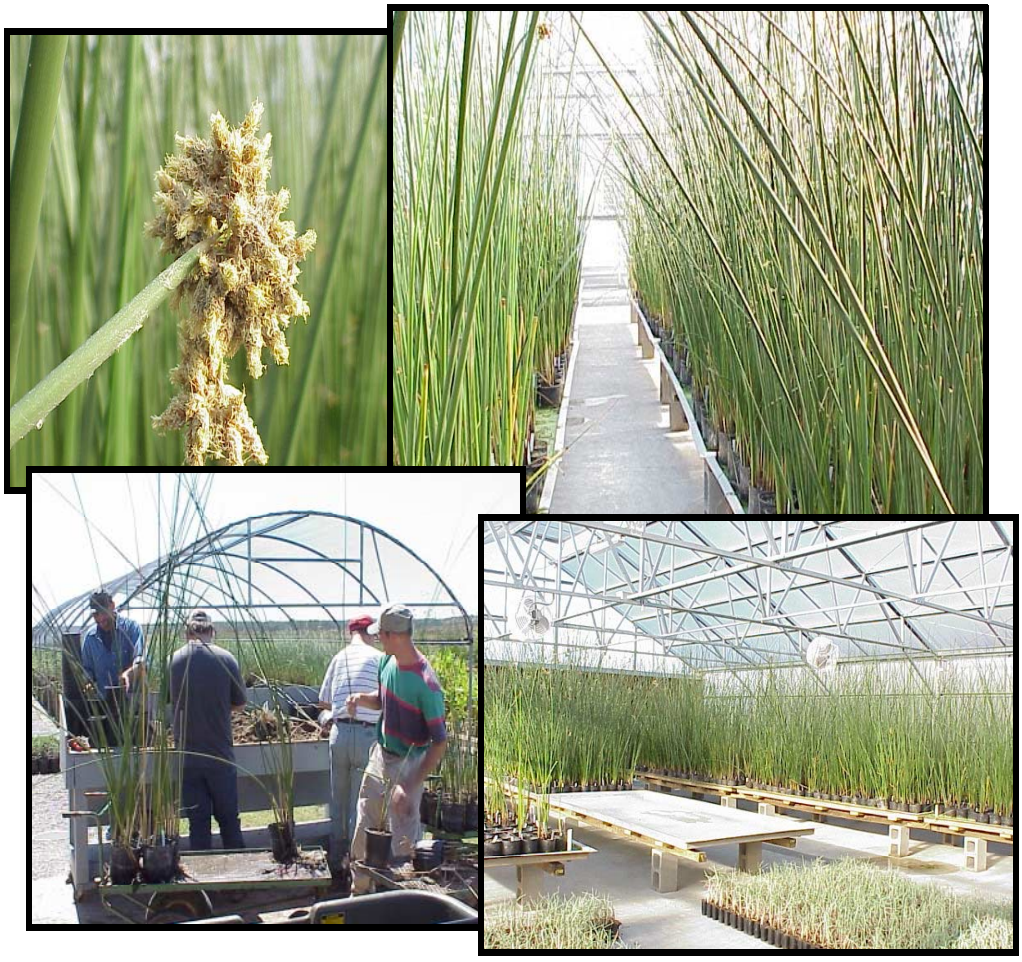
2000 Annual Report

Golden Meadow Plant Materials Center



USDA NRCS

Natural Resources Conservation Service

United States Department of Agriculture
Natural Resources Conservation Service
Golden Meadow Plant Materials Center
2000 Annual Report

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INTRODUCTION

The Golden Meadow Plant Materials Center (PMC) is funded and operated by the Natural Resources Conservation Service (NRCS), an agency of the United States Department of Agriculture. The PMC is part of a national network of Plant Materials Centers and Plant Materials Specialists (PMS) that are organized to form the NRCS Plant Materials Program. The purpose of the Plant Materials Program is to provide effective vegetative solutions to address conservation problems and needs. Plant Materials Centers are located to serve regional areas that have similar natural resource conservation concerns and needs. The Golden Meadow PMC was established because of a critical need to study and develop vegetative solutions and wetland plant technology for Louisiana's eroding coastal wetlands. Louisiana accounts for nearly 80% of the United States coastal land loss. It is estimated that Louisiana is losing 25-35 square miles of coastline each year. Coastal wetland remediation, restoration, and enhancement with vegetation has proven effective in retarding the conversion of marsh to open water, reducing erosion, and promoting the re-establishment of emergent vegetation.

To address coastal land loss and meet the objectives of the Plant Materials Program, the Golden Meadow Plant Materials Center:

- Develops improved plants that will persist in a dynamic coastal marsh environment.
- Develops cultural techniques for the successful use of improved plant materials.
- Develops and transfers effective plant science technology that addresses critical wetland conservation needs.
- Releases and provides foundation plant materials for the commercial increase of improved conservation plants.
- Promotes the use of tested and proven plant materials to solve specific coastal wetland conservation problems.
- Serves as a learning center to stimulate and foster an understanding of the importance of plants in the environment and their role in conservation programs.
- Cooperates with Louisiana State University and the Louisiana Department of Natural Resources to expand the technology and role of utilizing native plants for the conservation and preservation of coastal environments.

HISTORY

Coastal erosion and wetland loss in Louisiana are serious problems of national importance with long-term economic and social consequences. The progressive loss of Louisiana's coastal wetlands deprives Louisiana, the Gulf Coast region, and the nation as a whole of one of the most productive ecosystems in the world. With this in mind the Natural Resources Conservation Service (NRCS) realized a critical need for vegetative solutions to address coastal wetland loss and restoration.

