RUTGERS UNIVERSITY
Water Resources Program
New Jersey Agricultural Experiment Station

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WATER PAGES eNEWSLETTER

A long way from Neshanic Station, New Jersey

I've been transported from my bar stool at the Riverside Inn in Neshanic Station, New Jersey to a window seat on a high-speed train travelling from Taipei to Zuoying, Taiwan. No, its not a Walter Mitty experience; it is really happening. The train, often called a bullet train, travels at 300 km/hr or 180 mi/hr. The trip is 354 kilometers or 215 miles, about the same distance from New York City to Washington, D.C., but instead of 4.5 hours on Amtrack, the high-speed rail in Taiwan only takes 90 minutes and only costs $90 roundtrip. I am with four of my staff from Rutgers and six graduate students from Taipei University of Technology. A young woman just rolled down the aisle of the train with a snack cart like on the Hogwarts Express. It's warm in Taiwan (84°F) as the end of March approaches. The countryside is littered with rice patties and other farm operations. There is a lot of industrial type buildings and multi-family homes. I have yet to see any single-family homes, but I am told there are subdivisions of single family homes outside the cities, but they are not sprawled across the countryside like in New Jersey. Most of the Taiwanese people live in apartments in the cities. They all own scooters which they call motorcycles. The country runs on fossil fuels (i.e., mostly coal). There isn't enough land for solar, and they are just starting to install windmills along the shoreline and in the ocean. Every building has one or more cisterns (which they call rain barrels) on the roof to help balance water pressure and to store water during the dry season. As the train passes over streams, they all seem to have concrete or earthen levees. I guess this is to help prevent flooding during typhoon season when a single storm can drop several feet of rain.

Welcome to Taipei, Taiwan!
Gillian Mulvoy, Benny Roe, Erik Lin, Alena Brayshaw

Our trip to Taiwan is to share our knowledge on rain gardens with the Taiwanese and to gain knowledge from them. I was here in 2019 right after they installed their first two rain gardens in the country. Taiwan EPA was very proud to show these projects to us in 2019. It is 2025, and they now have 16 rain gardens installed across the country. Most of them are at schools or city parks and are coupled with permeable pavement, either grass pavers or pervious concrete. The pervious concrete works well here because there is no ice, so they have no need to use salt that tends to destroy the pervious concrete. Each rain garden has an underground storage tank with a water depth monitor and a pump. The pump transfers water to an irrigation system or back into the rain garden. Each rain garden contains an underdrain that discharges to the storage tank. Each rain garden is equipped with a hand pump so the student can better understand how water gets pumped from the ground, and the students enjoy operating the hand pump. The tanks are regularly tested for dissolved oxygen, conductivity, salinity, biochemical oxygen demand, suspended solids, and *E. coli*. *E. coli* has been very high, and they are doing some further investigation into the source of *E. coli*. Since Taiwan gets very hot, they are concerned about increases in temperature due to climate change. They monitor the air temperature in the rain garden and in the impervious pavement near the garden. The garden is often 2-4°C cooler than the pavement. All the rain gardens seem to be very well maintained. The last garden we saw was at a school that recently had their 90th birthday. They planted colorful petunias in the center of the rain garden in the shape of a "90." The remainder of the rain garden was mostly grass. As we were leaving the school, the janitor was hooking up the sprinkler to water the rain garden or maybe just the "90."

Avoiding the need to water is why we use native plants that have a much more substantial root system than these annuals planted in the shape of a “90.” But, I understand the school’s desire to celebrate their 90th birthday with petunias in the rain garden.

The RCE Water Resources Program met with the teachers at Dazhi Elementary School.

Rain garden and pond at Dazhi Elementary School

Every school has a rainwater harvesting system. They do not use a plastic tank but more steel and aluminum. The last school we were at also collected the wash water from the sinks to reuse to flush toilets in the school. Water is scarce in Taiwan, especially during the dry season. They have mastered conservation and reuse.

