likely your water is contaminated.

If you can afford only one filter for your home, most experts recommend a shower filter, as showering aerosolizes contaminants and chlorine in the water, giving them direct access to your body through your lungs. Drinking water gives your body a fighting chance to remove toxins through organs of elimination.

Ideally, your best bet is to filter the water at both the point of entry into your home and the point of use. This means installing filters where water enters your home and again at your kitchen sink and showers.

If your water is from a municipal source, it also affects your indoor air quality, courtesy of evaporating chlorine from toilets, showers, baths, dishwashers and washing machines. Evaporated chlorine forms chloroform gas and chlorine vapors that increase your risk of asthma, airway inflammation and respiratory allergies. It's important to open your windows for five to 10 minutes each day, summer and winter, to help remove the gasses and improve your indoor air quality.

One of the best water filters I've found so far is the Pure & Clear Whole House Water Filtration System, which uses a three-stage filtration process – a micron sediment pre-filter, a KDF water filter, and a high-grade carbon water filter²⁰ – to filter out chlorine, detergent byproducts and other contaminants.

Sources and References

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