WATER MARKS

Louisiana Coastal Wetlands Planning, Protection and Restoration News

April 2005 **Number 28**

VEGETATIVE PLANTINGS

On the front line in the battle to save coastal Louisiana

Root, Stem and Leaf, the Wetlands' Vital Tissues

Vegetative Plantings Take Hold

***WaterMarks* Interview with Gary Fine**

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April 2005 Number 28

WaterMarks

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WaterMarks is published three 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 enhancement projects nationwide, designating approximately $60 million annually for work in Louisiana. The state contributes 15 percent of total project costs.

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ABOUT THIS ISSUE'S COVER . . .

Plants are the foundation of wetland ecosystems, stabilizing soil, buffering wind and waves, and providing vital habitat. Hand plantings jump-start plant growth in fragile environments, such as this barrier island south of Terrebonne Parish.

Photograph of Pat Murphy of Black Lake Marsh Inc. courtesy of the Louisiana Department of Natural Resources.

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www.lacoast.gov/newsletter.htm

Root, Stem and Leaf, the Wetlands' Vital Tissues

"WHEN WE TALK ABOUT a land-loss crisis in coastal Louisiana, we're really talking about a plant-loss crisis," says Rex Caffey, wetlands and coastal resources specialist at Louisiana State University. "Land loss is just the inevitable consequence of losing vegetation."

Although wetland plants may seem to lack allure, professionals like Caffey insist that they are the foundation of coastal restoration. And with good reason when you consider the significance and scope of plants' four basic functions:

- **Plants build and stabilize soil.** Trapping particles of waterborne sediment among their roots, stems and leaves, plants slowly accumulate the thick mud of the marshes and keep soil from washing away. Vegetative cover protects existing soil substrates from erosion and nutrient loss, while dead and decomposing plant biomass further increases soil volume and improves soil structure.

- **Plants create habitat.** All organisms in the wetlands, from microbes to alligators, depend on plants or plant-eating animals for nutrition. As well as supplying food, wetland vegetation provides shelter, breeding grounds and nurseries for a profusion of marine organisms, waterfowl and terrestrial wildlife.

NOAA Restoration Center, Erik Zobrist

Versatile, hardy and fast-growing, smooth cordgrass is a popular choice for holding soil and stabilizing land. The Chandeleur Islands Restoration Project, shown here, planted smooth cordgrass to stabilize more than four miles of barrier island shoreline.

- **Plants purify water.** Plants contribute to aquatic health by absorbing large quantities of nutrients and chemicals from water and sediment. By diminishing the nutrient load and immobilizing toxins, plants reduce contamination both in groundwater and downstream.

- **Plants shield infrastructure.** The physical barrier of a single stem appears negligible, but thousands of acres of plants effectively absorb destructive wave energy and reduce damaging storm surge. Plants are a living shield against the sea, protecting Louisiana's coastal infrastructure as well as its natural environment.

Lending a Hand to Nature

Because the ecosystem of Louisiana's marshes is so destabilized, plants need help to save the wetlands. Many projects funded by the Coastal Wetlands Planning, Protection and Restoration Act (commonly known as the Breaux Act) involve engineering, such as designing water control structures to regulate tidal flow, stabilizing shorelines

or directing the correct placement of dredged material to create new marshes. Even so, typically the mark of these projects' success is the emergence of a thriving plant community.

In many instances that plant community will colonize a project area naturally; other sites benefit from humans intervening with plantings. Intervention is advantageous in places

- that could erode before natural colonization takes hold
- where there is no natural seed bank
- where water flow fails to deliver seeds or plant-generating bits of root
- in which foraging wildlife deplete the available store of plants and seeds
- where exotic plant species are likely to invade and prevent the succession of desirable plants

"Plantings can facilitate the restoration process," says Rebecca Howard, research ecologist at the National Wetlands Research Center. "They can establish conditions that foster the wetlands' capacity to regenerate themselves, and then let nature design and sustain their performance."

Planning for Plants

"Think of sediment in a new CWPPRA project as lumber," says Caffey, "and plants as the nails that hold that lumber in place. Without the nails of vegetation, the new land will collapse and be swept away."

National Wetlands Research Center

Plants provide food and shelter to wetland creatures from microbes to mammals. Exotic nutria eat marsh plants' stems, leaves and seeds, sometimes destroying the vegetation's regenerative capacity. In such instances, hand planting can give nature a boost by re-establishing plant communities.

To make the best use of the nails, Caffey supports including plans for plants in the initial design of Breaux Act projects that require revegetation. Projects can encourage the growth of desirable species by creating conditions under which they flourish. For instance, seashore paspalum grows best at low elevations in slightly salty soil. If limited in height, ridges built from dredged material become places where paspalum readily takes hold and thrives.

