

**Vegetation Monitoring at Yellow River Ranch
Northwest Florida Water Management District
Mitigation Site**

Fall 2025

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Yellow River Ranch

Qualitative and Quantitative Monitoring

October 2025

INTRODUCTION

The Yellow River Ranch consists of 275 acres in Santa Rosa County managed by the Northwest Florida Water Management District (Figure 1). It is located just north of the Yellow River adjacent to the floodplain and mitigates current and future wetland impacts by the Florida Department of Transportation (FDOT). The NFWMD goal is to return the Yellow River Ranch to pre-disturbance conditions in former Hydric Pine Flatwoods (HPF), Bottomland Forest, and Cypress through ditch plugging, breaching of dikes, prescribed fire, herbicide treatment, and planting of native species while preserving intact Bottomland Forest in the floodplain (Figure 2). We conducted quantitative and qualitative monitoring to document the current plant species composition and vegetation structure of Hydric Pine Flatwoods, and used belt transects to measure tree species composition and structure in restoration Bottomland Forest and Cypress areas with planted saplings. FNAI began annual monitoring in October 2018. Prior to 2018, the site vegetation was monitored by Ecological Resource Consultants, Inc. (ERC).

METHODS

The quantitative monitoring utilized 150-foot long transect lines established by ERC and permanently marked with metal posts. Two transects were located in the Hydric Pine Flatwoods target community (Figure 2). We placed eight 1m x 1m quadrats spaced every 20 feet along the left side of each transect line, beginning at 0 and ending at 140 feet.

In each quadrat, we visually estimated the percent cover of each plant species, including individuals rooted in the quadrat as well as overhanging. Canopy over 2 m in height was excluded from cover estimates. Only the lower 2 m portions of larger individuals were counted as cover, including the lower portions of tree trunks rooted in quadrats. We converted plant cover estimates to mid-point values and averaged them across each transect. We also calculated relative cover (in which all plant cover and open ground is given as a proportion of the total plant cover); this is reported in separate pie charts.

In addition to cover by species, cover was also estimated as a whole number for all plants, all herbs, and all shrubs. Relative covers for each plant species were calculated as a portion of the total plant cover.

For each quad, the height of shrubs was recorded in centimeters. The observer used a measuring pole marked in decimeters and estimated the average height over the quad. Woody vines and tree species were omitted from this measurement.

We collected data on the success of tree plantings on 2 belt transects in Cypress and 2 in Bottomland Forest. Transect corners were previously marked with metal posts by ERC. FNAI moved Belt Transect #3 in Cypress to a new location in 2018 on the recommendation of project manager David Clayton

(NFWFMD). Within each 20 by 150-foot transect, we tallied all tree species by height class. We calculated an estimate of total trees per acre by multiplying the tally by 14.28.

To conduct qualitative monitoring, we walked meandering transects through Hydric Pine Flatwoods, recording all plant species observed, as well as notes on vegetation structure. FNAI botanists Kim Alexander, Amy Jenkins, and Ethan Hughes conducted all field surveys on October 30, 2025.



Figure 1. Location map of Yellow River Ranch mitigation site monitored by FNAI.

