Preliminary Report on the 2023 Field Plantings at the Lemon Creek Wildflower Preserve

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1. Introduction

As part of the ongoing restoration work at the Lemon Creek Wildflower Preserve (Preserve), the Lemon Bay Conservancy (LBC) developed a plan that targeted the revegetation of seven planting Areas with native plant species (Figure 1). The primary objectives of these plantings were to create visual barriers (i.e., Gasparilla Pines and Marker 9 Areas) and enhance native plant communities. In addition, the Moorhen Mound, Duckweed Mound, Duckweed Pond, and Long Pond Areas are xeric (dry) sites and the 2023 planting will serve as a field trial to identify suitable species for planting on these types of habitats at the Preserve. While the aerial extent of the 2023 plantings is relatively small (less than 0.25 acres), the assumption is that once these plantings mature, they will spread via seed and vegetative means into adjacent locations.

2. Plant Material and Maintenance

Twenty native species were planted in 2023 (Table 1). Most of these species were obtained from Sandhill Native Growers Inc., Arcadia, Florida. The gumbo limbo and railroad vine were cuttings obtained from mature plants growing on the Preserve. Plants obtained from Sandhill Native Growers, Inc. were container grown plants except for lizard's tail, which were bare root plants. Water ash, Simpson's stopper, South Florida slash pine, and Laurel cherry were in 3-gallon containers and all other species were in 1-gallon containers.

Plant species were selected to match the habitats present at the various sites. The western portion of the Gasparilla Pines and Marker 38 Areas are mesic (wet) habitats characterized by shallow groundwater and standing water following rains. The other Areas contain sandy soils and are xeric habitats where drought tolerant species are required. The Long Pond – West Area is shaded by large trees and is assumed to be intermediate between the mesic and xeric Areas.

Sandhill Native Growers, Inc. delivered plants to the Preserve on June 19, 2023, and all plants were in good condition. The bare-root lizard's tail plants were planted in the field the same day at two locations on Long Pond and one Location on Duckweed Pond (Figure 1). The container plants were staged in a shaded area at the south end of Verna's Pond and irrigated every 2 to 4 days until planted in the field.

All plants (except grasses) were marked with orange plastic tape for identification in the field.

The day prior to field planting of container plants, the containers were soaked in rectangular sleds containing water with an approximate depth of six inches to ensure the plant root systems were saturated. Gumbo limbo and railroad vine cuttings were collected the day before field planting and maintained in water-filled containers until planted. Gumbo limbo cutting were

approximately three feet long with a diameter ranging from two to four inches. Railroad vine cuttings included three nodes (two planted below ground and one left aboveground) and all leaves were removed from the lower two nodes.

3. Site Preparation

Weedy non-native vegetation dominated the seven planting Areas prior to planting. The herbicide Glyphosate (Aqua Neat at 53.8 percent Glyphosate) was applied to all Areas except Marker 38. The spray solution consisted of 6 ounces of Aqua Neat, 1 ounce of Hel-Fire (a surfactant), and 1 ounce of spray indicator (colorant) per gallon of water. The herbicide solution was applied using a 3-gallon backpack sprayer and approximately 2-3 gallons of solution was applied to each area. Within two weeks of application, most weeds were observed to be dead.

In addition to herbicide application, the Gasparilla Pines and Long Pond - West Areas were brush hogged to remove standing dead weedy vegetation. These two Areas are flat while the other Areas are too steep to brush hog. The Long Pond - West Area was covered by a dense stand of muscadine grape which required additional treatment (i.e., a second application of Glyphosate and manual removal of vines growing along the banks).

4. Field Planting

The lizard's tail is a rooted aquatic plant that typically grows along the margins of water bodies. They were planted in the field on June 19, 2023 at two locations on Long Pond and one location on Duckweed Pond (Figure 1). At each location, 2 to 4 plants were planted just above the current water level and at a second point approximately one foot above the current water level. The water level in these ponds will rise during the rainy season. This planting design should ensure the survival of some if not all plants.

Field planting in upland Areas began on July 11, 2023 and ended on August 1, 2023. A total of 314 plants were planted and Table 1 shows the distribution of plants across planting Areas. Maps were generated in the office to guide the field planting. These maps were finalized following planting (Figures 2 to 8) and will be used in the monitoring program. Container plants were typically planted in groups of three to facilitate mapping and monitoring.

Planting holes were dug with a shovel that approximated 3 to 5 times the volume of the planting container. The depth of planting holes was sufficient to create a depression of 4 to 6 inches below the surrounding ground leve; that would help retain irrigation water. Planting holes were filled with irrigation water and allowed to drain prior to planting. Plants were removed from their containers, placed in the hole, and backfilled with soil in a manner that left a 4-6-inch-deep depression around the plant. The plants were then irrigated a second time. The soaking of container plants the day before planting and the repeated irrigation at planting should have provided sufficient soil moisture to sustain plants for approximately 5 to 7 days under otherwise dry soil conditions.

A similar planting method was used for the gumbo limbo and railroad vine. The proximal end of the 3-foot-long gumbo limbo cuttings was buried approximately 1-foot below ground. The two proximal nodes on the railroad vine were planted below ground leaving the distal node above ground.

5. Irrigation of Field Plantings

It was planned that the 2023 field plantings would commence at the beginning of the rainy season when the soil was sufficiently saturated to obviate the need to supplemental irrigation. The rainy season typically begins in late May to early June. However, the 2023 dry season was prolonged and the rainy season did not begin until mid-August. The late rainy season created a manpower scheduling conflict such that planting began on July 11, 2023. The lack of rain mandated the use of supplemental irrigation following planting.

A used 275-gallon plastic tote was procured for irrigation. The tote previously contained hydrogen peroxide and was thoroughly rinsed with fresh water prior to use. The tote was mounted on a trailer and a UTV was used to move the tote between planting Areas. During planting, water was dispensed using gravity feed. However, the water flow rate via gravity was low resulting in the extended duration of irrigation events. Post-planting irrigation was enhanced using a generator/pumping system attached to the tote that increased the water flow rate.

Table 2 provides a record of rainfall at the Preserve and shows when planting Areas were planted and irrigated. Relatively little rain fell prior to the commencement of planting on July 11, 2023. One-foot-deep pits were periodically dug in the planting areas to evaluate soil moisture conditions. Rainfall on June 29, 2023, was 2.2 inches and wetted the soil in a few Areas (e.g., Gasparilla Pines), while the soil in other Areas remained dry (e.g., Long Pond – West and Duckweed Pond Mound).

Irrigation was initially conducted within 2 to 5 days of planting in each Area to ensure adequate soil moisture conditions. Areas were then irrigated when soil moisture became low[1]. Irrigation was suspended on August 8, 2023, because the rainy season appeared to begin on August 13, 2023. A large quantity of rain (9.7 inches) fell on August 28-31, 2023, when Hurricane Idalia hit landfall north of Tampa, FL. No rain fell from August 31 through September 17. Several plants on the Moorhen Mound Area were showing symptoms of drought stress (i.e., lost leaves, brown leaves, shoot dieback) on September 10, 2023. Irrigation resumed on September 11, 2023.

