

WHAT'S NEW

EXTENSION – PAGE 3

Connectivity of Experiential Learning
Program Site Visits

RESEARCH – PAGE 4

New NSF Grant, Forecasted Projects
with New LC-MS/MS, and WAV Pond
Tracing

TEACHING – PAGE 5

Aquaculture Internship Program and
Municipal Operators Training with
Pontchartrain Conservancy

UPCOMING EVENTS

OCTOBER

Site Visits Across the State and New
Crawfish Collaboration...

NOVEMBER

Final Onsite Wastewater Installers
Course in Crowley and Adopt-a-Pond
Demonstration

DECEMBER

Ag Extension Summit in Crowley and
Municipal Operators Training Course

Water Quality Extension Newsletter



Let the water flow, and traps be in a row!

The team will be conducting extensive field projects over the next two years as part of the expanding Water Analysis Vessel (WAV) research. In addition to urban and coastal systems, the team will be collaborating with the Aquaculture Research Station to begin surveying crawfish ponds. This project will unfold over the next few years, but the long-term goal is to provide meaningful data to farmers on water quality dynamics and production under various pond operating practices. The lab is currently going through an extensive standardization of WAV and sonde methodology to ensure accuracy and reproducibility across all vessel projects. The new multi-sonde configuration will shift from single depth to multi-depth analysis to better understand variation in various pond settings. The next hurdle for the team and WAV platform is saline coastal systems, as an LSU AgCenter team, led by Dr. Peng Fu, will prepare for a partnership with LUMCON!



Two New Graduate Students

The Water Quality Extension Lab is excited to welcome two new graduate students to the team! Keana Howard, a recent graduate of the School of Plant, Environmental, and Soil Sciences, will be focusing on her NSF GRFP-proposed project, "Determining the Impact of PFAS on Natural Systems Using Fluorescent DOM Tracers." Her research will investigate the binding affinity of PFAS to soils to help forecast potential remediation strategies. She will gain insight into the fluorescent properties of natural organic matter while also quantifying low concentrations of PFAS using the lab's LC-MS/MS instrumentation. Hadley Tompkins, a recent graduate of the School of Renewable Natural Resources, has a background in wetland systems. She will be focusing on the standardization and validation of Water Analysis Vessel (WAV) research for urban and coastal environments. Her field-based project will help establish the framework needed to ensure the successful long-term use of this water resource management tool, enhancing current digital precision platforms and advancing knowledge across a wide range of water applications.



EPA Director Visit

The lab had a big opportunity recently when it was asked to host the new EPA Region 6 Division Director, Eunice Varughese, and Deputy Director, Robby Snowbarger. The visit came during their team's tour across region 6, where they stopped by many different EPA sites and offices. LSU was their first university site visit, our team was able to show them a few of our pollution prevention-based projects and the capabilities of the labs' leverageable benchtop and field-based instrumentation. With our newly installed Shimadzu LC-MS/MS, we showed pathways for future anthropogenic contaminant projects revolving around surface water inputs to agricultural systems. We also were able to showcase the waste valorization projects for non-hazardous industrial waste as edge-of-field sorption and insect feeds. These showed the practical applications of waste sharing between Louisiana agricultural manufacturers. The highlight of the day was to show off the WAV in University Lake and how we are planning to apply it to industrial and agricultural pond management. It was great to meet the EPA administrative team, and we hope to continue to produce successful stories from our funded projects!

Royal Society of Chemistry Publication!

One of the most recent outcomes of the LSU AgCenter Crop Development Center of Excellence Seed Grant Program is a publication in RSC Advances (see Content Created for DOI) resulting from our multidisciplinary collaboration with LSU AgCenter faculty members Jeff Plumlee and Damon Abdi, as well as Fluker's Cricket Farm. Shristi did an outstanding job tracing metals from seafood processing waste through black soldier fly (BSF) larvae and frass. These findings suggest that BSF bioconversion produces safe, low-mineral larval protein while simultaneously generating mineral-enriched frass with potential use as a slowly released organic soil amendment for agricultural waste valorization.

