

# Annual Report 2006

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## Endeavor to Achieve



“Those who dare to fail miserably can achieve greatly” ~ Robert F. Kennedy

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# 2006 Highlights

## Projects

- Produced the F<sub>2</sub> generation of oysters bred for tolerance to hypoxic environments.
- Investigated the underlying cause of oyster mortality in anoxic environments.
- Continued investigation into the role of *Perkinsus marinus* (“Dermo” disease) infection in oyster reef restoration.
- Analyzed the cold shock response of *Vibrio vulnificus* bacteria in oysters.
- Supported the Oyster Gardening Program in partnership with Mobile Bay NEP to plant 60,000 oysters for reef restoration grown by volunteers around the Bay. AUSL contributed an additional 55,500 oysters to the restoration efforts.
- Supported four graduate students and their associated research projects.
- Provided a summer internship for a high school student selected from Alma Bryant High School’s aquaculture program.
- Provided assistance to 14 researchers at 6 institutions in the form of lab space, oyster larvae, oyster seed or adult oysters. Also provided oysters for 2 private endeavors.
- Donated and planted approximately 55,000 oysters on reef restoration sites in Bon Secour Bay and Mobile Bay.

## Production

- Produced over 15 million larvae. From that total, 3.9 million were delivered as larvae, 2.6 million were set to produce single oysters and 8.5 million were set on whole shell.
- Maintained 15 different stocks of adult oysters in Mobile Bay for brood stock, anticipated experiments, and use by other researchers.

## Facilities

- AUSL hosted a group from Louisiana State University (LSU) for 11 days allowing them to continue research in the AUSL hatchery after the LSU hatchery on Grand Isle, Louisiana was destroyed in hurricane Katrina the year before.
- Installed 208 volt outlets in the hatchery to allow use of large titanium heaters for various projects.
- Installed a chilled flow-thru system for holding broodstock oysters.
- Installed a flow-through system with mechanical filtration and sterilization for depuration of *Vibrio* bacteria in oysters.

## Tours and Meeting

- Hosted over 80 people from 8 groups as part of tours, lectures, or use of conference room facilities.

## Introduction

Over the past two years, the recovery from hurricanes Ivan and Katrina has overshadowed the accomplishment in the mission of the AUSL program. But in 2006 we were able to revel in the successes of our production and research. Though lots of data and numbers show results and chart progress, pictures speak volumes. The photograph on the cover of this report shows the tremendous production of oysters from the oyster gardening program, a volunteer based oyster reef restoration project. Visually quantified results such as this not only inspire the volunteers in the program but also inspire ourselves by putting an image to what can be achieved through cooperation and persistence.

The past year was extremely busy for AUSL in supporting research efforts both internally and externally. AUSL supported several Auburn University research projects as well as four graduate students and their projects. AUSL also served to support other researchers and agencies through cooperative projects, providing lab space, and providing oyster larvae, spat, and adult oysters for a variety of research projects and cooperative programs. AUSL continued strong outreach and instruction efforts through facility tours and lectures regarding shellfish research and production and through guest lectures to academic classes at the DISL.

Production from the AUSL hatchery for 2006 remained at a high level to meet the ever increasing demand for shellfish products for research and restoration. To meet the demands of production and research AUSL continually strives to upgrade and maintain facilities to have one of the highest quality facilities in the southeast for shellfish production. This concerted endeavor to achieve should continue to provide impressive results both physically and academically.

# Projects

## Breeding Tolerance to Hypoxia

In 2004, AUSL began investigating oyster tolerance to hypoxic conditions and the potential for developing oysters more tolerant of low dissolved oxygen. Early work suggested that adult oysters from reefs that experience hypoxia have significantly longer survival times than oysters from normoxic reefs. But breeding trials with parental oysters challenged with hypoxic conditions showed that offspring (F<sub>1</sub> generation) from normoxic reef parents showed the most improvement in survival over control oysters indicating that the natural selection pressure on the hypoxia-challenged reef may have already reached some maximum limit.

In 2005, F<sub>1</sub> generation oysters from the previous study were again challenged with hypoxia. The surviving oysters were kept for brood stock and spawned in the summer of 2006 to produce an F<sub>2</sub> generation. Of the nine different crosses produced in 2006, the two that performed the best in anoxic conditions were inbred crosses of selected F<sub>1</sub> generation oysters from each of the two reef lines (Fig. 1).

