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Shortcomings of the Clean Water Act

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by Nick Bennett

The Clean Water Act (CWA) is one of the foundational environmental laws in the United States. Since its passage in 1972, it has changed the nation's rivers from open sewers to important commercial and recreational resources, even in large cities. There is no question that the CWA has changed our lives and the environment for the better, but it is a law with many limitations.

The CWA came into being in response to rivers being choked with organic waste from industrial facilities and municipal sewer systems. When it enters water, organic waste exerts a biochemical oxygen demand as bacteria respire and consume the waste. This process often resulted in rivers that were completely devoid of oxygen and, as a result, fish. The CWA required the installation of secondary treatment[1] at most sewage treatment plants and industrial facilities that discharged organic waste. This requirement allowed oxygen to return to the nation's rivers, and fish and other aquatic life followed. Secondary treatment and the funding to install it at publicly owned sewage treatment plants have been the major drivers of the CWA's success.

However, our rivers and coastal waters face numerous threats from pollutants that secondary treatment cannot address and where new science, newly discovered pollutants, and new pollution sources have shown the limits of the CWA. These new threats include metals that accumulate in sediments and biota, chemicals that are difficult to detect and treat, new chemicals of concern (such as per- and polyfluoroalkyl substances [PFAS]), and nutrient pollution.

For example, bacteria cannot consume heavy metals, so heavy metals pass through treatment plants and into the environment both in dissolved form and bound to organic material. Although there are water quality criteria for metals , it can be difficult for sewage treatment plants to comply with them in some circumstances, such as with copper that leaches from metal piping in drinking water systems. Moreover, the criteria are typically based on toxicity of metals in solution to aquatic organisms or on difficult-to-estimate bioaccumulation factors for fish. There are no criteria for metals in sediments, which means that metals can accumulate in sediments indefinitely as metals cannot be destroyed. The inability to deal with metals and other persistent chemicals that accumulate in sediments is a weakness of the CWA.

The Holtrachem chloralkali plant in Orrington provides a clear example of this problem. The plant made bleaching chemicals for Maine pulp mills and pesticides, and it was able to discharge mercury in wastewater for many years after the passage of the CWA. Discharges from this plant resulted in extensive sediment contamination in the Penobscot estuary. The mercury also caused the only closure of a lobster fishery in Maine due to mercury contamination in lobster *meat*. Mercury levels in lobster tomalley (the "green stuff," which functions as pancreas and liver and sequesters contaminants from lobster blood) have long been at levels high enough to result in consumption advisories. PCBs (polychlorinated biphenyls) and dioxins are also present at levels of concern in tomalley and contribute to the need for these advisories. However, a lobster fishery closure because of mercury at levels of concern in meat is a higher order problem unique to the lobster fishery in the Penobscot estuary. Despite the severity of the contamination, the Holtrachem facility obtained permits under the CWA for decades, and its legacy continues to harm Maine's environment today. It took nearly two decades of litigation by the Natural Resources Defense Council and the Maine People's Alliance to result in the plant's current owner finally agreeing to clean up the contamination.

The list of chemicals with criteria that wastewater dischargers must comply with is old and limited. The Environmental Protection Agency (EPA) rarely updates this list. In addition, some of these chemicals are unlikely to occur in wastewater (DDT, for example) and can be difficult to detect in water even at levels that could be harmful to wildlife and humans eating contaminated fish or shellfish. Dioxin, a pollutant associated with industries that bleach textiles or wood pulp, for example, can go undetected in wastewater. Nevertheless, it can be present at high enough levels in wastewater that it bioaccumulates in fish, which can then be unsafe for humans and wildlife to eat. Dioxin was thought to be a contaminant from the production and use of certain pesticides, but a national survey in the 1980s showed that fish from Maine's rivers with pulp and paper mills contained some of the highest levels in

the country. This finding led to a difficult process where the state had to legislate manufacturing changes for the paper industry and develop fish-consumption advisories to protect its citizens.

The CWA also does not address nutrient pollution adequately. The CWA focuses on municipal and industrial wastewater, but it avoids any direct regulation of agriculture and other land-based sources of pollution (i.e., nonpoint sources). There are no national criteria for nutrients in wastewater or ambient water. Although a few facilities in the country have limits for phosphorus and nitrogen, the limits must be calculated on a site-specific basis based on physical changes that result from nutrients in the downstream environment, such as algae blooms. Similarly, there is no limit to the amount of phosphorus or nitrogen that farmers can apply to their fields. Agricultural runoff has resulted in dead zones (areas where oxygen levels drop to near zero due to algae blooms) in the Gulf of Mexico at the mouth of the Mississippi River. In Maine, Casco Bay has elevated levels of nitrogen from atmospheric, nonpoint, and wastewater sources. The CWA is not capable of collectively addressing these sources to solve this problem.

The CWA has limited means to require pollution prevention for industrial or household users of chemicals. Individual homeowners can use a host of products containing toxic contaminants, and there is little in the CWA giving regulators the authority to stop this practice. Companies are able to use dangerous chemicals if there are no criteria to regulate them. Take PFAS, for example. Companies can use PFAS in their products even though they end up in wastewater and cannot be broken down by secondary treatment. Though we know PFAS are dangerous, persistent compounds, the CWA does not provide a clear mechanism to prevent companies from using them (or homeowners from unknowingly purchasing and discharging PFAS in their laundry wastewater). Because PFAS compounds are difficult to detect in wastewater, it is likely that they can be present at levels that cause environmental harm. Even if there were criteria for "safe" levels of PFAS in wastewater, they might be significantly lower than our ability to detect the chemicals, essentially rendering any wastewater discharge limits meaningless.

This discussion leads quickly to another emerging problem that the CWA does not consider: sludge. Wastewater treatment plants accumulate sludge, which settles to the bottom of primary clarification systems and secondary treatment systems. This sludge must go somewhere. Maine has dealt with municipal sludge and some forms of industrial sludge by composting it and spreading it on agricultural land. This method has great appeal because it is inexpensive, available, and provides phosphorus and nitrogen to crops. When sludge contains PFAS, however, using it as fertilizer becomes a major problem. PFAS is very resistant to breakdown in the environment and has been found in well water, cow's milk, and farmers' bodies, even at farms where sludge spreading ceased years ago. It is now being detected in wells, waterways, and fish relatively far from sludge spreading sites. The Maine Legislature has recently banned sludge spreading because of pervasive PFAS contamination. Given the limited number of chemicals that have been tested for in sludge over the years, it is possible there are other compounds present in sludge at levels of concern that we know nothing about.

While this is not an exhaustive list of the shortcomings of the CWA, these issues give a sense of how little we can do under the CWA to address some of the country's biggest water pollution problems. Political will and public funding are resources often in short supply. It will likely take both to fix the types of problems the CWA has proven ill-equipped to handle.

NOTES

1 Secondary treatment systems provide a controlled environment for bacteria to consume most of the organic material in wastewater before it is discharged to the environment.

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