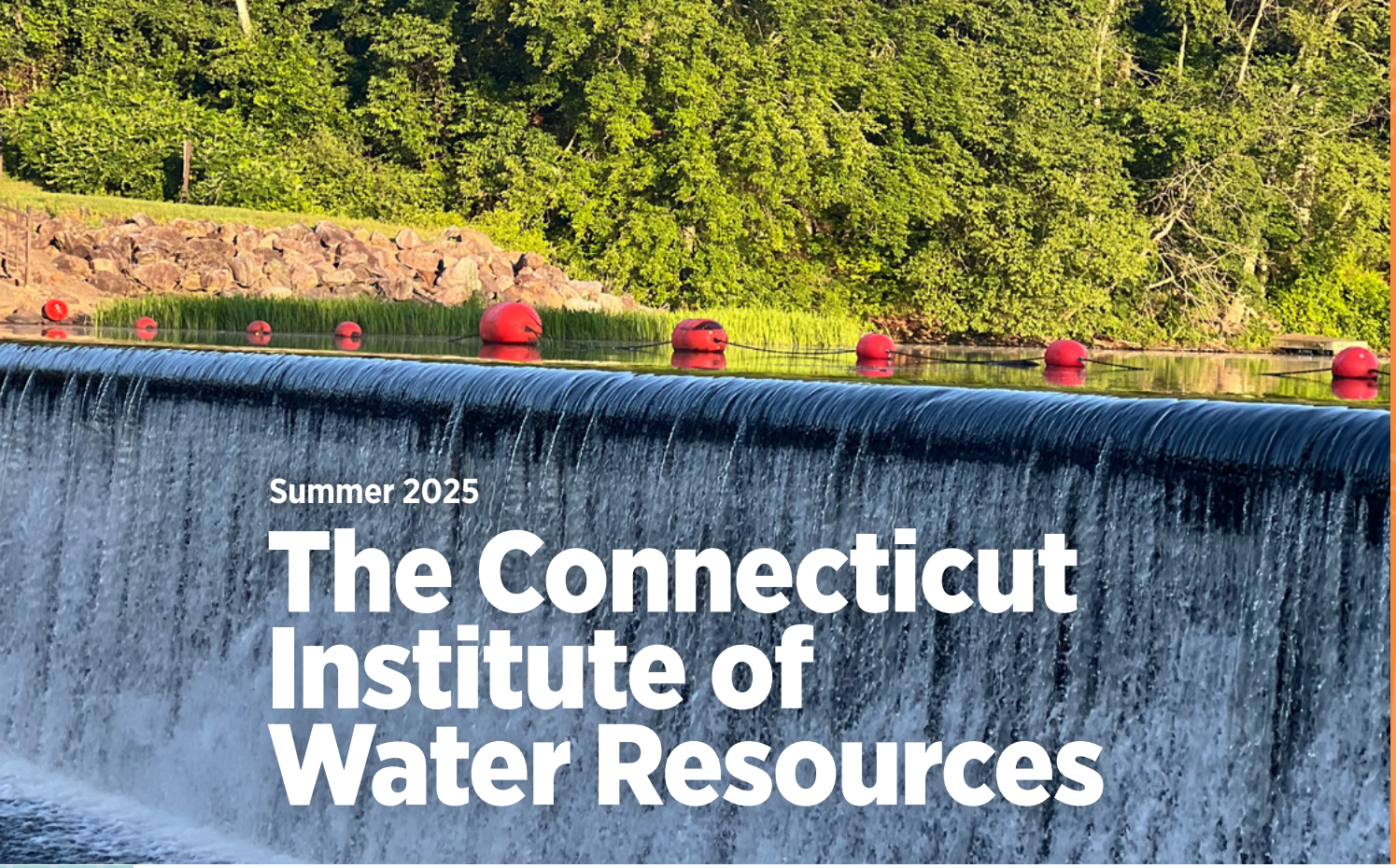

Summer 2025

The Connecticut Institute of Water Resources

CTIWR.UCONN.EDU

Photo: Bo Tao, CT IWR Associate Director

@CTIWR

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 a 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. What does this mean for you? 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, or USGS (around $147,000). Some of these funds are used for staff support, but the majority is awarded to support research and outreach on critical water issues every year through a competitive Request for Proposals (RFP) process. In addition to helping address these critical water issues, the grants help to train undergraduate and graduate students to work in water-related fields and provide support for early career water resources scientists.

