

Spring 2022

The Connecticut Institute of Water Resources

WHO WE ARE AND WHAT WE DO

In a state like Connecticut where water seems plentiful, it is easy to take water for granted. As long as clean water comes out of the tap, water issues may not rise to the top of our list of concerns. Although we do have plentiful water for the most part, there are still many reasons to keep water in mind. Who wants to take their kids to the beach in the summer and find that the beach was closed due to high bacteria levels in the water? Or who wants to have their water heater fail due to high salt in their well? And how do we know that we will have enough water to supply the state if we have another severe drought?

The CT IWR is part of a national network of 54 state and territory water institutes created by the Federal Water Resources Research Act of 1964. Our mission is focused on all aspects of Connecticut's water resources, which includes use, preservation, and proper management. Why is this important? It means that CT IWR is addressing the most pressing water issues in our state. Every institute receives funds annually from the United States Geological Survey (around \$132,000). A small amount is used for staff support, but the majority of funds are given out to support research on critical water issues every year through a competitive process. In addition to helping address these critical water issues, the grants help support training of undergraduate and graduate students to work in water-related fields, and provide support for early career water resources scientists.

Photo: Natalie Barahona, UConn undergrad, CT IWR photo contest winner



ABOUT US

The CT IWR is headed by Director Michael Dietz. Dr. Dietz is an Extension Educator at UConn, and also a joint faculty member in the Department of Natural Resources and the Environment. He has a background in water resources with a focus on green stormwater infrastructure techniques, and took over as director in January 2018. The Department of Natural Resources and the Environment provides critical administrative support to CT IWR (thank you to Chelsea Lebron and Department Head Jason Vokoun). An advisory board composed of members who represent the main water resources constituency groups in the state help to guide our activities and select research projects for funding.

Questions and comments can be directed to the Director at michael.dietz@uconn.edu.

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MESSAGE FROM THE DIRECTOR

There have been many challenges in Connecticut over just a few years, aside from COVID: drought, heavy storms, flooding, income disparities, etc. However, this is also a year to celebrate some of our successes. This year is the 50th anniversary of both the Connecticut Inland Wetland and Watercourses Act and the Federal Clean Water Act. Coincidentally, it is also the 50th year of my existence on this planet! In my lifetime, there have been dramatic improvements in the quality of the waters in our state and our nation. I just had a conversation with my uncle last week, who said that when he was a kid, the Connecticut river and many estuaries in the state had awful water quality. He has noted the improvements over the last 50 years. We owe a debt of gratitude to those who spearheaded these efforts to help preserve our critical wetlands here in Connecticut and the quality of our waters nationwide. We still have a long way to go to address persistent issues like nonpoint pollution from our developed areas, and I am proud to be a part of a program that helps to address these problems.

I would also like to introduce two new students. First, Aianna Xin Siembab is a UConn undergraduate student. Aianna just graduated from the College of Liberal Arts & Sciences, where she majored in economics. She is pursuing a career in the financial sector, but in her time at UConn she developed a keen interest in the economic impact of climate change, specifically that associated with water scarcity, after hearing about the record low levels of

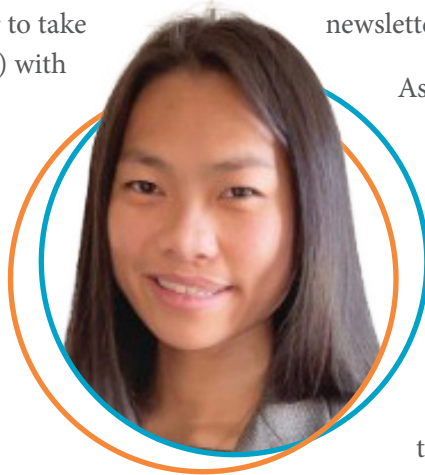




“ We owe a debt of gratitude to those who spearheaded these efforts to help preserve our critical wetlands here in Connecticut and the quality of our waters nationwide. ”

major US reservoirs. This prompted her to take NRE 3155 (Water Quality Management) with me, along with other environmentally focused courses. Aianna has been working for CT IWR to help with social media, and she also wrote an article for this year’s newsletter.

