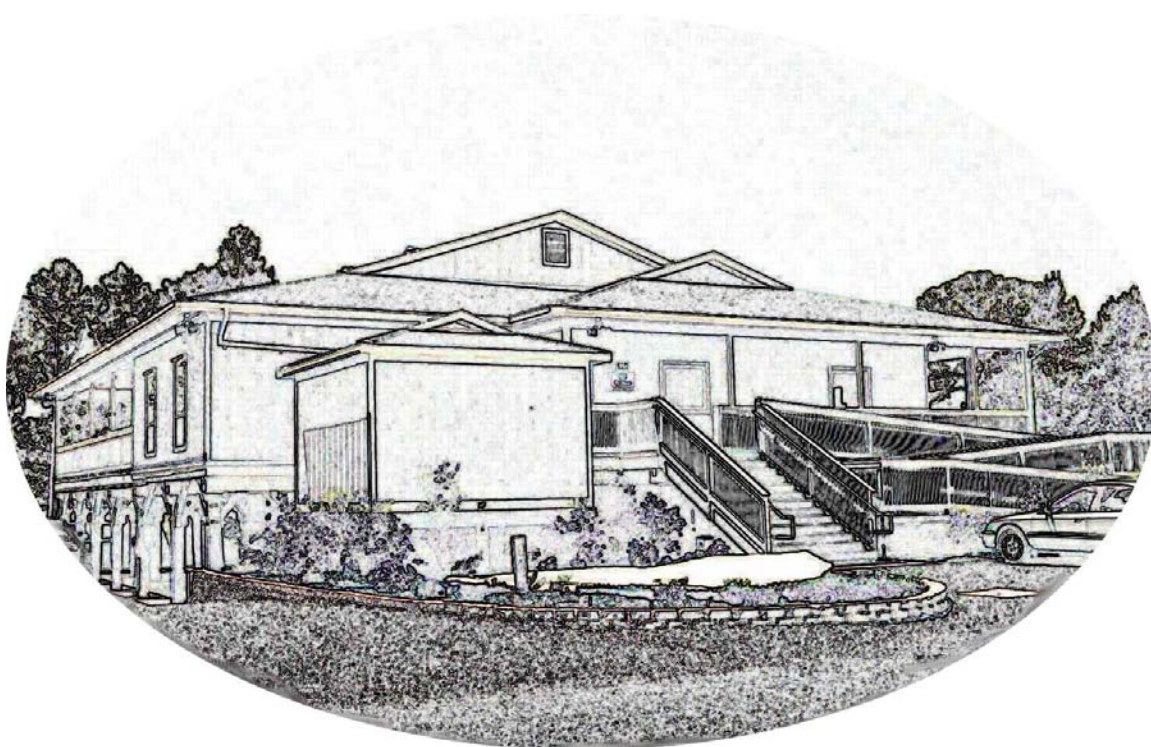


Annual Report 2003

New Beginnings



Introduction

The Auburn University Shellfish Lab (AUSL) located on Dauphin Island, officially opened its doors on Friday, April 11, 2003. The laboratory is a unit of the Auburn University College of Agriculture's Department of Fisheries and Allied Aquaculture and is located on land leased from the Dauphin Island Sea Lab.

AUSL was established with industry input to conduct practical research, in the spirit of the Land Grant College that will foster high quality shellfish production and protect shellfish resources in the Gulf of Mexico. The AUSL mission is to provide instruction, research and outreach services in the area of shellfish production to the citizens of Alabama, the region and the nation. The mission is met by providing formal instruction at the Dauphin Island Sea Lab, by providing research opportunities to faculty and students and through an outreach program conducted by the Auburn University Marine Extension and Research Center. Close cooperation with the Alabama Department of Conservation and Natural Resources, Marine Resources Division, the Dauphin Island Sea Lab, the Mississippi-Alabama Seagrass consortium and a host of other organizations contributes to meeting mission goals.

The facility includes 3452-square-feet of office and laboratory space and 4151-square-feet of hatchery space under the building. Incorporated into the office and laboratory space are a microbiology laboratory, water quality laboratory, self-contained algae laboratory, large conference room, student offices, and visiting scientist offices. The hatchery features experimental and production tanks ranging in size from 30 gallons to 250 gallons with larger tanks slated to be included at a later date. Seawater is supplied to the hatchery by two pipelines that extend into the Gulf of Mexico.

