

**Vegetation Monitoring at Plum Creek
Northwest Florida Water Management District
Mitigation Site**

Fall 2024

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Plum Creek at Holmes Creek Mitigation Site
Qualitative and Quantitative Monitoring
October 2024

INTRODUCTION

The Plum Creek at Holmes Creek Mitigation Site compensates for the loss of wetland function due to the impact of the SR 79 Open Creek Bridge in Washington County, Florida. The 130-acre tract lies just north of Holmes Creek and is contiguous with other Northwest Florida Water Management District holdings along the creek. Access is gained by going south on SR 79 for 6.3 miles from I-10 to Johnson Road (Figure 1) and traveling east on Johnson Road to the gate on the south side of the winding road. The Plum Creek Mitigation project aims to restore Sandhill (SA) from pine plantation and Wetland Forest Mixed (MFW) from a wetland impacted by a beaver pond (Figure 2). FNAI used quantitative and qualitative monitoring to document the current plant species composition and vegetation structure of the communities targeted for restoration, as well as an intact mixed forested wetland community. Previously, FNAI biologists have monitored the site's vegetation every fall from 2012 to 2023.

METHODS

FNAI collected quantitative monitoring data using 300-foot-long permanent transect lines previously marked during the 2012 survey. Two transects were located in the Sandhill community, one in the Restoration Wetland Forest Mixed, and one in the Preserved Wetland Forest Mixed (Figure 2). In 2013, FNAI installed metal T-posts at the ends of each transect to provide more permanent reference points. We placed fifteen 1m x 1m quadrats along the left side of each transect line spaced every 20 feet beginning at 0 and ending at 280 feet. In each quadrat, we visually estimated the percent cover of each plant species, including individuals rooted in the the quadrat as well as overhanging. We excluded canopy over 2 m in height from cover estimates; counting only the lower 2 m portions of taller individuals, including the lower portions of tree trunks rooted in quadrats. We estimated open ground (no plant cover) in each quadrat as the percentage of ground not obscured by plant cover up to 2 m tall. We converted all 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 100 percent cover); this is reported in separate pie charts.

We conducted qualitative monitoring by walking meandering pedestrian transects through each of these communities and recording all species observed, as well as descriptions of vegetation structure. FNAI botanists Kim Alexander, Kelly Anderson, Dani Davis, Allie Heiker, Amy Jenkins, Geoff Parks, and Leyla Wilson conducted all field surveys on October 16, 2024.



Figure 1. Location map of Plum Creek at Holmes Creek Mitigation Site monitored by FNAI.

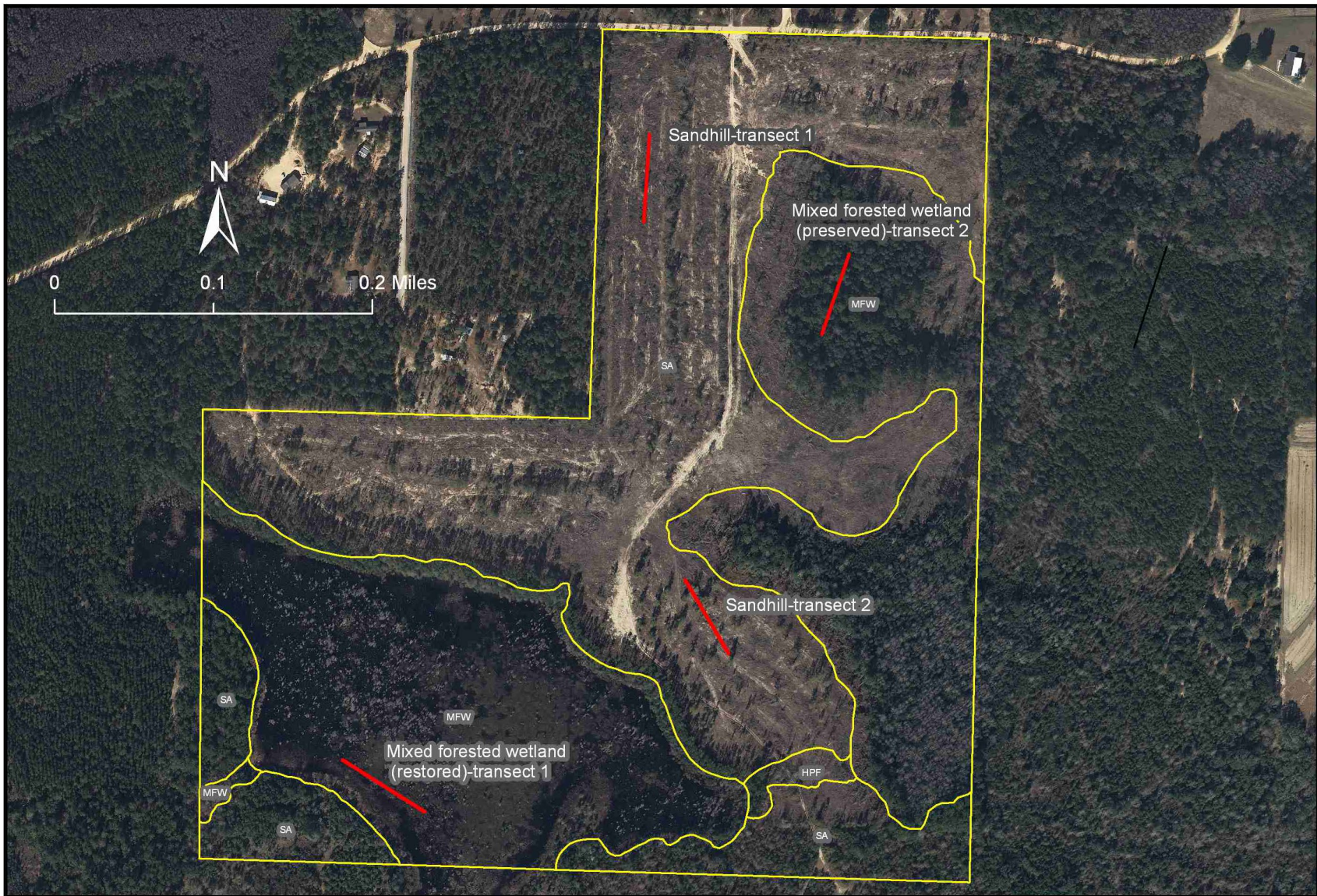


Figure 2. Location of permanent transects at Plum Creek at Holmes Creek Mitigation Site in Sandhill and Mixed Forested Wetland.

