

WATER MARKS

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Louisiana Coastal Wetlands Planning, Protection and Restoration News

May 2012 **Number 45**



Generating jobs,
conserving resources,
protecting assets

Wetland Restoration Powers Coastal Economics

May 2012
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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.

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ABOUT THIS ISSUE'S COVER . . .

From planning through construction to maintenance and monitoring, restoring wetlands requires a broad range of knowledge and skills. As well as protecting the natural resources upon which much of Louisiana's economy depends, environmental restoration itself is an engine of economic activity.

Photo: Weeks Marine



USDA-Natural Resources Conservation Service

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Amy Smith Kyle, The Nature Conservancy

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:

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Rebuilding the Coast Fosters a Vibrant Economy

“Originally the project’s goal was to generate 57 jobs,” says Mark Gagliano, manager of an environmental restoration project in coastal Louisiana. “To date the project has created or sustained 91 positions. Many of our new employees live near the sites where we built more than three miles of artificial oyster reefs.”

Gagliano is president of the Louisiana-based company Coastal Environments, Inc., which The Nature Conservancy contracted to design, manufacture and install the reefs near Grand Isle and in the St. Bernard marshes. The reefs comprise a triangular metal framework filled with

oyster shells in bags specially designed for reef restoration. “We anchor these artificial reefs in the project area and then let nature take over,” says Gagliano. “The structure provides instant, secure habitat, not only for oyster larvae but for crabs and shrimp and juvenile fish. As the reef grows and gains weight and mass, its capacity to quell wave energy increases. The slowed waves roll through the reefs and carry bits of broken shell onto the shore, building land.”

Shoreline protection, land accretion and increased marine habitat — such results are hallmarks of successful coastal restoration. But the driver of this project was economic:

putting local residents to work. Some workers — such as welders, boat captains, and heavy equipment operators — came with needed skills; others learned specialized techniques on the job.

The project’s economic impact, however, reached beyond the influx of paychecks in the community. Local stores sold materials, local stations supplied fuel, local restaurants served meals, a local camp provided housing. “We bought recycled shells from Louisiana oyster-processing plants to fill the reefs’ bags and purchased the steel for fashioning the reefs’ framework from American manufacturers,” says Amy

A grant funded through the American Recovery and Reinvestment Act and awarded through NOAA to The Nature Conservancy enabled the building of artificial oyster reefs near Grand Isle, Louisiana. Providing habitat for shellfish and juvenile fish as well as for oysters, the reefs become “living shorelines” that shield adjacent land from erosion.



U.S. Fish and Wildlife Service

From the early 20th century Louisiana's oil and gas industry has been active in responding to the nation's demand for energy. While some small wells still operate in coastal marshes, most oil exploration has moved into deep water in the Gulf of Mexico, giving rise to a vibrant business sector that services the offshore oil rigs.

Smith Kyle, The Nature Conservancy's manager for coastal conservation projects. "Now scientists from LSU's Ag Center are employed in long-term monitoring, and project participants are educating others about the importance and benefits of oyster reefs.

"Restoration not only rebuilds the environment, it strengthens the coastal economy," Kyle says. "One event resulting from the project, the community's fish-the-reef rodeo, demonstrates the close tie between the environment and the economy: Shellfish and juvenile fish taking refuge in the reefs attracted game fish, which in turn attracted fishermen, fishing guides and their clients, all of whom spent money on transportation, food, lodging, gear and



U.S. Geological Survey

For centuries the inhabitants of coastal Louisiana have relied on the region's bountiful natural resources for sustenance and livelihood. Today, transportation and distribution networks bring some of Louisiana's resources, such as seafood and oil and gas, to people throughout the country. Yet other resources are available only to the visitor: the beauty of the coastal landscape and the rhythm and piquancy of the region's unique culture.

other sundry purchases. As a result of restoration the environment flourished, and as a result of a flourishing environment the local economy grew."

The environmental base of Louisiana jobs

The Nature Conservancy's oyster reef project demonstrates how restoring the environment stimulates economic activity. However, the foundation of Louisiana's economy has always been

its environment. Fishing, oil and gas production, shipping and tourism – industries reliant on coastal resources or on the coastal landscape – continue to be dominant sectors of the economy. As noted in "Beyond Recovery," a report issued by the Center for American Progress and OxFam America,

- Nearly 44,000 Louisianans are employed in the seafood industry. Commercial landings of Louisiana fish



Louisiana Office of Tourism

The beauty of Louisiana's swamps and bayous draw thousands of visitors each year. Outdoorsmen and women are lured by the fecundity of this "sportsman's paradise." Birds find the area attractive, too; their concentration during migrations pull birdwatchers to their stopover habitat from across the globe.

account for more than a quarter of the weight of seafood harvested in the continental United States.

