

# Genius Reserve



## Guide to the Native Plant Nursery

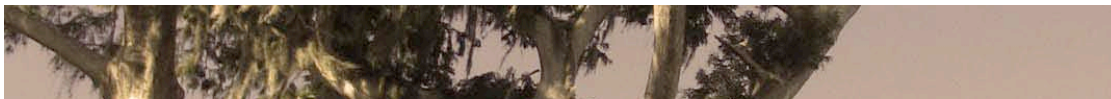
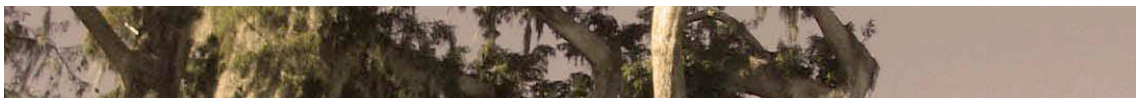
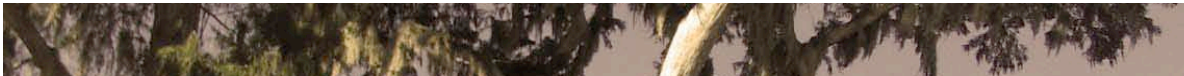
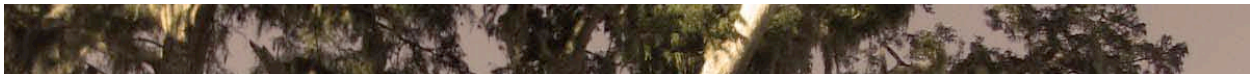
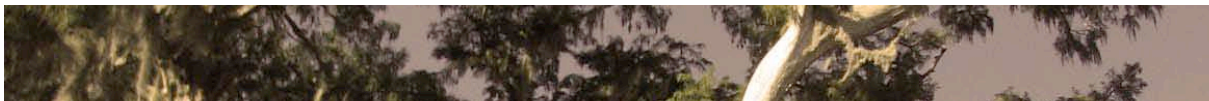
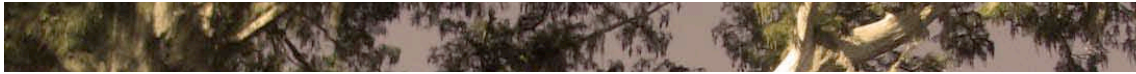
Laura Boyd  
Lauren Othon

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## a) Statement of Purpose



The Genius Reserve in Winter Park, Florida is a unique tract of natural land nestled between lakes Berry, Mizell and Virginia—a peaceful piece of “Old Florida” where the landscape and atmosphere have remained practically unscathed by the movement of progress and development that has left so much of Central Florida unrecognizable to its long-term inhabitants.

As the location of the historic Wind Song and Ward houses, both previously inhabited by founders of the City of Winter Park, and as the site of the former Dinky Rail Line, the reserve holds enormous historical significance for the region. The property can also be considered an area of vast ecological importance for its use as an ecological stepping stone for predatory birds, its function as habitat for certain native wildlife, its role in pollutant filtration for the surrounding lakes and communities, and its use as a living laboratory for local students and research groups.

Due to prolonged periods of near abandonment during which the property received little to no management, most of the natural vegetative communities were subject to rampant invasion by exotic pest species such as air potato, earpod trees, Mexican flame vine and many others. These invasive species are highly competitive and usually very successful in the struggle for nutrients and water. After the hurricanes of 2004, the reserve was in a state of distress. Many older native trees had been uprooted or turned over and the natural communities found on the property were unhealthy and in many ways indiscernible.

While this ecological disarray could have been considered an impediment, it instead offered a perfect opportunity to begin an ecological restoration effort from the ground up. Though the hurricanes had indeed destroyed a large portion of the native plant life, they also created a scenario that facilitated the removal of invasive species. With many large trees gone, the process of clearing and eliminating pest plants became easier and a complete overhaul of the property began.

