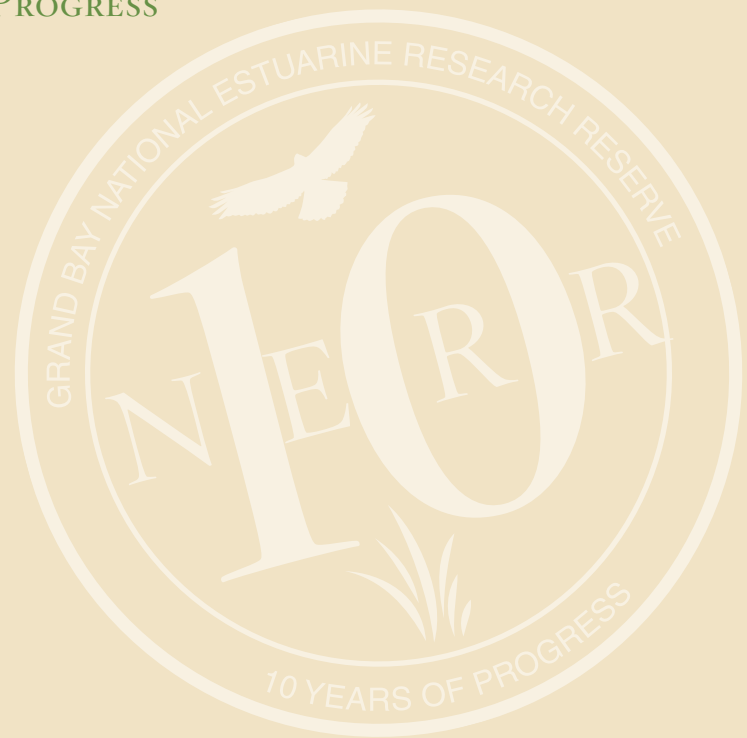




GRAND BAY NATIONAL ESTUARINE RESEARCH RESERVE

REFLECTIONS ON 10 YEARS OF PROGRESS
1999-2009



REFLECTIONS ON 10 YEARS OF PROGRESS 1999-2009

Letter from the Manager

December 7, 2009

On behalf of the Mississippi Department of Marine Resources (DMR), I am pleased to present this copy of the summary report: "Grand Bay National Estuarine Research Reserve: Reflections on 10 Years of Progress 1999-2009." This report provides a brief synopsis of Grand Bay National Estuarine Research Reserve (NERR) activities since our humble beginnings 10 years ago. On June 16, 1999, the Grand Bay NERR was officially designated into the National Estuarine Research Reserve System as the 24th estuarine reserve in the country.

The Reserve represents a unique partnership among several diverse groups working toward similar conservation objectives. The State of Mississippi, through the DMR, administers the NERR in collaboration with the National Oceanic and Atmospheric Administration (NOAA), which provides funding support and national program guidance. The focus of the Reserve is to address local, state and regional coastal management needs through research, education, training and stewardship programs. The Reserve works closely with the U.S. Fish and Wildlife Service (USFWS) on a variety of land management activities



and shares space in the new state-owned Grand Bay Coastal Resources Center, constructed on federal property that is part of the Grand Bay National Wildlife Refuge. We also partner with other private and public schools and universities along with citizen advisory groups.

With the completion of our permanent facilities in the fall of 2009, the NERR can direct greater numbers of on-site training workshops, field trips and school activities. While the entire Reserve serves as a "living laboratory" for researchers and teachers from near and far, the new facility with associated laboratories, dormitory and classrooms will allow us to better meet our users' needs. Key

components of our research and education programs are to attract researchers and educators from other institutions to focus their work at the Grand Bay NERR.

We have grown in so many ways over the past 10 years, and the task before us is to carry the momentum generated over to the next 10 years and beyond. With passing time, the pressures and threats to our state's natural areas will continue to mount, and we will continue to be challenged to better manage and protect those special places that we cherish. The lands and waters of the Grand Bay NERR, tucked away here in southeast Jackson County, represent such a gem. Our mission is to better understand the complexities and interrelations of our coastal ecosystems, to share what we learn so that others will appreciate the natural world and to better manage the lands and waters with which we are entrusted for future generations.

David Ruple
Reserve Manager



Introduction

Ecological Significance

The Reserve is a large, relatively intact area of coastal wetlands located in southeastern Jackson County, Miss., adjacent to the Mississippi-Alabama stateline. The site includes a variety of wetland types, including tidal estuary and non-tidal wetlands, that encompass some 18,448 acres. The NERR supports a highly diverse community of plants and animals and includes one of the largest estuarine systems in Mississippi. Such estuarine communities in the northern Gulf of Mexico are vital to many of our important commercial and recreational species of fish and shellfish.

The open-water estuarine areas support large, productive patches of submerged aquatic vegetation including widgeon

grass (*Ruppia maritima*) with smaller patches of shoal grass (*Halodule wrightii*). These beds are among the most extensive in the state. Tidal marshes at Grand Bay are dominated by black needle rush (*Juncus roemarianus*) interspersed with some of the most extensive, sparsely vegetated salt flats or pannes in Mississippi.