- Nearly one-sixth of Louisiana's workforce is employed in jobs related to the oil and gas industry. Louisiana is third among states in producing and refining petroleum, and the majority of deepwater wells in the Gulf of Mexico are located off of Louisiana's coast. More than one quarter of the nation's natural gas is produced in Louisiana.
- Louisiana is home to five of the 15 largest ports in the country. Louisiana's ports link to a distribution infrastructure through which flows a quarter of the country's oil supply, foreign and domestic. Twenty percent of the nation's waterborne commerce ply Louisiana's waterways.
- Statewide, tourism employs between 7 and 8 percent of Louisiana's workers. In the coastal region, the percentage is significantly greater. Recreational fishing and hunting, bird-watching and wildlife photography bring millions of visitors to Louisiana's coast and bayous annually.

Each of these economic activities, reliant on the coastal environment and its natural resources, is also vulnerable to environmental catastrophe

From its earliest settlement, Louisiana's waterways have been arteries of commerce. Now supplemented with highways, railroads and airports, the state's transportation and distribution networks deliver goods throughout the world.

or decay. Wetland loss reduces the amount of nursery habitat available to Gulf of Mexico fisheries. The oil and gas industry is subject to disruption and structural damage from hurricanes and floods as well as from man-made disasters. Storm-related shut-downs of ports and distribution systems can cripple shipping and waterborne commerce, while tourism is vulnerable to any event that reduces environmental health and vibrancy.

No-charge services, compliments of a healthy ecosystem

Even if there were no ships to ply its waters, no oil to flow through its pipelines, no nets set to trap its fish, Louisiana's wetlands would still play an essential role in the state's economy. Beyond providing livelihoods and wealth, wetlands deliver value by supplying ecosystem services. Long taken for granted, in 2010 the ecosystems of the Mississippi River Delta were estimated to provide between \$12 billion and \$47 billion worth

of benefits annually. Among the many wetland functions that enhance human health and wellbeing, the nonprofit organization Earth Economics cites the following in its report "Gaining Ground:"

- Wetlands filter hazardous pollutants commonly associated with agricultural runoff and sewage effluent. Locking up excessive nutrients in soil, sediment and vegetation, wetlands prevent concentrations of phosphorous and nitrogen from contaminating groundwater and reduce their capacity to deplete oxygen in water bodies downstream. Constructing water treatment plants to provide comparable services would cost between \$35,000 and \$150,000 per acre.
- Wetlands act as a sponge for water and wave energy. One acre of wetland may hold as much as one million gallons of floodwater. An estimated three and a half miles of wetlands could





U.S. Fish and Wildlife Service

Water moves slowly through a healthy marsh, its flow impeded by thick vegetation. Once naturally nourished by Mississippi River floodwaters, wetlands have weakened and subsided since levees were built that prevent the river from escaping its banks. To add nutrients and rebuild land, dredges capture sediment from borrow sites and deliver it to project areas. Much of the equipment used in wetland restoration is repurposed from their original functions in shipbuilding, road construction, oil and gas production and other industries.



U.S. Fish and Wildlife Service

reduce a storm surge by a foot, protecting people and towns and significantly reducing risk of disaster.

- Wetlands provide the largest terrestrial reservoir for carbon storage, a capacity of increasing monetary value as the world confronts the consequences of greenhouse gas emissions.

The economic value of the restoration industry

The jobs that depend on coastal resources and the dollar value assigned to ecosystem services would be cause enough to justify funding coastal restoration. But restoring and maintaining a thriving ecosystem is itself an engine of economic activity, creating new jobs while protecting the resource base of current industries. The organization Restore America's Estuaries has determined that investing in wetlands and coastal restoration can

create as many as four times the number of jobs as road infrastructure projects and as many as six times the number of jobs as investing in oil and gas. According to the report "Beyond Recovery," issued by the nonprofit organizations Center for American Progress and OxFam America after the Deepwater Horizon oil spill, \$1 million invested in wetland restoration creates 29 new jobs requiring various levels of skills and education in numerous fields.

Coastal restoration provides opportunities for existing businesses to find new markets. Often machinery and capabilities developed to serve oil and gas extraction, civil construction, navigational dredging or shipbuilding are easily converted to perform the tasks of restoration. Because the work is site-specific, jobs stay local.