Since the science of using plants for restoration purposes is relatively new, Howard cites the need for continuing research to determine what plants work best for specific locations, and why. "We want to select plants with known growth characteristics and match them to conditions at restoration sites," she says.

For example, plants with densely clumped stems can trap fine sediment, while those with sparse stems may capture only coarser particles. One species' bulbous root system may help aerate the soil, while another's slowly decomposing fibrous root contributes biomass. By studying botanical attributes and selecting plants for specific restoration purposes, scientists can build on nature's capabilities to protect and restore the wetlands. **WM**

NRCS Plant Materials Center
a Proving Ground in Struggle for Coast

A HARD RAIN IS FALLING and the red-tinged stems of smooth cordgrass are deeply bent under the weight of the downpour.

A researcher dressed in rubber boots and slicker stoops to inspect the base of the 'Vermilion' strain of cordgrass, and then moves on toward the main complex of the Natural Resources Conservation Service's Plant Materials Center (PMC) in Galliano, Louisiana.

Of the 26 plant materials centers in the nation, this is the only one that concentrates on developing plants to use in the struggle to save Louisiana's coastal wetlands. According to manager Gary Fine, the center is a living laboratory in which Louisiana's native plants are rigorously evaluated for characteristics important for wetlands restoration. "We need to understand how a plant strain will react to conditions like salinity levels, land elevations and tidal flows. We can't invest years in plantings only to discover that a strain is susceptible to drought or disease," says Fine.

Natural Resources Conservation Service

Scientists at the NRCS Plant Materials Center test strains of native species that are particularly adaptive to changing conditions in the wetlands. Only after careful, thorough testing is a superior strain identified and released as a proven performer.

Opened in 1989, the PMC sits on a 90-acre plot of land consisting of ponds, research plots, greenhouses and a laboratory. Its most visible contributions to the science of coastal wetlands plants are six plant releases — 'Vermilion' smooth cordgrass (*Spartina alterniflora*), Brazoria seashore paspalum (*Paspalum vaginatum*), Pelican black mangrove (*Avicennia germinans*), Fourchon bitter panicum (*Panicum amarum*), Caminada seaoats (*Uniola paniculata*), and 'Gulf Coast' marshhay cordgrass (*Spartina patens*). These strains have proven effective in limiting soil erosion, reducing the conversion of marsh to open water, and promoting the re-establishment of emergent vegetation.

Furnishing the seeds, propagules and foundation plant material that private nurseries use to raise these strains, the PMC is also providing a readily available supply of plant materials for restoration efforts

This is important in preventing indiscriminate, large-scale harvest of plants from already vulnerable coastal habitats.

Another key role of the NRCS Plant Materials Center program is developing plant technology. "Right now we're experimenting with numerous techniques for propagating, producing, managing and establishing a variety of plants for application in diverse coastal habitats," says Fine. "The PMC is devising methodologies to increase the success of planting for coastal restoration." **WM**

Natural Resources Conservation Service

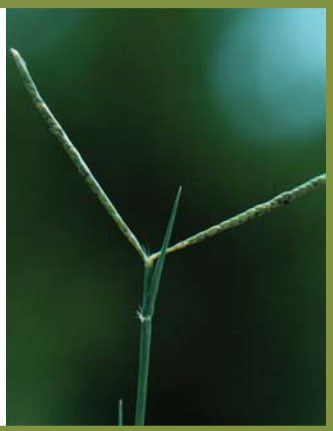
PMC's 'Vermilion' is often planted in areas accessible only by boat.

PMC's Releases Offer Benefits to Diverse Coastal Conditions

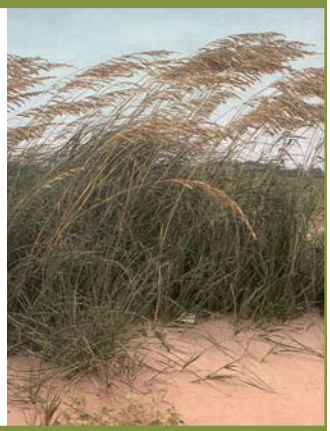
'Vermilion' smooth cordgrass
(*Spartina alterniflora*)
The stiff, high-density stems of smooth cordgrass buffer waves and collect sediment. The species thrives in areas frequently inundated, such as shorelines and barrier islands.

Fourchon bitter panicum
(*Panicum amarum*)
In sandy environments, bitter panicum provides vertical structure, blocking wind to trap and keep sand in place. The sand stimulates root production as it covers the plant's stems.

