

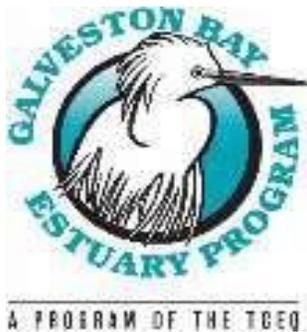
# Regional Conservation Maintenance and Management Program

Galveston Bay Watershed



Final Report June 2018

TCEQ Contract No. 582-17-70219



# Contents

EXECUTIVE SUMMARY	3
INTRODUCTION	3
PROJECT SIGNIFICANCE AND BACKGROUND	4
METHODS	6
RESULTS AND OBSERVATIONS	8
OBSTACLES	37
LESSONS LEARNED	37

## EXECUTIVE SUMMARY

The Galveston Bay Estuary Program's Regional Conservation Maintenance and Management Project (Project) provided financial support for on-the-ground property maintenance and habitat management projects on existing conservation lands within the Galveston Bay watershed. This regional partnership between GBEP, Texas Parks and Wildlife Department (TPWD), and Galveston Bay Foundation (GBF) provided funding to develop, coordinate, and implement projects with regional land trusts and conservation organizations. Program objectives included identifying priority tasks on target conservation lands, developing a project strategy, bidding individual or grouped projects, and overseeing contract work.

Tasks identified to accomplish the Project objectives include: (1) project administration; (2) habitat maintenance and management; and (3) final reporting. The combined efforts of the Project resulted in the enhancement, stewardship, restoration, or maintenance of over 423 acres coastal habitats at 19 conservation properties, across four counties, owned and managed by six different conservation organizations. Other project achievements include installation of 4,230 feet of boundary fencing, construction of one bird nesting structure (575 square feet), maintenance and repair of 27,650 linear feet of access road, and 9.5 miles of firebreaks.

## INTRODUCTION

The Regional Conservation Maintenance and Management Project was a collaborative effort to improve habitat on protected properties and maintain various conservation and restoration projects. This project benefited many of the non-governmental organizations conducting land protection and habitat enhancement activities throughout the region. GBF, along with five conservation partners, identified habitat enhancement opportunities and maintenance activities on existing preserves and conservation projects throughout the Galveston Bay watershed.

The following projects were identified by project partners as high priority:

- Invasive species control (Chinese tallow, Brazilian peppertree, privet, etc.)
- Coastal prairie restoration and enhancement (brush control)
- Freshwater wetland habitat management
- Fire line establishment
- Access road maintenance
- Prescribed mowing
- Boundary fencing
- Artificial nest site construction

The cumulative effect of these conservation projects improves the health and ecological function of natural habitats on protected property within the watershed. Many of these tasks provide annual financial challenges to non-profit organizations and individually would not be competitive for grant funding through traditional sources. The completion of these projects allowed additional management actions to be delivered.

Conservation partners identified their organization's highest priority enhancement and maintenance needs and utilized the project funds to accomplish the planned objectives. Collaboration between partners allowed GBEP funds to be delivered in a cost-effective manner to accomplish maintenance and management activities across the watershed and provided a significant benefit to wildlife and water quality.

GBEP cannot directly award funding to non-governmental entities, so TPWD was awarded the grant funds to complete the identified conservation actions. TPWD subsequently contracted with GBF to deliver the projects under a sub-grantee award.

Cooperating conservation partners included:

- Armand Bayou Nature Center (ABNC)
- Artist Boat (AB)
- Galveston Bay Foundation (GBF)
- Houston Audubon Society (HAS)
- Native Prairies Association of Texas (NPAT)
- The Nature Conservancy of Texas (TNC)



Photo 1. Invasive species control at Armand Bayou Nature Center (Prairie Dawn Flower Tract)

## PROJECT SIGNIFICANCE AND BACKGROUND

Galveston Bay is the largest of 12 estuaries in Texas and is the seventh largest in the nation. With its many waterways and diverse natural features, Galveston Bay affords an array of recreational and commercial opportunities for residents and visitors and plays an essential role in maintaining a high quality of life.

Tourism in and around Galveston Bay generates an estimated \$7.5 billion in travel and payroll dollars annually (EPA, 2004). In 2015, tourism on Galveston Island alone generated \$153 million in tax revenues, with \$73.8 million accruing to state and local governments (Galveston Island Nature Tourism Council). In 2016, Galveston Bay produced one-quarter of statewide commercial bay landings by value and weight. The largest commercial fisheries

in Galveston Bay are for blue crabs, oysters, and shrimp. For Galveston Bay, blue crabs were the top species landed by weight in 2016, comprising 37 percent of the catch, followed by shrimp at 32 percent, and oysters at 24 percent (TPWD, 2018). Galveston Bay’s ports, transportation and petrochemical industries, and proximity to rich petroleum reserves in the Gulf of Mexico, Caribbean Sea, and South America form the core of its economy, with tens of thousands of people employed in key water-based industries. The Port Houston and Port of Galveston are ports of entry, respectively contributing \$73 billion and \$2.9 billion to the gross state product and employ a combined 529,400 people (Texas Comptroller of Public Accounts, 2017a, 2017b).

The western side of the Galveston Bay estuary is adjacent to one of the most heavily urban, industrialized areas in the nation. Approximately 5.4 million people live in the five counties surrounding Galveston Bay (U.S. Census Bureau: Population Division, 2016). The Houston metropolitan area is growing rapidly, and its population is expected to nearly double by 2035 (H-GAC, 2007). As a result, human activities have significantly altered the ecosystem and affected its productivity, converting coastal wetlands to human uses, and fragmenting remaining coastal natural areas. The U.S. EPA characterizes coastal wetland and associated habitat loss in Texas as severe (EPA, 1999), and this is a continuing concern because of the many important functions and values these features provide.



Photo 2. Gordy Marsh wetland habitat.

Many local scientists and resource managers believe that continued habitat loss poses the greatest single threat to the Galveston Bay ecosystem. Galveston Bay Estuary Program’s habitat loss studies primarily focus on wetlands. However, the bay system features a diversity of habitats, including extensive coastal prairies and forests that contribute to the health and productivity of the estuary, and provide many important functions and values to humans. The upland components of these habitat complexes receive limited regulatory protection and are subject to significant loss and fragmentation. While minimal data exist on fragmentation and loss of these valuable upland features, the U.S. Fish and Wildlife Service reports that less than one percent remains of the once vast expanses of coastal prairie and considers coastal prairie ecosystems to be “critically imperiled” (USFWS, 2000).

In response to the identified pressures on natural resources in our region, GBEP and many conservation partners

have dedicated significant resources toward conserving, restoring, and protecting high quality habitats. Collectively, these conservation projects create a long-term burden on conservation entities to conduct regular management and maintenance activities. This Project was designed to provide funding to accomplish the highest priority needs for several non-governmental organizations working to protect, conserve, and enhance habitat in the Galveston Bay watershed.

## METHODS

### *Project Development*

GBF coordinated with conservation partners to develop a list of priority actions to be funded under this Program. Each entity was responsible for identifying a list of needs, which were subsequently reviewed and approved by GBF and grant funders. Each priority action either directly impacted a specific habitat, wildlife resource, or provided the opportunity to conduct additional habitat management following the completion of the funded task.

### *Project Implementation*

Projects that were similar in scope were bundled together, in an attempt, to reduce the cost of individual management and maintenance actions. For example, herbicide contractors were asked to submit bids for an overall package of chemical treatment on multiple sites. Projects with a narrow scope were completed individually.

