Spring 2021

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 \$120,000). 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 credit: Timothy Rodrigue, UConn student



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ABOUT US

The CT IWR is headed by Director Michael Dietz. Dr. Dietz is an Extension Educator at UConn, and also 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 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 Ashley Sandy and Department Head Jason Vokoun). An advisory board comprised of members who represent the main water resources constituency groups in the state help to guide our activities and select research projects for funding.

Comments can be sent to the Director MICHAEL.DIETZ@UCONN.EDU

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MESSAGE FROM THE DIRECTOR

Wow...what a year 2020 was. Although the pandemic and other issues may have dominated the thoughts of so many of us, water issues have not gone away. The Connecticut Institute of Water Resources has continued to carry out its mission of research and outreach, and we look forward to another year of work on the water issues that have direct impacts on our lives. We have continued to add information on our website about things that you can do in your life and on your property to positively impact water quality here in Connecticut. Visit http://ctiwr.uconn. edu/residents to learn more.

In addition to COVID, we have all seen how events in 2020 raised awareness of racial and cultural inequities in this country. At our annual directors' meeting of state and territory Institutes of Water Resources this past February, there was a presentation session and discussion related to this issue. The lack of ethnic and racial diversity in the sciences, and in hydrology fields in particular, was highlighted. A workgroup was formed to help figure out ways that we as individual institutes can help address this issue. I am serving on the workgroup and will provide an update on our progress in next year's newsletter. Please email or call me if you have any suggestions on how we can address this issue here in Connecticut.

Lastly, our Associate Director James Hurd retired in February 2021, after 25 years of service to UConn. I truly appreciate everything that James did for CT IWR, and wish him the best in his cycling adventures with his wife Laura!





UPDATE ON WELL WATER TESTING CAMPAIGN

In last year's newsletter, we highlighted our free water testing campaign. The goal of the campaign was to highlight the importance of testing your own drinking water if you have a private well. Due to COVID, sampling efforts were shut down for a period of time, but sampling has resumed. To date, 25 homes have been tested. Each homeowner/renter received a report on the basic potability parameters, which include contaminants that can impact human health such as nitrate-nitrogen and bacteria, and other things that are also of concern such as sodium, chloride, manganese, and sulfate. For a full list of testing parameters, see this publication from the CT Department of Public Health.¹ In general, water quality in the wells tested so far has been good, however there have been several exceedances of E. coli and manganese. We will continue to test more wells in the upcoming year, and will provide a summary of findings in the 2022 newsletter.

ROAD SALT LEGISLATION

Road salt has been the topic of other CT IWR newsletter articles (see 2019). During the 2021 legislative session, the Environment Committee raised a bill (SB 1031) that would require all municipal and private contractors to attend the Green Snow Pro training. As previously discussed, this training is offered by the Connecticut Training and Technical Assistance Center at UConn. The training teaches salt applicators how salt works, how to calibrate equipment, and how to properly apply given expected weather conditions. The bill also proposes liability protection for property owners who use Green Snow Pro certified contractors. The CT IWR director testified in favor of this bill, as this is the only proven approach currently available that will reduce the amount of road salt lost to the waters of our State. We will report on the outcome of this proposed bill in next year's newsletter.

DROUGHT? IN CONNECTICUT?

When we hear the word "drought", most of us probably think about the desert southwest, or California. However, even in a "water rich" state like Connecticut, we can experience drought. Although our annual average precipitation total is around 47 inches, in any given year we could have much more or much less than that total (see Figure 1). But even within a given year, if we have a prolonged dry period, it can be detrimental to ecosystems, agricultural producers, and humans.

This is exactly what happened in 2020. Although our annual total was just under the average, we experienced severe drought in many parts of the state during the late summer and fall. But what exactly does that mean? It can be confusing, as the definition of an agricultural drought may be different from a meteorological drought. The National Oceanic and Atmospheric Administration (NOAA) has lots of great information on different types of drought: (HTTPS://WWW. DROUGHT.GOV/WHAT-IS-DROUGHT/DROUGHT-BASICS). The United States Drought Monitor is updated weekly, with drought conditions across the entire United States (Figure 2). Their categories (Do-D4) are based on various criteria, including impacts to agricultural crops, ecosystems, drinking water supplies, among others.

Last summer/fall in Connecticut, most of the state was in severe to extreme drought. During the fall, several local rivers had record low flows for the day, based on more than 80 years of record keeping. Wells (especially shallow ones) were going dry, which attracted media attention. Precipitation in the fall and early winter brought our yearly total close to normal, but it was a difficult few months here in the state. The Connecticut Interagency Drought Work Group was meeting regularly during this time (HTTPS://PORTAL.CT.GOV/ WATER/DROUGHT/DROUGHT-HOME) and provided recommendations for residents of the State. Although all of the State is officially now out of the drought, the Work Group encourages people to conserve water where possible.

