



Mississippi-Alabama
Sea Grant College Program

2004 - 2005 Annual Progress Report

For the Period
February 1, 2004 - January 31, 2005

MASGP-05-043

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U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Sea Grant College Program
Silver Spring, MD 20910

2004-2005 Mississippi-Alabama Sea Grant Annual Report

Science Serving Coastal Mississippi and Alabama

Introduction

Founded in 1972, the Mississippi-Alabama Sea Grant Consortium (MASGC) is an organization of nine universities and laboratories supporting scientific research, education, and outreach programs that foster the conservation and sustainable development of coastal and marine resources in Alabama and Mississippi. Coordinated by a central administrative unit in Ocean Springs, Mississippi, the Consortium members include Auburn University, Dauphin Island Sea Lab, Jackson State University, Mississippi State University, The University of Alabama, The University of Alabama at Birmingham, The University of Mississippi, The University of Southern Mississippi, and the University of South Alabama. The Consortium has an extension program with offices in Biloxi, Mississippi and Mobile, Alabama and a legal program located at The University of Mississippi in Oxford, Mississippi.

This report documents progress on the first year of the 2004–2005 Omnibus program under NOAA Grant #NA16RG2258 which began February 1, 2004, and ended on January 31, 2005. Also included are the accomplishments from 2001–2003 Omnibus projects which had received extensions and have now closed.

Objectives of the MASGC program include working with organizations interested in the sustainability of coastal resources, promoting strategic assets of the program and its quality pool of investigators, and integrating programmatic efforts with those of research and education institutions to produce greater benefits for the coastal communities being served. The key to achieving results is in our approach of effective partnering, efficient management of program resources, and making prudent investments in program development.

Program development funds are used to initiate single and multi-institutional projects with the intention of seeding efforts resulting in larger proposals for submission to other federal, state, local, industry, or non-traditional Sea Grant sponsors. Funds are also used to address pressing issues of common interest in the coastal zones of Alabama, Mississippi, and the northern Gulf of Mexico by sponsoring workshops and symposia that bring experts together to formulate solutions.

The MASGC 2004–2005 Omnibus program began February 1, 2004. Included in this omnibus are sixteen projects: two in Seafood Production, four in Coastal Ecosystem Health, and eight Education and Human Resources projects, as well as the Program Administration and Program Development projects.

Programmatic Accomplishments and Impacts

MASGC is committed to interdisciplinary environmental scholarship, applied environmental research, and community-based natural resources management. MASGC supports applied, interdisciplinary marine science research and extension efforts using both targeted and cross-cutting approaches that foster the sustainable development and management of the Alabama and Mississippi coastal regions and Economic Exclusive Zone (EEZ). The National Sea Grant Program has three broad priority areas. The MASGC has five strategic areas that fall under these categories. These strategic areas include: Health and Restoration

of Coastal Habitats, Coastal Community Resource Management and Development, Seafood Safety and Processing Technology, Fisheries Ecology and Aquaculture, and Marine Education.

Funding

During program year 2004–2005, MASGC received \$1,202,000 from the National Sea Grant Office core allocation with \$710,130 in matching funds. An additional \$100,000 was added for year three funding of the National Sea Grant Law Center, \$125,000 added for the Regional Center for Ocean Sciences Education Excellence (COSEE) - Central Gulf of Mexico, and \$5,000 added for the EPA Smart Growth Extension Partnership. MASGC also sponsored seven projects through program development funds totaling \$98,970. (Appendix A).

Publications

This reporting period covers the completion of projects from the 2001–2003 Omnibus and year one of projects from the 2004–2005 Omnibus. During the current reporting period, MASGC sponsored research that led to 16 manuscripts, 9 abstracts, and 12 presentations. Education, Extension, Legal Program, and Communications production included 9 manuscripts, 7 abstracts, 12 presentations, 9 Legal Reporters, 21 newsletters, and 4 outreach publications.

Student Support

MASGC-sponsored research provides more than support for scientific discovery. Each research project also supports America's next generation of scientists who appreciate the importance of coastal issues and the role Sea Grant has in "Science Serving America's Coasts." During the first year of this Omnibus, MASGC sponsored research has led to the training of 6 Ph.D., 5 M.S., and 5 J.D. candidates, as well as 2 undergraduate students, 4 high school students, and 2 high school teachers.

Exemplary Impacts

Health and Restoration of Coastal Habitats

1. Developed effective stabilization techniques for beach edges through plantings and establishment of emergent vegetation.
Impact: Significant reductions in costs associated with beach restoration due to destructive erosion activities. (PM 1)
2. Criteria for the restoration of seagrass beds in the Gulf were developed.
Impact: Rigorous scientific criteria are now being used in the evaluation of an application that includes a mitigation plan to restore seagrass to areas not impacted by the dredging off Pensacola, Florida. (PM 3)
3. Oyster reefs provide important economic and ecological services. An oyster gardening program, conducted in partnership with the Mobile Bay National Estuary Program, trained volunteers and planted oysters on currently unproductive reefs.
Impact: Sixty-two volunteers became more familiar with oyster biology and management and 26,000 oysters were planted on degraded reefs. (PM 3)

4. A citizen-driven watershed management plan for the Bon Secour River was developed.
Impact: Property owners and local officials have increased their understanding of the watershed concept and participated in developing goals and action items to protect water quality in their watershed. (PM 3)
5. Sea Grant partnered with the Mississippi Department of Marine Resources to restore oyster reefs in the Back Bay of Biloxi and the Bay of Saint Louis.
Impact: Eight acres of oyster and fishing reefs were restored and led to improved habitat for the recreational fishing industry. (PM 1)

Coastal Community Resource Management and Development

6. The First Annual BirdFest to increase awareness of bird conservation was held in Alabama.
Impact: Increase in awareness, especially the conservative aspect, is a benefit by stimulating the growth of ecotourism. The Festival generated more than \$42,000 for acquiring essential bird habitat. (PM 1)
7. Shrimp fishermen suffered economic losses in recent years due to unfairly priced imports. Extension specialists successfully assisted industry in applying for Trade Adjustment Assistance and conducted required training for qualified shrimpers.
Impact: A total of 322 shrimp fishermen in Mississippi and Alabama received training in improving product quality and became eligible for direct financial assistance from the Farm Service Agency. The total amount of assistance received was approximately \$966,000. (PM 1)
8. Clean Marina Program begun in Mississippi-Alabama.
Impact: Decreasing stormwater pollution and maintaining water quality through recognition and publicizing marina best management practices. Four marinas were designated “Clean Marinas” and more are pledged to participate—each helping to educate the boating public. (PM 1 and 3)
9. In conjunction with the Coastal Alabama Clean Water Partnership, innovative waste management techniques on a locally-owned dairy farm within the watershed of the public drinking water supply for Mobile, Alabama were showcased in two field days.
Impact: Local landowners, regulators, planners, and water officials increased knowledge of innovative waste management control practices to protect water quality. (PM 3)
10. Rip current education in coastal counties was conducted through meetings with public officials, safety workers and hotel/condominium administrators and supported by the distribution of 34 metal signs, 9,000 brochures and refrigerator magnets with rip current information.
Impact: Increased rip current awareness and safety among tourists, general public, public officials, safety workers, and hotel/condominium administrations. (PM 3)
11. Sea Grant co-sponsored “Smart Growth for Coastal Alabama” conference in response to ongoing concerns about rapidly increasing development in coastal counties.
Impact: Over 300 realtors, developers, municipal officials, and other interested stakeholders were exposed to Smart Growth principles by leading national experts. (PM 3)
12. Sea Grant partnered with other agencies to develop a Healthy Coastal Communities Initiative (HCCI) with a focus on Smart Growth. A need to have a better informed public and to query citizens regarding Smart Growth issues was identified.
Impact: A listserv was set up through the Dauphin Island Sea Lab. The *Mobile Register* worked with HCCI to formulate polling questions through the University of South Alabama who conducted a telephone poll of over 600 citizens in the region. The results were published in the *Register* in November 2004. (PM 3)
13. Sea Grant supported the development of the Mississippi Coastal Birding Trail.
Impact: Exposure of thousands of people to birds and wildlife in their communities and concepts related to the conservation of birds, other wildlife, and the habitats that support them. (PM 3)