The associated non-tidal areas include wet pine savanna, coastal bayhead and cypress swamps, freshwater marshes and maritime forests. Savannas at the Reserve have been documented to be among the most diverse habitats in North America.



Background

The Grand Bay NERR is part of a national network of protected estuaries, one of 27 sites across the country that make up the National Estuarine Research Reserve System (NERRS). These reserves, established for long-term research, monitoring, education and stewardship, provide excellent opportunities for the study of coastal ecosystems and management.

This system of reserves currently protects more than 1.3 million acres of coastal habitat including estuarine lands and water which serve as living laboratories for scientists, educators, and students.

Designated in 1999, the Grand Bay NERR is a state and federal partnership between DMR and NOAA. The Grand

Bay NERR additionally includes several other primary partners, including the U.S. Fish and Wildlife Service, Mississippi Secretary of State, Mississippi State University, University of Southern Mississippi and The Nature Conservancy.

Portions of the USFWS lands within the Grand Bay National Wildlife Refuge (NWR) are included in the Reserve boundaries. The new State of Mississippi facilities at the NERR are constructed on Refuge property and are shared by NERR and NWR staff.

Facilities

In the summer of 2001, a NERR site selection committee looked at the suitability of several locations within the vicinity to locate permanent facilities. While several sites were considered, the current site on Bayou Heron Road was selected to serve as the NERR and NWR headquarters. The site was a residence known as the Ludlow Place prior to purchase by the NWR in the early 1990s. Early in the last century, the site was referred to by some as Strawberry Hill.

A Facilities Master Plan was developed with input from advisory groups. The plan provided recommendations and guidance for the future use of areas within the Reserve and an initial focus on permanent facilities.

The first phase of implementing the Master Plan was to construct facilities that would complement the goals and objectives of the Reserve.

Lord, Aeck and Sargent, Atlanta, Ga., and Studio South, Ocean Springs, served as the architects for the facilities design. Construction began on the Grand Bay Coastal Resources Center in November 2007. Rod Cooke Construction Inc. was selected as the general contractor and completed the project in October 2009.

The facility will serve as headquarters for both the Grand Bay NERR and NWR and includes office space, laboratories, classrooms, interpretative exhibits and a dormitory.

From the beginning, the goal of the facilities design team was to create a functional and environmentally friendly, or “green,” building that demonstrates the use of sustainable building strategies. A variety of concepts were utilized to meet the challenges of “building green.”

Firewise features have been included in the construction and landscaping of the Center. Firewise is a program developed to enable homeowners to live compatibly with nature, using elements of landscaping and building construction to reduce the threats of wildfire.

The constructed space provides a healthy work environment for staff and visitors, reduces operational costs and demonstrates a commitment to the environment and the future.



Interpretive Area



Grand Bay Coastal Resources Center



South side of building with rainwater collection cistern

Building Green

- Landscape restoration with native vegetation
- Reduced water consumption
- Innovative wastewater reduction
- North-south building orientation
- Daylighting and other energy saving strategies
- Low emission building materials
- Pervious concrete
- Stormwater management
- Optimization of energy performance systems
- Construction waste management
- Recycled construction materials
- Controllability of mechanical systems
- GREENGUARD-certified furniture
- Rainwater collection cisterns

Firewise Features

- Fire managed landscape
- Fuel reduction
- Control of invasive plants
- Fire break around facility
- Metal roof and foundation
- Fire protection system
- Retention ponds
- Native and drought resistant vegetation
- Mechanical clearing

Gulf of Mexico Alliance: Priority Issue Projects at Grand Bay NERR

The Grand Bay NERR is working collaboratively with other organizations through the Gulf of Mexico Alliance to address coastal issues that have been identified as regionally significant. These issues include:

- Coastal Community Resilience
- Habitat Conservation and Restoration
- Water Quality
- Nutrients and Nutrient Impacts
- Environmental Education
- Ecosystem Integration and Assessment

The Gulf of Mexico Alliance was established in 2004 as a partnership between the states of Alabama, Florida, Louisiana, Mississippi and Texas. The goal of the Alliance is to increase regional collaboration across states to enhance the ecological and economic health of the Gulf of Mexico.

The Grand Bay NERR related projects that address these priority issues are highlighted throughout this report.



Coastal Training Program

Since its designation in 1999, the Reserve has sought to bridge the gap between science and management by providing training workshops to professional coastal resource management audiences and other coastal user groups. These workshops, collectively referred to as coastal decision-maker workshops (CDMW), were coordinated through the Reserve's Education Program. As the CDMW initiative grew, so did the need to develop a more coordinated approach to training and information sharing based on assessments of audience needs and skill levels.