Every school in Taiwan has a rainwater harvesting system to water plants during the dry season.

The country of Taiwan is not much different than New Jersey. It is a little bigger and has some beautiful mountains, but the areas that are developed are densely developed, just like New Jersey. Even though they have much fewer cars than New Jersey, the traffic seems just as bad. The air quality is not great. My asthma has been acting up all week, and I only have a mild case of asthma. As I mentioned earlier, it is warmer in Taiwan. It was snowing in NYC while we were here, and it was in the 80's here in Taiwan. It is also humid, think Florida weather. The waterways may be cleaner in Taiwan. Only 23% of the waterways are described as moderately to severely polluted. I think the heavy rainfalls they get in Taiwan helps flush the local rivers and streams, keeping them relatively clean. The people of Taiwan are wonderful. They are all hard working and very respectful of visitors and of each other. The food is amazing and inexpensive. It seems the Taiwanese people get cold very easily. It was 84°F today, and people were wearing coats.

Taiwan is a fantastic place, and I encourage you all to visit here. The RCE Water Resources Program is excited about continuing our work with our colleagues in Taiwan, and we hope to host them soon in New Jersey. We will tour our many rain gardens with them and expose them to our delicacies like NY style pizza, the pork roll, egg, and cheese sandwich, and real bagels.

We are on our way to the Taiwan Climate Change Administration Ministry of the Environment to give our lecture on "Engaging Students in Climate Resilience with Rain Gardens." L. to R.: Kenneth Lin, Christopher Obropta, Erik Lin, Benny Roe, Alena Brayshaw, Gillian Mulvoy

~ Christopher C. Obropta, Ph.D., Extension Specialist in Water Resources

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Rain gardens take root at Oldmans Township School

The Rutgers Cooperative Extension (RCE) Water Resources Program, in partnership with the **South Jersey Land and Water Trust**, recently completed the installation of two new rain gardens at the Oldmans Township School in Salem County, New Jersey. With help from local contractor Ernie Davis, this project showcases how collaboration, flexibility, and a little problem-solving can create lasting green infrastructure benefits for a community.

Originally, the project plan called for two rain gardens, one 110 square feet and the other 130 square feet, along the southwest side of the school building. These gardens were designed to capture, filter, and treat stormwater runoff from 1,410 square feet of roof area.

But as work began on the 110-square-foot garden, the team hit an unexpected snag, literally. Excavation revealed a large concrete slab buried beneath the site, which turned out to be the remnants of an old house foundation. Rather than force the issue or abandon the space, the team pivoted. Working closely with school staff, they repurposed the area into a pollinator garden, providing a vibrant and educational habitat for bees and butterflies.

To stay true to the project's stormwater goals, the team identified a nearby location and installed a second 130-square-foot rain garden adjacent to the original one. Now,

side by side, these two functional and beautiful rain gardens serve as green infrastructure that not only manages runoff but also enhances the school's landscape.

This project demonstrates collaboration and adaptability in the face of challenges. The rain gardens at Oldmans Township School will not only improve local water quality but will also serve as outdoor classrooms for students to learn about sustainability, ecology, and the importance of garden maintenance.

Future pollinator garden

130-square-foot rain garden

Pollinator and rain garden construction, Oldmans Township School, April 2025 [Photo credit: Hollie DiMuro, RCE Water Resources Program]

