

**Vegetation Monitoring at Dutex West  
Northwest Florida Water Management District  
Mitigation Site**

Fall 2024

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**Dutex West Restoration Site**  
**Qualitative and Quantitative Monitoring**  
**December 2024**

## **INTRODUCTION**

The Dutex Restoration Site consists of 2 tracts totaling 820 acres in Escambia County managed by the Northwest Florida Water Management District (Figure 1). It is located on Perdido Bay, just to the southwest of Saufley Field. This site mitigates current and future Florida Department of Transportation (FDOT) wetland impacts. Only the western tract has been monitored by FNAI from 2018-2023. This tract is accessed by taking Saufley Pines Road west from North Blue Angel Parkway and then turning south onto Wyndotte Road.

The NFWFMD goal is to return the Dutex Restoration Site to pre-disturbance conditions. Target communities include Hydric Pine Flatwoods (HPF), Hydric Pine Savanna (HPS), Bay Swamp (BS), Mesic Flatwoods (MF), Freshwater Marsh (FM), and Salt Marsh (Figure 2). FNAI conducted quantitative and qualitative monitoring to document the current plant species composition and vegetation structure of these targeted communities. FNAI began annual monitoring in October 2018. Prior to 2018, the site vegetation was monitored by Ecological Resource Consultants, Inc. (ERC).

## **METHODS**

We conducted quantitative monitoring utilizing 300-foot-long permanent transect lines established and marked during previous surveys conducted by ERC. Two transects were located in the Hydric Pine Flatwoods target community and two in Hydric Pine Savanna (Figure 2). In 2018 during the first year of monitoring by FNAI, only the northern post was relocated for the HPS Transect 3, so the southern point was re-established and marked with a metal T-post. FNAI also re-established and marked the north and south ends of the HPS Transect 2, although the transect line did intersect the center marking post established by ERC. We placed fifteen 1m x 1m quadrats along the left side of each transect line, beginning at 0 and then spaced every 20 feet, ending at 280 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 estimated open ground in each quadrat as the percentage of ground not obscured by plant cover up to 2 m.

We conducted qualitative monitoring by walking meandering transects through each of the two target communities plus Bay Swamp, Mesic Flatwoods, Freshwater Marsh, and Salt Marsh. We recorded all species observed on each transect and noted observations of vegetation structure. FNAI botanists Kim Alexander, Amy Jenkins, Allie Heiker, and Ethan Hughes conducted all field surveys on December 9-10, 2024.

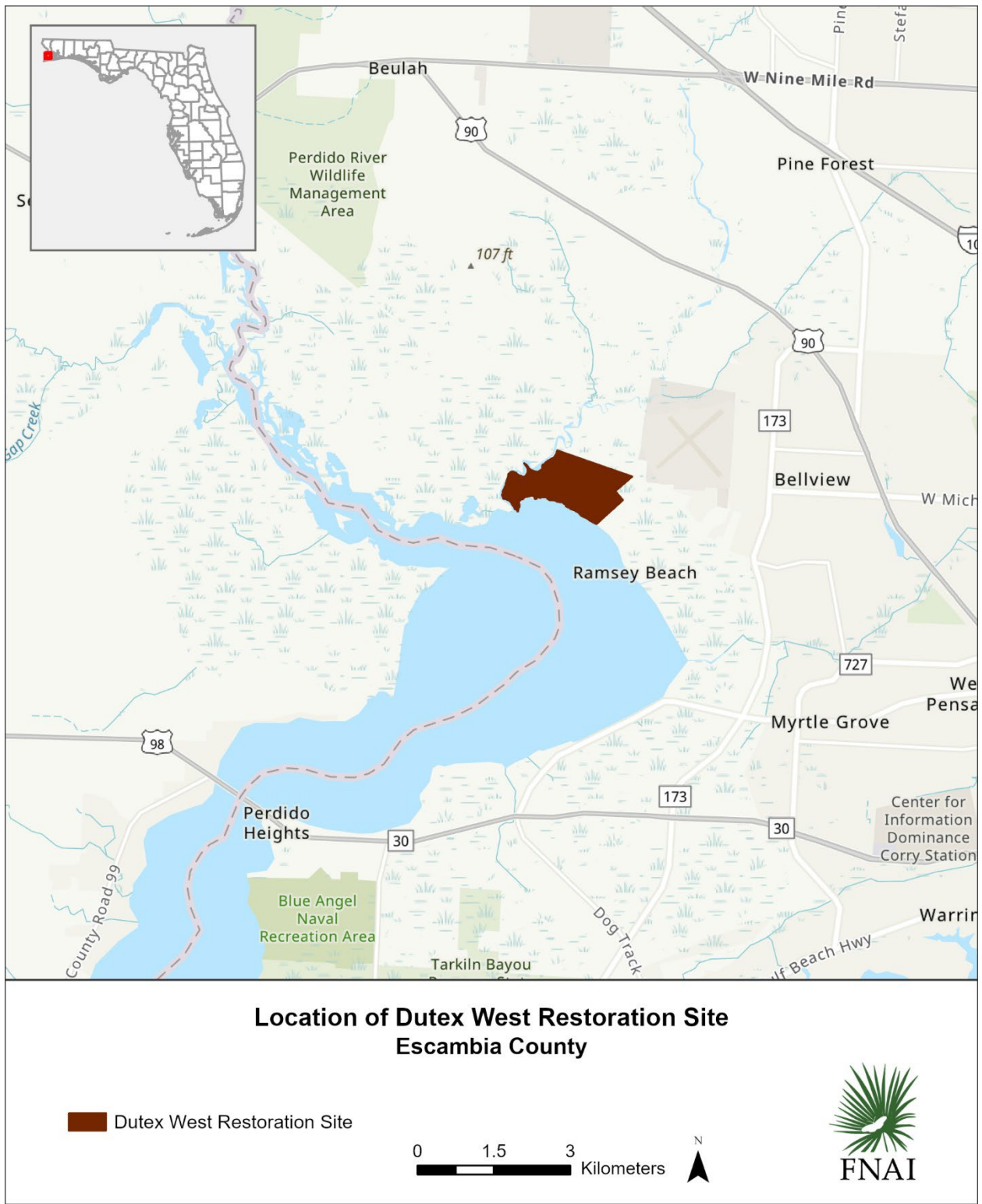


Figure 1. Location map of Dutex West Restoration Site.





Figure 2. Location of permanent transects at Dutex Restoration Site – West Tract. HPF=Hydric Pine Flatwoods, HPS=Hydric Pine Savanna, MF=Mesic Flatwoods, BS=Bay Swamp, FM=Freshwater Marsh, SM=Salt Marsh.

## RESULTS AND DISCUSSION

We recorded 227 plant taxa during the 2024 monitoring period in the target communities at Dutex West (Table 1). Twenty new species were found during the 2024 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. This is a change from the previous FNAI monitoring reports, which followed Wunderlin, R. P., B.F. Hansen, A.R. Franck, and F.B. Essig. 2017. Atlas of Florida Plants (<http://florida.plantatlas.usf.edu/>), Institute for Systematic Botany, University of South Florida, Tampa.