RESULTS AND DISCUSSION

FNAI observed a total of 259 plant taxa during the 2024 monitoring period in the target communities at Plum Creek at Holmes Creek Mitigation Site (Table 1). We documented 18 new taxa 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 target communities at Plum Creek at Holmes Creek Mitigation Site on October 16, 2024. (bold name = new species; bold X = new observation in community type; * = state-listed endangered or threatened; † = non-native invasive)

Scientific Name	Common Name	Sandhill	Wetland Forest Mixed - restoration	Wetland Forest Mixed - preserved	Grand Total
<i>Acalypha gracilens</i>	slender threeseed mercury	X			1
<i>Acer rubrum</i>	red maple		X	X	2
<i>Agalinis divaricata</i>	pineland false foxglove	X			1
<i>Agalinis fasciculata</i>	beach false foxglove	X			1
<i>Agalinis harperi</i>	Harper's false foxglove		X		1
<i>Agalinis obtusifolia</i>	tenlobe false foxglove	X			1
<i>Agalinis</i> sp.	false foxglove	X		X	2
<i>Ambrosia artemisiifolia</i>	common ragweed	X			1
<i>Anchistea virginica</i>	Virginia chain fern			X	1
<i>Andropogon cretaceus</i>	purple bluestem	X	X	X	3
<i>Andropogon dealbatus</i>	wetland white bluestem		X		1
<i>Andropogon glomeratus</i>	bushy bluestem	X			1
<i>Andropogon gyrans</i>	Elliott's bluestem	X			1
<i>Andropogon</i> sp.	bluestem	X	X	X	3
<i>Andropogon ternarius</i>	splitbeard bluestem	X			1
<i>Andropogon virginicus</i> var. <i>virginicus</i>	broomsedge bluestem	X	X	X	3
<i>Apteria aphylla</i>	nodding nixie			X	1
<i>Aristida beyrichiana</i>	Southern wiregrass	X			1
<i>Aristida purpurascens</i>	arrowfeather threeawn	X			1
<i>Aristida tenuispica</i>	Southern arrowfeather	X			1
<i>Aronia arbutifolia</i>	red chokeberry			X	1
<i>Arundinaria tecta</i>	small cane			X	1
<i>Asclepias tuberosa</i>	butterflyweed	X			1
<i>Asimina spatulata</i>	paw paw	X			1
<i>Baptisia lanceolata</i>	gopherweed	X			1
<i>Berlandiera pumila</i> var. <i>pumila</i>	soft greeneyes	X			1
<i>Bidens mitis</i>	smallfruit beggarticks		X	X	2

Scientific Name	Common Name	Sandhill	Wetland Forest Mixed - restoration	Wetland Forest Mixed - preserved	Grand Total
<i>Bulbostylis ciliatifolia</i>	capillary hairsedge	X			1
<i>Callicarpa americana</i>	American beautyberry	X			1
<i>Carex glaucescens</i>	clustered sedge		X	X	2
<i>Carex</i> sp.	sedge			X	1
<i>Carex striata</i> var. <i>striata</i>	Walter's sedge		X	X	2
<i>Cartrema americanum</i>	wild olive	X		X	2
<i>Chamaecrista fasciculata</i>	partridge pea	X			1
<i>Chamaecrista nictitans</i>	sensitive pea	X			1
<i>Chrysoma pauciflosculosa</i>	woody goldenrod	X			1
<i>Chrysopsis lanuginosa</i>	Lynn Haven goldenaster	X			1
<i>Chrysopsis mariana</i>	Maryland goldenaster	X			1
<i>Chrysopsis</i> sp.	goldenaster	X			1
<i>Cirsium horridulum</i>	purple thistle	X			1
<i>Clethra alnifolia</i>	sweet pepperbush			X	1
<i>Clethra tomentosa</i>	downy sweet pepperbush		X	X	2
<i>Cliftonia monophylla</i>	black titi		X	X	2
<i>Cnidocolus stimulosus</i>	tread softly	X			1
<i>Crocanthemum carolinianum</i>	Carolina frostweed	X			1
<i>Croptilon divaricatum</i>	slender scratchdaisy	X			1
<i>Crotalaria rotundifolia</i>	rabbitbells	X			1
<i>Crotalaria spectabilis</i>	showy rattlebox	X			1
<i>Croton argyranthemus</i>	silver croton	X			1
<i>Croton glandulosus</i>	vente conmigo	X			1
<i>Ctenium aromaticum</i>	toothache grass	X			1
<i>Cyperus ovatus</i>	pinebarren flatsedge	X			1
<i>Cyperus</i> sp.	flatsedge	X			1
<i>Cyrilla racemiflora</i>	titi		X	X	2
<i>Dalea pinnata</i>	summer farewell	X			1
<i>Decodon verticillatus</i>	willow herb		X		1
<i>Desmodium floridanum</i>	Florida tick-trefoil	X			1
<i>Desmodium obtusum</i>	stiff tick-trefoil	X			1
<i>Desmodium</i> sp.	tick-trefoil	X			1
<i>Dichantherium aciculare</i>	needleleaf witchgrass	X			1
<i>Dichantherium angustifolium</i>	narrowleaf witchgrass	X			1
<i>Dichantherium commutatum</i>	variable witchgrass	X			1
<i>Dichantherium dichotomum</i> var. <i>dichotomum</i>	forked witchgrass	X			1
<i>Dichantherium ovale</i>	oval-flowered witchgrass	X			1
<i>Dichantherium scabriusculum</i>	woolly witchgrass		X		1
<i>Dichantherium</i> sp.	witchgrass	X			1
<i>Dichantherium sphaerocarpon</i>	roundseed witchgrass	X			1
<i>Dichantherium strigosum</i> var. <i>leucoblepharis</i>	roughhair witchgrass	X		X	2