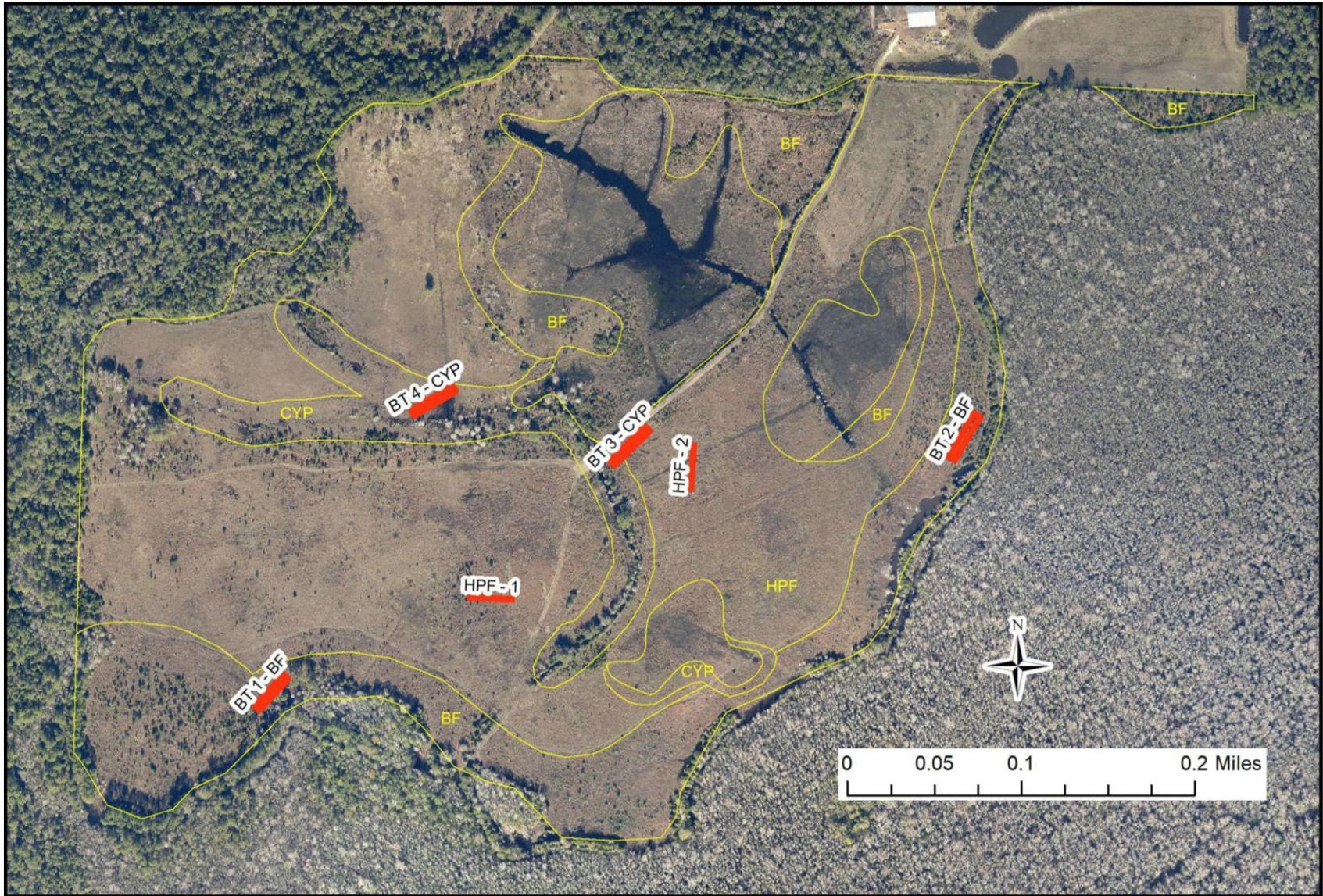


Figure 2. Location of permanent transects at Yellow River Ranch. HPF=Hydric Pine Flatwoods, CYP=Cypress, BF=Bottomland Forest, BT=Belt Transect.

RESULTS AND DISCUSSION

We recorded a total of 75 plant taxa during the Fall 2025 monitoring in Hydric Pine Flatwoods at Yellow River Ranch (Taxonomy follows Weakley, A.S., and Southeastern Flora Team. 2023. Flora of the southeastern United States: Florida. University of North Carolina Herbarium, North Carolina Botanical Garden, Chapel Hill, U.S.A.

Table 1). Three new taxa were recorded during the 2025 monitoring. Taxonomy follows Weakley, A.S., and Southeastern Flora Team. 2023. Flora of the southeastern United States: Florida. University of North Carolina Herbarium, North Carolina Botanical Garden, Chapel Hill, U.S.A.

Table 1. Plant species observed in Hydric Pine Flatwoods at Yellow River Ranch Mitigation Site on October 30, 2025. (bold name = new species; * = state-listed endangered or threatened; † = non-native invasive)