14. Sea Grant supported the development of the Scruggs Center for Compatible Development.
Impact: A permanent demonstration site has been established to promote on-site stormwater management and environmentally-friendly landscaping. (PM 3)

Seafood Safety and Processing Technology

15. Since 2001, increased media coverage of reported high levels of methylmercury in seafood has affected sales and consumption of seafood. A mercury forum was held in 2002 in Mobile, Alabama. As a result of the scientific meeting, Alabama Senator Jeff Sessions requested the President's National Science and Technology Council to create the Interagency Working Group on Methylmercury.
Impact: The Interagency working Group on Methylmercury released the report on Methylmercury in the Gulf of Mexico: State of Knowledge and Research Needs in June 2004. (PM 3)
16. X-ray treatment of oysters was as effective as gamma ray irradiation and increased shelf life for at least two weeks. X-ray irradiated oysters could not be distinguished from non-irradiated oysters by consumers.
Impact: Allows maintenance of larger inventory to meet consumer demand. (PM 1 and PM 3)
17. A specific phage-displayed peptide bound to a surface protein has been found to detect pathogenic vibrios.
Impact: Potential means for rapid detection of pathogenic vibrios in oyster tissue. (PM 1 and PM 3)

Fisheries Ecology and Aquaculture

18. Proportional differences in trace element and isotope chemistry of otoliths of sea trout exist.
Impact: Potential tool as a component in the identification of Essential Fish Habitat (locale of young juvenile growth). (PM 3)
19. Identification of qualitative and quantitative dietary protein requirements of red snapper.
Impact: Critical information for future programs devoted to stock enhancement or commercial culture technology of red snapper. (PM 3)
20. Insufficient potassium and magnesium have been identified as factors that have limited growth and reduced survival in inland culture of marine shrimp.
Impact: Successful culture protocol based upon modification of essential mineral composition of inland saline water improved survival and growth of marine shrimp in the nursery and growout phase. (PM 1 and PM 3)
21. Eight mini-grants were awarded to schools in Mississippi and Alabama to develop aquaculture facilities.
Impact: Students from 11 schools in Mississippi and Alabama now have aquaculture programs and ongoing support for hands-on science and math education opportunities. (PM 3)
22. At the request of the Gulf of Mexico Fishery Management Council, Sea Grant Extension Program personnel served on the Ad Hoc Aquaculture Advisory Panel to review and edit the Draft Options Paper for the Offshore Aquaculture Amendment.
Impact: A science-based regulatory structure will provide a basis for permitting offshore aquaculture in the Gulf of Mexico. (PM 3)
23. Partnered with state agencies from Mississippi and Alabama for a rapid assessment of Aquatic Nuisance Species in Mississippi coastal waters.
Impact: A baseline of species composition for plants and animals dwelling in Mississippi coastal waters, with special note of invasive species present was established and publicity from the project increased awareness of aquatic nuisance species issues. (PM 3)

24. Sponsored the internationally recognized Aquaculture Network Information Center (AquaNIC) web site (<http://aquanic.org>).
Impact: Provided a gateway to aquaculture resources to more than four million people. (PM 3)
25. Provided nine MASGC-sponsored professional development programs on aquatic nuisance species for formal and nonformal educators and included nuisance species concepts during six additional teacher workshops and an Elderhostel group (588 participants).
Impact: Utilized the train-the-trainer effort to enhance content knowledge of the teachers, their students, and the general public on the impact invasive species has on aquatic communities, habitats, and the economy. (PM 3)

Education and Legal

26. Presentations at the 2004 National Science Teachers Association Conference (*Chitin/Chitosan: Refuse Revisited*) (143 attendees) and National Marine Educators Association Conference (*Get the Fat Out and Marine Derived Polymer: Alginate*), Mississippi Academy of Sciences Conference (*Biotechnology in the Classroom*) and a teacher's workshop (*Marine Biotechnology: the Wave of the Future*) were implemented for formal and nonformal educators. One published abstract produced.
Impact: Leveraged a network of educators and scientists from multiple institutions infusing marine biotechnology content and concepts through formal and nonformal educational strategies. (PM 3)
27. Presentations and demonstrations using inquiry-based lesson plans on polymers, medicines, and products from the sea to Project Marine Discovery Program Series' students (Sea Camp, Mini Camps, Academic Year and On The Road).
Impact: Infused biotechnology into the curriculum of more than 11,467 K-12 students from more than 30 states. (PM 3)
28. Developed and distributed three lesson plans related to biotechnology (*Get the Fat Out, Marine Derived Polymer: Chitosan, Marine Derived Polymer: Alginate*) at National Science Teachers Association, Mississippi Science Teachers Association, Mississippi Academy of Sciences, National Marine Educators Association, and the Southern Association of Marine Educators conferences during workshops and share-a-thons.
Impact: Provided teachers across the country a means to infuse hands-on curricular materials on marine biotechnology into their classrooms. (PM 3)
29. Provided more than 11,467 students (K-12) lectures, demonstrations, and/or hands-on presentations which included biotechnology concepts and learning objectives.
Impact: Infused marine biotechnology into the curriculum of students from more than 30 states. (PM 3)
30. Distributed through the J.L. Scott Marine Education Center and Aquarium and the National Marine Educators Association more than 395,880 booklets of *Understanding Invasive Aquatic Weeds: Homework and Classroom Activities* throughout the United States.
Impact: Infused into the curriculum of middle schools across the country learning objectives and scientific concepts related to aquatic nuisance species. (PM 3)
31. Provided 435 educators (K-12) professional development workshop opportunities and exposed an additional 1,775 teachers and chaperones to nonformal programs.
Impact: Utilized the train-the-trainer efforts to enhance content knowledge of teachers and their students to multiple marine and ocean sciences concepts in two states. (PM 3)
32. Provided more than 33,638 students with hands-on inquiry based-lessons and field experiences.
Impact: Infused multiple ocean sciences and environmental learning objectives into the curriculum of 610 schools of Alabama, Mississippi, and 28 additional states. (PM 3)