All seven planting Areas were irrigated between September 11 and 17, 2023, except for Marker 38 and the southwest portion of Gasparilla Pines where shallow groundwater provided

[1] Soil moisture status was determined by digging a minimum of two 10 to 12-inch-deep test pits on each Area. In addition, the condition of planted plants and pre-existing vegetation on each Area was visually assessed to determine if plants were suffering moisture stress. Irrigation was deemed necessary when the soil moisture level was dry or nearly so.

adequate soil moisture. Plants in most Areas showed little or no drought stress during this irrigation period. The exception was Duckweed Mound which was not irrigated until September 17, 2023. Many species showed symptoms of drought stress on September 17, but did not show symptoms when surveyed on September 7. The lack of rain between September 1 and 17 resulted in a decrease in soil moisture that caused plant drought stress on Duckweed Mound. The most severely damaged species was rusty lyonia where virtually all the leaves on all six plants were brown on September 17 (Figure 9). It is unknow if rusty lyonia will recover following resumption of irrigation. Seacoast sumpweed (Figure 10), white indigo berry (Figure 11), beach creeper (Figure 12), and gopher apple (Figure 13) suffered some leaf loss/browning as well as shoot damage, but these species are expected to recover following irrigation. Gumbo limbo (Figure 14), railroad vine (Figure 15), and Spanish bayonet did not show any overt symptoms of moisture stress. The plants on Duckweed Mound will be periodically monitored through the end of October to assess their status and recovery from drought stress. Irrigation will continue as needed on Duckweed Mound and the other Areas.

6. Results of Monitoring of Plant Survival and Size

A monitoring program was developed for the 2023 planting Areas to assess near-term (August 2023, 2024, and 2025) growth and survival. Results of this monitoring program will be used along with other information to plan future revegetation projects.

Plant height and diameter were measured on the seven Areas on September 7-10, 2023 using an 8-foot long PVC tube marked in 6-inch increments. The maximum plant height was measured to the nearest 6-inches from the ground to the tallest live point on each tree and shrub. The maximum diameter of groundcovers and grasses was measured to the nearest 6-inches at ground level.

A summary of monitoring results for each species at approximately 1-month after planting are presented in Table 3. Monitoring results for each planting Area are summarized in Tables 4 to 11. Monitoring results along with field observations on the condition of each species are summarized as follows:

- Beach Creeper
    - Forty-eight plants were planted across 5 Areas.
    - Survival was 94 percent.
    - The mean diameter of plants was 1.5 feet.
    - Although most plants were actively growing, growth was modest (Figure 16). The plants at Moorhen Mound were in poor condition. Several plants at Duckweed Pond were growing at the water's edge at the time of this survey.

- Elderberry
    - Nine plants were planted at Long Pond – West and three plants planted at Marker 38 Areas.

- Survival was 83 percent.
- The mean height of plants was 2.9 feet.
- Although most plants were actively growing, growth was modest (Figure 17).

- Fakahatchee Grass
  - Ten plants were planted at Gasparilla Pines and five plants were planted at Marker 38 Areas.
  - Survival was 100 percent.
  - The mean diameter of plants was 1.0 feet.
  - All plants appeared healthy, but little new growth was observed (Figure 18). Ponded water occurs seasonally in both planting Areas.

- Florida Privet
  - Six plants were planted in the Long Pond – West Area.
  - Survival was 100 percent.
  - The mean height of plants was 1.4 feet.
  - All plants appeared healthy and showed moderate new growth (Figure 19).

- Gopher Apple
  - Twenty-four plants were planted across five Areas.
  - Survival was 88 percent.
  - The mean diameter was 0.5 feet.
  - Little new plant growth was observed (Figure 20). Several plants at Moorhen Mound were showing signs of moisture stress (Figure 21).

- Gumbo Limbo
  - Fifteen plants were planted across six Areas.
  - Survival was 87 percent. Only cuttings having new shoots were designated as alive. Cuttings lacking live shoots at the time of monitoring may still be alive and produce shoots.
  - Mean height was 2.2 feet.
  - Cuttings were just beginning to sprout (Figure 22).

- Laurel Cherry
  - Two plants were planted in the Long Pond – West Area.
  - Survival was 100 percent.
  - Mean height was 2.8 feet.
  - Both plants were severely stressed. Almost all the leaves on one plant were dead (Figure 23), while the second plant had a significant amount of brown/dead foliage (Figure 24).

- Live Oak
    - Two plants were planted at Gasparilla Pines.
    - Survival was 100 percent.
    - Mean height was 1.8 feet.
    - Both plants appeared healthy, but showed little new growth (Figure 25).

- Lizard's Tail
    - Twenty plants were planted in 3 Areas. At the time of planting, 2-3 plants were planted just above the current pond water level while 2-3 other plants were planted at approximately 1 foot above the current water level.
    - Survival was 5 percent. Almost all planting locations were underwater at the time of this monitoring. A single live plant was found in the upper Duckweed Pond location. The base of the plant was just above the pond water level. The single live plant was small and unhealthy. The reasons for this poor survival are unclear.
    - This species spreads by rhizomes. It is possible the plants are alive as underground rhizomes. Continued monitoring of this species is warranted.

- Muhly Grass
    - Fifteen plants were planted at Gasparilla Pines.
    - Survival was 100 percent.
    - Mean plant diameter was 1.0 feet.
    - All plants appeared healthy, but little new growth was observed (Figure 26).

- Railroad Vine
    - Twenty-two plants were planted across six Areas.
    - Survival was 73 percent. None of the four cuttings planted at Gasparilla Pines survived while survival ranged from 75 to 100 percent at the other 5 areas. The reasons for the low survival at Gasparilla Pines are unclear, but may be related to the shallow groundwater present at that Area.
    - The mean plant diameter was 1.4 feet. However, one plant at Marker 9 was 7 feet long.
    - All live plants were vigorously growing (Figure 27).

- Rusty Lyonia
    - Twenty-four plants were planted across five Areas.
    - Survival was 96 percent.
    - Mean height was 1.2 feet.
    - Plants were healthy and had new growth on all Areas (Figure28) except Moorhen Mound were some plants showed moisture stress (Figure 29).

- Seacoast Sumpweed
    - Twnety-four plants were planted across five Areas.
    - Survival was 100 percent.
    - Mean height was 2.3 feet.
    - Plants were healthy and had new growth on all Areas (Figure 30) except Moorhen Mound were some plants showed moisture stress. Several plants at Duckweed Pond had seeds. Several plants at Duckweed Pond were growing at the water's edge at the time of this survey.

- Simpson's Stopper
    - Six plants were planted in the Long Pond – West Area.
    - Survival was 100 percent.
    - The mean height was 1.9 feet.
    - All plants were actively growing and showed much new growth (Figure 31).

- South Florida Slash Pine
    - Six plants were planted at Marker 9.
    - Survival was 100 percent.
    - The mean height was 2.2 feet.
    - All plants were healthy and showed much new growth (Figure 32).

- Spanish Bayonet
    - Twenty-four plants were planted at Duckweed Mound and Duckweed Pond.
    - Survival was 100 percent.
    - The mean height was 1.0 foot.
    - Plants were healthy at all Areas except Moorhen Mound, but showed little new growth (Figure 33). Several plants at Duckweed Pond were growing at the water's edge at the time of this survey.

- Swamp Dogwood
    - Six plants were planted in the Long Pond – West Area.
    - Survival was 100 percent.
    - The mean height was 3.8 feet.
    - All plants were actively growing and showed much new growth (Figure 34). Plants were planted along a gradient from at the current pond water level to approximately 2 feet above the current water level.

- Sweetbay Magnolia
    - Five plants were planted in Gasparilla Pines and three plants were planted in Marker 38 Areas.
    - Survival was 100 percent.
    - Mean height was 4.3 feet.
    - All plants were actively growing and showed much new growth (Figure 35. Ponded water occurs seasonally in both planting Areas.

