Development and Operation of a Mobile Oyster Spawning System

Alma Bryant High School
South Mobile County Alabama
Alma Bryant HS Aquaculture Program

- School is located in south Mobile County, Alabama
- School district includes seafood communities of Bayou La Batre, Coden, and Dauphin Island
- Aquaculture program started when school opened in 1998
- Hands-on learning by doing the “real thing”
- Help to develop aquaculture opportunities by using commercially important species (seafood industry is struggling)
PILOT SCALE STUDIES

• Over the years we have conducted a number of pilot scale studies in an effort to find the species best suited for our conditions.

• We have cultured red snapper, cobia, tilapia, striped bass, white shrimp, rainbow trout, redclaw crawfish, and oysters

• While we do receive financial support from our school system, most of our funding comes from grants

• Over the past 19 years, we have been awarded almost $800,000 in grants
Aquaculture Challenges

- Saltwater aquaculture is expensive for us
- Fish species often had disease problems
- Redclaw crawfish had no disease problems and are FW but expensive to heat (tropical) and feed
- Oysters require no heat or feed (after setting)
- Oysters are part of seafood heritage in the area
- Decided to focus on oysters, both half-shell and restoration aquaculture
Aquaculture and Marine Biology Students at Bryant High School have:

- Participated in Oyster Gardening Project
- Participated in spawning activities at AUSL
- Conducted grow-out studies at BHS
- Conducted studies on effects of salinity on grow-out
- Assisted in deployment of oysters on area reefs
Students participating in oyster gardening
Students helping spawn oysters
Students working on oyster growth project at ABHS
National Fish & Wildlife Foundation Grant (NFWF)

- Prepared and submitted a proposal to NFWF in 2013
- ABHS was awarded grant for $26,000 in 2014
- Project was to grow and transplant restoration oysters
- First year we grew oysters in oyster gardening cages at Point aux Pins Oyster Farm (Steve Crockett – owner).
- Oyster drills took heavy toll on them so following year we grew them in off-bottom long-line cages (AUSL).
Auburn University Shellfish Lab (AUSL) site

- 40-acre site was located in Portersville Bay
- Site had restoration area, training area, and commercial farm areas
- AUSL offered ABHS one of the training runs
- ABHS purchased 200 long-line baskets and we grew restoration oysters in half the baskets and half-shell oysters in the other half
- We put out the oysters in park restoration area
ABHS Oyster Aquaculture Program

- We wanted to have our own oyster aquaculture area
- The AUSL 40-acre farm site ran out of available spaces
- I started looking for a new area for ABHS
- I knew that the Pointe aux Pins peninsula belonged to the University of Alabama
- I got approval from the University of Alabama to lease a farm site
Half-Shell High School

- Project “Half-Shell High School” – 09/30/14 to 08/31/16 was funded by NIFA (our 3rd grant from NIFA)
- Total project budget was $50,000
- Project was to cover all of the expenses in getting the PAP site permitted
- Expenses included sea grass survey, oyster resource survey, and preparation of maps by surveyor
- We divided the area up into 25 2-acre blocks
- Grant also purchased some initial oyster growing gear
U.S. EPA / Gulf of Mexico Partnership Agreement Grant

- February 2016 – January 2018 – grant total - $260,440
- Purchase of growing gear
- Training of students and area citizens (AUSL sub-contract)
- Piling installation
- Tumbler
- Next we have to assemble and install gear at farm site
- Then we have to load cages with seed oysters and tend them
NOAA B-Wet Grant

- Grant period is from 07/01/2017 to 06/30/2019
- Total funding is $68,251
- Oyster Reef and Saltmarsh Restoration in Coastal Alabama
- We will be growing restoration oysters (spat on bags of whole shell) to expand our intertidal reef project
- We will also be growing *Spartina alterniflora* plants for upcoming marsh restoration projects at an on-campus plant nursery
Gulf States Marine Fishery Commission Grant

- Grant was for $37,872 (2017) to construct and operate a mobile oyster spawning and larviculture system
- At the time we applied for this grant, AUSL and LSU were the only two hatcheries on the Gulf Coast
- At my former job as an environmental scientist, we had a mobile flow-through bioassay trailer that I operated
- An oyster spawning system in a trailer afforded environmental control and could be towed to safety during hurricanes
Trailer

- Provides for temperature and light control
- Provides for protection from the elements
- Can be relocated when needed
- Can be used to test site water suitability
Present Plans

• Our overall goal is to be able to spawn and set oysters for both the half-shell industry as well as restoration efforts.

• We want to train our students for jobs on oyster farms, for work relating to restoration efforts, and now for jobs at new oyster hatcheries and nurseries.

• Our first spawning attempt will be in May/June of this year.
Initial Spawning Attempt

- Researchers at USM successfully completed an inland spawn and set using synthetic seawater.
- Our first oyster spawning attempt will be on campus at ABHS using synthetic seawater.
- This initial attempt will also serve as a good “shakedown” test for us.
- We will spawn diploid oysters and set them on bags of whole shell for use as restoration oysters.
10,000 Gallon Tank

- Epoxy lined concrete
- Sand filter (shell)
- Biofilter with bioballs
Spawning System

- Spawning bins set up on counter
- 10,000-gallon SW reservoir with biofiltration set up in greenhouse
- Water will be supplied by reservoir in greenhouse
- Used water will return to reservoir for reuse or sent to saltmarsh plant growing beds
Initial Spawning Attempt

• We will attempt to culture the oyster larvae in static cone-bottom tanks with daily water renewals.
• If we can successfully get the larvae to the pediveliger stage, we will set them on mesh bags of whole clean shell.
• After setting, the bags of spat on shell will be relocated to our farm site in Sandy Bay.
Future Spawns

• If our initial attempt using synthetic seawater is successful, our next attempt will be to set the larvae on microcultch to produce half-shell oysters.
• After setting, they will be transferred to our bottle nursery.
• If we are not successful, we will relocate our trailer to Sandy Bay and attempt a spawn and set with bay water.
• After completing successful sets in a static larviculture system, we will attempt to culture larvae to the pediveliger stage in a high-density flow-through system.
• We eventually hope to attempt spawning and setting triploids.