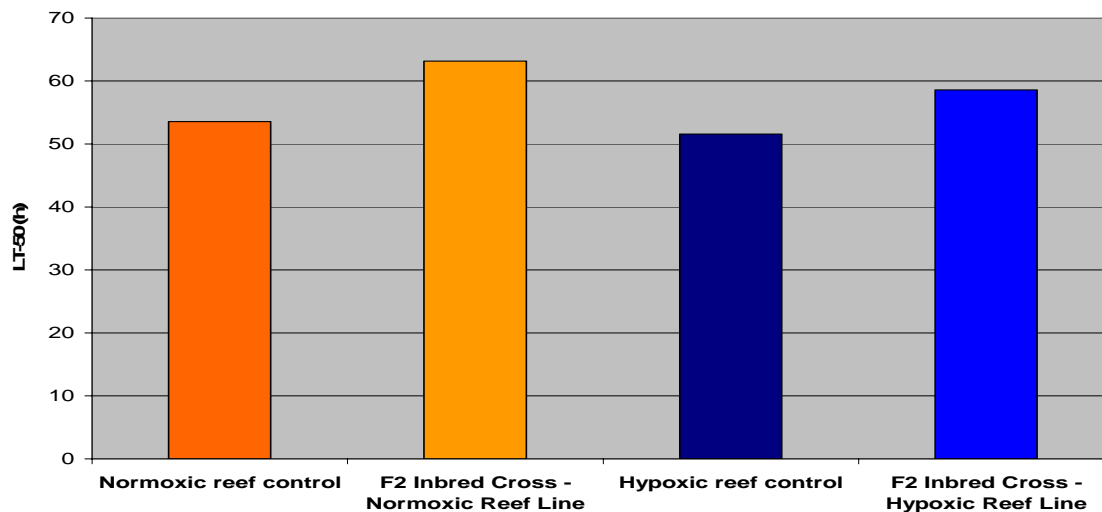


Figure 1: Lethal Time to 50% mortality for F<sub>2</sub> generation oysters from Cedar Point Reef (normoxic) and Whitehouse Reef (hypoxic) parental lines.

These inbred crosses as well as F<sub>2</sub> control oysters are being held for future selection studies.

Dr. Richard Wallace, Auburn University Marine Extension Research Center, (AUMERC) is the principal investigator for the project.

### **Understanding Oyster Response to Hypoxia**

Master's student Susan Fogelson embarked on a project in 2006 to determine the primary cause of mortality for oysters exposed to anoxic conditions at summer temperatures. To address the question, oysters exposed to anoxia for varying lengths of time were evaluated for changes in oyster tissue structure, bacterial levels, condition index values, glycogen levels, and fecundity induced by anoxia. Results indicated that glycogen reserves and oyster condition were not likely causes of mortality. But oysters stressed with anoxia did show an increase in bacteria. Bacteria were found at higher levels in some of the tissues in the stressed oysters. There was an inflammation of the mantle tissue and disintegration of some of the digestive tissues of the stressed oysters (Fig 2). The results of this study give us

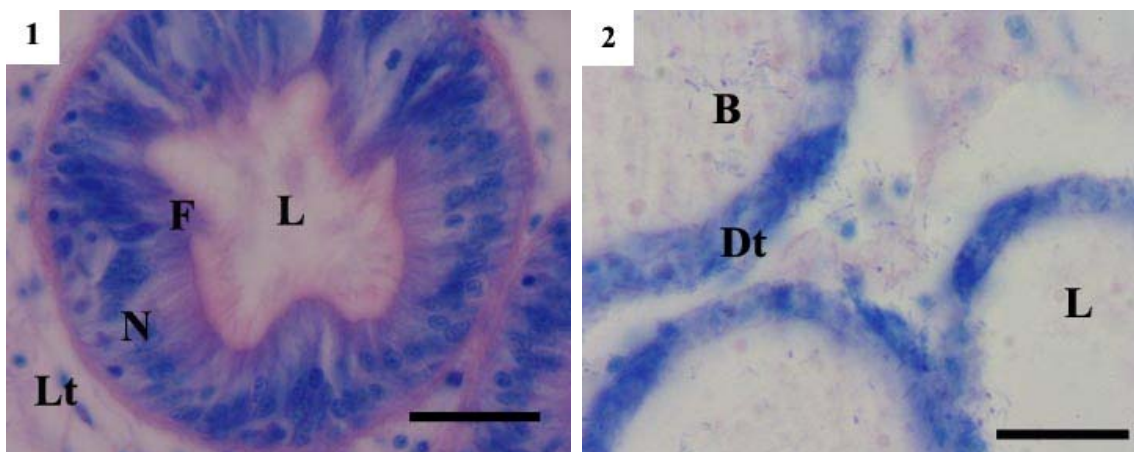


Figure 2: Microphotograph of digestive tubules at 100X showing breakdown and bacterial infection.