Table 1. Plant species observed in the target communities at Dutex West Mitigation Site on December 9-10, 2024. (bold name = new species; bold X = new observation in community type; \* = threatened or endangered; † = non-native invasive)

Scientific Name	Common Name	Hydric Pine Flatwoods	Hydric Pine Savanna	Bay Swamp	Mesic Flatwoods	Freshwater Marsh	Salt Marsh	Grand Total
<i>Acer rubrum</i> var. <i>trilobum</i>	Carolina red maple	X	X	X		X		4
<i>Amphicarpum muehlenbergianum</i>	blue maidencane	X	X					2
<i>Anchistea virginica</i>	Virginia chain fern	X	X	X	X			4
* <i>Andropogon arctatus</i>	pinewoods bluestem		X					1
<b><i>Andropogon campbellii</i></b>	deceptive bluestem				<b>X</b>			1
<i>Andropogon cretaceus</i>	purple bluestem	X	X	X	X			4
<i>Andropogon dealbatus</i>	wetland white bluestem	<b>X</b>	<b>X</b>					2
<i>Andropogon glomeratus</i>	bushy bluestem		X		X	X		3
<i>Andropogon perangustatus</i>	narrowleaf bluestem		X					1
<i>Andropogon</i> sp.	bluestem	X	X	X				3
<b><i>Andropogon tenuispathus</i></b>	<b>maritime bushy bluestem</b>		<b>X</b>				<b>X</b>	2
<b><i>Andropogon virginicus</i> var. 1</b>	<b>smooth bluestem</b>		<b>X</b>				<b>X</b>	2
<i>Andropogon virginicus</i> var. <i>virginicus</i>	broomsedge bluestem	X	X		X			3
<i>Anthenantia rufa</i>	purple silkyscale		X					1
<i>Aristida beyrichiana</i>	Southern wiregrass	X	X		X			3
<i>Aristida palustris</i>	longleaf threeawn		X					1
<i>Aristida spiciformis</i> var. <i>spiciformis</i>	bottlebrush threeawn				X			1
<i>Aristida virgata</i>	arrowfeather threeawn		<b>X</b>		X			2
<i>Aronia arbutifolia</i>	red chokeberry		X					1
<i>Arundinaria tecta</i>	small cane		X	X				2
<i>Baccharis halimifolia</i>	groundsel tree	X	X			X	<b>X</b>	4
<i>Bacopa monnieri</i>	herb-of-grace					X		1
<i>Bidens mitis</i>	smallfruit beggarticks	X	X	X				3
<i>Bolboschoenus robustus</i>	saltmarsh bulrush					X		1
<i>Carex glaucescens</i>	clustered sedge	X	X	X				3
<i>Carex longii</i>	Long's sedge		X					1
<i>Centella erecta</i>	spadeleaf	X		X				2

Scientific Name	Common Name	Hydric Pine Flatwoods	Hydric Pine Savanna	Bay Swamp	Mesic Flatwoods	Freshwater Marsh	Salt Marsh	Grand Total
<i>Chamaecrista</i> sp.	sensitive pea				X			1
<i>Chamaecyparis thuyoides</i>	Atlantic white cedar		X	X				2
<i>Chasmanthium laxum</i>	slender woodoats		X					1
<i>Cladium jamaicense</i>	sawgrass	X		X		X	X	4
<b><i>Clethra tomentosa</i></b>	<b>downy sweet pepperbush</b>			X	X			2
<i>Cliftonia monophylla</i>	black titi	X	X	X				3
<i>Coleataenia longifolia</i>	ciliate redtop panicum		X					1
<i>Crinum americanum</i> var. <i>americanum</i>	string lily			X				1
<i>Ctenium aromaticum</i>	toothache grass		X		X			2
<i>Cuscuta</i> sp.	dodder			X		X		2
<i>Cyperus polystachyos</i>	manyspike flatsedge					X		1
<i>Cyperus</i> sp.	flatsedge						X	1
<i>Cyrilla racemiflora</i>	titi		X	X				2
<b><i>Dichantherium chamaelonche</i></b>	<b>carpet witchgrass</b>		X					1
<b><i>Dichantherium dichotomum</i></b>	<b>cypress witchgrass</b>	X						1
<i>Dichantherium dichotomum</i> var. <i>nitidum</i>	shining witchgrass						X	1
<i>Dichantherium ensifolium</i>	small-leaved witchgrass	X	X	X	X			4
<i>Dichantherium leucothrix</i>	rough witchgrass	X	X					2
<b><i>Dichantherium longiligulatum</i></b>	<b>long-ligule witchgrass</b>	X	X					2
<i>Dichantherium portoricense</i>	Puerto Rican witchgrass		X		X			2
<i>Dichantherium scabriusculum</i>	woolly witchgrass	X	X	X				3
<i>Dichantherium strigosum</i> var. <i>leucoblepharis</i>	roughhair witchgrass				X			1
<i>Dichantherium tenue</i>	white-edged witchgrass		X		X			2
<i>Drosera capillaris</i>	pink sundew	X	X					2
<i>Dulichium arundinaceum</i> var. <i>arundinaceum</i>	threeway sedge			X				1
<i>Edrastima uniflora</i>	oldenlandia	X	X					2
<b><i>Eleocharis confervoides</i></b>	<b>algal bulrush</b>			X				1
<i>Eleocharis</i> sp.	spikerush					X		1
<i>Eleocharis tuberculosa</i>	conecup spikerush		X					1
<i>Eriocaulon compressum</i>	flattened pipewort		X	X				2
<i>Eriocaulon decangulare</i> var. <i>decangulare</i>	common ten-angled pipewort	X	X	X				3
<i>Eupatorium anomalum</i>	anomalous thoroughwort	X			X		X	3
<i>Eupatorium capillifolium</i>	dogfennel				X			1
<i>Eupatorium compositifolium</i>	yankeeweed				X			1
<i>Eupatorium mohrii</i>	Mohr's thoroughwort		X					1
<i>Eupatorium semiserratum</i>	smallflower thoroughwort	X	X					2
<i>Eupatorium serotinum</i>	lateflowering thoroughwort					X		1
<i>Euthamia caroliniana</i>	slender flattop goldenrod	X	X		X			3
<i>Euthamia scabra</i>	Gulf Coast goldenrod	X	X	X			X	4
<i>Euthamia weakleyi</i>	flattop goldenrod					X		1
<i>Fimbristylis castanea</i>	marsh fimbry						X	1



Scientific Name	Common Name	Hydric Pine Flatwoods	Hydric Pine Savanna	Bay Swamp	Mesic Flatwoods	Freshwater Marsh	Salt Marsh	Grand Total
<i>Fuirena breviseta</i>	saltmarsh umbrellasedge		X					1
<b><i>Fuirena longa</i></b>	<b>Chapman's umbrellasedge</b>					X?		1
<i>Fuirena scirpoidea</i>	Southern umbrellasedge		X					1
<i>Gaylussacia mosieri</i>	woolly huckleberry	X	X		X			3
<i>Gaylussacia nana</i>	dwarf dangleberry				X			1
<b><i>Gelsemium rankinii</i></b>	<b>swamp jessamine</b>			X				1
<i>Helianthus angustifolius</i>	narrowleaf sunflower		X					1
<i>Houstonia procumbens</i>	roundleaf bluet				X			1
<i>Hypericum brachyphyllum</i>	coastalplain St. John's wort	X	X		X			3
<i>Hypericum cistifolium</i>	roundpod St. John's wort	X	X		X			3
<i>Hypericum crux-andreae</i>	St. Peter's wort		X		X			2
<i>Hypericum hypericoides</i>	St. Andrew's cross			X				1
<b><i>Hypericum myrtifolium</i></b>	<b>myrtleleaf St. John's wort</b>		X					1
<i>Hypericum sp.</i>	St. John's wort		X					1
<i>Hypericum tetrapetalum</i>	fourpetal St. John's wort				X			1
<i>Hyptis alata var. alata</i>	clustered bushmint			X				1
<i>Ilex cassine</i>	dahoon		X	X				2
<i>Ilex coriacea</i>	large gallberry	X	X		X			3
<i>Ilex glabra</i>	gallberry		X		X		X	3
<i>Ilex myrtifolia</i>	myrtle-leaved holly	X	X					2
<i>Ilex vomitoria</i>	yaupon	X		X			X	3
<i>Ipomoea sagittata</i>	saltmarsh morning glory	X					X	2
<i>Iris sp.</i>	iris			X				1
<i>Itea virginica</i>	Virginia willow			X				1
<i>Iva imbricata</i>	seacoast marshelder					X		1
<i>Juncus marginatus</i>	grassleaf rush		X					1
<i>Juncus pelocarpus</i>	annual rush			X				1
<i>Juncus roemerianus</i>	needle rush					X		1
<i>Juncus sp.</i>	rush			X				1
<i>Juncus trigonocarpus</i>	redpod rush		X	X				2
<i>Kalmia hirsuta</i>	hairy wicky				X			1
<i>Kelochloa verrucosa</i>	warty panicgrass	X	X					2
<i>Kosteletzkya pentacarpos</i>	Virginia saltmarsh mallow						X	1
<i>Lachnanthes caroliniana</i>	Carolina redroot	X	X		X			3
<i>Lachnocaulon anceps</i>	whitehead bogbutton		X					1
<i>Lechea torreyi</i>	sandhill pinweed				X			1
<b><i>Liatris elegantula</i></b>	<b>grassleaf gayfeather</b>				X?			1
<i>Liatris resinosa</i>	dense gayfeather	X	X					2
* <i>Lilium iridollae</i>	Panhandle lily			X				1
<i>Lobelia brevifolia</i>	shortleaf lobelia		X					1
<i>Lophiola aurea</i>	golden crest		X					1
<i>Lorinseria areolata</i>	netted chain fern	X	X	X	X			4