The project that ensued involved removing the exotic species that had conquered the reserve and replacing them with native trees, shrubs and herbaceous plants, in an effort to restore the native communities that had once been prevalent. The efforts have not been in vain. The property can now boast of its mesic hardwood community, its cedar grove bordering a healthy lakeshore community, its numerous live oaks and its towering cypress. While exotic species continue to be a threat, their perceived existence is nowhere near as great as it once was.

Restoring and maintaining the historic attributes of the property have also been part of the effort. The citrus groves and processing facility have been left intact, as well as the historic homes and horse stable. Due to the former inhabitants known love for peacocks, there are a number of peacocks and peahens on the property.

As part of the ongoing ecological restoration project, the old aviary was transformed into a native plant nursery. The role of the nursery is to provide a location in which to plant, grow, observe and maintain native plants that will eventually be transplanted throughout the property. Containing an inventory ranging from coontie, to native orchids, to pignut hickory, the nursery acts not only as a breeding ground for viable plants, but also as an outdoor interactive classroom for students of Environmental Studies at Rollins College.

While the indoor classroom experience can do a great deal in informing students about the importance of ecological restoration, most of the focus lies in policy, design and decision-making. These concentrations are invaluable to the process of instructing students in the field of ecological restoration, however, a complete education is impossible without “hands on” experience in the implementation of these policies, designs and decisions.

This is where guided independent research and labor on the Genius Reserve becomes invaluable. The nursery delivers a perfect location for students to learn about and understand the immense amount of work and attention that young plants require. It provides a laboratory for experimentation and a living photo book of native and non-native species so that a student can hone her plant identification skills. It acts as a place of respite where a student can escape the constant movement and noise of the campus and surrounding establishments. Most importantly, it offers the gift of experience.

In this respect it should be noted that its educational value should not be limited to Environmental students. The nursery experience can be greatly beneficial to students of Botany, Biology and other specialized sciences that stress the importance of understanding plants and plant systems.

As students and nature enthusiasts, we, the authors, felt privileged and accomplished in our time on the Genius Reserve. No other location in Winter Park could offer the sights, sounds and experiences we encountered on a weekly, sometimes daily basis. The amusing behavior and calls of peacocks at 12:15 pm; the brilliant sheen of pignut hickory leaves in the afternoon, so verdant they called to mind the complexity of the natural world; the rare and precious sighting of a fox; and the quiet hum in the Cedar grove—all of these memories will remain in our psyches for years to come. It has been an education well sought and well received.

In spending a few semesters being “educated” by the nursery, several matters of importance became apparent. While the nature of our work on the property was deemed “independent,” we recognized the need for assistance with various tasks and processes such as plant propagation, plant identification and plant maintenance. We also agreed that a carefully implemented management plan for the nursery would not only benefit the nursery, but also assist any students who worked on the property in the future.

The result of these findings is this report. In it, we will discuss a maintenance and organization strategy for keeping the nursery and its inhabitants in a healthy state. We will describe the various methods of plant propagation and the process of maintaining plants. And though the level of personal danger in the nursery or on the reserve is minute, we will discuss various safety precautions, for their relevance to working in the field is strong.



## b) Nursery Maintenance and Organization

### Materials and Tools

Working in the nursery involves familiarizing oneself with the materials and tools used on a daily basis. Shovels, rakes and a broom are provided, as well as a wheelbarrow, a collection of different sized pots, spray bottles, buckets, pruning shears, scissors, trowels and gloves. Proper use of these tools is essential to successful work in the nursery and throughout the property.

