JUL 2025: YEAR 2, ISSUE 7

Water Quality Extension Newsletter

WHAT'S NEW

Photo by M.P. Hayes

UPCOMING EVENTS

JULY

Teacher Professional Development Days Around the State

Floating Solar Webinar for Association of Energy Engineers

AUGUST

Wastewater Installers Course will be in Baton Rouge for our 3rd workshop

SEPTEMBER

Handful of publications will be submitted for peer-review

Let the water flow, and research data show!

The lab is now to the point where students are finishing their projects and getting ready to transition to the real world. It has been a two-year process, but the data generated from these projects is being turned into content for peer-reviewed publications in a wide range of disciplines. Due to the diverse nature of our team's research, the lab is currently working on multiple publications in areas including experiential learning programs, insect rearing for aquaculture, trends in wastewater treatment, designs for technology in agriculture, and cycling of nutrients in runoff. The lab is excited to present our findings to the scientific community. Check out the website for updates and be on the lookout late this year for our team's publications!

LSU AgCenter Research · Extension · Teaching

Sea Grant LOUISIANA

Lab Students' First Conference

Congrats to the students for a successful poster session at the 14th International Symposium on Biogeochemistry of Wetlands and Aquatic Systems in Baton Rouge. Some of the topics featured at the conference included nutrient cycling in urban ecosystems, geospatial methods to evaluate biogeochemical processes and general water quality improvements for coastal wetlands systems. The students were able to engage faculty from other universities and state agencies that handle coastal conservation. Many of the presentation topics overlapped with nutrient goals from the lab's research projects. This opportunity allows for the connectivity of student research to larger problems seen around the region. The lab had poster presentations in the fields of organic fertilizer nutrient cycling, spatial evaluation of water quality, trends in wastewater treatment nutrients, and the impact of industrial waste biosorbent material on urban runoff. Shristi, Nick, Mason, and Mysha's posters will be on display outside the lab in Sturgis!

Photo by Conference Participant

... and Second!

Immediately following the first conference, Shristi took her project to New Orleans to present at the Aquatic Foods Conference. In conjunction with the multi-state Hatch W1197 Advancing Aquatic Food Product Sustainability: Improving Quality, Utilization, and Safety group, the conference promotes research around enhancing seafood processing operations. Her original submission was upgraded from a poster to an oral presentation where she spoke on Seafood waste as an effective way to rear Black Soldier Fly larvae. This project is structured to not only showcase waste reduction for seafood processors but also create a waste valorization loop in agriculture using larvae as an aquaculture feedstock and frass as organic fertilizer. The oral presentation encompassed data from the preliminary micro diet trials for feasibility which showed larvae survival rate and chemical characterization of frass and larvae. Shristi is currently in the process of converting her results into a publication for the aquaculture industry and analyzing data from the macro experiments. This project is thanks to funding from the LSU AgCenter Center of Excellence Crop Development and Biotechnology program.

Fluorescent Dissolved Organic Matter Methodology

Our newest graduate student, Enamul Moni, has been working to optimize and validate methods for fluorescent dissolved organic matter (fDOM) analysis of various environmental systems. These methods allow for an innovative understanding of parent source material from organic matter. The analysis yields indicators of carbon molecular weight, biological index, and humification index. Currently, the lab is exploring funding to couple the fDOM analysis with a TOC analyzer to produce SUVA values for organic carbon. If you are interested in collaborations, running samples, or seeing how the instrument works, please feel free to reach out to mhayes@agcenter.lsu.edu.

Crawfish Farm Demonstration for Technology Adoption

This last quarter the water quality extension lab has been expanding its collaboration network with crawfish farmers around the state, visiting multiple farms to promote surface water analysis. After preliminary trials in the LSU AgCenter South Farm, Mason and Nick traveled to farms around the southwest for a demonstration of the Water Analysis Vessel (WAV). These visits promote both extension and research for the crawfish industry with the ultimate objective of increasing an understanding of critical parameters like dissolved oxygen, nitrate, temperature, and ammonium. The WAV has been modified to navigate both shallow water (depths of less than 8") and pond systems with severe vegetation. Each of the sites the team visited had diverse pond setups leading to unique datasets. Currently, data is being compared using HYPACK Environmental software to build contour plots for water metrics and determine spatial correlations. The team anticipates a publication by the end of the year for a new method in agricultural water analysis. The data collected will also be transitioned into Nick's poster presentation Spatial Evaluation of Water Quality Parameters to Optimize Nutrients and Dissolved Oxygen for Crawfish Ponds. The future direction of this project will analyze water quality during various flooding stages and pond inundation for the 2025-2026 crawfish season. This will provide trends in nutrient dynamics through the crawfish season!