- *Invasive Species Control*

GBF coordinated with conservation partners to identify needs related to invasive species control on conservation lands. A comprehensive list of properties with maps and target acreages was created and used to solicit bids for work. Contractors submitted bids based on a day rate and general acreage targets. Each project site had a different primary target species and specific habitat considerations. Contract labor was provided by a 7-man professional crew and 10 conservation properties were treated for invasive plant species.

Foliar application and cut-stump treatment of unwanted vegetation were the two primary methods of treatment. For small shrubs and trees, a 2-4% solution of appropriate chemical was applied to the leaves of the target plants (foliar application). Larger trees were cut at ground level and the remaining stump was treated with a 20% solution of appropriate chemical. Tricolopyr was the most commonly active ingredient.

- *Prescribed Mowing*

GBF coordinated with conservation partners to identify needs related to mowing in prairie habitats. A comprehensive list of properties with maps and target acreages was created and used to solicit bids. Contractors submitted bids based on an acre rate. Each project site had individual environmental concerns, target species, and habitat considerations. Five conservation properties were scheduled to receive 144 acres of targeted mowing to reset plant succession and control woody plants in native grasslands.

- *Mechanical Mulching*

2 project sites included mechanical mulching as their highest need for restoration and enhancement. These project sites were bid simultaneously based on a total project cost. Hydraulic forestry mulchers were utilized to remove unwanted trees and shrubs to promote native grassland habitats and herbaceous plant diversity.

- *Rookery*

ABNC manages a rookery island on part of its Armand Bayou Park. Drought conditions in previous years caused mortality to mature trees growing on the rookery island, threatening the use of this important bird nesting site. Young trees growing on the island were not able to support the weight of roosting birds and nests and were regularly killed or stunted by high levels of waste produced by the birds. The concept to create an artificial nesting structure was developed in hopes to sustain the function of the rookery, while allowing young trees to develop and mature into suitable roosting and nesting sites.

GBEP funds used to purchase supplies and materials and the Texas Coastal Conservation Corps constructed the artificial nesting structure.

- *Access Road maintenance*

Two project sites required maintenance to interior roads to facilitate access for monitoring, restoration, and enhancement activities. Roads on these two conservation projects had deteriorated to the point of limiting access most of the year. Road maintenance included filling compromised areas of the roadway with new base material, grading roads to smooth rough areas or potholes and correct improper drainage, and removing any unwanted vegetation growth that restricted access.

- *Aquatic Herbicide Application*

In order to enhance waterfowl, wading bird, and waterbird habitat at GBF's Chocolate Bayou Preserve, emergent vegetation within a shallow freshwater reservoir was targeted. Primary targets of this effort were water lily and cattail, which had covered more than 90 percent of the shallow open water reservoir. Herbicide was applied by airboat due to shallow water depths within the target area.

- *Fencing*

Unrestricted access to conservation lands managed by Armand Bayou Nature Center had created issues with trespass, illegal dumping, and off-road vehicular traffic. Boundary fencing was erected to suppress opportunities to access these conservation lands. Commercial chain link fence and 4-strand barbed wire fence were used.

- *Fire Line Establishment*

Vegetation maintenance and control along property boundaries and burn units was conducted. Property managers were concerned that equipment would have difficulty accessing and damaging wetland habitats within the target areas. Specialized equipment was used to minimize short term impacts to sensitive environmental areas and reduce the risk of getting equipment stuck, causing project delays. USFWS has agreed to fund prescribed burning as part of their partnership program at these sites.

## RESULTS AND OBSERVATIONS

The Program supported habitat maintenance or management activities on 19 conservation properties within the Galveston Bay watershed. These projects displayed a high level of diversity in size, habitats, and management activities. This section of the report will identify the location of the various project sites on a regional map, provide a breakdown of tasks performed at each project site, and provide a description of the results achieved.

Approximately 423 acres of habitat were enhanced, restored, or managed under this grant. This acreage total includes efforts include mowing, invasive species control, and mechanical mulching. In addition, 4,230 linear feet of fencing was installed to protect preserve boundaries, 27,650 linear feet (5.23 miles) of access road was maintained and repaired to restore access and facilitate habitat enhancement, 9.5 miles of firebreak was created to prepare for prescribed fire efforts, and one nesting structure was constructed to support an active rookery island.



Photo 3. Turtle Bayou forest opening sprayed for woody vegetation.

