www.lacoast.gov

WATER MARKS

Louisiana Coastal Wetlands Planning, Protection and Restoration News

December 2016 Number 54

25 years of insight & experience

Coastal Louisiana's future builds on CWPPRA projects

December 2016
Number 54

WaterMarks is published two times a year by the Louisiana Coastal Wetlands Conservation and Restoration Task Force to communicate news and issues of interest related to the Coastal Wetlands Planning, Protection and Restoration Act of 1990. This legislation funds wetlands restoration and enhancement projects nationwide, designating nearly $80 million annually for work in Louisiana. The state contributes 15 percent of total project costs.

***WaterMarks* Editor**
Amy Robertson
3737 Government Street
Alexandria, LA 71302
318-473-7762

Changing address? Please don't forget to let us know.

If you receive the print version of WaterMarks and would prefer to receive the digital version, please email lacoast@nwrccom.cr.usgs.gov

ABOUT THIS ISSUE'S COVER . . .

For 25 years, the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) has constructed projects employing various strategies and testing innovative ideas to address Louisiana's crisis of coastal land loss. While these projects frequently have had considerable local significance, CWPPRA's contributions to environmental science and engineering may prove to be of greater value. This issue of WaterMarks continues a review of CWPPRA's history of developing effective techniques for restoring the coastal landscape.

Credit: CWPPRA

WATERMARKS
Louisiana Coastal Wetlands Planning, Protection and Restoration News
December 2016 Number 54

CONTENTS

U.S. Environmental Protection Agency, Region 6

For more information about Louisiana's coastal wetlands and the efforts planned and under way to ensure their survival, check out these sites on the World Wide Web:

www.lacoast.gov
www.coastal.la.gov
www.btnep.org
www.crcl.org

Like CWPPRA on Facebook at facebook.com/CWPPRA

Subscribe

To receive *WaterMarks*, e-mail lacoast@nwrccom.cr.usgs.gov

Moving? The post office will not forward *WaterMarks*. To continue delivery, send your change of address to lacoast@nwrccom.cr.usgs.gov

For current meetings, events, and other news concerning Louisiana's coastal wetlands, subscribe to the CWPPRA Newsflash, our e-mail newsletter, at

www.lacoast.gov/newsletter.htm

CWPPRA

DREDGE, PUMP, SPILL, BREACH – WHAT'S THE BIG DEAL?

Over 25 Years, CWPPRA Refines Each Step in Marsh Creation

The premise of marsh creation is simple: Dredge sediment from an available source, pump it through a pipe and let it spill out somewhere else. Stack it up until land rises out of water. "This technique produces tangible results quickly," says Kevin Roy, a biologist with the U.S. Fish and Wildlife Service. "The benefits are obvious: We can point to areas of new marsh able to support vegetation and wildlife habitat where there was once only open water."

Over the 25-year history of the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA), marsh creation has evolved into a favorite approach for efficiently and effectively restoring Louisiana's coastal wetlands. Simple as the premise is, CWPPRA has used the experience of conducting dozens of marsh creation projects to test solutions to specific problems, refine design and implementation, and improve each step in this method of creating functional, sustainable wetlands.

Finding sediment

Once again, the premise is simple: Dig up sediment and transport it to the project site. Early CWPPRA marsh creation projects dredged sediment from nearby lakes or bays; with low transport costs, the practice was economical. But because the Mississippi River no longer floods the wetlands, sediment in Louisiana's delta is in short supply. "Over time we changed our thinking," says Roy, "We realized we needed to add sediment, not simply move it around." Gradually restoration specialists began to look for borrow sites either in the Gulf of Mexico, well outside of the wetland system, or with a renewable source of sediment.

Building land requires big equipment. The sediment raised from a borrow site by this cutterhead dredge is transported to the project site and discharged (above photo) to build new marsh.

CWPPRA

Although levees channel most of the Mississippi's waters to spill deep off the continental shelf, the river, nonetheless, deposits pockets of land-building sediment in its bed. The initial challenge is to identify sites that contain sufficient reserves of sediment to dredge but are out of the way of navigation. "River sediment is a renewable resource – within two to five years, a site could refill with material well suited for building marsh," says Roy.