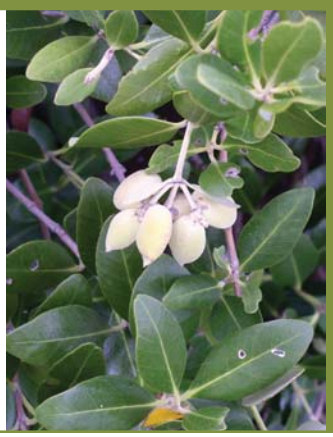
Brazoria seashore paspalum
(*Paspalum vaginatum*)
Seashore paspalum spreads rapidly in wet, slightly salty soil, preventing sediment loss by covering land quickly. It's also a "pioneer species," creating conditions for other plants to colonize readily.



Caminada seaoats
(*Uniola paniculata*)
Tolerant of salt spray, wind-driven sand accretion, and storm surges, seaoats help stabilize coastal beach dunes and barrier islands. This perennial grass reproduces primarily through rhizomes.



Pelican black mangrove
(*Avicennia germinans*)
The Pelican black mangrove stabilizes soil with its extensive root system and reduces wind and wave action in shoreline areas. The evergreen shrub also provides habitat for the brown pelican and other birds.



'Gulf Coast' marshhay cordgrass
(*Spartina patens*)
In marshes, along coastal beaches, and on barrier islands, marshhay cordgrass comprises one-fourth of the vegetation in Louisiana's coastal wetlands where it builds soil by contributing biomass.

Photo Credits: Gary Fine, USDA, NRCS and USDA, NRCS. 2004. The PLANTS Database, Version 3.5 (http://plants.usda.gov). National Plant Data Center, Baton Rouge, LA 70874-4490 USA

National Wetlands Research Center (NWRC)

Scientists Provide Basis for Decisions in the Field

SURVEYING THE TITLES IN ITS LIBRARY, a reader is struck by the breadth of subject matter under study at the National Wetlands Research Center (NWRC) in Lafayette, Louisiana.

Scientists working in numerous disciplines — biology, geography, genetics, ecology — are examining every aspect of Louisiana's complex coastal environment, from feeding patterns of microscopic organisms to land loss trends tracked through satellite imagery.

And the frequency with which the center's scientists author these publications indicates the leading role they play worldwide in the field of wetland ecology. Their research not only contributes to academic scholarship, but also finds application as the scientific basis for environmental actions in the field. For instance, the center might

- identify plants with the genetic characteristics most beneficial to a project area
- determine how changing wetland conditions affect plant growth and survival
- monitor a project's long-term influence on the coastal environment by surveying habitat and tracking changes

National Wetlands Research Center

Top: Research in the labs and greenhouses at NWRC not only helps Louisiana fight wetlands loss, but also contributes to understanding the complexities of wetland ecosystems worldwide.
Bottom: In this study, greenhouse conditions are controlled to test the effects of different nutrients, salinities and water depth on a species' performance.

National Wetlands Research Center

From microscopic examination of cells to mapping with satellite imagery, scientists work together at NWRC to unlock the wetlands' secrets.

Begun in 1975 as part of the U.S. Fish and Wildlife Service, in 1992 the center moved to the University of Louisiana's research park in Lafayette. Today the NWRC is one of 18 science centers in the U.S. Geological Survey's Biological Resources Discipline. **WM**

Successful Projects Reclaim Wetlands

Vegetative Plantings Take Hold

WITH THE STATE LOSING LAND at the rate of a football field about every half-hour, the news about Louisiana's wetlands is often dire.

As a means of stemming that loss and reclaiming marsh habitat, vegetative plantings offer a solid basis for hope.

"Vegetation is one of the easiest coastal restoration projects to do," says Kenneth Bahlinger, landscape architect with the Louisiana Department of Natural Resources (DNR). "You've just got to get out there quick and plant."

Revegetation may occur naturally, Bahlinger explains, but in many instances that won't happen before tides, storms, boat wakes, and other forces of erosion wash away sediment. Hand plantings can jump-start natural vegetation growth, creating a more stable home for plants and animals.

Three recent projects — on Queen Bess Island, in the Sabine National Wildlife Refuge and at Boston Canal/Vermilion Bay — illustrate this premise and the potential plants have for holding on to Louisiana's land.

LA Dept. Natural Resources

Thanks to habitat restoration projects in coastal Louisiana, the brown pelican is no longer on the U.S. Fish and Wildlife Service's endangered species list.

The Greening of Queen Bess

The success of Queen Bess Island, Bahlinger says, is easy to see: "Just count the birds. That island is full of pelicans."

Twenty years ago the brown pelican, Louisiana's state bird, had vanished from Louisiana's coastal wetlands as DDT pollution endangered its young and erosion claimed its habitat. Following a national ban on the use of DDT, the state reintroduced pelicans from Florida and began

Between 1956 and 1989, Queen Bess Island had lost under the Breaux Act and the Louisiana DNR increase sediment within them. Plantings by the DNR and Breau says Kenneth Bahlinger. "The plants change that as the

re-establishing their habitat. In the Barataria Bay Waterway Wetland Creation project, sediment dredged from the waterway was placed on Queen Bess Island. This small island in the Barataria-Terrebonne Estuary System had lost nearly two-thirds of its land due to storms, erosion from boat wakes, and lack of vegetation.