R&D'ing knowledge and programs from New England

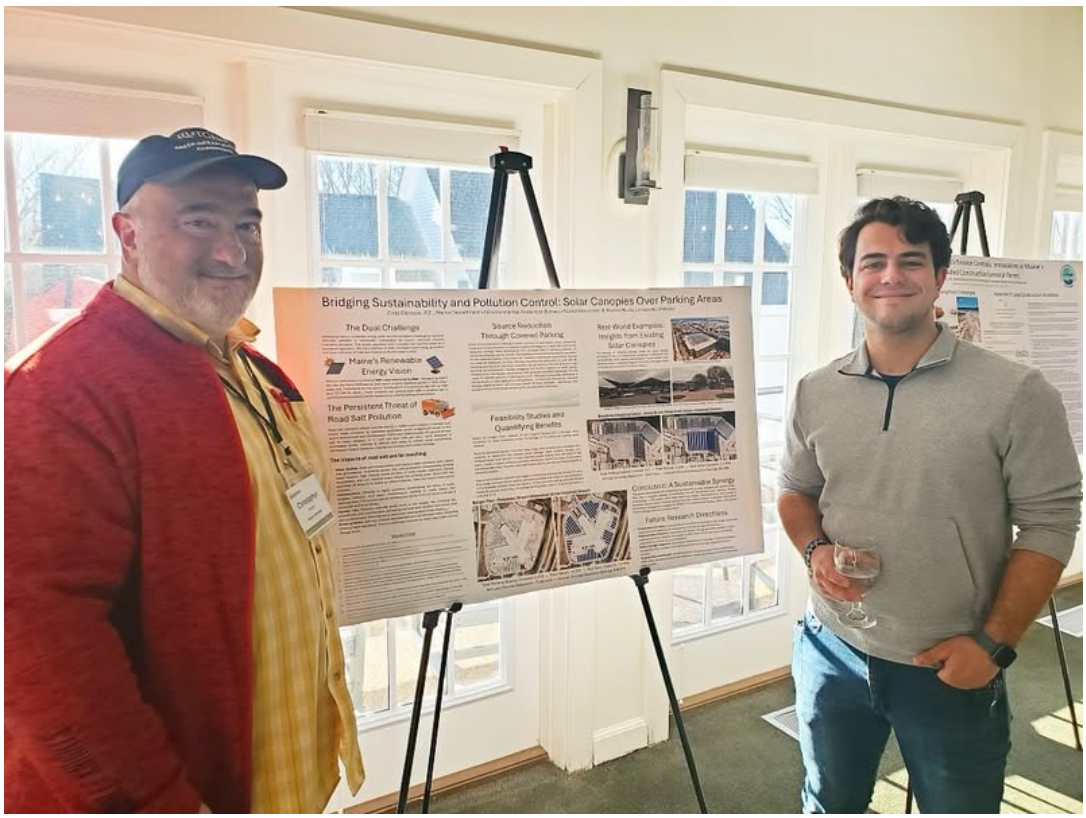
A good friend of mine, Jessica Browm, once told me that R&D for cooperative Extension doesn't mean "Research and Development" but rather "Rip-off and Duplication." All good Extension professionals share their good education and outreach programs and steal the great programs that their colleagues have created. As an Extension professional, I love when one of my colleagues R&D's one of my programs. This is my 4th year attending the NEIWPCC Nonpoint Source Pollution Conference. **NEIWPCC** is the New England Interstate Water Pollution Control Commission. The conference attendees are a mix of local, state, and federal officials, academics, local nonprofit leaders like watershed managers, and consultants. I know when I say "consultants" you think of slick salesmen trying to sell you their services. At the NEIWPCC Conference, I found the consultants are not like this; they really care about fixing the planet as much as you do and, in some cases, maybe more. It doesn't seem to be all about money for them.

This year's conference was in Freeport Maine, home of L.L. Bean. It focused on community engagement and a lot about engaging the community through art. I've always wanted to figure out how to link art to our work in water resources. The closest I have come is to work with some incredibly creative landscape architects (LAs) – Jeremiah Bergstrom, Toby Horton, and Chris Perez. These LAs took many

of our projects beyond simply managing stormwater and focused on placemaking creation. Green infrastructure projects can be gathering places for our communities, which can help improve people's health.

At the conference, I shared our work with Green Infrastructure Champions in New Jersey's overburdened communities building rain gardens. James Houle from the University of New Hampshire (UNH) Stormwater Center made fun of me saying I give the same presentation every year. Maybe there is some truth to that, but like I always say, "Give the people what they want."