Among the first CWPPRA projects to mine river sediment specifically for building wetlands, the second phase of Bayou Dupont Ridge Creation and Marsh Restoration was completed in 2015. "River sediment was used to create and nourish more than 300 acres of marsh and to build a two-mile-long ridge that re-establishes the bayou's natural bank," says Mel Landry, a marine scientist at the National Oceanic and Atmospheric Administration's (NOAA) Restoration Center. To date, few coastal restoration projects have attempted to build a ridge. "Building a ridge is more complex than building a level marsh platform, but we were able to pull the river sediment up to the desired elevation. Then we covered it with in situ material to encourage the growth of woody vegetation. Lessons from this project will be valuable going forward, as restoration plans call for building more ridges."

Another renewable source of sediment derives from the routine dredging of navigation channels by the U.S. Army Corps of Engineers (USACE). The practice, known as the beneficial use of dredged material, has long been used to build wetlands. However, in the early days of CWPPRA, the USACE was mandated to dispose of the material in the least costly way. As a consequence, funding constraints limited the use of the dredged sediment for coastal restoration.

As Louisiana's plight of wetland loss became more widely known, interest in using dredged material for wetland restoration increased, resulting in changes to laws and policy. In 2007, Congress expanded the mission of the USACE to include environmental restoration along with flood damage reduction and inland and coastal navigation. The changes have given the agency more flexibility in disposing of dredged

While not all project sites can support the weight of heavy machinery, bulldozers, track-hoes and marsh excavators coax the slurry into containment areas where excess water is allowed to drain away. As the new land stabilizes, vegetation helps to hold it in place.

CWPPRA

Marsh nourishment vs. marsh creation

Generally, marsh creation builds land by pumping two to three feet of material into a contained area in broken marsh or open water. In contrast, marsh nourishment pumps a layer of sediment six inches to a foot deep over an existing marsh. Mimicking natural sediment accretion and introducing nutrients, marsh nourishment raises elevation and promotes plant productivity, contributing to the sustainability of the natural wetland. While in the past a few projects were designed specifically to nourish broken marsh, today the technique is more frequently used in tandem with marsh creation to bolster areas adjacent to project sites.

sediment and in covering the costs of delivering the material to restoration project sites.

Transporting sediment

The premise is simple: Move sediment dug from the borrow site to the project area and dump it out to build land. In early projects using borrow sites adjacent to projects, this was easily accomplished: Dredging equipment, usually brought in on barges, pumped slurry through a pipe and discharged it in the desired location. But as choosing borrow sites outside the wetland system became an accepted best practice, distances between borrow sites and project areas increased. Pipelines became longer – sometimes so long as to require booster pumps to move the slurry. Consequently, the expense of sediment transport swelled.

To reduce project costs, CWPPRA engineers began to study the feasibility of building permanent pipelines from renewable sediment sites to project areas. The first permanent pipeline for coastal restoration in Louisiana was built to carry sediment dredged during routine maintenance of the Calcasieu Ship Channel to marsh creation projects in the Sabine Refuge. A trial run was conducted in 2014. "We estimate that using the permanent pipeline saved approximately $2 million," says Scott Wandell, an environmental engineer and project manager with the USACE. "This infrastructure will remain in place at least through the 20-year life of the Sabine Refuge Marsh Creation project. We anticipate using it every two years, during normal maintenance dredging of the channel, with continued savings."

Constructed in conjunction with CWPPRA's Bayou Dupont Ridge Creation and Marsh Restoration project and completed in 2015, the Mississippi River Long Distance Sediment Pipeline built a permanent corridor for pipelines to convey sediment from the river to marsh creation sites miles away. "The distance between the river and a project is often great," says Landry. "Funded by the state of Louisiana and local parishes through the Coastal Impact Assistance Program (CIAP), the project establishes a route that dodges commercial activities, buildings, roads – the obstacle course of Louisiana's modern-day working coastal region – and provides a platform on which we can construct a pipeline and move equipment to other proposed CWPPRA project sites."