### Weed and Pest Control

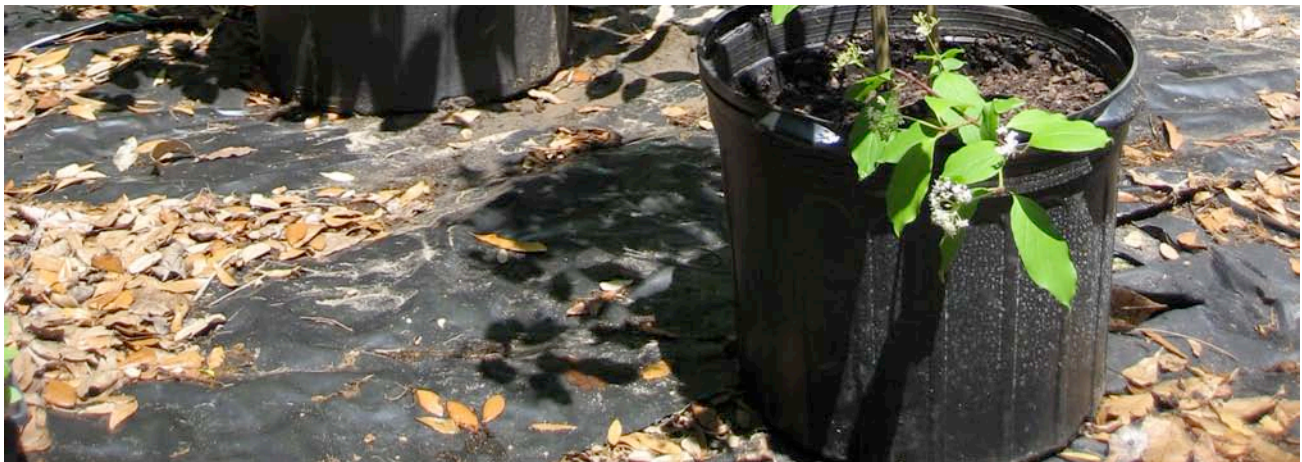
A large part of maintaining order in the nursery involves consistent upkeep of the weed mats, proper distribution of mulch and ground cover, removal of invasive weeds and the occasional use of pesticides on the nursery perimeter. Neglecting these routine tasks can make mountains out of small mounds, harming not only the

health of the plants, but also the state of the facility and its equipment. Inversely, keeping up with these tasks on a weekly basis, less in the case of pesticides, will insure a healthy, functional nursery, and lower the amount of work necessary to keep the nursery in shape.

### Maintaining Nursery Mats

All of the plants in the nursery are set upon large black weed control mats that serve various functions. First, they inhibit weed growth, which keeps both the workspace and the potted plants free from competition and invasion. The importance of keeping the potted plants “weed free” cannot be stressed enough, as weeds will compete for nutrients and water and will in most cases win. As most of the plants in the nursery are quite young and in many ways weaker than opportunistic weeds, it is imperative to keep the weeds out in order to protect them. This will make the plants less vulnerable to other negative influences and encourage their growth

The mats in the nursery also contribute to the general sense of order and arrangement that should be expected in a functional nursery. Nurseries are unique in that they offer a safe, organized living space for a variety of plants. As the plants are kept and grown in a controlled setting, their success and survival can be expected. However, if the controlled environment is disrupted or left without proper maintenance, the health of the plants can be compromised.



Leaf accumulation on mat.

Maintaining the mats involves three basic steps. They must be swept once a week, for allowing dead leaves and dirt to accumulate on the mats will encourage insect inhabitation and slowly contribute to the deterioration of the mat fibers. Leaves and dirt can be removed with a broom or with a large plastic rake that will not pull or

tear the mats. The key to clearing the mats easily is keeping the plants organized in tight rows with ample walking space in between. This will not only guarantee easier sweeping, but will also keep leaves and other debris from accumulating between pots, which can be problematic.



Invasive weed.



Rebellious weed growing through weathered mat.

Once the mats have been swept, removing invasive weeds that have grown through the mats is simple. They should be pulled using gloves, for some weeds bring painful surprises, and placed in a bucket for later disposal.

Some mats are more weathered than others, and should be replaced periodically. No weed mat full of holes and tears should remain under the plants for an extended amount of time. Replacing them requires semi-strenuous physical activity, but it must be done. The easiest manner in which to replace mats involves the cooperation of two people. By removing all of the plants that rest upon a tattered mat, pulling out the old one and laying a new mat down is easy work. Once the old mat has been



removed, two people can roll out a new one and one individual can maintain the necessary tension while the other inserts garden stakes to secure the mats.

