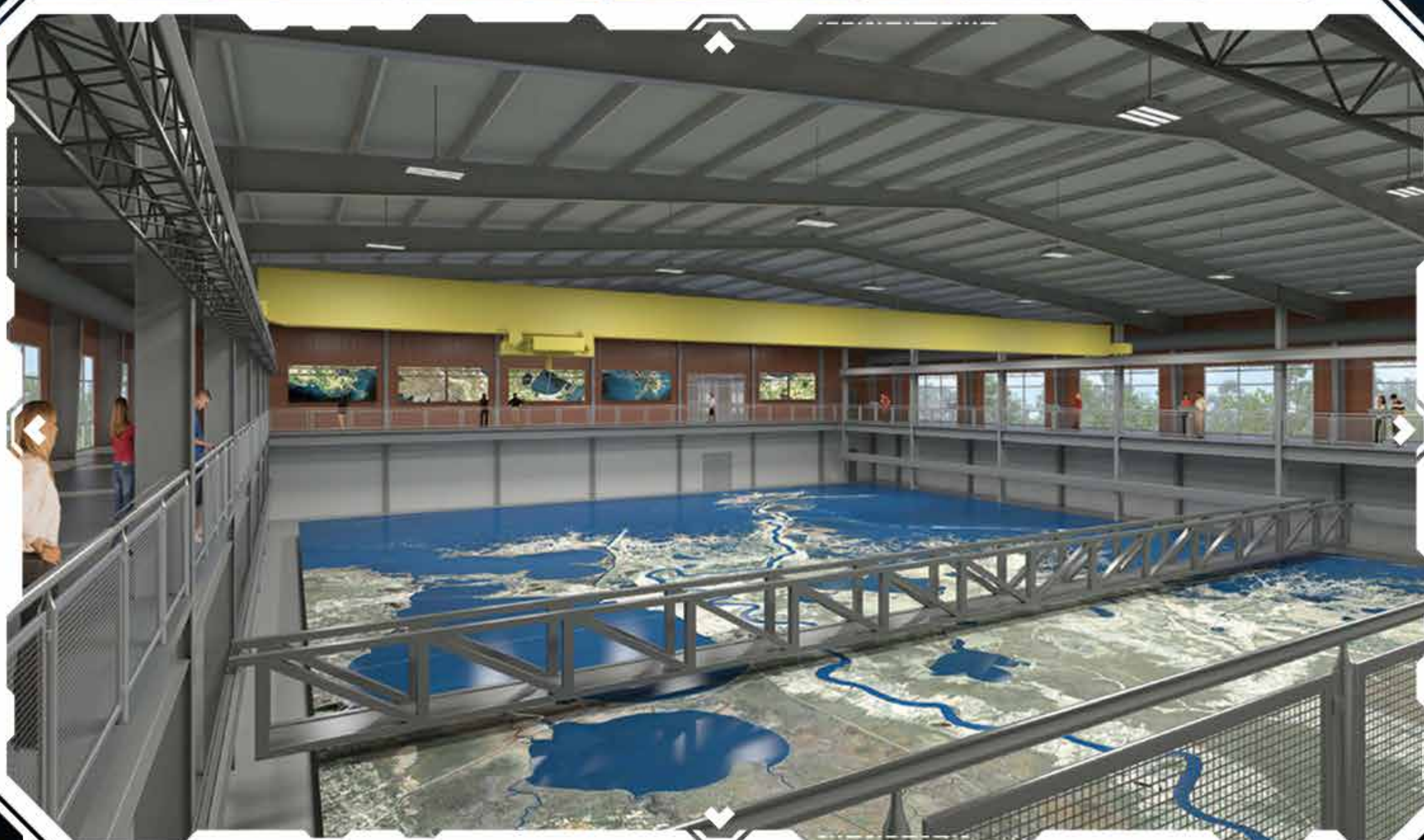
www.lacoast.gov

WaterMarks

Louisiana Coastal Wetlands Planning, Protection and Restoration News
August 2014 Number 49



Becoming a coastal science laboratory for the world

Forward Thinking for Fighting Land Loss Propels Louisiana into Global Leadership

August 2014
Number 49

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
Holly L. Martien
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 . . .

Located on Baton Rouge's Water Campus, the new physical model of the lower Mississippi River system will use precisely calibrated equipment and material to simulate the movement of water and sediment under various restoration scenarios.

Rendering by Mougeot Architecture.

WATERMARKS
Louisiana Coastal Wetlands Planning, Protection and Restoration News
August 2014 Number 49

