Auburn on the Coast

A Fisheries Extension Newsletter

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Master Oyster Gardening Program

Conrad Horst and Emily McCay

Oyster gardening has been a volunteer-driven effort on the northern Gulf Coast for over 20 years. With established programs in Mobile Bay, Little Lagoon, and Mississippi, waterfront stakeholders are offered a valuable opportunity to participate in local oyster reef restoration. This year we launched a new program designed to make oyster gardening accessible to all, regardless of waterfront property ownership. Upon completion, participants are certified as Master Oyster Gardeners and are offered the ability to engage in other volunteer opportunities within existing oyster gardening programs.

The Master Oyster Gardening Program included a series of informational sessions and field trips, each focusing on a different area of the oyster industry. The first two sessions featured introductory lectures on oyster ecology, anatomy, and the various restoration efforts in Mobile Bay. Locations visited during the other sessions included an oyster hatchery, farm, processing facility, and gardening site. Our final session is scheduled for October, finishing out the program with a presentation on seafood safety and a celebration of the first certified Master Oyster Gardener class here on the Gulf Coast.

Dr. Kayla Boyd leads the Master Class on a tour of the Auburn University Shellfish Lab.

We are proud that each of the dedicated participants who started the program in April are to receive their certification. Based on the level of community interest, we aim to offer this program again next year. If you would like to be a part of the next Master Oyster Gardening class, please send an email to oystergardening@auburn.edu or erm0086@auburn.edu for details.

Dense Spawning Aggregates

Conrad Horst

The dense spawning aggregate project is currently in its fourth growing season. Oysters from the site north of Forth Morgan were collected and planted at a living shoreline location in July. New spat set shell, spawned at the Auburn University Shellfish Lab, were placed into cages in August. During the interval between collection and stocking, additional improvements to the apparats were made to better cope with increased energy in some parts of the study area.

Oysters from the site at the Grand Bay Oyster Park in the Mississippi Sound are still in place. These oysters will be used for our EPA project to examine the relationship between oysters and their ability to sequester various nutrients. We will collect these oysters and plant them at the end of September when the EPA project has all the infrastructure in place. Once these oysters are moved out from the site location, we will stock the apparats again with spat set shell from this growing season.

Data from previous seasons still shows that the dense spawning aggregate project can produce up to a seven-fold increase in capacity when compared to traditional oyster gardening.

Research Assistant Conrad Horst loads spat set shell into cages for the Dense Spawning Aggregate project. Oysters will grow inside of these cages until they are large enough to be planted at various locations for habitat restoration.

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Congratulations to Luke Matvey

Congratulations to Luke Matvey, who graduated with his Master's Degree in August of this year! His thesis was titled "Seabird Mitigation and the Prevalence of Campylobacter spp. at Oyster Farms in the Northern Gulf of Mexico". Luke will be continuing this line of research starting in the Fall under the Dauphin Island Sea Lab-FDA (DISL-FDA) Fellowship program.

Dense Spawning Aggregates Continued

This picture shows one of our water quality monitoring systems. These monitoring systems are important to help understand some of the conditions that our oysters are grown in.

This method of growing oysters in an off-bottom and high stocking density setting continues to show promise as a method of growing oysters for restoration purposes. As in previous years, we will continue to monitor the effectiveness of our drill exclusion methods.

Finally, we are excited that our water quality monitoring system is back up and running. After many months of being down, the new parts were delivered and installed and began receiving data again in May. Having this real time monitoring system back in place allows us to better understand some of the many water quality conditions that our oysters grow in.

Meet Our Scientists: Tommie Cone

Tommie Kennedy Cone recently joined the AUMERC staff. She is from Joppa, Alabama, and is completing a BS in our program with a major in Marine Resources and a minor in Coastal Management. Her work will be focused on the near-shore nutrient pollution project funded by the EPA. She will also contribute to other ongoing studies. Tommie's career goal is to work in environmental education and coastal restoration.

Mississippi Oyster Gardening

Emily McCay

The 2023 Mississippi Oyster Gardening Season concluded this past March with 93,000 oysters produced. Teams from the Mississippi Department of Marine Resources (DMR) and Auburn University Marine Extension and Research Center (AUMERC) collected the oysters from 48 sites and planted them on a Biloxi reef. An additional 9,100 oysters were collected from St. Stanislaus College in May and turned over to DMR for planting. This is the largest number of oysters ever grown by the Mississippi Oyster Gardening Program in one season, totaling 102,100. We are thankful for all our oyster gardeners and their hard work!