## Ground Cover

The exterior perimeter of the nursery is covered in pine straw, a natural form of ground cover that inhibits weed growth and discourages insect infestation. Pine straw is delivered in bales bound with twine and should be distributed immediately before periods of heavy plant growth, i.e., before the spring growing season and during the summer growing season. Careful measures should be considered when working with pine straw bales, for while many insects dislike the medium, fire ants have an odd propensity for inhabiting the bales. The recommended method for handling bales is to wear gloves, a long-sleeved shirt and pants. Spraying the bales with a forceful shot of water is a good way to check for ants.

All dead leaves that are not on the weed mats may be left on the ground for weed inhibition. Furthermore, all leaves removed from the mats can be distributed on the ground in the nursery. This benefits the soil by adding nutrients and discourages weed growth by blocking sunlight.

## Invasive and Exotic Species

The removal of invasive species in and around the nursery perimeter is an important part of maintenance that will benefit the overall health of those species being grown inside the nursery. A list of some of Florida's most common invasive and exotic species, such as the camphor tree and air potato vine, can be found online at the Florida Exotic Pest Plant Council (FLEPPC) and Institute of Food and Agricultural Sciences (IFAS) websites. Not keeping these invasive species at bay will lead to an increase in their growth and aid in their dispersal to other areas in the reserve, displacing native species of plants in the process.



Camphor tree found growing in the nursery.

There are two methods in which to accomplish this task: pesticides can be used on areas that are intensely overrun with invasive species, (it is important to follow directions on labels), or weeding by hand can be done. The latter will take more time but will lessen the amount of chemicals being introduced to the area.

Do not spray pesticides on the plants growing in the nursery itself; these containers should be weeded by hand, taking care not to disturb the plants that are already growing there. The weeds can then be properly disposed of with any other accumulated waste. Therefore, setting aside a small amount of time to inspect the area for invasive species each week is highly recommended.

## Recycling

The methods of recycling and reusing implemented in the nursery are easy to carry out and compliment the functions of the nursery. They involve very little labor and yield useful materials.

## Compost Bins

There are two compost bins in the nursery that serve as a receptacle for pulled weeds and dead plants. All weeds pulled from the mats, plants and ground in the nursery should be disposed of in the compost bins for two reasons: one, isolating them in a dark nutrient-deficient environment will insure that they do not self-propagate or reproduce; and two, they will eventually become valuable nutrients that can be utilized throughout the nursery and property.



Compost Bins

The only maintenance required by the compost is to be rotated from time to time. Generally, the plant matter at the bottom of the bin has gone through more graduated stages of decomposition, subsequently producing more heat through energy transfers that occur during decomposition. By turning the compost, this hot layer of plant matter will be brought to the top, which will assist in the decomposition of the cooler layers the.

## Soil Recycling

Unfortunately not every plant in the nursery makes it. Various conditions and circumstances can lead to the illness or death of a plant. This must be accepted as a factor in working with plants, especially in a controlled environment. The death of a plant does not have to be a complete loss. Several things can be salvaged from a dead plant and its pot.

The soil in a pot should never be wasted. Dirt is a valuable component of the work in the nursery, and dirt that has housed a plant is likely to have more nutrients in it than other soil. Two large soil receptacles are located next to the worktable by the compost bins. All soil from unused pots should be dumped into these buckets for

later use. The dead plants can be disposed of in the compost bins, where they will be recycled into nutrients for use by other plants.

## Cleanliness

It may seem like a contradiction of terms to require a “clean” nursery. How can a workspace full of dirt, insects and plants possible be kept clean? Cleanliness, in terms of nursery cleanliness, does not mean spotless and dust free. Rather it implies organization, proper disposal of garbage, proper storage of materials and common sense. Nobody wants to work in a cluttered space.

Like any other maintenance tasks, keeping the nursery clean and tidy is much easier if it is done regularly. The work shed should be organized, keeping most materials and tools inside the closet or on the lower shelf space, so that the table can be used as a work surface for plant propagation, note-taking, and mixing plant food. The most effective way to clear the shed table of debris is to remove everything from the table surface and shelf and hose the entire thing down. This will not only remove dirt, but may also remove any spiders or insects, that may choose to pay backpacks or bags a visit.

The large worktable can be cleaned in the same fashion. Since this table is often used for plant propagation, transplanting and repotting, it is usually dirty. Simply hosing it off once a day will keep it free of debris and ready for work.

