

FINAL REPORT

Project Name: Volunteer Marsh Planting and Restoration Project

GLO Contract Number: 11-013-000-4311

The Coastal Bend Bays Foundation (CBBF) is submitting the following as a Final Report for the Volunteer Marsh Planting and Restoration Project awarded by the Texas General Land Office (GLO) through Coastal Management Program (CMP) Grant Cycle 15. The original project was planned for completion in March 31, 2012 but was extended to March 31, 2013 due to extended and severe drought conditions experienced in South Texas and the project area during the project work period.

As required, monthly reports and updates were provided to the GLO during the entire period of the project.

Task 1: Establish and coordinate Event Steering Committee and Develop Implementation Strategies

Form and provide staff support to the event steering committee. The committee will provide overall event guidance, and develop, in partnership with CBBF staff and other participating organizations, implementation strategies for key event elements such as, but limited only to these goals, on-the-ground activities, media participation, sponsorship solicitations, and public safety.

Throughout the volunteer marsh planting and restoration project, CBBF coordinated with members of the event steering committee to identify event dates, event activities and planting strategies. This included coordination with the Coastal Bend Bays and Estuaries Program (CBBEP), the Texas Air Boat Association, Texas Parks and Wildlife Department (TPWD), GLO, the Harte Research Institute for Gulf of Mexico Studies, the Gulf of Mexico Foundation's Science and Spanish Club Network, Martin Middle School, and Belaire Environmental. A list of members (including ad hoc members assisting in special areas were added during the project) is referenced in Table One.

A key part of planning involved working with the CBBEP to identify best management practices (BMP's) for planting events. Planning also took the following into consideration: planting dates, selection of island terraces to be planted, variety/type of vegetation to be planted, and planting methods. This was coordinated with resource agencies including TPWD, GLO, and the University of Texas Marine Science Institute. Please see Attachment One regarding the project site map and keys to island labels, and Attachment Two for a planting strategies and procedures guide.

Copies of the planting permits are also attached with this report. As indicated on the permits, two different species of marsh grass were planted during the first two planting periods (Winter 2010 to Spring 2011). The plants utilized were smooth cordgrass (*Spartina alterniflora*) and salt marsh hay cordgrass (*Spartina patens*). Because of survival rates observed from previous plantings, only smooth cordgrass was utilized during the final two plantings (Fall 2012 to Spring 2013). It is estimated that about 20 percent of the smooth cordgrass, a species planted along the shoreline and waters surrounding the islands, survived to 2012 and those plants are beginning to reproduce. Survival of the salt marsh hay, planted on the top of the island terraces, was minimal at about two percent and due to the severe drought experienced during the project period.

No problems regarding coordination or planning issues arose during the final quarter of this project. However, regarding overall final comments on Task 1, it should be noted that after the initial two planting events, it became apparent that face-to-face steering committee meetings were not necessary once the procedures and planting protocols were established and initial plantings performed. Members agreed that e-mail, other media and telephonic (fax and phone calls) coordination within the steering committee members and ad hoc participants were more efficient and timely in planning and preparing for each of the subsequent planting events. Formal meeting notes were not retained as informal coordination was the norm among key participating members.

Task 2: Recruit, Train and Coordinate Volunteers for Marsh Restoration Work:

CBBF will recruit volunteers from the organization's membership, CBBF's database contact list, other environmental organizations, businesses, and academic institutions. Recruitment will begin immediately upon CMP contracting completion. Training materials will be taught by natural resource specialists in classroom setting, in the field, or both, prior to scheduled on-the-ground activities.

TRAINING:

CBBF developed and maintained a committee of event steering partners and a corps of active volunteers. To build the volunteer pool, CBBF staff recruited volunteers from the general public, local schools and university with the use of volunteer event flyers. A copy of the spring flyer is attached at the end of this report. CBBF also hosted a volunteer meeting on June 1, 2012 to give local volunteer leaders an overview of the program and volunteer opportunities in 2012. A list of active volunteers and their contact information is attached also at the end of this report. All of the participants were trained, and became familiar and skilled in the following:

1. Understanding the importance of reclaiming and restoring wetlands, degraded or lost over the last fifty (50) years, in Nueces Bays and how planting marsh grasses in newly built island terraces helps to re-establish them into functional wetland habitats.
2. Personal Safety: Trained in identifying any potential safety hazards on and off the water such as biting insects, snakes, other wildlife they may encounter, water safety including airboat transportation, sharp hazards (shell fragments or other unseen water hazards), dehydration, sunburn precautions, and communicating any health or injury issue, among other topics covered. Please see Attachment Four regarding safety training. Water craft (airboat) safety was also covered by trained boat operators on site.
3. All participants were trained in protocols on how to prepare and plant marsh grasses on submerged and emergent island terraces.

