CWPPRA

Coastal Wetlands Planning, Protection and Restoration Act

Partners in Restoration

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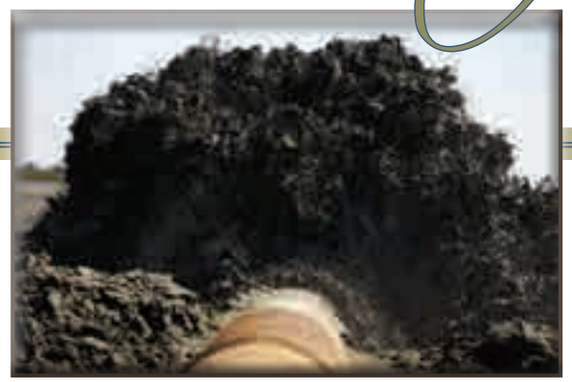

Twentieth Anniversary Portfolio

Partners in Restoration Dedication

Suzanne "Sue" Hawes

This portfolio is dedicated to Ms. Suzanne "Sue" Hawes, who spent a career working tirelessly to protect and sustain Louisiana's coastal wetlands.

Sue's unyielding expert understanding, professionalism, fairness, openness, clarity of thinking, and commitment to environmental protection and restoration gained her the unique role as the U.S. Army Corps of Engineers' Project Manager for the Environment. Over her career, Sue earned the highest respect and admiration from a diversity of groups, including Federal and State resource agencies, local governments, commercial fishermen, oil and gas representatives, land managers, and other interests throughout Louisiana and the Nation.

Her ability to listen and to explain the complexities of restoration projects has been crucial to building the coalition of stakeholders and staff who will continue the great effort to save Louisiana's coast. She will be most sorely missed and fondly remembered.

Foreword

CWPPRA Task Force

The intent of this book is to impart on the reader two points: (1) coastal Louisiana is being lost at an alarming rate, and (2) the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) has established a foundation for a successful restoration program in Louisiana. The act was created predominantly for restoration of the State's coastal wetlands.

Since 1990, the program can be described with one word—action. At the time of this printing, 97 projects have been constructed with another 51 in engineering and design. Collectively, these projects will protect, enhance, and/or restore over 670,000 acres of coastal wetlands and aquatic habitats. The strength of the program lies in successful multiagency collaboration and partnership with local governments that can turn a project from concept to construction in 3–5 years.

CWPPRA provides valuable near-term solutions to address immediate needs as larger scale projects are planned. As partners in restoration, the CWPPRA Task Force celebrates the first 20 years of CWPPRA and its continued relevancy in restoring coastal Louisiana.

USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

US Army Corps of Engineers
New Orleans District

NOAA

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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Barataria-Terrebonne National Estuary Program

Introduction

A Nation's Wetland

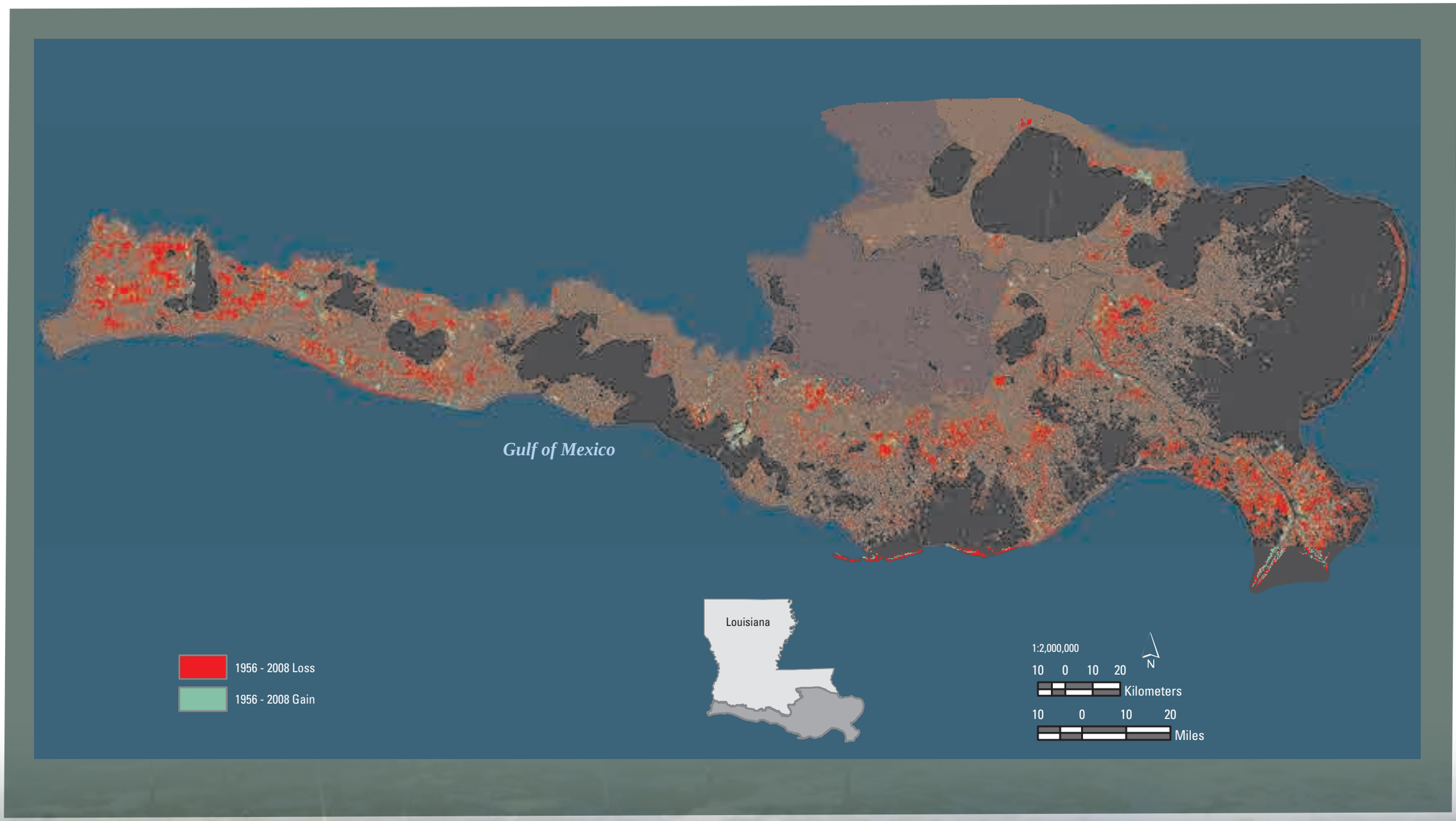
Meandering bayous, moss-filled trees, teeming wildlife against a backdrop of seemingly endless wetlands—these images have long depicted the cultural and environmental richness of coastal Louisiana. Familiar are the music and food that come from this region; less so is the economy derived from this natural bounty on which the country has come to depend. From these coastal waters comes nearly one-third of the Nation's fisheries, and one-quarter of the Nation's oil and gas supply is either produced or comes ashore in Louisiana's wetlands. The many miles of navigation channels and ports in the region account for nearly 20 percent of the Nation's waterborne commerce.

Because of these economic opportunities, nearly half of the State's population lives in the coastal zone. The importance of the economic contribution from Louisiana's coast is magnified by the fact that the coast is washing away at an alarming rate. This contribution is directly linked to the stability of the coastal wetlands that provide fish habitat and contain the infrastructure that has long supported energy production and commerce. As the land disappears, the human fabric that makes up south Louisiana and is enjoyed by thousands of visitors each year also will be lost. The tragedy of losing Louisiana's coast in terms of human and economic value is beyond enumeration and has become a matter of national concern. This is not only Louisiana's wetland – it is also the Nation's wetland.

