



East End Cemetery
Community Forest Management Plan
2019

Prepared By

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Capital Work Area

Virginia Department of Forestry

530 E. Main Street Richmond, VA 23219

East End Cemetery Urban Forest Objectives:

- Preservation of cultural & historical resources
- Control of invasive species
- Create a safe, inviting place for visitors to enjoy
- Maintain the health of the forest

The overall objective of this plan is to help build and maintain a healthy urban forest canopy that can be enjoyed for generations while honoring the cultural and historical nature of the property. Urban trees provide a long range of environmental benefits from stormwater mitigation to improved air quality. By constructing a plan to rid the area of the invasive species we are allowing the trees to highlight their social and cultural benefits as well.

Trees can improve health, reduce stress, reduce crime, improve social cohesiveness, and reduce the effects of ADHD. For more information about the benefits of urban trees, visit <http://www.naturewithin.info/>, <http://www.treesaregood.com/> and <http://lhhl.illinois.edu/>.

Community Forest Management Plan

This plan has been constructed with the hope of mitigating current and future issues facing trees in the East End Cemetery. Tree health, invasive species mitigation, public safety concerns, and the preservation of historical/cultural resources are the specific factors driving this plan's creation. The approach to developing the plan was to deliver on a "Level 2" Tree Risk Assessment as defined by the ANSI A300 Part 9-2011 standard. This standard is defined more specifically by the 93.4.2.2.1 which states that "*assessments shall include a 360-degree, ground-based visual inspection of the tree crown, trunk, trunk flare, above-ground roots, and site conditions around the tree in relation to targets*".

The need for a community tree management plan was indicated through the property owner of East End Cemetery. Historically, the cemetery was not a forested area and contained some native species with a mixture of ornamental species of trees/shrubs that spoke to the culture of those resting there. *Yucca filamentosa* can be found near various gravesites on the property. It was often tradition in southern folk cemeteries to plant live plants around grave sites.

Due to lack of management and the presence of succession, the cemetery grounds reverted back into a native forested area over the decades. The dominant native canopy cover is made up of a mixture Gum, Oak, Pine, and Hickory species. In conjunction, the dominant invasive species is English Ivy *Hedera helix* which can be found throughout the landscape. Invasive species negatively alter forestland composition and ecosystem processes on the landscape. Invasive plant control can be addressed via four different categories – mechanical, chemical, biological, and cultural techniques. This plan illustrates options to combat the invasive species and to re-establish this area to a beautiful resting space.

Data Collection

A team of foresters from the Virginia Department of Forestry collected data over the entire cemetery. The foresters collected 3 to 4 waypoints per grid area to produce an accurate representation of the entire forest canopy. Each waypoint contains information regarding the dominant tree species present, invasive species present, stand quality, and percent coverage of invasives. Collection was done using ArcGIS software and the ArcGIS ‘Collector’ application.

