

WHAT'S NEW

EXTENSION – PAGE 3

Students' experiential learning programs are taking our team across the state to see facilities! (Page 3)

RESEARCH – PAGE 4

Sensors have been deployed! Water quality monitoring at municipal wastewater treatment facility. (Page 4)

TEACHING – PAGE 5

First successful workshop with Louisiana Department of Health at Hammond Research Station. (Page 5)

UPCOMING EVENTS

APRIL

Floating and land-based solar panels scheduled to be deployed for research

MAY

Second Wastewater Installers Workshop to be hosted in Alexandria
Gulf Scholars Undergraduate Research Student will join the lab!

JUNE

Water Catchment and Water Quality Field Day in Plaquemines

Water Quality Extension Newsletter



Photo by M.P. Hayes

Let the water flow, and stakeholders know!

A large emphasis of our lab's research and extension is dedicated to immediately addressing the needs of individual stakeholders or smaller rural communities. With numerous grant-funded experiential learning programs (and more being applied for), the team is trying to get the word out to different groups about the sustainability assessments conducted by our team of faculty and students. The partnering industries we work with have an innate desire to pass along stories of resiliency and adaptation to the students involved with the program. This alone is one of the best sources of knowledge academics can provide to mold student growth and potential. Through these stories, our lab is also able to have a magnified impact on the stakeholders we work with by tailoring recommendations, resources, and research to help resolve persistent water-related issues in their industry.



Media Day with USDA

USDA announced the Water Quality Extension Lab's grant for Water and Energy Conservation for rural communities last month. This grant set in motion the funds to build an experiential learning program that allows students to see agricultural stakeholders and rural businesses across the state. Through the USDA Rural Development Program, stakeholders can apply for grant funding that allows for project implementation focused on our team's sustainability recommendations. To date, we have visited four facilities including a hydroponic farm, a koi fish farm, pecan processors, and a plant nursery. The USDA Rural Development Director Dr. Deidre Robert, Business Program Director Whew McGrew, and Business-Cooperative Programs Specialist Chaston Price made the trip to LSU to discuss the impact the program will have on rural communities across the state through the AgCenter's network of agricultural partners. For more information check out AgCenter's press release for the event: [USDA announces renewable energy grant for rural parishes](#)



Gulf Scholars Student

The lab is excited to host a Gulf Scholars undergraduate research this summer from the LSU Discover Program. Karrie Cheng is a rising junior majoring in mass communications at LSU. Her career focus is addressing environmental issues in Gulf Coast fisheries and wetlands through policy. Karrie expressed interest in learning about pollution in water through community immersion. The project she will be working on in connection with Shristi's current research quantifies aquaculture processors' waste profiles in Louisiana parishes. Karrie will be working with processors (shrimp, crab, crawfish, etc.) to determine wastewater effluent volumes and solid waste generation at facilities. The project will map high-density regions of waste for future composting projects for agricultural nutrients. Once the survey is approved by LSU IRB, it will be distributed through a partnership with the American Shrimp Processors Association (ASPA) and connections made during the experiential learning program site visit. The goal is to get Karrie into the field to see the needs of these processors and provide ideas for her future career path in Environmental Policy.

Instrument Installations and Method Development

Our lab's Thermo Scientific Gallery Discrete Analyzer and Shimadzu Nexera HPLC have officially been installed! The team has gone through training for the Gallery Discrete Analyzer and is currently in the process of building methods for the nitrate, nitrite, ammonium, and phosphate to start environmental sampling. This instrument will not only be to the graduate students' research but collaborations with other faculty interested in looking at environmental parameters for their research. If interested in a collaboration, feel free to reach out to Dr. Hayes at mhayes@agcenter.lsu.edu.

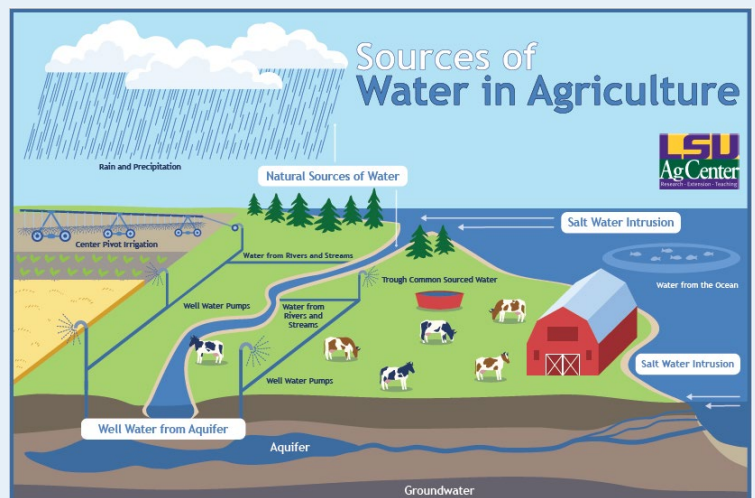
Student Engagement with Stakeholders Across the State



Since joining the lab in January, the students have been on 12 trips to different manufacturing and agricultural facilities across the state. Our team has been able to see manufacturing processors ranging from coffee processing to chemical production while also investigating recommendations for agricultural stakeholders at farms in rural communities. The sustainability recommendations generated at these facilities can provide short-term solutions to persistent problems or long-term project ideas for water quality and conservation. During the single-day site visit, data is collected for a report that is produced for the partnering company. After the report is finalized, the team continues to connect with our partnership to establish long-term collaborations. With the range of instrument capabilities in the lab, we can offer partners opportunities to explore agricultural wastewater effluent nutrient profiles and potential alternative uses of solid non-hazardous waste streams through graduate student research. The recommendation made on a single site can also have an amplified impact by developing case studies to disseminate to a larger audience. Various recommendations our team has found and are in processors for developing extension content include: shading balls for fire irrigation ponds at chemical facilities, smart irrigation systems for well water reduction for a plant nursery, and floating solar potential for chlorine reduction and energy generation at an urban drinking water facility. The extension of this material to communities across the state will provide more knowledge in water quality and conservation through interactions with single stakeholders apart of the experiential learning programs.