"Coastal restoration in Louisiana is maturing," says

Oneil Malbrough, president of Shaw Coastal, a division of Shaw Environmental & Infrastructure, Inc. A Louisiana native, Malbrough has worked in the industry since 1987. "The CWPPRA task force, comprising five federal agencies and the state, has done much to move coastal restoration forward over the past 22 years — even through CWPPRA's smallest projects we've learned a lot. Now we're ready to take on bigger projects."

A secure funding stream is essential for businesses to be ready for the work described in Louisiana's 50-year master plan for coastal protection and restoration, Malbrough says. "When we become confident of the state and federal governments' commitment to fund the plan, we can expand and have the needed expertise and workforce ready to start building immediately." **WM**

RESTORATION SUSTAINS A RESOURCE-BASED ECONOMY

“Green” Jobs Flourish on Louisiana’s Coast

The statistics are woeful: 1,900 square miles of Louisiana’s wetlands swallowed by open water over the past 80 years, more than 600 miles of Louisiana’s coastline contaminated by recent oil spills, a hypoxic zone in the Gulf of Mexico the size of Massachusetts, the ongoing decimation of barrier islands, and increasingly strong storms and rising seas posing ever-growing threats to the homes and livelihoods of two million coastal residents.

These environmental challenges create both risk and opportunity — risk of calamity and opportunity to address the crisis by developing “green” jobs. Defined as economic activity that helps protect or restore the

environment or conserve natural resources, green jobs are a fast-growing sector of Louisiana’s economy. The Louisiana Workforce Commission expects green jobs to grow by 13.8 percent over 10 years, compared to an overall job growth rate of 8.1 percent. Projections of the number of jobs in coastal restoration range from 5,500 to more than 10,000. Coastal restoration demands a wide array of skills and services, from engineering, ecological assessments and risk management to dredge operations, concrete manufacturing and

plant cultivation. According to the commission, wages for direct and indirect jobs created by restoration spending will exceed the state average by about one third. Average annual earnings for direct jobs are expected to be approximately \$56,000, about 50 percent higher than the state average.

Growing green in Louisiana

Perceiving that coastal restoration is one of the emerging environmental industries essential to Louisiana’s future, the economic development

Both the environment and the economy were beneficiaries when The Nature Conservancy undertook the project of building artificial oyster reefs in waters close to the community of Grand Isle. From truck drivers to ichthyologists, from structural engineers to day laborers, the workforce required for wetland restoration spans a broad range of knowledge and skills.



Local welders were employed to build the artificial oyster reef's metal structures for The Nature Conservancy's project near Grand Isle. Because it is site-specific, restoration creates jobs within the community, both ones directly involved with rebuilding the environment and indirect jobs, such as those in food services and materials supply. Yet, as rising sea levels and a burgeoning human population increase stress on wetlands worldwide, there is a growing global demand for the expertise developed by restoration specialists working in Louisiana's unique coastal environment.

alliance Greater New Orleans, Inc. (GNO, Inc.) has launched an initiative to attract companies specializing in environmental issues to Louisiana.

"There are numerous reasons for Louisiana to become a hub of these industries," says Robin Barnes, GNO, Inc.'s executive vice president. "First is Louisiana's resiliency — people have noticed that we don't give up, that we recover from disasters.

"Second, we have the infrastructure and workforce that these industries require to take root and grow. Our highways, ports and rail systems connect us to national and international markets. Our research universities and other educational institutions graduate students in "green curricula," programs in sustainable enterprises such as water management, renewable energy and, of course, coastal restoration.

"And third, we have money to invest strategically, funds that we can use to preserve natural assets like our coast and the Gulf and build a sustainable future. We must



Amy Smith Kyle, The Nature Conservancy

invest those resources wisely. What happens to our coast — to our fisheries, our oil production, our commerce, our tourism industry — affects the entire country."

Developing a set of cutting-edge industries in the fields of coastal and marine science and technology could turn the environmental vulnerability of the Gulf Coast into assets, according to "Beyond Recovery," a report issued by the nonprofit organizations Center for American Progress and OxFam America. "We want those companies to be located here," says Barnes, "to live here, hire here, expand here, and bid on contracts here. We have work for them to do, plus we offer a quality of life that many, many people find attractive."