- Water Ash
    - Two plants were planted in the Long Pond – West Area.
    - Survival was 100 percent.
    - Mean height was 5.3 feet.
    - Both plants were actively growing and showed much new growth (Figure 36). Both plants were growing in standing water (approximately 4 inches deep).

- White Indigo Berry
    - Thirty-two plants were planted across six Areas.
    - Survival was 100 percent.
    - Mean height was 1.5 feet.
    - Plants were actively growing in all Areas, but growth was modest (Figure 37). Plants at Moorhen Mound were the least healthy. Several plants at Duckweed Pond were growing at the water's edge at the time of this survey.

At the time of this monitoring event (September 5-10, 2023), soil moisture[2] was adequate in all plantings Areas, except Moorhen Mound, where many plants were showing signs of drought stress (e.g., few leaves, brown leaves, little new growth). Table 2 shows that the last recorded rain fell at the Preserve on August 31, 2023. Moorhen Mound was subsequently irrigated on September 11, 2023, to improve soil moisture conditions.

As noted in Section 5, plants on Duckweed Mound suffered drought stress before being irrigated on September 17, 2023. The information presented in this results section for Duckweed Mound was based upon observations gathered on September 7, 2023 and does not incorporate effects of the drought stress on plant size or survival.

Despite preforming mechanical and chemical weed control prior to planting, all Areas were suffering from some level of weed competition. Weed competition was greatest at Gasparilla Pines (wet area), Marker 38, and Moorhen Mound.

[2] Soil moisture status was determined by digging two shallow soil pits at each Area to qualitatively assess soil moisture to a depth 10 to 12 inches. In addition, the condition of newly planted native plants and pre-existing plants on the Areas was assessed for signs of moisture stress.

7. Future Activities

Since plants at Moorhen were showing signs of moisture stress on September 10, 2023, planting Areas will be monitored weekly for the next several months to determine if additional irrigation is needed. We anticipate the commencement of seasonal rains will obviate the need for much additional irrigation.

Periodic field assessments will be made of the condition of plants on all the planting Areas during the two years in the field. These assessments will include observations on symptoms of stress (leaf/shoot wilting, leaf yellowing, the presence of dead leaves, insect/disease damage), active shoot growth, and flowering/seeding. More frequent field assessments will be made at Moorhen Mound and Duckweed Mound to assess the impacts of observed drought stress episodes.

Excessive weed growth was observed in many planting Areas during this monitoring event (Figures 18, 25, 33, and 35). Since most of the plants were small when planted (i.e., 1-gallon container plants), weed competition could adversely affect initial survival and growth until the plants reach suitable size. Both mechanical and chemical weed control measures will be used during the first six months in the field.

Monitoring of plant growth and survival will be conducted in August of 2024 and 2025. A brief report will be prepared describing the results of each monitoring event. Recommendations on the need for additional periodic field observations and annual monitoring will be provided in the 2025 report.


Lemon Creek Wildflower Preserve
March 2021
Figure 1. 2023 Planting Areas
Gasparilla Pines
Marker 38
Moorhen Mound (North and South)
Lizard's tail planting location
Marker 9
North
Long Pond (West and East)
Duckweed Mound (North and South)
Duckweed Pond
Tarpon Crossing

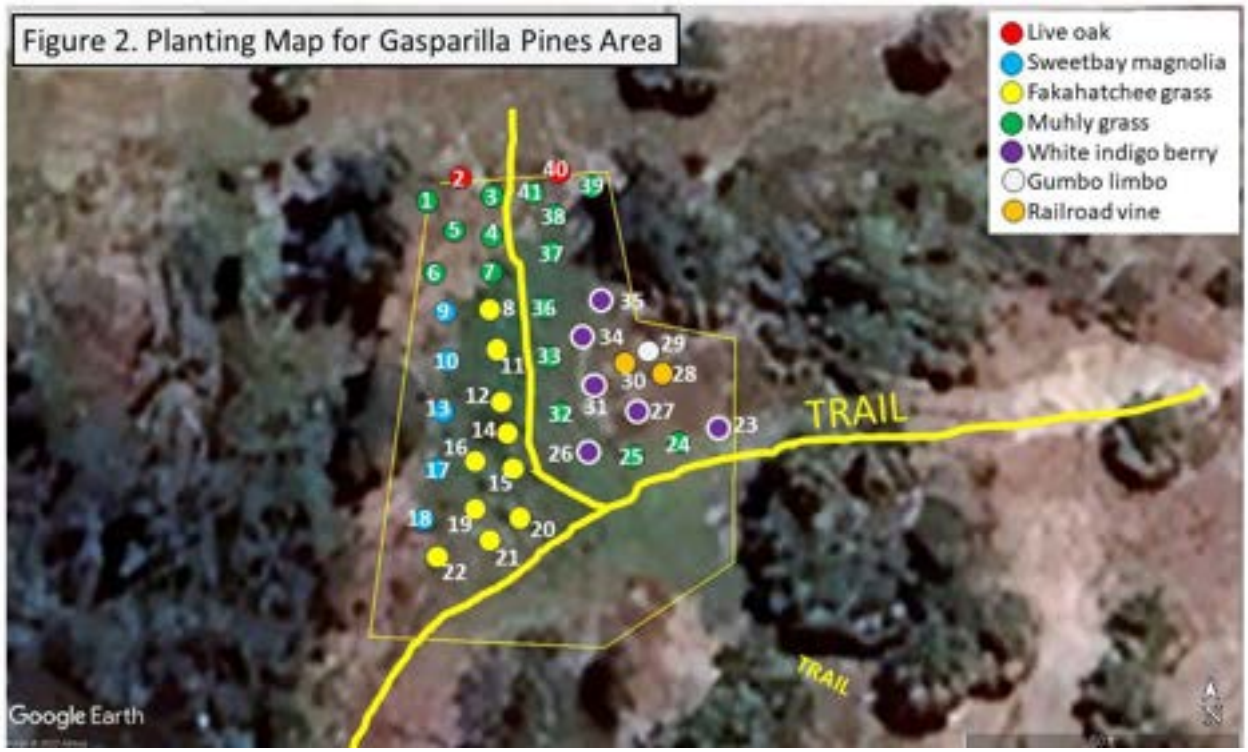
Figure 2. Planting Map for Gasparilla Pines Area
Live oak
Sweetbay magnolia
Fakahatchee grass
Muhly grass
White indigo berry
Gumbo limbo
Railroad vine
TRAIL
TRAIL
Google Earth