No Time To Lose

Like most deltaic systems, the Louisiana coast is sinking. The natural occurrence of subsidence was historically offset by new sediment from the annual overflow of the Mississippi River. With construction of the river levees, this overflow was cut off, leaving the wetlands to continue sinking with no source of renourishment. Since the early 1900s, storms and anthropogenic impacts have compounded with subsidence to cause drastic land loss in coastal Louisiana. In the past century, Louisiana has lost more than 1 million acres from its coast, 24 square miles annually, because of both human and natural factors that have disrupted ecological and economic stability.

Billions of dollars in seafood production, oil and gas revenue, and commercial shipping will be lost without Louisiana's coastal wetlands, which provide the basis and support for these industries. In terms of human life, the value of these wetlands is beyond estimation. Healthy marsh provides a buffer against storms, and its ability to absorb high water and slow wind is key to survival for coastal communities. As land is lost, hurricanes and tropical storms hit shore ever closer to the two million people who live near the coast. Every year as wetlands lose ground, these forces land closer to home. Without intervention, this ecosystem will be erased from the national landscape.


Gulf of Mexico
1956 - 2008 Loss
1956 - 2008 Gain
Louisiana
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Miles
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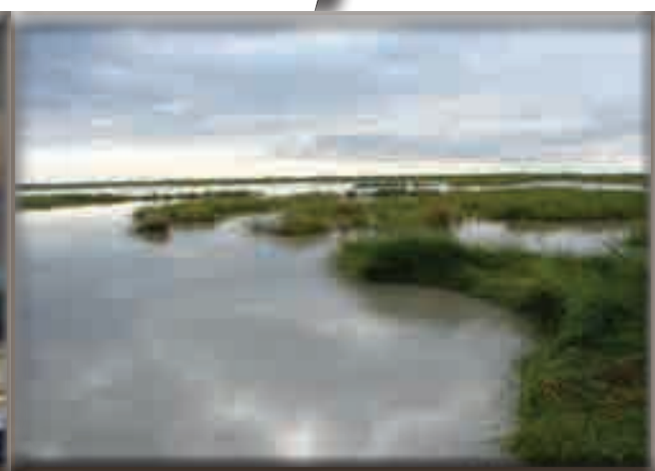
Creation of a Restoration Program: Genesis of CWPPRA

Congress recognized the ongoing severe coastal wetland losses in Louisiana and the increasing impacts on locally, regionally, and nationally important resources when it passed the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) in 1990. Over the last 20 years, the CWPPRA program has been the State's and Nation's primary means for responding to coastal wetland loss in Louisiana. As such, CWPPRA is focused on coastal restoration for the long-term conservation of the wetland habitats of Louisiana and the dependent fish and wildlife populations.

CWPPRA has been a consistent Federal funding source for coastal wetland restoration efforts, which enables program managers to plan for the future. Each year, a small amount is set aside for planning with the remaining funds going to direct project implementation. CWPPRA has been, and continues to be, an example of successful government, academic, and public collaboration in accomplishing meaningful ecosystem restoration.



Overview of CWPPRA

Public Process

Project Evaluation and Selection

Agency Participation and Organization

Planning Strategies and Restoration Techniques

Public Process

Since its inception, CWPPRA has been the primary mechanism for implementing coastal wetland protection and restoration projects in Louisiana as a result of the consistent long-term funding stream authorized by Congress. The CWPPRA program has proven to be very effective and efficient in designing and implementing medium to large-scale projects. This is accomplished by using a bottom-up and collaborative multiagency approach that closely engages the public, local governments, and other important stakeholders. Through a series of public meetings that are held throughout the year, the public is invited to participate in the nomination of projects, the development of project concepts, the project approval process, and providing input on management and policy decisions regarding the program. Representatives from the coastal parish governments are closely involved in the vetting of project ideas and often present their restoration priorities that stem from local restoration plans. This level of public and stakeholder involvement is critical for generating project buy-in and the ultimate construction of projects that meet local needs.

Project Evaluation and Selection

Projects are implemented under the CWPPRA program by using a systematic approach that starts with an annual planning cycle to select new projects. In January of each year, a new selection process begins with solicitation to the CWPPRA agencies, the public, parish governments, and other institutions to propose new projects. The CWPPRA workgroups screen this initial list of projects to ensure consistency with established restoration plans and then select a smaller list of candidate projects that will be further developed over the course of the year and evaluated for cost-effectiveness, feasibility, and other criteria.

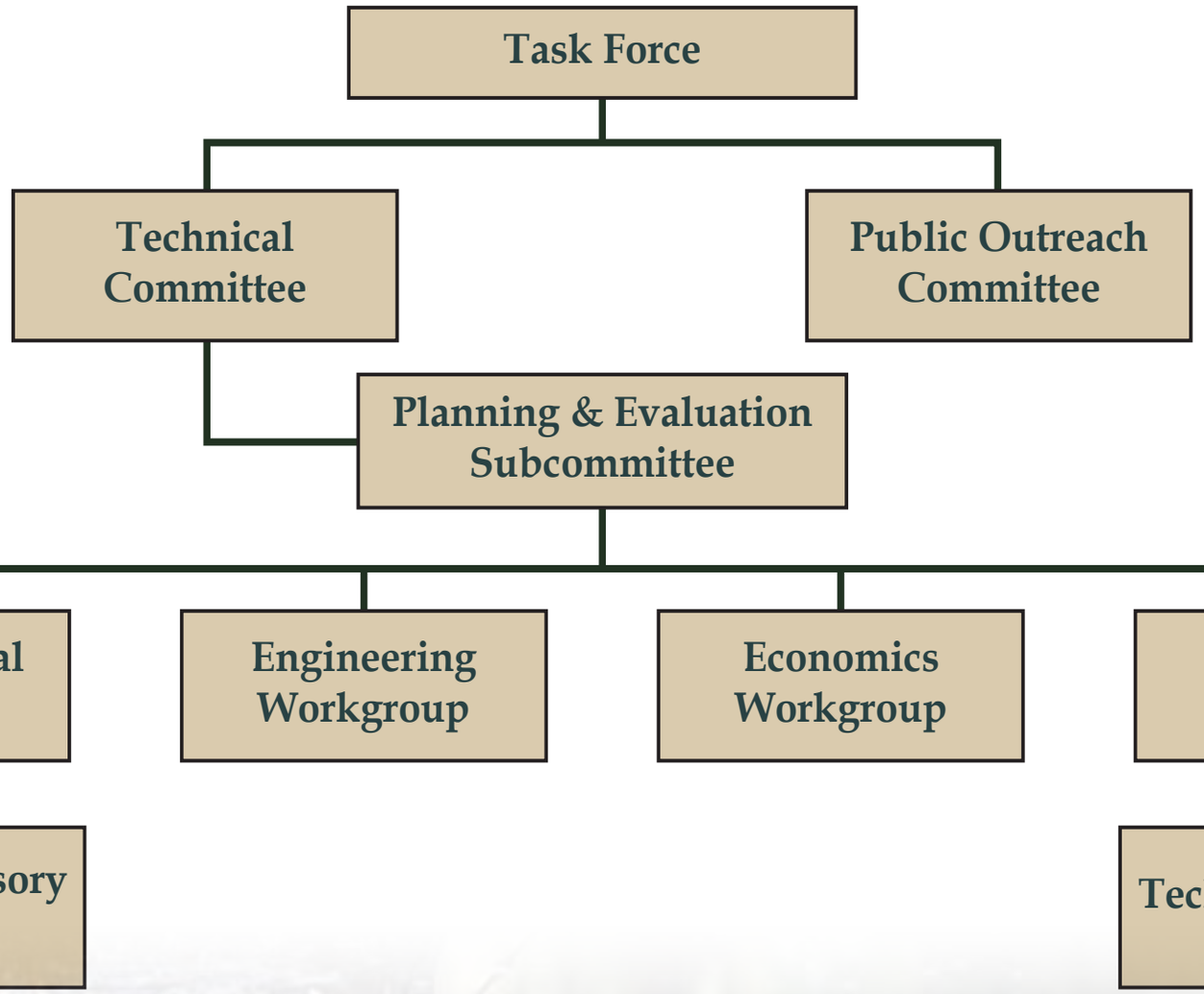
Cost-effectiveness is measured by comparing the estimated cost per acre of wetlands restored, enhanced, or protected among projects. Wetland benefits are estimated by conducting site visits and a wetland value assessment (WVA) by using habitat suitability models. In addition to the WVA, the workgroups also conduct an engineering analysis to estimate project costs and the feasibility of project construction. The project budget is then evaluated to determine the total cost to implement, operate, maintain, and monitor each project for 20 years.