Installing the infrastructure of the hatchery was the major goal of AUSL operations up to the official opening of the facility. Production of oyster larvae and juveniles and

experimental research use of AUSL began soon after the official opening. Throughout the year several tour groups visited AUSL and several courses were taught at the facility. In the first official year of operation, AUSL has vigorously strived to meet its mission objectives.

Projects

AUSL supported or was the base of operation for several projects and graduate students throughout 2003. AUSL played a major support role in the MBNEP's Oyster Gardening Project. The project consists of volunteers around Mobile Bay raising oysters on their waterfront property for restoration of oyster reefs. AUSL's role in the project was to provide the spat or juvenile oysters for the volunteers to rear. As mentioned earlier, AUSL set approximately 3 million eyed larvae on 60 bags of whole oyster shell for the project. As a supplement to the hatchery set oysters, 60 bags of shell were placed on a productive reef in the bay to catch a natural set of oysters. After spat set, bags were returned to AUSL where they were culled and held in flow-through tanks until delivered to volunteers to growout (Fig1). After the volunteers grew the oysters for 5 months, the oysters were



Figure 1. Kim Hamilton, MBNEP oyster gardening coordinator, with volunteer oyster gardener



Figure 2. Restoring oysters grown by oyster gardening volunteers to reefs.

collected by MBNEP personnel and placed in flow-through tanks awaiting restoration to reefs in the bay. On November 12, 2003, MBNEP, AUMERC and AUSL personnel restored approximately 74,000 oysters to Whitehouse Reef in Mobile Bay (Fig 2).

Graduate student, Stuart Goong, conducted a study on the effects of sublethal mercury exposure on growth and reproduction of oysters. Oysters were exposed to several mercury concentrations for three weeks at the Gulf Coast Research Lab in Ocean Springs, Mississippi and then overwintered on campus at Auburn. In the spring of 2003, the oysters were brought to AUSL for spawning and evaluation of larval quality and growth.

Another graduate student, Melanie Rhodes, has been working on a project investigating potential first foods for red snapper larvae at the Claude Petet Mariculture Center in Gulf Shores, Alabama. Melanie came to AUSL in the fall of 2003 to investigate different culturing techniques for 2 ciliated protozoa that could be used for first foods for snapper larvae. The goal was to vary environmental conditions and food requirements to find optimum culture conditions to scale up to mass cultures of the protozoans.

AUSL granted wet lab space in the fall of 2003 to University of South Alabama graduate student Matt Johnson. Matt is conducting research on how changes in patch size and shape influence community structure of macrofaunal organisms in seagrass beds. At AUSL, Matt manipulated patch size and shape with artificial grass units in 250-gallon tanks. He used these mesocosms to examine the effect on multiple predator-prey combinations to delineate between the consequences of shifts in patch size/shape and the threat of predation in these systems. The tertiary predator used in these experiments was juvenile red drum, while pinfish act as both a predator to lower trophic levels and a prey item to the red drum. Grass shrimp and amphipods were prey items for both higher order trophic levels.

The Aquaculture Network Information Center (AquaNIC) website is coordinated and maintained at AUSL. AquaNIC is a gateway to the world's electronic aquaculture resources.

AquaNIC is coordinated by the Mississippi-Alabama Sea Grant Consortium and is hosted by Purdue University and the University of Illinois through the Illinois- Indiana Sea Grant Program. AquaNIC is a member of the National Sea Grant College Program's Network of Aquaculture Information Services along with the DOC/NOAA Aquaculture Information Center, National Sea Grant Library, Delaware Aquaculture Resource Center, and the Maryland Sea Grant Program.

Production

Production of oyster larvae at AUSL began in June 2003. Our initial spawning of oysters produced 432 million fertilized eggs. These eggs were used to stock each of the 250-gallon larval rearing tanks with 7.2 million eggs. This spawn produced a total of 7 million eyed-larvae.