But becoming a hub of environmental industries will not occur automatically. "If our state does not work tirelessly to get the top-notch private-sector firms and researchers to Louisiana, we will miss out on this potential economic benefit and may fail to restore our coastline," says Michael Hecht, CEO of GNO, Inc. "If we are successful we will be able to simultaneously diversify our economy while sustaining our environment."

Local expertise, global demand

While the opportunities to restore Louisiana's wetlands may seem vast and endless, coastal restoration businesses anticipate exporting their technologies and expertise to other governments and industries dealing with environmental issues. From Califor-

nia to the Great Lakes, from Bangladesh to Viet Nam, investments in coastal restoration run into the hundreds of millions of dollars. And, as pressures from development and sea-level rise continue to threaten the world's wetlands, demand will increase for the experience and capabilities of Louisiana's coastal restoration industries.

As the Duke University report "Restoring the Gulf Coast" notes, "The Mississippi River Delta is unique in combining one of the world's largest and most productive river deltas with the most industrialized economy. The Gulf region, having experienced the potentially destructive effects of development on the very ecosystems that feed its economy, may have lessons for similar delta regions in Asia, Africa, and Latin America ... the Gulf region's evolving capabilities in coastal restoration could make it a future leader in similar efforts in the world's threatened coastal regions."

By simultaneously deterring environmental catastrophe and strengthening an economic sector increasingly in worldwide demand, restoring Louisiana's coast could convert crisis into opportunity. **WM**



Weeks Marine

Surveyors are among the many professionals ensuring that restoration projects are constructed where planned and as designed.



U.S. Fish and Wildlife Service

Mapping, planning, reports, evaluations, environmental assessments, legal contracts with landowners, purchase orders, writing and editing reports, economic impact analyses, engineering design specifications – a great deal of the work of environmental restoration takes place in offices.

Louisiana's Industries Thrive on Robust Wetlands

While other seashores in the United States conjure images of sun-soaked beachcombers stretched out on lounge chairs or bronzed surfers floating on swells as they wait for the next big wave, Louisiana's coast is a working coast. Vessels laden with supplies churn their way toward offshore oil rigs. Boats with shrimp nets raised like wings thread through the bayous and head toward open water. Tankers bringing black gold to an

energy-hungry nation dock alongside container ships packed with Midwestern grain bound for far reaches of the world. And amid the teeming activity of industry and commerce, the beauty and fecundity of the landscape entice millions of tourists to visit each year.

In Louisiana, the state economy flourishes in tandem with the coastal economy, and the coastal economy thrives only in a healthy environment.

Whether

- counting on flourishing wetlands to sustain marine nursery habitats
- trusting in a healthy, natural buffer to provide storm protection
- relying on functional ports and navigation routes to service the offshore oil and gas industry
- depending on operational distribution networks to speed international commerce

Building land often involves earth-moving equipment. While some conditions allow the use of conventional machinery, the coastal environment has spurred some Louisiana companies to develop specialized equipment, such as marsh buggies, that can operate safely in fragile wetlands.



Wetlands Marine

- banking on a fisherman’s catch to feed a family or feed a nation

the condition of Louisiana’s coastal environment has far-reaching economic impacts.

The cost of wetland loss

While a decline of natural resources would directly devastate many jobs, coastal land loss is already producing other destructive economic consequences. As the 2012 draft of Louisiana’s “Comprehensive Master Plan for a Sustainable Coast” points out, businesses have difficulty obtaining insurance, investments lose value because of uncertainty about the landscape’s future and families are forced to leave jobs and ancestral communities. If no further restoration is undertaken, the plan predicts that coast-wide, annual damage from flooding would increase ten-fold over the next 50 years, from an average of \$2.4 billion to \$23.4 billion.

Some such consequences of land loss can be assigned a dollar value. Less easy to measure is the worth of winter waterfowl habitat, or stopover habitat for neotropical migratory birds, or the dark waters where one might glimpse an alligator or catch the glint of fish. And deemed by some to be at greatest risk of loss is the invaluable history and culture of a unique, centuries-old, American place.

The demise of Louisiana’s wetlands threatens all coastal communities, habitats and enterprises. Whether the result is increased vulnerability to storms, diminishing capacity of flood protection systems, or the actual disappearance of the very landscape upon which fish, bird and human alike rely, a weakened wetland system erodes the strength and sustainability of life and work along the coast. **WM**



The Greater Lafourche Port Commission

Critical to both the nation’s energy supply and the local economy, Port Fourchon lies at the end of a highway that had become increasingly vulnerable to storms and erosion as protective wetlands weakened and became fragmented.