CT IWR
Institute of Water Resources

ABOUT US

The CT IWR is headed by director Michael Dietz with assistance from associate director Bo Tao. Dietz is a senior extension educator at UConn and is a joint faculty member in the Department of Natural Resources and the Environment. He has a background in water resources with a focus on protecting surface waters and green stormwater infrastructure techniques and took over as director in January 2018. Tao has a background in modeling of land use and climate impacts on water resources and has served as CT IWR associate director since August 2023. An advisory board composed of members who represent the main water resources constituency groups in the state helps to guide our activities and select research projects for funding.

Questions and comments should be sent to the Director michael.dietz@uconn.edu.

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Visit our website: ctiwr.uconn.edu

MESSAGE FROM THE DIRECTOR

I have been asked by many people if funding for our Institute is in danger of being reduced or cut right now, given the dramatic cuts that are taking place at the federal level. As of the writing of this newsletter, the funding has been released for the FY 2025 projects listed at the end of this newsletter. The USGS was put in a difficult position as the funding for our entire program was subject to several additional reviews that were not required previously, which delayed their release of the funds to the institutes. As noted in previous newsletters, our program has historically enjoyed strong bipartisan support in Congress. This is perhaps not surprising; although the specific issues vary by state, we all rely on water to survive. Much of the research and outreach that the state institutes support addresses water supply and water quality issues related to human needs. What is the outlook for next year? I have always felt that our funding was pretty secure, due to this strong support from both sides of the aisle and the Congressional authorization for our program. But there are many things happening with federal programs and funding right now that don't follow the way things have been done historically and frankly defy logic. While I am hopeful for the future of our program, I am also concerned.

UPCOMING RESEARCH

FOR FY25, CT IWR HAS SELECTED THE FOLLOWING PROJECTS FOR FUNDING:

Title: Projecting Streamflow Variations under Future Environmental Change in Connecticut River Basin
Investigator: Bo Tao (UConn)
Amount: $30,000

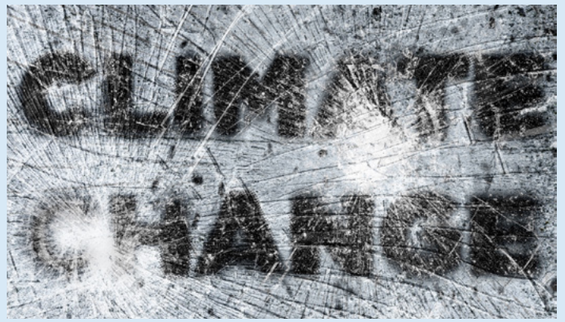
Title: Estimating River Network Contraction due to Invasive Japanese Barberry Establishment along Intermittent Streams in Connecticut
Investigators: James Knighton (UConn)
Amount: $30,000

Title: Predictive Modelling of Domestic Well Water Quality Using Artificial Intelligence Algorithms
Investigator: Chandi Witharana (UConn)
Amount: $30,000

Michael Dietz, CT IWR Director

Extreme Precipitation Events: Some Facts and One Man's Opinion

Because of changes in the priorities of the federal administration, among other topics, we have been directed not to fund any research or outreach projects related to:



However, I feel the need to provide some facts related to very recent weather events in our region. This July, a storm stalled over parts of New Jersey and New York — this was not even a tropical storm — just a "regular" storm. Although there were informal reports of up to 8 inches of rain falling, the top official totals for the day were around 6 inches, which is roughly 1.5 months' worth of rainfall. This alone would be problematic, but the bigger issue was that this rain fell in a very short period of time — over just three hours in some places! With this kind of intensity, the stormwater pipes and collection system get overwhelmed, leading to severe flash flooding in urbanized areas. The amount of impervious surfaces, including roads, parking lots, and buildings, only makes this problem worse, as water can't sink into the ground in these areas. The data show that this amount of rain in that period of time has a chance of happening only once in 500–1,000 years. Roads quickly became impassible, and numerous motorists were stranded, including my good friend and colleague Dr. Chris Obropta, who directs the New Jersey Institute of Water Resources. Three people died when their cars were swept away by flood waters. In New York City, subway tunnels flooded, and people were stranded-several videos posted online document this terrifying situation (see youtube.com/watch?v=ayv_bEumI7s). And although I am focusing on the northeast region right now, most people are aware of the very recent tragedy in Texas, where torrential rains and flash flooding caused extensive damage and resulted in more than 100 deaths.