Determining elevation

The premise is simple: Pile up sediment until it forms a marsh platform. "In early projects, little work was done to determine the correct elevation," says Roy. "Sediment was pumped until it 'looked right,' six inches or a foot above the existing marsh. Sometimes the process built excellent marsh, but sometimes it missed the mark."

Elevation determines the kind of vegetation that will thrive at a project site. "By raising the created marsh platform above the level of adjacent natural marsh, scrubby, woody species are likely to comprise early vegetation," says Roy. "But over time the area will settle, sink and subside. If we estimate the mature elevation perfectly, a robust marsh community will develop."

Today, restoration projects determine the desired elevation of created marsh with great accuracy. "Most design work aims to answer the question of appropriate elevation," says Roy. "We survey to determine water depths; take soil borings at both project and borrow sites to examine sediment characteristics; and perform settling and consolidation tests to decide the initial elevation that is most likely to maintain a functional marsh over time. Although the science of pumping runny mud into open water will never be exact, we have incrementally attained precision in building marsh to the correct elevation. Success has become increasingly consistent over the years."

"We're asking better questions now than we did 20 years ago," says Darryl Clark, a senior fish and wildlife biologist with the U.S. Fish and Wildlife Service, "and we're getting better answers. Now we can figure out how quickly a certain kind of sediment consolidates, or the likely rate of settlement of built land over twenty years, or the effect of sea-level rise on a marsh's future elevation. With better information, we can make better decisions. Better decisions produce better, more effective projects at a lower cost."

Containing and dewatering sediment

The premise is simple: Build dikes along a project boundary using material dug at the site. Pump in a slurry of sediment to the desired elevation, then breach the dikes to let the excess water flow out. In the past, precious sediment was carried away in the muddy discharge, challenging scientists and engineers to devise methods that make fullest use of available resources.

As a result, project designers began to allow low-level dikes to perform as spillways, or weirs. "Instead of trying to contain discharge waters within a project site," says Roy, "they were allowed to flow out into neighboring areas of broken marsh. There the sediment fell out to create mud flat habitat and deltaic-looking wetlands. The idea of using dikes as weirs evolved from observing the characteristics of broken marsh and the behavior of sediment in discharge waters. The willingness of CWPPRA's restoration community to try something different has led to ongoing innovation."

For example, customary containment dikes encircled the footprint of the Dedicated Dredging on the Barataria Landbridge project. "During the project, however, additional material became available," says Roy. "As they looked at expanding the

Marsh creation via diversion

"While a freshwater diversion can reduce salinity and alter a wetland vegetative community, it does not build much land," says Darryl Clark. "But the purpose of a sediment diversion is to create marsh."

On CWPPRA's first Priority Project List, the West Bay Sediment Diversion built a channel to convey sediment-rich water from the Mississippi River into an area of degraded wetlands and shallow open water. Material dredged from the channel was used to build marsh on the perimeter of the outfall area.

Six years after the diversion was constructed, CWPPRA helped to fund a project for the USACE to construct an island 500 feet wide by 3,500 feet long at the north end of West Bay. Using river sediment dredged from the Pilottown Anchorage Area, the island, known technically as a Sediment Retention Enhancement Device, slows water velocity and dissipates wave energy that keep diverted sediments in suspension. "Following its construction, emergent marsh began to form," says Clark. "West Bay is demonstrating that diversions do build land."

Studies suggest that deltaic development in West Bay will follow the typical life cycle of a sub-delta, with the peak of wetland growth decades down the road.

project area, engineers wondered if existing landscape features nearby might serve as a natural dike. When the extra sediment was placed outside the original project footprint, adjoining stretches of solid marsh and spoil banks did indeed successfully keep the material from washing away."