Training of all volunteers was conducted at the Nueces Bay causeway launch site the day of the planting events by Ismael "Smiley" Nava, CBBF Executive Director and retired TPWD employee with over 30 years in conservation and marine ecology experience. Training assistance was provided by US Fish and Wildlife Service and CBBEP biologists. Boat safety training was provided by the participating airboat operator(s). Please see Attachments Two, Three, and Four regarding operation work plans, planting procedures, and safety training. Additional photos, information and documents regarding the Volunteer Marsh Planting project are included at the end of the report.

During the first planting periods (Winter 2010 to Spring 2011), plants were planted in rows across the top of terraces and around the edge of terraces, respective to the waterline. Because of differences

between survival rates observed between species from previous plantings, smooth cordgrass (*Spartina alterniflora*) was planted only around the terrace edges during the final plantings (Fall 2012 to Spring 2013). Pictures of the training sessions and different planting methods are included at the end of this report.

Task 3: Coordinate/Stage/Host Marsh Planting and Restoration Events

Four marsh plantings will be conducted during the grant period with two acres of marsh planted. Each year (project year – May to April), a planting event will be planned, coordinated, and completed. CBBF will lead this effort in conjunction with other partner organizations and volunteers, and with the CBBEP which has received, in consultation with natural resource agencies, complete design work and necessary permits to restore 160 acres of marsh lost to changes in hydrology.

CBBF staged and coordinated a total of twelve marsh plantings and trainings between December 2010 and March 2013 for a total of 1664 volunteer service hours. The dates for planting events and volunteer hours (includes pre- and post-event planning meetings) are listed in the following:

Table 1: Volunteer Marsh Planting Coordination Committee and Ad-Hoc Members

Name	Organization/Affiliation	Expertise/Background
Susan Niemi	CBBF – Volunteer Coordinator	Public Relations
Smiley Nava	CBBF – Executive Director	Marine Biologist, Ecologist
Daniel Lucio	CBBF – Program Director	Public/Community Relations
Leo Trevino	CBBEP – Assistant Director	Environmental Engineer
Rosario Martinez	CBBEP – Program Manager	Biologist
Jace Tunnell	CBBEP – Program Manager	Marine/Conservation Biologist
Jimmy Martinez	Texas General Land Office	Program Director – O&G Prog.
Lauren Hutchison	Harte Research Institute	PhD candidate – Coastal
Amy Nunez	Texas General Land Office	Coastal Resources/Biologist
Debbie Grimaldi	CBBF – Volunteer Coordinator	Education and Fund raising
Jeff Rost (ad hoc)	Texas Airboat Association	President, airboat operator
Captain Kidd (ad hoc)	Self employed	Fishing guide, airboat operator
Charlie Belaire (ad hoc)	Belaire Environmental	Marine Ecologist, marsh plant resource
Beau Hardegree (ad hoc)	U.S. Fish and Willdlife Service	Marine Ecologist/Conservation
John Adams	Tx A&M Univ.-Corpus Christi	Marine Ecologist, TCOON
Gail Sutton (ad hoc)	Harte Research Institute	Program Specialist

Table 2: Planting Event Days

	Date Volunteer	Hours
Winter 2010	12/09/10	205.5
2/12/11		123.5
Spring 2011	3/05/11	122.5
3/26/11		148.5
4/9/11		200.5
4/30/11		134.5
Fall 2012	9/29/12	75
10/13/12		79.5
10/27/12		50.5
Spring 2013	2/23/13	93
3/9/13		184
3/30/13		247
TOTAL HOURS	12 Events	1664

During the first marsh planting period (Winter 2010 to Spring 2011), plants were planted in longitudinal rows across the top, around the edge, and in the water of the terraces (see photo illustrations). Because of the onset of a severe drought in South Texas during the early part of the project and poor plant survival observed from the 2010 to 2011 plantings, smooth cordgrass (*Spartina alterniflora*) was planted only around the terrace edges and water during the final plantings (Fall 2012 to Spring 2013). This plant showed a higher survival rate (~22 percent) than salt marsh hay cordgrass planted on the top of the island terraces which fared poorly (about 2 percent survival).