Scientific Name	Common Name	Hydric Pine Flatwoods	Hydric Pine Savanna	Bay Swamp	Mesic Flatwoods	Freshwater Marsh	Salt Marsh	Grand Total
<i>Ludwigia linifolia</i>	Southeastern primrosewillow		X					1
<i>Ludwigia pilosa</i>	hairy primrosewillow	X	X	X				3
<i>Ludwigia</i> sp.	primrosewillow		X					1
<i>Lycopodiella alopecuroides</i>	foxtail club-moss	X	X					2
<i>Lycopodiella appressa</i>	Southern club-moss		X					1
<i>Lycopus rubellus</i>	taperleaf waterhorehound		X	X				2
† <i>Lygodium japonicum</i>	Japanese climbing fern				X			1
<i>Lyonia lucida</i>	fetterbush	X	X	X	X			4
<i>Lythrum lineare</i>	wand loosestrife					X		1
<i>Magnolia grandiflora</i>	Southern magnolia				X			1
<i>Magnolia virginiana</i> var. <i>australis</i>	sweetbay	X	X	X			X	4
<i>Mnesithea tessellata</i>	lattice jointgrass	X						1
<i>Morella cerifera</i>	Southern bayberry	X	X	X		X	X	5
<i>Muscadinia rotundifolia</i>	muscadine			X	X	X		3
<i>Nymphaea odorata</i> ssp. <i>odorata</i>	white waterlily			X				1
<i>Nyssa biflora</i>	swamp tupelo	X	X	X				3
<i>Osmunda spectabilis</i>	royal fern	X		X				2
<i>Osmundastrum cinnamomeum</i>	cinnamon fern			X				1
† <i>Panicum repens</i>	torpedo grass					X	X	2
<i>Panicum virgatum</i>	switchgrass	X	X	X		X	X	5
<i>Paspalum floridanum</i>	Florida paspalum	X						1
<i>Paspalum praecox</i>	early paspalum	X						1
<i>Paspalum</i> sp.	crowgrass		X					1
<i>Paspalum vaginatum</i>	seashore paspalum					X		1
<i>Peltandra sagittifolia</i>	spoon-flower			X				1
<i>Phragmites karka</i>	tropical reed					X		1
<b><i>Physalis angustifolia</i></b>	<b>coastal groundcherry</b>					X		1
<i>Pieris phillyreifolia</i>	climbing fetterbush			X				1
<i>Pinus elliotii</i>	slash pine	X	X	X	X	X	X	6
<i>Pinus palustris</i>	longleaf pine				X			1
<i>Pluchea baccharis</i>	rosy camphorweed		X					1
<i>Polygala lutea</i>	orange milkwort	X			X			2
<b>Polygonaceae</b>						X		1
<i>Polypremum procumbens</i>	rustweed					X		1
<i>Proserpinaca pectinata</i>	combleaf mermaidweed		X					1
<i>Pseudognaphalium obtusifolium</i>	sweet everlasting				X			1
<i>Pseudolycopodiella caroliniana</i>	slender club-moss		X					1
<i>Pteridium pseudocaudatum</i>	tailed bracken	X	X		X	X		4
<i>Quercus geminata</i>	sand live oak				X			1
<i>Quercus hemisphaerica</i>	laurel oak				X			1
<i>Quercus nigra</i>	water oak			X				1
<i>Quercus virginiana</i>	live oak				X			1



Scientific Name	Common Name	Hydric Pine Flatwoods	Hydric Pine Savanna	Bay Swamp	Mesic Flatwoods	Freshwater Marsh	Salt Marsh	Grand Total
<i>Rhexia alifanus</i>	savannah meadowbeauty		X					1
<i>Rhexia petiolata</i>	fringed meadowbeauty	X			X			2
<i>Rhexia</i> sp.	meadowbeauty	X	X					2
<i>Rhexia virginica</i>	handsome harry				X			1
<i>Rhododendron viscosum</i> var. <i>viscosum</i>	swamp azalea			X				1
<i>Rhus copallinum</i> var. <i>copallinum</i>	winged sumac		X		X	X		3
<i>Rhynchospora baldwinii</i>	Baldwin's beaksedge		X					1
<i>Rhynchospora cephalantha</i> var. <i>cephalantha</i>	bunched beaksedge	X	X					2
<i>Rhynchospora chalarocephala</i>	loosehead beaksedge		X	X				2
<i>Rhynchospora chapmanii</i>	Chapman's beaksedge	X	X					2
<i>Rhynchospora fascicularis</i>	fascicled beaksedge	X	X		X			3
<i>Rhynchospora gracilentata</i>	slender beaksedge	X	X	X				3
<i>Rhynchospora inundata</i>	narrowfruit horned beaksedge			X				1
<i>Rhynchospora plumosa</i>	plumed beaksedge		X		X			2
<i>Rhynchospora rariflora</i>	fewflower beaksedge		X					1
<i>Rhynchospora</i> sp.	beaksedge		X	X				2
<i>Rubus pensilvanicus</i>	sawtooth blackberry	X	X	X	X	X	X	6
<i>Rubus trivialis</i>	Southern dewberry	X			X	X		3
<i>Rumex verticillatus</i>	swamp dock					X		1
<i>Sabal minor</i>	bluestem palmetto	X				X		2
<b><i>Sabal palmetto</i></b>	<b>cabbage palm</b>					X		1
<i>Sagittaria lancifolia</i>	bulltongue arrowhead			X				1
* <i>Sarracenia leucophylla</i>	white-top pitcherplant		X					1
<i>Sarracenia x rosea</i>	white-top pitcherplant x Gulf purple pitcherplant		X					1
<i>Saururus cernuus</i>	lizard's tail		X					1
<i>Schizachyrium hirtiflorum</i>	crimson bluestem	X						1
<i>Schizachyrium stoloniferum</i>	creeping little bluestem				X			1
<i>Scleria ciliata</i> var. <i>ciliata</i>	hairy nutrush		X					1
<b><i>Scleria ciliata</i> var. <i>elliottii</i></b>	<b>broad-leaved hairy nutrush</b>		X					1
<i>Scleria</i> sp.	nutrush		X					1
<i>Scleria triglomerata</i>	whip nutrush				X			1
<b><i>Scutellaria</i> sp.</b>	<b>skullcap</b>	X	X					2
<i>Serenoa repens</i>	saw palmetto	X	X		X	X		4
<b><i>Sericocarpus tortifolius</i></b>	<b>whitetop aster</b>	X						1
† <i>Sesbania punicea</i>	purple sesban					X	X	2
<i>Setaria</i> sp.	foxtail					X		1
<i>Smilax auriculata</i>	earleaf greenbriar				X			1
<i>Smilax bona-nox</i>	saw greenbriar					X		1
<i>Smilax glauca</i>	cat greenbriar		X	X	X			3
<i>Smilax laurifolia</i>	laurel greenbriar	X	X	X				3