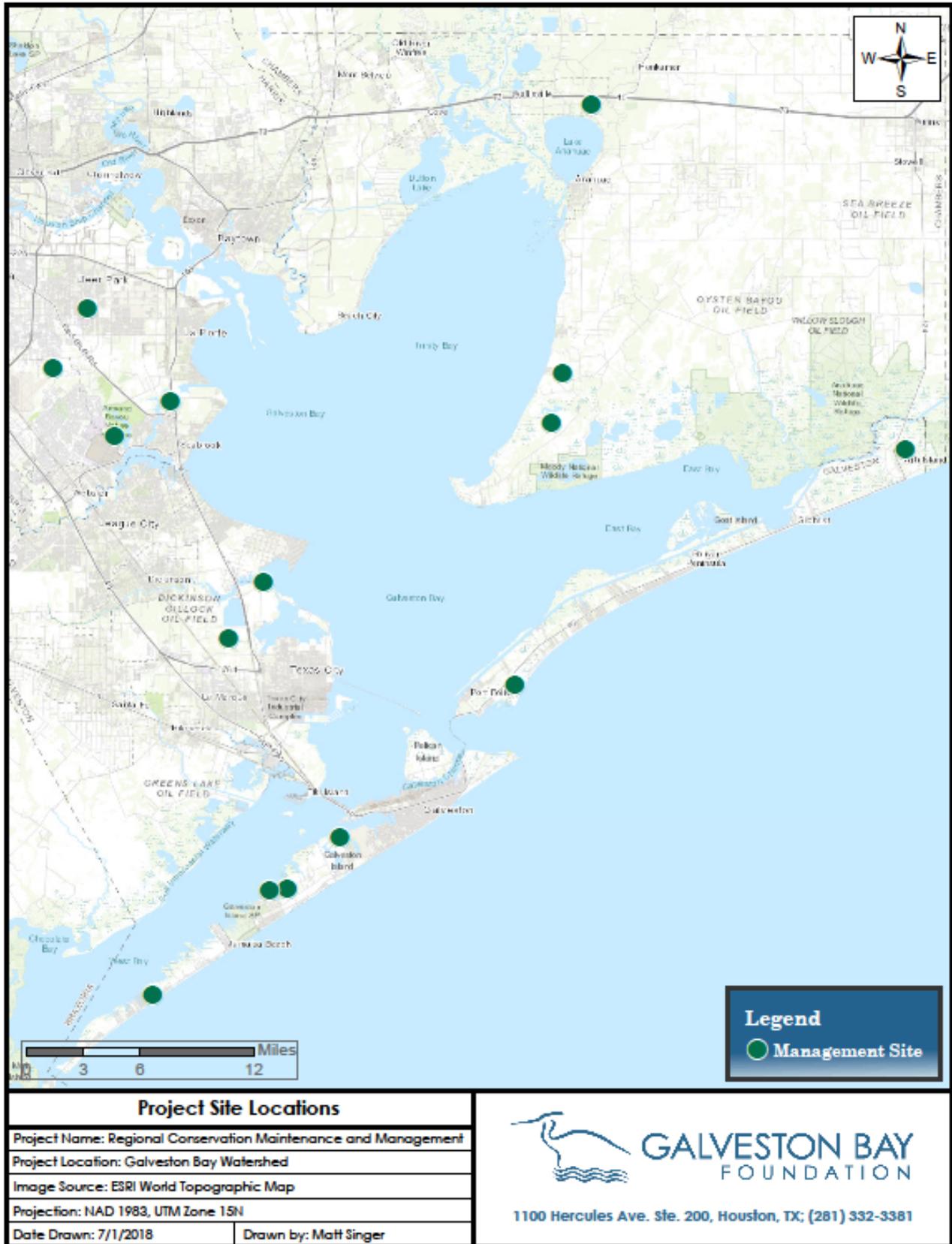


Figure 1: Conservation Maintenance and Management Project Locations

Partner Name	Project Site	Activity	Description	Area Affected
Armand Bayou Nature Center	Prairie Dawn Tract (Space Center)	Invasive Species Control	Foliar and cut stump herbicide application, spot treat along hog-panel fence	24 acres / 4,400
Armand Bayou Nature Center	Taylor Bayou	Fencing	Boundary fencing to prevent illegal access and off-road vehicles	4,230 feet
Armand Bayou Nature Center	Armand Bayou Park	Rookery	Construction of an artificial nesting structure to support an active rookery	1 nesting structure (575 square feet)
Artist Boat	Coastal Heritage Preserve	Invasive Species Control	Foliar treatment of McCartney rose	60 acres
Artist Boat	Bob Moore Island	Invasive Species Control	Cut stump treatment for Chinese tallow and Brazilian peppertree, foliar treatment for McCartney rose	7 acres
Galveston Bay Foundation	Chocolate Bayou	Aquatic Vegetation Control / Mechanical Mulching / Mowing	Freshwater wetland habitat management for waterfowl, prairie restoration and enhancement	11 acres / 14 acres / 38 acres /
Galveston Bay Foundation	Gordy Marsh	Invasive Species Control / Access Road Maintenance	Prairie enhancement by removing Chinese tallow, restore site access	44 acres / 10,600 linear feet
Galveston Bay Foundation	Rich Sanctuary	Invasive Species Control	Coastal prairie restoration by removal of Chinese tallow	65 acres
Galveston Bay Foundation	Sweetwater Preserve	Invasive Species Control	Habitat enhancement by removal of Brazilian peppertree and other invasive species	14 acres
Galveston Bay Foundation	Texas City Preserve	Mowing / Invasive Species Control	Prairie enhancement by mowing rank vegetation, removal and treatment of Chinese tallow	44 acres / 6 acres
Galveston Bay Foundation	Turtle Bayou	Invasive Species Control / Access Road Maintenance	Control of Chinese tallow and other invasive species in forest openings, restore access throughout property	11 acres / 17,050 linear feet
Houston Audubon Society	Bolivar Preserves (3)	Fire Lines / Mowing	Mowing boundaries and sensitive areas to prepare for prescribed fire	9.5 miles / 0.5 acres
Houston Audubon Society	Dos Vacas Muertas (Galveston)	Mowing	Wetland habitat mowing to suppress unwanted vegetation, including <i>Phragmites</i> sp.	1 acre

Houston Audubon Society	High Island (2)	Invasive Species Control / Mowing	Habitat enhancement by removal of Privet	2.44 acres / 2 acres
Native Prairies Association of Texas	Deer Park Prairie	Mowing / Invasive Species Control	Prairie management by chemical and mechanical suppression of woody vegetation	36 acres / 19 acres
Nature Conservancy	Texas City Prairie Preserve	Mechanical Mulching	Mechanical removal of Chinese tallow for habitat enhancement	25 acres

Table 1: Conservation Maintenance and Management Project List

## Project Results

### 1. Chocolate Bayou (GBF)

Activities: Mechanical Mulching, Prescribed Mowing, Aquatic Herbicide Application

Project Map:



Results: Hydraulic mulching was accomplished on 14 acres of land to remove unwanted trees and brush and restore herbaceous ground cover. Removing yaupon, tallow, oaks, and other trees revealed mima mounds and natural topography associated with coastal prairie habitats. Mowing was utilized on 38 acres to control woody shrubs and small trees within native prairie habitats. This effort will increase efficacy of future restoration efforts and promote native grasses and forbs. This project included control of aggressive freshwater wetland emergent vegetation within a 15-acre, shallow reservoir to promote waterfowl and waterbird use. Primary targets of this effort were water lily and cattail, which had covered more than 90 percent of the shallow open water reservoir. Contractors used airboats to deliver aquatic 2-4, D herbicide to 11 acres of the 15-acre reservoir.

Final Cost: \$31,400

Final Footprint (Acres/Linear Feet): 63 acres

Photos:



Mechanical mulching and coastal prairie restoration.



Chemical control of nuisance aquatic vegetation.

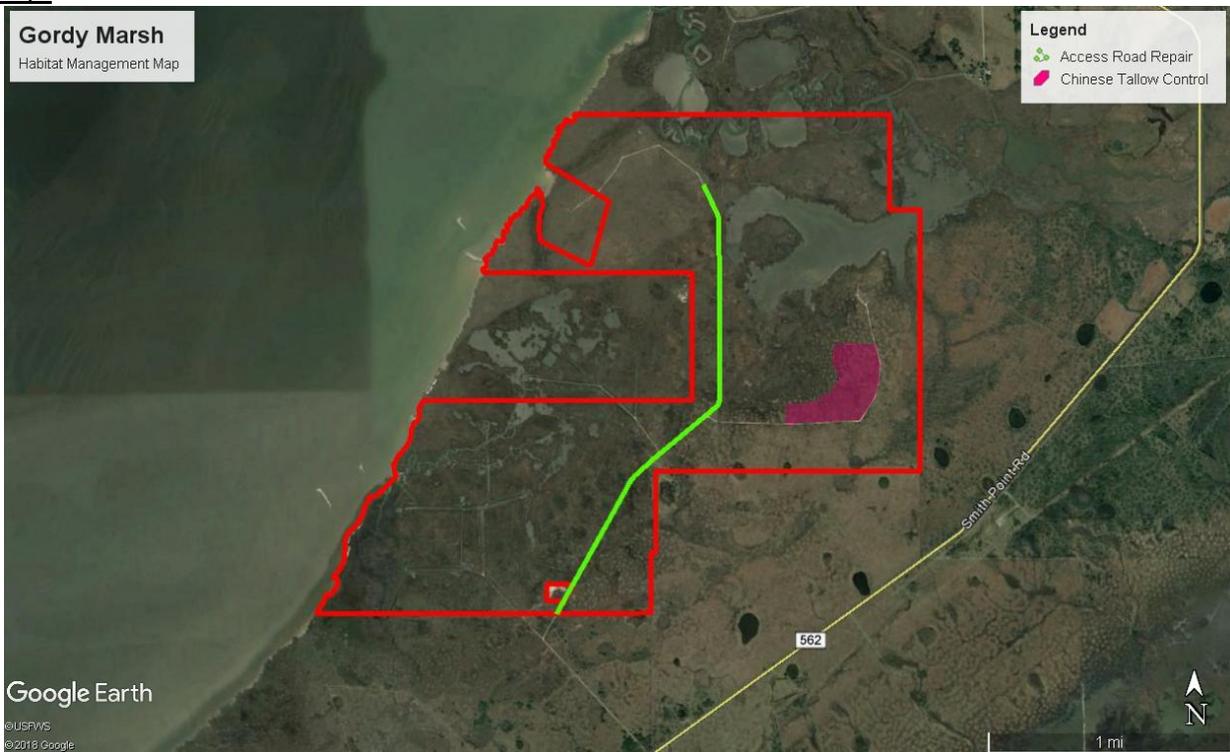


Mowing in coastal prairie to suppress woody vegetation.