While scientists have learned that breaching containment dikes is essential to promote a natural hydrologic exchange and create a functional marsh, they continue to explore the best ways to do it. Cutting gaps into dikes is less expensive than grading them to marsh level; are there benefits that justify the greater cost? Can smaller vehicles replace heavy, earth-moving equipment and shape a more natural slope to keep created areas open to tidal exchange? Should building tidal creeks in new marsh be a fundamental design component, or is there a way to promote their natural development without paying for their construction? As with other aspects of marsh creation, scientists and engineers will base answers on their observations of past projects, on consultation with contractors and other restoration specialists and on considering alternatives with an open mind.

Building common ground

The premise is simple: Bring interested parties together to work toward the shared goal of restoring Louisiana's coast.

Long noted for interagency cooperation, CWPPRA recognizes the importance of partnering with other players. "Forming partnerships among agencies, stakeholders, local sponsors and contractors can reduce customary financial constraints," says Wandell. "For example, the Port of Lake Charles supplemented Congressional funds to make dredged sediment available for building nearly 1,000 acres of marsh in the Sabine Refuge."

"Partnering with other government entities, such as Deepwater Horizon Early Restoration Natural Resource Damage Assessment program, as well as with private industries has enabled CWPPRA to expand projects during construction or to get designed projects on the ground quickly," says Clark. "Partnerships have increased the amount of marsh that we can build."

Past projects lay ground for the future

"With its 25-year history of building coastal restoration projects, CWPPRA has learned that money is well spent on marsh creation," says Clark. "This technique correlates directly to added acreage."

A pipe carrying slurry to a site in the wetlands traverses the landscape of Louisiana's working coast.

A quick look at CWPPRA projects over the years shows clearly that marsh creation is becoming a favorite strategy for restoring and protecting Louisiana's wetlands. On the first Priority Project List in 1992 there was a single marsh creation project. "This year 80 percent of CWPPRA's candidate projects are marsh creation," Clark says. "In 2015, 11 out of 11 candidate projects were marsh creation."

"We don't have many years of marsh creation projects to look at," Roy says, "but I think they are proving to be very resilient and sustainable. Whereas natural marshes have often been cut into ribbons by man-made waterways, we've learned to build created marsh as a solid block that is less susceptible to erosion. We've developed better methods of determining the content of land-building sediment and have come to understand its influence on developing vegetative communities. Determining elevation precisely has increased projects' sustainability and their success in evolving into the kind of wetland desired. And CWPPRA continues to introduce techniques to improve functionality, such as using semi-confined containment to make a more natural slope into the marsh and reintroducing tidal connectivity."

With the naked eye, it is difficult to discern differences between a created marsh and a natural marsh; both kinds provide critical protection to coastal communities and essential habitat for natural wetland resources. Basing marsh creation on the same principle of sediment deposition that built the delta over eons, CWPPRA accelerates the process, fighting against the disappearance of Louisiana's wetlands acre by new acre. As CWPPRA refines techniques, improves efficiency and increases the longevity of constructed wetlands, Louisiana's future brightens and hope strengthens for the survival of its coast. WM

Terracing

Long and linear, 10 to 15 feet wide with sloping sides, terraces are often incorporated into marsh creation projects. Although they do build a small amount of land, terraces are used primarily to reduce wave energy and protect shorelines.

"Using sediment dredged and transported with big machines, marsh creation can encompass acres and acres," says Darryl Clark. "Terracing uses marsh buggies, track hoes and excavators to fashion material at the project site into the desired shape. Its footprint is small."

"Initially the crown of terraces is a little high to call marsh," says Kevin Roy, "but over time a marsh community does develop on the slopes and increases wetland habitat acreage."

United States Fish and Wildlife Services

CWPPRA

LEARNING WHAT, WHEN, AND WHERE TO PLANT

25 Years of CWPPRA Projects Improve the Use of Plants in Restoration

Plants define the wetlands. They trap sediment, hold soils together and provide the organic matter that builds marsh elevation and supplies nutrients to the food chain. But even for indigenous plants, conditions in Louisiana's coastal region present innumerable challenges to survival – flooding from storms and high tides, drought, uprooting by animals, breakage caused by weather or rafts of algae. Yet plants offer unmatched value in establishing and sustaining wetland ecosystems. To embrace their promise, the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) draws on its 25 years of experience solving the problems inherent in using plants for coastal restoration.