Scientific Name	Common Name	Hydric Pine Flatwoods	Hydric Pine Savanna	Bay Swamp	Mesic Flatwoods	Freshwater Marsh	Salt Marsh	Grand Total
<i>Smilax pumila</i>	sarsaparilla vine				X			1
<i>Smilax walteri</i>	coral greenbriar		X	X				2
<i>Solidago altissima</i> var. <i>pluricephala</i>	Canada goldenrod				X			1
<i>Solidago fistulosa</i>	pinebarren goldenrod		X		X			2
<i>Solidago mexicana</i>	Southern seaside goldenrod					X	X	2
<b><i>Solidago virgata</i></b>	<b>wand goldenrod</b>	<b>X</b>						1
<b><i>Sorghastrum nutans</i></b>	<b>yellow indiagrass</b>		<b>X</b>					1
<i>Spartina patens</i>	saltmeadow cordgrass	X				X	X	3
<i>Sphagnum</i> sp.	sphagnum moss	X	X	X				3
<i>Sporobolus junceus</i>	pineywoods dropseed				X			1
<i>Styrax americanus</i> var. <i>pulverulentus</i>	downy American snowbell		X					1
<i>Symphotrichum dumosum</i> var. <i>dumosum</i>	long-stalked aster	X						1
<i>Symphotrichum tenuifolium</i>	perennial saltmarsh aster					X		1
<i>Tamala palustris</i>	swamp bay	X	X	X	X	X	X	6
<i>Taxodium ascendens</i>	pond cypress	X	X	X			X	4
<i>Tiedemannia filiformis</i> ssp. <i>filiformis</i>	water cowbane		X					1
<b><i>Tillandsia recurvata</i></b>	<b>ballmoss</b>			<b>X</b>				1
<i>Tillandsia usneoides</i>	Spanish moss			X				1
<i>Toxicodendron radicans</i> var. <i>radicans</i>	Eastern poison ivy	X		X				2
† <i>Triadica sebifera</i>	Chinese tallow tree	X	X	X				3
<i>Trilisa odoratissima</i>	vanillaleaf				X			1
<i>Typha latifolia</i>	broadleaf cattail					X		1
<i>Vaccinium elliotii</i>	Elliott's blueberry		X		X			2
<i>Vaccinium fuscatum</i>	hairy highbush blueberry		X	X	X			3
<i>Vaccinium myrsinites</i>	shiny blueberry		X		X			2
<i>Viburnum nudum</i>	possumhaw			X				1
<i>Viola lanceolata</i>	bog white violet		X					1
<i>Viola primulifolia</i>	primroseleaf violet		X	X	X		<b>X</b>	4
<i>Viola</i> sp.	violet		<b>X</b>					1
<i>Xyris ambigua</i>	coastalplain yellow-eyed grass	X	X					2
<i>Xyris caroliniana</i>	Carolina yellow-eyed grass				X			1
<i>Xyris fimbriata</i>	fringed yellow-eyed grass	X	X	X				3
<i>Xyris floridana</i>	Florida yellow-eyed grass		X					1
<i>Xyris</i> sp.	yellow-eyed grass	X	X					2
<i>Xyris stricta</i>	pineland yellow-eyed grass		X					1
<b>Total number of taxa: 226</b>		76	126	70	68	41	25	406

## Hydric Pine Flatwoods

**Qualitative sampling.** We accessed the Hydric Pine Flatwoods in the vicinities of Transect 1 (eastern) and Transect 4 (western) to create a species list (Figure 2). The eastern area had an open canopy (26-35% cover) of mature slash pines. The ground layer was mainly herbaceous, although short shrubs and

sprawling laurel greenbrier vines were dense in many areas. Purple bluestem and Carolina redroot were the dominant herbs, along with a mix of other, mostly weedy species. Shrubs were mostly black titi, but also included large gallberry, coastalplain St. John's wort, sweetbay, and highbush blueberry. The non-native invasive Chinese tallow tree was occasional near the road. The western flatwoods was only accessible by traversing a large bay swamp and is not currently actively managed. The canopy was denser and groundcover sparser than the eastern area. We observed a total of 76 plant taxa in this community (Table 1).

**Quantitative sampling.** The eastern Transect 1 (Table 2, Figure 3) had a total of 27 species with 11% open ground. Black titi, laurel greenbrier, coastalplain St. John's wort, purple bluestem, and bunched beaksedge contributed the most cover. Woody species made up about 54% average cover per quadrat, continuing to increase from two years ago. Laurel greenbrier and purple bluestem were slightly reduced, but black titi continued to increase along the transect compared to the last three years.

The western Transect 4 (Table 3, Figure 4) had a total of 24 species with 48% open ground. Swamp bay, yaupon, saltmeadow cordgrass, and sawgrass contributed the most cover. Woody species made up about 18% average cover per quadrat, similar to last year. Sawgrass was reduced from last year, but otherwise the vegetation was similar.

