Brazilian Peppertree Treatment and Control on Galveston Island – Year 2

GLO Contract No. 10-043-000-3739

FINAL REPORT
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Executive Summary

Brazilian peppertree (*Schinus terebinthifolius*) is a non-native, invasive plant species that constitutes a considerable threat to barrier islands and other coastal habitats along the Texas Gulf Coast. It is considered by many experts to be among the world's worst invasive species because of the immense threat it presents to native biodiversity. Brazilian peppertrees form dense thickets that shade out native plants. They quickly outcompete native vegetation in wetlands and coastal areas (much like Chinese tallow has done on the upper Texas coast), displacing diverse natural areas and creating a monoculture of this noxious plant. Furthermore, Brazilian peppertrees are of little value to local wildlife, and contact with this plant can cause dermatitis and respiratory irritation in some people. The species has caused massive ecological damage to temperate and subtropical South Florida, which is currently investing enormous financial resources in effort to control the nuisance along highways, railroads, and public parks and wildlife management areas. Large infestations have also been identified along the mid and lower Texas coast, and it has the potential to have similar impacts along the upper Texas coast. In 2005, the State of Texas enacted the Noxious Plants List, 4 TAC §19.300, which lists Brazilian peppertree as one of 29 plant species considered to have "serious potential to cause economic or ecological harm to the state." As of January 6, 2005, it became unlawful to sell, distribute, or import any live form of Brazilian peppertree in the State of Texas.

Introduction

As the plant is predominantly contained to Galveston Island at the present time, this project represents an opportunity to implement a control program with the potential to head off a much larger problem. In 2005, the Galveston Bay Estuary Program funded a small scale project that treated Brazilian peppertrees from all known locations of infestation at the Sweetwater Nature Preserve, Galveston Island Municipal Golf Course, Scholes Airport, and 17 private residential properties, were treated with a basal herbicide application. This project prompted natural resource experts to search for additional infestations, and subsequently new, larger areas were identified and planning for a broad scale control project was initiated.

In 2007, GBF sought funding through the Texas Coastal Management Program to help fund the first large-scale treatment effort on Galveston Island. The Texas General Land Office awarded $67,500 to GBF in 2008 and an additional $33,750 in 2009 for the purpose of controlling Brazilian pepper. GBF committed matching funds in the amount of $67,500 to this project.