## Tracking Work

Keeping a calendar on the shed in the nursery is a fantastic way to track activity, work and plant growth. Taking notes is effective, but a calendar can be used to monitor experiments, the success of seed planting and the progress of plant propagation. All tasks and activities involving plants should be annotated in a calendar and observed over time.

## c) Plant Propagation



Air Layering

One of the main goals of the nursery is to grow native plants that will be used to restore the property to a more natural state. A variety of methods can be used to grow plants: propagation from seed, taking cuttings of mature established plants, root division, locating volunteer species on the property, and a technique commonly referred to as “air layering.” The method chosen will largely depend on the characteristics of the plant species to be grown and may require some research.

### Seeds

The best time to collect seeds is from spring to fall. Seeds can be stored in containers and should be labeled with the date they were collected on as well as the species. Research will need to be done to determine the specifications each species will need in terms of light, water, and soil requirements.



Coontie



Seeds of coontie

Placing the trays of prepared seeds under a seed starter will help to retain moisture within the soil while allowing access to sunlight at the same time. Seed propagation may take a considerably longer amount of time compared to other methods, and this should be taken into consideration.

### Cuttings

Taking cuttings from mature plants takes less time in comparison to collecting seeds, however it is only successful with certain herbs and shrubs. Cuttings should be taken from the branch tips of well-established mature plants with sharp scissors and should vary only a few inches in length. The first few sets of leaves from the bottom of the cutting should be trimmed off and the remaining portion of stem will be covered in a layer of root hormone that will help to stimulate new growth.



Root hormone on the bottom of a cutting.



Cutting ready to be planted in moist soil.

Cuttings are then ready to be planted, one cutting per pot, taking care to gently pack in moist soil around the edges. Placing the finished trays near the sprinkler system to ensure sufficient soil moisture, they may also need to be shifted from different locations within the nursery depending on the shade/light requirements of the species.



A completed tray of wild coffee cuttings.

## Air Layering

Air layering is a technique often used on woody species such as swamp dogwood, live oak and other trees. Two people can make the job easier, and the following materials will be required: root hormone, plastic wrap, aluminum foil, rubber gloves, sphagnum moss, water and scissors. An ideal specimen for this process will be a well-established healthy sapling whose branches are within arm's reach. Scissors (or any sharp instrument) are used to make two incisions approximately five inches apart on a section of the inner branch, stripping away the outer layer of bark and exposing the underlying green layer of cambium. Root hormone is then evenly applied, making sure to cover all the exposed cambium.



Outer layer of bark is stripped away.

Wearing rubber gloves to prevent fungal disease, a thick layer of moist sphagnum moss (this should be broken apart and well kneaded with water in a bucket beforehand) is then packed around the cambium. While holding this in place, another person should wrap a sufficient amount of plastic taught around the entire area to retain moisture, tapering both ends, and then cover the plastic with a layer of aluminum foil to keep sunlight from evaporating the moisture.





Root Hormone applied to cambium. Plastic wrapped around sphagnum moss.



Finished product.

The end result will be an encapsulated pod in which the new root system will become established and grow, hopefully ready to cut and plant in about one month's time. This can be opened and checked after a few weeks to make sure there was no loss of moisture. If it is found to be dried out, a misting of water can be applied, making sure to rewrap everything tightly when finished.



Approximately one month later.

A new tree is ready to be planted.

## Volunteer Species

Often, various native species that were not specifically planted can be found growing throughout the property; these are commonly referred to as “volunteer” plants and can be the result of animal or wind dispersal from neighboring areas.

If they are not too large, they can be dug up and replanted in the nursery to increase their chances of survival and lessen the effects of overcrowding and competition for resources with surrounding species. Colored flags can be used to mark their locations and signal to others that this is a species of interest.



Volunteer bromeliads wired to tree inside nursery

## Root Division

Other species are best propagated by dividing the rhizome, which is an underground stem; ginger and banana are good examples of these. Similarly, grasses can also be divided into clumps and planted.