One factor in the pelican's remarkable recovery — from just 675 nests in the BTES in 1990 to more than 6,500 in 2001 — was the "greening" of Queen Bess: the hand planting of two plant species. Black mangrove trees now provide nesting areas for the pelicans, while smooth cordgrass collects sediment and serves as habitat for fish and crustaceans.

"What we've planted there has spread and covered Queen Bess," Bahlinger says. "Those plants are actually helping hold sediment on the island. The plants are thriving, and so are the pelicans."

s Help Rebuild Queen Bess Island

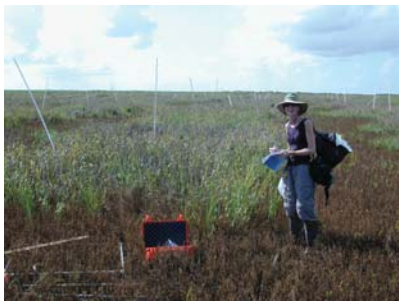
LA Dept. Natural Resources

28 of its 45 acres to subsidence, erosion, and storm-induced overwash. In the 1990s, projects
d the island's size to 34.6 acres by building rock containment structures and depositing
ux Act partners followed. "The material deposited on the island was very silty, soft, mucky soil,"
ey trap sediment, accumulate biomass and help the soil consolidate."

Marsh Makers

The Sabine National Wildlife Refuge — an ecotourism attraction and educational resource that draws some 300,000 visitors each year — is part of a vast ecosystem between the Calcasieu and Sabine rivers. But the construction of the Calcasieu Ship Channel in the 1960s, along with natural forces such as hurricanes, increased salinity in much of the marsh, killing its native plants and converting portions of it to open water.

To re-establish Sabine's wetlands, one recent project (Sabine Refuge Marsh Creation, Cycle 1) created marsh from open water areas by building temporary earthen containment dikes, then filling the areas between them with material dredged from the Calcasieu Ship Channel. The perimeter of the area and the edges of trenasses — man-made bayous permitting the natural movement of water and wildlife — were planted with smooth cordgrass, which holds the sediment in place and helps create a functioning marsh as it spreads to the interior of the dredged material.



LA Dept. Natural Resources

"Vegetation would probably have eventually covered the created areas naturally," says Leigh Anne Sharp, coastal scientist with the DNR. "But hand plantings made it happen faster because it kept the soil in place."

Four more cycles of pumping of dredged material are planned for other areas in the refuge, but results are already positive.

"The plants filled in really quickly and are beginning to create the marsh habitat," says Sharp. "This area is ripe for restoration. The cells of marsh we're building should help save the entire refuge."

Reclaiming the Shoreline

For decades, wind-driven waves pounding the shoreline of Vermilion Bay and wakes from boats traveling into Boston Canal scoured away soil and plants from the fragile wetlands bordering the bay.

"Once the shoreline eroded back far enough, the open water areas within those wetlands would become part of Vermilion Bay and the interior marshland would be lost," says Cindy Steyer, coastal vegetative specialist with the Natural Resources Conservation Service (NRCS).

As part of the 1995 Boston Canal/Vermilion Bay Shoreline Protection project, the NRCS and DNR planted 35,000 'Vermilion' smooth cordgrass transplants along a 14-mile stretch of Vermilion Bay shoreline. The goal: to dissipate wave energy to reduce the rate of shoreline erosion.

Ten years later, the cordgrass has not only stabilized the shoreline, it is also collecting sediment, creating marsh that other native plants have begun to colonize naturally.

"We hoped the smooth cordgrass would just slow the rate of shoreline loss," Steyer says. "But it has exceeded our expectations by actually promoting shoreline gain." **WM**

Saving the Shoreline

Partnerships can bring impressive results to coastal restoration projects. That's especially true of Soil and Water Conservation Districts (SWCDs), a longstanding partnership between landowners and government agencies. Over the last 15 years, this cooperative effort has used vegetative plantings to stabilize over 400 miles of Louisiana's shoreline—roughly the distance from New Orleans to Memphis.

Unique in that they're managed by local landowners, not government agencies, SWCDs have the authority to select sites for revegetation projects and hire area residents to complete the plantings. Planted sites include public and private property and occasionally one complements a larger state or federal restoration area.

SWCD planting projects are funded through the DNR Vegetative Planting Program and receive technical assistance from the NRCS and Louisiana Office of Soil and Water Conservation.