Three million eyed-larvae were remote set on whole oyster shell. The resulting spat was given to the Mobile Bay National Estuary Program (MBNEP) for their volunteer oyster gardening program. Approximately 2 million eyed-larvae were set in upwellers on micro-cultch (finely ground oyster shell) to produce single oysters (Fig. 3) and spat were reared in the hatchery for several months. Twenty thousand of these were given to an individual interested in trying a new oyster aquaculture system, the Australian longline system (ALS), on the west end of Dauphin Island. Another 50,000 were planted in Little Dauphin Bay in conjunction with Alabama



Figure 3. Single hatchery produced oysters.

Department of Conservation, Marine Resources Division on December 9th. We are currently holding another 100,000 oysters on racks in Bon Secour Bay for the University of South Alabama. On these same racks we are holding an additional 5000 oysters for future broodstock.

Facilities

Extending back into 2002 and continuing into 2003 staff from AUSL and the Auburn Marine Extension and Research Center (AUMERC) mounted a monumental effort to install the saltwater intake, delivery, and discharge systems. The saltwater systems were designed and engineered by All Plastics and Fiberglass, Inc. and were installed by AUSL and AUMERC staff (Fig 4).

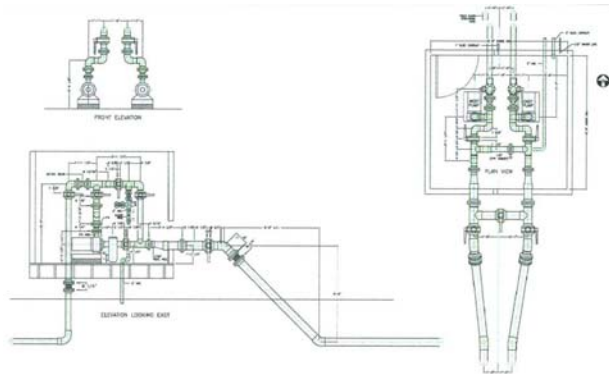


Figure 4: Engineered drawing of intake system.

A 7.5 HP intake-pump was employed to bring water to the hatchery at a rate of 250 gpm. Incoming water can be delivered straight to the hatchery or can be diverted to two 6100-gallon storage tanks. The overhead piping system is designed to deliver water directly from the Gulf or from the storage tanks to any locale in the wet lab. An air delivery system is also incorporated into the overhead piping.

Water leaving the facility exits through in-floor drains (Fig. 5). The discharge water is then caught in a 12,000-gallon in-ground sump constructed by AUSL and AUMERC personnel (Fig. 6). A 10HP pump discharges the water from the sump through a piping system to the North side of Dauphin Island (Fig. 7).



Figure 5: In-floor drains.



Figure 6: Discharge sump.



Figure 7: Discharge pumps.

AUSL and AUMERC personnel installed several tank systems in the hatchery. Nine 250-gallon round conical bottom tanks serve as larval rearing and remote setting tanks (Fig 8). The installation of another set of 27 30-gallon tanks provides smaller experimental units for larval rearing and setting (Fig 9). Ten 250-gallon rectangular tanks were set up with upwellers for setting larvae to produce single oysters (Fig 10). Ninety upwellers were constructed with various mesh sizes for use in the setting tanks.



Figure 8: Larval rearing and remote setting tanks.



Figure 9: Experimental 30-gallon tanks.



Figure 10: Setting tanks with upwellers.

The pipelines that supply saltwater to the facility were originally installed by a contractor with little experience in this type of work. The pipes were not weighted properly at that time. In the fall of 2003, AUSL and AUMERC personnel took on the daunting task of



Figure 11: Example of pipeline weighted with railroad rail.

uncovering the pipelines with a suction dredge. The pipes were then appropriately weighted with 8-ft sections of railroad rail, each weighing 450 lbs. (Fig 8). The pipelines were reburied once the rails were strapped to the pipes.