Second, Alec Janis, is a UConn graduate student working on his Master’s degree with me in the Department of Natural Resources and the Environment. Alec is a Connecticut native and graduated from Tulane University in 2019 with a degree in public health and a minor in psychology. Since then he worked on public health and water issues, most recently for the Water Collaborative of Greater New Orleans. He is back in New England and will be working on our new private well testing campaign for his Master’s research. Alec attended the study abroad class, Water Systems of Ancient Rome, that Gary Robbins offered in May 2022 (I was lucky enough to tag along as a co-instructor!), and he wrote an article for this year’s



newsletter as well.

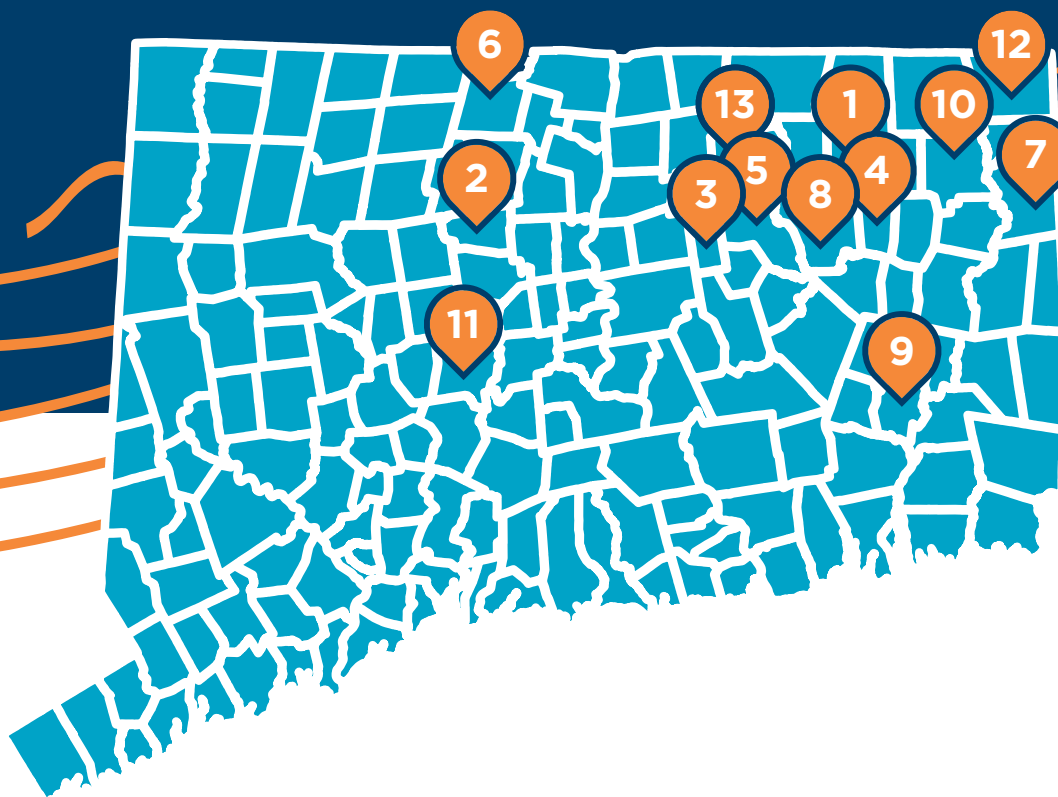
As noted in last year’s newsletter, I have been participating in a Diversity, Equity, Inclusion and Justice (DEIJ) subcommittee for the National Institute of Water Resources. In the face of so many obstacles to making real change, it can seem difficult to find a place to start. One of my recommendations was to send out draft DEIJ language for all of the 54 institutes to use when announcing their funding opportunities this year. The simple change encouraged submissions from underserved researchers / students and for work in underserved areas. We will be following up this year to see the results of these efforts nationwide. Here in Connecticut, this effort resulted in a project in an underserved area of the state (Newhallville, New Haven) and mentoring of a graduate student from an underserved population studying zooplankton.