To accommodate this need, the Reserve implemented a regional Coastal Training Program (CTP) in 2005 with funding and guidance from NOAA's Estuarine Reserves Division. The intent of the CTP is to empower audiences to make informed resource management decisions by providing science-based information and skill building opportunities. The program utilizes front-end



Wetland Plant Identification Workshop

evaluations (market analyses and needs assessments) and recommendations from an 11-member advisory committee to determine training priorities and fill gaps in training opportunities without duplicating the efforts of existing providers. The program has demonstrated flexibility and resilience in its ability to respond to emerging issues in a dynamic coastal environment. Expanded partnerships have helped the CTP assist communities in Jackson County and across coastal Mississippi with issues such as conservation planning, floodplain management, coastal

hazards, grant writing and stormwater management. The success of these efforts has enabled the CTP to become a valued source of training and information for local decision-makers.

Program Highlights

Land Use Planning for Water Quality

In December 2007, Grand Bay's CTP partnered with the Southeast Watershed Forum, the Land Trust for the Mississippi Coastal Plain and the Mississippi Department of Environmental Quality to host a Land Use Planning for Water Quality Workshop in Moss Point, Miss. The workshop was designed to help shape a master plan for the city that integrated environmental priorities into the planning process. During the workshop, participants identified key growth issues for the city as well as drivers for conserving natural resources. Additionally, participants worked in small groups to prioritize areas for conservation and sustainable development. Strategies to connect these "hubs" were discussed, and implementation tools were also identified. At the conclusion of the event, workshop outcomes were compiled. The summary data was presented to the mayor and Board of Aldermen in January 2008.

Gulf of Mexico Coastal Training Initiative

Increasing regional technical training opportunities is the focus of a subgrant awarded to the CTP coordinators at NOAA's five Gulf of Mexico NERRs. This award supports a regional coordinator position to help the Gulf Coast NERR CTPs connect the needs of the Gulf of Mexico Alliance Priority Issue Teams, the Gulf States and local communities. The development and delivery of practical training opportunities that meet the information needs of target audiences is an important component of this project. Training activities will raise awareness of the Alliance and critical Gulf issues, increase the application of technology and tools that are products of the Alliance priority issue teams, and provide professional technical forums to disseminate Alliance outcomes and initiatives. Partners in this effort include Rookery Bay NERR, Apalachicola NERR, Weeks Bay NERR, Grand Bay NERR, Mission-Aransas NERR and the Weeks Bay Foundation.

Wetlands and Water Quality: Regulating Construction Impacts in Coastal Areas

In August 2009, Grand Bay's CTP offered a wetland and construction stormwater regulatory workshop for city and county government staff. The class was designed to inform participants about state and federal environmental regulations that impact development in environmentally sensitive areas. Participants learned how construction affects wetlands and water quality as well as why and how government agencies regulate these impacts. The goal of the workshop was to empower attendees to better assist homeowners and local businesses with development decisions and hopefully reduce occurrences of wetland and construction stormwater violations in their communities.



Ecological Restoration Workshop

Priority Audiences and Issues

Local Government

Coastal Hazards

- Floodplain management

Green Infrastructure

- Low impact development
- Sustainable building
- Smart code
- Conservation easements
- Wetland mitigation
- Wetland protection
- Stormwater management

Population Growth Management

- Public access to waterfronts

Natural Resource Managers

Resource Management

- Wetland protection/restoration
- Streambank restoration
- Wetland ecology
- Geographical Information Systems (GIS)
- Conservation easements
- Conservation land planning
- Habitat buffers
- Mitigation
- Low impact development

**Gulf of Mexico Alliance:
Priority Issue Projects at
Grand Bay NERR**

Coastal Community Resilience

- Gulf of Mexico Alliance Spatial Infrastructure Project
- New Approaches to Floodplain Management for Coastal Communities Training Workshop
- Green Building is Storm Resistant Training Workshop
- Effects of Sea-Level Rise and Hurricanes in Coastal Transition Habitats
- Impacts of Hurricanes on the Recovery of Black Needle Rush in Coastal Salt Marshes
- Forest Structure and Growth Relating to Climate Effects and Fire Regime
- Use of Remote Sensing to Determine Marsh Elevations and Species Composition
- Application of Water Level and Datum Information to Coastal Zone Management Training Workshop
- Creating Community Support for Firewise Initiatives Training Workshop



Stewardship

The Grand Bay NERR is committed to promoting the wise use and conservation of coastal resources. As a responsible environmental steward, the Reserve strives to conserve plant and animal populations in order to maintain healthy and productive ecosystems. Stewardship activities on the Grand Bay NERR focus on three main areas including monitoring,



Submerged Aquatic Vegetation (SAV) Sampling

management and restoration. An important aspect of the Reserve's work is to demonstrate best management practices that other resource professionals, local decision-makers, and the general public can apply in their own communities.