Designing for plantings

"Thoughtful design fosters the success of vegetation at project sites," says Cindy Steyer, a coastal vegetative specialist with the Natural Resources Conservation Service (NRCS). "For example, marsh creation projects must designate elevation correctly so that the site is neither too wet nor too dry for the desired plant species to thrive. CWPPRA's history demonstrates that we cannot always assume the desired plant community will simply emerge on its own."

Successfully vegetating an area relies on thoughtful

Thriving vegetation is a sign of a stable, healthy wetland. In some project sites plants take root on their own; in other locations, setting out plants jump-starts ecological development in a newly created marsh.

scheduling as well as on physical design. Restoration specialists have learned to consider seasonal growth habits and likely weather and tidal patterns when drawing up a project's timetable. While there is no control over a storm that washes out new plantings or a drought that parches them, a site's physical readiness must nonetheless coincide with the planting calendar for vegetation to survive.

Matching plants and sites

Curt Riché, assistant manager of the Golden Meadow Plant Materials Center (PMC) in Galliano, Louisiana quite often quotes the first head of NRCS' Plant Materials Section, Franklin J. Crider: In most cases nature has evolved a plant for almost every growing condition. "To match specific ecological requirements," says Riché, "the PMC selects and releases coastal cultivars and vegetative and seed germplasm. Over the past 25 years, CWPPRA projects have provided a variety of sites to test and evaluate our releases."

Barrier islands: Islands have a variety of distinct habitats at different elevations, each offering a defined botanical niche. For back barrier marshes requiring a woody shrub to stabilize sediment and provide habitat for nesting birds and other organisms, the PMC selected the black mangrove cultivar Pelican. For dune conditions, the PMC developed beach grasses with sand-stabilizing root systems. "Their above-ground growth provides additional benefits by slowing the wind, accreting sand and offering habitat to small mammals and birds," says Garret Thomassie, manager of the PMC.

In addition to providing barrier island test sites, CWPPRA projects have improved planting methods by exploring questions such as the optimum density of plant cover, the preferable orientation to prevailing winds, the efficacy of fertilizers, the potential of seeding via hydromulching, and methods to promote the rooting of propagules. CWPPRA's years of data provide a foundation for making informed decisions and increase the likelihood of a barrier island project's success.

Marshes: At CWPPRA's inception, erosion, saltwater intrusion and deteriorating soils were chief perils facing Louisiana's wetlands. Restoration projects needed a grass species that would flourish in intertidal wetlands and salt marshes and could be grown commercially. Released by the PMC in 1989, 'Vermilion' smooth cordgrass was selected for its high saline tolerance and its vigorous growth in condi-

Native Plants Create Healthy Wetlands

tions throughout the coastal region. CWPPRA quickly tested the cultivar, installing it in newly created marshes, on terraces and along shorelines. Since 1991, CWPPRA has planted ‘Vermilion’ by the hundreds of thousands to buffer shorelines, reduce wave action, trap sediment, stabilize soils and produce quantities of organic matter essential to the wetland ecosystem.

But smooth cordgrass is not suitable for all marsh habitats. CWPPRA projects also needed a species that would perform well in brackish marshes. In response, the PMC produced the marshhay cordgrass ‘Gulf Coast.’ “Released in 2003, it has become valued for planting on higher intertidal elevations and the upper reaches of levees and terraces,” says Thomassie.

While smooth cordgrass has been the choice for saline marshes, it does not thrive robustly in freshwater and intermediate marshes. “To cultivate a species suitable for these habitats, California bulrush was collected from native stands across Louisiana,” says Thomassie. “Capable of forming dense colonies along shorelines, in open water or on mudflats, the bulrush can withstand water-level fluctuations and is somewhat salt tolerant. The release of the cultivar Bayou Lafourche in 2007 expanded the options for successful planting throughout the spectrum of marsh habitats.”