Top Left: Alec Janis | **Center:** Aianna Xin Siembab

Update: Well Testing Program

CT IWR had started a small program to do free well water testing for residents of the State (see previous newsletters). Although there were some setbacks due to COVID, we were able to cover costs for testing at 25 homes. Overall, the majority of test parameters were within acceptable limits. However, four wells had coliform bacteria present, two had high manganese, and one had high iron. CT IWR followed up and sent these homeowners information (from the CT Department of Public Health) on how to

remedy these issues. Unfortunately, there were many more people who expressed interest in getting their water tested for free, but due to COVID impacts at the laboratory, we had to end the program. However, in the next year, CT IWR will be starting a new effort to provide well water testing at a reduced rate for rural homeowners. There are more than 300,000 wells in the state; we want to help these homeowners get testing done so they know whether their water is safe to drink.



WELL TESTING LOCATIONS

- 1 Ashford
- 2 Avon
- 3 Bolton
- 4 Chaplin
- 5 Coventry

- 6 Granby
- 7 Killingly
- 8 Mansfield
- 9 Norwich
- 10 Pomfret

- 11 Southington
- 12 Thompson
- 13 Tolland

33

As

Arsenic

74.921

92

U

Uranium

238.029



ANOTHER REASON TO TEST: ARSENIC AND URANIUM

In addition to the standard potability parameters that are included in private well water testing, there are two more elements that have recently been found in Connecticut's groundwater: arsenic and uranium. A recent study in Connecticut by the United States Geological Survey showed that some well water samples exceeded EPA's maximum contaminant levels for these elements. Overall, around 5% of samples had arsenic and

uranium concentrations that exceeded EPA's maximum contaminant levels for these elements. These standards are set to protect human health; uranium can cause cancer or other health issues if high concentrations are ingested. Both of these elements occur naturally in certain types of bedrock in our area. However, some recent preliminary collaborative research by Dr. Gary Robbins at UConn and Dr. Meredith Metcalf at ECSU has indicated that historic spraying of apple orchards with lead arsenate pesticides could be contributing to high arsenic in groundwater today.

Note From The Director:

For the past three years, I have participated in the Implementation Workgroup for the State Water Plan (<https://portal.ct.gov/water>). I recently chaired a workgroup¹ that was tasked with determining if the current potability testing that is done for new wells is sufficient, or if it should be expanded. Given the recent findings above, our group concluded that arsenic and uranium should be added to the testing list when a new well is constructed. We also recommended that potability testing (including arsenic and uranium) be required for all real estate transactions where a private drinking water well supplies the dwelling. The Connecticut Department of Public Health advanced these recommendations in this year's legislative session, and was successful in changing the Public Health statutes through sHB 5500 (§ 60 — PRIVATE AND SEMIPUBLIC WELLS) to require that new wells be tested for arsenic and uranium, starting October 1, 2022! They also added lead to the list of requirements for new wells. The recommended change to require testing for all real estate transactions did not make it through in this session. However, the statute does require that all prospective home buyers and renters be provided information about well testing.



¹Group members included the following: Don Carew (ACT Labs), Jay Cohen (CT Dept. of Consumer Protection), Gene Fercodini (CT Realtors Assoc.), Meredith Metcalf (Eastern CT State Univ.), John Mullaney (USGS), Gary Robbins (UConn), Tiziana Shea (CT Dept. of Public Health), Thomas Stansfield (Torrington Area Health District), Veronica Tanguay (CT Dept. of Energy and Environmental Protection), Ryan Tetreault (CT Dept. of Public Health)



Big Impact:

Bioswales In New Haven

By Aianna Xin Siembab

This year CT IWR is highlighting an ongoing green infrastructure project in New Haven, Connecticut that is targeting water quality through the implementation of bioswales.

WHAT ARE BIOSWALES?

Bioswales, also known as rain gardens, are essentially engineered gardens designed to increase the infiltration of stormwater runoff while simultaneously improving water quality. They are considered to be engineered as they are often built in urban areas and must fit into the local infrastructure. The vegetation within bioswales must also be carefully planned to serve both a functional and aesthetic purpose.