Preparations for the start of the 2024 season are ramping up. Over the spring and summer, AUMERC staff built and distributed new gardens to incoming sites. Recycled oyster shell was cleaned and bagged for setting with oyster spat at the Auburn University Shellfish Lab. Oysters spawned and set in August, and are scheduled for distribution to 63 sites in September. They will remain at these sites under the care of the oyster gardeners until pick-ups again in the spring.

Anyone interested in joining the program can visit our website at oystergardening.org or contact us directly at oystergardening@auburn.edu.

The grant funds provided for the Mississippi Oyster Gardening Program are made available pursuant to Mississippi Trustee Implementation Group (MS TIG) Final Restoration Plan II and Environmental Assessment: Wetlands, Coastal, and Nearshore Habitats and Oysters approved by the MS TIG and provided through MDEQ to partially address the injuries caused by the 2010 Deepwater Horizon oil spill.

Oyster gardens are loaded with spat-set shell.
Photo by Tommie Cone

Can Oysters Take Probiotics?

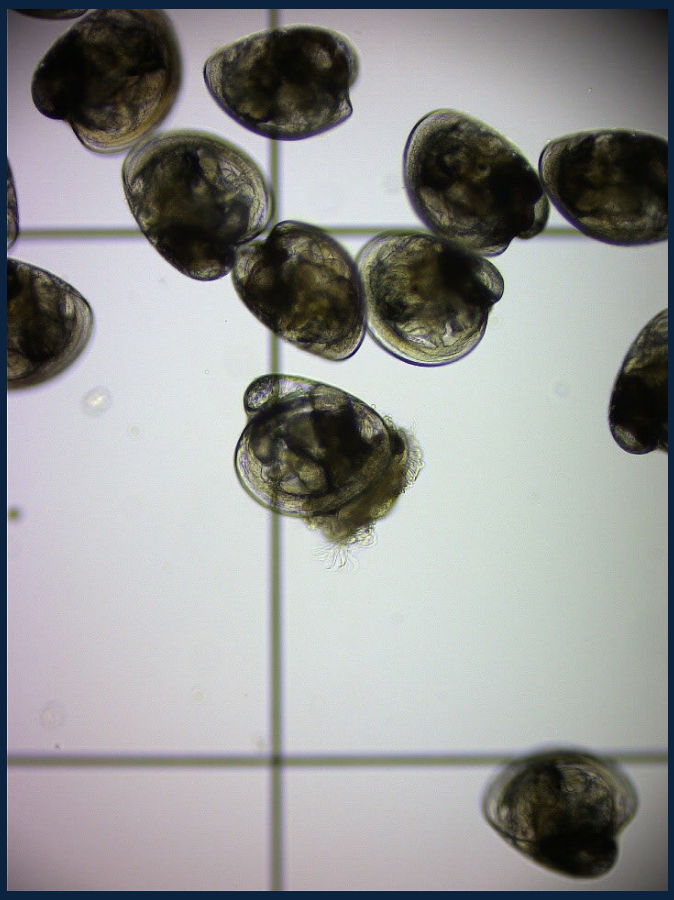
Andrea M. Tarnecki

Probiotics are live, beneficial bacteria that provide benefits to an organism. In humans, probiotics are known for boosting digestive health and can be taken orally as supplements or consumed through foods such as yogurt, sauerkraut, and kombucha. The bacteria in these products help digest your foods, relieve bloating, reduce inflammation, and can improve your immune system.

What if I told you that some types of bacteria have the same benefits in aquatic animals? Animals grown in aquaculture can be given feeds supplemented with probiotics. Just like in humans, these bacteria help these animals digest their foods, absorb important vitamins and minerals, improve immune function, and even grow faster. Aquatic animals such as fish and shellfish can also be dosed with probiotics directly through the water. These good bacteria interact with the skin and gills, helping to prevent disease.

In many cases, the same types of bacteria that are beneficial for humans are not the ones that are beneficial for aquatic animals. In the case of oysters, very little is known about the bacteria that provide benefits these health benefits.

In particular, the larval life stages are sensitive to pathogens found in the water since they are young and still developing their immune system. Therefore, research is needed to identify probiotics that can reduce mortalities during larval oyster production.