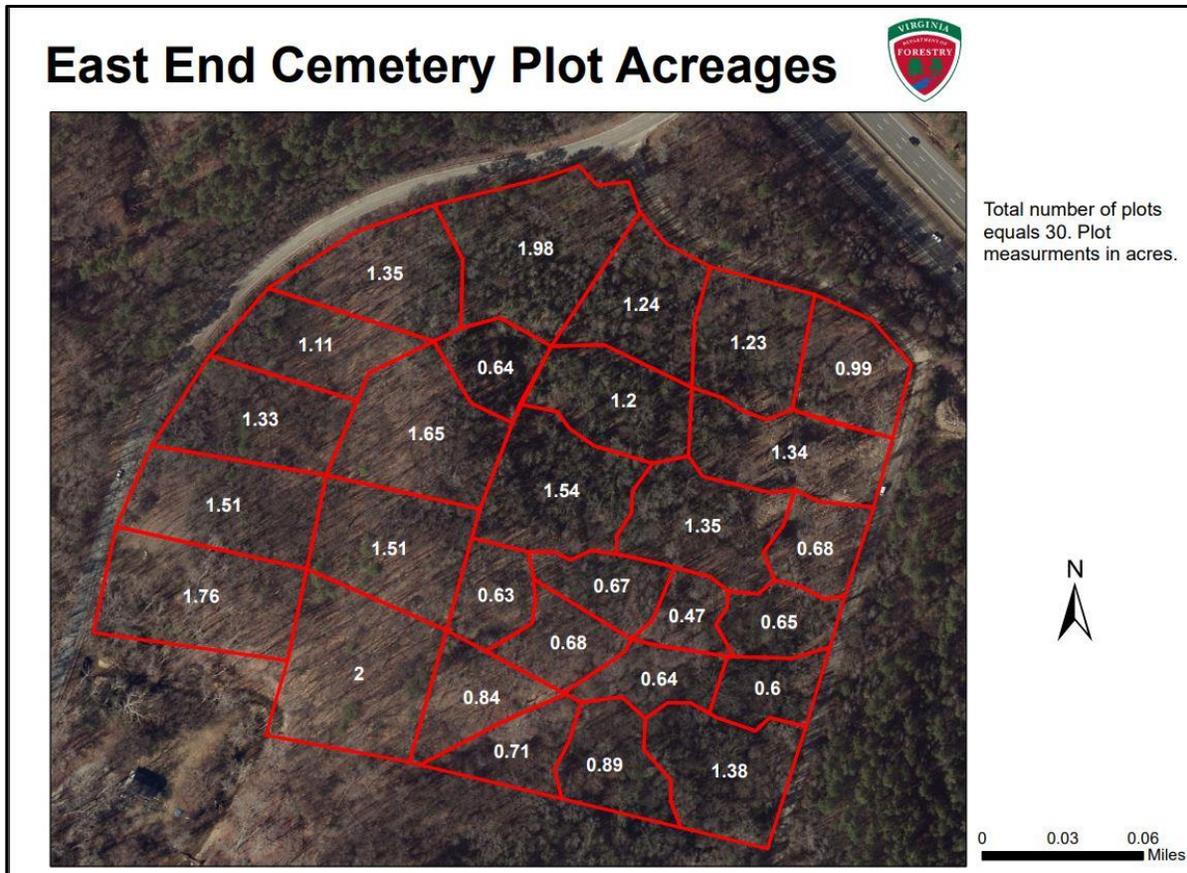


Figure 1. Overlay of plot work areas with acreages included

Forest Composition & Ground Cover

Although these maps and data findings largely identify invasive plants, there are beneficial/native plants that also reside throughout the plot areas. These plants are just as important to understand and identify because they will factor in to the management options of the property. As mentioned before, the canopy consists of mostly Oak, Gum, Pine and Hickory species. This is a standard mix of tree species for forests residing within the state of Virginia. Because many of these trees are deciduous, and only lose their leaves in the winter, shade is abundant throughout the area. That being said, ground cover that is currently present (that is not necessarily invasive) consists of shade tolerant species, such as vincas, mosses and lichens.

General Recommendations & Historical Trees

There were a total of twenty-four trees that were identified as ‘Historical trees.’ The species included Beech, Oak, Pine, Gum, Poplar and Chestnut. All of the historical trees were larger than many of the other trees on the property. Due to their height and circumference (Diameter Breast Height – DBH) measurements, it is believed that these trees were already established before succession took over the cemetery. Only one tree, Post Oak *Quercus stellata*, was indicated as being in ‘poor’ condition by the foresters due to the fact that it is visibly declining. Unlike the historical trees of Evergreen cemetery, none of these trees were threatened by climbing vines. The foresters indicated which trees would benefit from corrective pruning and cleaning.

- Focus on removing invasives manually from these all trees (historical included) if saving these are of interest
- Address areas that have already been cleared by volunteers; Bare soil needs to be covered and monitored to prevent return of invasives
- Establish access to additional work areas for volunteers
- Most of the areas have at least one of the three top invasive species present (English Ivy *Hedera helix L.*, Tree of Heaven *Ailanthus altissima*, and Mimosa Tree (*Albizia julibrissin*). Focus on eradication and treatment options for these invasives before moving on to lesser prominent invasives.

Many of these treatments will need to be repeated in order to gain control of invasives. Continuously monitor treatment areas and treat at first sign of invasive return

Management Recommendations -

1. Access

Establishing walking paths and access areas throughout the cemetery is essential to continue the forest management process. There are some pathways that are more visible than the neighboring Evergreen Cemetery, but there is still a large amount of potential access. There is a steep gully through one area of the property that drains out to the nearby waterway of Stony Run. This area in particular contained a number of large, specimen trees and had only a small amount of invasive English Ivy *Hedera helix L.* Aerial imagery (Figure 2) from the mid-1900s shows how the cemetery was originally laid out prior to succession taking over.



Figure 2. Aerial Imagery of Evergreen & East End Cemeteries- 1953 – Courtesy of VCU

2. Invasive Species Management

The three most common invasive species found on the property are English Ivy *Hedera helix L*, Tree of Heaven *Ailanthus altissima*, and Mimosa Tree (*Albizia julibrissin*). By using an Integrated Forest Vegetation Management approach (IVM) a combination of mitigation strategies can be used to rid this property of unwanted flora. IVM combines silvicultural, mechanical, biological, and chemical approaches to achieve this overall goal. **Please keep in mind that with any herbicidal use recommendation, the label is the law.** Make sure any applicators read and follow the label, mind safety warnings, and pay attention to site/rate warnings.