CONTENTS

U.S. Geological Survey

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

Like CWPPRA on Facebook at facebook.com/CWPPRA

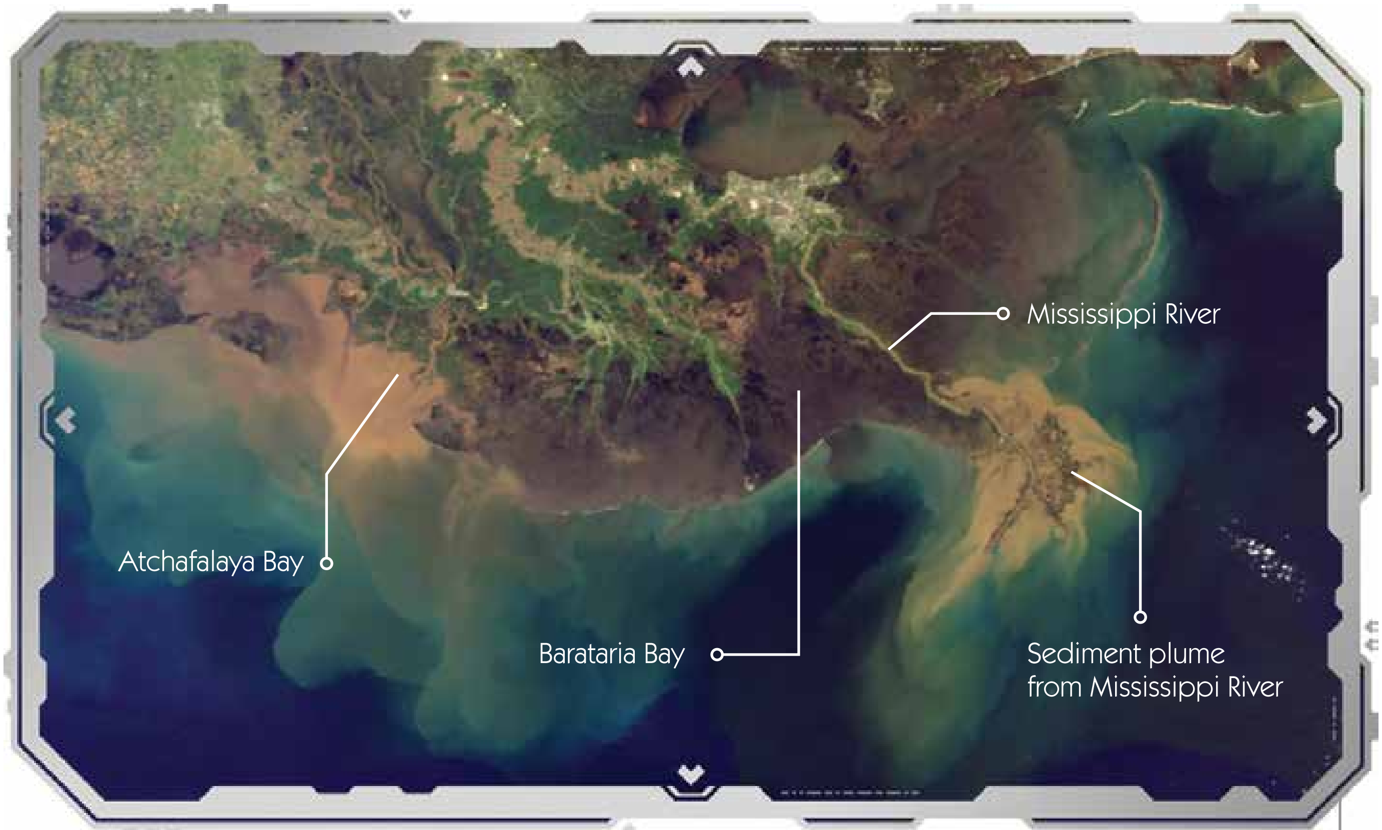
Subscribe

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



NOAA

From the Old River Control Structure to the Gulf

Studying the Flow of Ol' Man River

In the years since the enactment of the Coastal Wetlands Planning, Protection and Restoration Act in 1990, coastal restoration experts have greatly expanded their knowledge of the Missssissippi River and its delta. But the river still holds many secrets that scientists need to unravel to ensure the success of Louisiana's Master Plan for coastal protection and restoration. There is no laboratory where the massive, landscape-scale projects proposed in the plan can be tested under actual conditions. Prior to implementing these projects, scientists and engineers must learn everything they can about the river's fresh water, sediment and nutrients, and how best to use them to restore and sustain the coastal ecosystem. To acquire this information, the U.S. Army Corps of Engineers (USACE) and the Louisiana Coastal Protection and Restoration Authority (CPRA) have undertaken a comprehensive investigation of the lower river and its delta.

Already the study has fundamentally changed scientists' understanding of river resources. "For years people have viewed satellite images and thought the river discharges an enormous amount of wasted sediment into the Gulf of Mexico," says Barb Kleiss, who works at USACE's Mississippi Valley Division and is one of the study's technical leads. "But our investigations indicate that the plume at the mouth of the river consists primarily of fine clay that may not be well suited for building land in wetland habitats. Actually, about half of the

Long thought to be wasted land-building sediment, scientists now know the plume of material that the Mississippi River discharges into the Gulf of Mexico is made up primarily of fine clays, not the sands and coarse silts that can build and sustain Louisiana's wetlands. Maximizing the use of the river's resources to restore adjacent marshes requires thoroughly understanding the movement of water and sediment and matching it to conditions in the receiving basins.

A joint project of the U.S. Army Corps of Engineers and the Louisiana Coastal Authority, the Mississippi River Hydrodynamic and Delta Management Study encompasses the river and adjacent basins from the Old River Control Structure to the Gulf of Mexico.

Mississippi's water and suspended sediment is diverted from the river between Baton Rouge and Head of Passes. Instead of considering sediment and the water that carries it as a nearly inexhaustible resource to draw on, we now know that it is limited and precious. This is a paradigm shift."