Coastal Mississippi and particularly the Grand Bay NERR provide a perfect laboratory for examining landscape changes related to human population growth, natural disasters and the impacts of climate change and sea-level rise. Monitoring of sensitive habitats and species within the boundary of the Reserve provides information on the status and health of our coastal resources. Resource management on the Reserve is driven by science and based on the principles of adaptive resource management. The Stewardship Program selectively applies current techniques in restoration science to restore the function of impaired coastal habitats. Long-term monitoring allows us to evaluate the effectiveness of restoration activities. The Reserve also actively maps and monitors invasive species and controls them when appropriate. The stewardship efforts at the Grand Bay NERR are interwoven into the work of the USFWS, which owns portions of the land within the Reserve.

Program Highlights

Habitat Mapping

Climate change is an important regional issue along the Gulf Coast. A clear understanding of current and historic vegetation communities is important as the Reserve tracks ecological change associated with climate change. For this reason, habitat mapping remains a priority topic for the stewardship staff at the Grand Bay NERR. Fine scale mapping of the topography and plant distributions on the Reserve is critical to refine our understanding of how sea level rise will affect coastal resources. Detailed mapping of the Reserve watershed provides important information about how changes in human populations affect freshwater inflows and nutrient inputs into the system. While most coastal areas are experiencing large increases in human population, portions of the Grand Bay NERR watershed are actually experiencing a trend toward depopulation following the devastation of Hurricane Katrina. Mapping efforts will provide important baseline information to look for both short-term and long-term changes in plant communities on vacated properties.

Restoration Science

The restoration of coastal habitats is an important area of focus on the Grand Bay NERR. Many of the vegetative



Planting Marsh Grass

communities on the Reserve are fire-dependent, but pressures including human population growth and financial constraints make the regular application of fire on a landscape scale increasingly difficult on the Reserve and across the region. The Reserve staff is actively investigating the role of fire in the maintenance of these

communities by studying the dendroecology of maritime forests on the Reserve. The Reserve also maps invasive species, most notably Chinese Tallow (*Triadica sebifera* (L.) Small)



Juncus Restoration Project

and cogongrass (*Imperata cylindrica* (L.) P. Beauv.), to determine their rates of spread. Control efforts for these pest plants include mechanical removal and the selective application of herbicides. Additionally, the Reserve actively monitors for several invasive insect pests of regional importance.

Seagrass Beds

Seagrass beds are an important part of the aquatic environment. These beds of submerged aquatic vegetation (SAV)

benefit the shallow waters of coastal environments by reducing wave energy, stabilizing sediment and providing nursery habitat for commercial and recreational fish species. SAV is declining along the coast of the Gulf of Mexico and worldwide. Since 2003, the Reserve has been monitoring the SAV resource of Grand Bay NERR by mapping the extent of SAV beds and tracking seasonal changes in the extent and species composition of the seagrass beds. Baseline data will allow the Grand Bay NERR staff to assess the feasibility and need to restore SAV beds to areas that can support them.

Fire Management

The role of fire in maintaining coastal habitats can not be understated. Pine savanna and flatwood communities require frequent growing-season fires to remove accumulated fuels and to maintain an open canopy structure that promotes the great diversity of plants found in the understory. Fires started by both aboriginals and lightning would have carried for miles in an undisturbed landscape, but habitat fragmentation and fire suppression have resulted in the degradation of many fire-dependent habitats. The NERR is actively working in cooperation with the USFWS to restore fire to degraded habitats at Grand Bay through the application of prescribed burning. In recent years mechanical clearing efforts and burning have taken place on several hundred acres. Firebreaks have been installed around the Reserve as needed. This effort will result in improved ecosystem function and improved aesthetic value of the lands within our boundary.



Prescribed fire at Grand Bay NERR

Gulf of Mexico Alliance: Priority Issue Projects at Grand Bay NERR

Habitat Conservation and Restoration

- *Fundulus jenkinsi*, Saltmarsh Topminnow: Conservation Planning and Implementation
- Invasive Species Monitoring and Management
- Prescribed Burning in Coastal Ecosystems
- Living Shorelines Training Workshop
- Ecological Restoration of Coastal Habitats Training Workshop
- Identification and Management of Invasive Terrestrial and Aquatic Plants in Coastal Mississippi
- Ecology and Conservation Biology of Mississippi Gulf Coast Marsh Birds
- Use of Biologs for Shoreline Protection





- State Purchases First Properties - May 1992
- Coastal Preserves Program Begins - May 1992
- Nomination Process Initiated with NOAA - Dec 1993
- Site Nomination Sent to NOAA by Governor Fordice - Oct 1994
- Site Nomination Approved by NOAA - Jun 1997
- Official Designation by Secretary of Commerce, James Baker - Apr 1999
- Ecological Cooperative Science Center Partnership Begins - Oct 2001
- Bayou Heron Boat Launch and Fishing Pier Construction - Apr 2002
- Birding Trail Created - Sep 2002
- Facilities Master Plan Completed - Oct 2001
- First Graduate Research Fellow - Dec 1999
- Reserve Dedication Ceremony - Jun 1999
- Temporary Office Space at Reserve - Jun 1999
- First Staff Hired - Nov 1998
- EIS and Mgmt Plan Completed - Nov 1996