Meat Processors Experiential Learning Program Visit



Photo by Tanner Frost

The team took a trip to Cajun Family Traditions in Church Point for an experiential learning site visit this quarter. This facility was a unique opportunity to see a lean food manufacturer with an efficient operating schedule. A big focus of this site was excess heat generated from the cooking operations. Students were able to train on handheld thermal sensors and craft recommendations based on heat reclamation and propane savings. The facility personnel were gracious hosts and excited for potential leads on funding opportunities through USDA Rural Development. Overall, the students were able to see an impressive meat processor and learn the secret to smoking the best sausage!

Fish Processors Experiential Learning Program Visit

The day after Cajun Family Traditions, the team packed up and headed to Abbeville for a P2 FARM program visit to Omega Protein. This facility is one of only two in the state that processes menhaden and has a multistage water treatment process for strategic removal of nutrient compounds. The facility has a few varieties of wastewater generated on site, and the team was able to get valuable insight on different strategies to treat each one. While onsite, the facility personnel and faculty spoke of future research projects to assess pond nutrient reduction with the adoption of technology. We are hoping to align them with funding opportunities for deployable sensor installation for pond treatment efficiency.



Photo by M.P. Hayes

Seasoning Company Experiential Learning Program Visit



Photo by Facility Host

The LSU and Southern University P2 Program then collaborated with Louisiana Fish Fry, a local food manufacturer in Baton Rouge. For nearly forty years, this facility's focus has been sustainability from a waste and energy perspective. The facility personnel even spoke with students about sustainability internships as potential job opportunities. The building layout and operational schedule were efficient and strategic for the high-output production process. The students worked with the facility personnel to find recommendations that could help them craft future projects for the facility's sustainability initiative. The overall level of automation impressed the team, as we were able to see a quintessential Louisiana product being made.

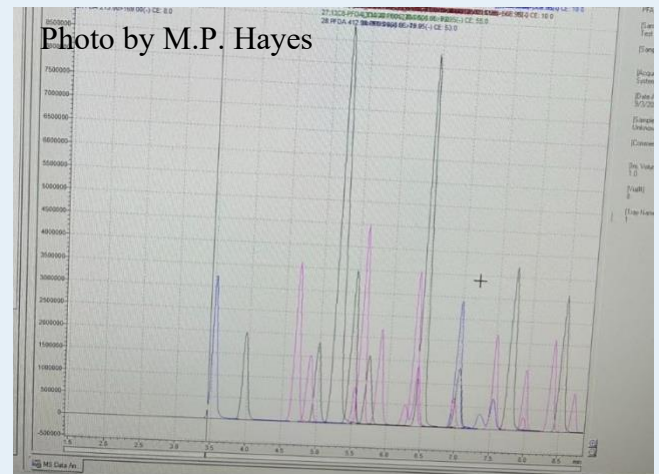
Digital Twins for Resilient Freshwater Infrastructure



Our lab will be collaborating with Dr. Mahathir Bappy in Industrial Engineering on an NSF ISP-funded project on drinking water security in Louisiana. Focused on the Bayou Lafourche region, the faculty team will work to enable AI-driven predictive digital twins for small and mid-sized freshwater infrastructure systems using real-time water quality sensing for surface water tributaries. The goal is to create models to forecast earlier warnings of system vulnerabilities and cascading disruptions. The data will help support more effective operational decisions, reduce duration of service interruption, and correlate water quality parameters to facility resource utilization.

The Many Research Capabilities of the LC-MS/MS

With the LC-MS/MS officially installed, the team has its eyes set on projects for 2027. We will finish getting methods validated and supplies ordered for the forecasted projects, but two major research focuses include: 1) PFAS fate in surface water irrigation for agricultural systems; and 2) amino acid changes in water-extractable organic matter from a variety of agricultural systems. Keana will begin her work validating PFAS concentrations in the presence of dissolved organic matter, while another student in the Spring semester will work on water-extractable organic matter from sugar cane soils that have been sent to the lab from one of the research stations. The hope is to generate additional funding by mid-2027 to increase sample analysis.