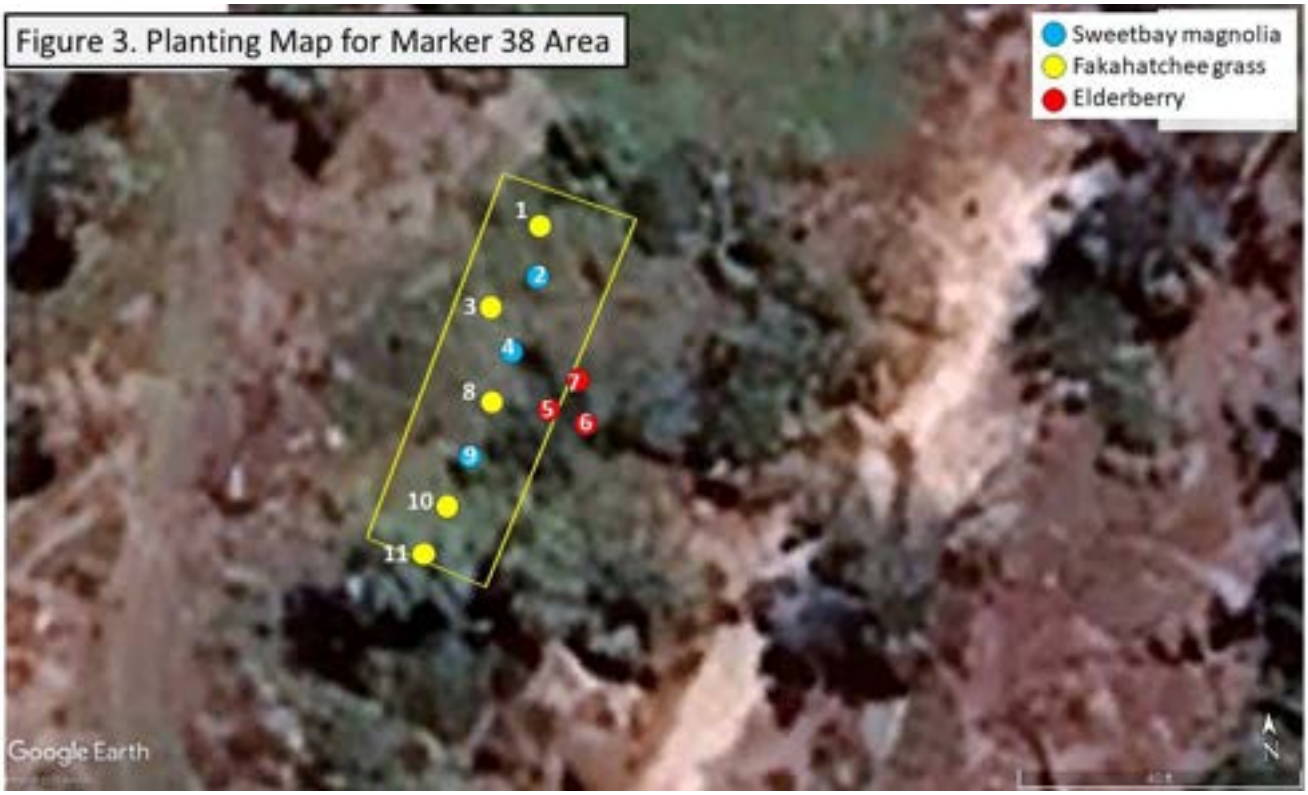
Figure 3. Planting Map for Marker 38 Area
Sweetbay magnolia
Fakahatchee grass
Elderberry
1
2
3
4
5
6
7
8
9
10
11
Google Earth
N

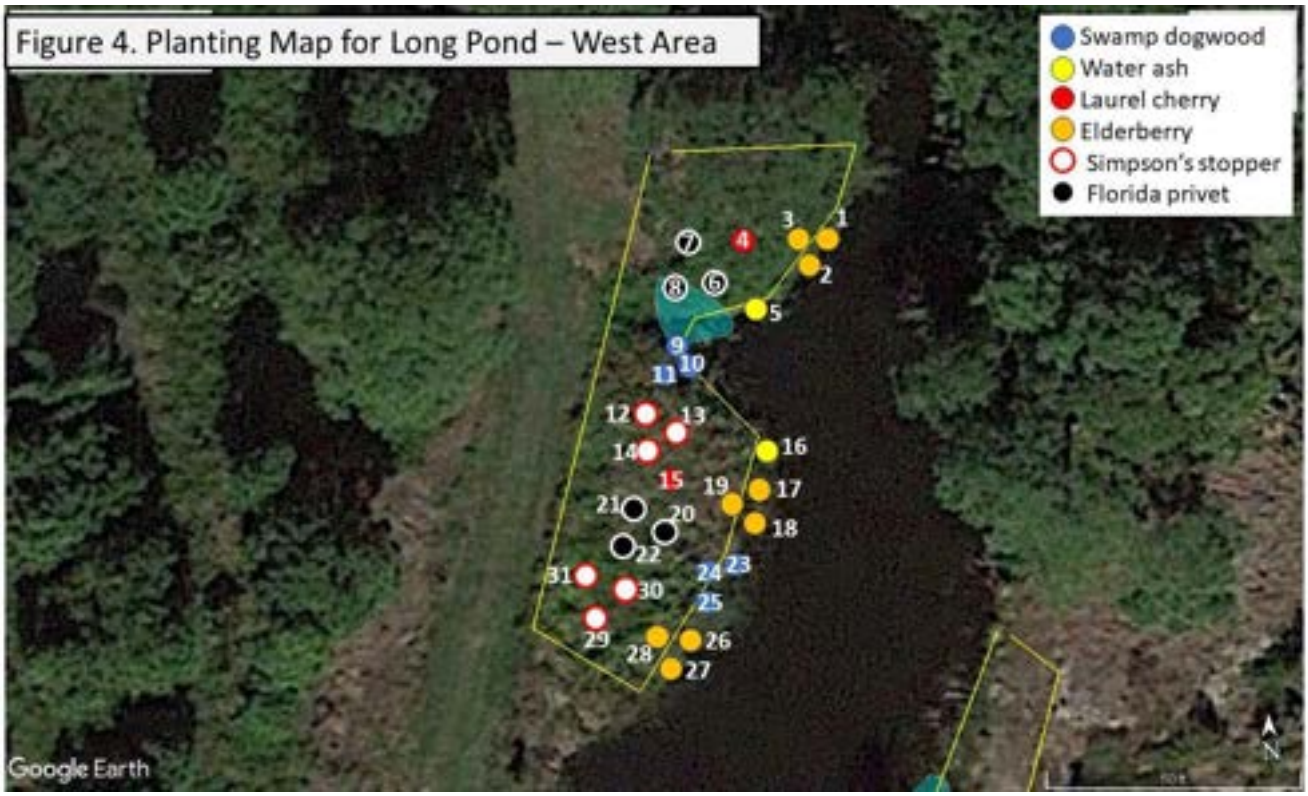
Figure 4. Planting Map for Long Pond – West Area
Swamp dogwood
Water ash
Laurel cherry
Elderberry
Simpson's stopper
Florida privet
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
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Google Earth
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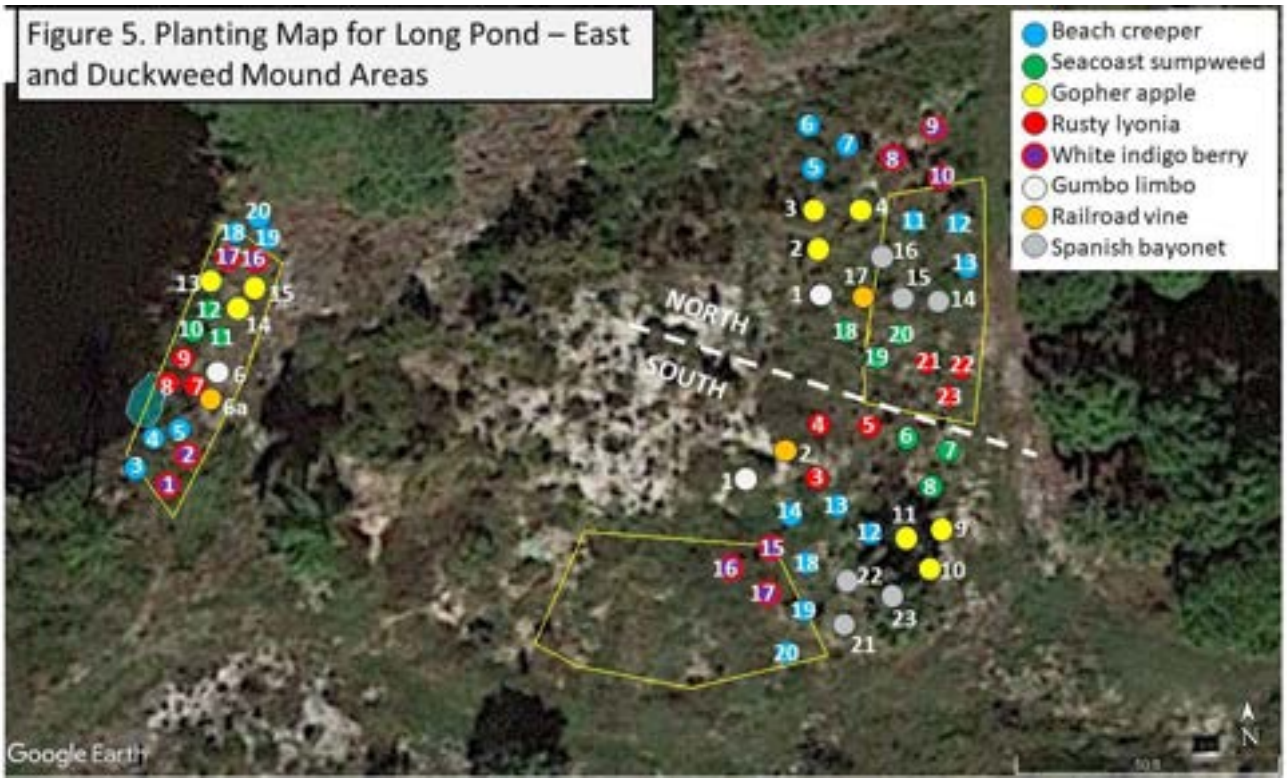
Figure 5. Planting Map for Long Pond – East and Duckweed Mound Areas
Beach creeper
Seacoast sumpweed
Gopher apple
Rusty lyonia
White indigo berry
Gumbo limbo
Railroad vine
Spanish bayonet
NORTH
SOUTH
Google Earth
N