Key Events in the History



- SWMP Water Quality Stations Deployed – Mar 2004
- Coastal Training Program Begins – Mar 2004
- Stewardship Program Begins – Mar 2004
- BioBlitz – Apr 2004
- Began Working with Gulf of Mexico Alliance – Apr 2004
- SWMP Weather Station Established – Jun 2004
- Hurricane Katrina Reshapes Mississippi Coast – 2004
- Mercury Monitoring Station Established – Jun 2004
- E-Live Broadcast – Aug 2005
- Facilities Partnership Established with NOAA – Sep 2005
- Site Profile Completed – Jul 2006
- Groundbreaking for New Facilities – Sep 2007
- Grand Bay Coastal Resources Center Completed – Oct 2009
- 50th Coastal Training Program – Oct 2007



ry of Grand Bay NERR

Research and Monitoring

The Grand Bay NERR has developed an active, dynamic and extensive research program which provides scientifically based data to inform management strategies for the conservation of critical coastal resources. The goal of the research program at the Reserve is to “provide a stable environment for research by staff and other investigators through long-term protection of the site to: 1) gain greater knowledge about coastal processes; 2) conduct studies relating to pertinent coastal management issues; 3) collect information necessary for better management of our coastal resources and 4) make this information available to stakeholders.”

Current research and monitoring efforts by Reserve staff and other researchers are focused on meeting this goal. To date, these efforts have focused on the implementation of various monitoring programs (e.g., water quality, meteorological conditions, nutrients, nekton, marsh birds, etc.), conducting status surveys and inventories for flora and fauna found on and around the reserve and compiling research needs and data gaps to be used in the development of a comprehensive, long-term research strategy for the Reserve. A comprehensive Grand Bay NERR site profile study was completed in 2007.



Fish collection in Hawkes' Marsh

Program Highlights

System-Wide Monitoring Program (SWMP)

The System-Wide Monitoring Program (SWMP) is one of two existing programs within the National Estuarine Research Reserve System that provide data critical to the understanding of the ecology of Grand Bay and address the system as a whole. The goal of the program is to track short-term variation and determine long-term trends in the condition of our coastal ecosystems. This program monitors

and provides baseline water quality data, weather conditions and nutrient levels for the Reserve. It also supplements research and monitoring efforts outside the local reserve and informs the public about conditions on the Reserve. Data for SWMP is compiled for all 27 reserves nationally and used to assess the environmental conditions on our nation's estuaries.



Crooked Bayou weather station

Graduate Research Fellowship Program (GRF)

A second NERRS program, the Graduate Research Fellowship (GRF) program, provides graduate students with opportunities to conduct research of local and national significance that promote the conservation of coastal ecosystems. GRF participants conduct their research within a specific NERR and gain hands-on experience by participating in their host reserve's research and monitoring program. The five focus areas for the GRF program are (1) eutrophication, effects of non-point source pollution and/or nutrient dynamics; (2) habitat conservation and/or restoration; (3) biodiversity and/or the effects of invasive species; (4) mechanisms for sustaining resources within estuarine ecosystems; and (5) economic, sociological and/or anthropological research applicable to estuarine ecosystem management. Created in 1997, this program has funded more than 160 fellows from 56 universities nationally. At Grand Bay NERR, 11 students have been funded through the GRF program since 2000, and their work has made substantial contributions to our understanding of the Reserve ecosystem.

Site Profile

The National Estuarine Research Reserve System requires the development of a site profile as part of the SWMP. This document reviews and synthesizes the existing knowledge for the Reserve's research and monitoring activities. In addition, identifying research and monitoring needs is a major goal of this effort. Completed in 2007 and released in 2009, the Grand Bay NERR site profile consists of 17 chapters highlighting the current state of ecological knowledge for the Reserve. To ensure the most comprehensive treatment of each topic, the editors selected experts most familiar with the Grand Bay area of Mississippi and Alabama. These chapters provide the most up-to-date and comprehensive summary of our current ecological knowledge of the Grand Bay NERR.

Gulf of Mexico Alliance: Priority Issue Projects at Grand Bay NERR

Water Quality

- Grand Bay NERR Water Quality, Weather and Nutrient System-Wide Monitoring Program (SWMP)
- Use of Remote Sensing to Predict *Vibrio parahaemolyticus* Risk
- Effects of Fire on Water Quality and Plant Communities
- Long-Term Monitoring of Atmospheric Mercury Compounds in the Gulf of Mexico
- Land Use Planning for Water Quality Training Workshop
- Wetlands and Water Quality Training Workshop
- Evaluating Sources of Freshwater Inflow into Grand Bay
- Extent of Intertidal Oysters and Use in Shoreline Protection





