

Hello again, friends and colleagues,

I think you will enjoy this issue of *Currents*. It features adventures in hydroponics, the Water Center's new faces, citizen science, and all the events we are excited about! Thanks for your partnership and for all you do to protect and restore Oklahoma's precious water resources!

-Kevin Wagner, Ph.D.

Director and Berry Endowed Professor
Oklahoma Water Resources Center



Hydroponics: Searching for a Sustainable Solution

by Ali Meek

Say the word farming and acres of cropland, seasonal cycles, huge tractors, plows, planters and combines come to mind. To those in the agriculture industry, these aspects are encompassed by the term conventional farming. Conventional farming is effective and still the most common method of producing food, but there may be more productive and reliable farming techniques on the horizon.

Hydroponics, the process of growing plants in a liquid solution with or without a soil mixture, allows quicker nutrient absorption and water uptake by the plant, which ultimately speeds up the growth and food production process.

For the last five years, Oklahoma State University researcher and horticulture professor, Bruce Dunn, and his team have been exploring the potential of large-scale hydroponics in Oklahoma's farming industry.

"We first received funding in 2016 to compare how three different fertilizer mixtures impacted the production of lettuce, basil, Swiss chard, bell peppers and eggplant," Dunn said. "The varying results indicated that different fertilizers would have to be used when hydroponically growing different crops."

Step by step, Dunn is filling in the blanks and turning hydroponics into a viable option for the farming industry. Hydroponics is a low maintenance farming method that eliminates the need for large farming equipment. The controlled environment used in hydroponics makes weeds a non-issue and allows easier nutrient and pH level control. Hydroponics allows the recycling of water and reduces evaporative water loss in a closed-off, low demand irrigation system, which decreases an operation's water demand. There are still many unknowns with hydroponics, but Dunn is working to make this farming method a plausible growing option for farmers everywhere.

With conventional farming methods, farmers are burdened by the erratic weather patterns of Oklahoma, but this is where hydroponics can make a difference. This water-based, controlled farming allows for year-round food production, regardless of the weather. However, there is still much improvement to be had with this method.

"The initial issue we came across was that, while the hydroponic products could be grown year-round, the produce was not the same quality as what would be grown in the field," Dunn

said. “We have to figure out how to get the same quality before advocating hydroponic farming as a sustainable option for agriculture.”

Dunn’s work in improving this farming method continues through a Specialty Crop Block Grant funded by the Oklahoma Department of Agriculture, Food and Forestry. With this grant, he is investigating how hydroponic agriculture affects product quality. He specifically looks at tomatoes grown in the field versus those grown in a type of greenhouse called a high tunnel and tests each for nutritional value. The quality of field-grown crops is currently better than hydroponic crops, but Dunn is confident that he and other OSU researchers can close this gap.

Since many freshwater sources are being depleted at an excessive rate, researchers need to look outside the box, and hydroponics has significant potential to address this issue. Advancements could reach far beyond the agricultural field and provide solutions for problems such as waste water treatment and reuse. As waste water reuse becomes more widely accepted and competition for water resources intensifies, hydroponics is poised to take advantage of a niche in the market by providing food without impacting existing water supplies. As of now, hydroponics is not the silver bullet solution to the water crisis, but it holds promising potential for the future.

More details on the basics of hydroponics can be found by clicking this button:



Hydroponics Facts



Rain, Rain Don't Go Away

by JoMarie Hickerson and Nicole Colston

What do you call it when science and the everyday person come together? The answer is citizen science. In the last 10 years, public participation and collaboration in scientific research have swelled with programs that engage everyday people in environmental monitoring.

One of the most expansive research categories in citizen science is water quality monitoring, with the number of U.S. programs totaling 1,720 in 2019, according to a recent article in the

Journal of Soil and Water Conservation. This spring, the water resources center faculty affiliate, Nicole Colston, helped the water center bridge the gap with the Spotty Rain Campaign. Funded by the National Science Foundation Advancing Informal STEM Learning program, the project aims to share resources for drought preparedness and risk management in public libraries across the Great Plains.

Since the rain in Oklahoma is spotty, drought is a slow onset disaster that often catches communities unawares and without an ability to manage. One goal is to engage communities in volunteer drought monitoring through a partnership with existing citizen science programs at the National Drought Mitigation Center and the Community Collaborative for Rain, Hail, and Snow Network. Local volunteer drought monitors can help scientists better predict when and where severe droughts will occur.

To engage the public, the campaign hosted a series of four webinars and launched a mini-grant opportunity for eligible rural and small libraries. Libraries are encouraged to host a drought-related library program and receive up to \$250 plus rain gauges. Every small community is different, so librarians design programming ideas that encourage local discussions about drought impacts relevant to their area. The water center invites researchers and extension agents to partner with libraries in their counties. You can find more information on how to bring a Spotty Rain program to your library by clicking the "Spotty Rain Campaign" button below.

Additionally, The Spotty Rain Campaign is set to host a Citizen Science Expo at the Stillwater Public Library on Saturday, April 4 from 1:00 p.m. to 3:00 p.m. If you have a volunteer-based program, you are invited to come and display your projects, sign people up to participate, distribute materials and share your project findings. You can register to exhibit at the event by clicking the "Citizen Science Expo" button below.

[Spotty Rain Program](#)

[Citizen Science Expo](#)

29th Annual OCLWA Conference

by Ali Meek

The Oklahoma Clean Lakes and Watersheds Association is set to host their 29th Annual Conference, Wednesday, April 8 to Thursday, April 9, 2020, at the Wes Watkins Center in Stillwater, Oklahoma. The event is an excellent opportunity for scientists, citizens, students and professionals to present their research and exchange ideas on how to manage our aquatic resources in the state better.