Scientific Name	Common Name	Sandhill	Wetland Forest Mixed - restoration	Wetland Forest Mixed - preserved	Grand Total
<i>Dichantheium tenue</i>	white-edged witchgrass	X			1
<i>Dichondra carolinensis</i>	Carolina ponysfoot	X			1
<i>Digitaria filiformis</i> var. <i>filiformis</i>	slender crabgrass	X			1
<i>Diodia virginiana</i>	Virginia buttonweed	X			1
<i>Diospyros virginiana</i>	common persimmon	X		X	2
<i>Drosera capillaris</i>	pink sundew			X	1
<i>Dulichium arundinaceum</i> var. <i>arundinaceum</i>	threeway sedge		X		1
<i>Edrastima uniflora</i>	oldenlandia		X	X	2
<i>Eleocharis equisetoides</i>	jointed spikerush		X		1
<i>Elephantopus elatus</i>	tall elephantsfoot	X			1
<i>Eragrostis elliottii</i>	Elliott's lovegrass	X			1
<i>Eremochloa ophiuroides</i>	centipede grass	X			1
<i>Erianthus giganteus</i>	sugarcane plumegrass	X	X	X	3
<i>Erigeron canadensis</i>	Canadian horseweed	X			1
<i>Erigeron strigosus</i> var. <i>strigosus</i>	prairie fleabane	X			1
<i>Eriocaulon decangulare</i>	tenangle pipewort			X	1
<i>Eriogonum tomentosum</i>	dogtongue wild buckwheat	X			1
<i>Eubotrys racemosus</i>	swamp doghobble			X	1
<i>Eupatorium capillifolium</i>	dogfennel	X	X	X	3
<i>Eupatorium compositifolium</i>	yankeeweed	X			1
<i>Eupatorium leptophyllum</i>	falsefennel		X		1
<i>Eupatorium mohrii</i>	Mohr's thoroughwort		X	X	2
<i>Eupatorium rotundifolium</i>	roundleaf thoroughwort	X			1
<i>Eupatorium semiserratum</i>	smallflower thoroughwort			X	1
<i>Euphorbia curtisii</i>	Curtis' spurge	X			1
<i>Euphorbia discoidalis</i>	summer spurge	X			1
<i>Euphorbia floridana</i>	greater Florida spurge	X			1
<i>Euthamia caroliniana</i>	slender flattop goldenrod	X	X	X	3
<i>Froelichia floridana</i>	cottonweed	X			1
<i>Fuirena breviseta</i>	saltmarsh umbrellasedge		X	X	2
<i>Fuirena scirpoidea</i>	Southern umbrellasedge			X	1
<i>Galactia minor</i>	leafy milkpea	X			1
<i>Galactia</i> sp.	milkpea	X			1
<i>Galium bermudense</i>	coastal bedstraw	X			1
<i>Galium pilosum</i>	hairy bedstraw	X			1
<i>Gaylussacia dumosa</i>	dwarf huckleberry	X			1
<i>Gelsemium sempervirens</i>	yellow jessamine	X		X	2
<i>Geobalanus oblongifolius</i>	gopher apple	X			1
<i>Gordonia lasianthus</i>	loblolly bay			X	1
<i>Gymnopogon ambiguus</i>	bearded skeletongrass	X			1
<i>Habenaria repens</i>	waterspider false rein orchid		X		1
<i>Hexasepalum teres</i>	poor joe	X			1

Scientific Name	Common Name	Sandhill	Wetland Forest Mixed - restoration	Wetland Forest Mixed - preserved	Grand Total
<i>Hibiscus aculeatus</i>	comfortroot	X			1
<i>Houstonia procumbens</i>	roundleaf bluet	X			1
<i>Hymenachne hemitoma</i>	maidencane		X		1
<i>Hypericum brachyphyllum</i>	coastalplain St. John's wort			X	1
<i>Hypericum cistifolium</i>	roundpod St. John's wort			X	1
<i>Hypericum crux-andreae</i>	St. Peter's wort			X	1
<i>Hypericum gentianoides</i>	orangegrass	X			1
<i>Hypericum hypericoides</i>	St. Andrew's cross	X			1
<i>Ilex coriacea</i>	large gallberry			X	1
<i>Ilex glabra</i>	gallberry	X	X		2
<i>Ilex myrtifolia</i>	myrtle-leaved holly		X	X	2
<i>Ilex opaca</i>	American holly	X		X	2
<i>Ilex vomitoria</i>	yaupon	X		X	2
<i>Itea virginica</i>	Virginia willow		X		1
<i>Iva microcephala</i>	Piedmont marshelder	X			1
<i>Juncus canadensis</i>	Canadian rush		X		1
<i>Juncus scirpoides</i>	needlepod rush			X	1
<i>Juniperus virginiana</i>	Eastern red cedar	X		X	2
<i>Kelochloa verrucosa</i>	warty panicgrass		X	X	2
<i>Lachnanthes caroliniana</i>	Carolina redroot		X		1
<i>Lechea minor</i>	thymeleaf pinweed	X			1
<i>Lechea sessiliflora</i>	pineland pinweed	X			1
<i>Lespedeza hirta</i>	hairy lespedeza	X			1
<i>Liatris elegans</i>	pinkscale gayfeather	X			1
<i>Liatris gracilis</i>	slender gayfeather	X			1
<i>Liquidambar styraciflua</i>	sweetgum		X	X	2
liverwort	liverwort		X		1
<i>Lobelia brevifolia</i>	shortleaf lobelia			X	1
<i>Lorinseria areolata</i>	netted chain fern			X	1
<i>Ludwigia pilosa</i>	hairy primrosewillow		X	X	2
<i>Lycopodiella alopecuroides</i>	foxtail club-moss		X	X	2
<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	2
<i>Magnolia virginiana</i> var. <i>australis</i>	sweetbay		X	X	2
<i>Mikania scandens</i>	climbing hempvine			X	1
<i>Mitchella repens</i>	partridgeberry			X	1
<i>Morella caroliniensis</i>	evergreen bayberry			X	1
<i>Morella cerifera</i>	Southern bayberry	X	X	X	3
<i>Morella inodora</i>	odorless bayberry			X	1
Bryophyta	moss			X	1
<i>Muhlenbergia expansa</i>	cutover muhly	X			1
<i>Muscadinia rotundifolia</i>	muscadine	X	X	X	3

