

Mt. Cuba, UD researchers partner to study stream health

Kate Bohri, Special to The News Journal 1:34 p.m. EDT September 21, 2016



(Photo: Courtesy of Mt. Cuba Center)

Stream health is important to our water supply and the habitats in which we live, play and work. It also impacts the well-being of everything downstream, including the ocean.

The Red Clay Creek, which twists and turns from Unionville, Pennsylvania, through Mt. Cuba Center to the Christiana River in Wilmington, is impacted by the health and activity of the surrounding communities and habitats that drain into it. When it rains, water flows from higher ground down into the Red Clay Creek, carrying with it any chemicals and sediment that may have accumulated between showers.

A watershed is, according to U.S. Forest Service, an area of land where all of the water that falls in it (from rain, snow melt or springs) drains into the lowest place, such as a river, lake or marsh. Think of it like an enormous sink bowl, where all the water, no matter where it falls in the sink, drains into the lowest part.

Whether in the Arizona desert, Delaware Coastal Plains or Colorado Rockies, you're in a watershed. For people who live in northern Delaware, their watershed is likely one of four that makes up the Christiana Basin. This basin provides drinking water to over 400,000 people, including much of New Castle County.

Makings of a healthy stream

In Mt. Cuba Center's natural areas – land managed by the botanical garden's staff – Gerald Kauffman leads four University of Delaware students down the railroad tracks to a point where they cross the Red Clay Creek. He is the director of the University of Delaware Water Resources Center, where he studies and teaches about stream health, restoration and environmental engineering.

They explore the stream, taking photos and examining plants along the stream bank. This is their first introduction to a body of water they will get to know very, very well.

"We're teaching students how to characterize a stream so we can get a baseline of its health," Kauffman said. "We want to be able to measure the changes – hopefully, improvements – in the stream's health over time, especially as the restoration progress continues."

Kauffman and Mt. Cuba Center's Natural Lands team have partnered to assess the health of the portions of the Red Clay Creek that travel through Mt. Cuba Center's property and the effects of Mt. Cuba Center's environmental restoration efforts. His work adds important measurements to what can often be the nebulous task of "helping the environment."

With four graduate students, Kauffman has set up a long-term stream monitoring network on Mt. Cuba Center's property where, for the foreseeable future, they will take samples and measurements of the stream and rate its health. The study's data points include measuring the amount of sediment, bacteria, heavy metals, nitrogen, phosphate and oxygen levels in the stream, as well as the shape of the stream.

“A narrow, winding stream is healthy while a shallow and wide stream means it’s been scoured,” Kauffman said. The substrate – the rocky material on the bottom of the stream counts, too. “If there’s lots of larger material, like rocks and sand, it’s healthy. Fish can lay their eggs in it; water can tumble over it. If it has a lot of muck, it’s not good habitat.”



A rain garden can make a beautiful addition to the home landscape that slows and filters stormwater runoff. (Photo: Courtesy of Mt. Cuba Center)

Overall, Kauffman and his students are measuring multiple different parameters on a 0 to 10 scale, zero meaning the water is polluted and 10 meaning it’s absolutely pure and drinkable. Then, they add up the results into a final score.

“A score of 100 to 150 is sub-optimal while 150 to 200 is optimal,” Kauffman said. “The best stream I know of in northern Delaware is in the White Clay Creek Watershed, and its score is 190. That’s the kind of quality each of these streams probably had pre-settlement. We’re using that as our reference stream.”

The goal of this work is to monitor the health of the stream and chart the effects of Mt. Cuba Center’s stream restoration efforts, which include planting trees and maintaining buffers of native plants along stream beds.

Starting at home

“That water that flows through your backyard is connected to a larger network of waterways,” said Eileen Hazard, Mt. Cuba Center’s volunteer coordinator who has a master’s degree in water resources and worked as an environmental engineer for local watershed organizations in the past. “The water that flows past your house may

be the same water you play in at the beach.”

What we do to our water impacts its quality. A history of human activities such as development, agriculture, industry and travel has damaged stream health in the area. Rooftops and asphalt create solid surfaces that rainfall can’t permeate, causing it to run off and take with it everything from motor oil and lawn fertilizer to litter and construction dirt.

These materials flood streams after a heavy rainfall, adding sediment and chemicals. Additionally, if the stream bank lacks a thick network of plants and their roots – called a riparian buffer – the force of the stormwater runoff can wash out the stream bank, turning a narrow, winding stream into a shallow and wide one.

“The key concept of any kind of stormwater management is to put the water into the ground first,” Hazard said. “You have to slow the flow and spread it out so that it can infiltrate and sink into the ground and then eventually into the stream. It’s the way rain gardens work: They are both a filter and a sponge. A rain garden slows water down so that you don’t have surges of rainwater ripping through your streams. Then, the soil is a natural filter, which removes organic compounds from the water before it hits the stream.”



Rain gardens made of native plants such as echinacea provide habitat and food for wildlife and insects. (Photo: Courtesy of Mt. Cuba Center)

Kristen Travers educates the public about the connection between human actions and stream water health as the Watershed Stewardship leader at Delaware Nature Society. Her work brings locals to these streams to learn about how interconnected stream health and human activity can be.

“We work to get people to experience our waterways so they can develop an appreciation for them,” Travers said. “That means getting people out on canoe trips to paddle the rivers – anything that gets them using and appreciating this great resource we have.”

The waterways offer recreation and tourism opportunities and vital habitat for wildlife. They’re also the source of drinking water in homes. When residents in northern New Castle County turn on the tap, the water that flows out comes directly from the creeks, Travers said. Of course, the water is processed through a water treatment facility first.

To keep these drinking water resources healthy, residents and the local workforce can keep an eye on what they put down the drain. “Not every homeowner has a yard,” Travers said. “One thing each of us could do is think about what we’re putting down our sink or in our drains. Go for the non-toxic housecleaning products and don’t dump excess medications down the toilet.”

For homeowners who do have yards, Travers suggests using chemicals with greater care, or not at all. “We know that many of our waterways have excess nutrients in them, so before we go and fertilize our lawns, for example, have a soil test done. You might not need any fertilizer at all. Know when to fertilize, too.

Fall is the best time to fertilize our lawns. This is the time when our grass will be forming the root structure.” When looking to add nutrients to a lawn, go organic with compost or compost tea, which feeds the microbial life in the soil that supports plants.

To take more direct action, Travers recommends getting involved in local stewardship opportunities, such as the annual Red Clay Cleanup, which takes place in the spring.

“Delaware Nature Society also has a Stream Watch program where people are trained to go out to waterways to help us measure their health,” Travers said.

Kauffman recommends turning part of that lawn into a native plant garden.

“Take just a portion of your lawn, maybe 10 percent, and replace it,” Kauffman said. “It’s a simple and effective way to impact your landscape. And, of course, plant trees. When you have a forest, you have a healthy stream.”

Nature’s Landscapes is a monthly column by Mt. Cuba Center, a Delaware botanical garden that focuses on native plants with a commitment to protect the habitats that sustain them. Today’s article is written by Katie Bohri, Mt. Cuba Center’s marketing and communications coordinator.

Read or Share this story: <http://delonline.us/2cAWkQk>