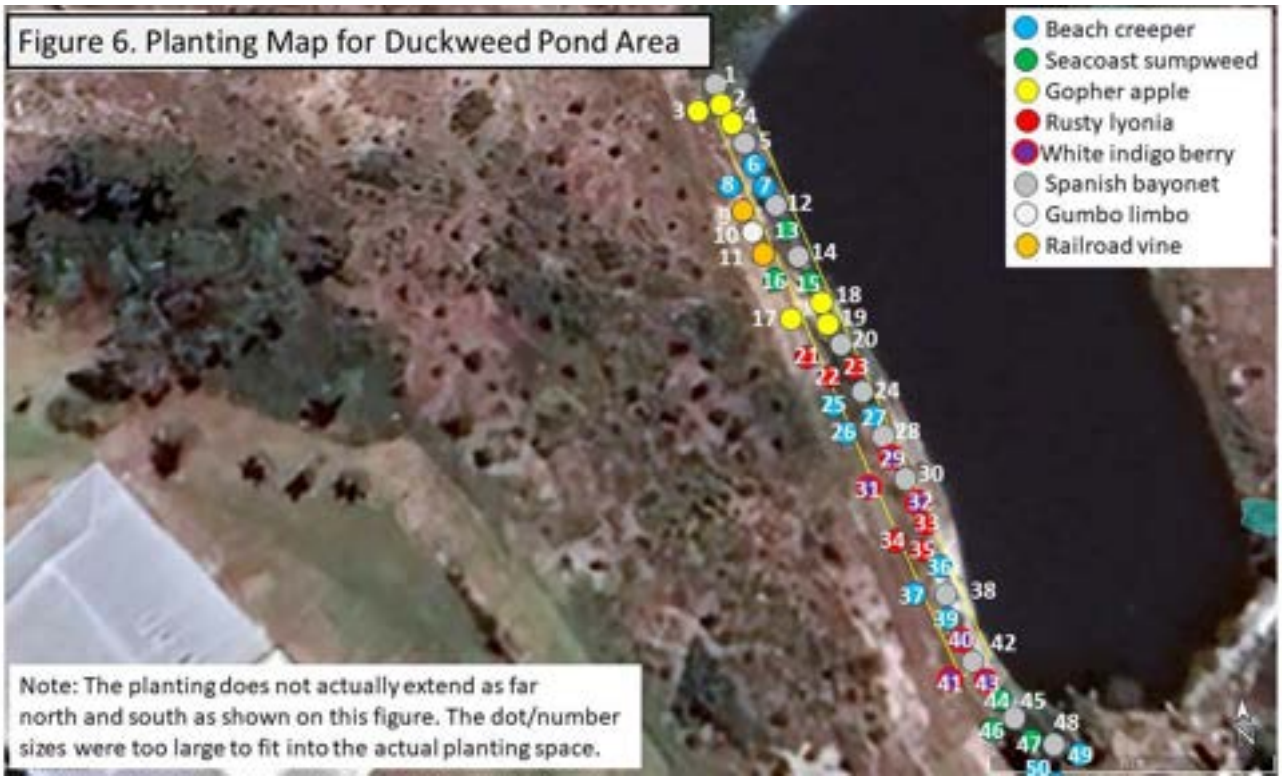
Figure 6. Planting Map for Duckweed Pond Area
Beach creeper
Seacoast sumpweed
Gopher apple
Rusty lyonia
White indigo berry
Spanish bayonet
Gumbo limbo
Railroad vine
Note: The planting does not actually extend as far north and south as shown on this figure. The dot/number sizes were too large to fit into the actual planting space.
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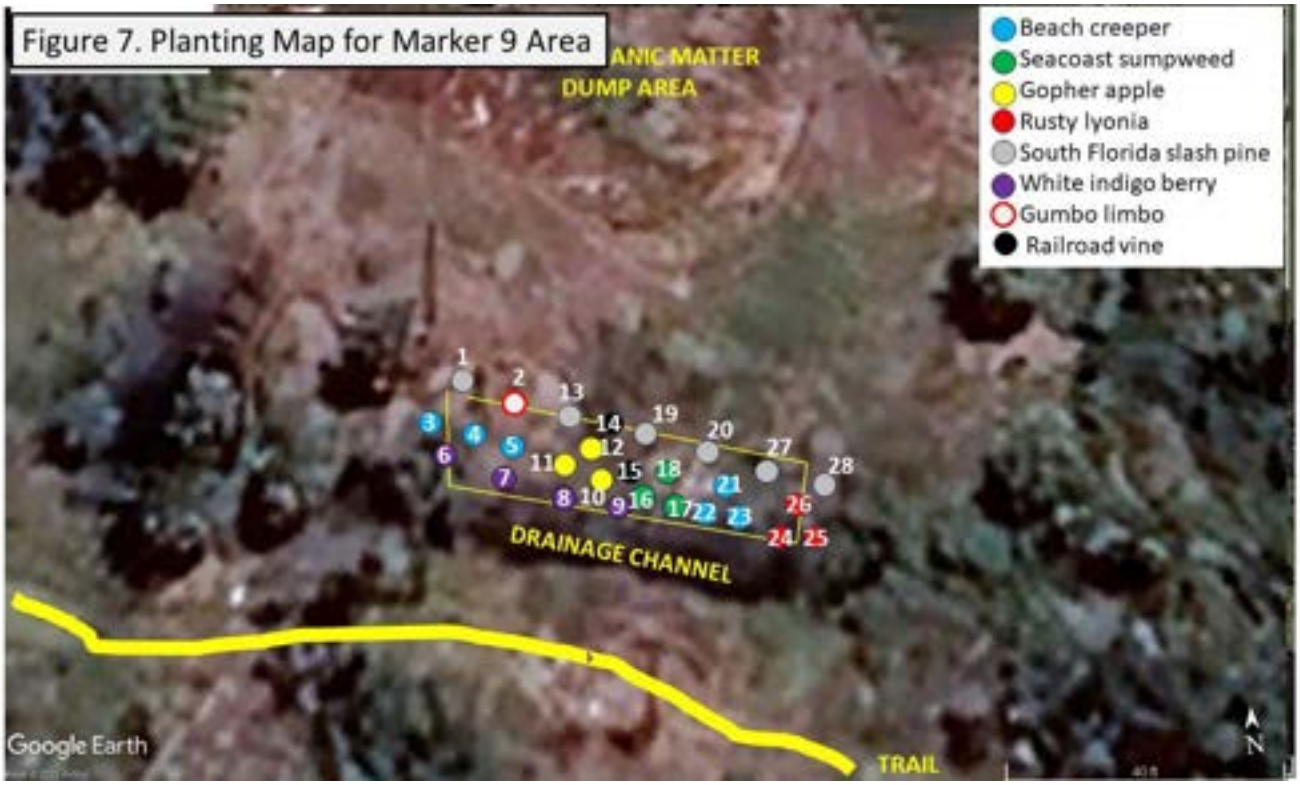
Figure 7. Planting Map for Marker 9 Area
ANIC MATTER
DUMP AREA
Beach creeper
Seacoast sumpweed
Gopher apple
Rusty lyonia
South Florida slash pine
White indigo berry
Gumbo limbo
Railroad vine
DRAINAGE CHANNEL
TRAIL
Google Earth
N