Scientific Name	Common Name	Sandhill	Wetland Forest Mixed - restoration	Wetland Forest Mixed - preserved	Grand Total
<i>Nymphaea odorata</i> ssp. <i>odorata</i>	white waterlily		X		1
<i>Nyssa biflora</i>	swamp tupelo		X	X	2
<i>Oenothera filipes</i>	slenderstalk beeblossom	X			1
<i>Osmunda spectabilis</i>	royal fern		X		1
<i>Osmundastrum cinnamomeum</i>	cinnamon fern			X	1
<i>Oxalis corniculata</i>	creeping lady's woodsorrel	X			1
<i>Packera anonyma</i>	Small's ragwort	X			1
<i>Palafoxia integrifolia</i>	coastalplain palafox	X			1
<i>Panicum virgatum</i>	switchgrass	X			1
<i>Paronychia patula</i>	pineland nailwort	X			1
<i>Paspalum setaceum</i>	thin paspalum	X			1
<i>Paspalum</i> sp.	crowgrass	X			1
<i>Passiflora incarnata</i>	purple passion-flower	X			1
<i>Pediomelum canescens</i>	buckroot	X			1
<i>Persicaria hydropiperoides</i>	mild waterpepper		X		1
<i>Pieris phillyreifolia</i>	climbing fetterbush		X	X	2
<i>Pinus elliotii</i>	slash pine	X	X	X	3
<i>Pinus palustris</i>	longleaf pine	X			1
<i>Pityopsis aspera</i>	pineland silkgrass	X			1
<i>Pityopsis aspera</i> var. <i>adenolepis</i>	pineland silkgrass	X			1
<i>Pityopsis graminifolia</i>	narrowleaf silkgrass	X			1
<i>Pluchea foetida</i>	stinking camphorweed			X	1
<i>Pluchea odorata</i> var. <i>odorata</i>	Southern saltmarsh fleabane		X		1
<i>Polygala nana</i>	candyroot	X			1
<i>Polygonella gracilis</i>	tall jointweed	X			1
<i>Polypremum procumbens</i>	rustweed	X			1
<i>Prunus serotina</i> var. <i>serotina</i>	Eastern wild black cherry	X			1
<i>Pseudognaphalium obtusifolium</i>	sweet everlasting	X			1
<i>Pteridium pseudocaudatum</i>	tailed bracken	X			1
<i>Pterocaulon pycnostachyum</i>	blackroot	X			1
<i>Quercus falcata</i>	Southern red oak	X			1
<i>Quercus geminata</i>	sand live oak	X			1
<i>Quercus hemisphaerica</i>	laurel oak	X			1
<i>Quercus incana</i>	bluejack oak	X			1
<i>Quercus laevis</i>	turkey oak	X			1
<i>Quercus nigra</i>	water oak	X			1
<i>Quercus virginiana</i>	live oak	X			1
<i>Quercus margaretiae</i>	sand post oak	X			1
<i>Rhexia mariana</i>	pale meadowbeauty		X	X	2
<i>Rhexia petiolata</i>	fringed meadowbeauty			X	1
<i>Rhexia virginica</i>	handsome harry		X	X	2
<i>Rhododendron viscosum</i> var. <i>viscosum</i>	swamp azalea			X	1
<i>Rhus copallinum</i> var. <i>copallinum</i>	winged sumac	X			1

Scientific Name	Common Name	Sandhill	Wetland Forest Mixed - restoration	Wetland Forest Mixed - preserved	Grand Total
<i>Rhynchosia cytisoides</i>	royal snoutbean	X			1
<i>Rhynchosia reniformis</i>	dollarleaf	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 glomerata</i>	clustered beaksedge		X		1
<i>Rhynchospora gracilentata</i>	slender beaksedge		X	X	2
<i>Rhynchospora leptocarpa</i>	brownish beaksedge			X	1
<i>Rhynchospora</i> sp.	beaksedge			X	1
<i>Richardia humistrata</i>	South American Mexican clover	X			1
<i>Rubus cuneifolius</i>	sand blackberry	X			1
<i>Rubus flagellaris</i>	Northern dewberry	X			1
<i>Rubus pensilvanicus</i>	sawtooth blackberry	X		X	2
<i>Salvia azurea</i> var. <i>azurea</i>	azure blue sage	X			1
<i>Schizachyrium stoloniferum</i>	creeping little bluestem	X			1
<i>Schizachyrium tenerum</i>	slender bluestem	X			1
<i>Scleria ciliata</i>	fringed nutrush	X			1
<i>Scleria ciliata</i> var. <i>elliottii</i>	broad-leaved hairy nutrush	X			1
<i>Scleria</i> sp.	nutrush	X			1
<i>Scutellaria integrifolia</i>	helmet skullcap	X			1
<i>Serenoa repens</i>	saw palmetto	X			1
<i>Sericocarpus tortifolius</i>	whitetop aster	X			1
<i>Seymeria pectinata</i>	Piedmont blacksenne	X			1
<i>Smilax auriculata</i>	earleaf greenbriar	X			1
<i>Smilax bona-nox</i>	saw greenbriar	X		X	2
<i>Smilax glauca</i>	cat greenbriar	X			1
<i>Smilax laurifolia</i>	laurel greenbriar			X	1
<i>Smilax pumila</i>	sarsaparilla vine	X			1
<i>Smilax</i> sp.	greenbriar		X		1
<i>Smilax walteri</i>	coral greenbriar		X		1
<i>Solidago fistulosa</i>	pinebarren goldenrod	X		X	2
<i>Solidago odora</i>	sweet goldenrod	X			1
<i>Solidago petiolaris</i> var. <i>petiolaris</i>	downy ragged goldenrod	X			1
<i>Sorghastrum secundum</i>	lopsided indiagrass	X			1
<i>Sphagnum</i> sp.	sphagnum moss			X	1
<i>Stillingia sylvatica</i>	queen's delight	X			1
<i>Stylisma patens</i>	coastalplain dawnflower	X			1
<i>Symphyotrichum dumosum</i>	rice button aster	X		X	2
<i>Symphyotrichum dumosum</i> var. <i>gracilipes</i>	rice button aster	X			1
<i>Tamala palustris</i>	swamp bay		X	X	2
<i>Taxodium ascendens</i>	pond cypress		X		1
<i>Tillandsia usneoides</i>	Spanish moss		X		1