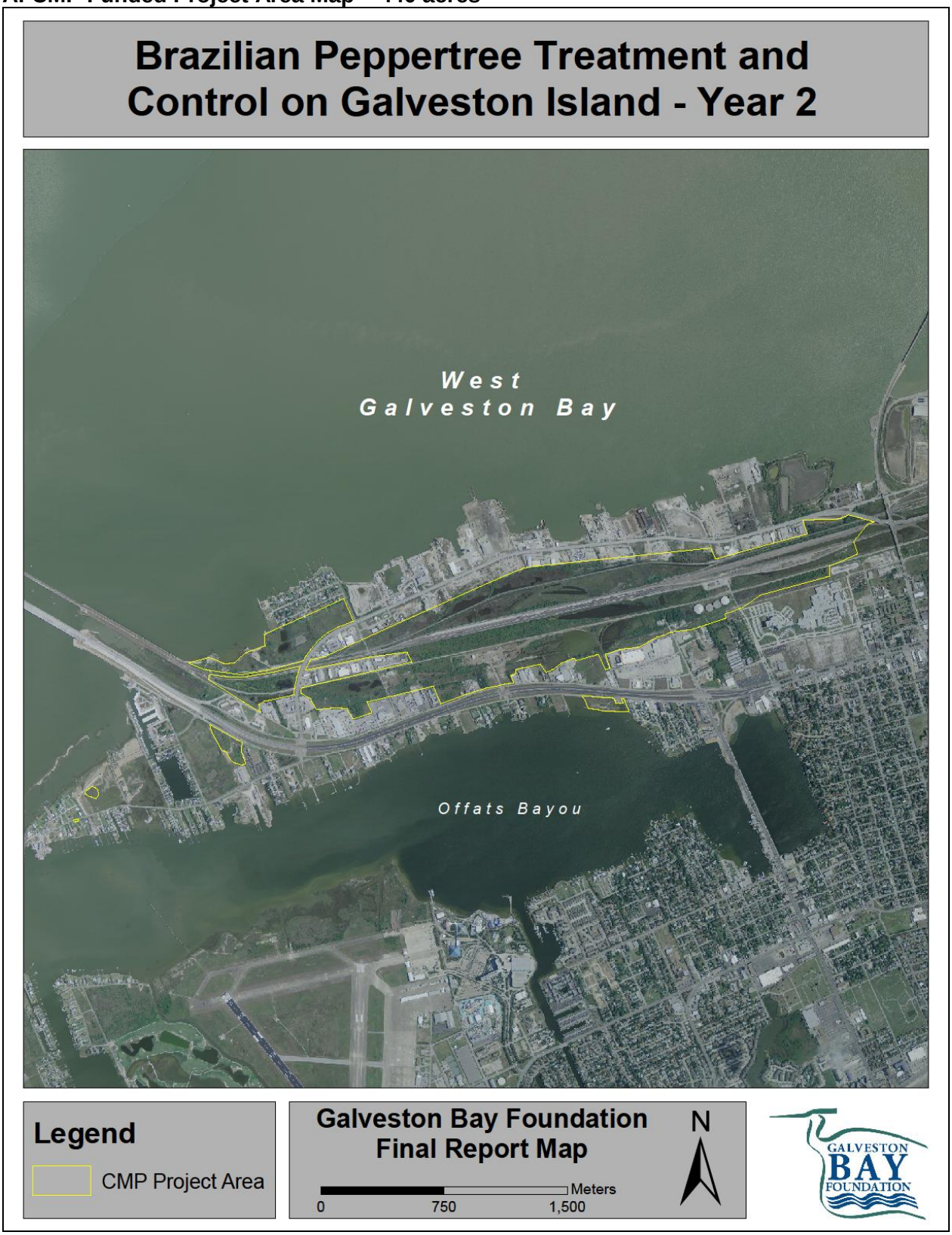
The initial phase of the project focused on never before treated Brazilian pepper infestations located near the I-45 corridor on Galveston Island as shown on the maps in Figure 1. The infestation existed on public right of ways, railroad properties, conservation properties, and private residential and commercial lots. Coordination with local agencies, private landowners, and corporations prolonged the planning phase of the project as authorizations to access infestations were obtained. The initial control efforts in this phase of the project began in August 2010 and carried in to September 2010. These efforts successfully targeted dense infestations of Brazilian peppertree in the areas depicted in Figure 1 A and B. Due to the hardiness of the plants, sheer size of the treatment area, and established seed bank multiple control efforts are necessary to eliminate the infestation.

The second phase of this project was dedicated to follow up treatments on these same areas to monitor success and control regrowth of the treated plants. Brazilian pepper is an evergreen plant and not tolerant to excessively cold temperatures. Freezing weather conditions in early