It was during the late seventies that the NRCS initiated projects to evaluate the benefits of planting marsh grasses for erosion control and restoration of Louisiana's coastal wetlands. These plantings were successful in proving that establishing marsh grasses are an effective means of retarding the conversion of marsh to open water, to reduce the erosion of shorelines, canal banks, or other marsh-water interfaces, and to promote the reestablishment of emergent wetland vegetation. It was the success of these trial plantings that prompted the establishment of the Louisiana Marshlands Plant Materials Laboratory in 1985. The Laboratory began as a

collaborative effort of federal, state, and private entities. The Louisiana Land and Exploration Company (now Burlington Resources) provided 11.5 acres of land to develop the plant materials laboratory. The purpose of the facility was essentially to identify and collect selected native coastal wetland plant species and evaluate them for their potential use as conservation plants. The prevailing thought was that such a facility would provide a means for a source of tested and proven plant materials that could be used in Louisiana's coastal restoration program. With a vision and purpose in mind, physical features of the facility soon became apparent. The facility began with the construction of fifteen shallow ponds in the late summer of 1985. Hurricane Juan delayed the completion of pond construction until April of 1986. The collection of plant materials had already begun by the time pond construction was completed. Vegetative propagules representing each collection were planted directly to evaluation plots in the newly created ponds. The first plant species selected for study was smooth cordgrass (*Spartina alterniflora* Loisel.). This effort resulted the Laboratories the first plant release in 1989. The new conservation plant was named 'Vermilion'. The benefits and success of planting 'Vermilion' for coastal restoration was evident soon after its release. This and other efforts prompted the U.S. Congress to authorize funding for the Laboratory and inclusion in the NRCS Plant Materials Program in 1989. The name was then changed to the Golden Meadow Plant Materials Center.

Plant Materials Center (PMC) facilities have continued to grow since 1989. Land improvements and structures now cover 92 acres. State-of-the-art facilities have been built that are used to develop, transfer, and promote coastal wetland plant science technology.

LOCATION AND FACILITY DESCRIPTION

The Golden Meadow Plant Materials Center is located in Lafourche Parish, Louisiana, approximately 70 miles southwest of New Orleans. This area is unique and of national significance as it lies within the Barataria-Terrebonne Estuary. This is the largest and most productive estuarine system in the United States. The Barataria-Terrebonne Estuary consists of over 6,300 square miles of swamps, expansive marshes, lakes, bays, and bayous. This is essentially a living laboratory from which to study and advance coastal wetland plant technology.

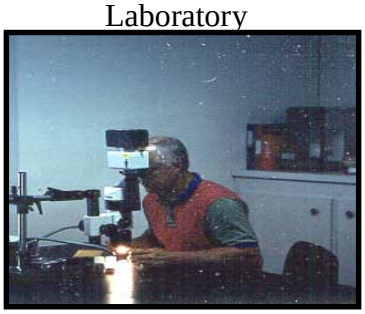
Facilities and equipment have been acquired that are used to propagate, and grow wetland plant materials for a variety of conservation uses. The Center has 23 constructed ponds that range in size of .3 acres to 2.2 acres. There are 50 acres used for study plot and field scale plant increase. Facilities have been built with the capability to produce most any type of plant material needed for study plots on and off of the Center. Off Center plantings (Field Evaluation Planting, FEP) are used to test plant assemblies and selected plant materials in actual use settings, or sites that exhibit environmental conditions proposed for the intended use of the plant. Facilities used for the increase of plant materials include:

- Three greenhouses totaling 6,180 Square feet.
- Plant propagation and production facility.
- Shadehouse structures totaling 5,520 square feet.

An Office/Conference facility is available for PMC operations, and use as a learning center. The Conference facility consists of a 2,016 square foot meeting room and a dormitory that will house up to 40 people. The intended use of the conference facility is to foster an understanding of the importance of coastal wetlands and conservation plants, and to provide a forum for the exchange of coastal wetland issues, knowledge, and ideas.

Propagation & Production Facility

Laboratory



Greenhouses

Shadehouse

CLIMATE AND SOILS

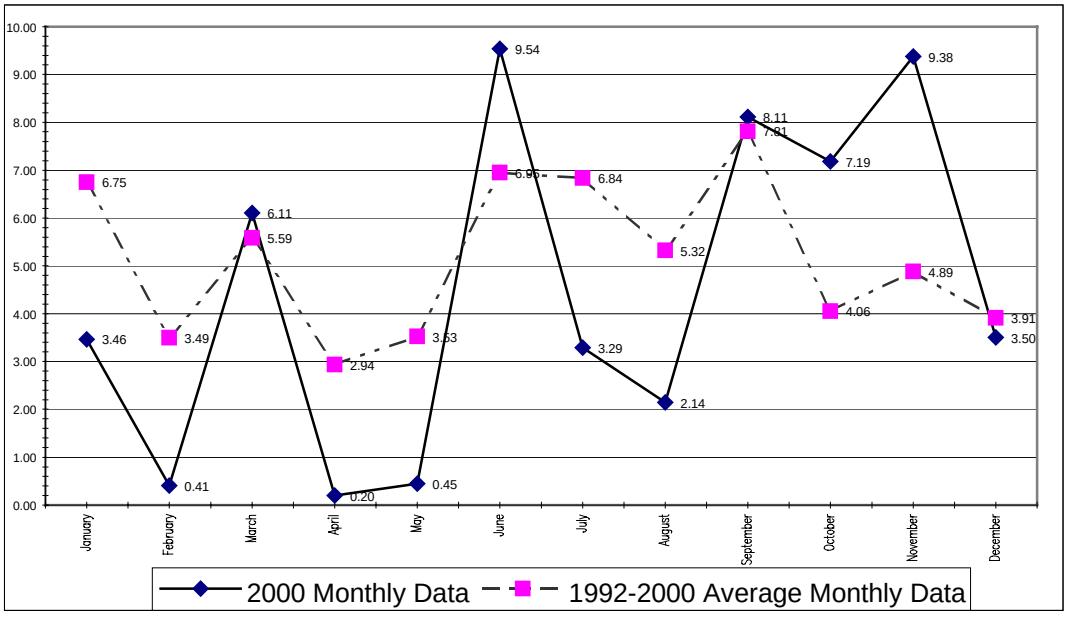
CLIMATE: The long summers are hot and humid but frequently cooled by breezes from the Gulf of Mexico. Winters are warm and only briefly interrupted by incursions of cool air from the north. Rainfall occurs throughout the year and precipitation is adequate for all crops. In winter the average temperature is 54 F^o and the average daily minimum temperature is 44 F^o. The average annual precipitation is 62 inches. Nine out of ten years there will be 245 days of temperatures above 32 F^o. There is sunshine on an average of 60% of the time during the winter. The prevailing winds are from the southeast.