Oyster larvae ready for setting collected from probiotics trials.

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Can Oysters Take Probiotics Continued

For the past two hatchery seasons, the Auburn University Shellfish Laboratory has been testing the effects of probiotics on larval oyster production. The probiotics under examination were effective at improving survival and stress resistance in larval marine finfish. Probiotics containing multiple bacterial species are supplemented to the rearing water at various concentrations and doses to determine if the addition of beneficial bacteria can improve growth, survival, number of setters, and water quality.

Additionally, the bacterial communities of the larvae are being examined to determine if the good bacteria play a role in protecting against potential oyster pathogens. It is our goal to take advantage of the natural benefits of bacteria to improve larval oyster production.

Meet Our Scientists: Zophia Galvan

Zophia graduated with a B.S. in Wildlife and Fisheries biology from Frostburg State University and is now a Master's student at the Auburn University Shellfish Laboratory under Dr. Andrea Tarnecki. Her research focus is improving larval production of the Eastern oyster. She is investigating gamete quality, and more specifically, what characteristics differentiate 'good' and 'bad' eggs. She is also leading the probiotics studies at the lab, focusing on how probiotics impact larval growth and survival.

AUSL webpage

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New Project: Living Shoreline Project

P.J. Waters

AUMERC received a 1.875-million-dollar appropriation to work on a living shoreline project with partners at Mississippi State University and the University of South Alabama. Beginning in 2025, this group will begin work on a 24-month effort along 1,150 meters of eroding shoreline along the north side of the Fort Morgan Peninsula (Gulf Shores, AL; Figure 1).

Some 70 years ago, the shoreline along this stretch was more than 120 meters from the road. Today, that distance is less than 40 meters. At any given point, some 20,000 residents and visitors can be found on the peninsula with this road and the Ft. Morgan to Dauphin Island ferry being the only means of evacuation. Additionally, electrical, water, and communications infrastructure run beneath this imperiled road. The outcomes of this project include designing and permitting a large-scale project as well as installing a small-scale demonstration project. These outcomes will directly address the opportunities to reduce further shoreline erosion and demonstrate the utility of such restoration efforts along other portions of the 21-mile peninsula.

The water is coming, but this project seeks to do more than just address the needed repair and renourishment of the project area.

A key element of the project will include the incorporation of USA Civil Engineering students enrolled in their senior design class. They will be deeply engaged with project partners and contracted engineering firms as they provide design components for the project and engage in experiential learning opportunities with real world applications. Their project will lay the groundwork for the study site and these students will see their ideas come to life along the way.

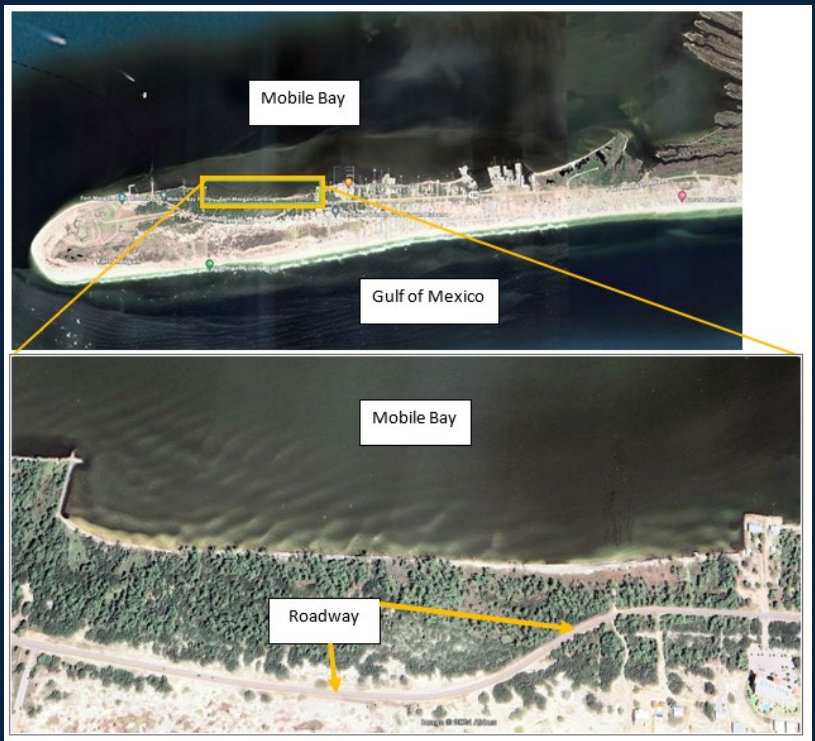

Figure 1 Project site along the Fort Morgan Peninsula.

