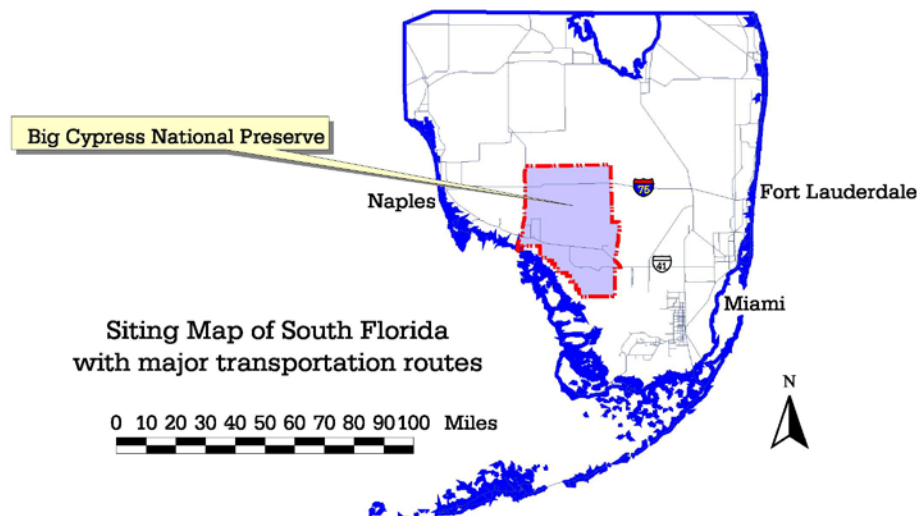


Restoration of Native Communities in Brazilian Pepper Dominated Areas

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Introduction

Big Cypress National Preserve covers 729,000 acres of southwest Florida. Big Cypress NP is connected to the Gulf of Mexico and provides a large portion of the overland freshwater drainage to Everglades National Park and the ten-thousand islands.



Habitat Description

The vegetation of the Preserve varies widely from mangrove tidal swamps on the coast to freshwater wetlands along the western edge of the Everglades, tropical hardwood hammocks and mesic flatwoods. The most dominant feature are the freshwater swamps and savannas dominated by pond cypress.

Prior to the establishment of Big Cypress National Preserve many areas of native habitat were physically altered for agricultural. These altered areas were later abandoned when Big Cypress National Preserve was established. These former agricultural areas (~700 acres) have become dominated by the non-native Brazilian pepper (*Schinus terebinthifolius*).



1994 – Former agricultural sites with little or no shrub or tree growth.



2014 – Sites have transitioned into Brazilian pepper mono-cultures.

Restoration

From 2004 -2012 Big Cypress National Preserve initiated a program to actively restore these former agricultural lands back to native pine flatwood communities. Gyrotrack (shredders) or bulldozers were used to mechanically clear the Brazilian pepper. Following the mechanical removal herbicide was applied to re-sprouting non-native plants. In 2012, sixty-seven thousand tubelings (one year old) native slash pine (*Pinus elliottii* var. *densa*) trees were installed on 150 restored acres at 400-680 plants per acre to accelerate restoration. Since 2012 the restoration areas have been allowed to undergo growth and succession without management activities.



Slash pine (*Pinus elliottii* var. *densa*) trees two years after planting;

About 500 additional acres in this area were similarly disturbed for agriculture, and are now dominated by nearly monocultural stands of exotic plants, mostly Brazilian pepper (*Schinus terebinthifolius*).

Scope of Work:*Phase 1*

All previously restored/planted areas (150 acres) will be aerially treated with hexazinone herbicide (1-2 lbs/acre) to release slash pines and suppress woody plant competition including Brazilian pepper. Application will occur in late winter/early spring.

Cost estimate: \$15,000 (150 acres @ \$70/acre)

Phase 2

All untreated project areas (500 acres) will be mechanically cleared with a gyrotrac (or similar). Three months post treatment the sites will be aerially treated with hexazinone herbicide (2 lbs/acre)

Mechanical Clearing: \$250,000 (500 acres @ \$500/acre)

Aerial Application: \$35,000 (500 acres @ \$70/acre)

Phase 3

Slash pine (340k) tubelings will be planted on the prepared site (500 acres).

Cost Estimate: \$30,000 Slash pine Tubelings (340,000)

Cost Estimate: \$50,000 Tubeling planting

Follo

Attachment 1: Statement of Work for preparation of sites and installation of native slash pine (*Pinus elliottii*) trees in Big Cypress National Preserve.

Project Size: 500 acres

1. Installation and Establishment Contractor shall re-establish pine flatwoods communities by providing and planting slashpine (*Pinus elliottii*) seedlings in areas previously dominated by Brazilian pepper trees (*Schinus terebinthifolius*). These sites (21), totaling approximately 500 acres represent some of the (formerly) most severely infested areas in Big Cypress National Preserve. Sites range in size from 1-80 acres.

Elevated grades exist adjacent to all identified areas, and access by truck or swamp buggy is possible for all areas.