The Task Force uses cost-effectiveness, critical need, and other factors as the primary metrics to determine which projects will be funded for full engineering and design and, ultimately, construction. Other important factors such as areas of critical need, strategic function, and public support are also weighed in the decisionmaking. Once projects are selected, lead Federal agencies are chosen to partner with the State and sponsor the projects through construction.

Agency Participation and Organization

The CWPPRA program is managed by the CWPPRA Task Force, which along with the State of Louisiana consists of five Federal agencies: the Department of the Army, Corps of Engineers; Environmental Protection Agency; Department of the Interior, Fish and Wildlife Service; Department of Agriculture, Natural Resources Conservation Service; and the Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service. The U.S. Army Corps of Engineers New Orleans District Commander is the Chair of the Task Force. The Task Force implements the CWPPRA program with the assistance of subordinate committees and workgroups and by closely engaging the public. The Technical Committee reports and makes recommendations directly to the Task Force on issues, funding, and procedures related to executing the CWPPRA program and its projects. The Task Force conducts general planning activities and makes program and project funding decisions in several public meetings held throughout the year.

The multiagency organization of the CWPPRA program has helped to streamline project implementation as part of a divide-and-conquer approach. As project lists are developed each year, the five agencies can apply their respective resources to executing projects. A multiagency approach has also benefited the program by encouraging multiple perspectives and priorities to be considered during project development. Over the last 20 years, the CWPPRA agencies have worked together to share experience that has reduced the learning curve and helped put projects on the ground faster.


Task Force
Technical Committee
Public Outreach Committee
Planning & Evaluation Subcommittee
Environmental Workgroup
Engineering Workgroup
Economics Workgroup
Monitoring Workgroup
Academic Advisory Workgroup
Technical Advisory Workgroup

Planning Strategies and Restoration Techniques

Restoration projects do not happen haphazardly but with thoughtful consideration to ecological need, feasibility, and the project's support of publicly vetted Federal and State restoration planning. In the aftermath of Hurricane Katrina in 2005, Federal and State master plans were initiated for the wide-scale restoration and protection of coastal Louisiana. In addition to the reevaluation of levee alignments and elevations, the plans include restoration strategies that have been developed and used largely by CWPPRA over the last 20 years.

The definition of these strategies is broad; however, their application is specific to the location of and environmental conditions surrounding a project site. In some cases, more than one strategy is used to offset land loss and restore a particular ecosystem. The strategies stem from evaluating—using the best science available—the root causes of land loss for a project site and then evaluating the best methods available for restoration. Systemic solutions, those that reverse the original cause of land loss, are pursued where possible. In some cases, the systemic solution requires political action or funding beyond the constraints of the program. In these situations, restoration projects are designed to optimize habitat conditions to help hold the line until longer term solutions can come to fruition.

The restoration techniques that are identified in planning strategies have two major objectives: (1) to physically rebuild the wetlands that have been lost and/or (2) to reduce or reverse the rate of land loss by improving the ecological stability of the remaining wetlands. The following chapters highlight each of the major restoration techniques that have been widely used under the CWPPRA program.

Restoration Techniques

Barrier Islands

First Line of Defense

Marsh Creation

Restoring What Has Been Lost

Shoreline Protection

Protecting What Is Left

Hydrologic Restoration

Supporting a Working Coast

Terracing

Innovative Solutions

Freshwater and Sediment Diversions

Restoring Natural Processes

Restoration Techniques

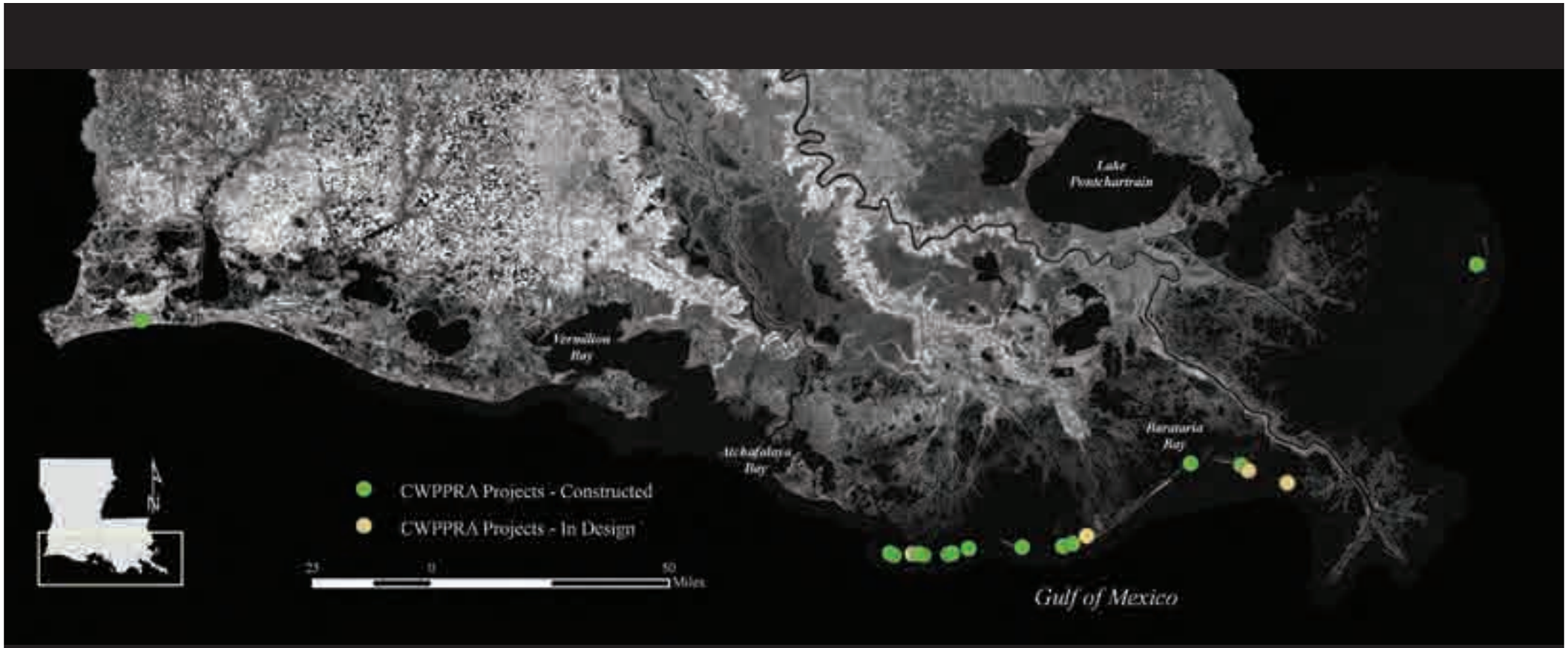
Barrier Islands

Within a vast expanse of open water a string of land emerges—a bastion for recreation, a last refuge for migratory birds, and a first line of defense for coastal Louisiana. Barrier islands represent the remnants of what was once a thriving delta. As a delta forms, sediments are reworked via wave energy and longshore drift to form elongated shorelines. As a delta degrades, the land sinks and separates from the coarser grained shoreline to form barrier islands. These islands are a unique composite of beach, dune, marsh, and sand flats that host a tremendous variety of fisheries, wildlife, and endangered species. Once a nearly continuous chain spanning from Terrebonne Bay to Barataria Bay and up through Chandeleur Sound, these islands have critically deteriorated, mainly as a result of storms and disrupted sediment drift. As levees, jetties, and deep navigation channels have been constructed, sediments that were once carried by currents and deposited onto islands are largely trapped or redirected offshore. Without this renourishment, an island's longevity is threatened by subsidence, sea level rise, and each passing storm.