Another factor limiting volunteer participation was also related to unfavorable climatic weather conditions. Three volunteer planting events had to be postponed and re-scheduled due to weather conditions because of concerns of unsafe airboat operations and personal safety for the volunteers. Primary factors were cold fronts which increased slipping or fall hazards and high winds which increased tipping hazard of airboats used in transportation of the volunteers. Re-scheduled events were conducted the following day but usually with fewer volunteers. Events that were re-scheduled had to be conducted immediately after the scheduled event day so that harvested marsh plants were still viable for planting.

Comments and Lessons Learned:

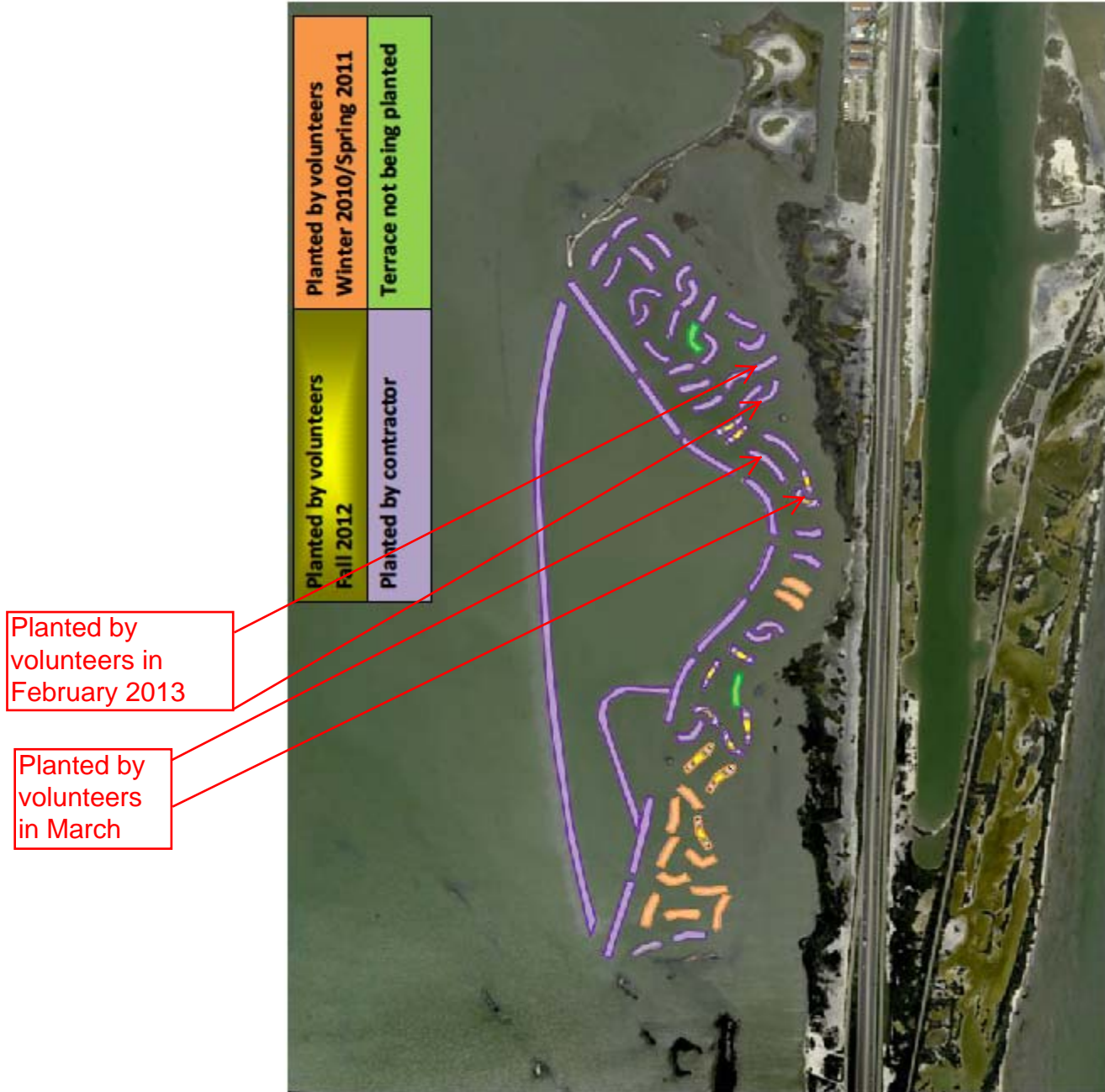
1. Weather was the major factor limiting plant survival rates in Nueces Bay and also hindered volunteer participation. The severe drought experienced during AY 2011 through 2012 had severe impacts on plant growth. Of the two varieties of marsh plants used, Smooth cordgrass was best suited for planting. Marsh hay planting is not recommended due to its poor survival on the top of island terraces.
2. Planning for marsh plantings was conducted at least two months prior to the events making it difficult to predict weather conditions on event days. Scheduling make-up events and planning for volunteer participation is essential to minimize the loss of harvested plants and labor to ensure quality and quantity plantings.
3. Plans to conduct award ceremonies at the Nueces Bay Causeway meeting and launch site were modified after the second and third plantings due to the lack of sufficient open area and