According to the Fifth National Climate Assessment[1] performed under the Biden administration, the northeast region (which includes the mid-Atlantic and New England states) is seeing approximately a 60% increase in the amount of rain that falls during the heaviest downpours — the largest increase in the United States. Put more simply, what used to be uncommon events are now becoming more common, and we are setting new records routinely for the intensity of rainfall events. In addition to warmer temperatures, further increases in rainfall intensity are expected in the future. We can have a healthy debate about how to handle the situation we are in, and I realize that there will be differing political opinions on how to deal with this large-scale, complex problem. However, the temperature and rainfall data are crystal clear: things are changing. We are seeing the consequences. In fact, public opinion over the last two decades has shifted in both red and blue states, with more people agreeing that there is scientific consensus that this is happening, we are feeling the impacts, and this is an important issue to address.[2]

Now for the opinion part: pretending these changes aren't happening is not only irresponsible, it is downright disrespectful to our children and future generations. I will follow federal directives related to what we fund, but I will not ignore facts, and I will seek other means to fund this important work in the short term. I look forward to the near future when we can once again work together without fear of retribution to tackle this generational problem.

[1]The summary of this report is available in an archived version here: bidenwhitehouse.archives.gov/ostp/news-updates/2023/11/09/fact-sheet-fifth-national-climate-assessment-details-impacts-of-climate-change-on-regions-across-the-united-states

[2]Marlon, et al. 2022. Change in US state-level public opinion about c.c. Environmental Research Letters, Vol. 17, pp. 1-18.

Keeping Connecticut Wells Clean: Filtration, Disinfection, Testing!

Alec Janis, Extension Research Specialist

When was the last time the average Connecticut resident tested their well water quality? We've been busy over the past few years trying to answer that question. The short answer is not recently enough. We've found that 94% of our participants do not test their wells every 1–2 years, which is what the Connecticut Department of Public Health (CT DPH) recommends. But the UConn Extension well testing program has been trying to correct that.

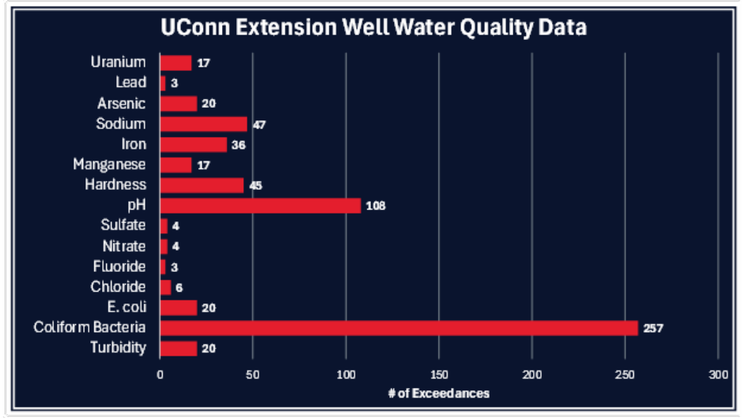
Since last year's update, we have tested 413 private wells in the state, bringing our total to 886 homes since the beginning of the project! This was a significant jump from the 263 wells we tested in 2023. We've attributed this success to utilizing local governments, health departments, and conservation commissions as community partners to spread the word about our program. Having a local voice to promote our program builds trust, making people more likely to participate.

We had articles featured in NPR and the Hartford Courant. The support and inquiries we received from our local media was incredible, bringing in well over 200 new participants! Besides that, we still had people delivering samples to the UConn main campus on a weekly basis. But maybe the biggest update of the past year was the utilization of the mobile well water testing lab! Although the inside is still a work in progress, we have been able to drive it to several events to use its refrigerators and use it as a marketing tool.

Since 2024, we hosted well testing workshops and sample collection events in New London, Fairfield, New Haven, and Middlesex counties. Once participants received their results, we were able to work with them to better understand their water quality. We find that 1 in 3 participants have coliform bacteria in their well. To disinfect, the recommended treatment is for the well owner to pour bleach directly into the well to disinfect their entire system. For persistent bacteria issues, we recommend a UV light system. For all other metals and nutrients, we recommend an assortment of filtration systems that can also be found in our treatment factsheet (ctiwr.uconn.edu/wq-factsheets). For a summary of the number of exceedances of water quality parameters that we test for in wells around the state, see the chart at right.