## 2. Gordy Marsh (GBF)

Activities: Invasive Species Removal, Access Road Maintenance

Project Map:



Results: Approximately 2 miles of interior roadways were repaired by adding base material, grading, and mowing.

This maintenance work provided vehicular access to habitat management projects within the conserved area. Professional contractors treated 44 acres of Chinese tallow control using cut-stump treatments. Access to the property also allowed GBF seasonal staff and Texas Conservation Corps to treat approximately 120 acres of coastal prairie habitat for Chinese tallow and other non-desirable woody plant species.

Final Cost: \$15,155

Final Footprint (Acres/Linear Feet): 10,600 feet (access road maintenance); 44 acres (Chinese tallow control)

Photos:



Herbicide crew targeting Chinese tallow at Gordy Marsh.



Cut stump herbicide treatment on Chinese tallow at Gordy Marsh.

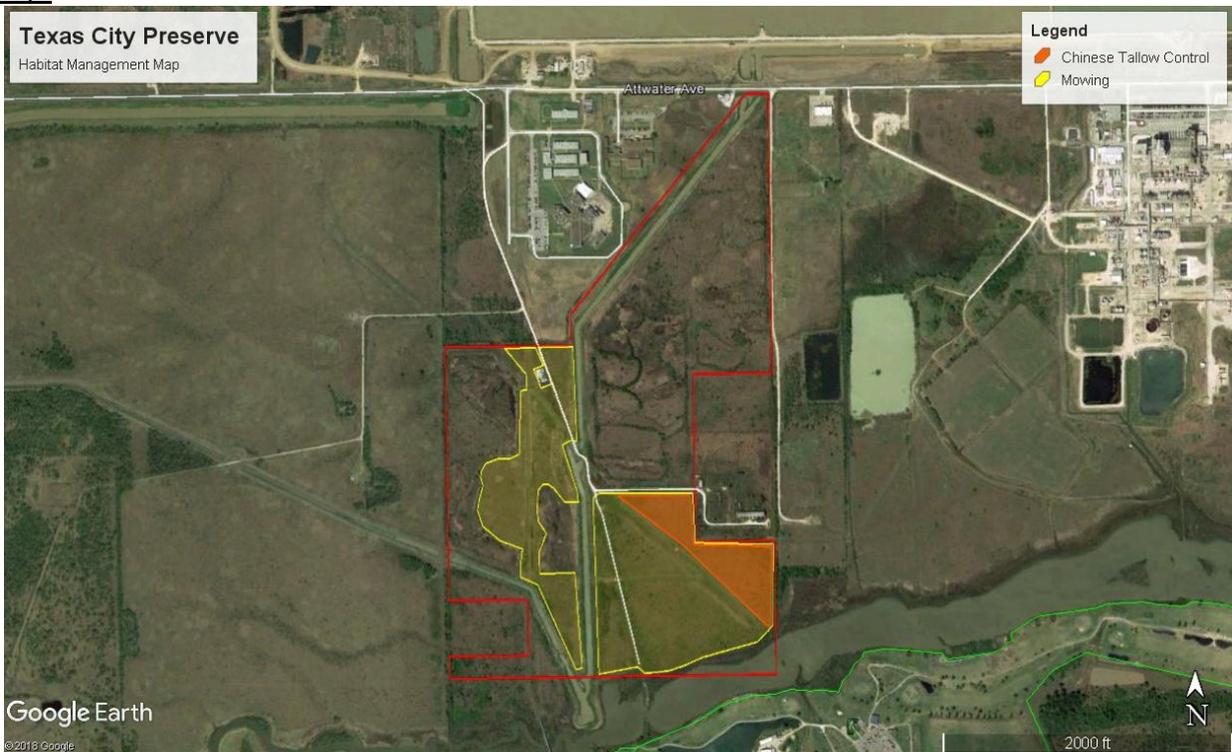


Gordy Marsh road repair to provide site access.

### 3. Texas City Preserve (GBF)

Activities: Mowing, Invasive Species Control

Project Map:



Results: 44 acres of native grasslands were mowed to suppress woody plant growth. Trees within the target area

too large to mow were left standing and will be addressed by Texas Conservation Corps and GBF seasonal staff. Efforts to treat larger infestations of Chinese tallow by aerial treatment methods were disallowed due to conflicts with neighboring land uses. Aerial applicators notified GBF near the end of this grant period that the golf course, prison system, and chemical plant nearby would all need to approve the use of selected herbicides and acknowledge the possibility that the chemical may drift onto their properties (wind). In the absence of the aerial application, GBF utilized a hand crew to target removal of six acres of Chinese tallow trees within the 44-acre mowed area.

Final Cost: \$3,785

Final Footprint (Acres/Linear Feet): 44 acres (mowing), 6 acres (invasive species control)

Photos:



Mowing at Texas City Preserve



Cut-stump treatment within mowed area

#### 4. Sweetwater Preserve (GBF)

Activities: Invasive Species control

Project Map:



Results: 33 acres of mowing was scheduled to be completed at this site. Due to issues with contractor equipment and mobility, this project was not completed within the Program timeline. Hand crews targeted Brazilian peppertree, Chinese tallow, salt cedar, and other non-desirable plant species on 14 acres within the preserve boundaries.

Final Cost: \$4,770

Final Footprint (Acres/Linear Feet): 14 acres

Photos:



Brazilian peppertree cut and treated at Sweetwater Preserve.

## 5. Turtle Bayou (GBF)

Activities: Access Road Maintenance, Invasive Species Control

Project Map:



Results: Road maintenance of 17,050 linear feet, including removal of vegetation and spreading base material, was conducted to restore access throughout this property. Encroaching trees and shrubs were physically removed with machinery, widening roads to provide access to vehicles and other management equipment. Eleven acres of wildlife openings were spot treated for invasive plants and woody vegetation to maintain open areas within the forest with herbaceous ground cover. Primary targets for control included Chinese tallow, trifoliolate orange, and deep-rooted sedge.

Final Cost: \$9,670

Final Footprint (Acres/Linear Feet): 11 acres, 17,050 linear feet

Photos:



Invasive species control in wildlife opening at Turtle Bayou Nature Preserve.