(1) Baseline; (2) after 24 h exposure to anoxic conditions. Abbreviations: B, bacteria; Dt, digestive tubule; F, flagellated basophil cells, L, lumen; Lt, leydig tissue; N, non-flagellated basophil cells. Scale bar= 50  $\mu$ m

an indication that tolerance to increases in bacteria may be what is selected for in the AUSL breeding research mentioned above. Ms. Fogelson's research was conducted under the direction of her major professor, Dr. Richard Wallace, Auburn University Marine Extension Research Center, (AUMERC).

### Dermo disease

A two-year project was initiated in 2005 investigating the role of *Perkinsus marinus* infection in oyster reef restoration. *Perkinsus marinus* is a systemic protozoan parasite that causes “Dermo” disease in oysters and can lead to mortality after prolonged infection. The goal of the project was to compare the effect of “Dermo” disease on oyster populations at unharvested and harvested reefs by comparing the density and size structure (proxy for age) of oyster populations, the prevalence and intensity of *P. marinus* infection, and mortality rates of existing oyster populations. Disease development was tracked in hatchery-reared oysters placed at reefs with varied harvest pressure.

In August of 2005, six harvested and six unharvested reefs were identified for use in the study (Fig. 3). Oysters were collected for baseline population data and analysis of disease prevalence and intensity at each site. An experimental array was constructed at each reef site composed of three mesh bags each containing 30 oysters collected from the reef. These oysters were checked monthly for mortality from August 2005 through the end of 2006.

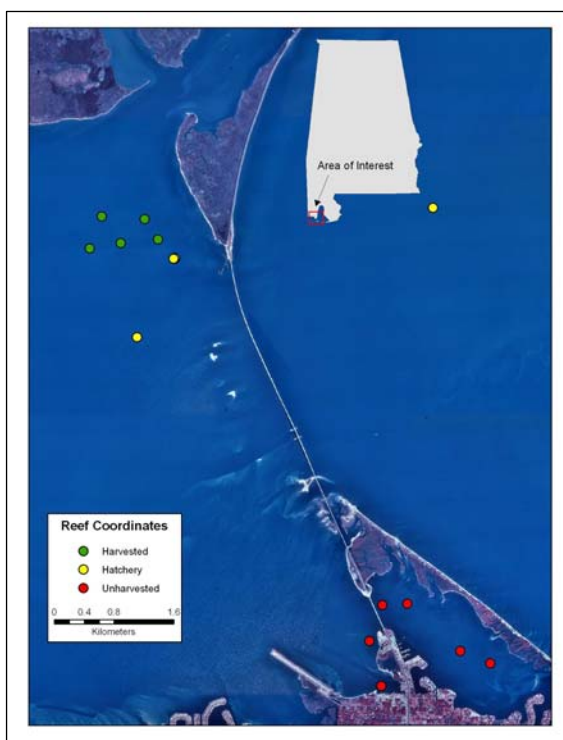


Figure 3: Location of study sites.

Three additional reefs with differing harvest pressures were selected to track disease development in hatchery-reared oysters (Fig. 3). The three reefs chosen had heavy harvest pressure, moderate harvest pressure, and no harvest pressure (a newly created reef). Bags containing hatchery-reared oysters were placed on these reefs and monitored monthly for mortality. Other hatchery-reared oysters were maintained to provide samples for disease analysis. Mortality monitoring and disease analysis began in August 2005 and proceeded periodically through the end of 2006.

Data from 2005 and 2006 show overall population densities at the unharvested sites was higher than the harvested sites as were the densities of all size classes (Fig. 4). Oysters on the unharvested reefs contain higher levels of *P. marinus* than oysters on harvested reefs (Fig. 4). Early results indicate that the unharvested sites may act as a reservoir of *P. marinus* that may influence neighboring reef sites. Sampling of the reef sites will continue through August of 2007.