Little Lagoon Project

Grace Gibbs

Located in South Baldwin County, Little Lagoon is part of a coastal lake system situated between Mobile Bay and the Gulf of Mexico. A popular recreational spot and home to multiple endangered species, this body of water holds significant ecological and economic importance to the region.

The 5-year initiative is part of a larger project led by the City of Gulf Shores directed at improving the overall health of the lagoon by strengthening the oyster restoration effort in Little Lagoon. The project will establish an oyster park within the lagoon, housing adult oysters for restoration, and up to ten off-bottom dense aggregate spawning areas. The success of these efforts will be defined in terms of oyster survival rates, reproductive conditioning, and spat recruitment.

Additionally, water quality data will be collected monthly from ten sites within Little Lagoon mirroring National Shellfish Sanitation Program standards.

The results of this project are expected to increase the oyster population, promote a stable larvae source in Little Lagoon, and provide information on the current lagoon status relative to water quality and shellfish. An increased oyster population will promote improved water quality and the creation of niche habitat areas for other species in the lagoon, complementing and expanding upon the successful Little Lagoon Oyster Gardening Program. The findings of this study will provide residents with a better understanding of Little Lagoon's environmental status and help support further restoration efforts.

Meet Our Scientists: Grace Gibbs

Grace is a new Research Assistant for the Auburn University Marine Extension and Research Center. She received a degree in Environmental Science this past spring from Juniata College. Her primary project will address oyster restoration in Little Lagoon, AL.

In her free time, Grace enjoys activities such as mountain biking, running, and kayaking.

Update On Near Shore Pollution Study

Tommie K. Cone

This project will evaluate the effectiveness of different oyster set style and size combinations: single seed, spat set shell, single adults, and adult florets. relative to sequestering nitrogen and phosphorus. The single seed (R6) and spat set shell were spawned in August 2024 at the Auburn University Shellfish Lab on Dauphin Island. The single sub-market oysters range from 60 to 65 millimeters in height and are sourced from local farms. The large floret oysters (sub-market) come from ongoing restoration research.

Additionally, the project will evaluate how infrastructure may stabilize restoration sites. Over the past several months, the team has installed 32 plots in the Mississippi Sound off Coden, Alabama.

The next step is to install a hard bottom on which to place the live oysters. Seasoned oyster shells from Alabama's shell recycling program will be placed across the 32 plots to form the hard bottom needed.

Sampling will be completed quarterly for each replicated treatment type. Nutrient content analysis will be done in Dr. Kevin Wang's lab at the University of Florida. We will evaluate any effect of set style and size on the amount of nitrogen and phosphorus sequestered. Additionally, we will calculate oysters' dry weight and abundance in combination to determine the restoration status. The goal of this study is to further best management practices for controlling near-shore pollution and advance local oyster restoration methods.

WATER QUALITY CORNER—MONITORING THE IMPACTS OF STORMS ON OYSTER GROWING WATERS

Missy Partyka

It felt like only yesterday when, with great optimism, I spoke to y'all about the coming warm days in South Alabama. Having endured one of the warmest summers on record, I can say that I'm just as excited about the coming fall when leaves begin to drop, evenings become more walkable, and the seemingly endless humidity of late summer is behind us. We've all watched this summer as the heat in the Gulf has stirred up massive local thunderstorms as the ever-present threat of a tropical cyclone and its associated feeder bands. This weather, the heat and the downpours of rain, are rough not only on us, but on many of our natural resources—like oysters.

Many may not know this, but water quality conditions in our nearshore waters are what make Alabama oysters so popular. The combination of salty Gulf waters lapping up against the nutrient rich waters of Mobile Bay allow for tremendous algae production—oyster food—while creating unique briny yet buttery oyster meats. However, when the water turns too hot and gets too salty (as when we go weeks without rain) or when it suddenly gets too fresh (like after one of our massive thunderstorms) oysters can experience a lot of stress. This is true for our precious native oyster reefs and for our locally farmed varieties. This stress can lead to poor growth, reduced reproduction (for wile oysters), and even mortality.