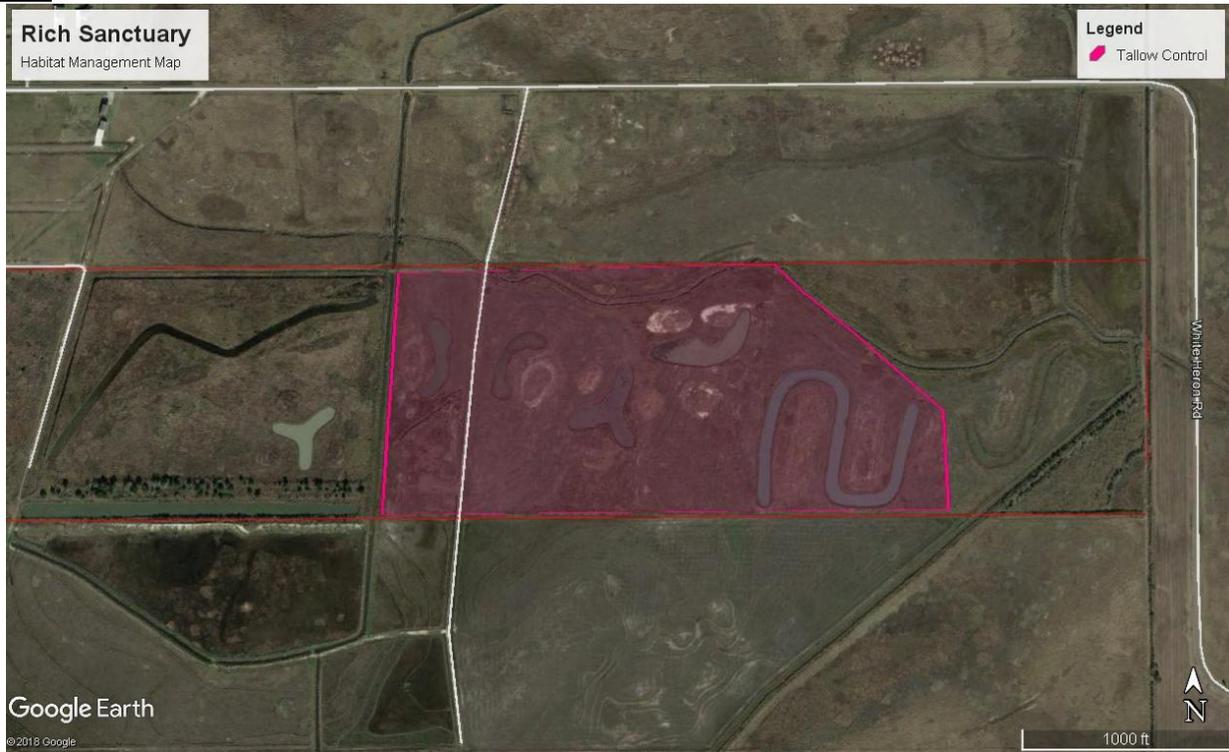


Road maintenance work to restore access through Turtle Bayou nature preserve.

## 6. Rich Sanctuary (GBF)

Activities: Invasive Species Removal

**Project Map:**



**Results:** Professional contractors were utilized to foliar treat Chinese tallow and other undesirable woody plant species on 65 acres within a coastal prairie restoration area. 12 acres of mowing was scheduled to be completed at this site. Due to issues with the selected contractor's equipment, this project was not completed within the Program timeline.

Final Cost: \$7,155

Final Footprint (Acres/Linear Feet): 65 acres

**Photos:**

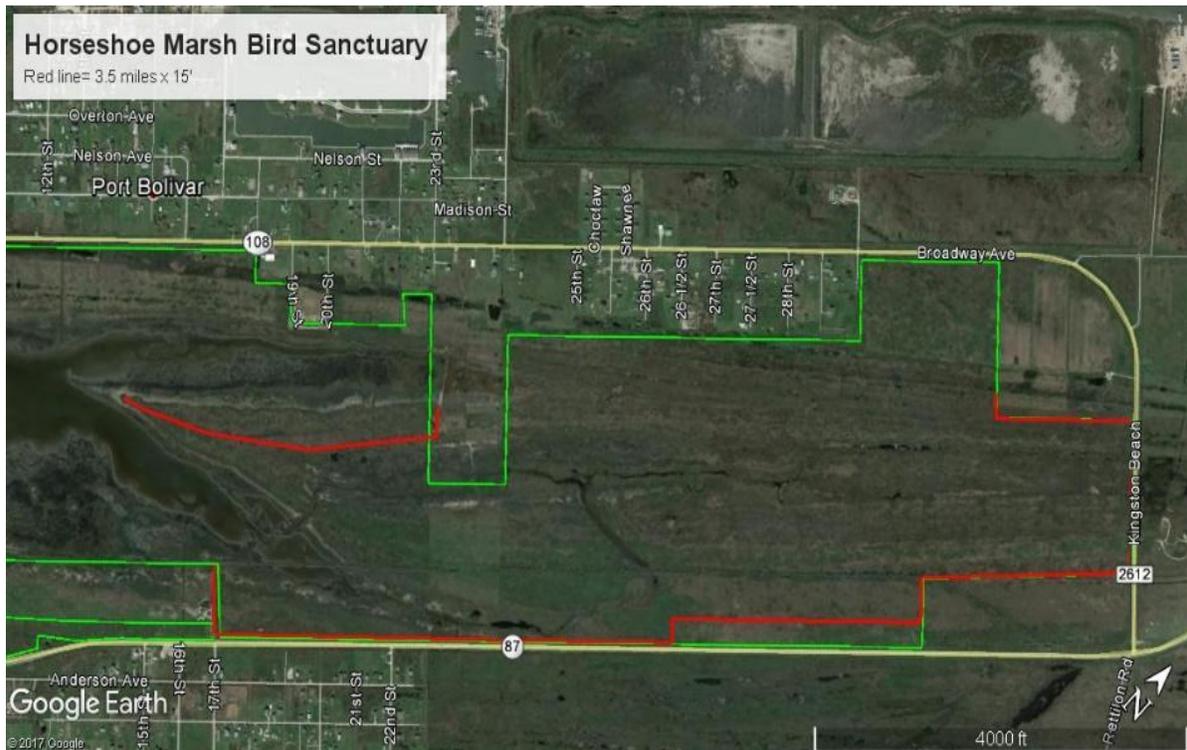


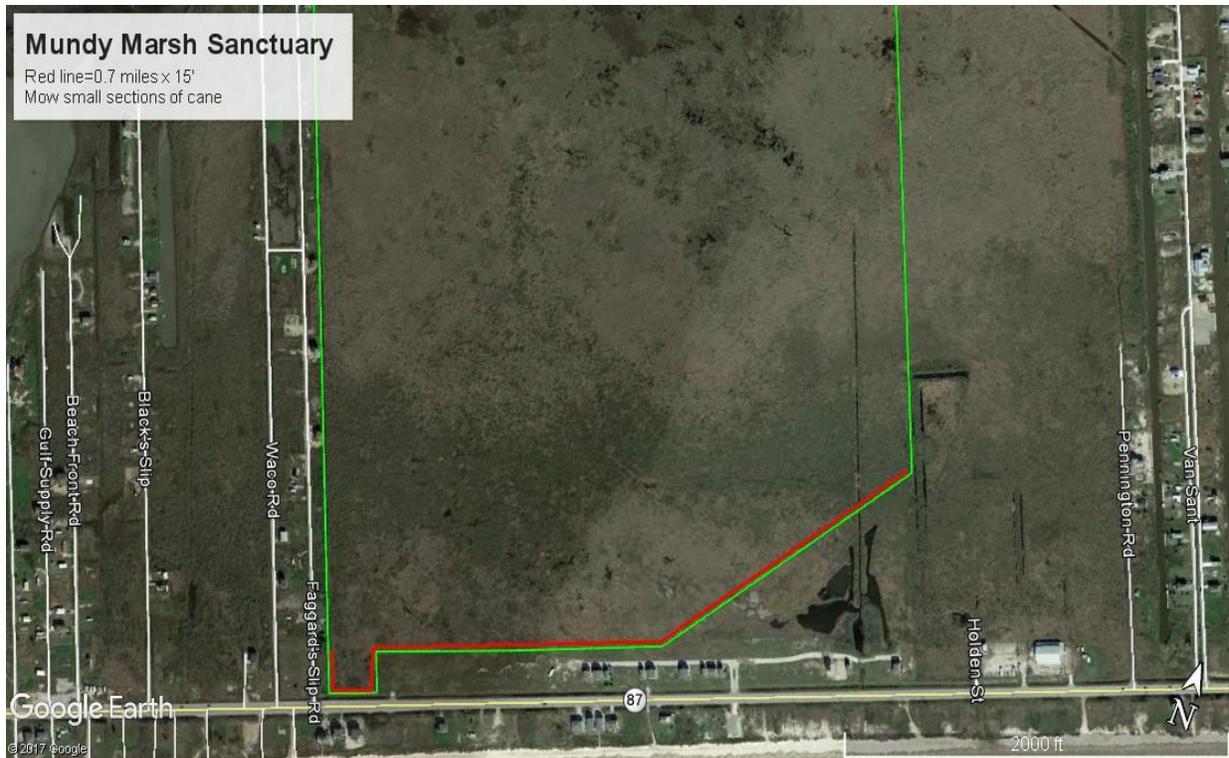
Chinese tallow control in Rich Sanctuary prairie restoration site.