Drs. Richard K. Wallace and Yolanda Brady are the principal investigators for this project. Funding is provided through the University of South Alabama's (USA) Alabama

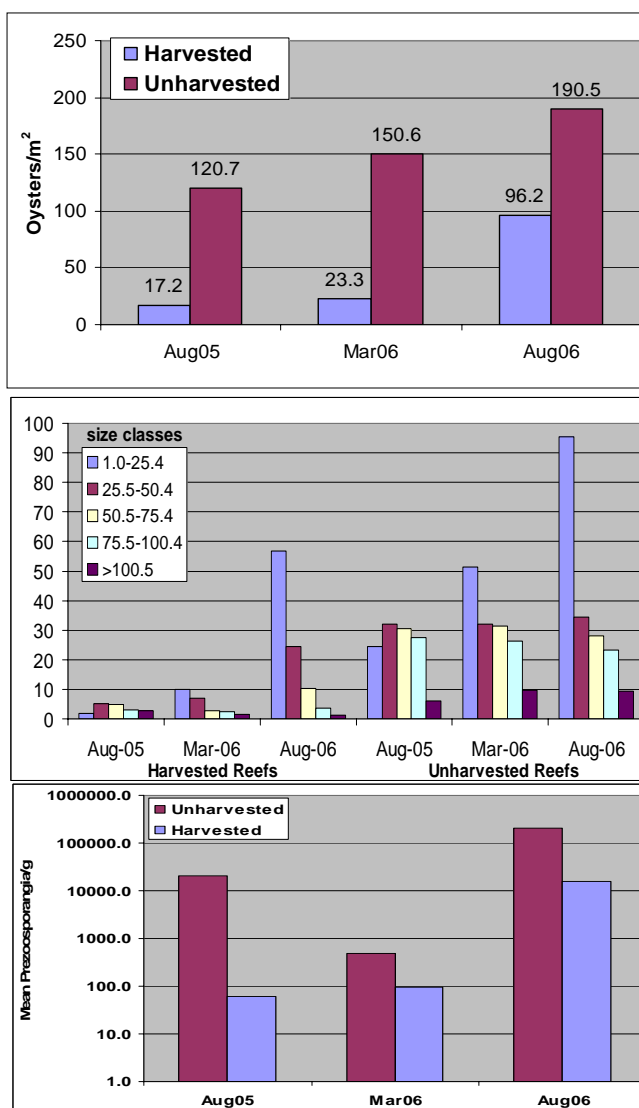


Figure 4: Population density, size structure, and disease intensity

Oyster Reef Restoration Program and NOAA. The project also supports graduate student Dennis Donegan.

### **Cold Shock Response in *Vibrio vulnificus***

*Vibrio vulnificus* is a naturally occurring bacterium in the coastal waters of Alabama. It can be an opportunistic human pathogen that can cause gastroenteritis, septicemia, and wound infections in humans. *V. vulnificus* infections can be associated with the consumption of raw oysters, primarily in immune compromised people. Graduate student Suttinee Limthammahisorn conducted a study on the cold shock response of *V. vulnificus* in oysters and evaluated the effect of postharvest time and temperature conditions on growth and survival.

AUSL provided one year old oysters for Ms. Limthammahisorn's experiments. A depuration system was setup at AUSL in an attempt to standardize bacteria levels prior to being inoculated with various strains of *V. vulnificus* (Fig. 5). After a 7 day depuration period, the oysters were transported to Auburn for inoculation with *V. vulnificus* and cold shock experimentation.

Results from the experiments suggested that a downshift in oyster temperature to an intermediate level of



Fig. 5: Oyster depuration system.

15°C and then to 4°C may result in cold adaptation by *V. vulnificus* compared to oysters that were downshifted straight to 4°C. The adaptations at the intermediate temperature helped *V. vulnificus* remain in a culturable state when exposed to the lower temperature. These findings may have implications for the post harvest treatment of oysters to reduce the potential threat of *V. vulnificus* infections.

The depuration system developed for this project showed a significant reduction in *V. vulnificus* bacteria. Further investigations into the use of this system to eliminate *V. vulnificus* bacteria from harvested oysters will be conducted in 2007.