Unusually dry weather patterns occurred from 1998 through 2000. The uncharacteristic weather pattern has been attributed to La Nina. Though the PMC received higher than average precipitation in 1998, the months of January and September accounted for 53% of the annual total. Precipitation for 1999 and 2000 fell 16% below the yearly average for each year. The unusually dry weather patterns were compounded by above normal temperatures during that same period. Official weather reports indicate that the past 24 months are among the driest observed during the past century for many Louisiana parishes. At the same time temperatures have tended to be above normal during this same period.

GOLDEN MEADOW PLANT MATERIALS CENTER RAINFALL TABLE (INCHES)

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Yearly Totals
1992	11.00	5.75	5.15	3.55	1.10	10.58	7.70	7.00	0.00	0.00	4.00	6.00	**61.83**
1993	8.50	3.45	7.50	6.45	7.15	5.70	9.15	5.80	7.70	6.15	5.05	5.10	**77.70**
1994	5.35	1.60	2.60	6.60	3.50	10.56	6.86	13.15	2.79	8.63	0.71	1.20	**63.55**
1995	4.15	1.07	9.31	0.61	4.49	3.64	9.66	3.26	1.74	3.33	5.30	0.69	**47.25**
1996	5.45	0.00	2.65	3.09	1.32	3.50	4.83	6.82	5.61	1.69	1.14	7.32	**43.42**
1997	0.00	8.91	2.38	3.05	11.71	7.86	9.69	2.27	5.52	3.66	9.49	2.53	**67.07**
1998	20.45	7.59	8.66	2.83	0.02	3.12	3.96	3.28	28.48	1.75	6.65	4.93	**91.72**
1999	2.42	2.66	5.91	0.04	1.99	8.08	6.41	4.20	10.35	4.10	2.25	3.95	**52.36**
2000	3.46	0.41	6.11	0.20	0.45	9.54	3.29	2.14	8.11	7.19	9.38	3.50	**53.78**
Monthly Totals	**60.78**	**31.44**	**50.27**	**26.42**	**31.73**	**62.58**	**61.55**	**47.92**	**70.30**	**36.50**	**43.97**	**35.22**	**558.68**
Mean	**6.75**	**3.49**	**5.59**	**2.94**	**3.53**	**6.95**	**6.84**	**5.32**	**7.81**	**4.06**	**4.89**	**3.91**	**62.08**

PRECIPITATION DATA



SOILS: The Golden Meadow Plant Materials Center is located on soils of mineral and organic consistency. The soils series names and descriptions follow.

- **Allemands series** consists of poorly drained and very poorly drained organic soils that formed in moderately thick accumulations of decomposed herbaceous material overlying clayey alluvium. These soils are in freshwater coastal marshes. Unless drained, they are ponded and flooded most of the time. Elevation ranges from about 1-ft. above sea level to six-ft. below sea level. Slope is less that 0.5%.

- **Sharkey series** consists of poorly drained, very slowly permeable, firm, mineral soils that formed in clayey alluvium. These soils are on low and intermediate positions on the natural levees of Bayou Lafourche and its tributaries. Elevation ranges from about 1-5 ft. above sea level. Slope is less than 1%.

- **Rita series** consists of poorly drained very slowly permeable, firm mineral soils that have a subsoil that is permanently cracked in the upper part. These soils formed in thin, herbaceous material over clayey alluvium. They are in freshwater marshes that have been drained and protected from flooding. Elevation ranges from 2-6 ft. below sea level. Slope is less than 0.5%. Rita soils commonly are near Allemands muck, drained, Rita Variant, Sharkey and Tunica soils.

SERVICE AREA

The Golden Meadow Plant Materials Centers service area of responsibility includes the coastal area of Mississippi, Louisiana, and Texas to Galveston Bay. The area's depth inland varies as to the extended reach of the coastal marshlands from as little as 1 mile to as much as 40 miles. The Major Land Resources Areas are as follows:

Texas	150 B, Gulf Coast Sabine Prairie
Louisiana	151, Gulf Coast Marsh
Mississippi	151, Gulf Coast Marsh &
	152 A, Eastern Gulf Coast Flatlands

PLANT MATERIALS CENTER OPERATIONS

PLANT SPECIES SELECTION, EVALUATION AND RELEASE:

The PMC has responsibility to assemble, test, release, and provide for the commercial production and use of conservation plants developed by the Center. Plant studies and species selection is based on ecological and conservation needs of the service area. Vegetative plant materials or seed of selected species are collected from native populations throughout the area of intended use for assembly. Commercial sources and established cultivars are included in assemblies if available. Each plant collection (accession) is given an identification number. The assembly forms a base population from which a selection nursery is established. All assemblies are established on the PMC for comparative evaluation. Assemblies are also established off Center to field evaluation planting (FEP) sites. FEP's are selected to represent actual use conditions for the desired use of the conservation plant. Plant performance criteria is determined and gathered from all planting sites over a specified period of time, generally several years. Superior performing plant materials are then selected based on the performance criteria. The top 10-20 % of the best performing plants are selected from the assembly. Selections are then increased vegetatively or by seed to provide plants for further testing. Enough plants are produced for planting to replicated plots on and off the Center. Advanced testing of the superior performing plants may be sufficient for release or several cycles of recurrent phenotypic selection may be needed before a release is made.