Scientific Name	Common Name
<i>Acer rubrum</i>	red maple
<i>Agalinis fasciculata</i>	beach false foxglove
<i>Anchistea virginica</i>	Virginia chain fern
<i>Andropogon cretaceus</i>	purple bluestem
<i>Andropogon virginicus</i>	broomsedge bluestem
<i>Anthenantia rufa</i>	purple silkyscale
<i>Aristida beyrichiana</i>	Southern wiregrass
<i>Baccharis halimifolia</i>	groundsel tree
<i>Carex glaucescens</i>	clustered sedge
<i>Centella erecta</i>	spadeleaf
<i>Cephalanthus occidentalis</i>	common buttonbush
<i>Chamaecyparis thyoides</i>	Atlantic white cedar
<i>Coleataenia longifolia</i>	ciliate redtop panicum
<i>Ctenium aromaticum</i>	toothache grass
<i>Cyrilla racemiflora</i>	titi
<i>Dichantherium scabriusculum</i>	woolly witchgrass
<i>Dichondra carolinensis</i>	Carolina ponysfoot
<i>Diodia harperi</i>	Harper's buttonweed
<i>Edrastima uniflora</i>	oldenlandia
<i>Erianthus giganteus</i>	sugarcane plumegrass
<i>Erianthus strictus</i>	narrow plumegrass
<i>Eriocaulon decangulare</i>	tenangle pipewort
<i>Eupatorium anomalum</i>	anomalous thoroughwort
<i>Eupatorium capillifolium</i>	dogfennel
<i>Eupatorium semiserratum</i>	smallflower thoroughwort
<i>Euthamia caroliniana</i>	slender flattop goldenrod
<i>Euthamia scabra</i>	Gulf Coast goldenrod
<i>Gelsemium sempervirens</i>	yellow jessamine
<i>Hypericum cistifolium</i>	roundpod St. John's wort

Scientific Name	Common Name
<i>Hypericum hypericoides</i>	St. Andrew's cross
<i>Hypericum nitidum</i>	Carolina St. John's wort
<i>Hyptis alata</i>	clustered bushmint
<i>Ilex glabra</i>	gallberry
<i>Ilex myrtifolia</i>	myrtle-leaved holly
<i>Ilex verticillata</i>	common winterberry
<i>Ilex vomitoria</i>	yaupon
<i>Kelochloa verrucosa</i>	warty panicgrass
<i>Lachnanthes caroliniana</i>	Carolina redroot
† <i>Ligustrum sinense</i>	Chinese privet
<i>Lorinseria areolata</i>	netted chain fern
<i>Ludwigia pilosa</i>	hairy primrosewillow
<i>Lycopodiella alopecuroides</i>	foxtail club-moss
<i>Lycopus rubellus</i>	taperleaf waterhorehound
† <i>Lygodium japonicum</i>	Japanese climbing fern
<i>Magnolia virginiana</i> var. <i>australis</i>	sweetbay
<i>Morella cerifera</i>	Southern bayberry
moss	
<i>Nyssa biflora</i>	swamp tupelo
<i>Osmunda spectabilis</i>	royal fern
<i>Pinus elliottii</i>	slash pine
<i>Pluchea foetida</i>	stinking camphorweed
<i>Pseudognaphalium obtusifolium</i>	sweet everlasting
<i>Quercus hemisphaerica</i>	laurel oak
<i>Rhexia nuttallii</i>	Nuttall's meadowbeauty
<i>Rhexia</i> sp.	meadowbeauty
<i>Rhexia virginica</i>	handsome harry
<i>Rhynchospora chalarocephala</i>	loosehead beaksedge
<i>Rhynchospora elliottii</i>	Elliott's beaksedge
<i>Rhynchospora microcarpa</i>	Southern beaksedge
<i>Rubus pensilvanicus</i>	sawtooth blackberry
<i>Rubus trivialis</i>	Southern dewberry
<i>Scleria</i> sp.	nutrush
<i>Scoparia dulcis</i>	licoriceweed
<i>Solidago fistulosa</i>	pinebarren goldenrod
<i>Symphotrichum dumosum</i>	rice button aster
<i>Tamala palustris</i>	swamp bay
<i>Taxodium ascendens</i>	pond cypress
<i>Taxodium distichum</i>	bald cypress
<i>Toxicodendron radicans</i> var. <i>radicans</i>	Eastern poison ivy
† <i>Triadica sebifera</i>	Chinese tallow tree
<i>Viola vittata</i>	Southern water violet
<i>Wisteria frutescens</i> var. <i>frutescens</i>	American wisteria
<i>Xyris fimbriata</i>	fringed yellow-eyed grass

Scientific Name	Common Name
<i>Xyris iridifolia</i>	irisleaf yellow-eyed grass
<i>Xyris platylepis</i>	tall yellow-eyed grass
Total number of taxa: 75	

Hydric Pine Flatwoods

Qualitative sampling. We accessed the Hydric Pine Flatwoods in the vicinity of Transect 2 to create a species list (Figure 2). This area had a very sparse canopy of young slash pines around 30 feet high and was quickly becoming dominated by hardwood species such as myrtle holly and swamp tupelo. Shrubs have been growing quickly, and the site has not been burned recently. Common species included sawtooth blackberry, groundsel tree, southern bayberry, gallberry, young slash pine, Atlantic white cedar, and swamp tupelo. The ground layer was mostly herbaceous and weedy with mostly woolly witchgrass. Wiregrass was present, but very sparse and concentrated in the western area. The non-native invasive Chinese tallow tree and Chinese privet, observed in prior site visits, are still present. We observed a total of 75 species in this community in 2025 (Taxonomy follows Weakley, A.S., and Southeastern Flora Team. 2023. Flora of the southeastern United States: Florida. University of North Carolina Herbarium, North Carolina Botanical Garden, Chapel Hill, U.S.A.