Natural Resources Conservation Service

Natural Resources Conservation Service

Above: A scientist conducts a site visit to monitor whether plantings have met goals for growth, coverage, and species dominance. **Left:** When these smooth cordgrass plugs were planted in 1995, the Vermilion Bay shoreline was eroding at a rate of 2.6 feet per year. **Right:** Today, the planted areas of the Vermilion Bay shoreline form a continuous vegetative hedge and shoreline loss has been reversed.

Cultivating Remedies to Stem Wetland Loss

"PLANTING VEGETATION IN LOUISIANA'S wetlands is hard work," declares Ron Boustany, biologist with the Natural Resources Conservation Service. "Keeping an eye out for alligators, you wade through murky water and sink up to your knees to dig hole after hole in soft, bottomless mud."

Louisiana Sea Grant College Program

The unconsolidated soil of Louisiana's wetlands can feel bottomless — in many places one can sink chest-deep in mud before there is enough solidity underfoot to arrest the plunge. The difficulty of establishing seedlings in such conditions spurs scientists to devise other planting methods.

And there's no assurance the hard work will pay off: a single high tide or unexpected storm can undo entire plantings.

Despite the difficulties, many scientists are convinced of the value of plantings and are experimenting with ways to overcome their drawbacks. Currently the entire process, from propagating stock through root division to setting out each plant by hand, is time-consuming and labor-intensive. However, some innovative ideas for expanding the use of this restoration tool are in the works.

Looking for Natural Answers

"Aerial seeding is the easiest, fastest, most cost-effective method of planting large areas of wetlands," says Mike Materne, plant specialist at Louisiana State University's Agricultural Center. "It's really the only alternative we have to planting by hand."

Unfortunately, aerial planting has a major drawback — many wetland plants produce few viable seeds, multiplying instead through rhizome division or root spread. Consequently, Materne and other scientists at the Ag Center are developing strains of native plants that promise both a high seed yield and a greater rate of germination. They are also looking for characteristics conducive to mechanical harvesting, and analyzing issues such as optimal temperature and moisture levels for winter seed storage.

But Materne isn't limiting himself to seed. "We're exploiting the plants' own strong suit: vegetative propagation. We're chopping the underground stem into small fragments for aerial distribution. This could be a way to get vegetation to large areas of wetlands that are inaccessible by boat or foot."

Submersed Vegetation Takes Root on Mats

Having done his share of digging in knee-deep water, Ron Boustany went back to the lab to search for other planting methods. In a recent study he grew submersed aquatic plant seedlings on biodegradable mats in a greenhouse. He then transplanted the seedlings

by pinning the mats to the bottom of marsh ponds.

"The mats provided a durable but temporary substrate," Boustany says. "They helped young plants withstand the destructive forces of wind and wave. Also, the mats seemed to bolster natural colonization by providing stability for additional species. As we learn how best to site the mats — how deep, how far from shore — we expect to increase the resulting plant cover."

Benefits Increase with Choices

Although the plants are natural, wide-scale plantings are not natural elements in the environment. Observers caution that, even as their successes are emerging, plantings may also be deleteriously affecting the ecosystems they are targeted to save.

Materne acknowledges the concern. "An area planted in a single species is artificial," he says. "As we see the widespread use of Vermilion cordgrass in restoration, we're realizing the benefit of planting multiple cordgrass strains. If one proves susceptible to changing conditions — drought, say, or a new insect pest — there would be other, more resistant strains to maintain the plant community. The collapse of one strain would not jeopardize the entire marsh."

More varied plantings could also alleviate fears of genetic dilution, the possibility that a single cultivar crossbreeding with wild strains could diminish the entire species' genetic diversity. Using multiple strains might instead enrich the species' genetic mix, while planting a blend, or suite, of different species could enhance an ecosystem's stability and resiliency.

With Louisiana's imperiled wetlands at stake, the quest for optimal plants and the best planting techniques is urgent. "Changes happen quickly in the wetlands," Materne says, "and we're helping plants keep pace. Drawing on the Ag Center's decades of agronomic experience, we're developing plants that will become the key element in coastal restoration." **WM**

Above: New propagation methods aim to reduce the expense of growing material for transplanting and transporting it to project sites.
Below: Characteristics such as stem density and root mass can be matched to conditions at planting sites.

Maritime Forest Project Points to the Future

As scientists develop a wide range of improved plants and planting methods for coastal restoration, one groundbreaking project shows exceptional promise. The 60-acre project will plant native trees, shrubs and grasses to restore a nearly vanished maritime forest ecosystem, once a prominent part of Louisiana's landscape. "This project will be the first to re-establish a forest, so we'll be evaluating plant species that aren't typically studied," says Richard DeMay, senior scientist with the Barataria-Terrebonne National Estuary Program (BTNEP). "We expect to learn a great deal that will apply to future restoration efforts."