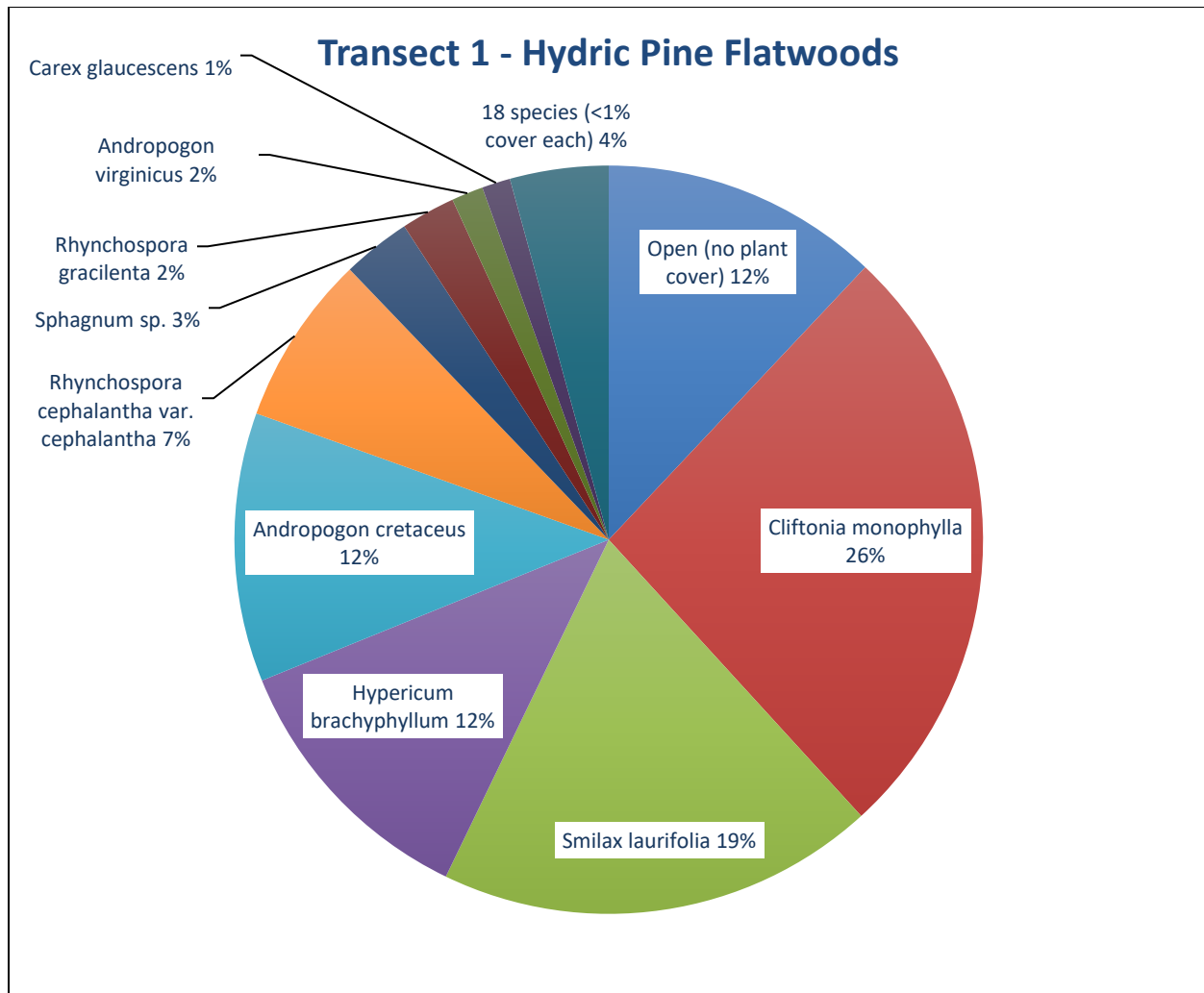


Figure 3. Percent cover of plant species in Hydric Pine Flatwoods Transect 1.

Table 2. Percent cover of plant species in Hydric Pine Flatwoods Transect 1 sampled on December 9, 2024.

Scientific name	Common name	Average percent cover per quadrat
<i>Anchistea virginica</i>	Virginia chain fern	0.33
<i>Andropogon cretaceus</i>	purple bluestem	10.73
<i>Andropogon virginicus</i>	broomsedge bluestem	1.27
<i>Carex glaucescens</i>	clustered sedge	1.13
<i>Cliftonia monophylla</i>	black titi	24.20
<i>Dichanthelium dichotomum</i>	forked witchgrass	0.10
<i>Dichanthelium ensifolium</i>	small-leaved witchgrass	0.27
<i>Dichanthelium scabriusculum</i>	woolly witchgrass	0.23
<i>Drosera capillaris</i>	pink sundew	0.03
<i>Edrastrima uniflora</i>	oldenlandia	0.03
<i>Hypericum brachyphyllum</i>	coastalplain St. John's wort	10.80
<i>Hypericum cistifolium</i>	roundpod St. John's wort	0.27

Scientific name	Common name	Average percent cover per quadrat
<i>Ilex coriacea</i>	large gallberry	0.23
<i>Kelochloa verrucosa</i>	warty panicgrass	0.50
<i>Lachnanthes caroliniana</i>	Carolina redroot	0.13
<i>Lyonia lucida</i>	fetterbush	0.73
<i>Pinus elliotii</i>	slash pine	0.33
<i>Rhexia petiolata</i>	fringed meadowbeauty	0.13
<i>Rhynchospora cephalantha</i> var. <i>cephalantha</i>	bunched beaksedge	6.80
<i>Rhynchospora chapmanii</i>	Chapman's beaksedge	0.17
<i>Rhynchospora fascicularis</i>	fascicled beaksedge	0.13
<i>Rhynchospora gracilentia</i>	slender beaksedge	2.17
<i>Sericocarpus tortifolius</i>	whitetop aster	0.03
<i>Smilax laurifolia</i>	laurel greenbrier	17.50
<i>Sphagnum</i> sp.	sphagnum moss	2.73
<i>Xyris ambigua</i>	coastalplain yellow-eyed grass	0.23
<i>Xyris</i> sp.	yellow-eyed grass	0.03
Open (no plant cover)		11.10



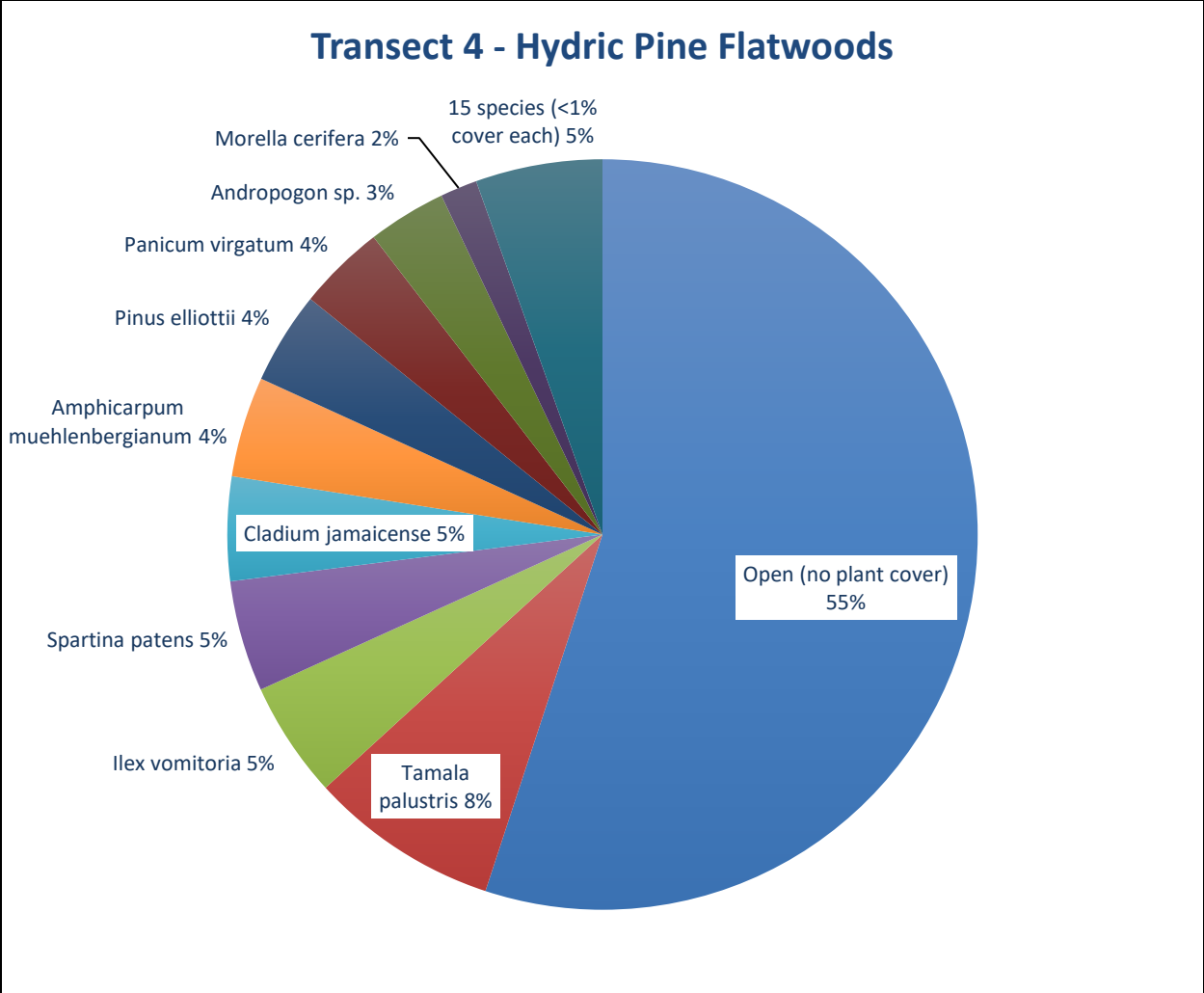


Figure 4. Percent cover of plant species in Hydric Pine Flatwoods Transect 4.