Table 1).

Quantitative sampling. The western Transect 1 (Figure 3, Table 2) had a total of 39 species with 56% total plant cover. Atlantic white cedar, red maple, southern bayberry, slash pine, and slash pine contributed the most cover. Total shrub cover was 12% with most shrubs over 1 m tall. However, other woody species contributed much more cover. Atlantic white cedar and red maple alone occupied around 20% of the transect. Herbs averaged around 5% cover, and wiregrass was about the same as last year. Overall vegetation composition was unchanged, but diversity is decreasing and woody cover continues to increase.

The eastern Transect 2 (Figure 4, Table 3) had a total of 30 species with 55% total plant cover. Woolly witchgrass, southern bayberry, and swamp tupelo contributed the most cover. Shrub species averaging close to 1 meter tall made up around 9% cover, but other woody species contributed an addition 10% cover and the overall vegetation is getting taller (over the 2 m cutoff for inclusion in these groundcover plots). Overall diversity was slightly lower than last year. Herbs averaged around 44% cover, with woolly witchgrass by far the most abundant.

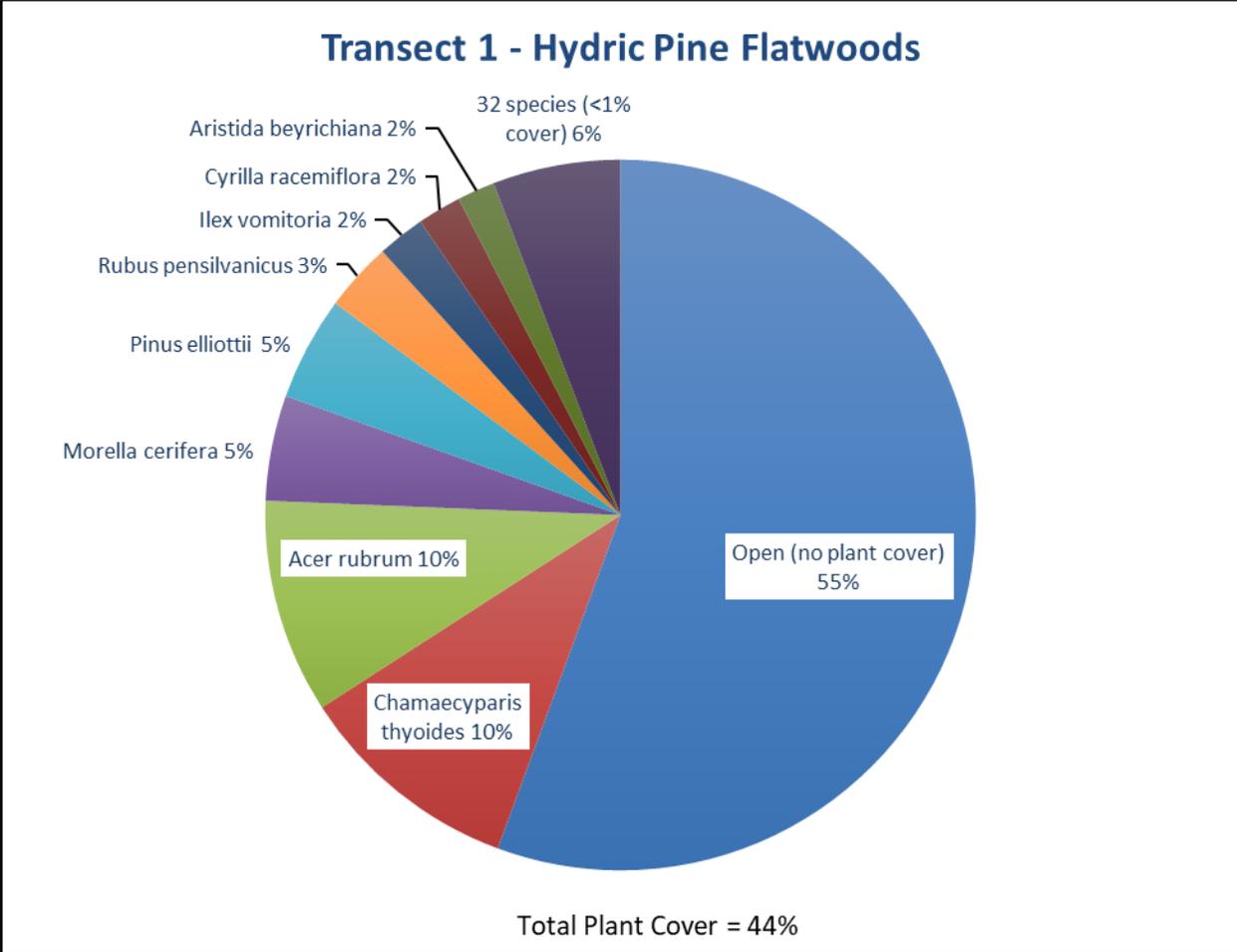


Figure 3. Percent relative cover of plant species in Hydric Pine Flatwoods Transect 1.

Table 2. Percent cover of plant species in Hydric Pine Flatwoods Transect 1 sampled on October 30, 2025.

Scientific name	Common name	Average percent cover per quadrat
<i>Acer rubrum</i>	red maple	10.69
<i>Anchistea virginica</i>	Virginia chain fern	0.19
<i>Andropogon virginicus</i>	broomsedge bluestem	0.25
<i>Aristida beyrichiana</i>	Southern wiregrass	1.88
<i>Carex glaucescens</i>	clustered sedge	0.13