From the river to the wetlands

A major tenet of the state of Louisiana's Master Plan is to mimic natural processes by building diversions at selected sites on the river and directing its resources – fresh water, nutrients and sediment – into adjacent basins. The Louisiana Coastal Authority (LCA) Mississippi River Hydrodynamic Model and Delta Management (MRHDM) Study is USACE's and CPRA's joint effort to examine the river and the basins and determine the potential effects of diversions on both.

Kleiss says, "While we want to place a diversion where there is a high concentration of river sediment, we need to optimize sediment's use by matching it to the characteristics and needs of the receiving basins. Understanding the effects of restoration projects on estuaries is essential; if we build a diversion and introduce fresh water into a brackish marsh, how much of the marsh could convert to a freshwater system? Will the clays in the water settle out or be resuspended? How might that affect oysters? If a diversion could build 10,000 acres, would that have a measurable impact on storm surge?"

"Optimal siting of diversions on the river side may not meet up with conditions on the receiving side," says Cherie Price, a civil engineer working in coastal restoration planning at USACE's New Orleans District. "We're looking at features such as the size, depth and vegetation in the receiving basins. We're determining how diversions could alter habitat diversity and marsh types. What might diversions' effects be on existing roads and buildings? Can we operate them in ways that minimize the possibility of adverse effects? The LCA MRHDM Study is producing the science that will reduce uncertainty in making decisions."

Studying both sides of the banks

"The purpose of the hydrodynamic portion of the LCA MRHDM Study is to assemble data about the lower Mississippi River and use that data to build and verify predictive models," says Bren Haase, deputy chief of the studies and environmental branch of CPRA. "The information is essential for figuring out project sites, sizes and operations that would maximize use of river resources for ecosystem restoration, and for determining how that restoration might support or sustain other river functions like navigation and flood control."

The study of the river answers such questions as

- What happens to water and sediments in the river and receiving basins?
- What are the characteris-

Outfall Management of Diversion Resources

Since 1991, the US Army Corps of Engineers and the state of Louisiana have utilized the Caernarvon Freshwater Diversion Project to divert fresh water, nutrients and sediments from the Mississippi River into coastal bays and marshes in Breton Sound. The diversion has controlled salinity in and supplied nutrients and sediment to the receiving basin, enhancing fish and wildlife habitats and fostering the restoration of former ecological conditions. But soon after the operation of the Caernarvon diversion began, landowners, environmental managers and other waterway users realized the majority of the diversion's fresh water exited the outfall area through natural and manmade outlets – bayous and canals. The freshwater flow never reached and did not benefit the interior wetlands. The problem became especially acute when flows from the diversion were at low levels and the fresh water, along with the nutrients and sediment it carried, was confined within channel banks.

Responding to this situation, in 1993 CWPPRA developed and approved the Caernarvon Diversion Outfall Management project (BS-3a). To increase the efficient distribution of river water and its beneficial resources over interior wetlands during periods of low flow, the project installed gated water control structures, restored spoil banks and constructed earthen closures in strategic outfall areas. Other project goals were to slow rates of marsh loss, reduce variation in salinity, increase the occurrence and abundance of fresh and intermediate emergent vegetative species and increase the occurrence of submerged aquatic vegetation. During normal weather patterns, improvements in interior marsh conditions within the areas targeted are the result of this CWPPRA outfall management project.

tics of sediment particles? How have they changed over time?

- Which sections of the river are stable, eroding or filling with sediment?
- What quantity of river resources can be allocated to restoration?
- How much land could be built or sustained with river resources?
- At what rate is sediment at borrow sites replenished?
- How frequently can river sandbars be dredged to supply sediment for restoration?
- How will potential restoration projects affect navigation?

"The primary goal of the delta management component of the LCA MRHDM Study is to connect river resources – sediment and water – to three receiving basins: Barataria, Breton and Pontchartrain," says Price. "The delta management component is a feasibility study to examine multiple plans and establish criteria for choosing which to implement. To accomplish this we are developing the most advanced models of basin hydrodynamics, nutrients, salinities and land-building ever undertaken."

Envisioning coastal changes through computer modeling

"When we don't have nature to tell us how a project will work," says Kleiss, "we use models to create simulations of the future. For this study we are answering a variety of questions by modeling different combinations of temporal and geographic conditions."

"To show the cumulative effect of big diversions, the LCA MRHDM Study is producing the first comprehensive models of the lower river and outfall basins," says Darrel Broussard, senior project manager at USACE's New Orleans District. "The models will identify and evaluate combinations of large-scale management and restoration components that can ensure the long-term sustainability of Louisiana's coast."

To replicate actual conditions, models rely on extensive and accurate data. One facet of the LCA MRHDM Study is the collection, analysis and management of field data. While the experience in project design, construction and implementation garnered under the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) and data collected through its Coastwide Reference Monitoring System contribute essential information to the study, researchers are focusing on collecting additional data about the Mississippi River. "To understand how it has changed and could change in the future, we are conducting a geomorphic analysis of the river over the past 50 years or so," says Haase. "Mapping the river bottom, tracking the movement of sand in the bed of the river and measuring water flows add to our scientific knowledge of the river."

The study's data will be analyzed, archived, and made available to the public. "It could be used to inform adaptive management of existing projects or to provide a suite of models that guide the planning and operations of future ones, including CWPPRA projects," says Haase.