Scientific Name	Common Name	Sandhill	Wetland Forest Mixed - restoration	Wetland Forest Mixed - preserved	Grand Total
<i>Toxicodendron radicans</i> var. <i>radicans</i>	Eastern poison ivy			X	1
<i>Tragia smallii</i>	Small's noseburn	X			1
<i>Tragia urens</i>	wavyleaf noseburn	X			1
<i>Tragia urticifolia</i>	nettleleaf noseburn	X			1
<i>Triadenum virginicum</i>	Virginia marsh St. John's wort		X	X	2
† <i>Triadica sebifera</i>	Chinese tallow tree	X	X		2
<i>Trichostema dichotomum</i>	forked bluecurls	X			1
<i>Tridens flavus</i>	tall redtop	X			1
<i>Trilisa odoratissima</i>	vanillaleaf	X			1
<i>Utricularia</i> sp.	bladderwort			X	1
<i>Vaccinium arboreum</i>	sparkleberry	X			1
<i>Vaccinium elliotii</i>	Elliott's blueberry	X	X	X	3
<i>Vaccinium fuscatum</i>	hairy highbush blueberry			X	1
<i>Vaccinium myrsinites</i>	shiny blueberry	X			1
<i>Vaccinium</i> sp.	blueberry	X			1
<i>Vaccinium stamineum</i>	deerberry	X			1
<i>Vernonia angustifolia</i> var. <i>mohrii</i>	tall ironweed	X			1
<i>Viburnum nudum</i>	possumhaw			X	1
<i>Viola</i> sp.	violet	X			1
<i>Xyris ambigua</i>	coastalplain yellow-eyed grass		X	X	2
<i>Xyris fimbriata</i>	fringed yellow-eyed grass		X	X	2
<i>Xyris flabelliformis</i>	savannah yellow-eyed grass			X	1
Total number of taxa: 259		171	63	88	322

Sandhill

Qualitative sampling. The sandhill natural community has been degraded by past silviculture activities but retains many characteristic species. Young planted longleaf pines were widely spaced over the hillside. These trees are starting to produce good needle cast that will help to carry prescribed burns on the property. The diverse but occasionally sparse groundcover was dominated by a mix of ruderal species indicative of past disturbance, along with more typical sandhill species such as wiregrass. Although the site was mostly open, tall shrubs form occasional thickets of mostly yaupon, laurel oak, and other oaks. Turkey oak, southern red oak, bluejack oak, persimmon, and sand blackberry were also frequent shrubs and small trees. Earleaf greenbriar and yellow jessamine vines were common. A small amount of the non-native invasive Japanese climbing fern, seen also in prior years, was found in 2024. There was also a new observation of the non-native Chinese tallow tree. The site has not burned in the last year. We identified a total of 171 plant taxa in this community (Table 1).

Quantitative sampling. The northern Transect 1 (Figure 3, Table 2) was located midslope on an east-facing hill. It had a total of 65 species with 33% open ground. The ground layer consisted of mainly herbaceous species with scattered shrubs. Wiregrass had the highest individual percent cover, followed

by yaupon, needleleaf witchgrass, and earleaf greenbrier. Wiregrass was present at around 19% cover, an increase from 2023. Woody species made up around 22% average cover per quadrat, mostly due to clumps of yaupon on the south end of the transect. Overall, vegetation measurements were very similar to last year.

The southern Transect 2 (Figure 4, Table 3) was situated near the top of a low ridge. It had a total of 68 species with 54% open ground. The highest herbaceous cover contributions were from Lynn Haven goldenaster and pineland silkgrass. Yellow jessamine, saw palmetto, earleaf greenbrier, and laurel oak formed most of the woody cover which made up around 21% average cover per quadrat, a slight decrease from 2023. Although not recorded as cover, fruticose lichens were observed in three quadrats.

