



Ecological Restoration; Natural Areas Inventory, Planning & Management

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MIKE'S ISLAND

**155-Acre Community-based Restoration Project
Hancock County, Mississippi**

Herbicide Treatment Report Chinese tallowtree (*Sapium sebiferum*)

Prepared for:

**The Nature Conservancy
Ocean Springs Field Office
1709 Government Street
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1.0 Introduction

Mike's Island is located in southwestern Mississippi approximately 26 km (16 miles) inland from the Gulf of Mexico. It occupies an area of western Hancock County along the eastern banks of the Pearl River in Township 7 South, Ranges 16 and 17 West and Township 8 South, Ranges 16 and 17 West. It covers about 1,123 ha (2,775 acres) immediately north of the confluence of Mike's River with the Pearl River. Mike's River forms a portion of the southeastern boundary of the project site and over eight km (five miles) of the Pearl River delineates the western boundary. The landscape is comprised of bottomland hardwood forests, cypress swamps, oxbow lakes and mesic uplands. Some abandoned sand and gravel mine pits located in the northeastern portion of the site are now open-water aquatic habitats. The nearest sizeable municipality is Picayune, which lies 16 km (10 miles) north of the project site along State Highway 11. Appendix A Figure 1 shows the general location of Mike's Island.

The property is owned by The Nature Conservancy of Mississippi (6400 Lakeover Road, Suite C, Jackson, Mississippi 39213), a non-governmental, non-profit organization. The Nature Conservancy (TNC) purchased it from the Canal Land and Development Company in July 2003. TNC's field office in Ocean Springs (1709 Government Street, Ocean Springs, Mississippi 39564, tel. 228-872-8452) is responsible for property management. The site was acquired as part of TNC's commitment to preserve biodiversity on earth by preserving land, water and natural communities. It will be a cornerstone project in continuing efforts to develop a conservation corridor along the Pearl River that links with the Hancock County Marshes, a Gulf Ecological Management Site (GEMS).

Forests that cover the project site have suffered extensive ecological damage. Timber removal along with the sand and gravel mining operations have extremely degraded or destroyed the bottomland hardwood forests and swamps that existed historically on this tract. Chronic anthropogenic disturbances have altered the hydrology of the area through mining, ditching, draining, and heavy equipment movements. Access roads constructed for logging and hunting have interrupted surface runoff and further interfered with the natural hydrology of the project site.

Destruction of the characteristic bottomland hardwood and swamp vegetation on Mike's Island has led to an invasion of Chinese tallowtree (*Sapium sebiferum*). This exotic tree species is highly invasive and considered a severe threat because of its ability to completely alter floral and faunal communities. This extremely aggressive exotic tree has managed to establish itself widely across the site. It has displaced a significant portion of the remnant native vegetation, in some cases forming extensive, dense monocultures.

A portion of the property totaling 62.73 ha (155 acres) was delineated in February 2004 to serve as a community-based restoration project. Appendix A Figure 2 is an infrared aerial photograph taken in July 2002 that shows the project area within the boundaries of the entire Mike's Island property. Funding for this project comes from a grant acquired through the National Oceanic and Atmospheric Administration (NOAA) along with in-kind match funding from TNC. The designated area was identified as a priority for restoration as it had been clear-cut recently and tallowtrees are rapidly colonizing the site. The restoration plan outlined for Mike's Island (AF Clewell, Inc. 2004) prescribes the eradication of these exotic

trees and their replacement with seedlings of indigenous bottomland hardwood trees. This report documents the first phase of the restoration process for this 155-acre parcel which is herbicidal treatment of the tallowtrees.

2.0 Herbicide Treatment

A chemical herbicide treatment of Chinese tallowtree was conducted at the 155-acre project site in October and November 2004. Application was conducted by a licensed chemical applicator certified with the Mississippi Bureau of Plant Industry in Forest and Right-of-Way weed control. The objective of this biotic intervention was to severely reduce or ideally eliminate tallowtree populations in the designated project area. Impacts to adjacent desirable native vegetation was minimized and the ecological integrity of the surrounding indigenous communities maintained.

Target areas were physically demarcated in the field with survey flagging and delineated on an infrared aerial map. The entire 155-acre project site was inspected for the target species. Herbicide application was accomplished using either the cut stump method or 'hack and squirt'. Stems of all Chinese tallowtrees within the project area were cut using a chainsaw or other cutting tool. The wound was cleaned and free of all sawdust before application to minimize deactivation of the herbicide. Stumps and/or cuts were treated as quickly as possible, ideally within 60 seconds of cutting. For stumps over 3 inches in diameter, the outer edge was completely wetted with the herbicide. For smaller stumps and all cut stems in a clump, the entire tops were completely wetted. The chemical triclopyr, as Garlon 3A®, was utilized in a 33% dilution with approximately 0.4% of a compatible spreader/adjuvant. A blue dye marker was added to aid in identifying treated areas.

3.0 Results

In May 2004, an inventory of the project site was conducted to quantify the existing vegetation before any restoration activities were undertaken. Two five-meter wide belt transects totaling 300 meters in length were established in the operations area (Appendix A Figure 2). A measuring tape was extended the length of each transect on one side of the 5-meter wide belt. Trees and shrubs rooted within the belt transect were tallied in 20 meter contiguous quadrats. Trees greater than 10 cm diameter at breast height (dbh) were considered to contribute to the canopy stratum. Trees or woody shrubs measuring 2.5-10 cm dbh comprised the sub-canopy or shrub stratum. Stems per acre and their relative frequency were calculated for each species in these two categories. The remaining vascular plants, coarse woody debris, leaf litter, bare soil and water were counted as groundcover. Relative percent cover for each component in this category was estimated using the point intercept method at 1-meter intervals along the same tape. Photostation points were established at 50 meter intervals along each transect to visually document the area.

Summary results of this initial baseline inventory are presented in Appendix B Table 1. *Sapium sebiferum* dominated the canopy stratum at 46.7% relative frequency represented by a total of 14 trees greater than 10cm dbh. *S. sebiferum* also dominated the sub-canopy at 16.5% relative frequency represented by a total of 122 stems.

In January 2005, following herbicidal treatments in the project area, the same transects were inventoried again to document the occurrence of any live stems of *S. sebiferum*. No other vegetation was inventoried. All tallowtree stems along both transects showed evidence of treatment. Almost all stems along both transects were unquestionably dead with the exception of two canopy-size and three shrub-size tallowtrees on Transect 2. These showed signs of continued chlorophyllous activity in the cambium layer, but they appeared extremely stressed by the herbicide. Although they are expected to succumb to treatment, they were considered alive for purposes of this report. Photographs taken in the project area following treatment are available in Appendix C.

Data collected on remaining live tallowtrees were used to replace those gathered in the baseline inventory. A revised summary table was produced and is shown in Appendix B Table 2. Following herbicidal treatment, *S. sebiferum* now occurs at 11.1% relative frequency in the canopy stratum. A reduction from 14 stems to 2 stems in this stratum represents a mortality rate of 85.7%. In the sub-canopy, *S. sebiferum* now occurs at 0.5% relative frequency. A reduction from 122 stems to 3 stems in this stratum represents a mortality rate of 97.5%. A total reduction of 96.3% was realized in both the canopy and sub-canopy, from 136 total stems to 5 total stems.

A complete inventory of transects will be conducted this spring following tree planting activities this winter.

REFERENCES

AF Clewell, Inc., 2004. *Mike's Island Community-based Restoration Plan*. The Nature Conservancy, Ocean Springs, MS.