After thorough testing and documentation of superior performance, improved or selected plants may be released to the public, i.e., made available for commercial plant increase. Techniques to improve the successful use of plant releases such as establishment

methods, culture, management, production, suitable use and range of adaptation are also made available. Names are given to new plant varieties, i.e., pre-varietal and cultivar releases. Cultivar names aids in the selection of appropriate varieties for use in conservation plantings. The cultivar name can be used to define the limits of performance that can be expected of any plant variety in any environment.

PLANT MATERIALS RELEASES:

- 'Vermilion' smooth cordgrass (*Spartina alterniflora*) was released for commercial production in 1989. 'Vermilion' originates from a population of native plants collected from Vermilion Parish, Louisiana. The 'Vermilion' ecotype was selected for its superior performance in comparative evaluation trials of over 89 accessions that was collected from throughout the Gulf of Mexico basin. 'Vermilion' is a native, herbaceous, warm-season, perennial grass that forms dense colonies along shorelines and intertidal flats of coastal wetlands. It is a robust and vigorously spreading plant that tolerates diurnal tidal inundation and relatively high salinities. 'Vermilion' is an important cultivar used to maintain the stability of saltwater marshes and shorelines. 'Vermilion' is recommended for shoreline, canal bank, levee, and intertidal erosion control. This cultivar is also an effective soil stabilizer on interior tidal mudflats, dredge fill sites, and other areas of loose and unconsolidated soils associated with marsh restoration. 'Vermilion' smooth cordgrass is a sustainable and renewable restoration resource. When properly established in the appropriate habitat, this cultivar will persist providing an important conservation tool for coastal restoration and preservation.

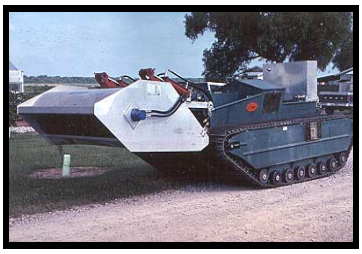
- **'**Pelican' black mangrove (*Avicennia germinans*) was released for commercial production in 1995. Pelican is a source-identified germplasm pre-varietal release. Pelican was released to provide a locally adapted and known ecotype for use on Louisiana's coastal marshes and barrier islands. It is a neo-tropical shrub that grows in salt marshes near high tide elevation. Pelican serves as sediment stabilizers, contributes leaf biomass to the marine food chain and detrical cycle, and provides habitat for numerous biological organisms. It is an important vegetative component for pelican nesting habitat found on Louisiana's barrier islands. Pelican black mangrove is recommended for planting on protected intertidal flats and shorelines of Louisiana's saline marshes, shorelines of protected shallow bays, and marshy barrier islands.

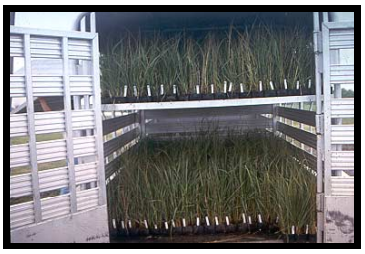
- **'**Fourchon'(*Panicum amarum*) bitter Panicum was released for commercial production in 1998. Fourchon is a selected class pre-varietal release. It is recommended for beach dune enhancement and stabilization on coastal beaches and barrier islands of the north central Gulf of Mexico basin. Fourchon is an early colonizing species that can tolerate the harsh environments of the dune system which is subject to salt spray, storm surges, occasional inundation, high temperatures, low soil moisture and fertility, sand abrasion, and smothering by drifting sand. The above ground portion of the plant reduces wind velocity allowing sand to drop out of the wind stream and accumulate. The below ground portion of the plant stabilizes and holds the sand in place with an extensive fibrous root and rhizome system. Fourchon bitter panicum was selected for its vigorous growth, persistence after storm events, and performance in stabilizing dunes enhanced or created with sand fencing structures.

- ‘Brazoria’ seashore paspalum (*Paspalum vaginatum*) was released for commercial production in 1999. Brazoria is a selected class pre-varietal release. Seashore paspalum is a perennial semi-aquatic, warm season, native grass. A dense sod-like turf is formed from an extensive system of rhizomes and stolons. Seashore paspalum is an effective pioneering plant that can be used in coastal restoration and conservation programs. It spreads rapidly and can be established on fresh to brackish soils with salinities to 10 parts per thousand. Brazoria is recommended for intermediate to brackish marshes, shorelines, coastal beach dunes, canal banks, mudflats, dedicated dredge materials, and areas of ephemeral soil deposition.

ACTIVITIES AT THE PMC

SPECIALIZED EQUIPMENT

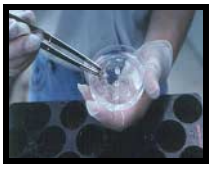







GREENHOUSE OPERATIONS





GETTING THINGS DONE:




STUDIES

- **Evaluation of *Spartina patens* for an asexually propagated cultivar.**

  Introduction: *Spartina patens* (marshhay cordgrass, wiregrass, saltmeadow cordgrass) is a dominant emergent macrophyte in many brackish and intermediate marshes of the north central Gulf Coast region. *S. patens* is a highly variable rhizomatous perennial grass that grows over a wide range of salinities. It is commonly found growing in dune, swale, and marsh habitats. *S. patens* may fill an important niche in marsh restoration efforts because of the ecological amplitude the species occupies.

  Objective: Collect and assemble plant materials from native communities of *Spartina patens* found in coastal areas of Louisiana and Texas. Establish a selection nursery for the development of an adapted and performance tested cultivar that can be used in coastal restoration programs.

  Status: Vegetative samples of *Spartina patens* were collected from Louisiana and Texas coastal marshes in 1991. Plant materials representing 47 collections were planted to containers and placed in a LSU greenhouse in Baton Rouge. The containerized plants were moved to the Golden Meadow PMC for planting and evaluation in late 1991. By 1992, thirty-six of the most promising accessions were transplanted to replicated study plots in Field Pond G2. Then Hurricane Andrew struck the Louisiana coast in late 1992. Storm surges breached the facility protection levee causing flooding that persisted for seven weeks. All existing field plots were inundated with flood water from August 26 to October 19, 1992. After floodwater receded, standing dead aboveground biomass was removed so that plots could be monitored for re-growth and survival documentation. The plots were then destroyed. Fortunately, accessional germplasm was being maintained at the facility headquarters. This material was divided and increased for replanting.