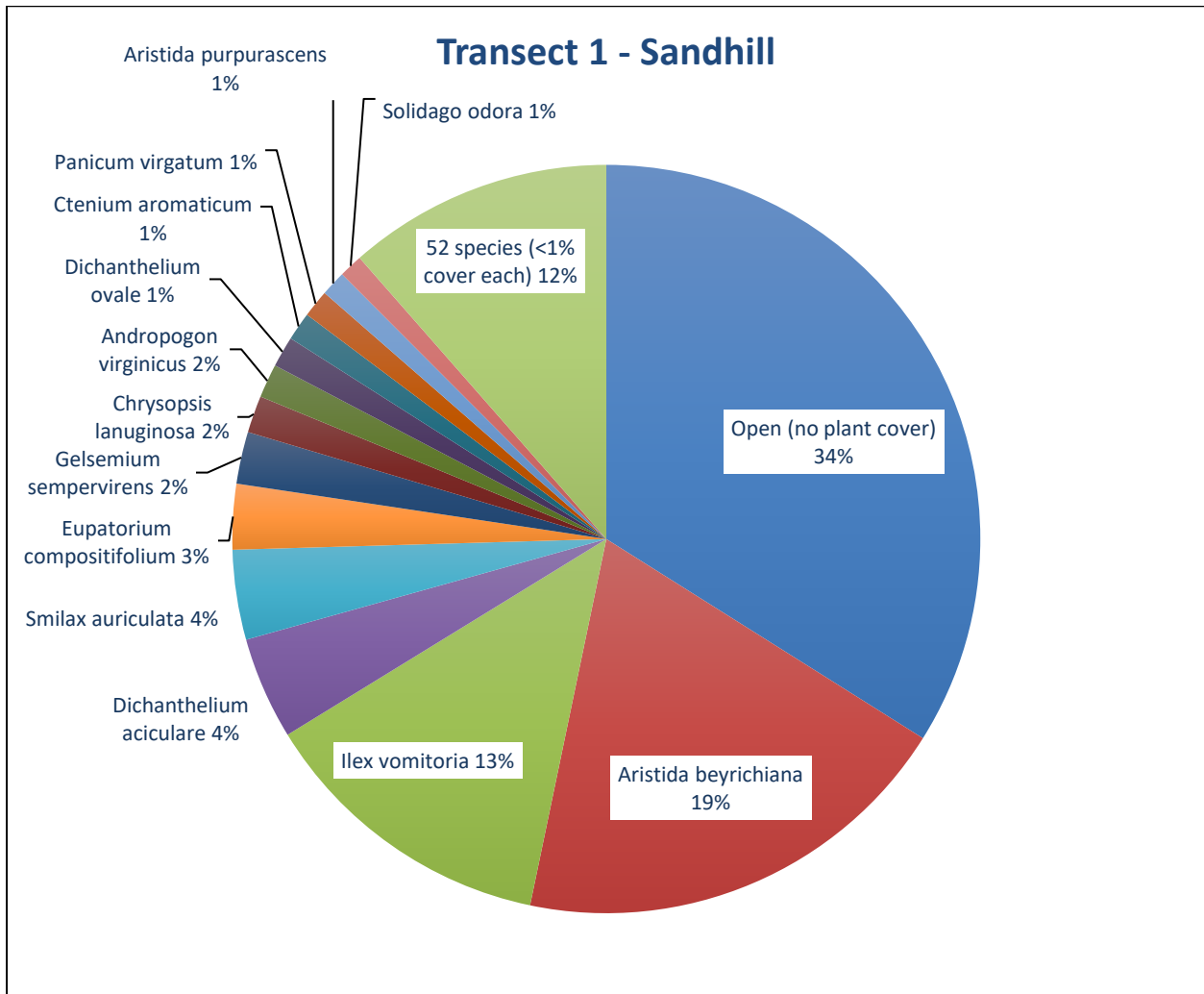


Figure 3. Percent relative cover of plant species in Sandhill Transect 1.

Table 2. Percent cover of plant species in Sandhill Transect 1 sampled on October 16, 2024.

Scientific name	Common name	Average percent cover per quadrat
<i>Acalypha gracilens</i>	slender threeseed mercury	0.07
<i>Agalinis divaricata</i>	pineland false foxglove	0.10
<i>Andropogon ternarius</i>	splitbeard bluestem	0.23
<i>Andropogon virginicus</i>	broomsedge bluestem	1.43
<i>Aristida beyrichiana</i>	Southern wiregrass	18.93
<i>Aristida purpurascens</i>	arrowfeather threeawn	1.07
<i>Asclepias tuberosa</i>	butterflyweed	0.03
<i>Berlandiera pumila</i> var. <i>pumila</i>	soft greeneyes	0.03
<i>Bulbostylis ciliatifolia</i>	capillary hairsedge	0.07
<i>Chrysopsis lanuginosa</i>	Lynn Haven goldenaster	1.57
<i>Chrysopsis</i> sp.	goldenaster	0.03
<i>Cnidocolus stimulosus</i>	tread softly	0.10
<i>Croptilon divaricatum</i>	slender scratchdaisy	0.20
<i>Ctenium aromaticum</i>	toothache grass	1.20
<i>Dalea pinnata</i>	summer farewell	0.10
<i>Dichantherium aciculare</i>	needleleaf witchgrass	4.33
<i>Dichantherium ovale</i>	oval-flowered witchgrass	1.30
<i>Diodia virginiana</i>	Virginia buttonweed	0.10
<i>Elephantopus elatus</i>	tall elephantsfoot	0.23
<i>Eragrostis elliotii</i>	Elliott's lovegrass	0.03
<i>Eupatorium compositifolium</i>	yankeeweed	2.77
<i>Euphorbia discoidalis</i>	summer spurge	0.03
<i>Euthamia caroliniana</i>	slender flattop goldenrod	0.10
<i>Galactia minor</i>	leafy milkpea	0.10
<i>Galactia</i> sp.	milkpea	0.03
<i>Galium bermudense</i>	coastal bedstraw	0.03
<i>Galium pilosum</i>	hairy bedstraw	0.03
<i>Gelsemium sempervirens</i>	yellow jessamine	2.20
<i>Hibiscus aculeatus</i>	comfortroot	0.03
<i>Hypericum gentianoides</i>	orangegrass	0.77
<i>Hypericum hypericoides</i>	St. Andrew's cross	0.33
<i>Ilex vomitoria</i>	yaupon	12.70
<i>Lechea sessiliflora</i>	pineland pinweed	0.47
<i>Liatris gracilis</i>	slender gayfeather	0.27
<i>Oenothera filipes</i>	slenderstalk beeblossom	0.37
<i>Panicum virgatum</i>	switchgrass	1.17
<i>Paspalum</i> sp.	paspalum	0.03
<i>Pinus palustris</i>	longleaf pine	0.50
<i>Pityopsis aspera</i> var. <i>adenolepis</i>	pineland silkgrass	0.90
<i>Polygonella gracilis</i>	tall jointweed	0.57
<i>Polypremum procumbens</i>	rustweed	0.53
<i>Pteridium pseudocaudatum</i>	tailed bracken	0.13
<i>Quercus hemisphaerica</i>	laurel oak	0.13
<i>Quercus margaretiae</i>	sand post oak	0.23
<i>Rhynchosia reniformis</i>	dollarleaf	0.20
<i>Rubus cuneifolius</i>	sand blackberry	0.63