Bioswales are becoming increasingly popular as a tool to counter the effects of urbanization. Urbanization has caused the disruption of the natural water cycle as permeable surfaces are covered with impermeable ones like roads, and buildings. Climate change is only making these issues worse, as we are getting more intense storms that can often overwhelm outdated infrastructure.



WHY NOW?

In 2021, Connecticut residents faced numerous weather challenges, from heavy snowfall to intense rainstorms, breaking records in some areas. Some notable events included the flash flooding in the aftermath of Tropical Storm Fred in August 2021 and the remnants of Hurricane Ida in September 2021.

However, these extreme weather events are not unique to the year 2021 and the state of Connecticut, as they are part of an overall global trend documented by climate scientists. These climate changes mean dryer regions are becoming dryer while wetter regions are becoming wetter due to extreme weather events/phenomena becoming more intense and frequent. The damages associated with these events are both hazardous and costly. Hazards may include diminished water quality as a result of excessive runoff and pollution from combined sewage overflows, and higher costs from any destruction that occurs.



NEW HAVEN'S EFFORTS WITH DAWN HENNING

In efforts to mitigate the effects of these extreme weather events, the City of New Haven has implemented numerous bioswales through their Advancing Green Infrastructure Program.

The project is led by city engineer and Connecticut native, Dawn Henning, who studied at Columbia and Yale University. Henning's passion for water resource management emerged as a child as she spent her life "on the water, in the water, and around the water," Henning stated.

Although Henning joined the project in 2015, the bioswales were first implemented in 2013 under city engineer Giovanni Zinn. Today, there are 286 bioswales in the New Haven area, which were mainly built from grants. In recognition of the program's efforts, in 2018, the project received the prestigious Roy Family Award for Environmental Partnership from Harvard University.

In addition to the environmental benefits of bioswales, there are economic benefits as they bring in construction jobs to the city and overall enhance the aesthetics of New Haven. Furthermore, as compared to "grey" infrastructure alone (typical piped systems), green infrastructure solutions integrated throughout the grey landscape have been shown to be more cost effective in the long run.

FINAL NOTES

As urbanization continues to grow in the presence of climate change, green infrastructure like bioswales can offer both an aesthetic and economical solution for the enhancement and preservation of water quality. Many thanks to engineers like Dawn Henning who are leading the green infrastructure charge here in Connecticut!

UPCOMING RESEARCH

FOR FY23, CT IWR HAS SELECTED THE FOLLOWING PROJECTS FOR FUNDING:

Title: Establishing a Model System to Restore Zooplankton Abundance in Connecticut Lakes
Investigators: Theodora Pinou (Western CT State Univ.) and Laurence Marsicano
Amount: \$6,305

Title: Field Hydrogeologic Study to Confirm Orchard Sources of Arsenic Contaminated Domestic Well Water
Investigators: Gary Robbins (UConn) and Meredith Metcalf (Eastern CT State Univ.)
Amount: \$25,024

Title: Investigating the Impact of Beavers in Connecticut Upland Rivers
Investigator: Will Ouimet (UConn)
Amount: \$15,438

Title: Assessment of PFAS-Impacted Soil and Groundwater in the State of Connecticut
Investigators: Nefeli Bompoti, Christopher Perkins, Anthony Provatas, Marisa Chrysochoou (UConn) and Zoi Dokou (CA State Univ. Sacramento)
Amount: \$25,000

Title: Building Environmental and Community Resilience with Rain Gardens: A Collaboration of SCSU and Neighborhood Housing Services in Newhallville, New Haven
Investigators: Sara Baker-Bailey and Suzanne Huminski (Southern CT State Univ.)
Amount: \$25,000



Thoughts From Abroad: WATER THE DIFFERENCE

By Alec Janis

Growing up in Connecticut, I was always amazed when I heard a house was built prior to the 1800s. Being in one of the original 13 colonies, it seemed like a piece of history, a mainstay from the founding of our country. Sure, people have lived in this area for thousands of years, but the indigenous peoples that lived with the same land either left few traces behind or what remnants that had been left were destroyed by colonial settlers. When I traveled through Rome on a trip with UConn's Water Systems of Rome: Ancient to Modern course, I saw structures that have been standing for 2,000 years. I was left awestruck, questioning what will be left from America centuries from now.