A large-scale, long-term study

The LCA MRHDM Study is conducted jointly by the USACE and CPRA. The effort is unique in that two team leaders, one from each organization, share responsibility for every component, from model development to data collection. But the study teams draw widely not only from the partner entities but from other federal and state agencies, The Water Institute of the Gulf, the USACE's Engineer Research and Development Center, and university and private-sector experts as well. "We enlisted the best people to participate, whatever their affiliation," says Kleiss, who, along with Dr. Ehab Meselhe, from The Water Institute of the Gulf, provides technical leadership to a team of more than 40 managers, scientists and technical support personnel.

Proposed as part of the 2004 Louisiana Coastal Area program, the study was authorized under the Water Resources Development Act of 2007. With the state of Louisiana agreeing to be a cost-share sponsor and having secured a rare waiver from the Corp's policy stipulating that feasibility studies comply with a three-level review, a three-year timeframe and a $3 million budget, the project got underway in 2011. The study's final report is expected in December, 2016.

> A statistical metric defined by the MRHDM Study team provides a consistent standard for evaluating the quality of all models, no matter who is running the model or what it is testing.

Society makes the decision

"Restoration's fundamental benchmark of success will be how much land is built or maintained," says Haase, "and doing it in ways that support marsh health, water quality, fisheries, navigation and flood reduction. Restoring the ecosystem will increase the viability of our coastal communities. The interests of healthy wetland habitats, flood control, navigation and the people who live and work in Louisiana are all intertwined and support one other. Soliciting public input is part of the LCA MRHDM Study. We want all communities to get involved and participate in the discussion."

"Science provides our best estimate of what will happen under various restoration scenarios," says Kleiss, "but society makes the decision as to whether or not it should happen." WM

The Water Institute of the Gulf

Applied science for near-term restoration and long-term sustainability

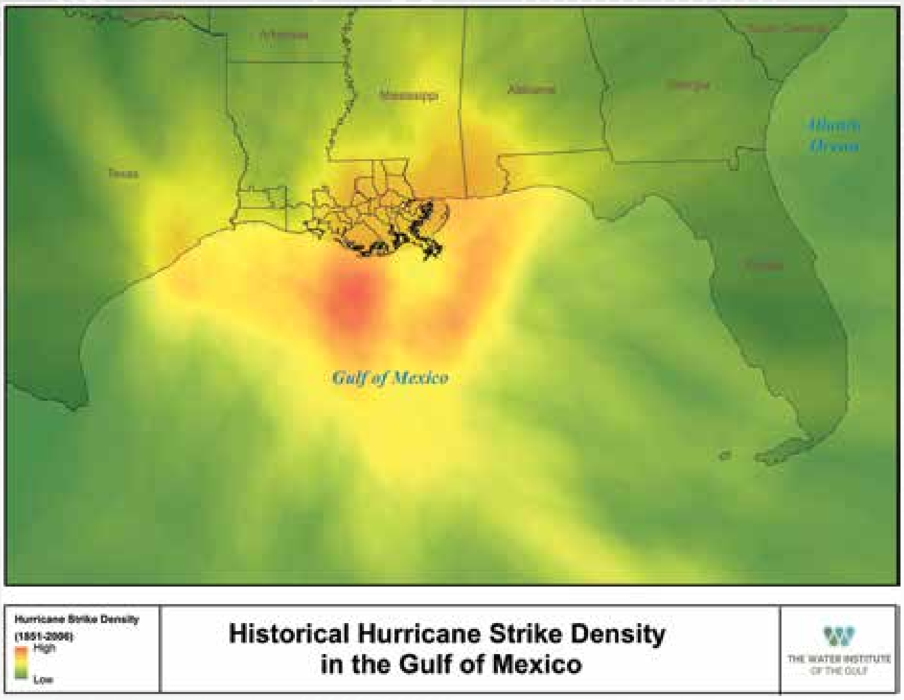
Independent Research Institute Puts Knowledge to Work