33. Provided nonformal educational experiences to more than 33,043 participants of 15 boat shows and/or festivals along the Alabama and Mississippi coasts.
Impact: Improved the basic knowledge and ocean sciences' literacy of the general public. (PM 3)
34. Provided more than 158,368 general admission individuals, Elderhostel, and other special interest groups nonformal educational experiences through static and dynamic exhibitry at the Estuarium (AL) and Scott Aquarium (MS).
Impact: Exposed and informed the general public to current research and technology in the ocean sciences. (PM 3)
35. Produced a 400 page document of lesson plans, background information and project ideas on coastal wildlife and a CD, *Endangered Species of Mobile and Baldwin Counties*.
Impact: Provided formal and nonformal educators curricular materials containing regional information. (PM 3)
36. Filled 24 requests for legal information from Sea Grant extension agents and their constituents.
Impact: Increased knowledge of Sea Grant extension agents regarding a number of important legal issues associated with shellfish farming, lobbying and 501(c)(3) organizations, and rip currents. (PM 3)
37. Published four issues of the Mississippi-Alabama Sea Grant Legal Program's newsletter, *Water Log*.
Impact: Over 632 subscribers were provided with updates of marine related legal issues in Alabama and Mississippi. (PM 3)
38. Published four issues of the National Sea Grant Law Center's newsletter, *The SandBar*.
Impact: Over 1,250 subscribers were provided updates of ocean and coastal law cases from around the nation. (PM 3)
39. Published two issues of the on-line National Sea Grant Law Center's *Law and Policy Digest*.
Impact: Over 705 visitors were provided summaries of recently published law and policy articles. (PM 3)
40. Distributed via e-mail two *Ocean and Coastal Case Alerts*.
Impact: In the first two months, 88 people subscribed and were provided with timely summaries of ocean and coastal cases from around the nation. (PM 3)
41. The National Sea Grant Law Center published five fact sheets in electronic format - *EPA Promulgates Final Effluent Wastewater Guidelines for Concentrated Aquatic Animal Production (CAAP) Facilities; EPA Promulgates Final Water Quality Criteria for Bacteria in Coastal Recreation Waters; California Enacts New Laws to Regulate Cruise Ship Pollution; The Oceans and Human Health Act of 2004; and Maine Cruise Ship Legislation Fact Sheet*.
Impact: Increased knowledge among the 30 Sea Grant programs and their constituents regarding recent marine-related legislative developments on the federal and state level. (PM 3)
42. Published in-house report - *The Shared Coast: Application of the Ocean Commission Recommendations in Mississippi and Alabama*.
Impact: Increased knowledge of the Ocean Commission's recommendations for the states among officials in Mississippi and Alabama state agencies. (PM 3)
43. Published one law review article - *The United States and Rising Shrimp Imports from Asia and Central America: An Economic or Environmental Issue?*
Impact: Increased knowledge among legal professionals of the economic and environmental law issues associated with increased shrimp imports. (PM 3)
44. Published one journal article - *The Legal Status of Autonomous Underwater Vehicles*.
Impact: Increased knowledge of the law affecting the operation of autonomous underwater vehicles among marine scientists, engineers, vessel operators, and marine law attorneys. (PM 3)

2001–2003 Omnibus Projects

1. **L-1 - Mississippi-Alabama Sea Grant Legal Program.** Stephanie Showalter, J.D., M.S.E.L. and Richard McLaughlin, J.S.D. The University of Mississippi.
2. **R/AT-2 - Design and Synthesis of New Anticancer and Antitubercular Agents Based on Marine Natural Product, Puupehenone.** Jordan K. Zjawiony, Ph.D. and Mark T. Hamann, Ph.D., The University of Mississippi.
3. **R/CEH-2 - Detection and Action of Endocrine Disrupting Chemicals in Estuarine Ecosystems.** Marius Brouwer, Ph.D., The University of Southern Mississippi.
4. **R/SP-2 - Nutritional Strategies for the Maturation and Rearing of Red Snapper.** D. Allen Davis, Ph.D. and Ronald P. Phelps, Ph.D., Auburn University.
5. **R/SP-3 - Development of Techniques for Inland Saltwater Shrimp Farming.** D. Allen Davis, Ph.D., David B. Rouse, Ph.D., and Claude E. Boyd, Ph.D., Auburn University.
6. **R/CCD-3-PD - Planning & Implementing Educational Conferences and Workshops on Smart Coastal Growth and Its Potential Impact.** Wendy Allen and Charlene Lee, InterLink, LLC.
7. **R/CCD-4-PD - Promoting the Great Backyard Bird Count & Mississippi Coastal Birding & Trail Map.** Bruce Reid, Audubon Mississippi and Mark W. LaSalle, Ph.D., Mississippi State University.
8. **R/CCD-5-PD - The First Alabama Coastal BirdFest.** John Borom, Ph.D., Faulkner State Community College.
9. **R/CCD-6-PD - Promoting On-Site Stormwater Management and Environmentally-Friendly Landscaping.** Linda Holden, City of Moss Point, Mississippi, and Mark W. LaSalle, Ph.D., Mississippi State University.

Appendix A

Projects Funded

2004–2005 Omnibus Projects

Project #	Federal Funds	Project Information
R/SP-8	\$ 50,203	<i>Rapid and Quantitative Detection of Vibrio vulnificus and V. parahaemolyticus in Shellfish Using Species-specific Phage-displayed Peptide Ligands and Real-time PCR.</i> Asim K. Bej, Ph.D., The University of Alabama at Birmingham.
R/SP-9	\$ 64,787	<i>Assessment of the Sea Urchin, Tripneustes ventricosus, as a Candidate for Aquaculture in the Gulf of Mexico Region.</i> Stephen A. Watts, Ph.D., The University of Alabama at Birmingham.
R/CEH-13	\$ 70,312	<i>A New Paradigm: The Trophic Importance of Sediment Microalgae in Seagrass Beds.</i> Michael J. Sullivan, Ph.D., Mississippi State University.
R/CEH-14	\$ 69,466	<i>Use of Otolith Microchemistry of Spotted Seatrout to Identify Stock Source-areas, Reveal Population Movements, and Determine Interannual Variability in Regional Patterns of Otolith Signatures in Mississippi Coastal Waters.</i> Bruce H. Comyns, Ph.D., Chet Rakocinski, Ph.D., Mark S. Peterson, Ph.D., and Alan Shiller, Ph.D. The University of Southern Mississippi.
R/CEH-15	\$ 61,110	<i>Effects of Anthropogenic Eutrophication on the Ecosystem Services Provided by Shoalgrass (Halodule wrightii) Meadows: Research and Education.</i> Just Cebrian, Ph.D., Dauphin Island Sea Lab.
R/CEH-16	\$ 64,989	<i>A Molecular Genetic Assay for Identifying and Quantifying a Cryptic Marine Bioinvader.</i> William M. Graham, Ph.D., Dauphin Island Sea Lab.
ED-12	\$ 98,196	<i>Educational Efforts at the Scott Aquarium, the Dauphin Island Sea Lab, and the Environmental Studies Center.</i> Sharon H. Walker, Ph.D., The University of Southern Mississippi; John J. Dindo, Ph.D., Dauphin Island Sea Lab, and David L. Scott, Mobile County Public School System.
EX-3	\$ 214,222	<i>Mississippi-Alabama Sea Grant Extension Program.</i> C. David Veal, Ph.D., Mississippi State University, and Richard K. Wallace, Ph.D., Auburn University.
L-1	\$ 100,000	<i>Mississippi-Alabama Sea Grant Legal Program.</i> Stephanie Showalter, J.D., M.S.E.L., Richard J. McLaughlin, J.S.D., and Josh Clemons, J.D., The University of Mississippi.

C-1	\$ 94,702	<i>Program Communications.</i> Timothy H. Reid, Mississippi-Alabama Sea Grant Consortium.
ED-10	\$ 125,000	<i>Center for Ocean Sciences Education Excellence (COSEE) - Central Gulf of Mexico.</i> Sharon H. Walker, Ph.D., The University of Southern Mississippi.
M/PA-1	\$ 217,476	<i>Program Administration.</i> D. LaDon Swann, Ph.D. and Louis R. D'Abramo, Ph.D., Mississippi-Alabama Sea Grant Consortium.
M/PD-1	\$ 96,537	<i>Program Development Funds,</i> D. LaDon Swann, Ph.D. and Louis R. D'Abramo, Ph.D., Mississippi-Alabama Sea Grant Consortium.