Taking soil samples on salt panne

Salt Panne Research Cooperative

Salt panne habitats are among the most unique and least understood of all habitats on the Reserve and throughout the Southeast. The Grand Bay NERR and the Gulf Coast are home to many pristine salt panne habitats, so the Reserve developed a research cooperative to investigate these habitats. The Salt Panne Research Cooperative is a collaborative effort towards an improved understanding of the ecology of salt panne habitats found along the Mississippi Gulf Coast. Salt Panne Research Cooperative member institutions include the Grand Bay NERR, Mississippi State University – Coastal Research and Extension Center, the University of Georgia, Mississippi Department of Marine Resources and the University of Southern Mississippi – Gulf Coast Research Laboratory. Since 2005, members of the cooperative have been studying the ecology of these distinctive habitats through surveys and inventories of broad taxonomic groups including plants,

benthic and terrestrial invertebrates, fish, birds and mammals. As investigators learn more about these unique habitats, they continue to search for answers about their formation and position in the landscape, particularly as it may relate to climate change.



Sampling fish on salt panne

Environmental Cooperative Science Center (ECSC)

The Environmental Cooperative Science Center, part of the NOAA Education Partnership Program, was established in 2001 to address ecological and coastal management issues at National Estuarine Research Reserves and the Florida Keys National Marine Sanctuary. The program provides opportunities for under-represented students and advances collaborative research in NOAA-related sciences.

Research activities occur within five thematic areas, and projects at Grand Bay include creation of a conceptual model

to support environmental decision making, hyperspectral data acquisition and remote sensing, submerged aquatic vegetation (SAV) monitoring and predictive habitat modeling, water quality and nutrient analysis and the evaluation of bacteriological and heavy metal contamination within the Reserve. Jackson State, Florida A&M and Creighton University are among several ECSC schools working at the Grand Bay NERR.

Focus Areas of the Research Program

The Grand Bay NERR research staff has developed several focus areas over the past 10 years. These focus areas are partly based on monitoring and research needs and data gaps identified in the Site Profile, research issues resulting from a conceptual risk assessment models developed in collaboration with the ECSC, areas of expertise of Reserve staff and opportunities for collaboration with universities, research laboratories and government scientists. Thus, the six broad focus-areas for research at the Reserve are: (1) Ecological Effects of Sea Level Rise, (2) Ecology of Tidal Marsh Vertebrates, (3) Ecology of Unique Habitats, (4) Monitoring Ecosystem Effects of Mercury, (5) Coastal Plant Ecology & Mapping and (6) Long-term Monitoring of Environmental Conditions. Since the inception of the research program, over 70 research projects have involved Reserve research staff or utilized data collected for the Reserve. As a result, research staff have been involved in over 60 presentations and 30 scientific publications since the designation of the Grand Bay NERR in 1999.



Graduate Research Fellow studying Clapper Rail nesting behavior

Gulf of Mexico Alliance: Priority Issue Projects at Grand Bay NERR

Nutrients and Nutrient Impact

- Development of Decision-Support Tool for Habitat Degradation Risk Assessment from Watershed Development
- Marsh Restoration as a Filter for Pollutants
- Application of the Marshland Upwelling System (MUS) to Treat Domestic Wastewater in Sensitive Coastal Areas
- Grand Bay NERR Water Quality, Weather and Nutrient System-Wide Monitoring Program (SWMP)



Education

During this first decade of the Reserve's education program, the formal and informal education programs have targeted diverse audiences including students, teachers and community members. The Grand Bay NERR has taken programs out into the community and brought members of the community to the Reserve. The Reserve's varied habitats and associated plants and animals provide an excellent "living laboratory" for all types of learning experiences.



Field class for Jackson State University students

In cooperation with research and stewardship staff, the educators have offered many onsite, experiential and field-based programs such as botany walks, sparrow sweeps, mist-netting for birds, kayaking adventures and estuary boat tours. Partnerships with other educational organizations such as the University of Southern Mississippi, J.L Scott Marine Education Center (MEC), Mississippi State University, the Gulf of Mexico Alliance and the Pascagoula River Audubon Center have resulted in program expansions. The Reserve shares a K-12 Educator with the MEC which affords the opportunity to offer on-the-road programs to regional schools and allows better program coordination to help fill the gaps in environmental education on the coast. Additionally, many high quality educational products featuring coastal flora and fauna have been developed to connect the community to the Reserve and its estuarine resources. With the completion of on-site facilities, Grand Bay NERR anticipates greatly expanding these opportunities and opening interpretative exhibits to the public.

Program Highlights

Grand Bay BioBlitz

In the spring of 2004, the Reserve hosted the BioBlitz, an activity designed to document the biodiversity of the Reserve. This intensive 24-hour sampling effort integrated science, education and recreation into one high profile event that attracted scientists and educators from universities and agencies from throughout the region. Daytime and nighttime activities were designed so that community members could interact with the scientists. Special programs for schoolchildren took place immediately prior to the kickoff of the event, and other public programs that occurred during the event were sunrise birding tours, bayou boat tours, twilight bat banding and owl calling to name a few. The Gulf of Mexico Program awarded the Grand Bay BioBlitz a Gulf Guardian Award in the Partnership category in 2005.