extreme winds. Occasional postponements as previously mentioned also influenced changes to simply passing out certificates to volunteers who were able to participate the day of the plantings.

4. CBBF provided additional services to the volunteers including water, refreshments, and meals for each planting, costs not permitted or chargeable to the GLO grant. Most of these expenses were donated from businesses solicited by CBBF for this purpose with any remaining of costs paid by CBBF funds. The result was a partnership to take care the natural resource and those who gave of their time in restoring habitats to their previous functions.
5. CBBF recommends providing similar programs which provide an outlet to the Coastal Bend Community for service, volunteer projects that engage the public in outdoor natural resource conservation issues. CBBF received positive remarks and feedback from most of the participants who frequently requested to be included in future events in the way of general comments. The volunteer marsh plantings were featured occasionally in local media including the Caller Times newspaper and occasionally in television news broadcasts prior to and after event plantings. As a positive result of this project, The Corpus Christi Convention (CVB) and Visitors Bureau asked CBBF to help partner with them and coordinate a marsh planting at this project site September 21, 2013. CVB is hosting the Texas Travel Industry Association (TTIA) Annual Meeting at that time. TTIA has adopted the Nueces Bay Wetland Restoration Site as a service project for its members and is proposing to host about 75 volunteers to help plant two to four acres of marsh grasses. CBBF has several other similar volunteer project proposals, some of which were suggested and sent out as grant proposals for funding. The ~225 member Volunteer Corps developed by the CMP 15 project will be an important source for continued service projects in the Coastal Bend.

Attachment 1: Map of Nueces Bay Marsh Planting Project

AERIAL VIEW OF NUECES BAY MARSH RESTORATION SITE



Attachment 2: Marsh Grass Planting and Design Guide

The purpose of this document is to provide a step-by-step guide to vegetate newly created island terraces in Nueces Bay. These terraces were created from nearby-bay bottom sediments, generally in finger-like configurations. The islands, once planted, will simulate wetlands which have been displaced by bay waters due to erosion from continued natural weathering (hurricanes, wind and wave action) and human impacts (oil spills, wetland filling, pollution, road bed harvesting, etc.).

Equipment and Supplies: The primary tools for use in planting marsh grasses in the island terraces are three-foot long stakes, and a two-pound rubber mallet. Cotton gloves are optional and will provide safe handling of the stakes.

Marsh Plants: Two different species of marsh plants are planned for covering the new island terraces: *Spartina alterniflora* (Smooth Cordgrass) is well-suited to planting in shallow, fresh to moderate brine bay waters and can tolerate occasional emergence or drying. Plant this species starting at the water's edge and out into the bay to about a 6 foot distance from shore in three rows which will surround the island terrace. The second species, *Spartina patens* (Salt Marsh Hay) is more adapted to upland conditions and tolerates occasional inundation of fresh to brine bay waters. This species will be planted on the top of the island terraces in multiple rows spaced in 3-foot spaced centers.

Marsh Grass Planting Procedures: Volunteers will break up into two- or three-member teams. Each team will be outfitted with one rubber mallet, stake and a bundle of marsh grass.