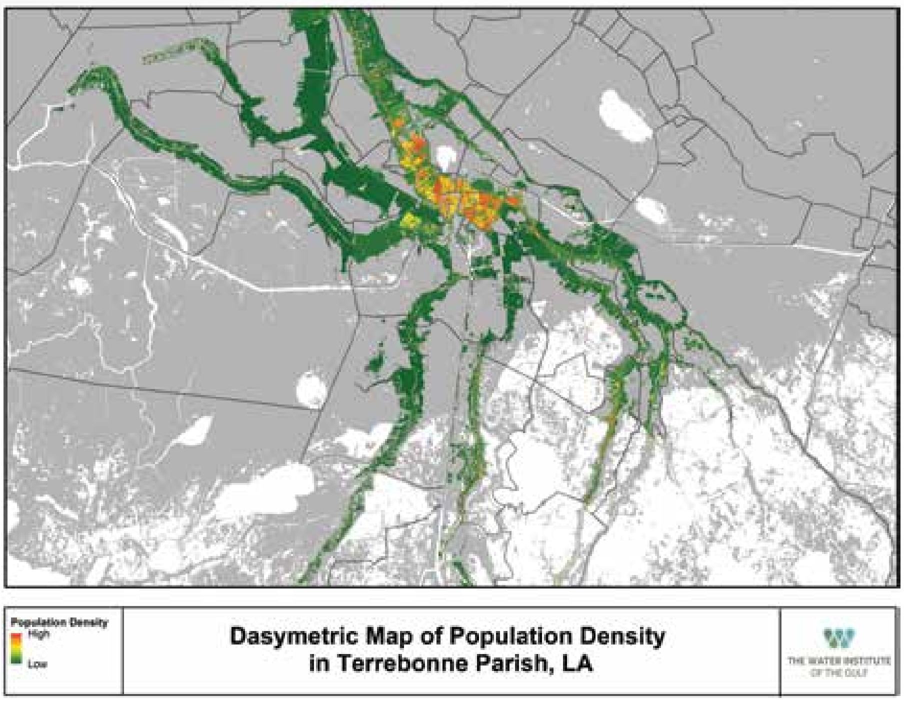
After Hurricanes Katrina and Rita in 2005, many recognized the urgent need for a big-picture vision and a long-term plan for restoring Louisiana's coast. In 2007, the newly created Coastal Protection and Restoration Authority (CPRA) released its first version of Louisiana's Comprehensive Master Plan for a Sustainable Coast (Master Plan). "For the first time in Louisiana's history, the state had approved a broad-scope plan to protect and restore its coastal region," says John Davies, president and CEO of the Baton Rouge Area Foundation (BRAF). Davies realized that science, not politics, must be the basis for decisions about the plan's implementation. With the support of Louisiana's Governor Bobby Jindal and U.S. Senator Mary Landrieu, BRAF established an independent organization, The Water Institute of the Gulf. Committed to rigorous science and engineering, the institute conducts research that is directly applicable to active projects, provides technical support, tests innovative approaches and recommends the best tools and tactics for achieving sustainable coasts and deltas.

Experts in the field

Since its launch in early 2012, The Water Institute of the Gulf has been advising

Within view of Louisiana's state capitol, The Water Institute of the Gulf produces science that not only assists Louisiana in restoring its wetlands but helps coastal communities confronting land loss and sea level rise throughout the world. Although applied science and engineering comprise much of the institute's work, social scientists' contributions ensure that the human element is prominent in planning and decision-making.





The Water Institute of the Gulf

Cartographic depictions help scientists, residents and policy-makers perceive spatial and temporal relationships, comprehend past and present coastal conditions, and spot trends toward change. The Historical Hurricane Strike Density map uses the track lines of storms in the Gulf of Mexico from 1851 through 2006 to portray the spatial extent of hurricane conditions and determine which communities historically have been most subject to hurricane risk. The Map of Population Density combines census data with secondary data sets such as Land Use Land Cover to estimate where people are likely to reside within Terrebonne Parish, aiding planners in pinpointing the locations of populations at risk in the event of a storm.

state and federal agencies and private enterprises on estuarine, deltaic and other water issues related to Louisiana's Master Plan. "We develop strategies to determine how best to use resources and to answer the question, 'Does the project stay useful?'" says Clint Willson, the director of engineering design and innovation at the institute. "We are not a part of CPRA, but we provide support to CPRA and contribute modeling and technical assistance to specific Master Plan projects."

Although the institute often works on projects with a near-term focus, it has the mission, personnel and funding to look at coastal issues from a big-picture perspective. "By working on specific, near-term projects, we get a good handle on the current state of restoration and protection practices and on the tools and knowledge base available," says Willson. "We use that understanding to develop and enhance plans and tools for longer-term projects, projects that are several years out. Our focus is not just on research, but on applying our knowledge in a technically sound way. We focus on linking knowledge to action."

To provide the best science, The Water Institute of the Gulf has attracted to its staff scientists, engineers and social scientists that are well known leaders in their fields. Staff expertise covers all facets of coastal issues, including

CWPPRA Project Selection

Through the years, the alarming loss of Louisiana's coastal wetlands has spawned many studies, plans, and strategies to prevent land loss. In 1990, the Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA) brought a new structure, devised through federal legislation, to the battle against the tides. A task force comprising five federal agencies and the state of Louisiana was charged with identifying, preparing and funding construction of coastal wetlands restoration projects. Early projects were nominated by the public and task force agencies, and the CWPPRA task force then selected projects for construction based on a cost-benefit analysis.

Throughout its 23 consecutive years of work in coastal restoration, the CWPPRA team has been responsive to new information that improves project selection. When, in 1998, the Louisiana Department of Natural Resources released the Coast 2050 plan, CWPPRA began to evaluate how well nominated projects supported the plan. Coast 2050 was developed with input from a host of coastal restoration experts, parish representatives and stakeholders; its goal was to provide a roadmap for coastal restoration that incorporated a multiple-use approach. Information regarding coastal wetlands, infrastructure, fish and wildlife resources, public safety and navigation were considered in the formulation of its strategies and projects.

In 2007, the state of Louisiana developed the Coastal Master Plan to guide all of its coastal restoration efforts. The plan was based on analysis from state, national and international scientists and coastal restoration specialists. Today's revised 2012 Coastal Master Plan proposes specific protection and restoration projects as well as recommending future investments that should be made in coastal restoration. "The state has been asked time and again to articulate its coastal restoration and protection priorities by stakeholders, federal agencies and the administration," says Bren Haase, deputy chief of the studies and environmental branch of CPRA's planning and research division. "While Coast 2050 provided the CWPPRA task force broad strategies as guidance for coastal restoration, the 2012 Coastal Master Plan provides it with targeted strategies and priorities for project selection. After considering projects offered by task force agencies and the public, CWPPRA then uses the Master Plan strategies and priorities to select the best projects promising the most effective use of construction dollars."