SCOPE OF SERVICES

Work to include:

1. Plant approximately 340,000 *Pinus elliottii* var *densa* tubelings ca. 500/ac., planted per standard practice used by Florida Division of Forestry. Trees will be planted on twelve-foot centers.
2. *Pinus elliottii* var *densa* seedlings will be containerized seedlings (tubelings) and will be planted before late August 2016 (see note below).

Seedling/Tubeling Specifications:

1. Seedlings should be less than 18 months from their sowing date.
2. Seedlings grown in Ropak Multipot #3 trays
3. Individual cell dimensions (and resulting root plug dimensions) are 1.5" in diameter and 4.8" deep.
4. The root plug volume is 6.0 cubic inches.
5. Soil mixture is 50% Canadian peat, 30 % Perlite, and 20% Vermiculite.
6. The seed used to produce the seedlings was collected from trees verified to be true south Florida slash pine (*Pinus elliottii* var. *densa*, and not north Florida slash pine (*Pinus elliottii* var. *elliottii*).
7. Seedlings should have a minimum root collar diameter of 5 mm and an average root collar diameter of 7 mm.
8. Each root plug should contain one and only one seedling.
9. The root plug should be free from other plant species (weeds)
10. The seedling should be free of plant pathogens (root diseases, foliage blights, etc.)
11. The seedling should be free of harmful insects and their damage.

12. The plug should remain intact during extraction from the trays, packaging and transport to the field.

13. The plug should be moist and never dry.

14. Seedlings should be packaged 125 seedlings to a wax coated cardboard box.

CARE, HANDLING AND STORAGE OF SEEDLINGS: The contractor must protect the seedlings and take precautions to prevent damage to them from the time received by the contractor until they are planted. This shall include:

1. Protection from Sun, Wind and Adverse Temperatures – Containerized pine seedlings must be handled, stored and transported in a manner to best protect them from sun and wind damage as well as excessive heat or cold. **Seedlings must either be kept in a seedling cooler or covered with a seedling tarp and stored in the shade, if shade is available, at all times.** Damaged bundles or boxes of seedlings must be repaired or patched immediately to prevent exposure. Only those boxes being used shall be open. All seedlings must be planted within one (1) hour after initial removal from the box.

Contractor will not allow seedlings to be exposed to the air more than five (5) minutes during the sorting and loading operations. Planting labor will not carry in their hands more than two seedlings at any given time. No seedlings will be left unboxed and exposed to the air, and no seedlings will be left unboxed at the planting site overnight.

2. Keep Roots Moist – **PINE SEEDLING ROOTS MUST BE KEPT MOIST AT ALL TIMES PRIOR TO AND DURING PLANTING.** Trees are not to be placed or dipped in water but may be covered with wet burlap or another suitable material to prevent seedling drying if conditions warrant. The contractor will be required to notify the Forester-in-Charge if the seedling roots become dry.

3. Protection from Contamination – Pine seedlings shall be protected from contamination by material such as gasoline, diesel fuel, oils or chemicals, which may damage the seedlings. The Forester-in-Charge will inspect the seedlings prior to planting and if found to be contaminated, the seedlings will be destroyed and not planted.

4. Storage of Seedlings – Seedlings will be stored in a refrigerated trailer on or near the planting site. Unplanted seedlings must be re-boxed or re-bundled, for return to the storage site or refrigerated trailer at the end of each day.

Also, the following will work as a good guideline for care and planting of seedlings.

CARE FOR CONTAINERIZED SEEDLINGS PRIOR TO PLANTING

- If refrigerated trailer or location not available, plant as quickly as possible. The day after delivery is recommended without refrigeration, especially in the summer. See information on bare root seedling refrigeration for refrigeration care.
- Keep seedlings in shade and out of major wind at all times until they are taken to plant. This could include a pole barn or heavily wooded area.

- Storage of seedlings should be no more than two boxes tall with more than 1 foot in between box stacks to allow for cooling air flow in shaded environment.
- Check seedlings daily for moisture. If root balls feel dry, or to avoid drying out, water by opening box and using a mister to avoid disturbing the root balls of the trees. Make sure that all of the root balls receive moisture. Watering once per day is recommended.

PROPER PLANTING OF CONTAINERIZED SOUTH FLORIDA SLASH PINES

1. Ensure proper and timely site preparation complete.
2. Try to plant when soil is moist or rain will soon arrive.
3. Seedlings should be planted in a manner that:
 - o avoids disturbing the root system of the seedling;
 - o minimizes the presence of an air pocket beneath the roots of the root ball (i.e. planting hole is too deep);
 - o ensures that the planting level of the seedling's root collar is even or slightly below the surrounding soil level (no more than a half inch deep);
 - o achieves a planted seedling that sits more or less straight up and down (i.e. no diagonal planting);
 - o and packs the soil firmly around the seedling to achieve good contact between the seedling and soil. This is done by using the heel of the boot to pack around the seedling after planting.
4. If hand planting, the use of a hoedad or containerized dibble planting bar is recommended.
5. Some machine planters have been modified to plant containerized seedlings.