EstuaryLive 2005

Originally designed to be broadcast live from the Reserve at the end of September 2005, this interactive distance learning Web-based student program had to be relocated to a new, less-damaged venue after Hurricane Katrina



April 30 – May 1, 2004

Grand Bay National Estuarine Research Reserve

destroyed the facilities at the Reserve. Thanks to the efforts of Weeks Bay NERR and the Mobile Bay National Estuary Program, the program went off with only one hitch—Hurricane Rita bore down on Mobile during the broadcast. It was fitting that the subject of the program was the impact of hurricanes on coastal habitats. During the program over 400 questions were received from viewers from around the world.



Students mapping invasive species

Bird and Plant Guide Series

Three full-color guides to the flora and fauna of the Reserve and nearby habitats have been produced and distributed. These publications have been eagerly accepted by the community. The success of the first publication, *Selected Plants of the Grand Bay National Estuarine Research Reserve and Grand Bay National Wildlife Refuge*, paved the way for the second, expanded edition, *Selected Plants of Coastal Mississippi and Alabama*. The Reserve partnered with the Weeks Bay NERR to produce this second edition. The third guide, *Selected Birds of the Grand Bay National Estuarine Research Reserve and Adjacent Habitats*, was produced in 2009 and has been widely praised. Many local birders and photographers donated pictures of a variety of birds for inclusion in this guide, and we are very grateful to them for their assistance. A poster entitled *Selected Plants of Mississippi's Wet Pine Flatwoods* was recently completed as a companion to the plant guides.



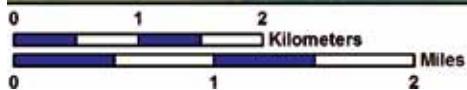
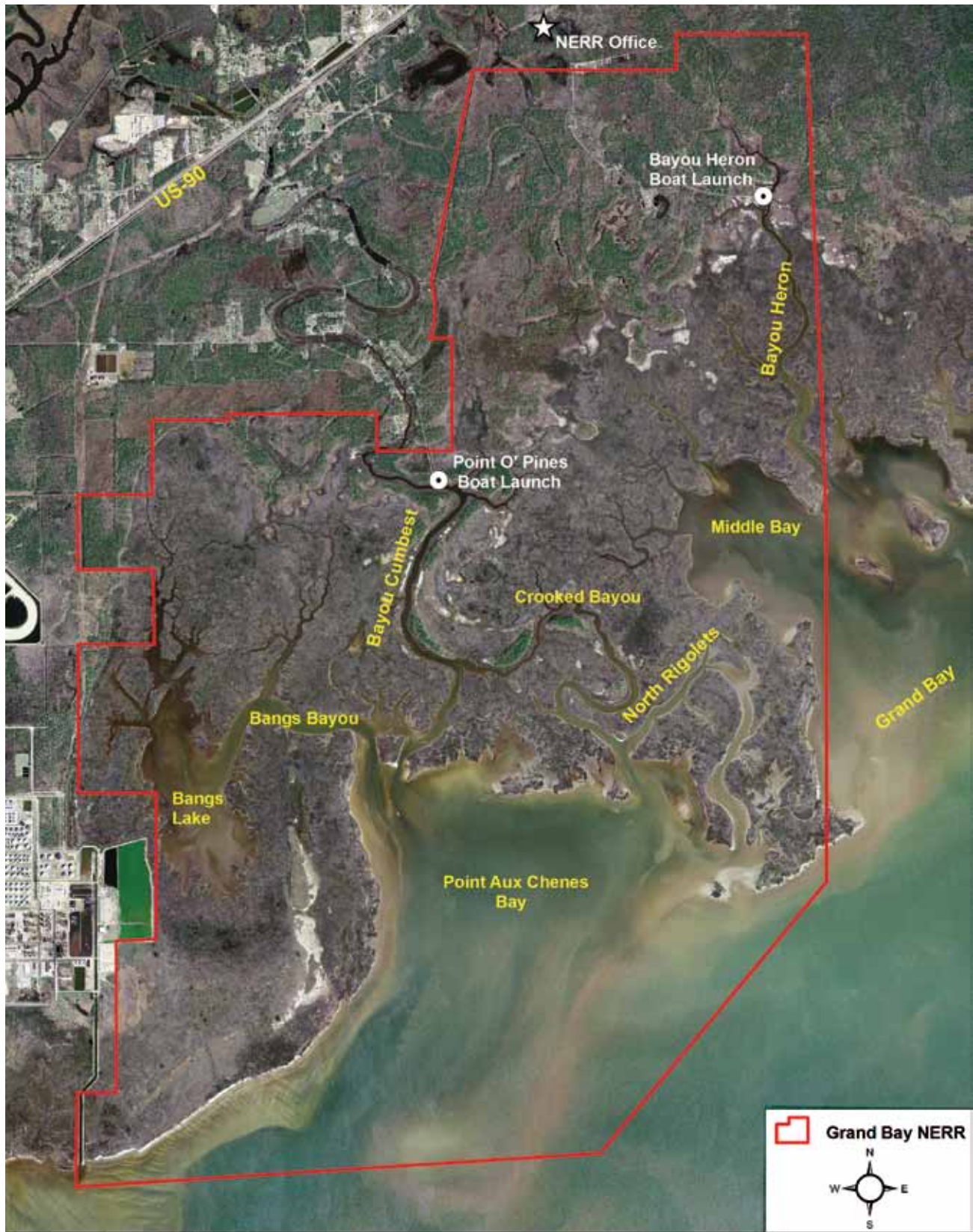
Gulf of Mexico Alliance: Priority Issue Projects at Grand Bay NERR