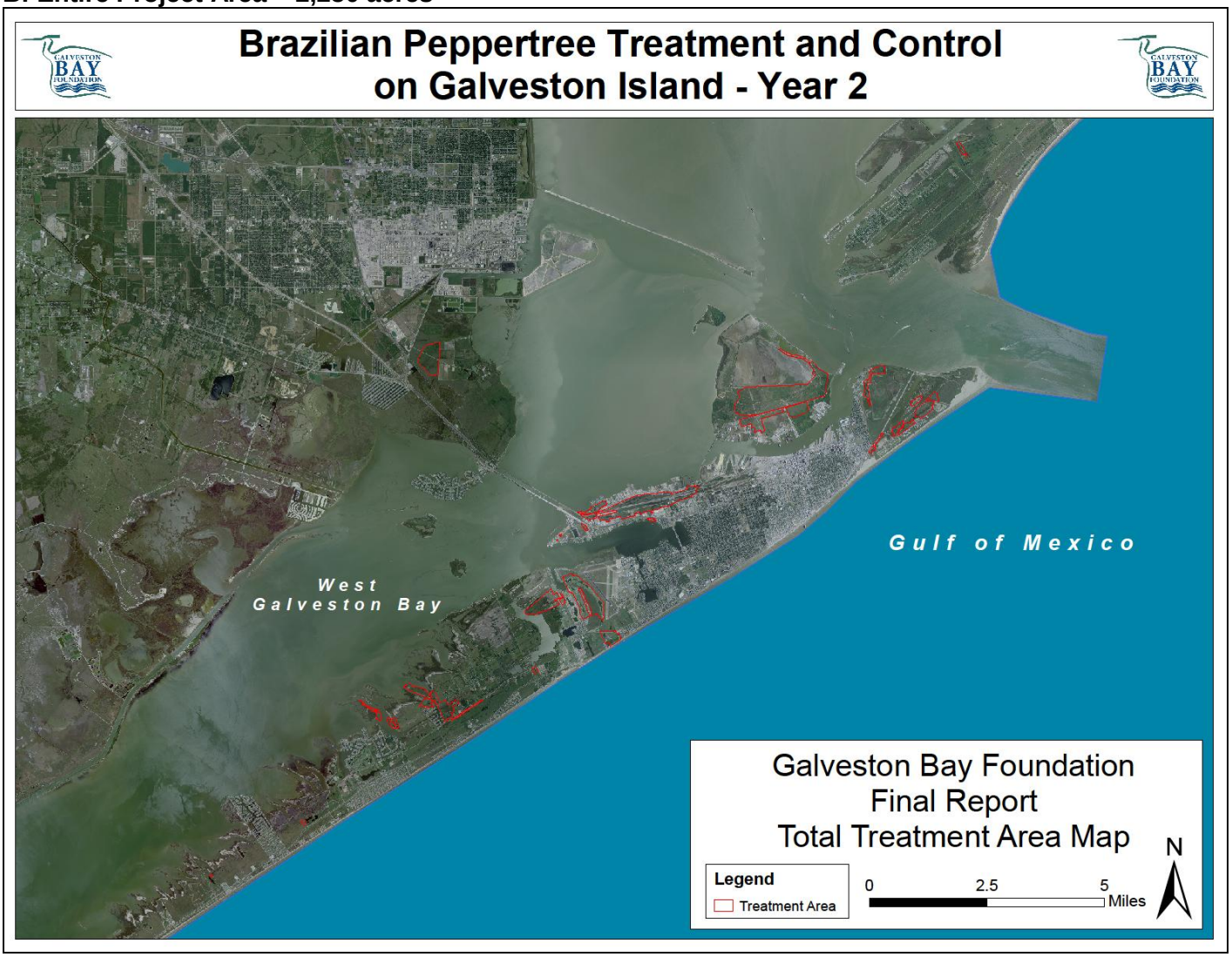
2011 defoliated these plants, postponing our monitoring and further control efforts. Follow up treatment efforts were initiated in early summer 2011, once new leaves had grown and hardened on surviving plants. Prior to initiating follow up efforts, GBF revisited the treatment sites to gauge the level of control and revise the chemical application techniques.

Plants that survived the initial treatments were typically in dense stands, and it is likely that sufficient chemical was absorbed to defoliate the tree and stunt growth, but not enough to provide a lethal effect. The follow up treatments were more effective as these infestations no longer provide a canopy to restrict the application of the chemical and access to the base of the plant. Also, chemical rates for foliar treatment were scaled back to encourage more chemical uptake and less leaf burn immediately following the treatment.

Figure 1: Project site maps.
A: CMP Funded Project Area Map – 440 acres



B: Entire Project Area – 2,250 acres



Project Methodology

Brazilian pepper can be treated with several different types of chemical applications, each with varying levels of success depending on the site conditions. Given the wide range of conditions found within the project area, the selected contractors coordinated with the project manager to develop a strategy for treating the different infestations on separate parcels of land.