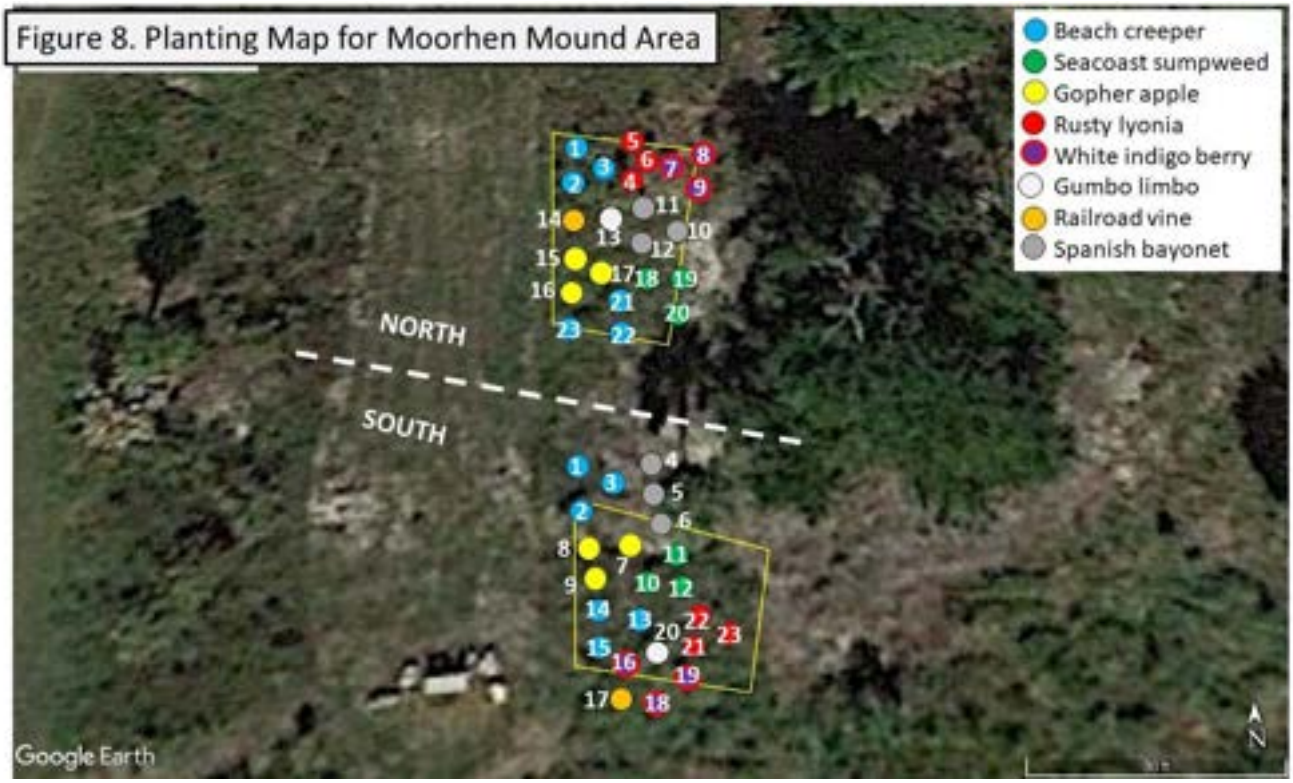
Figure 8. Planting Map for Moorhen Mound Area
Beach creeper
Seacoast sumpweed
Gopher apple
Rusty lyonia
White indigo berry
Gumbo limbo
Railroad vine
Spanish bayonet
NORTH
SOUTH
Google Earth
N

Figure 9. Rusty lyonia at Duckweed Mound (September 17, 2023). Note brown leaves.

Figure 10. Seacoast sumpweed at Duckweed Mound (September 17, 2023). Note brown leaves and shoot dieback.

Figure 11. White indigo berry at Duckweed Mound (September 17, 2023). Note brown leaves.

Figure 12. Beach creeper at Duckweed Mound (September 17, 2023). Note brown leaves and shoot dieback.

Figure 13. Gopher apple at Duckweed Mound (September 17, 2023). Note brown leaves.

Figure 14. Gumbo limbo at Duckweed Mound (September 17, 2023). Note healthy appearance.

Figure 15. Railroad vine at Duckweed Mound (September 17, 2023). Note healthy appearance.

Figure 16. Beach creeper at Long Pond – East Area (September 7, 2023)

Figure 17, Elderberry at Long Pond – West Area (September 7, 2023)

Figure 18. Fakahatchee grass at Gasparilla Pines Area (September 5, 2023). Note heavy weed growth in wetter parts of this Area.

Figure 19. Florida privet in Long Pond – West Area (September 7, 2023).

Figure 20. Gopher apple in Duckweed Pond Area (September 7, 2023).