Activities Supported From Program Development Funds

Project #	Federal Funds	Project Information
ED-14-PD	\$ 10,000	<i>Enhancement of Marine Environmental Education Opportunities for K-12 Teachers and Students in Jackson, Mississippi.</i> Paulinus Chigbu, Ph.D., Jackson State University
R/AT-5-PD	\$ 10,000	<i>Hybrid Soft Coral Antimicrobial Resistance: Combinatorial Chemistry & Gene Expression.</i> Marc Slattery, Ph.D., The University of Mississippi (Funded from Grant NA86RG0039)
R/CCD-7-PD	\$ 10,000	<i>Alabama-Mississippi Clean Marina Program.</i> Timothy Reid, The University of Southern Mississippi
R/CEH-17-PD	\$ 10,000	<i>The Seaweeds from the North Central Gulf of Mexico (Alabama): Development of a Biodiversity Baseline, Establishment of Molecular Protocols, and a Web-Based Identification Guide.</i> Juan M. Lopez-Bautista, Ph.D., The University of Alabama
R/CEH-18-PD	\$ 10,000	<i>A Methodology for Establishing Emergent Vegetation Along the Manmade Beach in Mississippi.</i> Pete Melby, ASLA, Mississippi State University
R/CEH-19-PD	\$ 25,000	<i>Reproductive Behavior and Early Life History of Gray Triggerfish, Balistes capriscus, in the Northeast Gulf of Mexico.</i> Stephen T. Szedlmayer, Ph.D., Auburn University
R/CEH-20-PD	\$ 23,970	<i>Mercury in the Mobile-Tensaw Delta: Using Fish Otoliths to Explore Bioaccumulation Patterns.</i> Dennis R. DeVries, Ph.D., Auburn University

National Strategic Initiatives

Project #	Federal Funds	Project Information
<i>Gulf Oyster Industry Program</i>		
R/AT-4-GOIP	\$ 84,042	<i>Gulf of Mexico Oyster Industry Program: High Intensity X-Ray Irradiation Processing as a Means of Treating Shell Stock Oysters to Eliminate Vibrio Pathogens.</i> Linda S. Andrews, Ph.D., Benedict C. Posadas, Ph.D., and C. David Veal, Ph.D., Mississippi State University. (06/01/03 - 05/31/04). Project extended to 05/31/05.
<i>Aquatic Nuisance Species</i>		
R/CEH-9	\$140,438	<i>Assessing the Potential of Nuisance Jellyfish Predation on the Eggs and Larvae of Red Drum and Red Snapper in the Northern Gulf of Mexico.</i> William M. Graham, Ph.D., Dauphin Island Sea Lab and James H. Cowan, Jr., Ph.D., Louisiana State University. (10/01/01 - 09/30/03) Project extended to 09/30/04.
ED-9-NSI	\$150,809	<i>Sea Grant Aquatic Nuisance Species Research Program: Southeast Regional Strategic Outreach Network.</i> Sharon H. Walker, Ph.D., The University of Southern Mississippi; John J. Dindo, Ph.D., Dauphin Island Sea Lab; Michael Spranger, Ph.D., University of Florida; and William Hall, Ph.D., University of Delaware. (06/01/03 - 05/31/05). Year one extended to 11/30/04.
<i>Marine Environmental Biotechnology</i>		
ED-8-NSI	\$ 49,827	<i>Sea Grant Marine Environmental Biotechnology Program: Southeast Education Network.</i> Sharon H. Walker, Ph.D., The University of Southern Mississippi, and John J. Dindo, Ph.D., Dauphin Island Sea Lab. (06/01/03 - 05/31/05). Year one extended to 11/30/04.

Appendix B

Collaborators, Partners, and Affiliates

Universities

1. Auburn University, Auburn, Alabama
2. Dauphin Island Sea Lab, Dauphin Island, Alabama
3. Florida State University, Edward Ball Marine Laboratory at Turkey Bayou, Florida
4. Harbor Branch Oceanographic Institution, Ft. Pierce, Florida
5. Jackson State University, Jackson, Mississippi
6. Louisiana State University, Baton Rouge, Louisiana
7. Michigan State University, East Lansing, Michigan
8. Mississippi State University, Starkville, Mississippi
9. NOAA Ocean Service, Beaufort, North Carolina
10. Mobile County Public School System, Mobile, Alabama
11. Purdue University, West Lafayette, Indiana
12. Roger Williams School of Law, Bristol, Rhode Island
13. Texas A&M Shrimp Mariculture Facility, Port Aransas, Texas
14. The Croft Center for International Studies at The University of Mississippi, Oxford, Mississippi
15. The Dean Rusk Center at the University of Georgia, Athens, Georgia
16. The University of Alabama, Tuscaloosa, Alabama
17. The University of Alabama at Birmingham, Birmingham, Alabama
18. The University of Florida, Gainesville, Florida
19. The University of Mississippi, Oxford, Mississippi
20. The University of Southern Mississippi, Hattiesburg, Mississippi
21. University of California at Davis, Davis, California
22. University of South Alabama, Mobile, Alabama

State and Federal Agencies

1. Alabama Cooperative Extension System
2. Alabama Department of Conservation and Natural Resources, Marine Resource Division
3. Alabama Department of Environmental Management
4. Alabama Department of Natural Resources
5. Alabama Department of Transportation
6. Alabama Forestry Commission
7. Gulf Island National Seashore, National Park Service
8. Gulf States Marine Fisheries Commission
9. Louisiana Department of Wildlife and Fisheries
10. Mississippi Cooperative Extension Program
11. Mississippi Department of Marine Resources
12. Mississippi Department of Wildlife, Fisheries, & Parks
13. Mobile Bay National Estuary Program
14. NOAA Coastal Services Center
15. Ocean.US
16. U.S. Coast Guard Marine Safety Office, Mobile, Alabama
17. U.S. Department of Agriculture, Cooperative State Research, Education, and Extension Service
18. U.S. Department of Agriculture Experiment Station, Stoneville, Mississippi
19. U.S. Environmental Protection Agency

20. U.S. FDA Seafood Laboratory, Dauphin Island, Alabama
21. U.S. Fish & Wildlife Service Daphne Field Office (AL)
22. U.S. Fish and Wildlife Service
23. U.S. Naval Oceanographic Office
24. U.S. Navy
25. Weeks Bay National Estuarine Research Reserve

Sea Grant Institutions

1. Florida Sea Grant College Program
2. Georgia Sea Grant College Program
3. Illinois-Indiana Sea Grant College Program
4. Louisiana Sea Grant College Program
5. Puerto Rico Sea Grant College Program
6. Texas Sea Grant College Program