The following map shows the dominant invasive species present in each work area. Focusing on the dominant species will give East End volunteers a direction to begin managing each area.

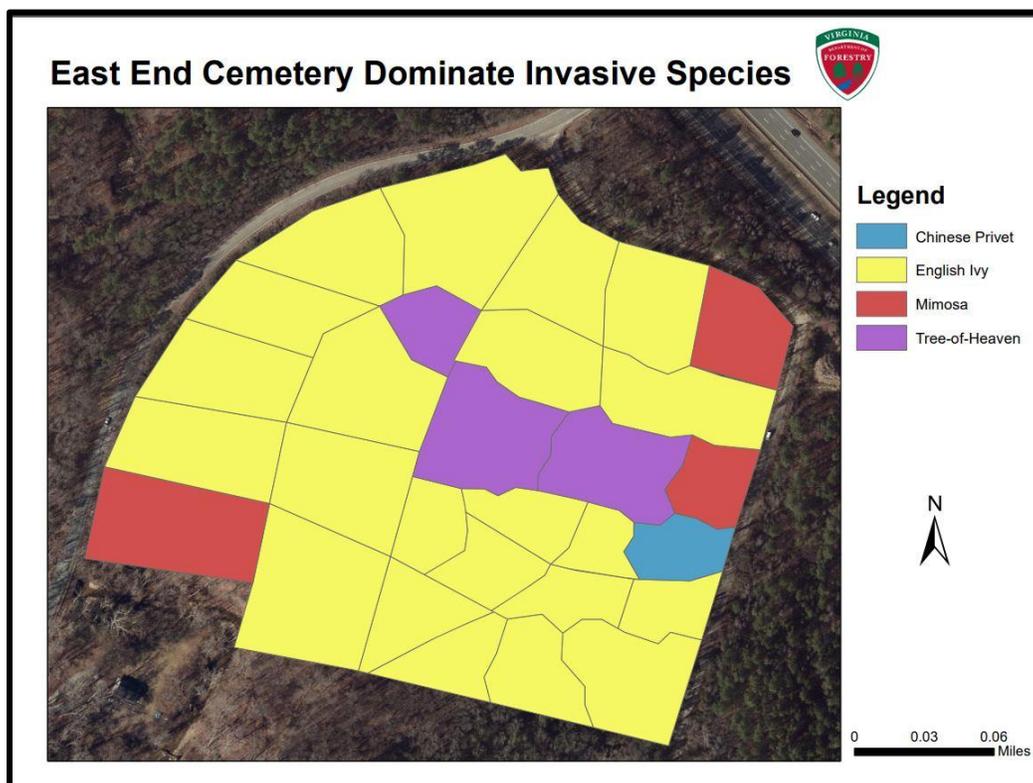


Figure 3: Dominant Invasive Species Map. A full page map is available on the next page.

English Ivy –

English Ivy *Hedera helix L.* touches almost all areas of the East End property. Because this is a climbing vine, English Ivy tends to climb up and around tree trunks to gain access to sunlight. Eventually the ivy will suffocate the tree and leave it susceptible to wind throw.

Prioritize volunteer work to remove vines from trees. Use garden clippers to cut the ivy at the bottom around the entire trunk of the tree. **Any ivy above the cut will die off on its own**; leave vines above the cut alone because pulling could harm the tree. Be sure to pull vines out of the ground surrounding the base of the tree. Removing all ivy from the soil in a 2 foot ring will prevent the ivy from re-establishing itself on the tree. Cover the 2 foot space surrounding the tree with 2 inches of arborist wood chips to preserve moisture in the soil and to discourage future ivy establishment. When cutting the ivy, be sure that tree is **NOT** damaged/cut during this process. Continuous, deep cuts around the tree may result in girdling of the tree which would inhibit the uptake of water/nutrients.



Figure 4. Courtesy of Arlington Tree Stewards- Ivy Removal

English Ivy has shallow roots which makes it easy to be pulled from the soil. Large areas or mats of ivy may need to be removed via shovel to ensure root removal. Large areas of ivy that are not intertwined with historically significant areas can be mowed down with a lawn mower or weed eater.