Localized flooding during afternoon thunderstorms can wreak havoc on local water quality conditions. Understanding where flood waters go and how long their impacts remain is essential to our ability to make recommendations and keep our communities safe.

If we add issues like regulatory closures for sanitary sewer overflows or excess discharge from treatment plats it can become increasingly difficult for our farmers and harvesters to keep afloat.

For the past two years my research team has been conducting water quality sampling around the Bay to better understand the different dynamics that drive nearshore water quality (e.g., rain, wind, tides, temperatures, etc.) in an effort to refine the current regulations based on data.

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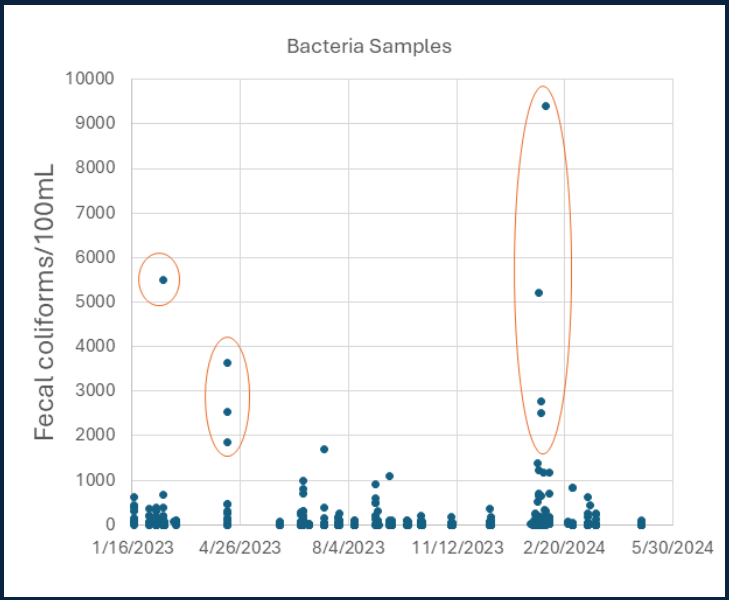
Water Quality Corner Continued

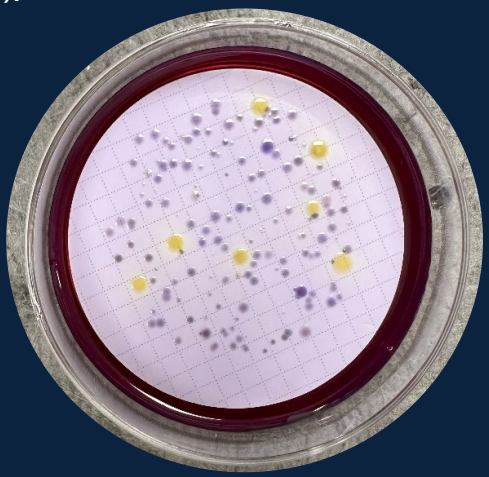
We have collected more than 600 water samples at 37 stations around the Bay and are beginning the work or analyzing all we've found. Of special interest are the fecal coliform data as that is the indicator that the State uses to regulate oyster growing/selling. While that project is sunsetting, we are looking forward to starting an additional study in partnership with the University of South Alabama and the Dauphin Island Sea Lab.

In this new study, we will be building on the knowledge gained from our previous sampling efforts and home in on some of our nearshore areas that have experienced water quality issues, particularly those that are near oysters, but also regions that are experiencing changes as our coastal counties grow and develop. This larger research group will continue to monitor for microbial water quality, but we are also adding in components like hydrodynamic modeling, improved physical and chemical data collection through ARCOS, and surveying the different algae species that bloom in these rich waters.

I look forward to taking y'all on that journey with us as we learn more about this amazing coastal environment, hoping to discover and helping to remedy issues we find along the way. Happy Fall Y'all!



Fecal coliform samples collected over a multi-year period show that while some areas of the bay have higher bacteria concentrations than others, most of the highest counts are during periods when local waters are closed to oyster harvesting (circled in orange).



Example of a fecal coliform test for water quality. Samples are poured through a filter and that filter is placed on selective media that allows us to tell different bacteria apart. Fecal coliforms show up as yellowish on this media and are easily distinguished from the background growth. The result here is 8 fecal coliforms/100mL sample. Any result less than 14/100mL indicates oysters are ok to eat.