Jump-starting nature

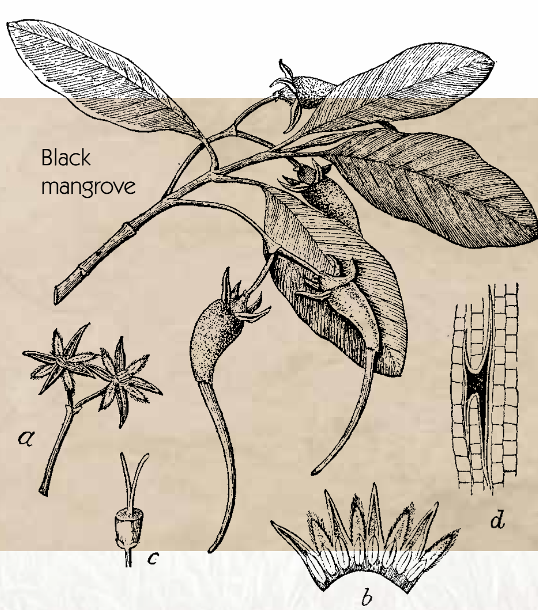
In the fragile coastal marshes, many projects are planted by hand. “The biggest plantings occur where soils do not support heavy equipment,” says Steyer. “Plantings are labor-intensive; people often slog through mud to set out the plants.” Nonetheless, these days a CWPPRA project may install as many as 200,000 plants or plant more than 40 miles of terraces.

Conditions determine whether or not to incur the expense of installation. “Experience has taught us when a site is likely to colonize naturally,” Steyer says. “In freshwater marsh creation projects, vegetation often takes root on its own.”

Some early CWPPRA projects proved the limits of natural colonization. Low elevation and persistent inundation, for instance, prevented vegetation from becoming established on Queen Bess Island. “Without good tidal drainage, plants have a hard time surviving,” says Quin Kinler, a resource conservationist with the NRCS.

Other early projects tested using plants alone to control shoreline erosion. “We quickly learned that plants subjected to wave action during their first few months incurred a high mortality rate,” says Kinler. To harness plants’ capacity to capture sediment and stabilize soils, project designers began coupling plantings with other restoration techniques, such as shoreline protection.

Bitter panicum



Black mangrove

Smooth cordgrass

USDA

"Under certain conditions, plants need hard structures to protect them while becoming established," says Thomassie, "but eventually we want vegetation to replace the structures."

"To some degree, we have become less aggressive in trying to save marsh that has lost elevation, such as you find along the shorelines of large lakes and bays," says Kinler. "But plants are relatively inexpensive. Sometimes trying to reclaim an area before greater loss occurs is worthwhile."

Planting damaged areas quickly

As vegetation became a common component in project design, restoration specialists noticed that quickly revegetating areas damaged by storms or other events could limit further deterioration. "But implementing a CWPPRA project from nomination to construction typically takes several years," says Kinler. "To get plants on the ground much faster, in 2011 CWPPRA approved the Coastwide Vegetative Planting project."

Each year the Coastwide project selects locations based on site reviews of the relatively small nominated areas and on the feasibility of planting. To date the project has installed plants at 12 sites, with a dozen more sites in the works.

Growing into the future

Scientists keep improving ways to use plants in wetland restoration. "Research continues to identify the best plants to meet specific restoration goals, such as finding a woody species that will thrive on newly created, artificial ridges," says Thomassie. "To increase the occurrence of vegetation replacing hard structures, we're selecting plants that will supersede sand fencing on barrier islands, or that can take root within rock structures and eliminate the need to replenish subsiding dikes."

To increase options for establishing a vegetative cover quickly, scientists are cultivating wetland species with seeds that promise a high rate of germination, or that can be distributed aerially or that are tolerant of storage conditions. They are experimenting with ways to propagate plants from chopped or mulched material and testing methods to increase plants' survival at project sites.