### **Clam Culture**

Dr. LaDon Swann and graduate student Jonathan Jackson initiated a project investigating the potential of raising clams, *Mercenaria mercenaria*, in the waters of Alabama. The project will compare on-bottom growout methods with off-bottom methods using Australian longline culture techniques. In 2006, a site in Grand Bay, Alabama was located and the area was surveyed to obtain a riparian lease for the project. The longline equipment was obtained from a company in Australia and equipment for the on bottom technique was obtained domestically. Installation of the growout systems will take place in the summer of 2007. Clams are on order and scheduled for arrival in May of 2007.

### **Oyster Gardening**

AUSL continues to support the Mobile Bay National Estuary Program's (MBNEP) Oyster Gardening Project. The project consists of volunteers around Mobile Bay raising oysters in protective cages on waterfront property for restoration of oyster reefs. The number of volunteers in the 2006 program was down to 33 from 47 the previous year. Declines in participation over the past to couple of years are due to the after effect of

Hurricane Ivan in 2004 and Hurricane Katrina in 2005. Many previous volunteers had lost piers where they raised oysters for the program and have not yet rebuilt.

AUSL set approximately 6 million eyed larvae on 90 bags of whole oyster shell for the project. After two weeks growth in the hatchery the shell bags were placed on commercially productive Cedar Point Reef in Mobile Bay for further growout. After two weeks in the field, bags were returned to AUSL and held in flow-through tanks until delivery to volunteers for growout. Oysters were delivered to volunteers in mid June where they were then cared for by the volunteers for the next five months. In early November, the oysters were collected from the volunteers by personnel from MBNEP and AUMERC and transported by boat to the restoration sites. On November 6, 2006, oysters from Mobile County volunteers were planted on Boykin Reef just to the north of Dauphin Island. On November 9, 2006, oysters

from Baldwin County volunteers were restored to Shell Bank reef to the north of the Fort Morgan peninsula. A total of 60,000 oysters were raised by the volunteers and delivered to these reefs (Fig. 6). AUSL contributed another 55,000 single oysters from excess



Figure 6: Oysters grown by program volunteers

hatchery production. In 2007, the

number of participating volunteers in the program is expected to almost double as past volunteers return to the program after recovering from the hurricanes of the past two years.

Students from Alma Bryant High School also played a role in oyster gardening in 2006 (Fig. 7). Four students and their teacher chose oyster gardening as their project in conjunction with the Second National Student Summit on Oceans and Coasts sponsored by

Coastal America. The students helped MBNEP personnel, count, collect, and deploy the oysters grown by volunteers. The four students involved in the project are Alex Callister, Gabriel Denton, Darrel Wright and Shaun Jenkins, under the direction of their teacher Lynn Stewart and DISL Discovery Hall Marine Educator Hazel Wilson. The relationship between ABHS and the Oyster Gardening Program is expected to continue in 2007.



**Figure 7: Students from Alma Bryant High School collecting oysters from volunteer sights with Kara Lankford (MBNEP) and restoring oysters to reefs in Mobile Bay.**

### **Summer Internship**

Once again in 2006, AUSL supported a summer internship for a student from Alma Bryant High School's (ABHS) aquaculture program. The student selected for the internship this year was Darrel Wright. Mr. Wright was highly recommended for his academic aptitude and his reliability in the aquaculture program at ABHS. He will graduate in the spring of 2007 from ABHS and continue his education at the University of South Alabama in the fall of 2007. AUSL plans to continue support of the ABHS aquaculture program by providing this summer internship program.

### **Helping Industry**

AUSL continued to assist local aquaculture interest in 2007. AUSL provided 8000 seed oysters to a novice oyster farmer on the West End of Dauphin Island. AUSL also

assisted another oyster farmer in Grand Bay, Alabama to establish his riparian lease for future oyster farming ventures. The Wetland Edge Environmental Center in Decatur, Alabama requested several larger oysters from AUSL for aquarium display.

### **Assisting Other Researchers**

Dr. Stephen Kempf in the Department of Biological Sciences at Auburn University received oyster larvae supplied by AUSL for the third year in a row. These larvae were used for research on the structure and function of the larva's apical sensory ganglion (ASG). The ASG is thought to be the structure which senses the inductive cue for metamorphosis. Some of the larvae have also been used in the development of monoclonal antibodies to further aid in this research. In 2006, AUSL provided Dr. Kempf with 3 shipments totaling 1.1 million oyster larvae.