**7. Bolivar Preserves (Houston Audubon Society) – Bolivar Flats Sanctuary, Horseshoe Marsh, and Mundy Marsh**

Activities: Fire line establishment, Mowing in environmentally sensitive areas

Project map:





**Results:** Contractors utilized a Marsh Master machine to create fire breaks around the preserve boundaries and strategic burn units to facilitate planned prescribed burning by USFWS. A small area was mowed at Mundy Marsh to control unwanted vegetation. Follow up treatment will be conducted by USFWS to remove vegetation from fence lines and prep for future prescribed fire efforts.

Final Cost: \$18,332

Final Footprint (Acres/Linear Feet): 9.5 miles (fire breaks), 0.5 acre (mowing)

Photos:



Cleared vegetation along fence line at Horseshoe Marsh.

**8. Galveston Island Preserves (Houston Audubon Society) – Dos Vacas Muertas**

Activities: Mowing

Project Map:



**Results:** Specialized equipment used to create fire lines on Bolivar Preserves was utilized to mow unwanted vegetation at Dos Vacas Muertas on West Galveston Island. The target area is primarily wetland habitat and traditional machinery is not suitable for accessing this area.

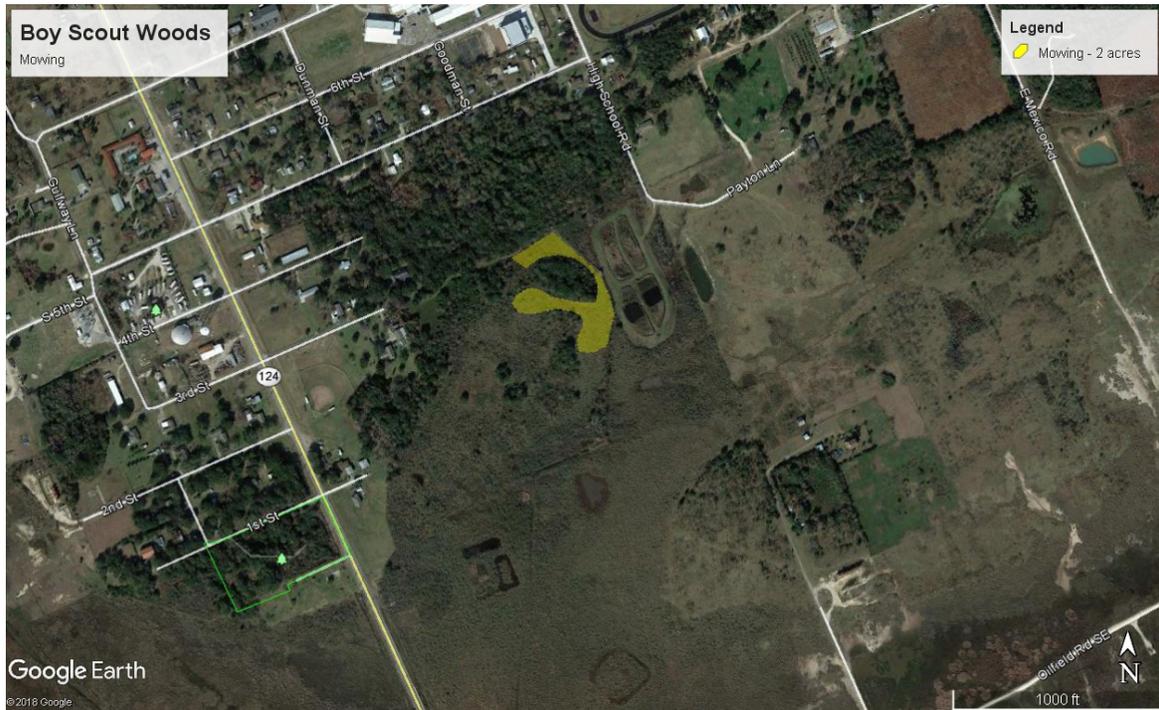
Dos Vacas Final Cost: \$2,095

Final Footprint (Acres/Linear Feet): 1 acre

**9. High Island Preserves (Houston Audubon Society) – Smith Oaks Sanctuary, Boy Scout Woods**

Activities: Invasive Species Control, Mowing

Project Map:





**Results:** Work completed at Smith Oaks Sanctuary and Boy Scout Woods was targeted to address invasive plant species (Chinese privet and others) growth along trails, boardwalks, and within sensitive bird habitats. Professional contractors were hired to manually remove target species and treat cut-stumps with herbicide. 2.44 acres were accomplished at Smith Oaks Sanctuary. Shredding /mulching of 2 acres using specialized equipment was conducted at Boy Scout Woods. Invasive species were targeted to maintain the quality of habitat at the site and promote wildlife viewing opportunities for preserve visitors.

Final Cost: \$10,298

Final Footprint (Acres/Linear Feet): 2 acres mowing, 2.44 acres of invasive species control

Photos:



Mechanical treatment of unwanted trees and brush adjacent to a boardwalk at Boy Scout Woods in High Island.



Cut-Stump treatment for tallow control at Smith Oaks Sanctuary in High Island.

**10. Texas City Prairie Preserve (The Nature Conservancy)**

Activities: Mechanical Mulching

Project map:



**Results:** Hydraulic mulching equipment was used to physically remove Chinese tallow and other unwanted shrubs within a 25-acre area. Wet conditions prohibited access to portions of the property.

Final Cost: \$30,600

Final Footprint (Acres/Linear Feet): 25 acres

Photos:



Mechanical mulching in North Levee unit at TNC's Texas City Prairie Preserve.

## 11. Coastal Heritage Preserve (The Artist Boat)

Activities: Invasive Species Control (McCartney rose)

Project Map:



**Results:** Professional herbicide applicators targeted 60 acres of the Coastal Heritage Preserve for McCartney rose. Foliar application of a broadleaf selective chemical was applied to target species throughout a maintained grassland. Low vegetation provided easy access throughout the property, but efficacy of chemicals applied may be

reduced due to recent mowing of the target shrubs.

Final Cost: \$7,155

Final Footprint (Acres/Linear Feet): 60 acres

Photos:



Foliar treatment of McCartney rose at CHP.