## d) Species Identification and Inventory

An inventory of the plants in the nursery should be conducted at the beginning and end of every semester/season. Plants should be grouped together by species and labeled appropriately with their common and scientific names. Documenting the amount of each species present will help to determine which species are more successful than others and which species need to be restocked (especially after a planting day). Species identification can be done with the help of several resources such as the *Audubon Field Guide to Florida* and *Native Florida Plants: Low Maintenance Landscaping and Gardening*.

A list of the plants currently growing in the nursery include: Southern red cedar, butterfly ginger, American beautyberry, swamp dogwood, live oak, loquat, azalea, butterfly weed, wild coffee, banana, wild orchid, Florida anise, coral honeysuckle vine, Southern magnolia, loblolly bay, pignut hickory and pond apple.

## e) Plant Maintenance

An inspection of plants to assess their health should be done from time to time. Dead plants can be removed and the soil can be recycled and used for repotting other plants. At the end of the winter season and the beginning of spring, many plants enter into periods of increased growth and signs of new life will be evident. Some plants may appear dead, but are actually not. All of the plants being grown in the nursery are perennials and should persist from one year to the next. For example, the butterfly weed will drop its leaves during the winter months and take on a very dry looking appearance. However, in the spring it will generate new growth again.



Butterfly weed in the springtime.

Scratching the surface bark and finding green coloration is another good indication that a plant is not dead but rather may need to be fertilized, applied with a dose of vitamins and hormones such as Superthrive (follow instructions on label), or clipped back to stimulate new growth. Plants that show signs of struggle should be stripped of dead leaves and flowers to prevent the waste of energy that a plant may be diverting towards an already unprofitable area.

If a plant shows signs fungal infection it should be moved away from the rest of the plants immediately to prevent the spread of infection. Signs of a fungal infection may appear as brown or white spots or lesions on a plant's leaves and stems and may produce a musty smell. Samples can be taken and inspected under a microscope in a lab setting to help identify the specific type. Keep in mind that insects such as spiders and ladybugs play a vital role in the nursery and are not to

be considered parasites. There have not been any problems related to parasites reported in the nursery thus far.

Plants should be replanted in larger containers (next available size) when they show signs of having outgrown their old ones. Not doing this can cause the root system to strangle a plant, thus killing itself. After replanting, watering the plants will help to remove excess pockets of air and make the dirt more compact.



Roots growing out from bottom of pot; time to replant.

## f) Safety Precautions

Although working in or visiting the nursery is relatively safe and danger free, there are some precautions that should be taken into consideration. It is a semi-natural environment lodged between developments, making it a safe haven for critters and insects.



Pots turned over by rogue raccoon.

Many species of stinging insects chose the reserve and the nursery as their home. For instance, in the nursery, there has been a long-existing colony of mud daubers living on the shed. While these and most other insects keep to themselves and are usually harmless, it is better to keep a calm awareness of their presence than to be surprised and excited.

Peacocks and peahens sometimes find an open nursery gate an invitation to come in and around clown around. Unfortunately, they are less likely to find their way out and timely chases may ensue. For this reason alone, it is worthwhile to keep the gate closed when not in use. Much larger animals such as raccoons can also wreak havoc in nursery, although usually after hours.



Mud dauber nest on shed door.

Rusty items and sharp objects may be encountered from time to time. Common sense dictates that these things should be left alone, unless they can be disposed of in a safe manner. In many cases working with sharp objects is required. Most of these tools come with safety features and should always be handled with gloves.



## g) Conclusion

The time spent in the nursery and at the Reserve has provided a wealth of knowledge and experiences that will undoubtedly prove to be highly applicable in the future, contributing to a much better understanding of the way complex systems in nature interact and compose the 'big picture'. In this sense, it is essential that the Reserve remain open and available to Rollins students as a living and breathing learning tool. Equally important is for these students to realize the advantages at their fingertips and take advantage by actively participating in Reserve activities and independent studies.

While the long-term fate of the Reserve remains unknown, what is unquestionable is that the earnest effort made by many individuals have contributed immensely towards this restorative work-in-progress. In some ways, the impacts of these efforts can be measured, yet there remain many intangible benefits as well.

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