To breathe new life into this rich habitat, CWPPRA is rebuilding the barrier island chain one island at a time. Island restoration is a complex and expensive undertaking compared to other restoration techniques. This is due to the extensive hydrodynamic modeling, design, and search for adequate offshore or river sand necessary to rebuild an island. Determining the correct dimensions for dune height, beach width, and backbarrier marsh elevation that can withstand major storms is a major consideration during project design. Once design is complete, sediment is dredged and pumped to the project site, which is then vegetated with native dune and marsh plants. CWPPRA is designing or has constructed projects within nearly every barrier island or headland within the State.

Responsible for the majority of barrier island restoration to date, CWPPRA has led the charge in barrier island restoration because it recognizes the ecological importance of barrier islands and their critical role in the defense of coastal Louisiana.

First Line of Defense



Locations of Barrier Island Projects

Midway through construction, this island within 2 years matures into a fully functional barrier island (middle right photo).

First Line of Defense

Restoration Techniques

Marsh Creation

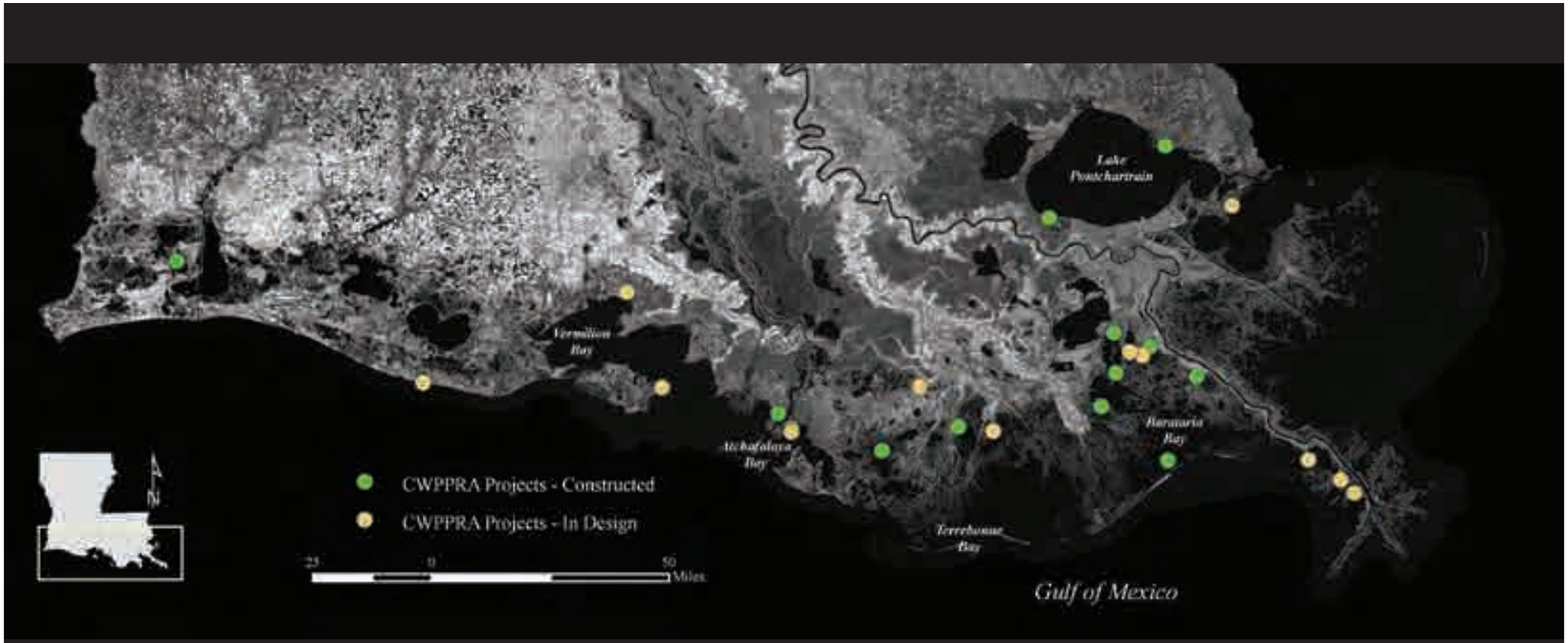
Over millennia, sand, silt, and clay delivered via the muddy floodwaters of the Mississippi River built the wetlands of Louisiana's coastal zone. With construction of the levees along the river to reduce flood risk to adjacent communities, the floodwaters responsible for creating the wetlands were channeled into the Gulf of Mexico. Without the annual renourishment from the river, wetlands have been sinking and converting to open water. To restore the sinking wetlands, marsh creation replicates the natural land-building process in a controlled, and much accelerated, fashion.

Land is built by a pipeline dredge that removes sediment from a "borrow site" by using a specialized vessel outfitted with a drill, suction pump, and pipe. As the drill, or cutterhead, spins, it agitates sediment at the bottom of the borrow site. This sediment is then pumped with water into a pipe that carries the resultant slurry to the restoration site. Once the slurry is in place, the water runs off as the sediment settles to form new land. Native vegetation is then installed to jump-start wetland productivity. Marsh creation projects result in restored wetlands in areas that were open water just weeks before.

Even the largest marsh creation projects built to date, however, cannot keep pace with Louisiana's annual land loss of 24 square miles. The current condition in Louisiana did not develop overnight; it has taken more than 80 years of natural and artificial impacts to realize this drastic rate of decline. Marsh creation projects are limited by increasing water depths and funding constraints; the program cannot restore every acre that has been lost. CWPPRA is striving to identify and construct projects that provide strategic benefits by holding together larger ecosystems and that use renewable sediment resources like the river.