Photo by M.P. Hayes

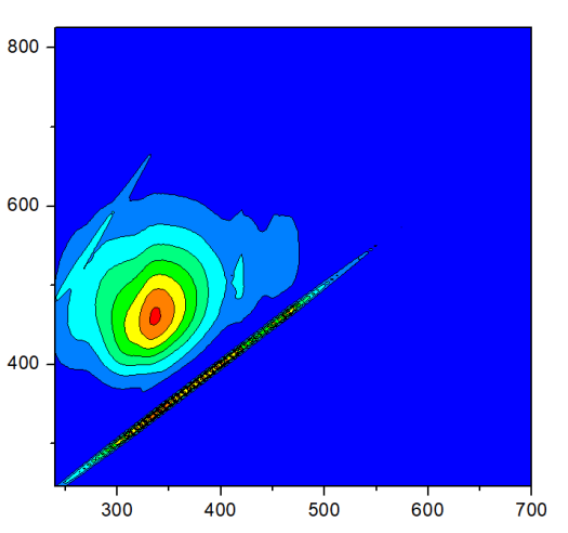
St. Tammany and St. Mary Events for High School Students

Working with local Sea Grant agent Carol Franze (St. Tammany & Tangipahoa) and Thu Bui (St. Mary, Iberia, and Vermilion), the team presented the dynamic range of our lab's expertise. Enamul headed out to St. Tammany to show high school students various soil types and promote the benefits of hydric soils to coastal ecosystems. By designing a hands-on soil demonstration, students were able to see the difference in agricultural and coastal soils that are prevalent in our state. On the other side of the state, Mason and Nick worked in St. Mary's to show water quality sensors and the WAV to high school seniors. During the event, the importance of validation from a lab setting was emphasized by combining in-field measurements (led by Dani DiIullo) with real-time water quality sensors. The students were also able to drive (and crash) the WAV to see the next generation of digital precision agricultural tools for water mapping. The team is excited to participate in more demonstrations around the state to promote research and extension in Louisiana water.


Photo by M.P. Hayes

Photo by Kai Wilson

Tracing Dissolved Organic Matter in Environmental Systems



fDOM provides a unique understanding of transition in organic carbon through an environmental system. Since getting the instrument installed, Enamul has been running various samples from projects across the stations. The goal is to understand the cycling of organic matter and determine correlations to the nutrient profiles analyzed by our lab. This will provide a more detailed understanding of sources for microbial activity and humification transformation in soil profiles during saturation events. This same methodology of fDOM and nutrient analysis can be applied to pulse water from flooding events, wastewater effluent, and porewater from soil profiles. Enamul is currently working on a review paper for fDOM studies in agriculture to establish our lab as a leader in the field.

Summer Heat Magnifies the Benefit of Floating Solar Panels

The early summer is starting to show interesting water-cooling effects from the floating solar unit shading. Since installing the sensors, there has been very little variability in spring energy production or water parameters. With summer temperatures starting to rise, Mason is starting to see trends in water quality under the panels versus the sensors stationed in open water. This project has yielded interest from many different organizations. Upcoming events include a demonstration at the Hammond Field Day in July and two webinars to promote the topic in the late summer. Additionally, there has been some discussion on a projects to help grow collaborations between industry and academics for floating solar in the state…. stay tuned!


Photo by Mason Marcantel

Increased Frass and Larvae Yield for Seafood Waste Trials


Photo by M.P. Hayes

During the second stage of the frass trials, Shristi scaled up her experiment from 100 grams of food blend for 250 larvae to 8.5 pounds of food blend for 20,000 larvae. The team set up 30 macro bins with various blends of crab and shrimp to determine if the preliminary project was scalable and to characterize the by-products for their nutrient content. Collaborators on the team were also able to get samples for analysis. Dr. Jeff Plumlee received larvae for a fatty acid profile to assess food web potential, and Dr. Damon Abdi received 10 blended samples of frass to integrate into plant growth trials. The project aims to determine a waste valorization network for seafood processors and agricultural farmers.