The value of restored wetlands

“Obviously, healthy wetlands reduce storm surge,” says Henri Boulet, executive director of LA1 Coalition. The organization was founded 15 years ago when stakeholders along the coast recognized the vulnerability of the only road to Port Fourchon and Grand Isle. A high priority corridor designated by Congress as critical energy infrastructure, the highway was increasingly exposed to storms and wave action as surrounding wetlands converted to open water. “With climate change, we’ll be facing tougher storms,” says Boulet. “We need healthy wetlands to buffer the highway if it is to remain a vital route.”

Boulet knows how coastal restoration enhances the protective capacity of natural systems. “I’ve seen how the freshwater diversion at Davis Pond transformed a highly saline, dead lake into a lake flourishing with abundant greenery and incredible fisheries. Wetlands rejuvenated by fresh water increase in organic matter and absorb wave energy before it reaches the levees. The wetlands are critical to the levees’ performance, and the levees are essential to protecting the blue-collar, working communities that produce energy for our nation.”

As a result of state and federal transportation studies, the Louisiana Department of Transportation has undertaken replacing LA1 with a structure elevated above the floodplain and built to withstand 100-year storm surges (pictured above). LA1 will revert to a parish road. “We need the road as an alternate route to the elevated highway,” says Boulet. “To protect the road, community leaders are urging the state to restore the wetlands on both sides of Lafourche ridge. Because of its scenic beauty and proximity to the water, LA1 will become a favorite route for fishermen and tourists.”



U.S. Army Corps of Engineers

Reweaving the fabric of a flourishing marsh takes imagination, cooperation, scientific analysis, planning, engineering, machinery, energy, money and a long-term commitment to environmental restoration.

- Health, safety and wellbeing of coastal communities that depend on ecosystem services, including the wetlands' natural capacity to provide protection from storms and floods

The coastal economy's golden egg

Louisiana is rich in natural assets. Energy, fisheries, wildlife, forests, land, water and wetlands form the resource base of the state's economy. Additionally, healthy ecosystems provide services that are integral to communities' health and wellbeing, such as water purification, carbon storage and storm protection. "The value of these services is often overlooked," says Michèle Deshotels, a coastal scientist and planner at Louisiana's Coastal Protection and Restoration Authority, "but understanding how essential natural systems are to the economy can lead to improved and more responsible societal decisions, which in turn can increase our economic resilience."

According to the Center for Natural Resource Economics and Policy at Louisiana State University, Louisiana's economic future depends on efficiently managing the state's natural resources by focusing

THE ECONOMICS OF STEWARDSHIP

Conservation the Cornerstone of a Resilient Future

Like a worn quilt made from patches of tattered marsh, Louisiana's wetlands are difficult to stitch back together. "Rarely can we restore an ecosystem to its original condition," says Dr. Linwood Pendleton, the director of ocean and coastal policy at Duke University's Nicholas Institute for Environmental Policy Solutions. "Protecting what we have is far less costly than replacing what we've lost. There are areas where restoration is the only option, but in healthy and highly functional parts of the coast, it pays to be good stewards now."

Preventing loss is not the only economic benefit of ecological stewardship, says Pendleton. He cites these three components of a coastal economy that rely on a healthy ecosystem:

- Commercial activity traditionally associated with Louisiana's resource-based economy, such as fishing, shipping, and oil and gas production
- Recreation, which generates jobs, produces expenditures within the local economy, and enhances quality of life for the local population

on more than extraction and utilization, jobs and income. Although the development of resource management plans always involves complex economic and environmental tradeoffs, the center urges consideration of how resource allocations and investment decisions will affect generations to come.

The ultimate challenge of resource management, the center says, involves reconciling the dual needs for a prosperous economy and a thriving environment. At times seemingly adversarial, the two needs nevertheless are intertwined. Pendleton points out how the nation’s energy infrastructure — oil and gas processing facilities and distribution networks — relies on the protection of healthy wetlands and forests along the coast. Many past practices of the energy industry led to these habitats’ degradation, but the viability of that very industry now depends on restoring and sustaining these ecosystems.

Conservation practices secure the future

“Louisiana’s economy relies on people choosing to live on



U.S. Fish and Wildlife Service

The economy of coastal Louisiana depends on workers with a wide range of knowledge and skills. Fortunately the region offers a quality of life appealing to people who enjoy outdoor activities and family-centered cultural traditions.

the coast,” Pendleton says. “Much of the current economic activity depends directly on the ecosystem, and amenities such as recreation and natural beauty draw people here to live and work. For Louisiana’s economy to remain healthy, the coast must remain livable.”