<i>Centella erecta</i>	spadeleaf	0.13
<i>Chamaecyparis thyoides</i>	Atlantic white cedar	11.25
<i>Coleataenia longifolia</i>	ciliate redtop panicum	0.06
<i>Cyrilla racemiflora</i>	titi	2.19
<i>Dichanthelium scabriusculum</i>	woolly witchgrass	0.13
<i>Dichondra carolinensis</i>	Carolina ponysfoot	0.25
<i>Eriocaulon decangulare</i>	tenangle pipewort	0.06

Scientific name	Common name	Average percent cover per quadrat
<i>Eupatorium capillifolium</i>	dogfennel	0.25
<i>Euthamia scabra</i>	Gulf Coast goldenrod	0.06
<i>Gelsemium sempervirens</i>	yellow jessamine	0.06
<i>Hypericum cistifolium</i>	roundpod St. John's wort	0.06
<i>Hypericum hypericoides</i>	St. Andrew's cross	0.06
<i>Ilex glabra</i>	gallberry	0.38
<i>Ilex vomitoria</i>	yaupon	2.38
<i>Kelochloa verrucosa</i>	warty panicgrass	0.13
<i>Lachnanthes caroliniana</i>	Carolina redroot	0.25
<i>Lorinseria areolata</i>	netted chain fern	0.44
<i>Lycopus rubellus</i>	taperleaf waterhorehound	0.06
<i>Lygodium japonicum</i>	Japanese climbing fern	0.13
<i>Morella cerifera</i>	Southern bayberry	5.25
moss	moss	0.13
<i>Osmunda spectabilis</i>	royal fern	0.06
<i>Pinus elliotii</i>	slash pine	5.19
<i>Pinus</i> sp.	pine	0.06
<i>Quercus hemisphaerica</i>	laurel oak	0.19
<i>Rhexia</i> sp.	meadowbeauty	0.25
<i>Rhynchospora</i> sp.	beaksedge	0.06
<i>Rubus pensilvanicus</i>	sawtooth blackberry	3.44
<i>Scoparia dulcis</i>	licoriceweed	0.19
<i>Solidago fistulosa</i>	pinebarren goldenrod	0.69
<i>Symphyotrichum dumosum</i>	rice button aster	1.00
<i>Tamala palustris</i>	swamp bay	0.44
<i>Toxicodendron radicans</i> var. <i>radicans</i>	Eastern poison ivy	0.13
<i>Viola vittata</i>	Southern water violet	0.06
<i>Xyris platylepis</i>	tall yellow-eyed grass	0.06
Open (no plant cover)		55.63