Partnerships

1. Alabama Gulf Coast Area Chamber of Commerce
2. Alabama Gulf Coast Convention & Visitor's Bureau
3. Alabama Stream Restoration Committee
4. Alabama-Mississippi Clean Marina Program
5. Alba Middle School (AL)
6. Alma Bryant High School (AL)
7. Baldwin County (AL) High School
8. Baldwin County Planning & Zoning Department
9. Bayou LaBatre Chamber of Commerce
10. Bon Secour National Wildlife Refuge
11. City of Foley
12. City of Gulf Shores
13. City of Moss Point
14. City of Ocean Springs (MS)
15. City of Orange Beach
16. Clarke School of Math & Science (Mobile County, AL)
17. Club Caribbean Dive and Travel
18. Coastal Alabama Clean Water Partnership
19. Coco-Cola Bottling Company of Mobile
20. Daphne (AL) High School
21. Dauphin Island Chamber of Commerce
22. Dauphin Island Parks and Beach Board/Fort Gaines
23. Degussa Corporation
24. Fairhope (AL) High School
25. Fort Morgan
26. Gulf Coast Resources Conservation & Development Council
27. Institute for Tuberculosis Research, College of Pharmacy, University of Illinois
28. Interlink, LLC
29. Jackson County (MS) Master Naturalist Program
30. Java Jean's Bagels
31. Knight-Abbey Printing
32. Land Trust for the Mississippi Coastal Plain
33. Litton Industries/Ingalls Shipbuilding

34. Maritime & Seafood Industry Museum
35. Mississippi Coast Audubon Society
36. Mississippi Gulf Coast Community College
37. Mississippi Master Naturalists
38. Mississippi Museum of Natural Science
39. Mobile Area Water and Sewer System
40. Mobile County (AL) Soil & Water Conservation Service
41. National Center for Natural Products Research (NCNPR)
42. Natural Resources Conservation Service
43. Papa John's Pizza
44. Port of Pascagoula
45. Shaughnessy Printing Co.
46. Ship Island Excursions
47. South Alabama Regional Planning Commission
48. South Baldwin Chamber of Commerce
49. South Mississippi Environmental & Agricultural Coordination Organization (SMEACO)
50. Southern Association of Marine Educators
51. Summerdale (AL) Middle School
52. T.J.'s Custom Apparel
53. Town of Dauphin Island
54. Wildlife Care and Rescue Center, Inc.

Appendix C
Sources of Significant Non-federal Funding
Program Year 2004

Funding Source	Amount
Mississippi State Appropriation	\$175,000
Mississippi-Alabama Sea Grant Consortium Subscriber Fees	<u>\$112,500</u>
TOTAL	\$297,500

Appendix D

Program Awards and Honors

A Cooperative Environmental Project For All to Share, For All to Care

The Mobile Bay Oyster Gardening Program was designated as a Five Star Restoration Site Restoring America's River Corridors & Wetlands. The restoration partners were Mobile Bay National Estuary Program, Mississippi-Alabama Sea Grant Consortium, Gulf of Mexico Foundation, Dauphin Island Sea Lab, Auburn University Marine Extension and Research Center, and Citizen Volunteers. The site was designated by the National Fish & Wildlife Foundation, National Association of Counties, Wildlife Habitat Council, NOAA Fisheries Community-based Restoration Program and the U.S. Environmental Protection Agency.

Appendix E

Publication List

This reporting period covers year one of the 2004–2005 Omnibus. Also included are several extended projects from the 2001–2003 Omnibus which have now closed. During this reporting period MASGC sponsored research that led to 16 manuscripts, 9 abstracts, and 12 presentations. Education, Extension, Legal Program, and Communications production included 9 manuscripts, 7 abstracts, 12 presentations, 9 Legal Reporters, 21 newsletters, and 4 outreach publications.

R/SP-8 - *Rapid and Quantitative Detection of Vibrio vulnificus and V. parahaemolyticus in Shellfish Using Species-specific Phage-displayed Peptide Ligands and Real-time PCR.* Asim K. Bej, Ph.D., The University of Alabama at Birmingham.

Manuscripts:

1. Panicker, G., M. Vickery, A.K. Bej. 2004. *Multiplex PCR Detection of Clinical and Environmental Strains of Vibrio vulnificus in Shellfish.* Canadian Journal of Microbiology. 50:911-922. MASGP-05-012.
2. Panicker, G., D.R. Call, M.L. Krug, and A.K. Bej. 2004. *Detection of Pathogenic Vibrio spp. in Shellfish Using Multiplexed PCR and DNA-Microarray.* Applied Environmental Microbiology. 60:7436-7444. MASGP-01-035.

R/SP-9 - *Assessment of the Sea Urchin, Tripneustes ventricosus, as a Candidate for Aquaculture in the Gulf of Mexico Region.* Stephen A. Watts, Ph.D., The University of Alabama at Birmingham.

Abstracts:

1. Gibbs, V.K. and S.A. Watts. 2004. *The Effect of Temperature on Nutrient Absorption in the Regular Sea Urchin Lytechinus variegatus.* American Zoologist, Society for Integrative and Comparative Biology, New Orleans, Louisiana.
2. Powell, M.L. and S.A. Watts. 2004. *Sea Urchin Embryos: A Classical Model Redefined.* J. Ala. Acad. Science.
3. Powell, M.L., A.L. Morris, and S.A. Watts. 2005. *Observations on Early Nutrition and Growth in Newly-Metamorphosed Sea Urchins, Lytechinus variegatus.* Society for Comparative and Integrative Biology, San Diego, CA.
4. Gibbs, V.K. and S.A. Watts. 2005. *Exposure Temperature Affects Biochemical and Cellular Composition of the Gonad in the Sea Urchin Lytechinus variegatus (Echinodermata:Echinoidea).* Society for Comparative and Integrative Biology, San Diego, CA.
5. Hammer, H.S., B. Hammer, S.A. Watts, J.M. Lawrence, and A. Lawrence. 2005. *Dietary Protein Affects Growth of Cultured Sea Urchins.* Aquaculture America, New Orleans, LA.
6. Gibbs, V.K. and S.A. Watts. 2005. *Significance of Culture Temperature to Roe Quality in Cultured Sea Urchins Fed a Formulated Diet.* Aquaculture America, New Orleans, LA.
7. Jones, W.T., M.L. Powell, and S.A. Watts. 2005. *Aquaponics: A Comprehensive Teaching Tool in Education.* Aquaculture America, New Orleans, LA.
8. Powell, M.L., A.L. Morris, L.R. D'Abramo, A. Lawrence, and S.A. Watts. 2005. *Advances in Juvenile Culture of Sea Urchins.* Aquaculture America, New Orleans, LA.

R/CEH-13 - A New Paradigm: The Trophic Importance of Sediment Microalgae in Seagrass Beds.
Michael J. Sullivan, Ph.D., Mississippi State University.

Presentations:

1. Bucolo, P., M.J. Sullivan, and P.V. Zimba. *The Effects of Nutrient Enrichment on Sediment Microalgal Primary Production within Halodule wrightii Ascherson Communities*. Southeastern Phycological Colloquy, Dauphin Island Sea Lab, Dauphin Island, Alabama, 22-24 October 2004.
2. Bucolo, P. *The Effects of Nutrient Enrichment on Sediment Microalgal Biomass and Primary Production*. Graduate Student Symposium, LUMCON, Cocodrie, Louisiana, 28-2 January 2005.

R/CEH-15 - Effects of Anthropogenic Eutrophication on the Ecosystem Services Provided by Shoalgrass (*Halodule wrightii*) Meadows: Research and Education. Just Cebrian, Ph.D., Dauphin Island Sea Lab.

Manuscripts:

1. Turner, J., L. Allen, A. Anton, M. Miller, R. Swann, and J. Cebrian. 2005. *SAVing the Gulf: Education, Restoration, Conservation*. Mobile Bay National Estuary Program and Mississippi-Alabama Sea Grant Consortium, 32 pages. MASGP-04-047.