The project is co-administered by BTNEP and the Greater Lafourche Port Commission; partners include the EPA's Gulf of Mexico Program, Gulf of Mexico Foundation, Louisiana DNR, National Oceanic and Atmospheric Administration, Plant Materials Center of the NRCS, and AmeriCorps.

WaterMarks Interview with Gary Fine

Gary Fine is the manager of NRCS' Golden Meadow Plant Materials Center in Galliano, Louisiana.

WaterMarks: **Compared to large-scale restoration projects like freshwater diversions, putting plants in the ground as a way to save Louisiana's coast doesn't fire the imagination. What are we missing?**

Fine: When we talk about land loss in coastal Louisiana, we don't just mean we're losing ground, the stuff you walk on. We're losing an entire ecosystem involving marine life, mammals, birds, reptiles and, of course, plant life. But it's the plants that support all the rest of the ecosystem. That's why they're called the primary producer.

WaterMarks: **And that means they do a lot more than stabilize the soil.**

Fine: I wouldn't underrate that function, but yes, they do a lot more. It's easy to forget that we don't build freshwater diversions for the sake of freshwater diversions. We build them to save and restore the plant community because plants define the marsh. They build soil, improve water quality and create habitat.

WaterMarks: **How does your work at the NRCS Plant Materials Center fit into all this?**

Fine: The Plant Materials Center isn't some abstract research center. We're here to play a very specific role in saving Louisiana's coast. Our job is to find the native plants that will be the most effective when used in wetlands restoration. That might mean a plant that has a high tolerance for salinity, the ability to grow in varying water depths, or a capacity to propagate quickly. Then another important factor is the plant's ability to survive and persist in ever changing coastal environments. When we identify a plant that meets our standards by thoroughly testing and proving its performance, we make it available to commercial growers who produce it for large-scale projects.

Natural Resources Conservation Service

WaterMarks: **Obviously one plant won't work everywhere.**

Fine: That's right. A tidal environment requires a species with different characteristics than one that's planted in a terrestrial environment at a higher elevation. Our goal is to offer a suite of plants that are performance proven for specific conditions.

WaterMarks: **Does your research anticipate future problems like the possibility of sea-level rise due to global climate change?**

Fine: We don't have any choice but to look ahead because it takes so long for a plant strain to prove itself — literally evaluating hundreds of plants over time in the case of a fully proven species or cultivar. Sea-level rise is a good example. We're searching for plants adaptable to rising sea levels and greater water depths now, even though its full effects probably won't be felt for some time.

WaterMarks: **When you say searching, do you mean that literally?**

Fine: When we're identifying native plant species that have the characteristics we need, the first step is to search for and collect samples of plant materials found growing in natural plant communities. When we

find what we want, we start a series of tests to determine how well adapted to our needs the strain really is. Sometimes people will say that we're developing a super plant. That's not the case. Our focus is on searching out native plants — plants that already exist in the wild and display the desired adaptive characteristics.

WaterMarks: **Some professionals argue that it's unwise to plant for coastal restoration, that the best option is natural colonization. How do you respond?**

Fine: Our work supports natural colonization; it's not a substitute for it. So I don't see this as an either/or situation. Part of our research involves determining when to plant and when to let nature restore vegetation. I think planting offers the same results as natural propagation, but at a faster rate. And often speed is important. The faster the plant community is established, the faster the entire ecosystem is stabilized.

WaterMarks: **But what about the danger of diluting the genetic base by introducing a nursery grown plant into the ecosystem?**

Fine: Remember that we start with a wild, native species, indigenous to Louisiana. We are not introducing a super plant but identifying a native one that is tested and proven successful for an intended use. For example, the most common plant used in coastal restoration is smooth cordgrass and one specific release widely used is named 'Vermilion'. This is a clonal release that has been planted throughout the coastal area of Louisiana and has proven very successful.

Having said that, I think the question of genetic dilution is important. Because Vermilion smooth cordgrass — or any other single strain of a species — if used extensively in plantings, may dominate an area or cross breed with adjacent wild smooth cordgrass populations, possibly making adjacent communities more genetically homogenous. With less genetic diversity, is a species more vulnerable to a catastrophic event? Possibly. Or is the Vermilion strain hybridizing and improving local smooth cordgrass populations, making strains more adaptive to evolving conditions? That's also possible. Studies on this issue are ongoing.

What we do know is that coastal wetlands in Louisiana are in deep trouble. We don't have the luxury of time; we have to use all the tools we have available, and right now one of the best is vegetative plantings.