## 12. Bob Moore Island (The Artist Boat)

Activities: Invasive Species Control

Project Map:



**Results:** Presence of Chinese tallow and Brazilian peppertree have been documented as expanding for several years and are now reported to be on Bob Moore Island. A 7-man crew was ferried to the island via boat. The crew

treated 7 acres within the preserve utilizing the cut stump treatment on larger Brazilian peppertrees and Chinese tallows, foliar application was used on smaller trees and McCartney rose bushes.

Final Cost: \$2,385

Final Footprint (Acres/Linear Feet): 7 acres

Photos:



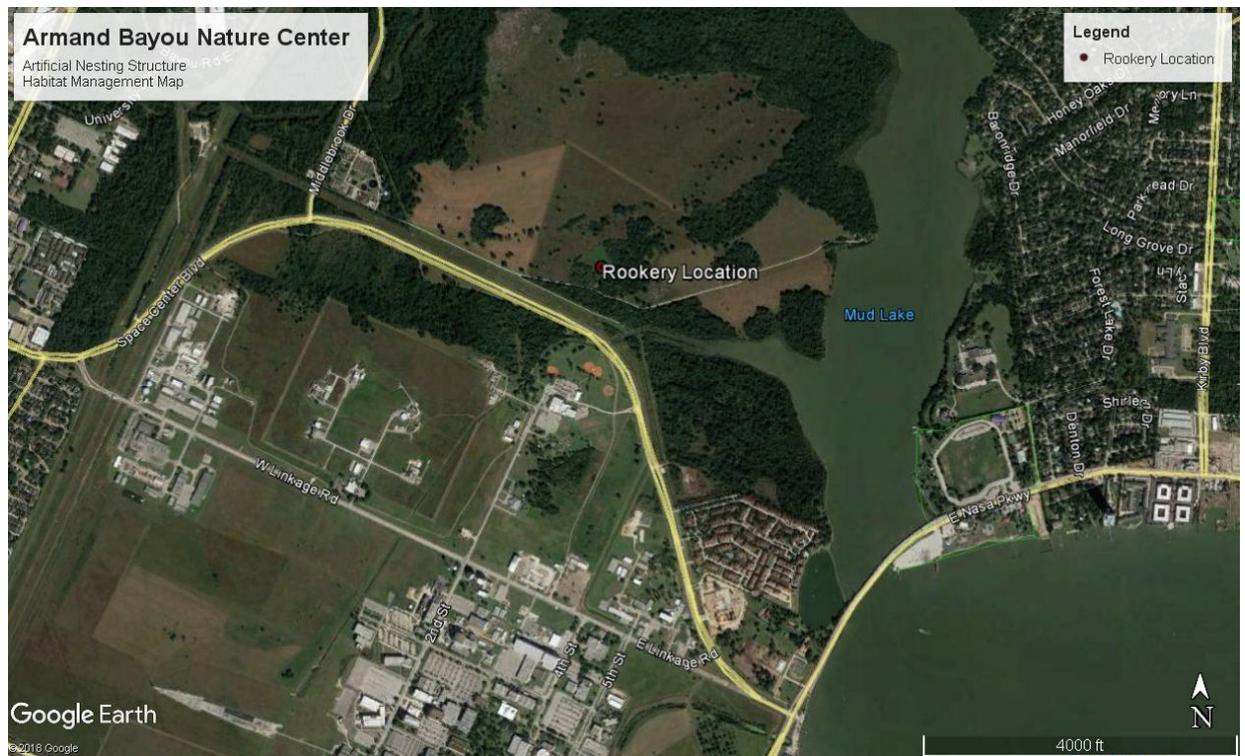
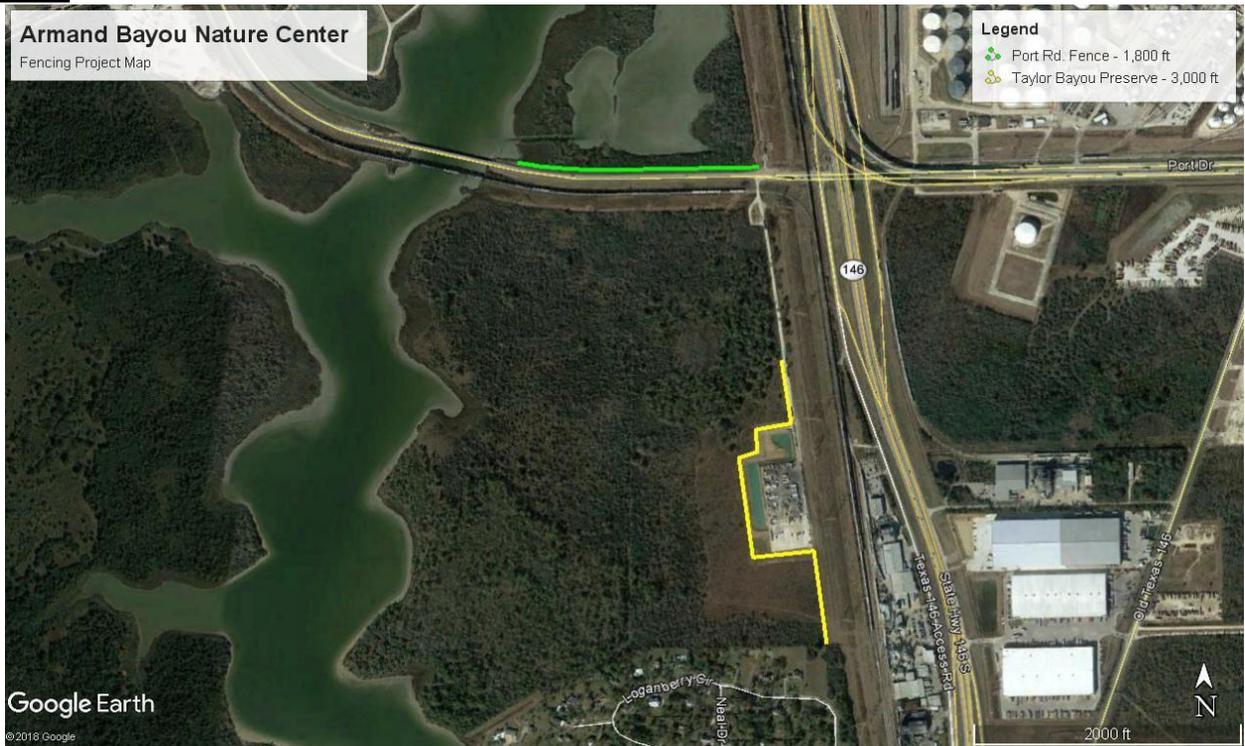
Cut stump treatment of Brazilian peppertree at Bob Moore Island.