Presentations:

1. Stutes, J., A. Dunsmuir, A. Hunter, A. Corcoran, and J. Cebrian. *Comparing Community Production Dynamics Between Seagrass Dominated Benthos and Bare Sediment in a Pristine and Impacted Coastal Lagoons in NW Florida*. 33rd Annual Marine Benthic Ecology Meeting. Mobile, Alabama. March 25-28, 2004.

EX-3 - Mississippi-Alabama Sea Grant Extension Program. C. David Veal, Ph.D., Mississippi State University, and Richard K. Wallace, Ph.D., Auburn University.

1. Burrage, D. 2004. *Evaluation of the "Gulf Fisheye" Bycatch Reduction Device in the Northern Gulf Inshore Shrimp Fishery*. Gulf of Mexico Science, 2004(1): 85-95. MASGP-04-044.
2. Burrage, D. 2004. *2005 Mississippi Tide Tables*. MASGP-04-024.
3. Posadas, B.C., and C.J. Bridger. *Economic Feasibility and Impact of Offshore Aquaculture in the Gulf of Mexico*. In Bridger, C. J. (ed.). *Efforts to Develop a Responsible Offshore Aquaculture Industry in the Gulf of Mexico: A Compendium of Offshore Aquaculture Consortium Research*. MASGP 04-045.
4. Posadas, B. C. *Potential Economic Impact of Commercial Offshore Aquaculture in the Gulf of Mexico*. Online proceedings of the 2004 IMPLAN Users Conference sponsored by the National Marine Fisheries Service in Shepherdstown, WVA on October 6-8. In press. MASGP 04-036.
5. Waters, P.L., Jr. and R.K. Wallace. 2004. *Mariculture: A Developing Industry*. Alabama Cooperative Extension System, Auburn, AL. MASGP-04-003.

Gulf Coast Fisherman (11 issues) Dave Burrage, Editor

1. *SSA Files Antidumping Petitions*. MASGP-04-001-01.
2. *2004 Mississippi Crab Trap Closure*. MASGP-04-001-02.
3. *Gulf Oyster Industry Concerns Presented in Washington, D.C.* MASGP-04-001-03.

4. *Oyster Season Update*. MASGP-04-001-04.
5. *NMFS Proposes Longer Flaps on Double Cover Flap TEDS*. MASGP-04-001-05.
6. *License Reminder*. MASGP-04-001-06.
7. *Shrimp Tariffs Imposed*. MASGP-04-001-07.
8. *Hearings on Red Snapper IFQs Scheduled*. MASGP-04-001-08.
9. *Mississippi Coastal Cleanup*. MASGP-04-001-09.
10. *Council Hearings Slated*. MASGP-04-001-10
11. *Mississippi Shrimp Peeling Machine Earns Historic Honor*. MASGP-04-001-11

Sea Harvest News (6 issues) Richard K. Wallace, Editor

1. *Kemp's Ridley Recovery Continues*. MASGP-04-002-01.
2. *Trade Adjustment Assistance Approved for Shrimp in Alabama*. MASGP-04-002-02.
3. *Trade Adjustment Assistance Program*. MASGP-04-002-03.
4. *Shrimp Quality*. MASGP-04-002-04.
5. *Bycatch Information Available*. MASGP-04-002-05.
6. *Trade Action Deadline*. MASGP-04-002-06.

SGEP wrote 17 newspaper articles in 2004 (circulation 100,000+) on aquaculture subjects providing a better understanding of various topics.

Abstracts:

1. Posadas, B. C. *Consumer Acceptance of Irradiated Raw Oysters*. Paper presented at International Food Irradiation Conference, The Institute of Food Science and Engineering at Texas A&M University, College Station, Texas, March 30-April 2, 2004.
2. Posadas, B. C., R. A. Posadas, L. S. Andrews, and S. DeBlanc. *Marketing Considerations for Postharvest Processed and Value Added Oyster Products*. Paper presented at the Gulf & South Atlantic Fisheries Development Foundation Oyster Education Public Conference, New Orleans, Louisiana, July 31, 2004.
3. Posadas, B.C. *Economic Feasibility of Alternative Pond Management Systems for Freshwater Prawn Macrobrachium Rosenbergii Production in the United States*. Paper presented at Aquaculture America 2005 Conference, New Orleans, Louisiana, January 17-20, 2005.
4. Posadas, B. C. *Potential Economic Impact of Commercial Offshore Aquaculture in the Gulf of Mexico*. Paper presented at the IMPLAN Users Conference, Shepherdstown, WVA. October 6-8, 2004
5. Wallace, R.K., P.L. Waters, J.R. Stewart, L. Swann, and R.P. Phelps. 2004. *High School Aquaculture in a Traditional Fishing Community*. World Aquaculture Society Book of Abstracts. Aquaculture 2004, Honolulu, Hawaii, USA.
6. Wallace, R.K. and P.L. Waters, Jr. 2004. *Growing Bull Minnows for Bait*. SRAC 1200. Southern Regional Aquaculture.
7. Waters, Jr., P.L., R.K. Wallace, and R.P. Phelps. 2005. *Scholastic Aquaculture Programs: Growing in Southwest Alabama*. World Aquaculture Society Book of Abstracts. Aquaculture America 2005, New Orleans, LA.

Presentations:

1. Burrage, D., and R. Wallace. 2004. *Experiences With Knotless Spectra Webbing*. Invited presentation at Gulf of Mexico Regional Sea Grant Extension Meeting, August 19, 2004, Port Fourchon, LA.
2. Scanlan, J.A., June 2004. *Principles of Smart Growth*. Presentation at the Weeks Bay National Estuarine Research Reserve Nonpoint Source Workshop, Fairhope, AL.

3. Waters, Jr., P. L. 2004. *High School Aquaculture Programs: A Success Story*. Presented to the Alabama Fisheries Association 2004, Gulf Shores, AL.
4. Waters, Jr., P.L. and D. L. Swann. 2004. *Aquaculture Overview*. Presented to Alabama COSEE teachers 2004, Dauphin Island, AL.
5. Waters, Jr., P. L. and D. L. Swann. 2004. *Aquaculture Overview*. Presented to Mississippi COSEE teachers 2004. Biloxi, MS.
6. Wallace, R.K. 2004. *Wild-Harvested Shrimp Technical Assistance Curriculum*. Presentation to TAA qualified shrimp vessel owners and operators.

L-1 - Mississippi-Alabama Sea Grant Legal Program. Stephanie Showalter, J.D., M.S.E.L., Richard J. McLaughlin, J.S.D., and Josh Clemons, J.D., The University of Mississippi.

Publications:

1. Clemons, Josh. *Interstate Water Disputes: A Road Map for States*. Southeastern Environmental Law Journal 12(2): 115-142. MASGP-04-033.
2. Clemons, Josh. *The Shared Coast: Application of the Ocean Commission Recommendations in Mississippi and Alabama*. MASGP-05-002.
3. Showalter, S.E., *The United States and Rising Shrimp Imports from Asia and Central America: An Economic or Environmental Issue?* Vermont Law Review (in press).

Water Log (3 issues) Josh Clemons, Editor

1. *Supreme Court Answers Clean Water Act Question*. MASGP-04-009-01.
2. *Rip Currents and Landowner Liability*. MASGP-04-009-02.
3. *Georgia Scrap Metal Yard Violates CWA, RCRA*. MASGP-04-009-03.