Smaller, easily accessible tracts and isolated individual plants were treated with a basal chemical application, while larger, denser infestations on inaccessible parcels were treated with a foliar chemical application from ATVs or spray trucks. During the initial phase, 100% of the project area targeted with CMP funds was treated with a large volume foliar application from ATVs or spray rig trucks depending on the density and the location of vegetation. Follow up treatments included foliar and basal bark treatments in this area. The initial foliar treatments allowed hand crews to enter dense infestations and spot target regrowth and new sprouts with a basal herbicide application.

Garlon (triclopyr), considered the most effective herbicide to use on Brazilian peppertree, was reduced in the foliar mixture to help prevent some of the leaf burn and top kill effects we observed during the initial phases of this project and the ongoing monitoring. Arsenal Powerline (Imazapyr), a soil active herbicide, was maintained at the original percentage to help reduce the probability of new growth from the established seed bank. Vista (fluroxypyr) was precluded from the follow up treatments in effort to reduce the cost of the chemical mixture. Below is the mixture selected for foliar treatment throughout second round of treatment for this project:

2 qts Garlon 3A (Triclopyr)
3 qts Arsenal Powerline (Imazapyr)
1 gal MSO
per 100 gal of water

This chemical application was used to retreat large infestations with the intention of controlling plants that were not destroyed during the initial effort and reduce the number of viable plants re-establishing from seed. The treated plants were already stressed from the 2010 control efforts and the sub-freezing temperatures experienced during early 2011. Given these factors, the plants should not have required the same amount of chemical to produce a lethal effect. This also helped conserve grant dollars to allow for a greater coverage area during follow up treatment efforts.

A tertiary treatment effort was conducted with ground crews using a basal bark application. Three to five man crews targeted treatment areas with backpack sprayers filled with a mixture of Garlon 4 Ultra and penetrating oil. These crews targeted thick infestations that could not easily be accessed prior to a foliar chemical application. This technique is more labor intensive, but provided a more thorough coverage of the target area.

Project Results

The initial control effort for this project was considered successful as nearly all of the Brazilian pepper plants in the target area depicted in Figure 1.A were chemically treated. The project was also successfully expanded with funding from partnering agencies to include treatment of several other large infestations that were identified during the course of this project.

Only a small percentage of basal bark treated plants survived the initial treatment, however, a much larger percentage of foliar treated plants had significant regrowth following the initial control effort and required a greater focus during follow up. Most of these areas were treated a second time with a foliar application and then followed up with basal bark application to ensure good coverage within the treatment area. This method of treatment was effective at killing dense, mature stands of Brazilian peppertree.

Recent monitoring visits have shown high kill rates on double and triple treated stands. Very few trees were missed even in the densest infestations, but a few have been identified. These large trees will be targeted with 2012 Galveston Bay Estuary Program (GBEP) funding.

Even with the planned efforts to control regeneration from seed sources, many young plants are beginning to grow within the treatment area. These plants will also be targeted with 2012 GBEP funding. Treatment before the plants are able to mature and produce seeds will be critical to the long term success of this project.

Contractors were able to cover over 2,250 acres throughout the course of this project treating Brazilian peppertree infestations. 440 acres, including some of the densest infestations on Galveston Island, were targeted with CMP funds. Within the 440 acre CMP treatment area, foliar or basal bark chemical application was applied to 99% of live Brazilian pepper plants. It is very difficult to estimate percent live reduction given the rank site conditions and new growth from seed sources. Current estimates would be in the 80% - 85% range.

Lessons Learned

During the course of this project, several consistencies related to killing Brazilian pepper were identified. First, this plant is hard to kill with a single control effort. Second, when allowed to mature into large acreage monocultures the cost of treatment increases and the success of treatment decreases. And third, Brazilian pepper will re-establish very quickly from seed once the canopy is removed and sunlight and water are made available.

Foliar treatment is effective if trees are isolated enough that you can cover the entire tree crown and most of the trunk with chemical. This treatment method is faster given the level of mobility provided by UTVs and 4X4 trucks and the effect of treatment can be witnessed within a couple days of treatment. However, extremely dense infestations prevent the applicator from spraying a lethal amount of chemical on plants. The result observed in these scenarios was a 95% – 100% defoliation of treated plants, but a low kill rate. However, this allowed follow up treatments of foliar and basal bark chemical application to be much more effective.