"Challenges lie ahead," says Thomassie. "We are frequently asking how best to mimic what nature does. Our achievements provide coastal restoration with the plants and techniques that it needs; our disappointments challenge us to find better ideas and improve the plant technology available for restoring our natural resources." WM

Plant Materials Center

The Golden Meadow Plant Materials Center in Galliano, Louisiana, evaluates plants and vegetative technologies to support NRCS conservation programs and practices. One of 25 such centers operated by USDA's Natural Resources Conservation Service, the Golden Meadow center supports coastal wetland conservation efforts by

- identifying and evaluating species selected for erosion control, marsh restoration and dune stabilization
- developing and evaluating techniques for propagating and establishing plants
- providing commercial growers with foundation stock and technology to grow and propagate plants for restoration programs

CWPPRA

CWPPRA

25 YEARS OF DATA COLLECTION

Project Monitoring Proves Past Performance, Improves Future Design

From the first days of the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA), restoration specialists recognized the need to determine if projects were achieving their desired results. By monitoring a project site and comparing it to a nearby reference area with similar characteristics, scientists and engineers could measure differences that a project made.

However, there were a number of obstacles to early monitoring efforts: While analysis of 50 years of aerial photographs revealed changes in coastal vegetation and land-water ratios, there were no long-term records of historical conditions. Monitoring variables were inconsistent and not always adequately documented. Sometimes there was no suitable reference area to compare to a project area, and as CWPPRA began to restore more sites, projects began to influence conditions in areas previously used for reference.

Confronting these shortcomings, in 2003 CWPPRA undertook to increase coast-wide data collection and improve monitoring standards by approving the Coastwide Reference Monitoring System (CRMS) project. Challenged to design a mechanism capable of assessing individual project performance and of documenting the collective, long-term effects of the coastal restoration program, CRMS' designers faced choices imposed by budgetary constraints. "Monitoring at the project-

A scientist measures the growth of vegetation in a restored marsh. A suite of data points is collected from specified sites to determine the effects of restoration projects and to monitor changing conditions in the wetlands over the years.

specific scale gave us great detail, but we risked losing data as adjoining areas changed," says John Foret, formerly a scientist with National Marine Fisheries Service. "But monitoring at a landscape scale sacrificed the fine resolution of the project scale. In the end we blended the two approaches – losing some resolution of specific project sites but gaining the capacity to see the basin and coastwide effects of CWPPRA projects."

Site construction of 390 stations throughout the Louisiana coastal region began in 2005. A suite of measures is collected at each site, including elevation, soil type, soil characteristics, vegetation type and vertical accretion. This data support CWPPRA in every phase of project implementation:

- In project planning and selection: "CRMS helps us see the effects of projects both large and small on the coastal zone," says Foret. "At proposed project sites, having a record of past conditions provides a foundation for evaluating the need for a project and a basis for gauging the chances of a project's success."
- In project engineering and design: With a record of the ecological effects of similar projects, scientists and engineers build on past experience to improve design and implementation.
- In establishing baseline conditions: Knowing previous conditions facilitates evaluating a project's results.
- In modeling and adaptive management: "As project-specific data is collected, we can make adjustments in project management to better realize its goals," says Foret. "Data help us to improve tools like settlement tables so that they become increasingly accurate. Consequently we are building projects more precisely and maximizing the life of a marsh."

In addition to CWPPRA scientists and engineers, resource managers, academics, landowners and researchers have been relying on CRMS' data for their work. Publicly available at www.lacoast.gov/crms2/, the data permit users to do such things as

- evaluate coastal conditions
- determine the environmental and ecological effects of restoration projects
- survey biological, chemical, physical and climatological variables – information critical to coastal managers making day-to-day public policy decisions

CWPPRA funds the coastwide monitoring program as one of its projects. "However, with increasing frequency," says Foret, "sponsoring agencies are including monitoring to answer specific questions in a new project's budget. That they are willing to shoulder the cost of monitoring indicates the growing recognition of the value of the data CRMS has generated."