  Plants were grown out and used to replant study plots at the Center and to establish FEP sites off the Center. Replicated plantings were established at two FEP sites in 1993. FEP sites were established at Three Bayou Bay, Jefferson Parish and Trinity Island, Terrebonne Parish. The Trinity Island FEP was destroyed by a tropical storm soon after planting. Another planting was attempted on Timbalier Island, Terrebonne Parish on May 10, 1995. Again this planting was destroyed by a tropical storm soon after planting. One additional planting was attempted with success in southwestern Louisiana at Black Lake Marsh, Cameron Parish. Plant performance documentation has been gathered form the PMC and FEP sites from 1993-1998. Five accessions demonstrate superior performance. Release of proven germplasm is anticipated for 2001.

- **Evaluation of selected grasses for stabilizing and enhancing Louisiana's coastal beaches and barrier islands.**

  Introduction: Louisiana has the distinction of having the highest coastal erosion rates in the United States. A significant component of this erosion is found on the barrier islands that front the Mississippi River deltaic plain. These islands are considered by many as the first line of defense protecting Louisiana's coastline from storm surges, and other natural forces associated with the Gulf of Mexico. The barrier islands are experiencing landward migration, island narrowing, and segmentation. The decline of Louisiana's barrier islands are attributed

by many to subsidence, inadequate sediment supply, global sea level rise, storm surges, and human influences.

Vegetation has long been used in coastal areas to slow the erosion of beaches, and stabilize sand dunes. Some small plantings have been attempted in Louisiana. But establishing vegetation has not been an ongoing practice. Artificially establishing (planting) vegetation in Louisiana has been hampered by the lack of knowledge and availability of suitable plant species and establishment methods.

Objective: Assemble selected species that have potential for beach and dune restoration in coastal Louisiana. Establish replicated field trials to test and determine species suitability, and establishment and cultural techniques.

Status: Plantings of selected species have been established on the PMC, Timbalier and Trinity Islands, Terrebonne Parish, Grand Terre Island and Grand Isle, Jefferson Parish, Fourchon Beach, Lafourche Parish, and Rutherford Beach, Cameron Parish. Initial plantings were moderately successful. Plantings were then tried in as a component with sand fencing. The combination of using sand fencing in association with planting vegetation has shown the best results in creating, and stabilizing sand dune features on coastal beaches. The most effective species planted in association with sand fences that have persisted, and created and enhanced dune formation and stabilization is bitter panicum. Other important species that have proven effective are sea oats and seacoast bluestem. These trials have resulted in the release for commercial use 'Fourchon' bitter panicum. Sea oats, 9068262, is scheduled for release in 2001. Seacoast bluestem, 9068227, has potential for release; further testing is being conducted on Grand Terre Island.

Newly Constructed Sand Fence

Fencing after one year with Bitter panicum and Seaoats

Species Selected For Evaluation

Common Name	Scientific Name	Variety/Accession No.	Source
Torpedo grass	*Panicum repens*	9068231	LAPMC
Bitter panicum	*Panicum amarum*	Southpa	FLPMC
		Northpa	FLPMC
		Fourchon	LAPMC
Coastal Panicgrass	*Panicum amarum var.amarulum*	Atlantic	NJPMC
Marshhay cordgrass	*Spartina patens*	Sharp	FLPMC
		Flageo	FLPMC
		9067788	LAPMC
Seacoast bluestem	*Schizachyrium maritimum*	9068229	MSPMC
		9068227	LAPMC
Gulf cordgrass	*Spartina spartinae*	9068219	LAPMC
Sea oats	*Uniola paniculata*	9035147	FLPMC
		9068262	LAPMC
Switchgrass	*Panicum virgatum*	Alamo	TXPMC
Roseau cane	*Phragmites australis*	9068236	GMPMC
Vetivergrass	*Vetiveria zizanioides*	Fort Polk	GMPMC
Seashore paspalum	*Paspalum vaginatum*	Brazoria	GMPMC
Coastal dropseed	*Sprorobolis virginicus*	9068304	GMPMC

- **Biotechnology applications for coastal wetlands erosion control with *Spartina alterniflora,* Phase I.**

Introduction: This is a cooperative study with the Louisiana State University Agricultural Center. *Spartina alterniflora* is the dominant species used for coastal restoration plantings. Traditional plantings have consisted of using vegetative plant materials from bare-root single stems, bare-root plugs, to various sizes and types of container grown plants. Vegetative plant materials are extensively used because many of the wetland plant species including *Spartina alterniflora* are poor seed producers. Establishing plantings vegetatively is expensive, labor intensive, and not very efficient for large-scale conservation plantings. It is widely known that the most effective means of establishing conservation plantings is by seed.

Objective: Combining biotechnology and conventional plant breeding techniques to improve the propagation and genetic quality specifically seed production characteristics of important wetland plant species such as *Spartina alterniflora*.

Status: The LSU Agricultural Center Rice Research Station collected native ecotypes of *Spartina alterniflora* from selected marsh sites specifically looking for uniquely fertile plants. Seed collections from the highly fertile plants have enabled the establishment of hundreds of seed-producing breeding lines. Stratified seed from forty of the most promising genotypes was delivered to the PMC for germination and growing out for field plantings. Procedures

were developed for planting seed to germination trays and multi-pot containers. A specified numbers of seedlings were selected and transplanted to 4" containers. The container-grown plants were used to establish field evaluation plantings at West Bell Pass (2-sites), Lafourche Parish, and Sabine Wildlife Refuge, Cameron Parish. Plant performance and seed production data has been gathered from all of the study sites. Additional performance will be collected in 2001 and potential selection for further breeding.

- **Evaluation of S*partina alterniflora* for improved seed production traits, Phase II.**

  Introduction: This is a continuing study in cooperation with the Louisiana State University Agricultural Center to advance effective vegetative solutions for coastal wetland restoration.