The year was not without setbacks. Although we had been able to provide water quality tests for $50 a sample since 2022, we had to increase the cost of testing this past September to $100 a sample to help compensate for the program's diminishing grant funds. More recently we have had to increase to $225, which is what the testing costs us. At this price, we should be able to run the program indefinitely. This is still cheaper than what a resident would pay if they went to a lab on their own. One recent note: We were notified that the Rural Health Safety and Education grant program may have some additional funds for our program. We should know soon whether we will receive this funding, which will allow us to reduce the cost to $50 again.

In May 2025, we brought the mobile well testing lab to the Middlesex County Extension Office in Haddam for a one-day testing event. We had over 130 participants drop off a sample. Although the percentage of samples that contained uranium was comparable to what we have seen around the state, the percentage of samples that had a uranium level over the state's recommended health standards was twice our expected average. USGS has found similar results in this area. In 2022, CT DPH added lead, arsenic, and uranium to the required contaminants that need to be tested for when a well is installed. Since it was not legally required, anyone in Connecticut who installed their well before 2022 may have never tested their water for these three contaminants. The concern is that regular exposure to uranium can lead to kidney dysfunction or other problems. Although we cannot help everyone, this was a great start to helping residents of this area to better understand how their local geology can impact their health.



At the end of 2024, we received some exciting news from the CT DPH. The well testing program has been asked to expand its efforts to include PFAS testing. For those unfamiliar, PFAS, also known as forever chemicals, are a group of manmade chemicals that have been used in commercial products for almost 80 years. They have recently been labeled as "emerging contaminants" that are linked to immune system disruption, thyroid complications, kidney cancer, testicular cancer, and more. We will be testing for several PFAS compounds in private drinking wells located in economically disadvantaged communities around Connecticut. We are beyond grateful that such an important program is currently being funded. This research will help CT DPH understand the risk related to consuming PFAS through private wells in Connecticut. This program is set to begin in the fall.

That's it for now. If you see our mobile lab traveling around the state, feel free to say hi! And of course, you can request a testing kit and make an appointment to drop off your sample here: s.uconn.edu/welltest.

RESEARCH HIGHLIGHT

Community-Led Green Infrastructure to Improve Urban Water Quality in Hartford

Bo Tao, CT IWR Associate Director

with contributions from Sophia Gagnon, MS student in the Department of Natural Resources and the Environment at UConn

This year, CT IWR highlights a recent project supported by USGS that addresses critical water quality challenges in Hartford, with an emphasis on areas affecting the Connecticut River and local waterways. The project was led by Mayra Rodríguez, an assistant extension educator in urban and community forestry with UConn Extension and the Department of Natural Resources and Environment. Her outreach and research has focused on investigating interactions between nature and people to identify the barriers to achieving equitable resilience. She applies this knowledge to support institutions, governmental agencies, and community groups in addressing environmental and climate injustices through the management of urban forests.

Growing up in Puerto Rico, Rodríguez developed a strong connection to science and the natural world around her. She began her academic career there, followed by internships in Arkansas, and furthered her education and research at Purdue and the University of Vermont. Now at UConn, she continues to advance community-focused research and outreach.

Through her career, Rodríguez has led with intention and empathy for the communities she works with. She has refined her community engagement skills by remaining humble in all situations and holding herself accountable when missteps are made. She emphasized the importance of embedding the value of community awareness into the foundational teachings of environmental and natural resources. By doing so, she ensures that more projects "hit the mark" on what individual communities need.

Urban water pollution has long been a persistent and complex issue in cities like Hartford, Connecticut, where aging drainage systems have struggled to manage stormwater, resulting in problems such as flooding, polluted runoff, and combined sewer overflows. Green stormwater infrastructure (GSI) is a promising way to manage water pollution. It can also help reduce urban heat, provide recreational spaces, and enhance community health. But, despite municipal support for GSI, progress has been slow due to limited community engagement and concerns about costs and implementation. To address this issue, the project adopted a community-based approach to promoting GSI solutions, demonstrating the power of inclusive environmental planning.

WHY IT MATTERS

In Connecticut, nonpoint source pollution is a significant cause of ecological degradation of local waterways. Hartford's water bodies, including the Connecticut River and Park River, frequently experience combined sewer overflows and runoff pollution, especially during storms. Dangerous bacterial levels have been recorded in the Connecticut River, exacerbated by polluted runoff and combined sewer overflows. Meanwhile, other surface waters, such as Trout Brook and the Park River, are also impaired, likely due to urban stream syndrome. These conditions highlight the urgent need for solutions that address stormwater runoff and pollution while promoting ecological health.