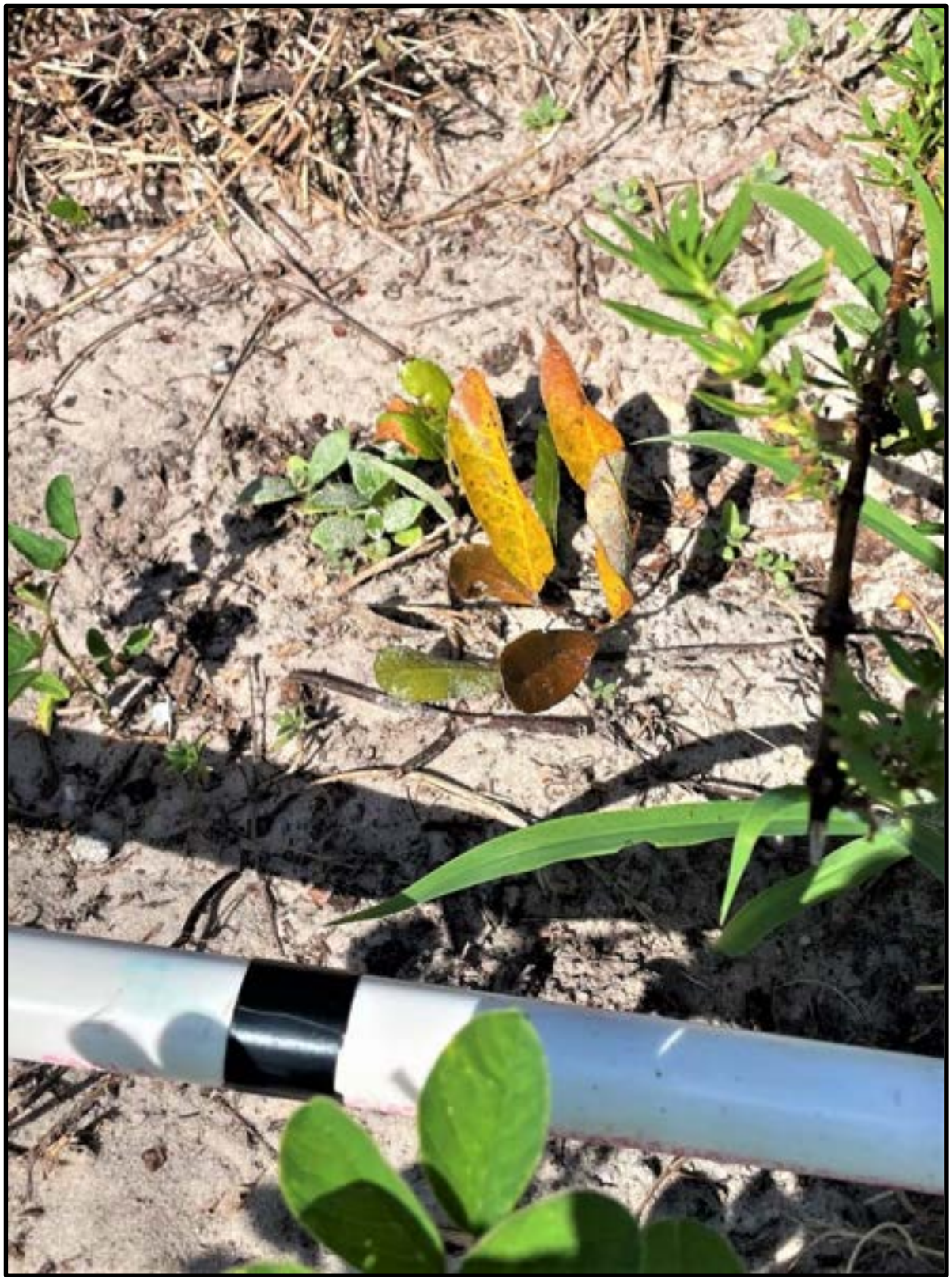

Figure 21. Gopher apple at Moorhen Mound (September 10, 2023). Note stressed appearance of plant.

Figure 22. Gumbo limbo at Duckweed Pond (September 7, 2023). Note growth was greatest on these gumbo limbo.

Figure 23. Laurel cherry at Long Pond – West (September 7, 2023). Note browning leaves.

Figure 24. Laurel cherry at Long Pond – West (September 7, 2023). Closeup of browning leaves.

Figure 25. Live oak at Gasparilla Pines Area (September 5, 2023). Note heavy weed growth.

Figure 26. Muhly grass at Gasparilla Pines Area (September 5, 2023).

Figure 27. Railroad vine at Duckweed Mound Area (September 7, 2023).

Figure 28. Rusty lyonia at Marker 9 (September 7, 2023).

Figure 29. Rusty lyonia at Moorhen Mound (September 10, 2023). Note browning foliage.

Figure 30. Seacoast sumpweed at Marker 9 Area (September 7, 2023).

Figure 31. Simpson's stopper at Long Pond – West (September 7, 2023).

Figure 32. South Florida slash pine Marker 9 Area (September 7, 2023).

Figure 33. Spanish bayonet at Duckweed Mound Area (September 7, 2023). Note heavy weed growth.

Figure 34. Swamp dogwood at Long Pond – West Area (September 7, 2023). Note plant growing just above pond water level.

Figure 35. Sweetbay magnolia at Gasparilla Pines Area (September 5, 2023). Note heavy weed growth.

Figure 36. Water ash at Long Pond – West Area (September 7, 2023). Note plant is growing in the water.

Figure 37. White indigo berry at Duckweed Pond Area (September 7, 2023). Note plant is growing close to pond waterline in upper left.

Table 1. Plant List for 2023 Field Plantings

Common Name	Scientific Name	Total Number	Planting Areas and Number of Plants							
			Gasp-arilla Pines	Marker 38	Long Pond - West	Long Pond - East	Duck-weed Pond	Duck-weed Mound	Moorhen Mound	Marker 9
Beach creeper	*Ernodea littoralis*	48				6	12	12	12	6
Elderberry	*Sambucus nigra var.*	12	3		9					
Fakahatchee grass	*Tripsacum dactyloides*	15	10	5						
Florida privet	*Forestiera segregata*	6			6					
Gopher apple	*Licania michauxii*	24				3	6	6	6	3
Gumbo limbo (a)	*Bursera simaruba*	16	2			2	2	4	4	2
Laurel cherry	*Prunus caroliniana*	2			2					
Live oak	*Quercus virginiana*	2	2							
Lizard's tail (b)	*Saururus cernuus*	20			6	6	8			
Muhly grass	*Muhlenbergia capillaris*	15	15							
Railroad vine (a)	*Ipomoea pes-caprea*	22	4			2	4	4	4	4
Rusty lyonia	*Lyonia ferruginea*	24				3	6	6	6	3
Seacoast sumpweed	*Iva imbricata*	24				3	6	6	6	3
Simpson's stopper	*Mycianthes fragrans*	6			6					
South Florida slash pine	*Pinus elliottii densa*	6								6
Spanish bayonet	*Yucca aloifolia*	24					12	12		
Swamp dogwood	*Cornus foemina*	6			6					
Sweetbay magnolia	*Magnolia virginiana*	8	5	3						
Water ash	*Fraxinus caroliniana*	2			2					
White indigo berry	*Randia aculeata*	32	6			4	6	6	6	4
TOTALS		314	47	8	37	29	62	56	44	31

(a) Two cuttings per planting location.

(b) Three to four bare root plants per planting location.

Table 2. Rainfall and Irrigation Record

Date	Rainfall at Preserve (inches) (a)	Area (planting date)							
		Gasparilla Pines (7/11/2023)	Marker 38 (7/11/2023)	Long Pond West (7/13/2023)	Marker 9 (7/18/2023)	Long Pond East (7/20/2023)	Duckweed Pond (7/24/2023)	Duckweed Mound (7/27/2023)	Moorhen Mound (8/1/2023)
6/18/2023	2-3*								
6/21/2023	< 1*								
6/29/2023	2.2								
7/10/2023	0.3								
7/14/2023		X	X	X					
7/15/2023	0.4								
7/18/2023	3.3								
7/23/2023				X	X	X			
7/26/2023		X					X		
7/29/2023				X	X	X	X	X	
8/1/2023	0.8								
8/3/2023				X					X
8/7/2023		X			X	X	X	X	
8/8/2023			X	X					X
8/13/2023	1.3								
8/15/2023	1.8								
8/16/2023	2.2								
8/18/2023	0.5								
8/21/2023	0.4								
8/24/2023	1.5								
8/28/2023 (b)	4.8								
8/31/2023 (b)	4.9								
9/11/2023				X					X
9/14/2023					X	X	X		
9/17/2023		X						X	
9/19/2023	0.2			X				X	X
9/21/2023	2.9				X	X	X		
9/23/2023	0.6								

(a) Rainfall measured using the rain guage located near the sheds at Preserve which was installed on 6/25/2023.