1. Select whether the team will be working in the water or on the island terrace. If working in the **water**, select marsh grass bundles from the buckets labeled **Smooth Cordgrass**. If working on the **island terrace (dry land)**, select marsh grasses labeled from the bucket labeled **Salt Marsh Hay**.
2. **If working in the water**, begin by planting a row of marsh grasses at the **water's edge** spacing the plants three feet apart. Use the rubber mallet to tap the stake about 6 to 8 inches into the bay bottom. Remove one stem from the bundle of other grasses and insert the shoot into the hole, then cover the shoot with soil using your hands or shoe and tamp down.
3. Since the stakes are 3 feet long, and after completing with step 2 above, lay one end of the stake at bottom of the newly planted stem and the other end in the direction of the next hole and begin a new hole at that end.
4. Proceed until you have completed a ring around the island.
In subsequent rows, offset the plants so the plants are not parallel to the plants in the parallel row.
5. Repeat the process above for the second ring around the island except begin the next ring 3 feet from the edge of the island.
6. Repeat the process above for the third ring of plants around the island from the previous row except begin the ring 6 feet from the edge of the island.
7. **If working on the dry land-portion of the island**, repeat the process above by planting rows beginning 3 feet away from the water's edge and in rows that extend along the long axis of the island, not in short rows.

Attachment 3: Nueces Bay Volunteer Marsh Grass Planting Project – General Work Plan

The purpose of this document is to provide a step-by-step guide to work planned in vegetating 60 to 100 newly created island terraces in Nueces Bay. These terraces were created from nearby-bay bottom sediments, generally in finger-like configurations. The islands were created to simulate wetlands which have been displaced by bay waters due erosion from continued natural forces (hurricanes, wind and wave action) and human impacts (oil spills, wetland filling, pollution, road bed deposition, etc.). ***The following are approximate times and may change per event.***

9:00 am Arrive at launch site:

1. The launch site located on South Bound State Highway 181 at the exit to Indian Point Pier, or about two miles south of Portland, Texas
2. Prepare personal apparel for working in wet or muddy conditions on the island terraces

9:30 am Safety Training and Resource Education Presentation:

1. Safety training regarding potential hazards, water safety, boat safety, and other appropriate instructions
2. General presentation on purpose and goals for Marsh Grass Plantings of the island terraces

10:00 am Boarding Airboats and transportation to Island Terraces

10:30 am Arrive at Island Terraces, break up into groups, and begin planting of marsh grasses as per instructions

1. Two different types of marsh plants are planned for planting: Marsh Hay and Smooth Cordgrass. Five-gallon buckets are labeled identifying the appropriate species which hold bunches of up to 30 to 50 stems per bucket. **Salt Marsh Hay will be planted on the top of the island terraces** in rows set apart three feet apart from each other. **Smooth Cordgrass will be planted beginning at the water's edge** in three rows surrounding the island, out into the water at three-foot spacings.

11:45 am Return to shore/base camp by Airboats

12:00 pm Light Refreshments or Lunch

12:45 pm Presentation of Certificates

1:00 pm End of Event – time to go home!

THANK YOU FOR HELPING!!!

Attachment 4: Nueces Bay Marsh Grass Planting Safety Training Guide for Volunteers

The purpose of this document is to give general safety tips and suggestions for volunteers, leaders and participants in marsh planting activities hosted by the Coastal Bend Bays Foundation in Nueces Bay. It serves only as a guide and does not replace common sense as different situations and conditions may and will be countered in the field.

Pre-Planting:

1. Wear appropriate clothing and footwear. Loose clothing is recommended including long sleeve shirts. Also, use caps, gloves and closed footwear (open toed sandals discouraged and not recommended).
2. Sun screen recommended for protection from sun burn. SPF 20 or higher recommended.
3. Stay hydrated. Water is provided both at the launch site and on the island terraces to be planted.
4. Be aware and avoid sharp objects on the beach, from vegetation or in the water.
5. Be aware of and look for stinging insects and other wildlife (snakes and other wildlife may be encountered at the launch site, in the water or on the islands). **IF YOU NEED ASSISTANCE, BE SURE TO CALL FOR HELP FROM OTHERS IN YOUR GROUP, OTHER ADULT VOLUNTEERS OR STAFF!**
6. First aid kits are available on the boats, islands and at the launch site. **ALWAYS ASK FOR ASSISTANCE AND REPORT ANY CUTS, BRUISES OR INJURIES.**