Invasive Species	Type of Treatment	Equipment Needed	Time of Year	Notes
English Ivy <i>Pueraria montana</i>	Mechanical (Hand Cutting & Pulling)	Hand Pruners, Loppers, Shovel, and/or Mower, PPE (Personal Protective Equipment i.e. gloves, glasses, etc)	Winter is most common but can be done anytime	Focus on removing any ivy on trees before focusing on ground populations

Table 1. English Ivy Removal Options (IVM)

Tree of Heaven –

Tree of Heaven *Ailanthus altissima* is not as prevalent throughout the property as English Ivy, but is very aggressive invasive specie that spreads rapidly. Established trees send up root suckers that can emerge as far as 50 feet from the parent tree. The leaves, shoots, roots, and bark are allelopathic which means they produce chemicals that can prevent or limit the establishment of other plants. Unfortunately, removing this tree is not as simple as cutting it down. Once the trunk is cut, the tree responds by sending up numerous new stump sprouts to establish even more specimens. Mechanical methods are not as effective because these trees are so heavily rooted.

When removing this invasive, the applicator must follow and read the label on the herbicide completely. It is a heavy pollen producer and has been known to irritate skin on contact. Treating these areas with an herbicide is the most effective way to manage its numbers. Because East End is a sensitive area and has great historical value, only individual stems should be treated either by a basal bark method or frill herbicide applications (hack and squirt). The timing is particularly important when treating this pest to ensure maximum control of the root system.

Invasive Species	Type of Treatment	Equipment Needed	Time of Year	Notes
Tree of Heaven <i>Ailanthus altissima</i>	Chemical (Herbicide) – Basal Bark Treatment	PPE, Backpack Sprayer, Concentrated herbicide containing active ingredient triclopyr	July through October	Apply w’ backpack sprayer from ground to 12 – 18” up trunk completely around the stem
	Chemical (Herbicide) – Frill Application or Hack & Squirt	PPE, Backpack Sprayer, Machete or Ax, Concentrated herbicide containing active ingredient glyphosate or triclopyr	July through October	Make cuts in stem every inch per diameter of the tree (min of two); Spray herbicide into cuts **Make sure not to girdle the tree which would inhibit the flow of herbicide through the tree **

Table 2. Tree of Heaven Removal Options (IVM)

Mimosa Tree –

Mimosa Tree is a landscape tree from Asia that has escaped cultivation and moved into natural areas. Areas in East End that contain Mimosa Tree are near the waterway of Stoney Run and along the entrance road. Young plants can be managed through mechanical techniques such as hand pulling, weed wrenching, mowing, or cutting. The plant tends to re-sprout, so to be observant of new growth. The new growth will need to be removed again by hand or an herbicide can be applied to the trunk.

Invasive Species	Type of Treatment	Equipment Needed	Time of Year	Notes
Mimosa Tree <i>(Albizia julibrissin)</i>	Mechanical (Hand Cutting & Pulling)	Hand Pruners, Loppers, Mower, and/or Shovel, PPE <i>Optional – Weed Wrench</i>	Anytime – usually easiest when soil is moist	Following mechanical treatments, mimosa sprouts from stumps.
	Chemical (Herbicide) – Frill Application or Hack & Squirt	PPE, Backpack Sprayer, Machete or Ax, Concentrated herbicide containing active ingredient glyphosate or triclopyr	July through October	Make cuts in stem every inch per diameter of the tree (min of two); Spray herbicide into cuts **Make sure not to girdle the tree which would inhibit the flow of herbicide through the tree **

Table 3. Mimosa Tree Removal Options (IVM)

3. Ground Cover Options

Successful eradication of these invasive species will not stop with the first pesticide treatment or volunteer work day. It is likely that the top soil (seedbed) is inundated with seeds from these plants. Newly exposed bare soil should be covered. An inexpensive option would be to cover the ground with a thick layer of mulch to keep any sunlight from reaching the fragile seedbed. Another option would be to introduce a combination of native ground cover species with a high rate of spread that would establish quickly and reduce the likelihood of invasives/weeds returning to the site.

If composting is an option, unwanted vegetative debris (native or invasive) could be composted into usable mulch. Make sure that the compost cures for at least one growing season before use to allow organisms and enzymes to break down any invasive material.

When selecting ground cover options, be sure to lean on native species. Native species grow well in Virginia's Plant Hardiness Zones (5-7) as well as will provide the most benefits in terms of wildlife support and pollinator habitat. If new tree seedlings are needed for the area, the Virginia Department of Forestry grows and sells both pine and hardwood species through their state nurseries. Larger trees could also be obtained from various nurseries around the Richmond area.

Additional Resources –

Please contact the Virginia Department of Forestry with any questions or suggestions in regards to this plan. A forester should be called at a minimum of every 3 years to update this plan and visit the site. Below are additional informational resources that may be helpful when enacting this plan.

English Ivy - <https://www.srs.fs.usda.gov/factsheet/127>

Tree of Heaven - <https://www.srs.fs.usda.gov/factsheet/120>

Mimosa Tree - <https://extension.tennessee.edu/publications/Documents/W232.pdf>

Virginia Department of Forestry - <http://www.dof.virginia.gov/>