HERE ARE SOME ACTIONS THAT YOU CAN TAKE TO CONSERVE WATER AT YOUR HOME.³

- Repair leaky faucets, indoors and out.
- Consider replacing old equipment (like toilets, dishwashers and laundry machines)
- Take short showers instead of baths.
- Repair leaky toilets. Add 12 drops of food coloring into the tank, and if color appears in the bowl one hour later, your toilet is leaking.
- When mowing your lawn, set the mower blades to 2-3 inches high. Longer grass shades the soil improving moisture retention, and has more leaf surface to take in sunlight, allowing it to grow thicker and develop a deeper root system. This helps grass survive drought, tolerate insect damage and fend off disease.





U.S. Drought Monitor

Current Drought Change in Drought



The U.S. Drought Monitor (USDM) is updated each Thursday to show the location and intensity of drought across the country using a five-category system, from Abnormally Dry (D0) conditions to Exceptional Drought (D4).

The USDM is a joint effort of the National Drought Mitigation Center, USDA, and NOAA. Learn more.

U.S. Drought Monitor Categories



FIGURE 2 DROUGHT CONDITIONS AS OF 3-10-21.

Unfortunately, due to climate change, we can expect more prolonged periods of drought, in addition to more intense storm events. These changes have already been documented in our region, and we can expect them to continue into the future (see HTTPS://19JANUARY2017SNAPSHOT.EPA.GOV/SITES/ PRODUCTION/FILES/2016-09/DOCUMENTS/CLIMATE-CHANGE-CT.PDF) Here are some actions that you can take to conserve water at your home (full list available at HTTPS:// WWW3.EPA.GOV/REGION1/ECO/DRINKWATER/WATER_ CONSERVATION_RESIDENTS.HTML)



Illustration credit: Angie Harris, UConn



DR. DIBA KHAN-BUREAU

THIS ARTICLE WAS WRITTEN BY KATHY DOIRON AND ALLEN LYON, TWO UNDERGRADUATE STUDENTS AT THREE RIVERS COMMUNITY COLLEGE WORKING WITH DR. KHAN-BUREAU ON HER PROJECT.

TWO FIRST GENERATION, COMMUNITY COLLEGE STUDENTS AND THEIR RIVER DIATOM EXCURSION

Let us start by saying that due to COVID, meeting up and using lab space has been difficult at best, much like the rest of the world. Despite these difficulties, Kathy and I have been able to spend time working on

a research project called "Paleolimnology to understand blooms of Didymosphenia hullii, Didymosphenia geminata, Cymbella janischii; nuisance stalk-forming diatoms in the West Branch Farmington River, Connecticut, USA". Dr. Diba Khan-Bureau has been researching diatoms now for many years, and her research has primarily focused on the association between them and water quality. Diatoms are single-celled algae that live in a shell made of glass, and they create about 50 percent of the air we breathe. She discovered a new to science species of diatom, Didymosphenia hullii in the Farmington River located in Northern Connecticut. She also documented two other nuisance species, Didymosphenia geminata and Cymbella janischii, impacting the same waterways. This is what our research has been centered around. The current hypothesis is that these three species of diatom have been introduced by fisherman's boots and are growing and spreading due in part to climate change.



The overall goal of this research is to find out how long these invasive species have been here by taking core samples of the riverbed and flood plain. By doing this we can cut the sample at different levels, date them and comb through each sample to gather evidence of when they arrived. This research has been such a great experience for the two of us. We have had countless opportunities and have been able to see all aspects from site selection, data collection, sample production, even searching through all the prepared slides. We have learned valuable techniques for each process and continue to improve our skills after each task.

This research is extraordinarily valuable for future research and for decisions being made to protect our waterways here in Connecticut. The three species we have been studying can alter entire river and stream ecosystems, growing at a high rate and outcompeting other diatom species while blocking the sun from reaching lower levels of the water. It will be important in helping to mitigate the impact. Due to COVID we have not been able to finish this project and have instead turned to training the two students that will replace us as we are graduating this May. We are excited to stay in touch with Dr. Khan-Bureau and the incoming students and see the end results of this incredible research.



UPCOMING RESEARCH

FOR FY22, CT IWR HAS SELECTED THE FOLLOWING PROJECTS FOR FUNDING:

Title: Contaminant threats to groundwater-supplied ecosystem services in the Farmington River watershed

Investigators: Jessica Brandt (principal) and Ashley Helton (UConn Department of Natural Resources and the Environment)

Title: Groundwater and catch basin roles in regional salt pollution dynamics at multiple scales

Investigators: Steven Brady (principal, Department of Biology, Southern CT State University), and Gaboury Benoit (Yale School of the Environment)

Title: Investigating root water uptake variations between younger and older riparian trees. **Investigator:** James Knighton (UConn Department of Natural Resources and the Environment)

Title: Recent changes in the form, frequency, and amount of cold-season precipitation in New England and their impact on streamflow dynamics **Investigator:** Guiling Wang (UConn Department of Civil and Environmental Engineering)

OTHER INTERESTING STORIES

UConn continues sampling of wastewater for early detection of COVID. https://today.uconn. edu/2021/01/covid-wastewater-testing-continuingspring-absorbent-new-twist/

Information on the Governor's Council on Climate Change (GC3) workgroup: https://portal.ct.gov/ DEEP/Climate-Change/GC3

What climate change means for Connecticut: https://19january2017snapshot.epa.gov/sites/ production/files/2016-09/documents/climatechange-ct.pdf

UConn Associate Professor Will Ouimet helping.



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