What did the Romans do that was so special? I could argue some of these projects were products of pride, but the *why* is not as interesting as the *how*. Two thousand years ago, waterproof cement and concrete became widely used construction materials in the Roman Empire. This allowed structures such as bridges and piers to be set in water, waterproofed aqueducts to channel water for miles without spillage, and supported massive bath houses that would suit the general populace's hygiene needs. The Romans had developed a means to control water and in turn the empire flourished. Will futuristic societies gaze upon our water treatment plants and dams with a sense of wonder and reverence?

Perhaps not, but maybe they'd admire our inventive ways to provide water to our 3.5 million residents.

The concept of public access to water was valued by the ancient Romans and has been upheld ever since.

Aqueducts channeled water from the nearby mountains into the city where it was delivered to public fountains, bath houses, and the private homes of the city's elite upper classes. Today, as we roamed the streets of Rome, where one may expect a fire hydrant, small waist-high spigots called *nasoni* produced a constant stream of potable water for anyone to enjoy. Connecticut is a water-rich state, making it very easy for residents to connect to either a public or private water supply. Free water, however, is not as readily available in Connecticut, but springs such as the public fountain in Willimantic or the natural spring



“ Even though society is constantly striving to invent new, complex ideas, sometimes our solutions are timeless and simple. ”

in Enders State Forest exist in pockets across the state. The same sentiment to water access may not be held in all of Connecticut, but with the surplus of water that exists in this area, we can value it in other ways.

Now the art in Rome; the meticulous detail that was put into columns, fountains, sculptures... I'm sorry, Connecticut cannot boast any pieces of that quality. Yet maybe our state could achieve a feat the Romans could never fathom. In their buildings, Romans valued beauty of fine detail and storytelling as well as functional design.



Today, around the country and abroad, cities are combining art and environmental design. One of many aspects of these installments is the storage and treatment of stormwater that would normally pollute and inundate bodies of water in urban areas. New Haven has begun a movement to install bioswales, rain gardens, permeable pavers, and other forms of green infrastructure in many of its neighborhoods. As this movement spreads throughout the state, we should be conscious of how we can incorporate local artists and horticulturists into the GI design phase. For further examples and discussion, check out the Story Map created by UConn student Lauren Pawlowski at <https://arcg.is/uevjK>.



My main takeaway from Rome is that the ideas and technology of ancient Rome can still be incorporated today. The layers that make up the Roman road are the same as the layers of the pervious paver roads and driveways we build today. Even though society is constantly striving to invent new, complex ideas, sometimes our solutions are timeless and simple. We live in an era where natural resources are dwindling while global temperatures are rising; issues that previous generations never had to concern themselves with. Yet, Rome was able to support

a million residents at its peak without the aid of our postindustrial technologies. Efforts to green urban and rural areas such as installing less impervious surfaces, using alternative energy sources, and returning to small-scale farming styles use simple logic and can make significant environmental impacts. When future generations discover our ruins let them see a culture that, unlike the Romans, did not construct commemorations of its greatness but had built a community that cherished its natural resources, if there are any traces left at all. ■





SOME SUCCESS ON EFFORTS TO ADDRESS ROAD SALT CONTAMINATION

In previous CT IWR newsletters, I have highlighted the Green Snow Pro trainings delivered by the Connecticut Training and Technical Assistance Center (T2 Center) at UConn. This program provides training for municipal snow applicators to optimize deicing material application and reduce environmental impacts, while still providing safe conditions for drivers and pedestrians. The State legislature recently passed legislation (SB 240) requiring the Green Snow Pro training in the state, and the T2 Center will be increasing their efforts to address the need. The T2 Center received some pilot funding from the State to increase the number of Green Snow Pro trainings, and to expand the audience to include private snow contractors. As I have mentioned before, this training is currently the only proven way to reduce road salt contamination in the environment, so this is huge win! And CT IWR greatly appreciates the efforts that Donna Shea, Mary McCarthy, and Jim Mahoney at the T2 Center have put forth to address this issue.





Photo: Alex Joslin, UConn undergrad,
CT IWR photo contest runner up

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