Instruction

AUSL in cooperation with the MBNEP and AUMERC, conducted an Oyster Gardening Workshop for volunteers in the Oyster Gardening Program. The workshop provided an overview of the project and educated volunteers about why oysters are important to the ecosystem and why oyster restoration is important for Mobile Bay. Topics covered an overview of oyster gardening, oyster biology and the role of oysters in Mobile Bay, oyster aquaculture, fecal coliforms and importance of septic system maintenance, oyster growout cage maintenance and record keeping and how to build your own growout cage. Included were a tour of the AUSL facility and a discussion of how the hatchery produces oyster spat.

Two courses were taught at the facility through the DISL summer school program. Dr. Yolanda Brady taught a course on Marine Fish Diseases. Students were introduced to aquatic animal diseases, specifically finfish and shellfish. They learned practical microbiological techniques for isolation and identification of diseases.

The second course, Marine Aquaculture, was taught by 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. As part of the course students aided AUSL staff in constructing a soft-shell crab shedding system.

Facility Tours and Lectures

During the year we had several diverse groups visit AUSL. John Olive with the Ornamental Horticulture Research Center brought in a group of 54 Research Center administrators from all over the country to tour the AUSL on February 4th. Dr. Len Lovshin brought 6 undergraduate students to the lab on July 23rd as part of his Introduction to Fisheries course. On July 29th, DISL's Discovery Hall program brought over 21 high school students to tour the lab and discuss possible careers in marine science, fisheries, and aquaculture. ALFA brought over approximately 100 people. On October 15th six students from DISL's Research Experience for Undergraduates Program came to AUSL for a presentation on the how an oyster hatchery works and were then given a tour of the facility.

Media

Darwin Singleton with WPMI-NBC 15 did a live news segment from AUSL on Aug 20th. The focus of the news segment was on oyster gardening and the role of the AUSL hatchery in the project. The hatchery production of seed for the oyster gardening project was featured in the morning segment. Taped segments aired on various newscasts throughout the day.

After the opening on April 11, several newspaper articles appeared describing AUSL facility and discussing the AUSL mission. A list of articles is as follows:

"Lab dedication set at Dauphin Island" Mobile Register, Mobile, AL, April 7, 2003

"Dedication set for new shellfish lab" The Bulletin, Daphne, AL, April 9, 2003

"Dedication set for new shellfish lab" The Islander, Gulf Shores, AL, April 9, 2003

"Dedication set for new shellfish lab" Fairhope Courier, Fairhope, AL, April 9, 2003

"Dedication set for new shellfish lab" Foley Onlooker, Foley, AL, April 9, 2003

"Dedication set for new shellfish lab" The Ledger, Elberta/Lillian, AL, April 10, 2003

"Dedication set for new shellfish lab" Baldwin Times, Bay Minette, AL, April 10, 2003

"Dedication set for new shellfish lab" The Independent, Robertsdale, AL, April 10, 2003

"Auburn Shellfish Lab off to sound start" Mobile Register, Mobile, AL, December 11, 2003

A glimpse at 2004

The 2004 year looks to be even busier than 2003. Duplicate pumping systems will be installed for backups, to allow alternation of pipelines and increased volume if necessary. This will also allow us to back-flush our pipelines. We will also update our oyster setting system based on experience from the 2003 season. The crab shedding system developed with the aid of the marine aquaculture class will be put into service this spring also.

One of the major research projects for the upcoming season is the development of a low oxygen tolerant oyster. Adult oysters will be challenged with anoxic conditions for a period of time. Survivors will be spawned and the resulting juveniles tested for low oxygen tolerance.

We will again be producing oysters for the oyster gardening project. We also anticipate producing oysters and larvae for a variety of projects for researchers with DISL and the University of South Alabama. We will also be producing new families of oysters for future broodstock as well as maintaining broodstock from last year's production.

Summer school courses will be taught in conjunction with DISL. Once again, Marine Fish Diseases and Marine Aquaculture will both be offered. We anticipate also holding another oyster gardening workshop at the facility in late spring or early summer.

In the coming year we again expect to give tours of the AUSL facility for Auburn University Landscape Architecture students conducting a course at DISL, the Discovery Hall program, and the REU program. The biggest tour expected this year will be in June when Auburn host the National Agriculture Alumni Conference in Mobile. This group will visit AUSL

as part of a conference-related tour. We are looking forward to a year full of advances in our capabilities, production techniques and research applications.