Air Boat Safety:

7. Wait for the Boat Captain to direct you to board the airboat before approaching it.
8. Never stand close or behind the wash of the airboat propeller – you might be injured by flying debris that is picked up by the props. Remain a least 50 feet from an approaching or departing airboat or water craft.
9. No standing on the airboat during the ride to or from the islands. Raise your hand to get the attention of the airboat operator if you need something/anything.
10. Always wear an appropriate fitting life jacket while on board on the airboat and use hearing protection.
11. Do not disembark without the airboat operator's approval that all is safe or clear.

Island Terrace:

12. No horse-play during the planting, or in general, during the whole event.
13. Be on the look-out for any stinging insects or wildlife (snakes) that may harm you on the island.
14. Work in 2 or 3-member teams.

15. Beware of deep mud near the bank and in the water. Water may be deep where the bottom of the bay is not visible. Avoid venturing into areas where you do not see the bottom of the bay.
16. **PICK UP ANY TRASH OR WASTE YOU ENCOUNTER. ALWAYS LEAVE THE AREA YOU ARE IN BETTER CONDITION THAN YOU FOUND IT! THAT GOES FOR THE ISLANDS AND BEACH.**

Volunteer Marsh Planting and Restoration Project
Texas General Land Office Coastal Management Program Cycle 15 Project
Contract No. 11-013-000-4311

Nueces Bay Marsh Planting Monitoring Effort
Coastal Bend Bay Foundation

The Coastal Bend Bays Foundation (CBBF) contracted with the Texas General Land Office (GLO) to coordinate a marsh planting program in Nueces Bay beginning in November 2010 and extending to March 31, 2013 with funding provided through the Coastal Management Program Cycle 15. The goal of the project was to develop local community volunteers to assist plant bay marsh grasses in newly created island terraces to re-establish and restore upland and inundated wetlands which had been lost in the last fifty to sixty years due to a variety of effects including but not limited to sea level rise, excavation of wetlands for road construction, other dredging of wetlands, oil spills damaging and killed emergent vegetation, natural erosion due to wave action from hurricanes, northerns and strong, prevalent south winds.

A component of the project was to monitor the marsh planting over time. CBBF coordinated all of its activities with the Coastal Bend Bays and Estuaries Program (CBBEP), the primary managing contractor over the project site, for information regarding which terraces would be planted by volunteers and which would be planted by its contractor, Belaire Environmental Services (BES) out of Rockport, Texas.

General monitoring conducted follow:

As the primary project organization, CBBEP conducted weekly over-site of the construction of the island terraces including monitoring responsibilities in 2010 and 2011. CBBEP selected and coordinated with the CBBF the island terraces for planting by volunteers. Once planted, CBBEP monitored the planting success or failures on a monthly basis beginning from the first plantings (December 5, 2010) through the late summer fall of 2011 when plantings were abandoned due to extreme drought conditions experienced in South Texas coastal areas. Monitoring of previous planting efforts by CBBEP continued on a monthly basis as part its over-site of continued island terrace construction (but no plantings).

In the Spring and Summer of 2012, little on-site inspections to the island terraces was conducted due to the colonization of many islands by shorebirds and colonial water birds. Most of the monitoring was conducted at a distance using binoculars to reduce disturbance to nesting birds.

No plantings were conducted until September 2012 as drought conditions changed with improved water quality (bay salinities lessened) and two marsh plantings were conducted followed by additional plantings in March 2013. CBBF also conducted quarterly monitoring visits from the shoreline but with reduced access to the island terraces. CBBEP which was able to travel to the islands with BES personnel and conduct onsite inspections.

CBBEP will continue monitoring the island terraces and wetlands creation program as part of its responsibilities under the Coastal Bend Bays Plan.



Volunteers being lead through training and safety session by CBBF staff and air boat operators. Photo Credit: CBBF Staff





Left: marshhay cordgrass (*Spartina patens*) being planted on top of terraces.
Photo Credit: Jace Tunnell, CBBF Trustee





Photos taken July 10, 2013 showing establishment and growth of marsh grass.