AUSL has had a continuing working relationship since 2004 with Dr. Ann Boettcher and her graduate student Nobuo Ueda, supporting their research on the effects of temperature, salinity and dissolved oxygen concentrations on larval settlement and metamorphosis. In addition, they examined the relationship between these environmental stresses and the expression of heat shock proteins. In 2006, AUSL provided approximately 2.1 million larvae and 210,000 newly-settled spat for this project. Dr. Wallace served on Mr. Ueda's graduate committee.

Since 2004 AUSL has also provide oysters for Dr. Sean Powers and Dr. Ken Heck from USA for field projects investigating oyster reef restoration. In 2006, AUSL set larvae on 169 bags of oyster shell resulting in 272,000 spat for their projects. The spat were used for restoring oysters on five 100m<sup>2</sup> plots near Point Aux Pines in Mississippi Sound and near Bay Front Park in lower Mobile Bay.

Dr. Steven Hall with Louisiana State University is investigating the use of various composite materials in creating engineered reefs for coastal erosion control and protection of

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coastal wetlands. The materials are designed to attract aquatic organisms to settle on the reefs to enhance aquatic productivity in addition to serving as coastal protection. AUSL supplied Dr. Hall's team with 900,000 oyster larvae to investigate the attractiveness of these materials for setting larvae.

AUMERC and AUSL have a long standing relationship with oyster researcher, Dr. John Supan from LSU and the Louisiana Seagrant program. In 2005, Dr. Supan suffered a setback with the loss of the oyster hatchery he managed on Grand Isle, Louisiana during hurricane Katrina. This was the location of much of his research as well as his graduate student's research. Though plans are underway to rebuild the hatchery on Grand Isle, Dr. Supan and his colleagues needed a place to continue their research in 2006. In the spirit of cooperation, AUSL was able to turn over hatchery facilities to Dr. Supan and his students of 11 days in May, 2006 to allow them to spawn oysters for their research in producing triploid and tetraploid oysters. AUSL looks forward to continuing cooperative work with Dr. Supan in the future.

## Production

### Oyster Spawning

AUSL conducted three separate spawns on the following dates in 2006 for the stated projects or purposes:

- |          |  |
|----------|--|
| April 24 | - MBNEP Oyster Gardening Project                                     |
|          | - USA heat shock protein project (Nobuo Ueda and Dr. Anne Boettcher) |
|          | - AU apical sensory ganglion function (Dr. Steve Kempf)              |
|          | - Single oyster production for stock maintenance                     |
| June 21  | - AUSL anoxia tolerance project                                      |
|          | - LSU reef construction for coastal restoration (Dr. Steven Hall)    |

- June 28        - USA oyster restoration projects (Drs. Sean Powers and Ken Heck)  
                  - USA heat shock protein project (Nobuo Ueda and Dr. Anne Boettcher)

### **Oyster Larvae**

The 2006 oyster spawns resulted in over 20 million larvae being raised for the following projects or purposes:

- 1.1 million    - AUSL anoxia tolerance project (13 families)  
2.1 million    - USA heat shock protein project (Nobuo Ueda and Dr. Anne Boettcher)  
1.0 million    - AU apical sensory ganglion function (Dr. Steve Kempf)  
0.9 million    - LSU reef construction for coastal restoration (Dr. Steven Hall)  
1.5 million    - AUSL fast growth selection line. Set on micro-cultch.  
14.2 million   - Set on whole shell.

### **Oyster Seed**

Oysters set on micro-cultch or whole shell were distributed for the following projects or purposes:

- 5,000         - Single oysters planted on Shellbank Reef in Bon Secour Bay in conjunction with MBNEP Oyster Gardening Program.  
50,000        - Single oysters planted on Boykin Reef in Mobile Bay in conjunction with MBNEP Oyster Gardening Program.  
210,000      - USA heat shock protein project (Nobuo Ueda and Dr. Anne Boettcher)  
8,000         - Singles oysters 4 to 8mm – Private aquaculture interest (Steve Meyers)  
3,900         - AUSL anoxia tolerance project – 300 from each of 13 families used to test anoxia tolerance.  
4000         - AUSL anoxia tolerance project – 1000 from each of 4 families kept on racks in Bon Secour Bay for future use.