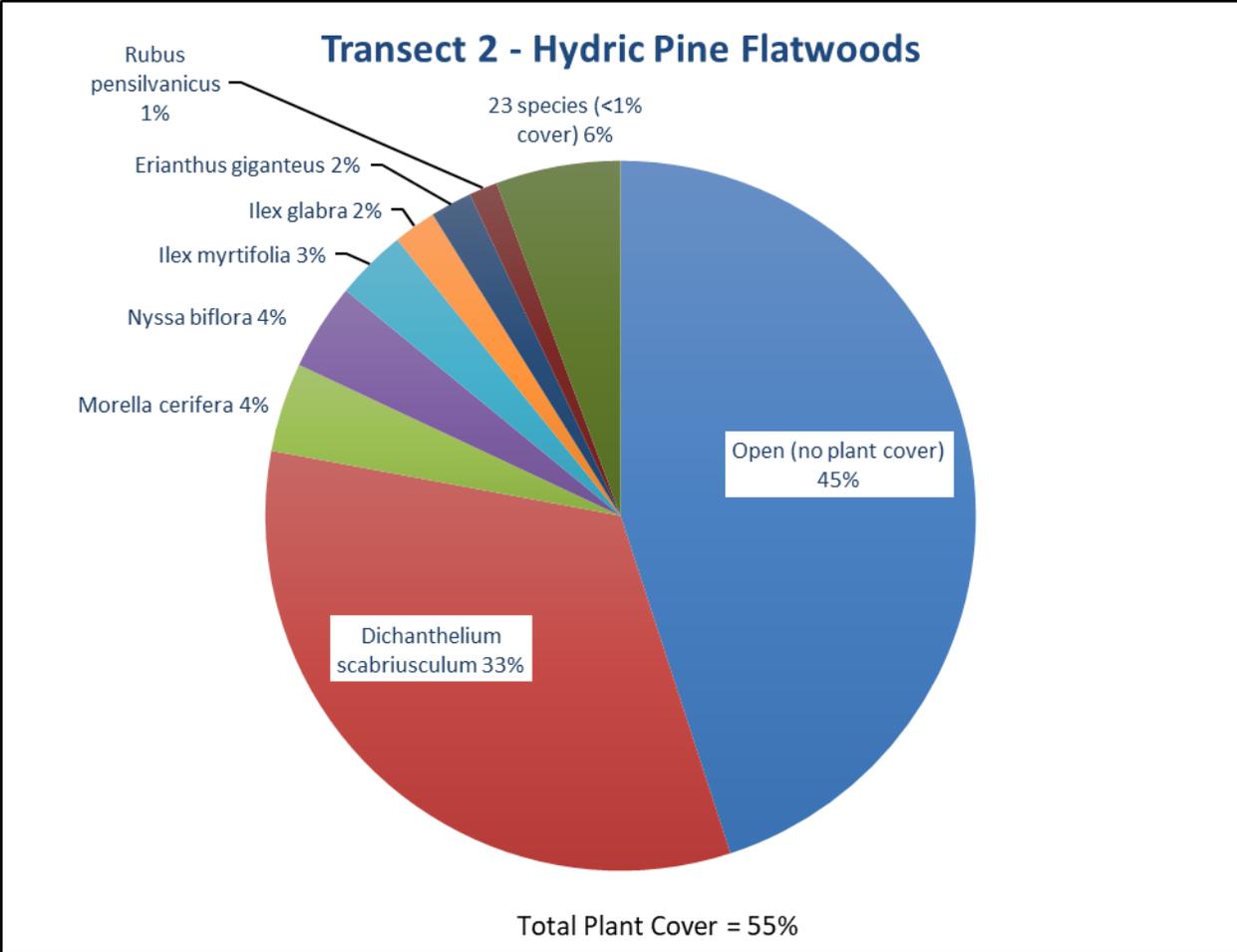


Figure 4. Percent relative cover of plant species in Hydric Pine Flatwoods Transect 2.

Table 3. Percent cover of plant species in Hydric Pine Flatwoods Transect 2 sampled on October 30, 2025.

Scientific name	Common name	Average percent cover per quadrat
<i>Acer rubrum</i>	red maple	0.38
<i>Andropogon sp.</i>	bluestem	0.06
<i>Andropogon virginicus</i>	broomsedge bluestem	0.19
<i>Carex glaucescens</i>	clustered sedge	0.13
<i>Centella erecta</i>	spadeleaf	0.25
<i>Dichanthelium scabriusculum</i>	woolly witchgrass	38.06
<i>Edrastima uniflora</i>	oldenlandia	0.06
<i>Erianthus giganteus</i>	sugarcane plumegrass	2.19
<i>Eupatorium semiserratum</i>	smallflower thoroughwort	1.06
<i>Euthamia caroliniana</i>	slender flattop goldenrod	0.44
<i>Euthamia scabra</i>	Gulf Coast goldenrod	0.19
<i>Hypericum hypericoides</i>	St. Andrew's cross	0.06
<i>Ilex glabra</i>	gallberry	2.25
<i>Ilex myrtifolia</i>	myrtle-leaved holly	3.75
<i>Kelochloa verrucosa</i>	warty panicgrass	0.06