New Methods in Water Quality Tracing for Agricultural Systems



Uncrewed surface vessels (USVs) are becoming valuable tools for researchers seeking to improve water quality monitoring across diverse environmental systems. These modern autonomous surface vessels are commonly equipped with multiparameter sondes, GPS data loggers, and wireless communication systems that enable rapid field deployment and data acquisition. While USVs provide an innovative approach to automated, high-resolution water quality assessments, several challenges remain regarding the large-scale implementation of this technology. Our team is expanding this research into the field of aquaculture by monitoring crawfish ponds for water quality parameters at two depth profiles.

Aquaculture Internship

A big thank you to Dr. Elizabeth Robinson and Wood Oglesby for the invitation to train their Aquaculture Interns on water quality technology. The full-week event had our team schedule a morning classroom session and an afternoon field demonstration for water quality technology capabilities. The participating interns were able to learn about the highly variable water systems across the states and resources from the Department of Environmental Quality to identify impairments. They were also able to see a range of handheld instrumentation while discussing the frequency of maintenance, calibration, and spot sampling. We ended the day at the Aquaculture Research Station, where they were able to see the Water Analysis Vessel (WAV) in action. Though there were some technical difficulties at the start, the interns were finally able to drive around the uncrewed surface vessel and see where the future of aquaculture water quality is heading.



Photo by M.P. Hayes

Operators Training

This quarter, the lab was also able to partner with the Pontchartrain Conservancy to host a session at their Wastewater Operators Continued Education Training. Their program provides technical assistance and continuing education for operators of on-site and installers of commercial wastewater treatment systems. Our talk focused on “Investigating Waste Stabilization Pond Water Quality Using Strategic Sensor Installation” to show how the adoption of technology could aid the treatment of effluent. During the talk, there were excellent conversations with participants on total maximum daily loads (TMDLs) and the impact any user can have on downstream permits. This operator training is a unique perspective on commercial wastewater treatment units, compared to the Louisiana Department of Health Onsite Wastewater Installers Course that works with just residential units. After this visit, PC has invited me for another lecture in December, where I will be working with participants on the application of Water Analysis Vessels in wastewater ponds and tributaries.

Content Created

Peer Review Publication

Upadhyaya, S., **Hayes, M.**, Vail, V., Tweedy, D., Neff, E., Plumlee, J., and Abdi, D., Element Partitioning of Minerals and Trace Metals during Black Soldier Fly-based Bioconversion of Seafood Waste. *RSC Advances*. 2026. [Journal Link](#)

Marcantel, M., and **Hayes, M.** Influence of Atypical Cold Weather on Wastewater Stabilization Pond: A Case Study from the South Louisiana Snow Storm. *Journal of Environmental Engineering*. 152 (10). [Journal Link](#)

Content Created (cont.)

Presentations and Demonstrations

Hayes, M. Understanding Water Quality Impacts and Best Management Practices for Aquaculture. Sea Grant Aquaculture Internship Program. Baton Rouge, LA. September 17, 2026

Hayes, M. From Farm to Frontier: Unlocking Surface Water Quality Management and Sustainable Soils. Louisiana Board of Supervisors Monthly Meeting. Baton Rouge, LA. September 5, 2026

Onsite Wastewater Installers Certification Workshop. Lead Chair. Louisiana Department of Health Sanitarian Program. Baton Rouge, LA. August 13, 2026.

Hayes, M. Integration of Technology to Investigate Seasonal Water Quality Dynamics in Waste Stabilization Ponds. Pontchartrain Conservancy Municipal Wastewater Operators Continued Certification Course. Hammond, LA. August 19, 2026.

Hayes, M. Developing Water Quality Research for Community Impact. Louisiana Sea Grant Law Program. Baton Rouge, LA. July 16, 2026

Extension Publications

Hayes, M., and DeBoer, E. Remote Water Quality Sensing: A Tool for Golf Course Irrigation Best Management Practice Validation. *Lead Author*. May 2026. [Article Link](#)

Hayes, M., New Resources of Community and Commercial Ponds. Summer 2026. Volume 95; Page 21-23 [Article Link](#)

Hayes, M. Unlocking Water Quality Parameters for Gardens. Horticulture Hints for Louisiana. Fall 2025. P3655-26-F. Page 6. [Article Link](#)