- hydrology and geomorphology of coastal water bodies
- sediment transport
- landscape ecology and sustainability
- fish and other aquatic fauna
- coastal sustainability, flood protection and climate adaptation
- socio-economic analysis
- community resilience
- data collection and statistical analysis
- modeling of riverine, estuarine and coastal wetland systems
- project planning
- environmental and natural-resource law

"The way the institute works – and the reason it does work – is through broad partnerships and collaborations among the staff and with academia, consultants and non-governmental organizations," says Willson. "Scientists and engineers must forge a new consensus about the best way forward. The Water Institute convenes and leads such discussions, bringing together experts from an array of disciplines to consider key questions."

Putting people into the coastal equation

Equally important as the institute's scientific and engineering expertise is its commitment to incorporate social science into coastal restoration. "A principle

Commercial Property Realty Trust

Conceived as a place where professionals – scientists, engineers, educators, contractors, businesspeople – involved in coastal issues across the globe will convene to work and share ideas, the Water Campus will rise along the banks of the Mississippi River in downtown Baton Rouge. A building on the waterfront will house public exhibits that relate the story of Louisiana's pioneering work in coastal restoration. *(Conceptual rendering of future Water Campus buildings)*

mission is to elevate awareness about people living and working on the coast to the level of awareness about land loss," says Craig Colten, director of human dimensions at The Water Institute of the Gulf. "The coastal population and the coastal economy are as vibrant and dynamic as the coastal ecology. We need to conduct social impact assessments in tandem with environmental impact assessments."

The institute offers a suite of tools to promote coastal community involvement in restoration and to foster communication among scientists, social scientists, decision-makers and the people affected by their decisions. One tool under development is a coastal atlas that will show how hazardous events and the loss of livelihoods have affected population distribution and land use. "Historically, people have adapted after disasters, at times choosing to relocate," says Colten. "When we overlay maps of population change and economic change with coastal land loss, the relationships among these phenomena become clear."

Another tool from the institute is a community adaptation toolkit, offering "best practices" for how other communities have coped with and adjusted to disruptive events. "These best practices present a set of options for a community to consider, enabling it to make informed decisions before a calamity strikes," says Colten.

The institute's scenario-building workshops encourage coastal communities to think through the effects, both positive and negative, of building – or not building – a restoration project. Jeffrey Leuenberger, a senior planner for Lafourche Parish, attended one such workshop. "No one argues that restoration must be done," says Leuenberger. "Coastal erosion is so dominant a part of everyday life that the community is worried about its survival for even just five more years. No matter which scenario unfolds, workshop participants agreed on the importance of keeping the community involved throughout the implementation of the Master Plan."

"For coastal communities, the toughest issues are the uncertainties associated with climate change, sea-level rise and impacts of proposed coastal restoration projects under the Master Plan," says Colten. "What do we gain if we restore the coast but lose the population? We're building the case for fuller inclusion of the human dimension in coastal restoration efforts."

A coastal science laboratory for the world

Colten thinks that by understanding the relationship between people and the coastal environment, Louisiana can be instructive beyond its borders. Already The Water Institute of the Gulf is carrying science and solutions to other coastal regions throughout the world. "Scientists affiliated with the institute are working on projects in New Zealand, Viet Nam's Mekong Delta, Brazil and other places in Latin America," says Willson. "As people recognize the institute's expertise, they will turn to it for tools like modeling, planning and engineering to help them solve their problems. We will go to them and their students and researchers will come to the institute to work with us."

To foster international collaboration, a 33-acre riverfront water campus is under construction in downtown Baton Rouge. Managed by BRAF's real estate subsidiary, the first phase will house The Water Institute of the Gulf, CPRA, public education exhibits, a small conference center and a physical model of the Mississippi River. Additional future office space is designated for more research organizations, engineering companies and other entities involved in coastal restoration. "We envision the campus becoming a hub for synthesis, with people located in proximity to work on problems," says Willson.

"The campus will provide a setting for cross-fertilization, for 'water cooler' conversations," says Davies, "because the best science never happens in a vacuum." WM

The Water Institute of the Gulf

The Water Institute of the Gulf helps to put Louisiana's experience and expertise in coastal restoration within reach of other coastal communities throughout the world. Chief scientist at The Water Institute and professor of earth and environmental sciences at the University of New Orleans, Denise Reed listens as a resident describes bank erosion problems in Myanmar's Ayeyarwady River basin village of Paginaw.

BCG Engineering & Consulting, Inc. and Alden Research Laboratory, Inc.

A birds-eye view of the Mississippi River

Physical Model Telescopes Time and Terrain to Test Restoration Options

How do you take a comprehensive look at 190 miles of the fourth largest river system in the world, perceiving not only how it behaves under current circumstances but how it's likely to behave five, 20, even 50 years from now? "Modeling helps us study likely interactions among numerous factors," says Kyle Graham, executive director of Louisiana's Coastal Protection and Restoration Authority (CPRA). "It provides the foundation for making decisions about the best ways to sustain coastal Louisiana."