WaterMarks: **Plants cost five dollars or more a container, and that's before they're put on barges and hand planted. When you're considering large projects, aren't those costs often prohibitive?**

Fine: That's a common misconception, but vegetative plantings are a small part of the total cost of most restoration projects. When you consider that restoring vegetation is probably one of the key measures of a project's success, plantings are highly cost effective. The fact is that we're not trying to create mud flats — we want marsh, and that means vegetation. If it occurs through natural colonization, all the better. If not, or if the colonization will be too slow, planting is the logical alternative.

WaterMarks: **What's the challenge ahead for you?**

Fine: Even among the professionals in coastal restoration, the role plants play in the coastal ecosystem is often misunderstood and sometimes undervalued. But that's not the professionals' problem, it's ours. We have to raise awareness by making a long-term commitment to communicating the work we're doing, the advances we're making and the possibilities we envision. This has to be done because every tool, including vegetative planting, needs to be used to its fullest advantage if we have any hope of saving Louisiana's coastal wetlands. **WM**

Under Fine's leadership, the Plant Materials Center has become recognized for its botanical contributions to protecting and restoring Louisiana's wetlands.

Natural Resources Conservation Service

Current CWPPRA Vegetation Projects

Project Name/ Lead Agency	Date/Description/ Plants Used	Results
Bayou LaBranche Wetland Creation Seeding/ EPA	1994: Japaneese millet and soybean screenings	Good coverage
Black Bayou Hydrologic Restoration/ NMFS	2002 & 2003: Hydrologic restoration, vegetative plantings/ California bulrush	Established wave dampening; 70% survival rate, expansion of plantings
Boston Canal/Vermilion Bay Shoreline Protection/ NRCS	1995: 13.5 miles shoreline protection/ 'Vermilion' smooth cordgrass	Established wave erosion buffer, reversed land loss along shoreline
Brady Canal Hydrologic Restoration/ NRCS	2000: Bayou bankline protection (maintenance only) giant cutgrass	Established wave buffer
Chandeleur Islands/ NMFS	2000 (test) & 2001: Barrier island restoration of 4.2 miles shoreline/ 'Vermilion' smooth cordgrass	Success related to location — plants did not survive in very high energy environments
Dewitt Rollover Demonstration/ NRCS	1994: 1.5 miles shoreline protection, sediment accretion /'Vermilion' smooth cordgrass	Plants did not survive in very high energy environment
East Sabine Lake Hydrologic Restoration/ NRCS/FWS	2005: 171,000 feet of terraces /'Vermilion' smooth cordgrass	Under construction
East Timbalier Island Sediment Restoration, Phase 1/ NMFS	2001: Dune Vegetation, bitter panicum and marshhay cordgrass	Planted adjacent to dune sand fence to retain captured sand.
East Timbalier Island Sediment Restoration, Phase 2/ NMFS	2001: Dune Vegetation, bitter panicum and marshhay cordgrass	Planted adjacent to dune sand fence to retain captured sand.
Falgout Canal Demonstration/ NRCS	1997: 1,500 feet canal bankline protection/ 'Vermilion' smooth cordgrass	Wave dampening structures ineffective; plants did not survive
Floating Marsh Creation Demonstration/ NRCS	2004: Creation of floating marsh/ maidencane, other species	First phase not complete
Four Mile Canal/ NMFS	2003-2004: Terracing and sediment trapping/ 'Vermilion' smooth cordgrass	Terraces adjacent to canal fully vegetated; half of Little White Lake terraces maintained elevations conducive to plantings
Grand Terre Island/ NMFS	2001: Vegetative plantings/ 'Vermilion' smooth cordgrass, 'Fourchon' bitter panicum, marshhay cordgrass, Gulf cordgrass, 'Pelican' black mangrove	Bayside cordgrass plantings very successful; other species and locations showed variable results
Grand-White Lake Land Bridge/ USFWS	2004: 1,530 acres shoreline protection, terraces/ California bulrush, giant cutgrass, Brazoria seashore paspalum	Protected terraces from wave erosion
Holly Beach Sand Management/ NRCS	2003: Dune creation/ Fourchon bitter panicum	High rate of plant survival and cover
Isles Dernieres Restoration East Island/ EPA	1999: Dune and marsh vegetation, bitter panicum, marshhay cordgrass, 'Pelican' black mangrove, 'Vermilion' smooth cordgrass	Plants installed adjacent to sand fence and along dune to trap sand and reestablish vegetation and on marsh platform.
Isles Dernieres Restoration Trinity Island/ EPA	1999: Dune and marsh vegetation, bitter panicum, marshhay cordgrass, 'Pelican' black mangrove, 'Vermilion' smooth cordgrass	Plants installed adjacent to sand fence and along dune to trap sand and reestablish vegetation and on marsh platform.
Lake Chapeau/ NMFS	2000: Hydrologic restoration and marsh creation/ 'Vermilion' smooth cordgrass	Reduced wave-driven erosion, although land loss remains high
Little Vermilion Bay/ NMFS	1999: Sediment trapping/ 'Vermilion' smooth cordgrass	Plantings increasing wetland acres
North Lake Mechant Land Bridge Restoration/ USFWS	2003: 8 miles shoreline protection 'Vermilion'smooth cordgrass	Good survival along Lake Mechant
Oaks /Avery Canal Hydrologic Restoration/ Shoreline Protection/ NRCS	2000: 5.1 miles shoreline protection/ 'Vermilion' smooth cordgrass	80% survival and shoreline protection
Pecan Island/ NMFS	2003: Terracing/ 'Vermilion' smooth cordgrass	Plantings established on terraces and expanding onto pond bottom
Perry Ridge West Bank Stabilization/ NRCS	2002: 23,000 feet of terraces/ California bulrush	Excellent plant survival and cover
Plowed Terraces Demonstration/ NRCS	2000: 35,956 feet of terraces/ 'Vermilion' smooth cordgrass	Terraces sustaining some erosion, plant survival low in some sections
Sabine Refuge Marsh Creation, Cycle 1/ COE/ FWS	2001: 200 acres marsh creation/ smooth cordgrass	Created marsh area protected from erosion; revegetation ensured
Sediment Trapping at "The Jaws"/ NMFS	2004: Sediment trapping/ California bulrush, giant cutgrass	Plantings underway
SW Shore White Lake Demonstration/ NRCS	1996: 5,300 feet shoreline protection/ California bulrush	Plants did not survive winter storms
Sweet Lake/Willow Lake Hydrologic Restoration/ NRCS	2002: 83,625 feet terraces/ giant cutgrass	Terraces sustaining erosion; plant survival low except in Willow Lake
Thin Mat Floating Marsh Enhancement Demonstration/ NRCS	2000: Enhancement of thin-mat floating marshes to develop thick mat flotant/ maidencane	Protocol developed to induce thick-mat flotant with protection from herbivory
Timbalier Island Demonstration/ NRCS	1996: 7,390 feet dune creation (seven sites)/ marshhay cordgrass, Atlantic panicgrass	Created stable dune habitat at one site; others destroyed by storms
Timbalier Island Dune and Marsh Creation/ EPA	2005: Barrier island restoration/ 'Vermilon' smooth cordgrass, 'Fourchon' bitter panicum, marshhay cordgrass, gulf cordgrass, salt grass, 'Caminada' sea oats, matrimony vine, 'Pelican' black mangrove	Results not yet known
West Hackberry Demonstration/ NRCS	1994: Shoreline protection, sediment accretion/ California bulrush	Formed wave barrier, created emergent vegetation; damaged by 1995 drought
Whiskey Island Restoration/ EPA	1999: Dune and marsh vegetation, bitter panicum, marshhay cordgrass, 'Pelican' black mangrove, 'Vermilion' smooth cordgrass	Dune and marsh platform planted to trap sand and reestablish vegetation
Whiskey Island Restoration/ EPA	1998 : 'Vermilion' smooth cordgrass	Quick planting to protect containment berm