  Objective: Assemble seed collections of *Spartina alterniflora* from native populations found growing throughout the coastal marshes of Louisiana. Provide genetically diverse germplasm for breeding stock and selection for an improved sexually propagated cultivar.

  Status: Native *Spartina alterniflora* plant communities were sampled (126 sites) from throughout the coastal area of Louisiana and Texas. Seed was hand harvested from naturally occurring populations from 10/27/98 to 12/14/98. Seed harvests consisted of hand clipping, bagging, and labeling 100 seed culms from each collection site. Seed collections were then delivered to LSU campus for processing and placement in cold storage. After a specified stratification period in cold storage, 20 grams of seed from each collection was returned to the PMC for planting to germination trays. Seed germination was recorded from each tray. Then 100 seedlings were selected from each tray and transplanted to 4" containers and placed in a greenhouse for growing out. Established container grown plants from 101 accessions were selected and planted to field evaluation planting sites at the PMC, Grand Terre Island, Jefferson Parish, and Brown Lake Marsh, Cameron Parish. Plant performance data is being recorded. Seed collections from established plots are scheduled for 2001.

- **Cultural techniques for improved seed production of *Spartina alterniflora*.**

  Introduction: *Spartina alterniflora* (smooth cordgrass) is the dominant plant found in Louisiana's coastal saltwater tidal marshes. This species is also the dominant plant used for coastal restoration efforts. There is considerable knowledge relative to the use and establishment of *S. alterniflora*. There is knowledge of the sexual reproduction characteristics of *S. alterniflora* but information is lacking on field scale seed production techniques.

  Typically large-scale conservation plantings in coastal Louisiana have been accomplished with expensive and labor-intensive containerized plant materials. A much more efficient method of establishing *Spartina alterniflora* for large-scale conservation interior marsh plantings would be by seed. The purpose of this study is to develop improved methods and technology for the production handling, and harvesting of *S. alterniflora* seed production fields.

Objective: Determine seed production management technology

Status: Two research field ponds (3-acres) were established with *Spartina alterniflora* with vegetative propagules, single stems, taken from existing plots. This is a diverse population of *Spartina alterniflora* germplasm. Planting was accomplished using a mechanical transplanter. Seed was collected 11-21-00 using mechanical seed harvester. Also some manual harvesting was done. Seed was thrashed, cleaned and stored for later test trials.

Spartina alterniflora seed production, first growing season (established March 8, 2000)

- **Salt Marsh Die-back (Brown Marsh) *Spartina alterniflora*, assembly and evaluation.**

Introduction: Widespread browning and dieback of coastal salt marsh vegetation in the Barataria-Terrebonne Basins is impacting and estimated 390,000 acres. Of this acreage, 110,000 acres is considered moderately impacted and 150,000 acres is considered moderately impacted. Of the severely impacted marsh 17,000 acres is considered dead with once healthy vegetation being converted to open mud flats having little or no vegetation. Areas of what appeared to be dying marsh was first noticed in 1999. The severity of the problem was not realized until the spring of 2000 when scientists noticed large areas of brown and dying marsh while conducting routine aerial surveys. Local scientists are calling this event "brown marsh" which is a term given to the rapid and unusual browning and death of intertidal salt marsh vegetation. Louisiana's Governor, Mike Foster issued a proclamation declaring Lafourche, Terrebonne, Jefferson, and Plaquemines Parishes to be in a state of emergency.

Smooth cordgrass (*Spartina alterniflora*) is the dominant species found in Louisiana's coastal salt marshes and consequently the most affected species associated with the brown marsh phenomenon.

Natural Resources Conservation Service (Golden Meadow Plant Materials Center) has taken the lead in trying to find reasons and solutions for this dieback phenomenon with the help of other Federal, State, and Local agencies, and State Universities.

Objective: Evaluate selected plants that may have potential to stabilize saline marshes.

Status: Collected live regenerating plant materials of *Spartina alterniflora* from 20 impacted brown marsh sites in Terrebonne, Lafourche, and Jefferson Parishes. Materials collected will be grown under greenhouse conditions until plans to transplant to selected impacted sites during the spring of 2001. Two hundred twenty five propagules of *S. alterniflora* were potted and are now been grown in greenhouses for pathological studies. Also harvested *S. alterniflora* seed collected from native stands grown at the PMC, will used for testing in these dead areas. Black mangrove seed was also collected and grown in greenhouses for brown marsh field trials.

- **Evaluation of *Schoenoplectus californicus* for an improved cultivar.**

Introduction: *Schoenoplectus californicus* (California bulrush, giant bulrush, bulwhip) is a native, rhizomatous perennial herbaceous plant that forms dense vegetative colonies along shorelines, in open water, or on mudflats. California bulrush spreads primarily by vegetative propagation, producing new stems from an extensive system of underground rhizomes, or, to a limited extent, through seed dispersal. Plant stems are triangular and generally range from 5 to 10 feet in height. An important characteristic of California bulrush is that it can grow in relatively deep water. It also has a relatively low tolerance to salinity and usually restricted to fresh and intermediate marsh.

Schoenoplectus californicus is used primarily to control erosion along shorelines and other areas of soil-water interface. Also when planted as continuous vegetative barriers across open water, California bulrush has significantly reduced pond fetch and wave energy.

Objective: Evaluation of *Schoenoplectus californicus* for shoreline erosion control and development of an improved cultivar for use in Louisiana's coastal restoration program.

Status: Vegetative plant materials were collected from native plant communities found growing in coastal marshes of Louisiana and Texas. Fifty-two collections were delivered to the Golden Meadow Plant Materials Center for accessioning and plant increase. Each collection was divided vegetatively and planted to trade gallon containers.

Containerized plant materials representing each collection was grown out and transplanted to Field F7 at the PMC and one field evaluation planting site in Cameron Parish, Louisiana. Additional plant materials for each ecotype is being grown out for establishing to field evaluation planting sites in Lafourche and Jefferson Parishes in the spring of 2001.