Computer models are powerful, but they can be time-consuming to build and run. Answering basin-wide questions such as the optimal location and depth of a diversion requires modeling multiple scenarios of changing conditions over numerous spans of time. Alternatively, a dynamic physical model can show how water and sediment flow across the total landscape all at one time. To help scientists and engineers understand the Mississippi River system and how to use its resources for restoration, CPRA is building a small-scale physical model of the lower river, from Donaldsonville to the Gulf of Mexico. Part of the USACE-CPRA LCA Mississippi River Hydrodynamic and Delta Management (MRHDM) Study, the model will be housed in a 50,000-square-foot facility built on a 3.3-acre tract at

The small scale physical model of the lower Mississippi River will be housed in a 50,000-square-foot building. To test how well it will work, the model team is building a miniature version of it. The team will evaluate its performance by running a simulation of the opening of the Bonnet Carre spillway in 2011 and comparing model results to data gathered during the actual event.

the new water campus in Baton Rouge.

"The model simulates the river's depth, sediment and flow," says Rudy Simoneaux, a supervisor in the engineering department of CPRA. "Every component of the model is scaled to the real world and based on exact parameters of the river's physical and kinetic properties. The model will provide qualitative information that will assist in the planning and design of sediment diversion projects."

Probing the river body

Scientists and engineers will use the model to study the hydrology of the river and explore different approaches to diversions, marsh creation and other methods of coastal restoration. Questions the model could answer include

- What are the present geographic characteristics of coastal Louisiana and how might they change under various restoration scenarios?
- Where does sediment go? Where does water flow?
- Where are the best sites for locating large river diversions to restore wetlands?
- What are the individual and cumulative impacts of operating diversions?
- How might diversions affect maintenance dredging?
- When should diversions be opened to maximize their land-building potential?
- Where might scouring and shoaling occur?
- How will sea-level rise affect conditions in receiving basins?

Once completed, the physical model will devote its first runs to answering a suite of questions for CPRA about the state's Master Plan for protection and restoration. But other entities will be able to request other tests. "Future projects under the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) might use the model to answer design questions or to test operation options," says Simoneaux. "The facility has the capability to build and house other physical models, such as a flood wall or other river systems. We anticipate attracting visitors from across the globe."

Tests for two kinds of models

In recent years scientists and engineers have increasingly used computer modeling to envision the river's future conditions and the likely effects of restoration efforts. Speaking to the complexity of computer modeling, Barb Kleiss, a technical expert at USACE's Mississippi Valley Division, says, "A one-dimensional model that considers a single dimension of the river – say, its flow and sediment transport from upstream to downstream – can predict conditions as far out as several decades. But expand the model to two dimensions by adding a second feature – the horizontal component of the river's

BCG Engineering & Consulting, Inc. and Alden Research Laboratory, Inc.

Speedy and accurate, a CAD-driven router carves the terrain of the lower Mississippi River into blocks of foam. Each aspect of the model is carefully calibrated to simulate as closely as possible actual conditions of the river and in its adjacent basins.

banks –and projection times fall to three to five years. Add a third dimension, the river's depth, and that increases the computational time so much that the time frame predicted shrinks to a span of a few months. The complexity of the system is why we need to use computer models."

Each kind of modeling – computer and physical – supports the other. "We can use the physical model to verify computer model results, and vice versa," says Simoneaux. "A physical model complements but does not replace computer models. This type of physical modeling is qualitative; it's not meant to predict the exact acreage that will be built, but to indicate trends, to demonstrate that 'this location performs better than that one.' If both kinds of modeling point in the same direction, we know we're on the right path."

A physical model can produce results more quickly than computer modeling. "In one hour the physical model can produce data that covers an entire year," says Simoneaux. "In 100 hours it can construct a map of land built over 100 years. Additionally, it's much easier to visualize how a diversion works by looking at a physical model than by watching an animation on a computer screen."

To test how the small-scale physical model under construction will work, Simoneaux's team is building a miniature version – a model of the model at a ratio of one to 30. Scaling material to mimic actual riverborne, land-building sediment, they are running a simulation of the opening of the Bonnet Carre Spillway during the flood of 2011. "The model shows us the movement of water and sediment," says Simoneaux. "We have good data from that event, so we can compare the model's results to the actual occurrence. It's somewhat of a validation exercise in advance of constructing the full model." WM

"Complete with sediment and running water, the small-scale model of the Mississippi River will be the largest moving-bed, hydraulic physical model in the country," says Simoneaux, "and one of the largest, most dynamic models in the world."

Covering an area 90 feet by 120 feet, the river is sculpted into 216 5x10-foot foam panels using a state-of-the-art 3-D router. "Entering data into the CAD-driven router produces a much more accurate representation of the river than the physical model made a decade or so ago," says Simoneaux. "The old model was built by cutting foam profiles of sections of the landscape with a band saw and gluing them together. Operators poured dippers of sand into the water to mimic seasonal differences in sediment loads." In the new model, adding plastic particles calibrated to mimic the river's sediment and pumping temperature-controlled water through the system will be automated functions.