Scientific name	Common name	Average percent cover per quadrat
<i>Lachnanthes caroliniana</i>	Carolina redroot	0.31
<i>Ludwigia pilosa</i>	hairy primrosewillow	0.19
<i>Lycopus rubellus</i>	taperleaf waterhorehound	0.50
<i>Morella cerifera</i>	Southern bayberry	4.69
<i>Nyssa biflora</i>	swamp tupelo	4.56
<i>Pinus elliotii</i>	slash pine	0.44
<i>Pluchea baccharis</i>	rosy camphorweed	0.44
<i>Rhexia nuttallii</i>	Nuttall's meadowbeauty	0.06
<i>Rhynchospora microcarpa</i>	Southern beaksedge	0.19
<i>Rhynchospora sp.</i>	beaksedge	0.06
<i>Rubus pensilvanicus</i>	sawtooth blackberry	1.50
<i>Scleria sp.</i>	nutrush	0.19
<i>Solidago fistulosa</i>	pinebarren goldenrod	0.19
<i>Symphotrichum dumosum</i>	rice button aster	0.69
<i>Triadica sebifera</i>	Chinese tallow tree	0.44
Open (no plant cover)		45.00

Bottomland Forest

Quantitative sampling. Belt transect 1 contained a mix of mostly red maple, slash pine, and cypress, with a few additional species occurring only occasionally (Table 4). Slash pines and red maples were gaining height compared to last year, and there was an abundance of red maple seedlings. Both bald cypress and pond cypress stems were recorded in the transect, but juvenile similarities between these two types make them difficult to distinguish when young, and many taxonomists consider them to be a single species. The invasive non-native Chinese tallow tree was recorded along the transect for the first time in 2020 and was again found this year. Overall stem density was similar to last year.

Belt Transect 2 consisted of a mix of larger Atlantic white cedars with an abundance of small, regenerating cedars and red maples (

Table 5). Six stems, mostly young, of the invasive non-native Chinese tallow tree were spotted along the transect, as well as a single small camphor tree that was hand-pulled. Overall, stems increased, mainly driven by abundant Atlantic white cedar seedlings, but larger cedars are decreasing with several standing dead trees seen in the transect.

Cypress

Quantitative sampling. Belt transect 3 is located adjacent to the elevated road through the site in an area that was previously planted with native trees. Trees consisted of mainly larger swamp tupelo and pond cypress with a fair number of Atlantic white cedars and a mix of other species (Table 6). The number of stems detected was similar to last year.

Belt Transect 4 was quite open and contained mostly young pond cypress. Swamp tupelos are continuing to grow vigorously, and seven other species had stems over 6' tall (

Species	Total Stems	0-1'	>1'-2'	>2'-3'	>3'-4'	>4'-5'	>5'-6'	>6'
<i>Acer rubrum</i>	144	15	15	19	19	20	11	
<i>Chamaecyparis thyoides</i>	29	0	0	0	1	2	4	
<i>Ilex myrtifolia</i>	12	1	2	1	0	0	0	
<i>Ilex verticillata</i>	4	0	0	0	0	0	0	
<i>Magnolia virginiana</i>	10	1	0	1	0	0	0	
<i>Nyssa biflora</i>	276	0	0	0	0	0	2	
<i>Pinus elliotii</i>	13	0	0	0	0	0	0	
<i>Quercus laurifolia</i>	1	0	1	0	0	0	0	
<i>Taxodium ascendens</i>	53	0	0	0	0	0	0	
<i>Triadica sebifera</i>	1	0	0	0	0	0	0	
Total Stems All Species	543							
Stems/Acre	7754							

Table 7). Cypress on the transect appear to be maturing well. The overall number of stems along the transect increased since to last year driven by the increase in red maple seedlings. The non-native invasive Chinese tallow tree was found along the transect, and smaller stems were hand-pulled.

Table 4. Belt Transect Summary for Bottomland Forest Transect 1 (YYR-BT1-630) sampled on October 30, 2025, listing the number of tree stems by species and height class.