My son, Cody, was at the conference. He usually presents, but this time he had two posters. One was on salt reduction on parking lots by installing solar arrays over a parking lot. Great idea; he is a chip off the old block! He also had a poster on reducing erosion from large solar arrays that are built on virgin land both during construction and after construction. Maine is very concerned about the environmental impact of stormwater runoff from large solar projects. Maybe New Jersey should follow their lead.



Chris and Cody Obropta at the NEIWPCC Conference in Freeport, ME, April 2025

At the conference, a lot of people talked about using ArcGIS Storyboards to engage people and ArcGIS Survey123 to get their feedback and their promise of participation. There was a presentation on a buffer restoration guide, a RiverSmart Homes program, and a group around Bangor, Maine that has created a great Outfall SignSearch Program with all new and cool emojis. The UNH Stormwater Center always has a big presence at the NEIWPCC Conference, and once again, Jamie Houle and Tom Ballestero delivered. Jamie spoke about *Forensic Deconstruction of Two 20-Year-Old Green Infrastructure Stormwater Control Measures* and basically showed the life span of rain gardens is well beyond 20 years. Tom focused on sharing the carbon storage characteristics of bioretention systems based upon his research. Bioretention does a much better job of storing carbon than turfgrass.

NEIWPCC prides itself on delivering a great conference for a low cost. Next year the conference will be in Massachusetts. I hope you all will come. I can guarantee you will have a great time. In the meantime, I hope to reach out to some of the conference presenters and see if they would be willing to do webinars for stormwater managers and Green Infrastructure Champions in New Jersey.

~ Christopher C. Obropta, Ph.D., Extension Specialist in Water Resources

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Spring maintenance tips for your rain garden

It's that time of year! Rain gardens are starting to bloom once again, and here are a few spring maintenance tips to keep your planted green infrastructure functional and beautiful.

~ Identify desirable plants using your maintenance guide and plant list.

~ Prune or cut back previous perennial growth.

~ Remove non-desirable and invasive plant species.

~ Inspect inlet and outlet structures, stone, pipes, drains, and grates.

~ Remove accumulated debris from the rain garden.

~ Add a 2 to 3-inch layer of undyed triple shredded hardwood mulch. This will help curtail weeds and retain moisture during the heat of summer.

~ Start early and weed often to keep the work manageable and fun!

People pollution ~ Let's fix it!
NO EXCUSES WILL BE ACCEPTED!

We often refer to nonpoint source pollution as people pollution. It is a pollution that comes from people simply living their lives. So how do we reduce nonpoint source pollution? Well, the obvious way is to get people to take personal responsibility and to get everyone to do their part. It all starts with behavior change. The goal of every good education program is to get people to act. When you come to hear me speak or you get online for one of my webinars, I will increase your knowledge and awareness. Now you need to use this knowledge to do something, to change your behavior, and to share this knowledge with others.

Many people are concerned that the people in power in Washington, D.C. don't care about the environment. The last time I checked, President Trump and Mr. Musk

don't control your property. They can't stop you from building a rain garden or installing permeable pavement on your property. They can't stop you from working with your town to install a rain garden at the library or the municipal building. They can't prevent your child's school from building a rain garden with the students. Regardless of what is happening in D.C., the RCE Water Resources Program will continue to educate people and work with them to take action. We the people have to step up and do more!

~ Christopher C. Obropta, Ph.D., Extension Specialist in Water Resources

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Registration Now Open for the 2025 New Jersey Sustainability Summit
Friday, May 9th at Bell Works, Holmdel, NJ

The New Jersey Sustainability Summit is a dynamic one-day event that brings together leaders from the political, private, and public sectors. Attendees will take part in insightful discussions, exchange best practices, celebrate sustainability efforts across the state, and explore opportunities for future collaboration. Register today to learn more: **bit.ly/SustainabilitySummit-25**

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