- 2,000 - AUSL fast growth line - Single oysters placed on racks in Bon Secour Bay for future use.
- 169 Bags - Approximately 272,000 spat set on whole shell - USA oyster restoration projects (Drs. Sean Powers and Ken Heck)
- 90 Bags - Approximately 150,000 spat set on whole shell – MBNEP oyster gardening project.

### **Large Oysters**

AUSL and AUMERC maintained 13 different stocks of oysters on racks in Bon Secour Bay. Some of these oysters date back to AUSL production from 2003. Oysters from stocks on the racks were distributed for the following projects or purposes:

- 800 - Single oysters from 2005 production – AUSL cold shock response of *Vibrio vulnificus* (Graduate student, Suttinee Limthammahisorn)
- 500 - Single oysters from 2005 production – AUSL anoxia study (Graduate student, Susan Fogelson)
- 500 - Single oysters from various groups planted on Shellbank Reef in Bon Secour Bay in conjunction with MBNEP Oyster Gardening Program.
- 15 - Single oysters from anoxia production – For display at the Wetland Edge Environmental Center, Decatur, AL.
- 4,000 - Singles oysters from 2005 production – Private aquaculture interest (Steve Meyers).
- 80 - Single oysters from 2003 production – Rutgers University (Dave Bushek)

## Facilities

AUSL had some lingering effects from hurricane Katrina that needed to be addressed in 2006. Most of the pine trees between the AUSL facility and the beach died due to

saltwater intrusion from the storm. AUSL and AUMERC personnel cut down over 30 pine trees. With cooperation from the Dauphin Island Sea Lab, a chipper was brought in to chip the tree limbs and a large portion of the trees. The chips were left on the ground to supply nutrients for new growth in the area. Saltwater exposure and intrusion also killed many of the landscape plants in the migratory bird habitat created at the AUSL facility. More native plants were brought in to replace the ones lost due to the storm.

After four years of production the AUSL discharge sump had accumulated a large amount of sediment. Past attempts to clean out the sump involve buckets and a lot of physical labor. Though this method was effective, a much better method was used in 2006. A vacuum pump-out truck (typically used to pump out septic systems) was employed to pump out the sediment in the sump. The material was dewatered and placed on site to add nutrients to the dune system behind AUSL.

The sump also incurred damage from rising ground water during hurricane Katrina. The liner in the discharge sump floated as the ground water rose causing the liner to tear around the hatchery discharge line. The liner was repaired and a large retaining collar (3ft diameter) was placed around the discharge pipe to prevent such damage in the future. Hurricane preparation protocols have been changed accordingly to call for the sump to be filled prior to arriving storms to equalize the ground water pressure on the sump liner.

AUSL also expanded its capabilities with the installation of three 220 volt outlets in the hatchery. This allowed for the use of 3 large titanium immersion heaters. The capability to use these heaters allows for the efficient heating of large quantities of water. This greatly improves our capabilities when it comes to spawning oysters. The use of the heaters also allowed for the development of a heated flow-thru system for holding oysters allowing them to feed on natural phytoplankton while maintaining temperature for conditioning brood stock for spawning and also maintaining oysters at a constant temperature to keep them from

spawning. AUSL plans to expand the use of the heaters in spawning systems and condition systems in the years to come. A water chiller was also installed to facilitate holding broodstock in the flow-thru system in the summer.

A flow-thru system for the depuration of oysters was set up for Graduate student Suttinee Limthammahisorn for her work with *Vibrio vulnificus* bacteria. The system consisted of incoming raw water passing through a mechanical cartridge filter for solids removal followed by an ultraviolet light sterilizer to kill bacteria in the water. Though the system was developed to try to standardize bacteria levels for Ms. Limthammahisorn's work, it showed the potential to eliminate *Vibrio* bacteria from oysters. The system will be further developed for depuration work in 2007.