Presentations:

1. Clemons, Josh. *Warning Signs for Rip Currents: Legal Issues*, MASGC Rip Current Workshop, June 2004.
2. Showalter, S. *The United States and Rising Shrimp Imports from Southeast Asia and Central America: An Economic or Environmental Issue*. Oxford Round Table, Oxford, England, August 2004.
3. Showalter, S. *Boundaries and Case Law Examples in Alabama/Mississippi*. A NOAA Workshop for Application of Water Level and Datum Information to Coastal Zone Management, August 2004.

C-1 - Program Communications. Timothy H. Reid, Mississippi-Alabama Sea Grant Consortium.

Publications:

1. Reid, T. *Publications Policy and Requirements for Principal Investigators Funded by Mississippi-Alabama Sea Grant Consortium*. MASGP-04-026.
2. Burrage, D., T. Reid, and R. Wallace. 2004. *Protecting Your Fishing Waters -- Ways to Reduce Fishing Gear and Other Marine Debris*. MASGP-04-042.

Sea Briefs (4 issues). Tim Reid, Editor.

1. *Testing the Waters*. MASGP-04-007-01
2. *Clean Marina Program Certifies First Marinas*. MASGP-04-007-02

3. *BirdFest Lands in Alabama*. MASGP-04-007-03
4. *Water Issues*. MASGP-04-007-04

R/CEH-2 - Detection and Action of Endocrine Disrupting Chemicals in Estuarine Ecosystems.
Marius Brouwer, Ph.D., The University of Southern Mississippi.

Manuscripts:

1. Adam Kuhl. Dissertation: *The Effects of Endocrine Disrupting Chemicals on Sex Differentiation in Japanese Medaka (Oryzias latipes) and the Role of Brain Aromatase*. (2004).
2. Kuhl, Adam J., Steve Manning, and Marius Brouwer. *Brain Aromatase in Japanese Medaka (Oryzias latipes): Molecular Characterization and Role in Xenoestrogen Induced Sex Reversal*. *The Journal of Steroid Biochemistry and Molecular Biology* 96: In press. (2005).

Abstracts:

1. Kuhl, A.J. and M. Brouwer. *Effects of Endocrine Disrupting Chemicals on Sex Differentiation in Medaka and the Role of Brain Aromatase and its Response to the Xenoestrogen o,p-DDT in Japanese Medaka*. *Soc. Env. Tox. Chem. Abstract Book*: p 305.

R/SP-2 - Nutritional Strategies for the Maturation and Rearing of Red Snapper. D. Allen Davis, Ph.D., and R.P. Phelps, Ph.D., Auburn University.

Publications:

1. Miller, C.L., D.A. Davis, and R.P. Phelps. *The Effects of Dietary Protein and Lipid on Growth and Body Composition of Juvenile and Sub-adult Red Snapper, Lutjanus campechanus (Poey,60)*. *Aquaculture Research* 36:52-60. (2005). MASGP-05-023.
2. Davis, D.A., C.L. Miller, and R.P. Phelps. *Replacement of Fish Meal with Soybean Meal in the Production Diets of Juvenile Red Snapper, Lutjanus campechanus*. *Journal of the World Aquaculture Society* 36: 114-119. MASGP-05-021
3. Papanikos, N., R.P. Phelps, K. Williams, A. Ferry, and D. Maus. *Egg and Larval Quality of Natural and Induced Spawns of Red Snapper, Lutjanus campechanus*. *Fish Physiology and Biochemistry* 28: 487-488.

Presentations:

1. Davis, D.A. and R.P. Phelps. Replacement of fish meal in practical diets for juvenile red snapper, *Lutjanus campechanus*. *Aquaculture America*, New Orleans, LA January 17-20, 2005.
2. Miller, C.L., D.A. Davis, and R.P. Phelps. Effect of Dietary Protein and Lipids on Growth and Body Composition of Juvenile Red Snapper, *Lutjanus campechanus*. *Aquaculture 2004*, Honolulu, Hawaii. March 1-4, 2004.
3. Phelps, R.P., N. Papanikos, R. Hasty, A. Ferry, D. Maus, and D.A. Davis. Red Snapper *Lutjanus campechanus*, Broodstock Management and Reproduction Under Controlled Conditions. *Aquaculture 2004*, Honolulu, Hawaii. March 1-4, 2004.
4. Papanikos, N., R.P. Phelps, A. Ferry, D. Maus, and D.A. Davis. Effect of Spawning Method and Broodstock Nutritional Background on Egg Quality in Red Snapper, *Lutjanus campechanus*. *Aquaculture 2004*, Honolulu, Hawaii. March 1-4, 2004.

R/SP-3 - Development of Techniques for Inland Saltwater Shrimp Farming. D. Allen Davis, Ph.D., and David B. Rouse, Ph.D., Auburn University.

Publications:

1. Davis, D.A., I.P. Saoud, C.E. Boyd, and D.B. Rouse. *Effects of Potassium, Magnesium, and Age on Growth and Survival of Litopenaeus vannamei Post-Larvae Reared in Inland Low Salinity Well Waters in West Alabama.* Journal of the World Aquaculture Society. (In press)
2. Davis, D.A., T.M. Samocha, and C.E. Boyd. *Acclimating Pacific White Shrimp, Litopenaeus vannamei, in Inland Low-salinity Water.* Southern Regional Aquaculture Center. SRAC Publication No 2600. (2004).
3. Garza de Yta, A., D.B. Rouse, and D.A. Davis. *Influence of Nursery Period on the Growth and Survival of Litopenaeus vannamei.* Journal of the World Aquaculture Society 35: 357-365. (2004).
4. Saoud, I.P. and D.A. Davis. *Salinity Tolerance of Brown Shrimp Farfantepenaeus aztecus as it Relates to Postlarval and Juvenile Survival, Distribution and Growth in Estuaries.* Estuaries 26: 970-974. (2003).
5. Saoud, I.P., D.A. Davis, and D.B. Rouse. *Suitability Studies of Inland Well Waters for Litopenaeus vannamei Culture.* Aquaculture 217: 373-383. (2003). MASGP-04-013.
6. McGraw, W.J., D.A. Davis, D. Teichert-Coddington, and D.B. Rouse. *Acclimation of Litopenaeus vannamei Post Larvae to Low Salinity: Influence of Age, Salinity Endpoint and Rate of Salinity Reduction.* Journal of the World Aquaculture Society 33: 78-84. (2002). MASGP-04-015.
7. Davis, D.A., I.P. Saoud, W.J. McGraw, and D.B. Rouse. *Considerations for Litopenaeus vannamei Reared in Low Salinity Inland Waters.* VI International Symposium on Aquaculture Nutrition. Cancun, Quintana-Roo, Mexico, September 3-6, 2002. MASGP-04-014.
8. Saoud, I.P., D.A. Davis, and D.B. Rouse. *Shrimp Culture in Low-salinity Waters Inland.* World Aquaculture Magazine 33: 51-52. (2002). MASGP-04-016.