The conference offers multiple presentation tracks, an expanded student poster contest, and professional exhibition and sponsorship opportunities. OCLWA is sponsoring its first student oral presentation contest. This year the theme is “Bloom or Bust!” which focuses on bloom-oriented issues from bacteria to harmful algal blooms. However, the conference supports a variety of topics, including watershed management, fisheries science, invasive aquatic species regulation and other limnological studies.

Oklahoma State University recently approved a new OCLWA university chapter, and members are looking forward to a great conference as an official student organization, said OSU OCLWA chapter president Meghan Martin. The chapter is hoping to use this opportunity to bring in new members and build upon the chapter, she said.

Please consider submitting abstracts for oral and/or poster presentations of your exciting work in aquatic resource science and management. Abstracts must be submitted by March 13, 2020, to be considered for presentation. Students, professionals and citizens alike are encouraged to submit their research and join us for OCLWA’s 29th Annual Conference.

Registration and abstract submission information can be found on the water center’s website by clicking the link below.

[OCLWA Registration](#)

New Faces

Towards the end of last year, the Water Resources Center added new company to our team!
We are excited to expand our focus and reach due to these individuals' input!

Nicole Colston joined our staff in December as an assistant research professor in natural resource, ecology and management. She earned her doctorate in environmental science from Oklahoma State. After her Ph.D., she participated in a three-year post-doctoral fellowship funded by the National Science Foundation to investigate drought impacts and resilience in the panhandle. Previously, she held a position in the OSU Center for



Research on STEM Teaching and Learning as the associate director. Colston joined our staff to enhance our education of and outreach to the public. Her first initiative in doing so is her work with the Spotty Rain Campaign.

"We all have a connection to water, especially here in Oklahoma with our Dust Bowl history," Colston said. "My big goal is to support youth-focused and community science programs that tap into that ethic of responsible use and resilience. The focus is on broadening public discussion and involvement in water and environmental monitoring."

Outside of her work in research, Colston enjoys hiking, gardening and conducting homemade science experiments with her daughter.



JoMarie Hickerson joined us this December as a communications specialist, splitting her time between the water center and the Department of Biosystems and Agricultural Engineering. Originally from Lawton, Oklahoma, Hickerson graduated from Oklahoma State University in December of 2019 with a

Bachelor of Science, with an agricultural communications major and minor in English. Communications gave her a sense of direction and passion, which she was able to expand upon as an editorial intern for the state's official magazine, *Oklahoma Today*.

"I learned what it is to love something and put every bit of yourself into it," Hickerson said, "I want my work to reflect that."

She plans to put the same energy into her work here at OSU and to make sure her work reverberates her love for communications. Her focus will be on making connections between audiences and the water center because she believes this is the foundation of communications. Hickerson feels she will help to enrich the work done here at the water center because she sees it as work worth doing for the betterment of Oklahoma.

Outside of her work, Hickerson is an avid reader. She set a goal to read 10 nonfiction and 10 fiction books this year, starting with "Places for the People," by Eric Klinenberg. Her passion for writing goes beyond her job as she often writes poetry and freelance material on her own

fiction books this year, starting with “Places for the People,” by Eric Klinenberg. Her passion for writing goes beyond her job as she often writes poetry and freelance material on her own time. She also enjoys painting, drawing and design and loves the outdoors, where she can often be found hiking and kayaking.

Dates to Remember

Tuesday, March 3 at Western Oklahoma College in Altus: Oklahoma Irrigation Conference. The last day to register is March 27, click [here](#) to register.

Friday, March 6: Last day to submit 104g Grant proposals to Dr. Kevin Wagner at kevin.wagner@okstate.edu or Dr. Abu Mansaray at abu.mansaray@okstate.edu.

Saturday, March 7: The Oklahoma Louis Stokes Alliance For Minority Participation Ph.D. Camp.

Monday, March 9 through Tuesday, March 10: Spotty Rain Campaign Advisory Meetings. For an agenda click here: https://docs.google.com/document/d/1oixbuCwKlz_wldQM2vcGF_mj89iQ7bIJZz-oFdCDn6A/edit.

Thursday, March 12 from 8:00 a.m. to 3:00 p.m. at the State Capitol: Oklahoma Water Day. For more information click here: <https://www.owrb.ok.gov/WaterDay/index.php>.

Friday, March 13: Last day to submit proposals to participate in the OCLWA conference.

Friday, March 27 at the OSU Museum of Art from 5:00 p.m. to 7:00 p.m.: Artist Meet and Greet with Marguerite Perret and Robin Lasser. Their exhibitions, called *Signaling Water* and *The State We're In: Water*, survey human relationships to water.

Monday, March 30, through Wednesday April 1 in Amarillo, Texas: 2020 Ogallala Aquifer Summit. To find registration information and event details click [here](#).

Friday, April 3, through Saturday, April 4 at OSU: National American Indian Science and Engineering Fair. For more information click here: <https://fairs.aises.org/>.

Wednesday, April 4 from 1:00 p.m. to 3:00 p.m. at the Stillwater Library: Citizen Science Expo. Register to exhibit by clicking [here](#).

Wednesday, April 8 to Thursday, April 9: OCLWA 29th Annual Conference. For registration information and event details click here: <http://www.oclwa.org/>.