Coastal Roots Teaches Hands-on Lessons in Wetland Restoration

Louisiana Sea Grant College Program

Louisiana Sea Grant College Program

Left: At Baton Rouge Earth Day, community members visit the Coastal Roots booth to "plant a seed to save the coast." Coastal Roots' ties to communities throughout Louisiana help to identify planting sites and raise awareness about wetland issues.
Above: Each fall or early spring, Coastal Roots students trek to wetland sites to plant seedlings started by the previous year's class.

THE KIDS WHO PARTICIPATE IN COASTAL ROOTS are not only learning about the crisis facing Louisiana's wetlands — they're also helping to solve it.

Coastal Roots students learn firsthand about ecology, horticulture and wetland restoration as they grow seedlings in school nurseries and plant them at nearby wetland sites. Since 2001, over 2,000 elementary, middle and high school students have participated in Coastal Roots, restoring 19 acres at state parks, national wildlife refuges, wetland reserves, boat landings and a zoo.

"This hands-on learning experience is exciting for the kids," says Dianne Lindstedt, program coordinator. "It makes the importance of wetlands much more meaningful to them. We're hopeful this will keep students engaged with wetland issues far into the future."

Coastal Roots is administered by the Louisiana Sea Grant College Program and supported by the LSU Agricultural Center, BTNEP, Louisiana DNR, National Oceanic and Atmospheric Administration and the Plant Materials Center of the NRCS, among others. For more information about Coastal Roots, visit www.lamer.lsu.edu/projects/coastalroots/index.htm. WM

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