Presentations:

1. Davis, D.A., L.A. Roy, I.P. Saoud, and R.P. Henry. "Effects of varying levels of aqueous potassium on survival and growth of *Litopenaeus vannamei* reared in low salinity waters." Aquaculture America, New Orleans, LA, January 17-20, 2005.
2. Davis, D.A., G.W. Whitis, D. Teichert-Coddington, D.B. Rouse, and C.E. Boyd. "Inland Penaeid Shrimp Farming in Alabama." Aquaculture 2004, Honolulu, Hawaii. March 1-4, 2004.
3. Davis, D.A., O.D. Zelaya, and D.B. Rouse. "Evaluation of Feed Management Strategies for *Litopenaeus vannamei* Under Pond Production Conditions." Aquaculture 2004, Honolulu, Hawaii, March 1-4, 2004.
4. Davis, D.A., O.D. Zelaya, and D.B. Rouse. "Influence of Stocking Density, Nursery Duration and Artemia on the Growth and Survival of *Litopenaeus vannamei* Reared Under Intensive Nursery Conditions." Aquaculture 2004, Honolulu, Hawaii, March 1-4, 2004.
5. Davis, D.A., O.D. Zelaya, and D.B. Rouse. "Influence of Stocking Density, Nursery Duration and Artemia on the Growth and Survival of *Litopenaeus vannamei* Reared Under Intensive Nursery Conditions." Alabama Fisheries Association, Inc. 21st Annual Meeting, Gulf Shores, AL. February 16-18, 2004.

L-3 - National Sea Grant Law Center. Stephanie Showalter, J.D., M.S.E.L., Richard J. McLaughlin, J.S.D., and Jason Savarese, J.D., The University of Mississippi.

Publications:

1. Showalter, S.E. Commentary. *The Legal Status of Autonomous Underwater Vehicles*. Marine Technology Society Journal, 38(1): 80-83.(2004). MASGP-04-041.
2. Showalter, S.E. Book Review. *In Peril: A Daring Decision, a Captain's Resolve, and the Salvage that Made History*. Marine Technology Society Journal, 38(1): 84. (2004).
3. Showalter, S.E. Book Review. *The Machine in Neptune's Garden: Historical Perspectives on Technology and the Marine Environment*. Marine Technology Society Journal 38(3): 83. (2004).

The SandBar (4 issues). Stephanie Showalter, Editor.

1. *Stocking Project Deemed "Commercial Enterprise"*. Vol. 3:1. MASGP-04-004-01.
2. *No Right to Walk Between High Water Mark and Water's Edge*. Vol. 3:2. MASGP-04-004-02.
3. *Not Just a Walk in the Park: Beach Access and the Public Trust Doctrine in New Jersey*. Vol. 3:3. MASGP-04-004-03.
4. *Ninth Circuit Denies Standing to World's Whales and Dolphins*. Vol. 3:4. MASGP-04-004-04.

Sea Grant Law and Policy Digest (2 issues) Jason Savarese, Editor.

1. Available on-line only. Volume 3, Number 1. MASGP-04-025-01.
2. Available on-line only. Volume 3, Number 2. MASGP-04-025-02.

Presentations:

1. *Coastal Zone Management Act 101*. Stephanie Showalter, Presentation to law and policy course for hydrographers, The University of Southern Mississippi, April 2004.
2. *The United States and Rising Shrimp Imports from Southeast Asia and Central America: An Economic or Environmental Issue*. Stephanie Showalter, Oxford Round Table, Oxford, England, August 2004.
3. *Ohio H.B. 218 and the Public Trust Doctrine*. Stephanie Showalter. International Submerged Lands Management Conference, Halifax, Nova Scotia, September 2004.

Appendix F

Students Supported

During the first year of these projects, 6 Ph.D., 5 M.S., and 5 J.D. candidates have been supported, as well as 2 undergraduate students, 4 high school students, and 2 high school teachers.

R/SP-8 - *Rapid and Quantitative Detection of Vibrio vulnificus and V. parahaemolyticus in Shellfish Using Species-specific Phage-displayed Peptide Ligands and Real-time PCR.* Asim K. Bej, Ph.D., The University of Alabama at Birmingham.

1. Amy Rizvi, Department of Biology, The University of Alabama at Birmingham. M.S. May 2004. *Rapid Detection of Pathogenic Vibrio parahaemolyticus in Shellfish and Gulf of Mexico Water Using Multiplexed Conventional and Real-time PCR.*
2. Gitika Panicker, Department of Biology, The University of Alabama at Birmingham. Ph.D. July 2004. *Molecular Analysis and Detection of Vibrio vulnificus in its Quiescent and Active State.*

R/SP-9 - *Assessment of the Sea Urchin, Tripneustes ventricosus, as a Candidate for Aquaculture in the Gulf of Mexico Region.* Stephen A. Watts, Ph.D., The University of Alabama at Birmingham.

1. Adele Cunningham, Department of Biology, The University of Alabama at Birmingham. Ph.D. Expected graduation Spring 2006.
2. Hugh Hammer, Department of Biology, The University of Alabama at Birmingham. Ph.D. Expected graduation Fall 2005.
3. Warren Jones, Department of Biology, The University of Alabama at Birmingham. Ph.D. Expected graduation Spring 2008.
4. Katie Gibbs, Department of Biology, The University of Alabama at Birmingham. Ph.D. Expected graduation Spring 2008.

Undergraduate Students:

1. Anna Morris, Department of Biology, The University of Alabama at Birmingham. B.S. student.
2. Amy Burroughs, Department of Biology, The University of Alabama at Birmingham. B.S. student.

High School Students:

1. Larry Lawal, Jefferson County International Baccalaureate School
2. Kim Trawick, Jefferson County International Baccalaureate School
3. Jordan Harris, Jefferson County International Baccalaureate School
4. Lawanda Taylor, Parker High School

High School Teachers:

1. Beth Hines, Mountan Brook High School
2. Franchelle Thomas, Birmingham School System

R/CEH-13 - A New Paradigm: The Trophic Importance of Sediment Microalgae in Seagrass Beds. Michael J. Sullivan, Ph.D., Mississippi State University.

1. Philip Bucolo, Department of Biological Sciences, Mississippi State University. M.S. candidate. Degree expected August 2005. Tentative thesis title: *Effects of Nutrient Enrichment on the Primary Production and Photopigments of Sediment Microalgae Within and Adjacent to Seagrass Beds.*
2. Andy Sanderson, Department of Biological Sciences, Mississippi State University, M.S. candidate. Degree expected August 2005. Tentative thesis title: *Effects of Nutrient Enrichment on the Invertebrate Populations of a Seagrass Bed.*

R/CEH-14 - Use of Otolith Microchemistry of Spotted Seatrout to Identify Stock Source-areas, Reveal Population Movements, and Determine Interannual Variability in Regional Patterns of Otolith Signatures in Mississippi Coastal Waters. Bruce H. Comyns, Ph.D., Chet Rakocinski, Ph.D., Mark S. Peterson, Ph.D., and Alan Shiller, Ph.D. The University of Southern Mississippi.

1. Paul Grammer, Department of Coastal Sciences, The University of Southern Mississippi. Current M.S. student.

R/CEH-15 - Effects of Anthropogenic Eutrophication on the Ecosystem Services Provided by Shoalgrass (*Halodule wrightii*) Meadows: Research and Education. Just Cebrian, Ph.D., Dauphin Island Sea Lab.

1. Jason Stutes, Department of Marine Sciences, University of South Alabama and Dauphin Island Sea Lab. Ph. D. student. Jason is expected to defend his thesis this year.
2. Andrea Anton, Department of Marine Sciences, University of South Alabama and Dauphin Island Sea Lab. M.S. student. She is scheduled to defend in 2007.

L-1 - Mississippi-Alabama Sea Grant Legal Program. Stephanie Showalter, J.D., M.S.E.L., Richard J. McLaughlin, J.S.D., and Josh Clemons, J.D., The University of Mississippi.

1. Danny Davis, J.D., December, 2005.
2. Leah Huffstatler, J.D., May 2005.
3. Luke Miller, J.D., May 2005.
4. Elizabeth Mills, J.D., May 2006.
5. Ronni Stuckey, J.D., May 2006.