Schoenoplectus californicus assembly and evaluation planting

S. californicus seedlings

Greenhouse Cultivation

Field Establishment

Schoenoplectus californicus performance evaluation planting

Schoenoplectus californicus Assembly

Accession No.	Origin		Accession No.	Origin
9068265	St. Landry Parish, LA		9068299	St. Charles Parish, LA
9068267	Calcasieu Parish, LA		9068301	Terrebonne Parish, LA
9068268	Cameron Parish, LA		9068309	Cameron Parish, LA
9068269	Cameron Parish, LA		9068310	St. Charles Parish, LA
9068270	Cameron Parish, LA		9068311	St. Charles Parish, LA
9068271	Lafourche Parish, LA		9068312	Tangipahoa Parish, LA
9068272	Lafourche Parish, LA		9068313	Orange County, TX
9068273	Terrebonne Parish, LA		9068323	Cameron Parish, LA
9068274	Terrebonne Parish, LA		9068324	Cameron Parish, LA
9068275	Calacsieu Parish, LA		9068325	Cameron Parish, LA
9068276	Cameron Parish, LA		9068326	Cameron Parish, LA
9068277	St. Mary Parish, LA		9068327	Calcasieu Parish, LA
9068278	Calcasieu Parish, LA		9068328	Cameron Parish, LA
9068279	Iberia Parish, LA		9068329	Cameron Parish, LA
9068280	Cameron Parish, LA		9068330	Cameron Parish, LA
9068281	Vermilion Parish, LA		9068331	Iberia Parish, LA
9068282	Cameron Parish, LA		9068332	Iberia Parish, LA
9068283	Vermilion Parish, LA		9068333	Vermilion Parish, LA
9068284	Calcasieu Parish, LA		9068334	Vermilion Parish, LA
9068286	Cameron Parish, LA		9068335	Vermilion Parish, LA
9068287	Lafourche Parish, LA		9068336	Vermilion Parish, LA
9068293	Lafourche Parish, LA		9068337	Vermilion Parish, LA
9068294	Lafourche Parish, LA		9068370	Cameron Parish, LA
9068295	St. Charles Parish, LA		9068371	St. Mary Parish, LA
9068296	St. Charles Parish, LA		9068372	St. Charles Parish, LA
9068298	St. Charles Parish, LA		9067578	Terrebonne Parish, LA

- **Coastal wetland biomass production for critical area stabilization.**

  Introduction: Dredge sediments are increasingly being used to preserve and restore coastal shorelines and interior marshes. Vegetative components are important to the success of sediment dredge-fill sites. Studies have shown that plant survival and productivity on highly disturbed soils such as dredge sediments is a function of a number of critical factors. The more important factors include species adaptation, soil characteristics, and site hydrology.

  Objective: Evaluate selected coastal wetland plant species suitability, biomass production, establishment techniques, and general effectiveness to stabilize dedicated dredge sediments.

  Status: Initial plant selection, collection, and increase began in 2000. The assembly of plant collections will be completed in 2001. Species collected for plant increase during 2000 include:

  Cladium jamaicense, sawgrass
  Distichlis spicata, saltgrass
  Panicum virgatum, switchgrass
  Spartina cynosuroides, big cordgrass
  Spartina alterniflora, smooth cordgrass
  Spartina patens, marshhay cordgrass

- **Evaluation of *Quercus virginiana* for use on coastal beaches and barrier islands of the north central Gulf of Mexico basin.**

  Introduction: *Quercus virginiana* (live oak) is native to coastal plains of the southern Atlantic states and Gulf of Mexico. Live oaks are long-lived trees typically having short trunks with very large girth and wide spreading limbs. Several variants have been identified by various authors that are more scrubby found growing on deep sands along the coast of the Gulf of Mexico. These plants are typically of short stature with long drooping limbs often touching the ground and more resembling large shrubs.

  There may be live oak ecotypes found growing along these coastal plains that have characteristics with potential for use on Louisiana's vanishing barrier islands and other sandy coastal habitats. A woody component to vegetative plantings on barrier islands and other sandy coastal habitats would restore lost biodiversity, improve stabilization, and wildlife habitat.

  Objective: Comparatively evaluate live oak ecotypes grown from seed collected form throughout its natural range specifically coastal plains and barrier islands of the south Atlantic and Gulf of Mexico.

  Status: An assembly of acorn collections from South Carolina, Georgia, Alabama, Florida, Mississippi, Louisiana, and Texas was made in the fall of 1999. This assembly was made possible due to the efforts of Natural Resources Conservation Service (NRCS) employees serving those states. NRCS Plant Materials Specialists (Georgia and Florida), District Conservationist, and the Florida and South Texas Plant Materials Centers devoted time and effort to identify and collect acorns to make this assembly possible. Trees found growing on barrier islands and coastal beaches that are prone to salt spray, storm surges, and other tropical events were targeted for collection.

Collections were assigned accession numbers and direct seeded to germination flats upon receipt. Germinating seedlings were then transplanted to trade-gallon containers and moved to a greenhouse. Containerized plants will be transplanted to selected sites on Grand Terre Island, Grand Isle, and the PMC in 2001.