(b) Rainfall associated with Hurricane Idalia.

* These are estimates of rain fall before the rain guage instaled.

X indicates when an Area was irrigated.

- Irrigation consisted of filling the depression made around each plant two times during each irrigation event. From 2-4 gallons of water were applied to each plant during each irrigation event.

- Plants were well watered at the time of planting. The planting hole was initially filled with water and allowed to infiltrate into the soil before planting. Immediately after planting the depression made around each plant was filled with water.

Table 3. Species Summary for Survival and Size (9/7-10/23)

Species	Number Planted	Number Alive	Survival (percent)	Mean Size (feet) (a)
Beach Creeper	48	45	94	1.5
Elderberry	12	10	83	2.9
Fakahatchee Grass	15	14	93	1.0
Florida Privet	6	6	100	1.4
Gopher Apple	24	21	88	0.5
Gumbo Limbo	15	13	87	2.2
Laurel Cherry	2	2	100	2.8
Live Oak	2	2	100	1.8
Lizard's Tail	20	1	5	0.1
Muhly Grass	15	15	100	1.0
Railroad Vine	22	16	73	1.4
Rusty Lyonia	24	23	96	1.2
Seacoast Sumpweed	24	24	100	2.3
Simpson's Stopper	6	6	100	1.9
South Florida Slash Pine	6	6	100	2.2
Spanish Bayonet	24	24	100	1.0
Swamp Dogwood	6	6	100	3.8
Sweatbay Magnolia	6	6	100	4.3
Water Ash	2	2	100	5.3
White Indigo Berry	32	32	100	1.5

(a) Size is height for trees and shrubs and diameter for grasses and groundcovers (i.e., fakahatchee grass, gopher apple, muhly grass, and railroad vine).

Table 4. Species Summary of Survival and Size at Gasparilla Pines (9/5/23)

Species	Number Planted	Number Alive	Survival (percent)	Mean Size (feet) (a)
Fakahatchee Grass	10	9	90	1
Gumbo Limbo	2	1	50	2.5
Live Oak	2	2	100	1.8
Muhly Grass	15	15	100	1
Railroad Vine	4	0	0	
Sweetbay Magnolia	5	5	100	3.3
White Indigo Berry	6	6	100	1.4

(a) Size is height for trees and shrubs and diameter for grasses and groundcovers (i.e., fakahatchee grass, gopher apple, muhly grass, and railroad vine).

Table 5. Species Summary of Survival and Size at Marker 38
(9/5/23)

Species	Number Planted	Number Alive	Survival (percent)	Mean Size (feet) (a)
Elderberry	3	2	67	2.3
Fakahatchee Grass	5	5	100	1.0
Sweetbay Magnolia	3	3	100	3.0

(a) Size is height for trees and shrubs and diameter for grasses and groundcovers (i.e., fakahatchee grass, gopher apple, muhly grass, and railroad vine).

Table 6. Species Summary of Survival and Size at Long Pond -West (9/7/23)

Species	Number Planted	Number Alive	Survival (percent)	Mean Size (feet) (a)
Elderberry	9	8	89	3.1
Florida Privet	6	5	83	1.4
Laurel Cherry	2	2	100	2.8
Simpson's Stopper	6	6	100	1.9
Swamp Dogwood	6	6	100	3.8
Water Ash	2	2	100	5.3

(a) Size is height for trees and shrubs and diameter for grasses and groundcovers (i.e., fakahatchee grass, gopher apple, muhly grass, and railroad vine).

Table 7. Species Summary of Survival and Size at Long Pond -East (9/7/23)

Species	Number Planted	Number Alive	Survival (percent)	Mean Size (feet) (a)
Beach Creeper	6	4	67	1.8
Gopher Apple	3	3	100	0.4
Gumbo Limbo	2	2	100	2.3
Railroad Vine	2	2	100	0.5
Rusty Lyonia	3	3	100	1.0
Seacoast Sumpweed	3	3	100	2.5
White Indigo Berry	4	4	100	1.3

(a) Size is height for trees andshrubs and diameter for grasses and groundcovers (i.e., fakahatchee grass, gopher apple, muhly grass, and railroad vine).

Table 8. Species Summary of Survival and Size at Duckweed Mound (9/7/23)

Species	Number Planted	Number Alive	Survival (percent)	Mean Size (feet) (a)
Beach Creeper	12	12	100	1.6
Gopher Apple	6	5	83	0.5
Gumbo Limbo	4	4	100	2.2
Railroad Vine	4	3	75	0.7
Rusty Lyonia	6	5	83	1.2
Seacoast Sumpweed	6	6	100	2.3
Spanish Bayonet	6	6	100	1.0
White Indigo Berry	6	6	100	1.6

(a) Size is height for trees and shrubs and diameter for grasses and groundcovers (i.e., fakahatchee grass, gopher apple, muhly grass, and railroad vine).

Table 9. Species Summary of Survival and Size at Duckweed Pond (9/7/23)

Species	Number Planted	Number Alive	Survival (percent)	Mean Size (feet) (a)
Beach Creeper	12	11	92	1.6
Gopher Apple	6	5	83	0.5
Gumbo Limbo	2	2	100	2.5
Railroad Vine	4	4	100	1.8
Rusty Lyonia	6	6	100	1.3
Seacoast Sumpweed	6	6	100	2.0
Spanish Bayonet	12	12	100	1.0
White Indigo Berry	6	6	100	1.6

(a) Size is height for trees and shrubs and diameter for grasses and groundcovers (i.e., fakahatchee grass, gopher apple, muhly grass, and railroad vine).

Table 10. Species Summary of Survival and Size at Marker 9 (9/7/23)

Species	Number Planted	Number Alive	Survival (percent)	Mean Size (feet) (a)
Beach Creeper	6	6	100	2.3
Gopher Apple	3	3	100	0.5
Gumbo Limbo	2	2	100	2.0
Railroad Vine	4	4	100	2.5
Rusty Lyonia	3	3	100	1.0
Seacoast Sumpweed	3	3	100	2.2
South Florida Slash Pine	6	6	100	2.2
White Indigo Berry	4	4	100	1.4

(a) Size is height for trees and shrubs and diameter for grasses and groundcovers (i.e., fakahatchee grass, gopher apple, muhly grass, and railroad vine).

Table 11. Species Summary of Survival and Size at Moorhen Mound (9/10/23)

Species	Number Planted	Number Alive	Survival (percent)	Mean Size (feet) (a)
Beach Creeper	12	12	100	0.9
Gopher Apple	6	5	83	0.5
Gumbo Limbo	3	2	67	1.7
Railroad Vine	4	3	75	0.5
Rusty Layonia	6	6	100	1.1
Seacoast Sumpweed	6	6	100	2.3
Spanish Bayonet	6	6	100	1
White Indigo Berry	6	6	100	1.7

(a) Size is height for trees and shrubs and diameter for grasses and groundcovers (i.e., fakahatchee grass, gopher apple, muhly grass, and railroad vine).