An observation deck like a cat walk above the model will provide vantage points for viewing it in action. The facility will be open to coastal science professionals and students and will offer educational exhibits to the public in a museum-like setting. "Although the physical model is the centerpiece, we're really excited about building a state-of-the-art exhibit center that focuses on restoration work in coastal Louisiana," says Simoneaux. "I don't think people realize how much progress we've made through programs like CWPPRA. These exhibits will showcase our accomplishments."

CPRA is funding construction of the model and its housing with a federal grant through the Coastal Impact Assistance Program. The LCA MRHDM Study has allocated funds through the U.S. Army Corps of Engineers to perform initial evaluations of the new river model. Once complete, the model will be operated by Louisiana State University.

WaterMarks Interview
continued from back page

WATERMARKS: What about changes in vision, techniques and the tools of restoration – what stands out for you?

MATHIES: Linking hurricane protection and coastal restoration – it's not how we started. We used to think of protection only in terms of structures – levees and flood walls and such. Now we realize protection and restoration can't exist without the other.

Advances in modeling have been dramatic. As a result, we are able to see the big picture and understand how the entire system works. Modeling gives us tools for weighing choices.

But most importantly, the people now working in coastal restoration for the state, federal agencies, local governments and the private sector have never been better. Coastal restoration specialists are passionate – it isn't just a job for them, it's a calling. And new people are excited to become part of it. Coastal restoration has become a hot profession; that bodes well for the future.

U.S. Fish and Wildlife Service, John and Karen Hollingsworth

As changing environmental conditions pose challenges to waterfront communities across the globe, Louisiana's coastal specialists are sharing their knowledge and experience to help people protect and restore healthy, enduring wetland habitats.

WATERMARKS: What are the major obstacles to accelerating the pace of coastal restoration?

MATHIES: Most Louisianans don't realize that their tax dollars do not provide the primary funding for coastal restoration. When we seek working partners outside of Louisiana, we need to go to the table with proof of Louisiana's investment in coastal restoration, which means that all Louisianans need to commit, as taxpayers, to restoring our coastal landscape.

Right now the discussion about how to pay for restoration and protection is taking place through lawsuits. Environmentalists are pitted against industry, diversion proponents against fishermen. We have to change the discussion so all parties function as partners, because preserving the coast is critical for everyone.

WATERMARKS: What lies ahead?

MATHIES: Regionally, there are a couple of coalitions that offer the opportunity to expand our vision and base of action. Through the RESTORE Act, funded by penalties levied against parties responsible for the Deepwater Horizon oil spill, we're uniting with other gulf states to develop a regional approach to rebuilding the ecosystem and revitalizing the economy. And the America's Watershed Initiative gives us a chance to work on issues involving other states that are part of the Mississippi River watershed.

Globally, Louisiana is on the cutting edge for developing the best technical solutions to coastal challenges. Louisiana is a leader in designing and implementing restoration and protection projects, structural and non-structural; and in balancing myriad interests – fisheries, navigation, agriculture and development. We have valuable experience to share with other communities that are facing similar problems around the world, and we can learn from observing how they go about finding solutions to their coastal issues. It is time for us to lead the world from a coastal protection and restoration perspective. WM

WATERMARKS

Louisiana Coastal Wetlands Planning, Protection and Restoration News

August 2014 Number 49

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

WaterMarks Interview with Steve Mathies

A Louisiana native, Steve Mathies has devoted his career to ecosystem restoration and hurricane risk reduction in the Gulf of Mexico coastal region. He has extensive experience in both the public and private sector, including as executive director of the Louisiana Office of Coastal Protection and Restoration (2009-2011); chief of the Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA) Project Management Branch, U.S. Army Corps of Engineers (1998-2000); deputy secretary at the Louisiana Department of Natural Resources (1996-1998); and director of the Barataria-Terrebonne National Estuary Program (1991-1996). Presently he is serving as vice president of the private-sector company AECOM, providing expertise related to planning, design and construction of coastal protection and restoration projects.

WATERMARKS: How did you become interested in coastal issues?

MATHIES: As a kid I knew the coast as a place to go fishing, but it wasn't until the Mississippi River flooded in 1973, when I was in college, that I started to think about how I could change Louisiana for the better. In 1982, after receiving advanced degrees in botany and biology, I went to work for the U.S. Army Corps of Engineers in New Orleans. I was assigned to work on the environmental impact statement and feasibility study for the Avoca Island Levee Extension, south of Morgan City. It was my first exposure to the crisis of land loss and to the dedicated professionals working on coastal issues.

WATERMARKS: Thinking over the years, what changes in coastal Louisiana are most remarkable to you?

MATHIES: The magnitude of land loss – it's devastating. Louisianans who lived through Hurricane Betsy in 1965 believed they had lived through the worst storm we could ever have. Then Katrina hit. The difference between the two storms was that in 2005 there were no contiguous wetlands to absorb the storm surge. Katrina forced us to change how we thought about our coastal wetlands.

We were fortunate that the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA, or the Breaux Act), passed in 1990, had brought the state and five federal agencies together to find common ground, formulate long-term coastal restoration strategies, agree upon objectives, and forge trusting relationships. Although we recognized the urgency of the situation, we didn't know where funding to address it would come from. We thought we had time to figure it out. Katrina changed that. The storm changed our priorities and accelerated action.

continued on page 15