Scientific name	Common name	Average percent cover per quadrat
<i>Rubus flagellaris</i>	northern dewberry	0.13
<i>Schizachyrium stoloniferum</i>	creeping little bluestem	0.73
<i>Schizachyrium tenerum</i>	slender bluestem	0.23
<i>Scleria ciliata</i>	hairy nutrush	0.30
<i>Seymeria pectinata</i>	Piedmont blacksenna	0.23
<i>Smilax auriculata</i>	earleaf greenbrier	3.80
<i>Smilax bona-nox</i>	saw greenbrier	0.10
<i>Smilax glauca</i>	cat greenbrier	0.67
<i>Smilax pumila</i>	sarsaparilla vine	0.10
<i>Solidago odora</i>	sweet goldenrod	1.00
<i>Solidago petiolaris</i> var. <i>petiolaris</i>	downy ragged goldenrod	0.23
<i>Stylisma patens</i>	coastalplain dawnflower	0.13
<i>Symphotrichum dumosum</i>	long-stalked aster	0.07
<i>Tragia urticifolia</i>	nettleleaf noseburn	0.03
<i>Trichostema dichotomum</i>	forked bluecurls	0.07
<i>Vaccinium arboreum</i>	sparkleberry	0.03
<i>Vaccinium stamineum</i>	deerberry	0.33
<i>Vernonia angustifolia</i> var. <i>mohrii</i>	tall ironweed	0.03
<i>Viola</i> sp.	violet	0.03
Open (no plant cover)		33.23

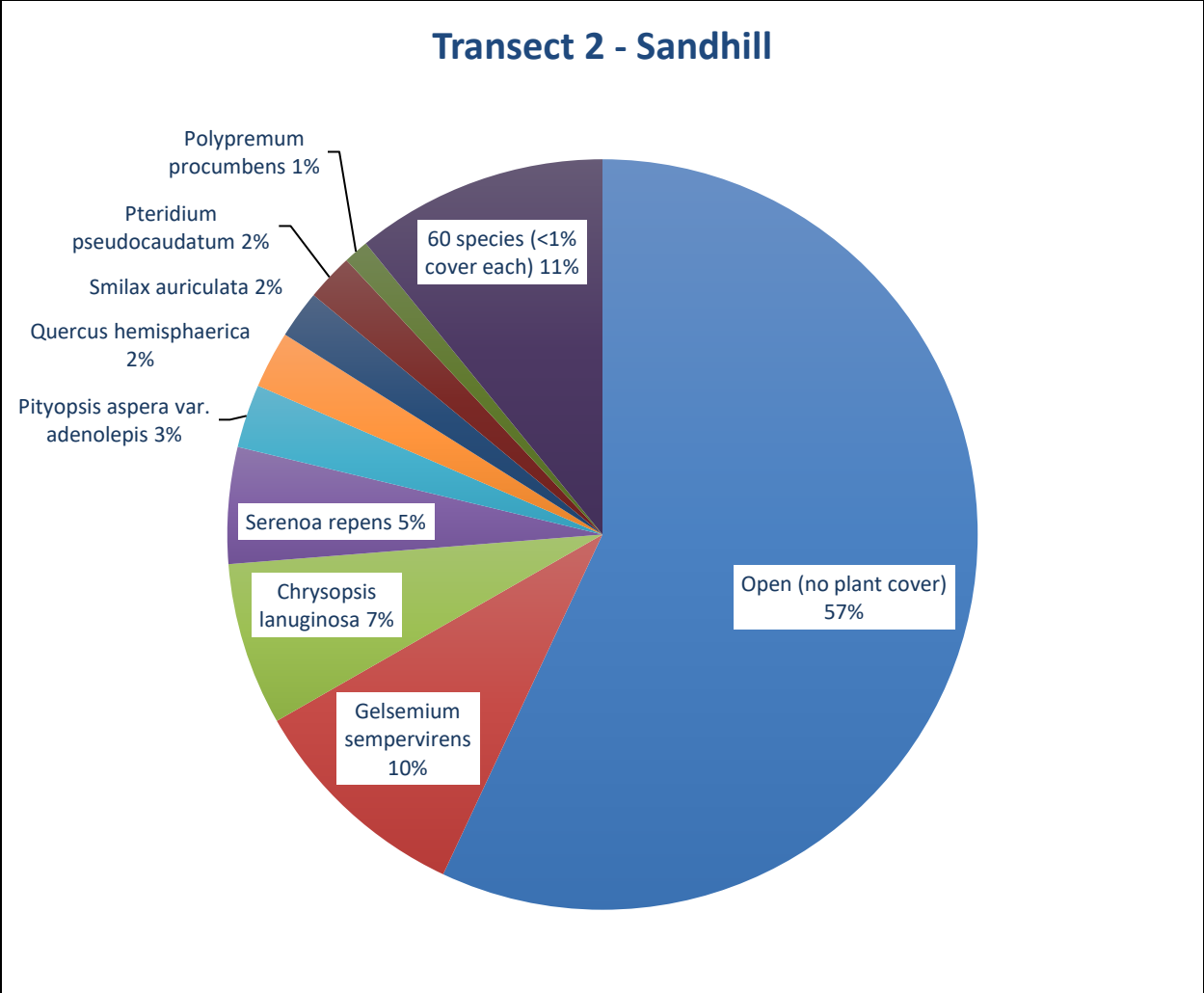


Figure 4. Percent relative cover of plant species in Sandhill Transect 2.

Table 3. Percent cover of plant species in Sandhill Transect 2 sampled on October 16, 2024.