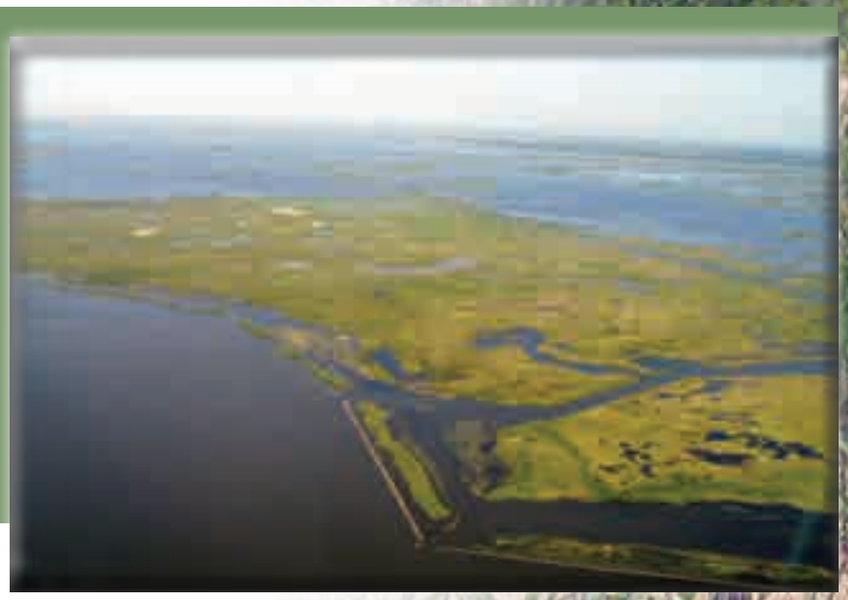
Over the course of 20 years, CWPPRA has been restoring one piece of broken marsh at a time, which cumulatively yields significant results over time. The long-term vision is to sustain these restored marshes by restoring part of the riverine processes that first built them.

Restoring What Has Been Lost



Locations of Marsh Creation Projects

Pumping from the Mississippi River, sediment is filling this area to create new marsh. After 2 years, this area will be fully vegetated wetland.



Restoring What Has Been Lost

Restoration Techniques

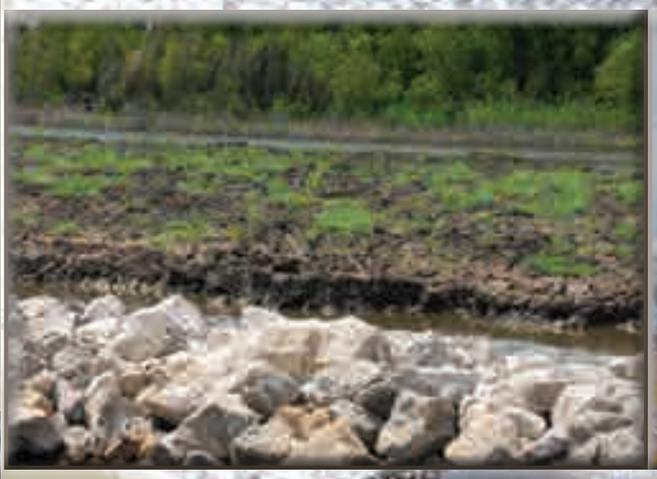
Shoreline Protection

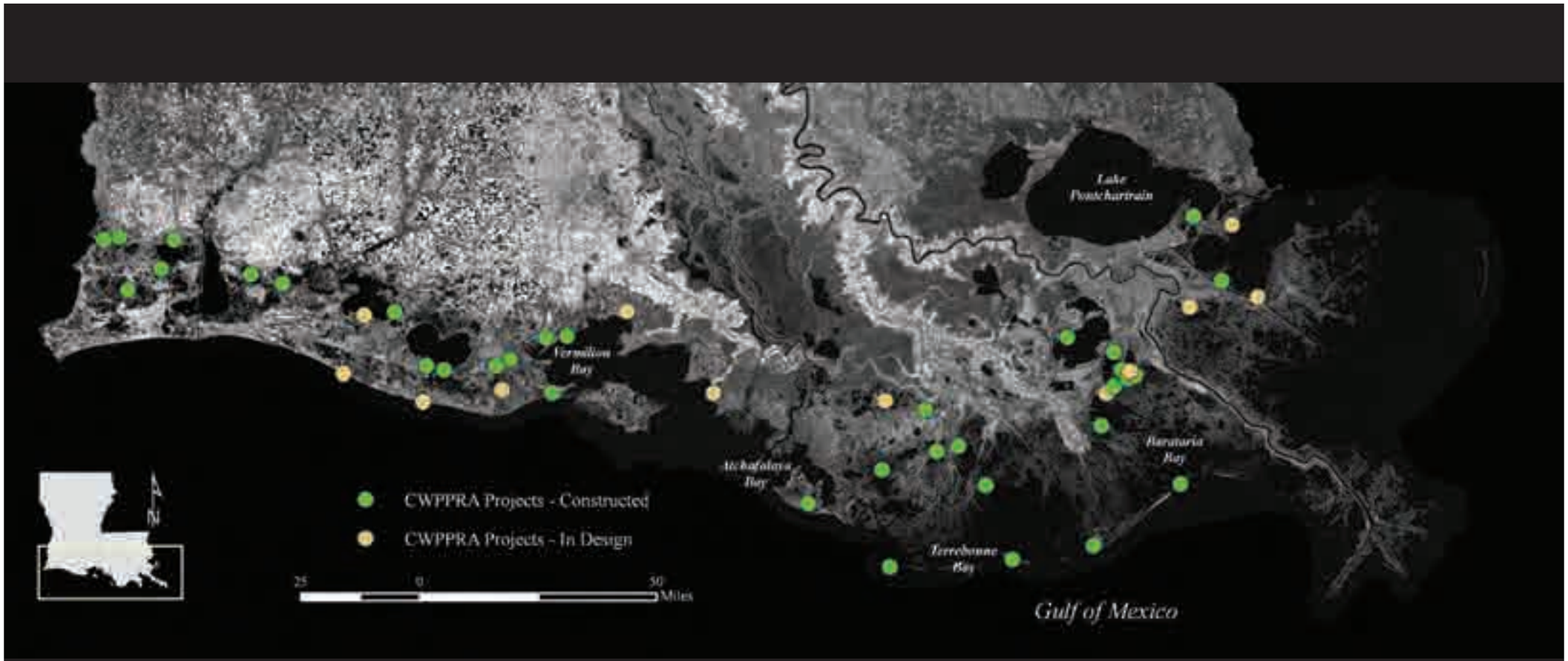
As the adage goes, "An ounce of prevention is worth a pound of cure." For Louisiana's wetlands—where it is easier and often less expensive to protect what is left than replace what has been lost—this is especially true. Louisiana's shorelines are eroding at a drastic pace, some at rates up to 50 feet per year. The fertile but fragile soils found in the wetlands are susceptible to wave energy. As land is lost, water bodies merge together, which can increase wave fetch and shoreline erosion. Behind these shorelines lie communities, highways, and infrastructure that are at risk of washing away.

Various techniques to defend the coastline have been tested and applied under CWPPRA. Rock revetments, oyster reefs, concrete panels, and other fabricated materials have been constructed along otherwise unstable shorelines to abate wave energy and reduce erosion. These structures are designed to break waves, and they often trap waterborne sediments behind the structures that over time can become new land.

Through the course of the CWPPRA program, advancements have been made in shoreline structures that have helped maintain natural processes while providing critical protection. Such advancements have included using lighter weight materials that require less maintenance and can be constructed on organic sediments. Other advancements include low-relief structures that are designed to trap sediments and natural breakwaters such as reefs that can self-maintain and support other ecological functions. Other natural shoreline protection measures include vegetative plantings, whose roots help secure soils and can promote accretion. These projects are implemented with consideration for minimizing impacts to the surrounding environment. Although some shoreline structures may look foreign in a natural landscape, they are necessary features that physically protect communities and hold wetlands in place by mitigating the harsh forces that move to destroy them.

Protecting What Is Left





Locations of Shoreline Protection Projects

Concrete panels are installed in lieu of rock because of poor soils. This wall reduces wave energy and serves as containment for marsh created behind it.