Table 3. Percent cover of plant species in Hydric Pine Flatwoods Transect 4 sampled on December 10, 2024.

Scientific name	Common name	Average percent cover per quadrat
<i>Acer rubrum</i>	red maple	0.23
<i>Amphicarpum muehlenbergianum</i>	blue maidencane	3.80
<i>Anchistea virginica</i>	Virginia chain fern	0.03
<i>Andropogon dealbatus</i>	wetland white bluestem	0.73
<i>Andropogon sp.</i>	bluestem	2.97
<i>Andropogon virginicus</i>	broomsedge bluestem	0.87
<i>Baccharis halimifolia</i>	groundsel tree	0.10
<i>Carex glaucescens</i>	clustered sedge	0.97
<i>Centella erecta</i>	spadeleaf	0.60
<i>Cladium jamaicense</i>	sawgrass	3.93
<i>Dichanthelium leucothrix</i>	rough witchgrass	0.03

<i>Ilex vomitoria</i>	yaupon	4.40
<i>Ipomoea sagittata</i>	saltmarsh morning glory	0.03
<i>Morella cerifera</i>	southern bayberry	1.40
<i>Nyssa biflora</i>	swamp tupelo	0.23
<i>Osmunda spectabilis</i>	royal fern	0.07
<i>Panicum virgatum</i>	switchgrass	3.30
<i>Pinus elliotii</i>	slash pine	3.50
<i>Rubus pensilvanicus</i>	sawtooth blackberry	0.17
<i>Rubus trivialis</i>	southern dewberry	0.10
<i>Spartina patens</i>	saltmeadow cordgrass	4.20
<i>Tamala palustris</i>	swamp bay	7.17
<i>Taxodium ascendens</i>	pond cypress	0.53
<i>Toxicodendron radicans</i> var. <i>radicans</i>	eastern poison ivy	0.10
Open (no plant cover)		48.33

## Hydric Pine Savanna

**Qualitative sampling.** We accessed the Hydric Pine Savanna between Transects 2 and 3 to create a species list (Figure 2). This area had an open canopy of mature slash pines. The ground layer was mostly herbaceous with hairy primrosewillow and woolly witchgrass dominant along with a mix of other species including various beaksedges, tenangle pipewort, yellow-eyed grass, slender flattop goldenrod, and wiregrass. Shrubs included coastalplain St. John’s wort, titi, gallberry, sweet pepperbush, and southern bayberry. Dense patches of sprawling laurel greenbrier were common. The savanna in the vicinity of Transect 2 has been mechanically and chemically treated to produce dramatic shrub reduction since 2017. This area was much more heavily dominated by weedy purple bluestem. The state-listed endangered whitetop pitcherplant is known from Transect 3 and was observed this year. The state-listed pinewoods bluestem was also observed during qualitative sampling. The non-native invasive Chinese tallow tree was also observed again in Fall 2024; however, camphor tree was not found this year. We observed a total of 126 plant taxa in this community (Table 1).

**Quantitative sampling.** The southern Transect 2 (Table 4, Figure 5) had a total of 45 species and 28% open ground. Until 2019, Transect 2 was dominated by a thicket of tall, woody species. The area was mechanically treated to reduce shrubs, and the 2019 monitoring transect recorded the very open habitat that resulted from this treatment. All shrubs had been mowed to the ground which was covered in the resulting mulch. Herb cover has been increasing since that treatment, and woody cover was likewise increasing. In 2021, woody species were further treated, resulting in reductions in titi, black titi, and gallberry cover in Fall 2022. Woody species made up about 18% average cover per quadrat in Fall 2024, similar to last year, but overall plant cover increased.

The northern Transect 3 (Table 5, Figure 6) had a total of 51 species and 18% open ground. Laurel greenbrier, coastalplain St. John’s wort, and hairy primrosewillow contributed the most cover, similar to last year. Woody species made up about 58% average cover per quadrat, continuing an increase from 2022 that appears mostly attributable to small increases in sawtooth blackberry, titi, and black titi. Woolly witchgrass decreased this year. Otherwise, vegetation along the transect was very similar to 2023. The state listed endangered whitetop pitcherplant was seen again this year along Transect 3.

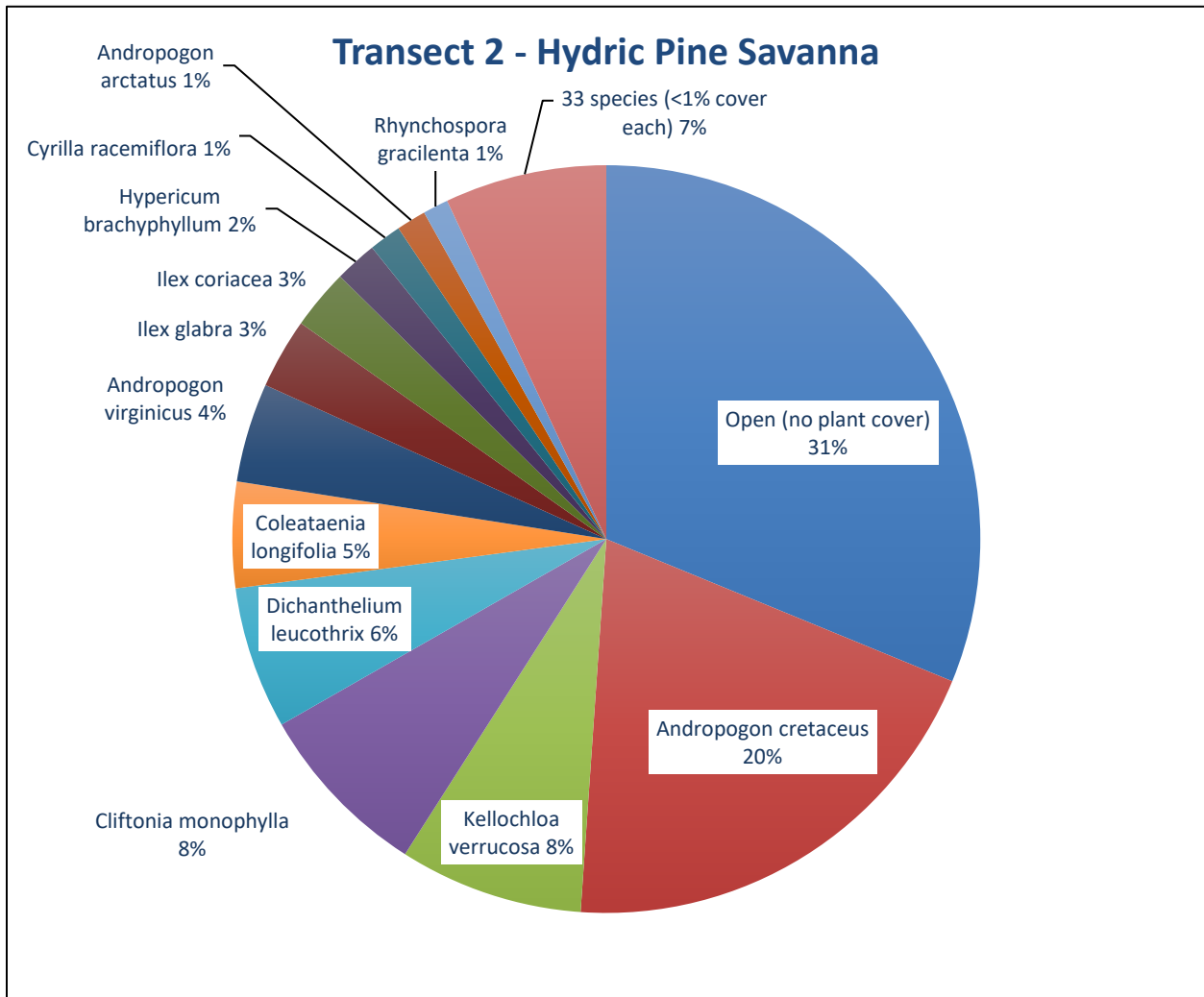


Figure 5. Percent cover of plant species in Hydric Pine Savanna Transect 2.