Ripple of Experiential Learning Programs

The lab worked with the Louisiana Section of the Air and Water Management Association to present at their monthly meeting for industry and academics to get a glance at current water quality research and extension. Most of the people at the meeting were environmental health and safety personnel from chemical industries. While getting set up for the talk, two students from previously hosted experiential learning programs came up to the front to chat. It was a great experience to see that students participating in university experiential learning programs translate the knowledge they gain from assessments to the real world in their career pathways. The presentation promoted Developing an Appreciation for Sustainability and Stewardship by Connecting Louisiana Communities, but the opportunity showed that with impactful education appreciation for the state's resources can be passed down and carried on through the students.

Photo by Dr. Maud Walsh

Law, Policy, and WQ

The Sea Grant Law and Policy Program crafted a demonstration day with the Water Quality Extension Lab to showcase various projects and their impact on communities to their summer interns. With a central focus on energy and policy, the day started at the Mandeville Wastewater Treatment facility with a tour of the process. One of the more unique treatment facilities in the state, Mandeville uses a man-made wetland as final treatment before discharge. The students we able to see the energy and environmental footprint of the wastewater treatment facility while discussing with the host about the cost of operation and compliance. After lunch, the group went back to Hammond Research Station, where the lab connected the floating solar project and water analysis vessel (WAV) to the immediate needs of facilities. The nexus of energy and water in the state has become a focus of the Water Quality Extension Lab's program to build resilience and sustainability for resources. The Law and Policy Interns learned that by incorporating both research and extension into projects, the deliverables can be more targeted and impactful for communities.

Content Created

Presentations

Hayes, M. Understanding Sustainability and Stewardship through Extension and Research. Sea Grant Law and Policy Summer Internship Program. Hammond, LA. June 11, 2025

Hayes, M. Developing an Appreciation for Sustainability and Stewardship by Connecting Louisiana Communities. Louisiana Section of the Air and Water Management Association. Gonzales, LA. May 22, 2025

Hayes, M. Projects and Resources for Processors. American Shrimp Processors Association Annual Meeting. Lake Charles, LA. April 4, 2025

Content Created (cont.)

Poster and Oral Presentations at Conferences

Upadhyaya, S., and **Hayes, M**., Seafood waste is an effective way to rear Black Soldier Fly larvae. Aquatic Food Conference. New Orleans, LA. June 12, 2025.

Marcantel, M., and **Hayes, M**., Developing a Framework for Remote Water Quality Sensing of Nutrients from Urban Wastewater Effluent. The 14th International Symposium on Biogeochemistry of Wetlands and Aquatic Systems. Baton Rouge, LA. June 2, 2025.

Ahmed, M., Abdi, D., and **Hayes, M**., Evaluating the Impact of Urban and Agricultural Runoff Mitigation Utilizing Waste Valorization for Nutrient Absorption. The 14th International Symposium on Biogeochemistry of Wetlands and Aquatic Systems. Baton Rouge, LA. June 2, 2025.

Wagner, N., Marcantel, M., and **Hayes, M**., Spatial Evaluation of Water Quality Parameters to Optimize Nutrients and Dissolved Oxygen for Crawfish Ponds. The 14th International Symposium on Biogeochemistry of Wetlands and Aquatic Systems. Baton Rouge, LA. June 2, 2025.

Upadhyaya, S., and **Hayes, M**., Investigating the Cycling of Nutrients from Seafood Processors' Waste in Organic Fertilizer. The 14th International Symposium on Biogeochemistry of Wetlands and Aquatic Systems. Baton Rouge, LA. June 2, 2025.

Wagner, N., and **Hayes, M.,** Developing the Framework for Agricultural Energy Optimization at Crawfish Farms using Water Quality Sensing. LSU Discovery Day 2025. Baton Rouge, LA. April 25, 2025

Cheng, K., Upadhyaya, S., and **Hayes, M.,** Analyzing and Surveying the Solid Waste Profile of the Louisiana Aquaculture Industry. LSU Discovery Day 2025. Baton Rouge, LA. April 25, 2025

Extension Publications

Hayes, M., Pond Buffer Zones to Improve Water Quality. Louisiana Nursery and Landscape. Summer 2025. Volume 91

Other Mass Media

LSU AgCenter's New Water Assessment Vehicle Making Waves in Crawfish Ponds by Neil Melancon. Louisiana Farm Bureau This Week In Louisiana Agriculture. April 19, 2025. Interviewed. Online.