As do many restoration specialists, Foret would like to expand the scope of monitoring. "I'd like to establish baselines of how biotic communities respond in project sites," he says, "and I'd like to undertake high resolution aerial photography more frequently. From a boat it's difficult to see phenomena, like brown marsh, that occur across all marsh types coastwide."

A recent collaboration between the CWPPRA Bayou Dupont Ridge Creation and Marsh Restoration project and Mississippi State University (MSU) may herald the way to make these goals affordable. Using an unmanned aerial vehicle – a UAV, or drone – to photograph the thousand-acre project, technicians captured a large quantity of data. "Because the site is marshy, we could launch the UAV from a small boat," says Robert Moorhead, director of the Geosystems Research and Northern Gulf Institutes at MSU. "We flew the entire area in about two hours, photographing it at a resolution that distinguishes marsh from water, exhibits various species of vegetation, and indicates the birds and animals using the habitat."

Moorhead thinks that with advances in technology to make larger devices easier to launch and recover in water, changes in Federal Aviation Administration regulations and increases in demand, UAVs will become a common tool for monitoring wetlands. "It's cheaper, faster, and can capture data at a higher resolution than photographing from a manned aircraft," he says. "And there are no limitations on the data you can collect. It just depends on how fast you want the data and how much data you can store." WM

A graphic showing the recovery of an early CWPPRA project site compared to a nearby unrestored reference area demonstrates the effectiveness of marsh creation in the LaBranche wetlands. Not all early monitoring efforts are able to show the efficacy of restoration so clearly; many reference areas benefited from adjacent projects or were incorporated into later restoration efforts.

CWPPRA

WaterMarks

Louisiana Coastal Wetlands Planning, Protection and Restoration News

December 2016 Number 54

DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
P.O. BOX 60267
NEW ORLEANS, LOUISIANA 70160-0267

OFFICIAL BUSINESS

PRESORTED
FIRST-CLASS MAIL
U.S. POSTAGE PAID
NEW ORLEANS, LA
PERMIT NO. 80

Jenneke Visser, Co-director, Institute for Coastal Ecology and Engineering, University of Louisiana in Lafayette; SPRING 2010

We know some things about how the coastal ecosystem works, but we don't know everything. We have learned to mimic some of the processes that historically have sustained the wetlands, but we don't understand them all… We need new approaches to addressing the threats that are most intractable, such as marsh loss due to subsidence and sea-level rise [and to] continue to test materials and equipment that improve conventional restoration methods.

Jerome Zeringue, Chairman, Coastal Protection and Restoration Authority and the Governor's Executive Assistant for Coastal Activities; DECEMBER 2014

Some inherently pessimistic people say efforts to restore the coast are too little, too late, but both science and our experience indicate that [our plan] will work … If we lose Louisiana it will affect everyone in America, anyone who eats Louisiana's seafood or relies on goods that move in and out of its ports or enjoys zydeco music and New Orleans jazz. It is not just square miles of land that the nation is losing, but an irreplaceable part of its economy, culture and history.

Scott Kirkpatrick, President, Coast Builders Coalition; SPRING 2012

We are much better off than we were 25 or 50 years ago, when awareness was low and impacts on the environment were high. Now there is a commitment to work on the coast without destroying the coast. … [T]he concept of a working coast is possible, and we're figuring out how to be smart in creating it.

Robert Twilley, professor of biology and Director, Center for Ecology and Environmental Technology, University of Louisiana in Lafayette; WINTER 2003

Once we understand the physiology of the earth, … we'll be much better at diagnosing its problems and finding the right planetary treatment to bring about a solution… Like the human body, the earth has a great resiliency — far greater than many give it credit for. It's that remarkable resiliency that encourages me — it's where I find a great deal of hope.

Steve Mathies, Vice President, AECOM; SUMMER 2014

Advances … have been dramatic. … we are able to see the big picture and understand how the entire system works. But most importantly, the people now working in coastal restoration … have never been better. Coastal restoration specialists are passionate – it isn't just a job for them, it's a calling.

Read the full interviews in WaterMarks issues on line:
https://lacoast.gov/new/Pubs/WaterMarks.aspx?yr=2016