Daily Herald: https://www.dailyherald.com/news/20230617/how-do-you-treat-contaminated-rainwater-at-a-dupage-county-landfill-let-trees-clean-it

# How do you treat contaminated rainwater at a DuPage County landfill? Let trees clean it.

**At DuPage County's Mallard Lake, an irrigation system deals with water that has gone through waste**

The 8,500 hybrid trees that grow atop a hill at Mallard Lake landfill in Hanover Park are irrigated by wastewater from the landfill. It is perhaps the largest operation of this type in the United States.
*( John Starks | Staff Photographer )*

**Jenny Whidden**

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To treat millions of gallons of contaminated rainwater that has filtered through waste at the closed Mallard Lake landfill in Hanover Park, DuPage County Forest Preserve District officials are using what they know best: trees.

Since coming online in 2018, a 14-acre irrigation system of 8,500 trees has treated more than 20 million gallons of the leachate that otherwise would have been trucked to a water treatment plant. That's curbing emissions, saving energy and cutting costs for the district.

The trees soak up the leachate, using compounds to fuel growth and releasing clean water through their leaves via a process called "evapotranspiration." District staff members say the trees also provide wildlife habitat and improve aesthetics for neighbors of the preserve and users of the nearby North Central DuPage Regional Trail.

The system is one of three like it in the state -- one in South Barrington and the other in Milan near the Quad Cities -- and it's believed to be the largest in the U.S. Officials say it so far has reduced leachate disposal costs by $700,000. With an installation cost of $919,000, the district is within a few years of a return on its investment.

The initial funding came out of a county fund built with fees from landfill users over the years.

Last month, members of the International Phytotechnology Society, a professional scientific association focused on using plants to address environmental issues, toured the closed landfill.

"It is gratifying to me that the International Phytotechnology Society considers our site a model of science and engineering put into practice and worthy of attention," said Dan Zinnen, the district's director of resource management and development, "because from the time the project was conceived, we wanted it to both functionally address our environmental protection needs and demonstrate that landfills need not be wastelands -- they can be a valuable part of the landscape if we're willing to make the effort."

The landfill, which operated from 1970 to 1975, has been in the care of the county since its closure. It is referred to as Mallard North to distinguish it from the Mallard Lake landfill, which is the largest in the state and operated from 1975 to 1999. The district maintains seven closed landfills in total.

At the time Mallard North was built, "there was no understanding of groundwater contamination," Zinnen said, and there were little to no environmental protections separating the waste from the nearby West Branch DuPage River.

Since then, the county has put a series of systems in place to address the issue, including a network of about 30 wells drilled throughout the landfill. The county also keeps tabs on potential contamination at each of its landfills with groundwater monitoring wells.

Leachate is pumped out of the wells and stored in a 20,000-gallon tank on-site. From there, the contaminated water is either sent to a wastewater treatment plant or diverted to the tree system, which essentially is a "sophisticated irrigation system" that includes a computer system, a weather station and 69 miles of irrigation tubing, Zinnen said.

The trees -- mostly poplar and willow due to how fast the species grow -- drink up the fluid and breathe it out through their leaves, absorbing organic chemicals like ammonia along the way.

The trees use ammonia as fertilizer, neutralizing one of the district's more dire concerns being so close to the river -- ammonia is extremely harmful to aquatic life. Inorganic compounds like metal also can be absorbed by the trees, which store them in their wood as they grow.

"One of the bigger ways the bad stuff and the leachate gets degraded is also in the soil itself, because there's this whole ecosystem in the soil, particularly at the tree root interface, where there are fungi and bacteria that latch on to the tree roots," Zinnen said.

"They have a symbiotic relationship where there's a trade of moisture or nutrients, and a lot of those organisms at the root interface do a lot of biological degradation of the bad compounds."

The overall goal is to slowly draw down how much leachate is in the landfill, preventing it from leaking into the river or down into the groundwater. The district is able to treat up to 5.4 million gallons a year with the system.

"We're at the point now where we met our first goal of getting all our pumps at the elevation of the river. Now the question is, do we want to lower our pumps to get the leachate level lower, knowing we are likely going to draw in some river water? It's kind of a 'what is our preference?' situation," Zinnen said. "We do have groundwater monitoring wells all around the landfill, so we know that for the most part, there are no impacts from the landfill."

While the district is using hybrid willows and poplars to get started, Zinnen hopes to incorporate more native trees and bring the environment closer to a natural ecosystem. Already, local birds flock to the site and enjoy the habitat.

This spring, the district planted a host of native tree seeds: walnut, Kentucky coffee tree, oak, redbud and dogwood.

"We're hoping to evolve the system more into a natural forest versus this artificial mono- or biculture," Zinnen said. "Black walnut trees seem to like to grow on landfills. Cottonwood trees seem to like to grow on landfills. With some of these other trees, we don't know, but we're going to give it a shot.

"If something works, we'll stick with it. If it doesn't work, we'll try something else. As far as we know, nobody's doing what we're doing in the situation we have."

• Jenny Whidden is a climate change and environment writer working with the Daily Herald through a partnership with Report For America supported by The Nature Conservancy. To help support her work with a tax-deductible donation, see dailyherald.com/rfa.