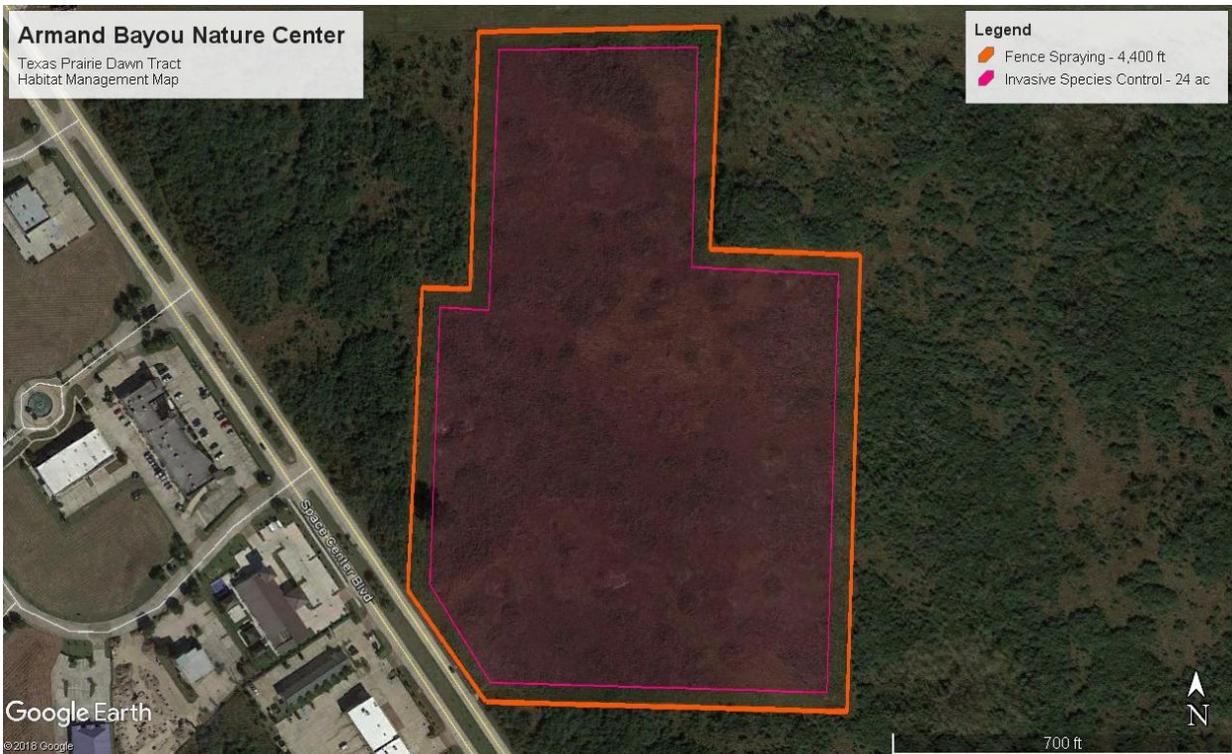


Brazilian peppertree stump treated with herbicide at Bob Moore Island.

### 13. Armand Bayou Nature Center (ABNC)– Armand Bayou Park, Taylor Lake, Texas Prairie Dawn Flower Tract

**Activities: Boundary Fencing, Rookery Construction, and Invasive Species Control**  
**Project Maps:**





**Results:**

1. **Fencing** - ABNC identified a critical need for boundary fencing to prevent trespass from neighboring industry and off-road vehicles. This grant was able to support the construction of 650 feet of chain link fence and 3,580 feet of 4-strand barbed wire fence.
2. **Rookery Construction** – An artificial nesting structure was constructed to replace trees killed during the 2011 drought. This rookery structure will host hundreds of colonial nesting water birds throughout its lifespan, including great egrets, snowy egrets, tri-colored herons, little blue herons, great blue herons, anhingas, and roseate spoonbills. Materials for this structure were paid for by this grant, but construction labor was provided by the Texas Coastal Conservation Corps.

The new structure, approximately 12x16, was constructed at Armand Bayou Nature Center’s rookery island off Space Center Blvd. The structure contains 3 levels with each level containing approximately 30 nest boxes for a total of 90 boxes on the structure. Total area for the nesting structure is approximately 575 square feet (about 192 feet per level). During peak nesting season, the entire Rookery Island hosts a population of approximately 200 nesting pairs. The lifespan of the structure will be approximately 25 years.

3. **Texas Prairie Dawn Flower Tract** – Invasive species and scrub/shrub control throughout a 24-acre tract targeted Chinese tallow, yaupon, and other unwanted shrubs and trees. Foliar application was the primary method of herbicide application. Contracted herbicide crews also spot treated nuisance vegetation along the perimeter fencing of this tract to maintain the integrity of the 4,400 ft hog-panel fence intended to exclude feral hogs from sensitive habitats.

Mowing –12 acres was scheduled to be targeted using prescribed mowing as part of ABNC’s vegetation management strategy. The mowing effort was made, but the equipment used was too heavy for the moist soils and was unable to complete the task.

Rookery Final Cost: \$2,620

Invasive Species Control Final Cost: \$7,155

Fencing Final Cost: \$20,225

Final Footprint (Acres/Linear Feet): 24 acres and portions of 4,400 linear feet (herbicide); 4,230 linear feet (fencing); 575 square feet (nesting platform)

Photos:



Construction of artificial rookery nesting structure at ABNC.



Chemical treatment of woody vegetation at ABNC's Prairie Dawn Flower tract.



Chain Link and barbed-wire fencing at ABNC.

#### 14. Deer Park Prairie (Native Prairie Association of Texas)

Activities: Invasive Species Control, Mowing

Project Map:



**Results:** 19 acres of the Deer Park Prairie were treated for invasive species. The primary objective of this effort was to reduce the percent cover of woody plant vegetation within the native grassland. Foliar application was used to target most of the plants, a few larger trees and shrubs were cut, and herbicide was applied to the stumps. Forty acres of mowing was scheduled to be completed at this site. Due to conflicts with NPAT’s scheduled educational programs for summer 2018, only 36 acres within the preserve were mowed.

Final Cost: \$6,030

Final Footprint (Acres/Linear Feet): 36 acres (mowing), 19 acres (invasive species control)

Photos:



Chemical treatment of woody vegetation at Deer Park Prairie.



Mowed area at Deer Park Prairie.

## OBSTACLES

Over the course of this project, several issues presented challenges to completing this project. One of the most challenging obstacles to overcome during the project was weather. Many of the locations targeted for management efforts were naturally wet ecosystems. Extended periods of dry weather are required prior to accessing these sites to minimize damage to sensitive habitats and prevent equipment from becoming stuck. Typically, much of this mechanical work would have been completed during late summer months. Due to the timing related to the grant requirements and inability to conduct this work in 2017, the work was scheduled to be completed in May and June 2018. Although many of the original objectives were completed, more work would have been accomplished if soil conditions were drier, providing better access for equipment and contractors.

Another issue we experienced that caused project issues was proximity to developed areas. Many conservation sites have neighboring properties that are utilized for something other than conservation purposes, and this proved problematic when attempting to treat a stand of invasive Chinese tallows at GBF's Texas City Preserve using aerial treatment methods. The potential drift for aerial herbicide is up to ½ mile. After further examining the maps provided, the herbicide applicator notified GBF that permission would be required from several neighbors prior to completing the job. Those permissions included a state-run prison, county water authority, a chemical plant, and a municipal golf course. Due to the timing of this project, there wasn't ample time to secure authorizations from each of these entities and there was no guarantee that the adjacent property owners would have agreed to accept the potential for damage to non-target vegetation.

## LESSONS LEARNED

This project was intended to reduce costs by bundling projects from multiple entities, increasing the scale of projects and, in return, reducing the total costs for individual project tasks. Projects that were packaged together to achieve this intended economy of scale included mowing and herbicide application. GBF was able to secure a very favorable rate of \$40 per acre for mowing at 5 conservation properties. However, the awarded contractor was unable to complete the awarded acreage within the period of performance under this contract.

The herbicide application contract work was also secured at a favorable rate; however, this rate was also secured for previous smaller projects GBF had performed in the past. Value to the overall project was achieved by outperforming the original target acreage in 7 of the 9 project locations. This resulted in an additional 94 acres of habitat affected by this effort.