Quercus virginiana Acorn Collections

Accession No.	Origin	Collector	Accession No.	Origin	Collector
9067573	Jackson County, MS	J. Ford	9068348	Liberty County, SC	Nathaniel Brewton
9067573	Jackson County, MS	J. Ford	9068349	Charleston County, SC	Wilkes
9067581	Okaloosa County, FL	Darryl Wiliams	9068350	Colleton County, SC	Fred Tritopoe
9067582	Escambia County, FL	Ken Collar	9068351	Colleton County, SC	Fred Tritopoe
9068314	Okaloosa County, FL	Darryl Wiliams	9068352	Baldwin County, AL	Carolyn King
9068315	Jefferon Parish, LA	Gary Fine & Garrret Thomassie	9068353	Baldwin County, AL	Larry Morris
9068316	Jefferon Parish, LA	Gary Fine & Garrret Thomassie	9068354	Baldwin County, AL	Carolyn King
9068317	Nueces County, TX	J.Lloyd-Reilly	9068355	Baldwin County, AL	Carolyn King
9068318	Escambia County, FL	Ken Collar	9068356	Baldwin County, AL	Carolyn King
9068319	Hancock County, FL	David Peacock	9068357	Mobile County, AL	Grant Mattox
9068320	Hancock County, FL	David Peacock	9068358	Mobile County, AL	David Stewart
9068321	Hancock County, FL	David Peacock	9068359	Beaufort County, SC	Tyler Gawlt & Russell Mixson
9068322	Hancock County, FL	David Peacock	9068360	Mobile County, AL	David Stewart
9068338	Mobile County, AL	David Stewart	9068361	Beaufort County, SC	Bruce
9068339	GA		9068362	Beaufort County, SC	Mike Walker
9068340	Glynn County, GA		9068363	Beaufort County, SC	John Luce
9068341	Camden County, GA		9068364	Beaufort County, SC	John Luce
9068342	Effingham County, GA	Charles Branch	9068365	Beaufort County, SC	Carol Murphy
9068343	Effingham County, GA	Stacy Souther & Charles Branch	9068366	Beaufort County, SC	Paula Berube
9068344	Chatham County, GA	Stacy Souther & Charles Branch	9068367	Georgetown County, SC	Debbie Mann
9068345	Chatham County, GA	Stacy Souther & Charles Branch	9068368	Georgetown County, SC	Debbie Mann
9068346	Beaufort County, SC	Carol Murphy	9068369	Georgetown County, SC	Debbie Mann
9068347	Charleston County, SC	Bentley			

- **Evaluation of *Panicum virgatum* for potential applications to coastal conservation programs.**

Introduction: Switchgrass (*Panicum virgatum)* is an important native perennial grass widely used for forage production (hay and pasture). It is also an important conservation plant used for erosion control and wildlife habitat. Switchgrass is now being studied for its potential use as a bioenergy source. Biomass is considered to be one of the most promising sources of renewable energy. This renewable energy source can be converted into liquid fuels or other chemical products that are currently produced from petroleum. Switchgrass is very effective in converting solar energy into chemical energy, thus biomass.

Switchgrass is commonly found in small isolated stands throughout brackish marshes of coastal Louisiana. An assembly was initiated in 2000 to look for promising ecotypes of switchgrass that may have potential for use in all aspects of conservation programs and applications for biomass production in Louisiana.

Objective: Assemble collections of switchgrass from coastal marshes of Louisiana to establish a selection nursery and evaluate germplasm for potential uses and production in Louisiana.

Status: Initiated plant collections in 2000. Assembly in progress with expected completion in 2001.

- **Evaluation of *Spartina spartinae* for an asexually propagated cultivar.**

Introduction: Gulf cordgrass *(Spartina spartinae)* is a tufted perennial becoming occasionally sub-rhizomatous toward the outside of a large tuft. It is abundant in somewhat saline poorly drained flats along the Gulf coast. Although less common now, pastures and range areas of south Texas were managed for grazing by prescribed burning. Gulf cordgrass becomes less prevalent as you travel eastward in the coastal area of Louisiana. It is mostly found but rarely on coastal beaches and barrier islands of eastern Louisiana. This species was identified along with three other coastal wetland species for assembly and evaluation when the in the PMC established. Gulf cordgrass then became of less importance in the plan of work for developing wetland plants for use in Louisiana. Interest in the potential use for this species has increased more recently.

Objectives: Recurrent phenotypic selection for intrapopulation improvement of a cross-pollinated perennial cultivar with improved seed production traits.

Status: Sixty-five vegetative collections were assembled from Louisiana and Texas in 1986 and planted in rod rows at Golden Meadow PMC. Plants were rated for vigor, disease resistance, insect resistance, cold tolerance, heat tolerance, spread, height, seed culm production, and weight of seed produced. Thirty-two accessions were selected from the assembly for further testing in 1991. The accessions selected were vegetatively reproduced and replicated twenty-five times in a randomized complete block with plants established on two-foot centers. Evaluation criteria was recorded and it soon became apparent that the spacing was to close for suitable evaluation. Plants were moved to a randomized complete block planting design. Single plants were established on eight-foot centers. Evaluation data was collected from 1995-2000. Cultivar release is anticipated for 2001.

- **Evaluation of commercially available native grass cultivars under grazing pressure for use in south Louisiana.**

Introduction: Grazing lands are an abundant, diverse, and important natural resource. Grazing lands have always been recognized for the production of food and fiber products. Other functions and values have often been overlooked. Managing for healthy vigorous plant communities on grazing lands stabilizes and enhances a fundamental resource, our soils. Functional, healthy grazing lands are now recognized for their value to wildlife and recreation. The functions and values of grazing lands have now come to the forefront of

national attention. National priorities have been established to conserve, protect, and enhance grazing lands through the Grazing Lands Conservation Initiative.

Information and knowledge is lacking for the adaptation, selection, and use of native grasses to improve, protect, and enhance Louisiana's grazing lands. Native grassland studies and demonstration plantings are being established to gather needed information and knowledge to promote their wise use and provide alternative land use decisions in Louisiana.

Objective: Evaluate selected commercially available native grass cultivars for adaptation and use under grazing pressure in south Louisiana.

Status: Five commercially available native grass cultivars were selected and planted to 48 acres on the PMC in 1997. The acreage was divided into four 12-acre blocks. Each 12-acre block was subdivided with cross fences into three 4-acre plots creating 12 separate paddocks. Plant materials selected were 'Pete' eastern gamagrass, 'Alamo' switchgrass, 'Lometa' Indiangrass, 'Cimarron' little bluestem, 'Kaw' big bluestem. Native grass demonstrations plantings have also been established in Cameron and Tangipahoa Parishes.

Eastern gamagrass

Switchgrass