Protecting What Is Left

Restoration Techniques

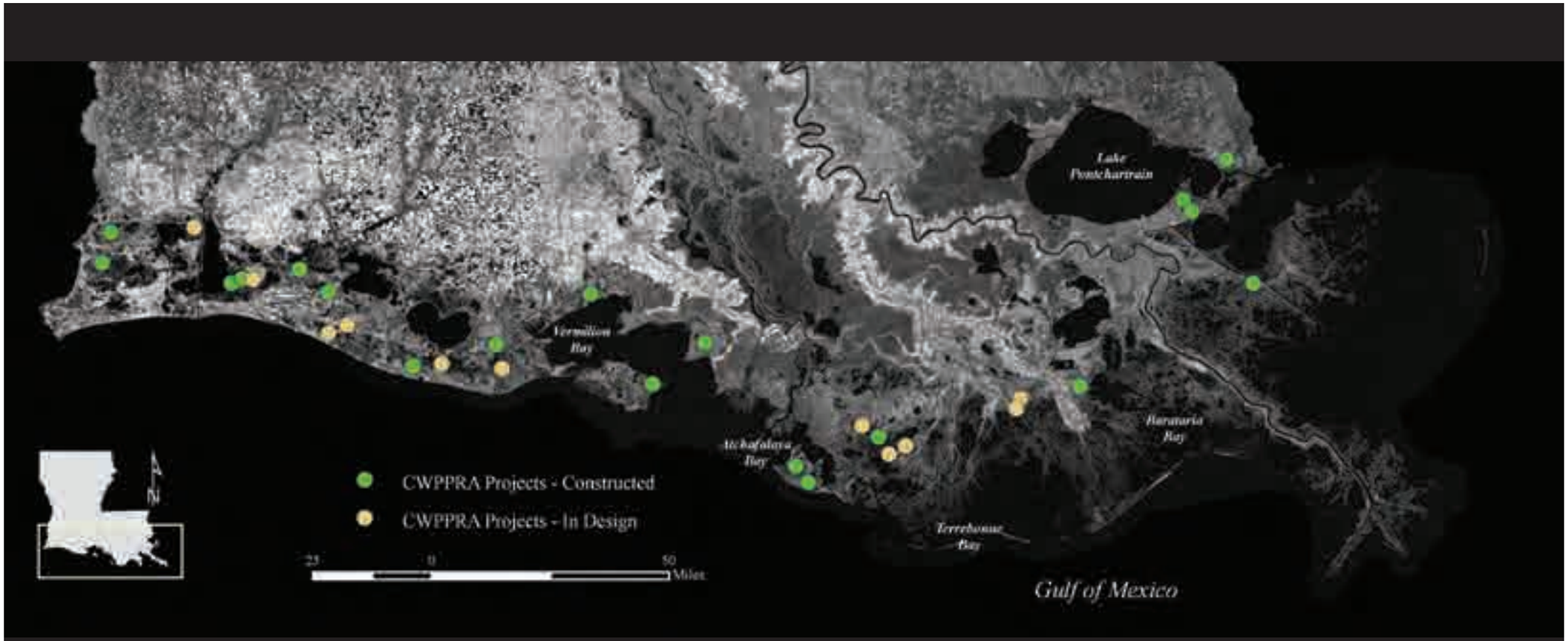
Hydrologic Restoration

The Louisiana coastal zone has been called "America's wetland" because of the significant contribution made to the national economy in part from petrochemical production, maritime traffic, and agriculture. Thousands of miles of navigation channels and pipeline canals have been dredged through the wetlands in support of this economy. Although vital services are provided to the State and Nation, the cost to Louisiana's marshes has been significant. When channels are dug, wetlands are directly removed. As the number of canals and channels crisscrossing the marshes increases, the amount of water movement also increases. Large navigation channels have been a conduit for storm surge and saltwater intrusion, while agricultural and other marsh impoundments have also stressed wetlands by altering natural hydrology.

The intent of hydrologic restoration projects under CWPPRA is to reduce these impacts without disrupting the commerce that still thrives in Louisiana's coastal zone. Earthen and rock plugs prevent unnatural tidal flow through abandoned canals, and water-control structures help regulate water and salinity levels. In some cases, large culverts are installed under roads, levees, or other obstructions that have impounded wetlands. Impounded wetlands can suffer from stressed vegetation, restricted access for marine organisms, and water poor in oxygen, sediment, and nutrients that feed the marsh. Without reintroduction of more natural hydrology, marshes will eventually succumb to these stressors.

Through a combination of passively and actively managed structures, saltwater intrusion can be abated and water levels managed to optimize wetland growth and vitality. Wetlands are dependent on natural hydrology, and industry is dependent on access to resources in the coastal zone. CWPPRA projects are helping to maintain the coexistence of Louisiana's wetlands and the working coast.

Supporting a Working Coast



Locations of Hydrologic Restoration Projects

Water-control structures help restore hydrology to marshes impacted by development, navigation channels, and canals.

Supporting a Working Coast

Restoration Techniques

Terracing

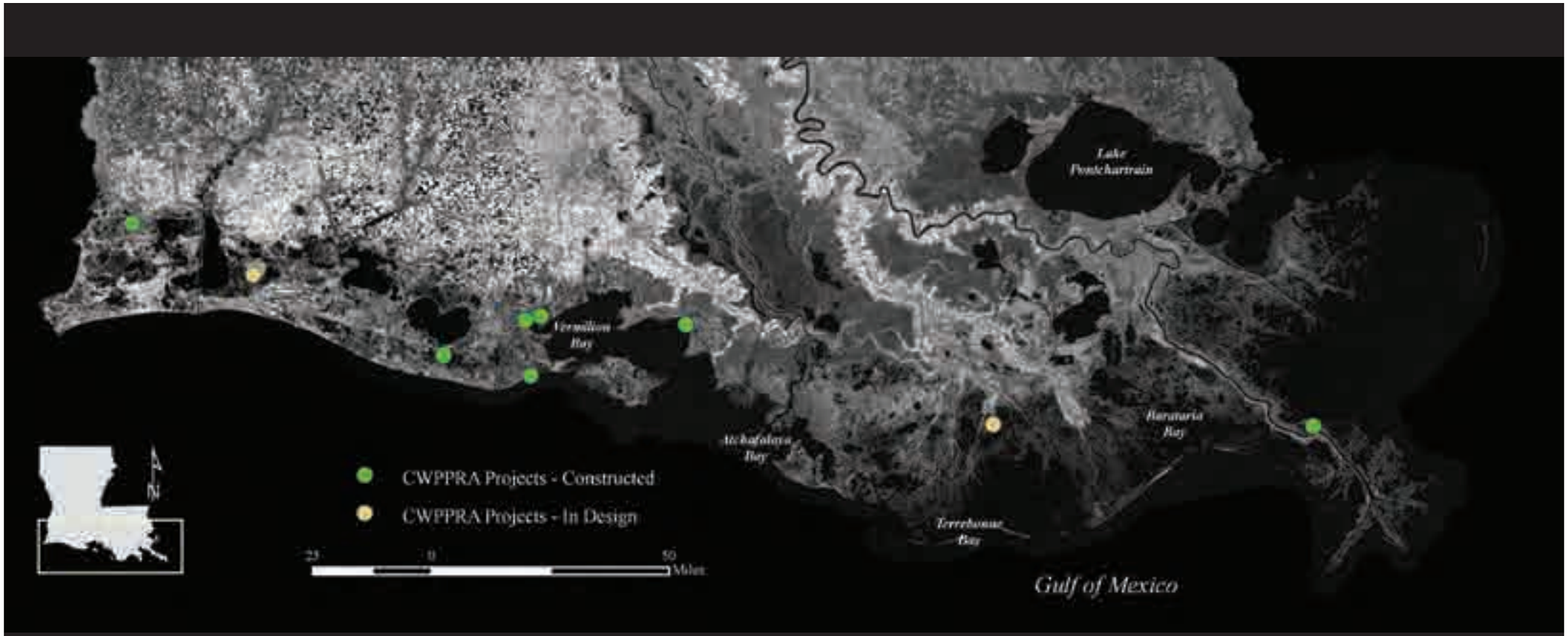
The magnitude of land loss in Louisiana requires innovative solutions. One of the most immediate techniques for reversing land loss is to build new land. Replacing each acre of lost marsh with newly created marsh is a desirable goal but not entirely feasible because of cost constraints and the limitation of material with which to build new marsh.

