

Keep Our Waters Blue

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Gowanus Canal. Photo: Damon Winter/The New York Times

When you think of areas with contaminated, undrinkable water, which places come to mind? Countries like Bangladesh and India, where arsenic poisoning is prevalent, or areas in West China and Africa, where water is so scarce that people must walk for miles to the nearest source of water, before carrying it all the way back. In the driest parts of China, residents only bathe three times in their lives: when they are born, the night before their wedding day, and after they die. Only 3% of the world's water is fresh water, even though three-fourths of the Earth's surface is covered in water. There are about one billion people today who do not have access to fresh water, and two billion who lack basic water sanitation. Millions die each year from waterborne diseases, and 4,500 children each day. Climate change and increased demand for food due to global population growth are further straining our already fragile water supply.

Living in a first world country where potable water comes out of any faucet, it is easy to take what we have for granted. It might be hard to imagine that the waters that surround us in New York City are just as polluted and toxic as in third world countries.

A Look at New York City Waterways

Many of our surrounding waterways have become contaminated with chemicals and raw sewage. In the 1970's, many factories dumped waste into the Hudson River and near the Gowanus Canal which left toxic chemical residues that are still present today. While the dumping has since stopped, untreated

sewage is released into nearby waters every time heavy rain hits. The New York sewage systems are designed to carry both sanitary waste as well as storm water. The problem with this is that heavy rain can overflow the system, and the overflow is released into nearby rivers. Untreated sewage in the waterways has led to the growth of antibacterial resistant microbes. Researchers from Columbia University found Hudson River [bacteria to be resistant to ampicillin and tetracycline](#), two antibiotics that are often used to treat ear infections, pneumonia and salmonella. While there have been efforts to clean up the Hudson, the Gowanus Canal is still one of the most polluted waterways in the US.

What NYC is doing to help

New York City has pledged billions of dollars to hopefully alleviate the problem of combined sewage overflow (CSO): \$187 million to replacing the pavement in parking lots and streets with more porous materials and \$2.4 billion to stop 1.5 billion gallons of CSO by 2030. New York has built and is planning separate sewage systems and High Level Storm Sewers (HLSS) in certain areas to prevent CSO, as well. The HLSS will capture 50% of rainfall and divert it into the waterways directly, cutting down the amount of water that flows through the combined sewer system and water treatment plants. EPA is also working on a plan to dredge the Gowanus Canal, aiming to finish by 2020.

Thankfully, NYC gets its tap water from the Delaware/Catskill Watersheds, and not the Hudson River or other surround waters. [\\$1.5 billion has been invested in the protection of the watersheds](#), as well as operation of the UV Disinfection Facility to ensure that we have pristine drinking water for ourselves and our kids.

Everyone Can Help - Green Solutions

One way to alleviate the capacity of sewer systems is to build rain gardens. These gardens are planted in a depression so that rainwater runoff can be contained and drain gradually into the ground. They also help prevent erosion, flooding and further water pollution. Rooftop detention systems can be put in place to absorb water as well. The NYC Department of Environmental Protection gives away rain barrels; the captured water can be reused to water gardens or wash cars.

[Dr. John Todd](#) and his colleagues from the New Alchemy Institute came up with an innovative way to restore polluted waters. [Living Machines \(or Eco-Machines\)](#) clean sewage water and return it to its natural state, taking inspiration from natural aquatic ecosystems. Plants and other organisms naturally absorb toxins and kill parasitic microbes, so Dr. Todd created a system of tanks holding different ecosystems that break down toxic wastes and purify water. Each of the mini-tanks is designed to clean up a certain type of inorganic material, and the wastes produced in one tank provide food for the organisms in the next. While the water released can't be used for drinking water, it can be used for irrigation or to flush toilets. The Eco-Machines are designed per clients' needs, and can be made for small-scale use or to treat wastewater for an entire village or be a part of a large city's water system.

Implementing more green initiatives into our homes and cities, as well as reducing our carbon footprints will help relieve the burden of the worldwide water crisis. There is no singular solution, but the more we conserve and the more we give back, the more clean water there is for the future.