Species	Total Stems	0-1'	>1'-2'	>2'-3'	>3'-4'	>4'-5'	>5'-6'	>6'
<i>Acer rubrum</i>	310	64	34	32	39	28	13	100
<i>Cephalanthus occidentalis</i>	12	1	2	1	0	0	0	8
<i>Chamaecyparis thyoides</i>	23	8	6	0	0	2	1	6
<i>Fraxinus caroliniana</i>	0	0	0	0	0	0	0	0
<i>Ilex myrtifolia</i>	2	0	1	0	0	0	1	0
<i>Nyssa biflora</i>	16	0	1	0	0	0	1	14
<i>Pinus elliotii</i>	51	0	0	0	0	0	0	51
<i>Styrax americana</i>	6	6	0	0	0	0	0	0
<i>Taxodium ascendens</i>	18	0	0	4	1	0	0	13
<i>Taxodium distichum</i>	18	0	0	0	1	0	1	16
<i>Triadica sebifera</i>	2	0	0	0	0	0	0	2
Total Stems All Species	458							
Stems/Acre	6540							

Table 5. Belt Transect Summary for Bottomland Forest Transect 2 (YYR-BT2-630) sampled on October 30, 2025, listing the number of tree stems by species and height class.

Species	Total Stems	0-1'	>1'-2'	>2'-3'	>3'-4'	>4'-5'	>5'-6'	>6'
<i>Acer rubrum</i>	150	101	16	9	1	6	2	15
<i>Chamaecyparis thyoides</i>	527	473	21	8	4	1	0	20
<i>Cornus foemina</i>	5	5	0	0	0	0	0	0
<i>Ilex opaca</i>	3	0	0	0	0	1	0	2
<i>Juniperus virginiana</i>	4	0	1	0	0	0	0	3
<i>Magnolia virginiana</i>	1	0	0	0	0	0	0	1
<i>Nyssa biflora</i>	1	1	0	0	0	0	0	0
<i>Pinus palustris</i>	1	0	0	0	0	0	0	1
<i>Pinus elliotii</i>	2	1	0	0	0	0	0	1
<i>Quercus laurifolia</i>	15	13	0	0	0	0	0	2
<i>Triadica sebifera</i>	6	1	2	1	0	0	0	2
<i>Taxodium distichum</i>	1	0	0	0	0	1	0	0
<i>Persea palustris</i>	1	0	1	0	0	0	0	0
<i>Camphora officinarum</i>	1	0	1	0	0	0	0	0
Total Stems All Species	718							
Stems/Acre	10253							

Table 6. Belt Transect Summary for Cypress Transect 3 (YYR-BT3-621) sampled on October 30, 2025, showing the number of tree stems by species and height class.

Species	Total Stems	0-1'	>1'-2'	>2'-3'	>3'-4'	>4'-5'	>5'-6'	>6'
<i>Acer rubrum</i>	144	15	15	19	19	20	11	45
<i>Chamaecyparis thyoides</i>	29	0	0	0	1	2	4	22
<i>Ilex myrtifolia</i>	12	1	2	1	0	0	0	8
<i>Ilex verticillata</i>	4	0	0	0	0	0	0	4
<i>Magnolia virginiana</i>	10	1	0	1	0	0	0	8
<i>Nyssa biflora</i>	276	0	0	0	0	0	2	274
<i>Pinus elliotii</i>	13	0	0	0	0	0	0	13
<i>Quercus laurifolia</i>	1	0	1	0	0	0	0	0
<i>Taxodium ascendens</i>	53	0	0	0	0	0	0	53
<i>Triadica sebifera</i>	1	0	0	0	0	0	0	1
Total Stems All Species	543							
Stems/Acre	7754							

Table 7. Belt Transect Summary for Cypress Transect 4 (YYR-BT4-621) sampled October 30, 2025, showing the number of tree stems by species and height class.

Species	Total Number	0-1'	>1'-2'	>2'-3'	>3'-4'	>4'-5'	>5'-6'	>6'
<i>Chamaecyparis thyoides</i>	33	9	12	4	1	0	3	4
<i>Magnolia virginiana</i>	8	0	0	1	0	0	0	7
<i>Nyssa biflora</i>	49	0	0	0	1	6	2	40
<i>Pinus elliotii</i>	7	0	2	0	1	0	1	3
<i>Taxodium ascendens</i>	132	0	2	1	4	4	2	119
<i>Acer rubrum</i>	240	99	61	39	23	5	5	8
<i>Ilex myrtifolia</i>	4	0	0	0	0	0	0	4
<i>Triadica sebifera</i>	4	2	0	1	0	0	0	1
Total Number All Species	477							
Number of Saplings/Acre	6812							