Environmental Education

- Annual spring “Celebrate the Gulf” Marine Education Festival
- Coastal Decision-Maker workshops including Media Prescribed Fire Academy, Littoral Rights and Plant Identification
- Gulf of Mexico Alliance stakeholder meeting
- Oak Grove Birding Trail development
- Community activities such as Painting en Plein Air, nature photography, castnetting, kayaking, bird-watching, and nature walks
- On the Road Environmental Education Programs for schools in coastal Mississippi and Alabama
- Pontoon boat and kayaking educational tours
- Regional Science Fair Taskforce participation
- Reserve brochure, poster and guide publications



Grand Bay NERR, Jackson County, Mississippi



Moving Forward

The Grand Bay NERR staff are excited about the opportunity to make use of the new facilities to stretch their programs to the next level. Much has been accomplished over the first ten years at the Reserve, and those activities will serve as a foundation for work over the next ten years and beyond.



As we continue to work with coastal researchers, educators, resource managers, local officials and the public, our objectives are many...

- Expand habitat restoration and enhancement efforts through fire management and invasive exotic plant and animal removal;
- Expand the use of the Reserve by visiting scientists, teachers and students;
- Expand K-12 school programs, field trips and community outreach efforts;
- Train and collaborate with local officials, resource managers and local communities address issues relating to wetlands, stormwater, land use and climate change in order to protect water quality and marine resources of coastal Mississippi;
- Revise the Reserve Website – www.grandbaynerr.org;
- Secure additional properties within the Reserve boundaries;
- Expand efforts to examine effects of climate change and sea-level rise on coastal plants, animals, ecosystems and the human-built environment;
- Maintain existing collaborations and forge new partnerships;
- Expand mercury-related, ecosystem-based research to complement existing mercury monitoring data collected at the Reserve; and
- Continue and expand research and monitoring programs to track short-term variation and assess long-term trends in the health of our coastal ecosystems.

Gulf of Mexico Alliance: Priority Issue Projects at Grand Bay NERR

Ecosystem Integration and Assessment

- Development of Decision-Support Tool for Habitat Degradation Risk Assessment from Watershed Development
- Evaluation of New Techniques for the Control of Cogongrass
- Conceptual Modeling for Ecological Risk Assessment of the Grand Bay NERR
- Ecology of Salt Panne Habitats in Coastal Mississippi
- Use of Remote Sensing to Determine Marsh Elevations and Species Composition
- Forest Structure and Growth Relating to Climate Effects and Fire Regime
- Development of Ecological Characterization for the Reserve
- Hydric Soils for Natural Resource Managers Training Workshop





Acknowledgements

Special thanks goes to all those who have made the Grand Bay National Estuarine Research Reserve a reality and success over the first 10 years. Thinking back to everyone involved with the site selection and nomination process in the mid-1990s to the everlasting support from the Mississippi Department of Marine Resources and our growing list of partners and supporters, the task of counting individuals is overwhelming. So, for those who have assisted and supported the Reserve, thank you.

To the current staff:

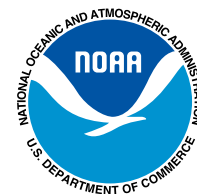
Jennifer Buchanan, Brenna Ehmen, Gretchen Grammer, Marian Hanisko, Daniel McDonell,
Jay McIlwain, Rick Ranew, David Ruple, Teresa Stadler, Tom Stadler, Tom Strange, Jake Walker,
Will Underwood, Christine Walters, Christina Watters, Mark Woodrey

Thanks for your commitment to the Reserve, your contributions and photos for this publication.

Front and Back Cover Photos – Courtesy of Tom Carlisle ©



**Grand Bay
National Estuarine Research Reserve**



6005 Bayou Heron Road
Moss Point, MS 39562
228.475.7047
grandbaynerr.org

This publication was funded through a federal grant from the National Oceanic and Atmospheric Administration (NOAA), Office of Ocean and Coastal Resource Management under the Coastal Zone Management Act of 1972, as amended.



Printed on Recycled Paper, December 2009

This public document is not for sale, and all rights to the publication are reserved to the DMR.
Copies may be made for educational purposes only.



GRAND BAY NATIONAL ESTUARINE RESEARCH RESERVE