The goal of building terraces is to achieve some of the same objectives as full marsh creation but over a larger area of open water, where marsh creation alone is not feasible. Terraces are long, earthen berms that are built by mechanically dredging material and piling and shaping the material to a desired height. Most terraces average around 3 feet tall, with shallow side slopes and a wide base. This size and shape optimize the amount of terrace that falls in the intertidal zone and will support wetland vegetation.

The objectives of constructing terraces are several and depend upon the location in which they are built. These include acting as a sediment trap to help build new land, reducing wave fetch and erosion on adjacent marsh shorelines, creating habitat for fish and waterfowl, and improving water quality to promote the growth of aquatic vegetation. Terracing projects constructed under CWPPRA have achieved each of these goals, with sediment trapping being most evident near the openings of sediment-laden bays or navigational waterways.

Terracing has become a widely used technique that is expanding across the Gulf Coast because of the success and cost-effectiveness demonstrated through CWPPRA and privately funded projects. Although these features may not look like natural marsh and often use geometric configurations, they are able to perform a lot of the functions of natural marsh in areas that have become vast open water. Developing this cost-effective technique for use in areas that have few other restoration options is a testament to CWPPRA's ability to adapt to funding constraints and a quickly changing environment.

Innovative Solutions



Locations of Terracing Projects

These terraces are providing fish and wildlife habitat, reducing shoreline erosion, and trapping sediment that over time can accrete into new land.

Innovative Solutions

Restoration Techniques

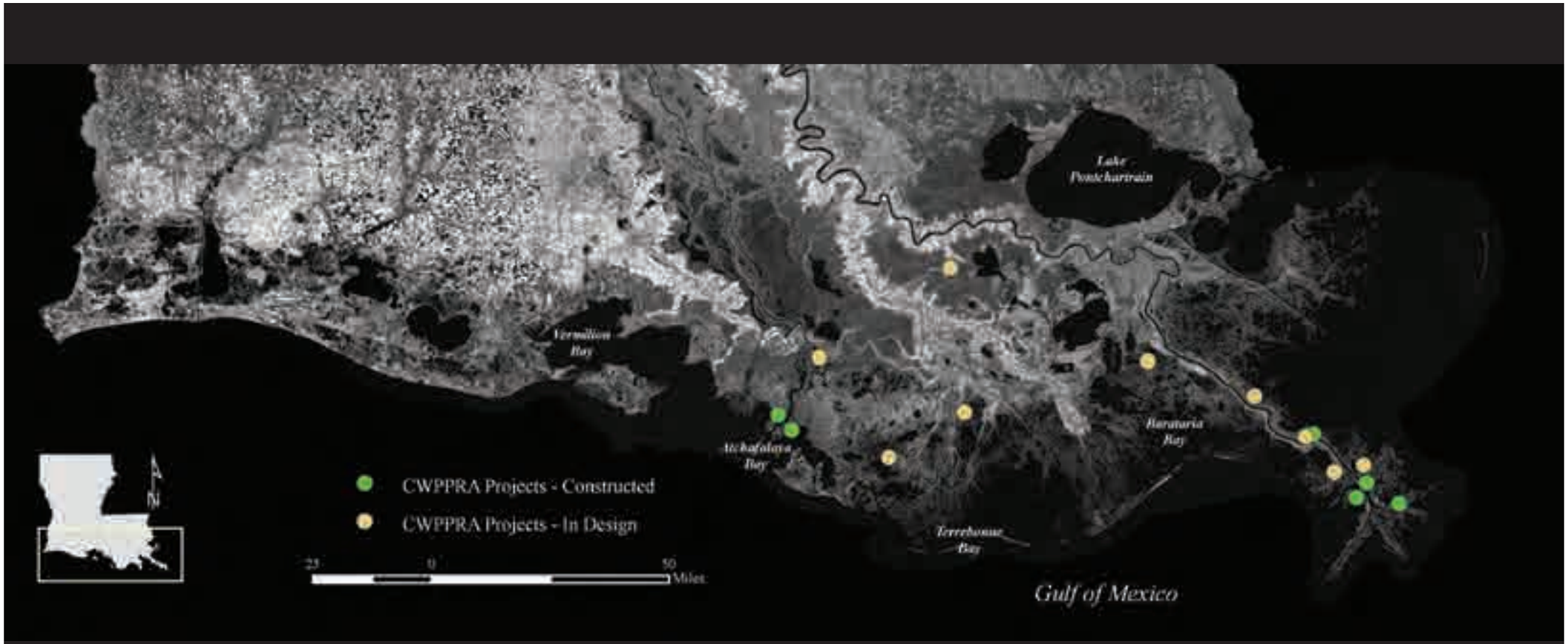
Freshwater and Sediment Diversions

Water is the essence of life, and the Mississippi River is the lifeblood of Louisiana's wetlands. Over thousands of years, the unconfined Mississippi changed course and created seven historical deltas that built most of Louisiana's coast. Annual flooding events caused sediment-laden, nutrient-rich water to overflow riverbanks and deposit into low-lying areas that over time became emergent wetlands. The present location of the river has been confined by levees constructed in response to the devastating flood of 1927. Although necessary for protecting life and property, the levees prevent the natural processes of delta building and sediment deposition that are vital for sustaining wetlands. Without this renourishment, the wetlands will eventually succumb to subsidence, storms, and anthropogenic impacts.

The CWPPRA program has been finding solutions to optimize river resources and help rebuild wetlands with minimal impact to other stakeholders. Controlled diversions route river water through strategic locations in the levees to feed starving marshes. Crevasses, or cuts, are constructed through levees to allow passive creation of smaller deltas. Siphons suction fresh river water and direct flow into wetlands suffering from saltwater intrusion. Water-control structures and channel maintenance help distribute river water diverted from large-scale structures constructed under other authorities.

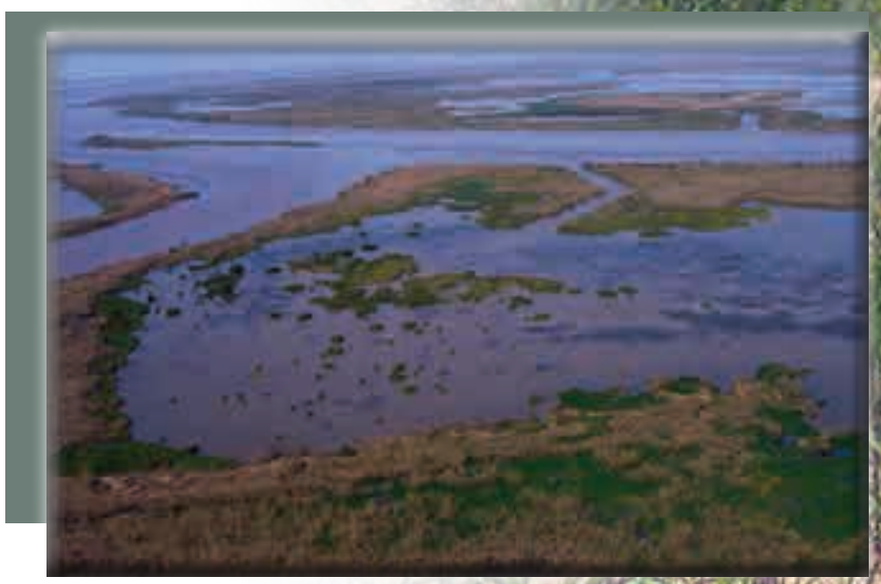
The river presents the greatest opportunity for rebuilding land but also the greatest challenges, as competing needs are inevitable. The human and natural environments must be able to coexist because they are inextricably connected. Together with stakeholders, CWPPRA projects are helping to reverse land loss on an ecosystem scale and support the economy on which coastal Louisiana has come to depend.