Sources for Water in Agriculture booth for LSU AgMagic

This year marked the first that the Water Quality Extension Lab designed a booth for AgMagic. The *Sources of Water in Agricultural* poster showed students the different water sources that contribute to sustaining agriculture across the state. Both crop production and cattle operations commonly utilize surface water from streams or underground well water. Precipitation is also a major factor for crop production in the state. Each method of watering provides both benefits and drawbacks including chemical composition (i.e. minerals), cost for pumping, and runoff potential. The poster depicts saltwater intrusion in the coastal zone to indicate the challenges some farmers face to get water as a resource. For the event, three fish tanks with "clean" well water, surface water with organic material from LSU Lake, and saltwater with sand minerals were displayed for students to see the difference in water sources. A big thank you to Allison Strahan in communication for developing the poster for this event!



Water Quality and Energy Optimization Project for Municipal Wastewater Treatment Plant



Photo by M.P. Hayes

In partnership with Gonzales Municipal Wastewater Treatment Facility, Dr. Hayes will be conducting research using water quality metrics to measure processing and optimize energy usage at the facility. The LSU team is using deployable YSI EXO2 sondes in the settle pond and effluent pipe to determine changing changes in parameters during the 30-day processing cycle. The sondes will be measuring nitrate, ammonium, pH, temperature, total suspended solids (via turbidity), and dissolved oxygen at each location in the pond for a full year to see seasonal fluctuations and variations during different weather

events. The facility is sharing both single-point sampling data post-effluent and energy usage for Dr. Hayes and Mason Marcantel (lead graduate students) to correlate data sets. The goal of this research is to help the facility transition to real-time water quality monitoring to optimize dissolved oxygen generation in their pond (thus lowering energy cost) and automate chemical usage for monitored water quality parameters in the chlorine contact chamber. The impact of the findings will be amplified through extension publications and working in partnership with the Louisiana Rural Water Association (LRWA) to host workshops on water quality and energy.

Nuisance to Nutrients: Connecting Aquaculture Processors' Waste to Agricultural Fertilizer

The Water Quality Extension Lab is working with both industry and faculty collaborators on a project to understand the nutrient potential of solid waste materials and wastewater effluent from aquaculture processing facilities. This project will incorporate faculty and collaborators from LSU AgCenter, Southern University, the University of South Alabama, and the University of West Florida to set up a network of colleagues to disseminate value-added nutrients from waste to processors across the Gulf Coast. Faculty expertise adds dimensions of cost-benefit analysis for quantified economics and plant-fertilizer interaction to show nutrient potential. Our lab will be conducting amino acid profiles for wastewater effluent, determining chemical characterization on composted waste materials, and monitoring leaching potentials for synthetic fertilizers versus composted seafood waste fertilizers. The research findings will be promoted through composting workshops for both aquaculture processors and agricultural communities focusing largely on plant nursery operations. The project aligns multiple sectors of agricultural industries to promote a more sustainable bio-economy and environmental stewardship in the state.



Photos by M.P. Hayes during experiential learning site visit to Louisiana processors

Guest Lecture at Southern University for Water Quality

Southern University hosted a guest lecture for Dr. Hayes to promote opportunities for undergraduate summer research and graduate school positions with the Water Quality Extension Lab on various projects. While speaking to the Urban Tree Physiology, Dr. Hayes outlined the importance of water quality in the state and the impact it has on the immediate community. LSU AgCenter and Southern University collaboration on a recent EPA Pollution Prevention grant will build the foundation to bridge the universities to promote student research in the field of industrial water quality. The grant allows for experiential learning site visits at urban manufacturers in Baton Rouge and New Orleans. The goal is to spark student research opportunities to address the state's vast water quality needs in local communities. *Photo taken by Chris Smith.*



Onsite Wastewater Installers Workshop

In partnership with the Louisiana Department of Health (LDH), Dr. Hayes hosted the first Wastewater Installers Workshop for the year to educate sanitarians on proper techniques to treat sewage. The event was hosted at the Hammond Research Station and had 13 installers (nine new and four renewals) from across the state join. The installers went through the morning workshop and then took their certification test immediately following the event for licensing by LDH. The course must be renewed every five years to maintain good standing. The workshop is developed to understand proper septic treatment techniques and the various forms of secondary treatment including adsorption fields, oxidation ponds, and land application. This workshop will be provided each quarter at the following extension sites: Dean Lee Research and Extension Center in Alexandria (May), LSU Main Campus in Baton Rouge (August), and Acadian Parish Cooperative Extension in Crowley (October). Registration for this event is posted on the Water Quality Extension Website under the [Teaching](#) tab.

Content Created

Hayes, M., 2023. Rainwater Harvesting for Small Nurseries and Home Gardens. Louisiana Nursery and Landscape. Spring 2024.

Hayes, M., Ahmed, M., Wastewater Reuse in Crop Production. 2024. Extension Article. (In Review)

Hayes, M., Timmerman, A., Kirk-Ballard, H., Small-Scale Solar Distillation for Gardeners. 2024. Extension Article. (In Review)

Southern University AgCenter - Invited Guest Lecture. Water Quality and Pollution Prevention for Louisiana. Presentation. March 5, 2024 (12 attendees)