Basal bark treatment with a tryclopyr product was the most effective method for killing Brazilian peppertree. However, when acreages are over 20 acres, this provides a challenge for project managers as the number of treatment days are increased significantly, as well as the probability of missing plants. Basal treatment does not show effects of treatment for several weeks and therefore, misses cannot be identified until long term monitoring efforts are underway.

Since Brazilian peppertree is an evergreen plant, treatment effort during the winter months allows easier plant identification. The winter weather conditions also provides a safer working environment for the chemical applicators.

The overall scope of this project turned out to be much larger, geographically, than intended during the planning process. The goal of the project was to completely eradicate Brazilian pepper from Galveston Island and initial plans targeted an isolated infestation along the I-45 corridor, a small US Army Corp of Engineers property, and small infestations on privately owned parcels throughout the island. Infestations discovered during the project were much larger than previous estimations and the scope of the project was greatly expanded.

It is clear that long term funding will be necessary to completely eradicate Brazilian peppertree from Galveston Island and the region. Significant efforts will need to be made to counter the new flush of growth from the established viable seed bank. These new plants should be treated before they mature and produce large numbers of seed annually.

The goal to completely eradicate Brazilian peppertree from Galveston Island is not unattainable, but will prove to be a long term effort with cooperation from local resource managers and the Galveston community. There is no doubt that the initial effort associated with this grant will make significant improvements to the wildlife habitat found on Galveston Island. However, the

established seed bank, additional untreated infestations, and isolated trees remaining in residential areas will provide opportunities for Brazilian pepper to rebound and reclaim the island's native communities. GBF recommends that this project be revisited on three to five year intervals for monitoring and follow up treatment in order to have long term success.

Project Funding:

Partner	Contribution	Contribution Type
GBEP (TCEQ)	$22,500.00	State
CMP (GLO)	$33,750.00	Federal
Total	**$56,250.00**	

Deliverables:

Task 1: Follow up Treatment and Control Work

1. A copy of the executed contracts with the selected contractors are included in this report.
2. A copy of the invoices are included to show treatment dates.

Task 2: Monitoring and Follow Up

1. Before and after photos are included.
2. Monitoring is ongoing and follow up treatment efforts will be funded through Galveston Bay Estuary Program dollars in 2012.

Project Photos:
Monitoring initial treatment efforts: Prior to follow up efforts.

Railroad corridor: May 2011 Foliar treatment.

Harborside Drive: May 2011 Foliar treatment

Harborside Drive: May 2011 foliar treatment

Harborside Drive: January 2011. Following foliar treatment

Harborside Drive: January 2011. Foliar treatment

Railroad Corridor: May 2011. New growth from seed bank.

Interstate 45 feeder: January 2011. Foliar application

Follow up treatment and effects: May - August 2011

Corps Woods basal bark application: May 2011

Interstate 45: Basal treatment after application.

Harborside Drive: August 2011. Follow up foliar application.

Monitoring follow up efforts:

Corps Woods: December 2011. Follow up basal application effects.

Corps Woods: December 2011. Follow up basal application effects.

Transmission corridor: December 2011. Foliar treatment

Railroad Corridor: December 2011. Follow up foliar treatment

Railroad Corridor: January 2012. Follow up foliar treatment

Railroad Corridor: January 2012. Follow up foliar treatment

Harborside Drive: January 2012. Follow up foliar treatment effects.

Harborside Drive: January 2012. Follow up foliar treatment effects.

Harborside Drive: January 2012. Effects of initial and follow up treatment. Dense linear infestation.

Harborside Drive: January 2012. New growth from seed bank

Railroad corridor: January 2012. New growth from seed bank

Railroad corridor: January 2012. New growth from seed bank

Railroad corridor: January 2012. New growth from seed bank

Aerial Photo Documentation (Google Earth):

February 2010 – Green plants are mostly Brazilian peppertree.

November 2011: Brazilian peppertree infestation after treatment.

January 2008: Dense infestation of Brazilian peppertree.

November 2011: Brazilian peppertree infestation after treatment.