Table 4. Percent cover of species in Hydric Pine Savanna Transect 2 sampled on December 9, 2024.

Scientific name	Common name	Average percent cover per quadrat
<i>Acer rubrum</i>	red maple	0.10
<i>Anchistea virginica</i>	Virginia chain fern	0.03
<i>Andropogon arctatus</i>	pinewoods bluestem	1.17
<i>Andropogon cretaceus</i>	purple bluestem	18.10
<i>Andropogon virginicus</i>	broomsedge bluestem	3.90
<i>Aristida beyrichiana</i>	Southern wiregrass	0.77
<i>Aronia arbutifolia</i>	red chokeberry	0.07
<i>Carex glaucescens</i>	clustered sedge	0.03
<i>Carex longii</i>	Long's sedge	0.13
<i>Cliftonia monophylla</i>	black titi	7.00

Scientific name	Common name	Average percent cover per quadrat
<i>Coleataenia longifolia</i>	ciliate redtop panicum	4.17
<i>Cyrtia racemiflora</i>	titi	1.27
<i>Dichantherium ensifolium</i>	small-leaved witchgrass	0.20
<i>Dichantherium leucothrix</i>	rough witchgrass	5.60
<i>Dichantherium portoricense</i>	Puerto Rican witchgrass	0.23
<i>Drosera capillaris</i>	pink sundew	0.03
<i>Edrastrima uniflora</i>	oldenlandia	0.20
<i>Eriocaulon decangulare</i>	tenangle pipewort	0.07
<i>Euthamia caroliniana</i>	slender flattop goldenrod	0.13
<i>Gaylussacia mosieri</i>	woolly huckleberry	0.10
<i>Hypericum brachyphyllum</i>	coastalplain St. John's wort	1.67
<i>Hypericum cistifolium</i>	roundpod St. John's wort	0.07
<i>Hypericum crux-andreae</i>	St. Peter's wort	0.10
<i>Hypericum</i> sp.	St. John's wort	0.10
<i>Ilex coriacea</i>	large gallberry	2.37
<i>Ilex glabra</i>	gallberry	2.77
<i>Kelochloa verrucosa</i>	warty panicgrass	7.23
<i>Lachnanthes caroliniana</i>	Carolina redroot	0.27
<i>Magnolia virginiana</i> var. <i>australis</i>	sweetbay	0.10
<i>Pinus elliotii</i>	slash pine	0.27
<i>Rhexia</i> sp.	meadowbeauty	0.07
<i>Rhynchospora cephalantha</i> var. <i>cephalantha</i>	bunched beaksedge	0.53
<i>Rhynchospora chapmanii</i>	Chapman's beaksedge	0.27
<i>Rhynchospora gracilentia</i>	slender beaksedge	1.00
<i>Rubus pensilvanicus</i>	sawtooth blackberry	0.53
<i>Scleria ciliata</i>	hairy nutrush	0.07
<i>Scutellaria</i> sp.	skullcap	0.03
<i>Serenoa repens</i>	saw palmetto	0.10
<i>Smilax glauca</i>	cat greenbrier	0.23
<i>Smilax laurifolia</i>	laurel greenbrier	0.73
<i>Tamala palustris</i>	swamp bay	0.37
Unknown herb		0.03
<i>Viola</i> sp.	violet	0.13
<i>Xyris floridana</i>	Florida yellow-eyed grass	0.03
<i>Xyris</i> sp.	yellow-eyed grass	0.23
Open (no plant cover)		28.40

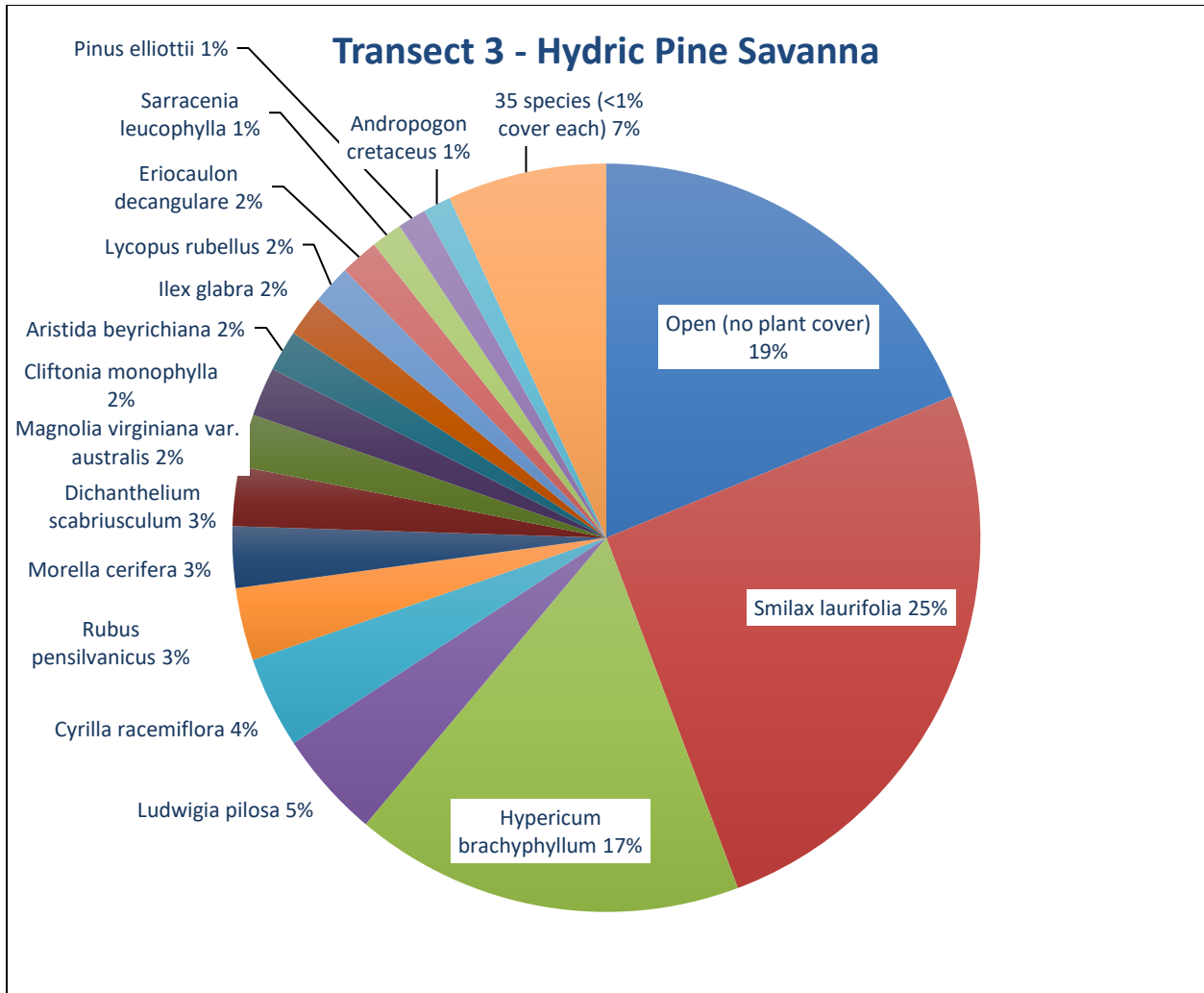


Figure 6. Percent cover of plant species in Hydric Pine Savanna Transect 3.