Traditional stormwater systems have proven insufficient, and while the city has recognized the value of GSI — such as rain gardens, tree planting, and permeable surfaces — implementation has been slow. Key barriers include high costs, lack of long-term maintenance, and insufficient demonstration projects.

This project aimed to shift that narrative by adopting an inclusive, community-driven approach to GSI education and demonstration.

BUILDING GREEN SKILLS AND AWARENESS

Over the project period, Rodríguez's team engaged community members through a combination of adult and youth green-skills training, interactive learning sessions, and outreach events rooted in local culture. Adult programs trained local residents in tree planting and care, as well as long-term maintenance of green infrastructure, equipping local residents for future green career pathways. Youth sessions introduced participants to waste management strategies, environmental monitoring techniques, and environmental career opportunities, thereby fostering environmental stewardship among young people. Collectively, these efforts reached over 200 participants, showcasing GSI and nature-based solutions (NBS). Notably, 100% of the training participants were recruited through minority-oriented organizations, promoting inclusivity and long-term sustainability in urban greening projects.

Guided by a bottom-up approach, Rodríguez and her team were able to engage with community members and build a trusting relationship where community members could voice their own concerns. Rather than instructing residents on environmental issues they face, her team worked to provide a space to share their experiences, which were then placed in a scientific context to understand how to address these issues. This approach not only enhanced community engagement but also ensured community members felt supported, valued, and empowered throughout the sessions and into the future.

VISIONING AND CO-DESIGN WITH THE COMMUNITY

This project conducted Spanish-language community visioning workshops to identify neighborhood priorities on topics ranging from climate change and tree equity to urban biodiversity, water issues, and food sovereignty. Participants shared personal experiences and provided valuable insights into how environmental challenges have affected their daily lives, which will help inform future co-production initiatives.

> **"Guided by a bottom-up approach, Dr. Rodríguez and her team were able to engage with community members and build a trusting relationship where community members could voice their own concerns."**

Using a dynamic approach called "sensemaking," participants expressed a strong desire for safer and cleaner green spaces, more fruit trees and food-producing plants, greater community involvement in environmental planning, and funding mechanisms that support community-based groups.

Through a series of co-design workshops, Rodríguez's team worked to integrate community design preferences into nature-based solutions, such as GSI, to create greener, healthier, and more equitable urban environments. The workshops were held both virtually and in person, encouraging a high level of participation from Black and Hispanic residents.

MAPPING FOR EQUITY

To support future implementation, the team conducted a spatial analysis using vulnerability data from UConn's CIRCA Climate Change Vulnerability Index (CCVI). The analysis identified city-owned lots in Hartford's most flood- and heat-vulnerable areas, particularly in Hispanic neighborhoods like Frog Hollow and the North End (majority Black).

These efforts, aligned with community feedback, will help guide future GSI investments that improve environmental and public health outcomes.

Mayra Rodríguez

LOOKING FORWARD

The project enhanced understanding of GSI and green infrastructure (GI), providing actionable data to advance equitable GI planning, and successfully engaged diverse community groups throughout the project. By adopting an inclusive and community-driven approach that addressed environmental justice concerns, the project laid a foundation for sustainable and equitable improvements to Hartford's water quality and urban resilience.

For Rodríguez, however, the most rewarding outcome of the project was the meaningful connection she forged with the community and the army of committed community members that was established. She acknowledges that environmental issues can often feel daunting, but she continues to find hope and resiliency in even the smallest things. Her perseverance is possible by finding hope in the silver linings and power in her ability to change just one person's life, which can ripple outward to strengthen the community as a whole.

Most recently, Rodríguez has continued her work in community engagement research in Bridgeport, Connecticut, where she has further developed her understanding of variation in community needs. In her future work she will continue to engage with communities to personalize efforts and ensure that their needs are at the forefront of each project. Particular effort will be devoted to expanding peer-learning opportunities, strengthening local partnerships, and ensuring public green spaces reflect the needs and values of existing communities, thereby enabling green infrastructure projects to benefit everyone equitably.

The full report can be accessed via ctiwr.media.uconn.edu/wp-content/uploads/sites/2848/2024/12/Final-report-RodriguezGonzalezMI-20241119.pdf

Photo: Bo Tao, CT IWR Associate Director

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