In 2006, maintenance protocols were established for cleaning of the two 6000 gallon saltwater reservoirs at the facility. Growth of algae and the settling of fouling organisms on the interior of these reservoirs as well as the accumulation of mud in the bottom have the potential to cause mechanical and contamination problems down the road. Cleaning the tanks is no easy task since they are 13 feet tall and 10 feet in diameter. There is also a danger of hydrogen sulfide gas from the accumulated mud in the bottom these large enclosures. The tanks are first flushed with copious amount water to remove some of the sediment in the bottom and also reduce potential problems with hydrogen sulfide gas. The tanks are then filled to capacity and a scuba diver enters the tank with a pressure washing wand. The tank is slowly drained while the diver pressure washes the interior surfaces. Atmospheric air is blown in to the tanks from the facilities regenerative blowers, again to reduce the potential for hydrogen sulfide gas exposure. When the tank is drained and cleaned, any remaining sediment is flushed out the drain. The tanks will be cleaned each spring prior to spawning season.

## Instruction

Dr. Hugh Hammer with Gasden State University taught Marine Aquaculture through the DISL summer school program. The course was originally developed by Auburn professor and Mississippi-Alabama Seagrant director Dr. LaDon Swann. This course introduced students to techniques in marine aquaculture with emphasis in the areas of nutrition and feeding, reproductive biology, production techniques, water quality requirements, processing, marketing, and economics of commercially important marine aquaculture species. AUSL continues to have a role in the course by providing guest lectures. AUSL graduate student Susan Fogelson provided a lecture and lab activities related to oyster culture as well as serving as teaching assistant for the course. AUSL also provided lecture materials relating to Bullminnow Aquaculture.

## Facility Tours and Lectures

In 2006, AUSL provided tours to several groups and allowed use of conference room facilities for various meetings.

- As part of their Marine Application of Science and Technology Workshop, DISL brought nine individuals to AUSL for a tour of the facility on June 6<sup>rd</sup>.
- Ten students from the DISL Research Experience for Undergraduates program visited AUSL for a presentation on oyster hatchery production and a tour of the facility on June 15<sup>th</sup>.
- As part of their Marine Application of Science and Technology Workshop, DISL brought twenty-three individuals to AUSL for a tour of the facility on June 20<sup>th</sup>.
- As part of the MBNEP program review, seven individuals with the EPA toured the hatchery and discussed the cooperative role AUSL plays in the MBNEP Oyster Gardening Program.

- Eight undergraduate students from the Auburn University Department of Fisheries and Allied Aquaculture came to AUSL for a tour and lecture on July 26<sup>th</sup> as part of Dr. Jeff Terhune's Introduction to Fisheries Science course.
- On August 7<sup>th</sup>, Kara Lankford with the MBNEP brought five individual from Florida for a hatchery tour and a discussion of potential oyster gardening projects and restoration projects in the panhandle of Florida. Sam Wilson is with the City of Fort Walton, Sarah Kalinoski and Joy Brown are with the Choctawahatchee Basin Alliance, and Heather Reed and Traci Bruce are with the Florida Department of Environmental Protection.
- The marine biology teacher at Alma Bryant High School, Lynn Stewart and four students came to AUSL on October 6th to discuss a project for the students to work on as part of the Second National Student Summit on Oceans and Coasts sponsored by Costal America. The students chose Oyster Gardening as the subject of their project. Kara Lankford with the MBNEP and Hazel Wilson with the DISL Discovery Hall Program, who acted as an advisor to the students, were also present.

## A glimpse at 2007

In 2007, F<sub>2</sub> generation oysters from the hypoxia tolerance project will be tested again and the program evaluated for further selection work. The project initiated in 2005 assessing "Dermo" disease will continue through 2007. Field sampling for the "Dermo" project is due to end in August of 2007. The field work for the project investigating the feasibility of clam culture is slated to start in the summer of 2007. A new project will be initiated to further develop and analyze a depuration system for elimination of *Vibrio vulnificus* bacteria in oysters. Early in the year, graduate students will be making several presentations at local and national meetings on the results from much of the ongoing research at AUSL.

AUSL will continue to support the MBNEP Oyster Gardening Project. Volunteer numbers are anticipated to increase as more people rebuild docks and piers destroyed in the hurricanes Ivan and Katrina. The demand for oysters from outside needs shows no sign of letting up. AUSL will attempt to meet all the needs for oysters from other researchers, agencies and individuals interested in oyster aquaculture.

As in past years, AUSL will support the summer academic program at DISL by providing guest lectures and facilities. AUSL will continue to provide tours and lectures to various groups visiting the Lab including our yearly commitment to the Discovery Hall program and the REU program at DISL.

There seems to be no end to the growth potential for AUSL as long as we continue to endeavor to achieve.

## Acknowledgements

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