Table 5. Percent cover of plant species in Hydric Pine Savanna Transect 3 sampled on December 9, 2024.

Scientific name	Common name	Average percent cover per quadrat
<i>Acer rubrum</i>	red maple	0.03
<i>Andropogon cretaceus</i>	purple bluestem	1.13
<i>Andropogon glomeratus</i>	bushy bluestem	0.30
<i>Andropogon sp.</i>	bluestem	0.10
<i>Andropogon virginicus</i>	broomsedge bluestem	0.10
<i>Aristida beyrichiana</i>	Southern wiregrass	1.67
<i>Aristida palustris</i>	longleaf threeawn	0.50
<i>Aronia arbutifolia</i>	red chokeberry	0.20
<i>Bidens mitis</i>	smallfruit beggarticks	0.17
<i>Carex glaucescens</i>	clustered sedge	0.27
<i>Cliftonia monophylla</i>	black titi	2.00



Scientific name	Common name	Average percent cover per quadrat
<i>Cyrilla racemiflora</i>	titi	3.73
<i>Dichantheium ensifolium</i>	small-leaved witchgrass	0.07
<i>Dichantheium leucothrix</i>	rough witchgrass	0.23
<i>Dichantheium scabriusculum</i>	woolly witchgrass	2.43
<i>Eleocharis tuberculosa</i>	conecup spikerush	0.03
<i>Eriocaulon decangulare</i>	tenangle pipewort	1.57
<i>Eupatorium semiserratum</i>	smallflower thoroughwort	0.13
<i>Euthamia caroliniana</i>	slender flattop goldenrod	0.13
<i>Gaylussacia mosieri</i>	woolly huckleberry	0.03
<i>Hypericum brachyphyllum</i>	coastalplain St. John's wort	15.90
<i>Ilex cassine</i>	dahoon	0.10
<i>Ilex coriacea</i>	large gallberry	0.67
<i>Ilex glabra</i>	gallberry	1.67
<i>Ilex myrtifolia</i>	myrtle-leaved holly	0.50
<i>Juncus marginatus</i>	grassleaf rush	0.10
<i>Juncus trigonocarpus</i>	redpod rush	0.03
<i>Lobelia brevifolia</i>	shortleaf lobelia	0.03
<i>Lorinseria areolata</i>	netted chain fern	0.33
<i>Ludwigia linifolia</i>	southeastern primrosewillow	0.03
<i>Ludwigia pilosa</i>	hairy primrosewillow	4.37
<i>Lycopus rubellus</i>	taperleaf waterhorehound	1.60
<i>Magnolia virginiana</i> var. <i>australis</i>	sweetbay	2.13
<i>Morella cerifera</i>	southern bayberry	2.50
<i>Nyssa biflora</i>	swamp tupelo	0.17
<i>Pinus elliotii</i>	slash pine	1.17
<i>Rhynchospora cephalantha</i> var. <i>cephalantha</i>	bunched beaksedge	0.03
<i>Rhynchospora chalarocephala</i>	loosehead beaksedge	0.23
<i>Rhynchospora fascicularis</i>	fascicled beaksedge	0.07
<i>Rhynchospora gracilentia</i>	slender beaksedge	0.10
<i>Rhynchospora rariflora</i>	fewflower beaksedge	0.10
<i>Rhynchospora</i> sp.	beaksedge	0.20
<i>Rubus pensilvanicus</i>	sawtooth blackberry	2.97
<i>Sarracenia leucophylla</i>	white-top pitcherplant	1.27
<i>Scleria</i> sp.	nutrush	0.23
<i>Smilax glauca</i>	cat greenbrier	0.03
<i>Smilax laurifolia</i>	laurel greenbrier	24.03
<i>Solidago fistulosa</i>	pinebarren goldenrod	0.17
<i>Sphagnum</i> sp.	sphagnum moss	0.93
<i>Taxodium ascendens</i>	pond cypress	0.10
<i>Vaccinium elliotii</i>	Elliott's blueberry	0.03
Open (no plant cover)		17.77

## Bay Swamp

**Qualitative sampling.** We sampled an area of Bay Swamp south of the Hydric Pine Savanna Transect 2 in Fall 2024. Species were also noted while walking across the restored bay swamp that separates the two main areas of pine flatwoods (Figure 2). This community is more similar to a freshwater tidal swamp or

basin marsh than a typical bay swamp. Following large scale titi reductions in the savannas and flatwoods adjacent to the bay swamp in the vicinity of Hydric Pine Savanna Transect 2, the Perdido River can now be seen through the open canopy. There is a seepy ecotone from the Hydric Pine Savanna to the swamp. The majority of the community was a mix of trees and shrubs with patches of herbs typical of marshes. The ground was mucky with pools of ankle-deep water, large patches of sphagnum moss, and numerous hummocks. In the southern bay swamp, the canopy was more stunted and composed of slash pine, pond cypress, and swamp tupelo to about 45 feet tall. A subcanopy and tall shrub layer was composed of the canopy species plus red maple, sweetbay, southern bayberry, and swamp bay. The short shrub (under 6 feet tall) layer was composed of black titi, southern bayberry, and swamp bay. The patchy herbaceous layer consisted mostly of sawgrass, cinnamon fern, and clustered sedge. The state-listed endangered Panhandle lily is known from the western bay swamp along the former road that was removed for hydrology restoration. In Fall 2024, we found fourteen stems in this area. The non-native invasive Chinese tallow tree was observed this year. We observed a total of 70 plant taxa in this community (Table 1).

### Mesic Flatwoods

**Qualitative sampling.** We sampled 2 areas of Mesic Flatwoods, one on the eastern side of the property between Hydric Pine Flatwoods Transect 1 and the main road through the Dutex West property, and the other southwest of Hydric Pine Savanna Transect 3 (Figure 2). The eastern area had a canopy of mature slash pine and an open layer of shrubs intermixed with patches of herbaceous species and open ground. Shrubs were mainly saw palmetto, shiny blueberry, and dwarf huckleberry with a diversity of other species present. Wiregrass was common, along with weedy species, such as purple bluestem, and typical flatwoods species. Shrub reduction efforts throughout this area in recent years have greatly increased bluestem cover and decreased saw palmetto and other flatwoods shrubs. The state-listed threatened pinewoods bluestem was observed in this community in prior years, but not re-located this year. Japanese climbing fern was seen for the first time this year in mesic flatwoods near the road. We observed a total of 68 plant taxa in this community (Table 1).

### Freshwater Marsh

**Qualitative sampling.** We accessed the Freshwater Marsh target community along the Perdido River southwest of the Hydric Pine Flatwoods 1 Transect (Figure 2). The community was mostly an open, solid stand of sawgrass with patches of other herbs. Shrubs were mainly tall individuals of swamp bay, southern bayberry, yaupon, and groundsel tree. The non-native invasive species torpedo grass and purple sesban were seen again in Fall 2024. We observed a total of 41 plant taxa in this community (Table 1).

### Salt Marsh

**Qualitative sampling.** We accessed the Salt Marsh target community by walking south from the Hydric Pine Flatwoods Transect 4 (Figure 2). The community was largely herbaceous, dominated by sawgrass with patches of needle rush. Small patches of shrubs consisted of dahoon and swamp bay. The non-native invasive Japanese climbing fern, Chinese tallow tree, and purple sesban have been observed in

prior years invading in the ecotone between the hydric pine flatwoods and the salt marsh, but only purple sesban was found in 2023 and 2024. However, this year in the same area, we detected topedo grass for the first time. We observed a total of 25 plant taxa in this community (Table 1).