Restoring Natural Processes



Locations of Freshwater and Sediment Diversion Projects

Cutting through the Mississippi River levee allows sediment to create small deltas, or crevasse splays, in adjacent open water.



Restoring Natural Processes

Monitoring and Demonstration Programs

Monitoring

Applying Adaptive Management

Tools for Advancing Restoration Science

Demonstration Projects

Monitoring

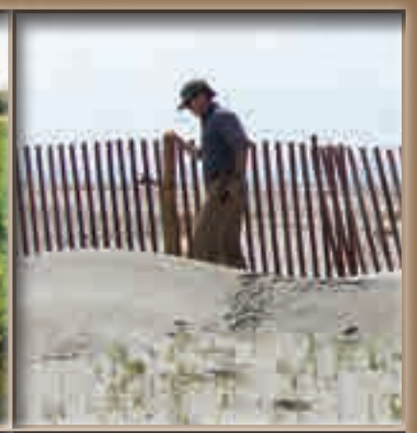
Applying Adaptive Management

A pioneer in coastal restoration, CWPPRA is seeking answers to the land loss crisis based on the best scientific and engineering knowledge available. On each CWPPRA project, scientists and engineers seek up-to-date understanding of coastal ecosystems and collaborate to set goals, develop designs, and monitor results. Project monitoring is a critical component of any restoration program because it helps assess whether a project technique is working to generate desired ecologic goals. If not, monitoring data can help determine how a project should be adaptively managed to improve design and performance.

Tools for Advancing Restoration Science

Aerial photography and geospatial tools offer a wealth of information about Louisiana's wetlands, but when it comes to monitoring the health of those wetlands, there is no substitute for being there. To understand the cumulative effect of restoration projects on the coastal landscape, the Coastwide Reference Monitoring System (CRMS), supported under the CWPPRA program, is installing monitoring stations at 392 sites across coastal Louisiana. Year round, staff members travel to the remote monitoring sites to maintain the equipment and collect data. Spanning the State's coastal zone, the stations monitor hydrology, vegetation, accretion, and erosion, as well as contain documentation of elevation and aerial and ground-level photographs of the monitoring sites. These data are posted on a public Web site, which allows project managers, academia, and landowners to readily retrieve information regarding project performance and ecosystem-level response to projects over time.

To glean lessons from CWPPRA's past projects, scientists must continually monitor habitat health. Project-specific monitoring and the CRMS program help CWPPRA agencies evaluate project success and apply lessons learned to new restoration endeavors.



Scientists visit restoration sites and collect data year round to evaluate project performance and success.

Demonstration Projects

Like most ecosystems, coastal Louisiana is a dynamic environment. Responding to impacts caused by both natural and engineered elements, Louisiana's coastal wetlands either adapt to or are swept away by larger forces. As well, restoration solutions must adapt to changing conditions or risk becoming useless. Over the course of 20 years, the CWPPRA program has had to adapt to environmental changes and rising construction costs to identify ways to be more effective. The CWPPRA demonstration program provides an opportunity to investigate new technologies to do exactly this.

Each year as part of the project selection process, demonstration projects are nominated on the basis of new technology meeting the following three criteria: (1) it has not been fully developed for routine application, (2) the results are transferable, and (3) the technology is not duplicative. Although demonstration projects are not selected every year, many have been funded. Thoroughly studied to gauge their ability to advance wetland restoration, demonstration projects have tested a variety of new approaches to restoration in hopes of enhancing known techniques and improving performance. These projects have included testing new materials for shoreline protection that may be more suitable for

Louisiana's soft soils and testing new ways of dredging and containing sediment used in marsh creation projects. Other projects have involved new approaches to vegetative plantings and techniques for regenerating delicate floating marshes. If a project shows promise, it may be scaled into a larger project that is further studied for applicability coastwide.

The success of the demonstration program as a whole is found in members of the public who have been able to introduce their inventions and concepts and in agencies who have embraced the opportunity to think beyond the common restoration techniques to find something truly innovative. On the cutting edge, CWPPRA continues to strive to maximize project efficiency and pioneer new approaches to restoration.

Conclusion

The Louisiana wetlands are a national treasure, one upon which millions of people are dependent and one that is quickly vanishing. The loss of coastal Louisiana is more than a sad inconvenience but a cultural, ecologic, and economic crisis that can be felt far beyond the State's borders. As land washes away, so go jobs, homes, and services to the country such as commercial fisheries, energy production, and waterborne commerce. The time to act is now.

For more than 20 years, CWPPRA has been actively reclaiming wetlands and helping to turn the tide on land loss. Projects that have rebuilt the barrier islands and interior marshes and have repaired hydrology have all left a lasting mark on the coastal landscape. The resources are limited, however, and much of the problem awaits larger funded solutions.

Since the inception of the CWPPRA program, a foundation has been laid upon which larger restoration initiatives have been built. Capitalizing on the public process of CWPPRA, several comprehensive restoration plans have been generated and widely accepted because of the encouragement of public involvement. Government master planning documents and ongoing feasibility studies have often been born from CWPPRA-generated project concepts. As well, projects that were designed through CWPPRA but exceeded the program's financial constraints have been adopted and constructed through other funded programs. This type of synergy between funding vehicles is not duplicative but rather an example of efficiency in pursuing project implementation.

In addition to putting projects on the ground, the CWPPRA program remains uniquely committed to the understanding and furthering of restoration science. Together with a rich brain trust of local academia, program scientists collect and analyze data from CWPPRA projects to evaluate the ecologic response from one blade of grass to an entire ecosystem. This helps guide managers in developing projects by using the most cutting edge and relevant science to support successful restoration.

The mission is great, and solutions have been identified; now the challenge of moving swiftly to stem the crisis lies ahead. The Coastal Wetlands Planning, Protection and Restoration Act has been, and remains, a critical component of saving coastal Louisiana from extinction.





Acknowledgments

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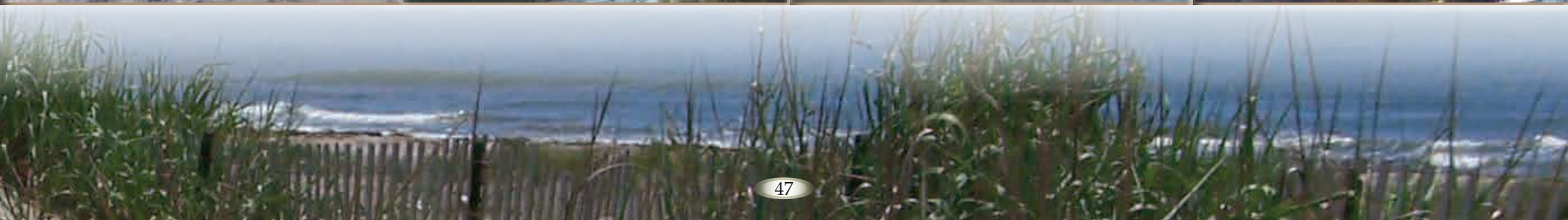

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Davis Pond Freshwater Diversion Project (funded through the Water Resources Development Act)

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