Louisiana’s “Comprehensive Master Plan for a Sustainable Coast” acknowledges that expanding development, a growing population and rising levels of pollution have compromised the coastal environment. Economic, ecological and social losses resulting from coastal hazards have multiplied. Calling for wiser

land-use practices and adjustments in the long-term settlement of the coastal area, the plan outlines steps to take to secure environmental health and sustainability. Enhancing the resiliency — the capacity to adapt to and recover from change — of individuals, businesses, communities and ecosystems is imperative for maintaining and growing the region’s economic prosperity.



The plight of Louisiana’s wetlands has increased public awareness of environmental values and has promoted community action to address a common threat. High school students are among the groups who volunteer for wetland restoration activities, undertaking projects such as planting vegetation on newly restored barrier islands and building brush fences out of recycled Christmas trees.



WATERMARKS INTERVIEW WITH SCOTT KIRKPATRICK, COAST BUILDERS COALITION

Building Businesses to Rebuild the Coast

Scott Kirkpatrick is president of the Coast Builders Coalition, a nonprofit organization committed to bringing industry together to support a sustainable coast in Louisiana.



WATERMARKS: You've said a vibrant coastal ecology is essential to a healthy economy. What's the connection?

KIRKPATRICK: In Louisiana, we've seen what can happen if environmental and economic interests become unbalanced. Decades ago, desire to accommodate navigation, enhance commerce and provide

flood protection drove the construction of levees along the Mississippi River. Levees served the economic interests of the entire nation, but the wetlands suffered, making Louisiana more vulnerable to natural disasters. We've learned that to achieve a sustainable coast, we have to combine protection and restoration.

WATERMARKS: Rebuilding the coast comes with a big price tag. There are compelling environmental reasons to undertake restoration, but does it make good business sense?

KIRKPATRICK: Restoration produces three economic impacts: First, it provides work for businesses involved in restora-



Flourishing wetlands are essential not only to a vibrant coastal economy and to the protection of coastal communities, but also to the birds, fish and other wildlife dependent on wetland habitat. In turn, the allure of these wild creatures helps to attract the diverse workforce that Louisiana needs to restore its wetlands.

tion activities. In many cases, coastal restoration is but one component of a business's activity, not its sole focus. However, these companies can now look at the state's coastal plan to get an idea of what work will be done in the future, and where it is. That helps them to develop long-term strategies for hiring and growth and, coincidentally, develop expertise that is increasingly in global demand.

Secondly, as we return areas to sustainability, the health of the ecology improves. This helps people whose livelihoods depend on ecosystem services, like fishermen who rely on seafood production in the wetlands' marine nurseries.

Thirdly, restoration rebuilds the protective capacity of the natural landscape. Everyone benefits from that. Even businesses located farther inland realize advantages from a strong natural defense against storms.

WATERMARKS: What kinds of business activities does coastal restoration involve?

KIRKPATRICK: The businesses can be fairly well divided into two categories: consultants and contractors. Between the two they employ an extremely diverse work force, everyone from day laborers to PhDs. Engineers, surveyors and scientists generally work for consultants. Contractors employ people to put projects on the ground, to move earth, build pipelines, man boats, repair machinery, plant vegetation — there are hundreds of different jobs. Plus, projects require materials and manufactured products, stimulating activity far down the value chain.

WATERMARKS: Does awareness of the plight of Louisiana's coast make a difference in the business community?

KIRKPATRICK: Among coastal businesses I certainly see a

greater willingness to work with parish, state and federal programs to promote environmental sustainability. 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. We've realized that the concept of a working coast is possible, and we're figuring out how to be smart in creating it. We have a number of companies in this state that have become so proficient at operating in environmentally sensitive environments that they are global leaders in their industry sector. The best solutions combine ideas from industry, academia and government; success requires collaboration among all three sectors.

WATERMARKS: Is there something to be learned from what's happening in Louisiana, a broader application for its lessons?

KIRKPATRICK: We've learned that a huge public works project like the restoration of Louisiana's coast requires a solid plan and a long-term commitment to funding. For that to happen, it's crucial to educate people about the problem so that they understand the need for such a large undertaking. Over the past few decades many people — elected officials, nonprofit organizations, educators, concerned citizens — have worked endlessly to raise awareness. It has been a monumental task, but without that work we wouldn't be where we are today — proposing a \$50-billion, 50-year project to rebuild our coast. **WM**