Scientific name	Common name	Average percent cover per quadrat
<i>Acalypha gracilens</i>	slender threeseed mercury	0.13
<i>Agalinis fasciculata</i>	beach false foxglove	0.07
<i>Agalinis</i> sp.	false foxglove	0.03
<i>Andropogon</i> sp.	bluestem	0.17
<i>Andropogon virginicus</i>	broomsedge bluestem	0.33
<i>Andropogon virginicus</i> var. <i>virginicus</i>	broomsedge bluestem	0.40
<i>Aristida beyrichiana</i>	Southern wiregrass	0.20
<i>Aristida purpurascens</i>	arrowfeather threeawn	0.30
<i>Aristida tenuispica</i>	Southern arrowfeather	0.03
<i>Asimina spatulata</i>	paw paw	0.03
<i>Bulbostylis ciliatifolia</i>	capillary hairsedge	0.03
<i>Chamaecrista nictitans</i>	sensitive pea	0.03

Scientific name	Common name	Average percent cover per quadrat
<i>Chrysopsis lanuginosa</i>	Lynn Haven goldenaster	6.67
<i>Cnidocolus stimulosus</i>	tread softly	0.03
Commelinaceae	Dayflower family	0.13
<i>Crocanthemum carolinianum</i>	Carolina frostweed	0.03
<i>Crotalaria rotundifolia</i>	rabbitbells	0.03
<i>Croton glandulosus</i>	vente conmigo	0.17
<i>Cyperus</i> sp.	flatsedge	0.03
<i>Dichantherium aciculare</i>	needleleaf witchgrass	0.90
<i>Dichantherium commutatum</i>	variable witchgrass	0.43
<i>Dichantherium dichotomum</i> var. <i>dichotomum</i>	forked witchgrass	0.10
<i>Dichantherium ovale</i>	oval-flowered witchgrass	0.37
<i>Dichantherium</i> sp.	witchgrass	0.10
<i>Dichantherium strigosum</i> var. <i>leucoblepharis</i>	roughhair witchgrass	0.03
<i>Dichondra carolinensis</i>	Carolina ponysfoot	0.03
<i>Digitaria filiformis</i> var. <i>filiformis</i>	slender crabgrass	0.03
<i>Diospyros virginiana</i>	common persimmon	0.20
<i>Eupatorium compositifolium</i>	yankeeweed	0.07
<i>Euphorbia curtisii</i>	Curtis' spurge	0.07
<i>Euphorbia discoidalis</i>	summer spurge	0.10
<i>Euthamia caroliniana</i>	slender flattop goldenrod	0.20
<i>Galactia minor</i>	leafy milkpea	0.10
<i>Gelsemium sempervirens</i>	yellow jessamine	9.27
<i>Hexasepalum teres</i>	poor joe	0.03
<i>Hibiscus aculeatus</i>	comfortroot	0.47
<i>Houstonia procumbens</i>	roundleaf bluet	0.03
<i>Hypericum gentianoides</i>	orangegrass	0.27
<i>Hypericum hypericoides</i>	St. Andrew's cross	0.10
<i>Lechea minor</i>	thymeleaf pinweed	0.07
<i>Lechea sessiliflora</i>	pineland pinweed	0.40
<i>Liatris gracilis</i>	slender gayfeather	0.03
<i>Pinus elliotii</i>	slash pine	0.50
<i>Pinus palustris</i>	longleaf pine	0.23
<i>Pityopsis aspera</i> var. <i>adenolepis</i>	pineland silkgrass	2.60
<i>Pityopsis</i> sp.	silkgrass	0.17
<i>Polygala nana</i>	candyroot	0.07
<i>Polypremum procumbens</i>	rustweed	1.03
<i>Pteridium pseudocaudatum</i>	tailed bracken	1.93
<i>Quercus hemisphaerica</i>	laurel oak	2.33
<i>Rhus copallinum</i> var. <i>copallinum</i>	winged sumac	0.20
<i>Rubus cuneifolius</i>	sand blackberry	0.43
<i>Scleria ciliata</i> var. <i>elliottii</i>	broad-leaved hairy nutrush	0.27
<i>Scleria</i> sp.	nutrush	0.13
<i>Serenoa repens</i>	saw palmetto	4.77
<i>Sericocarpus tortifolius</i>	whiteweed aster	0.03
<i>Smilax auriculata</i>	earleaf greenbrier	1.97
<i>Smilax bona-nox</i>	saw greenbrier	0.93
<i>Smilax glauca</i>	cat greenbrier	0.10

Scientific name	Common name	Average percent cover per quadrat
<i>Smilax pumila</i>	sarsaparilla vine	0.10
<i>Solidago fistulosa</i>	pinebarren goldenrod	0.03
<i>Solidago odora</i>	sweet goldenrod	0.20
<i>Stylisma patens</i>	coastalplain dawnflower	0.03
<i>Symphotrichum dumosum</i> var. <i>gracilipes</i>	long-stalked aster	0.13
<i>Tragia smallii</i>	Small's noseburn	0.07
<i>Trichostema dichotomum</i>	forked bluecurls	0.07
<i>Vaccinium arboreum</i>	sparkleberry	0.27
<i>Vaccinium</i> sp.	blueberry	0.03
Open (no plant cover)		54.17

Wetland Forest Mixed (Restoration)

Qualitative sampling. The Wetland Forest Mixed Restoration area (Figure 2) resembled a marsh due to its sparse tree cover, although the central portion of the area is a stand of young swamp tupelo and pond cypress with only a few mature trees. The muck soil of the former beaver pond was dry at the edges but had deeper water in the center than was present in 2023. The vegetative cover in the central portions in the vicinity of the transect consisted primarily of hairy primrosewillow. White waterlily was common, but only in the deepest, frequently inundated parts of the marsh. Interspersed with the low groundcover were patches of young cypress with occasional swamp tupelo, sweetbay, and red maple. Shallower areas near the shore were dominated by loosehead beaksedge, warty panicum, and a diverse set of wetland herbs, including taperleaf waterhorehound and maidencane. Shrubs and small trees dominated the ecotone to the adjacent uplands. The non-native invasive Chinese tallow tree was detected for the first time this year. We observed a total of 63 species in this community (Table 1).

Quantitative sampling. Transect 1 (Figure 5, Table 4) had a total of 27 species with 19% open ground). Water levels were higher than in 2023, but still fairly dry compared to prior years. In general, the western end of the transect is shallower than the eastern end where hummocks are common. The highest percent cover by far was loosehead beaksedge, a species that has quadrupled in cover due to the drier conditions. Hairy primrosewillow was also abundant, followed by willow herb and sugarcane plumegrass. Willow herb and white waterlily, once dominants along this transect, continued to be much reduced but were increasing. Woody species made around 6% average cover per quadrat, an increase from last year mainly attributable to the rebound of willow herb.

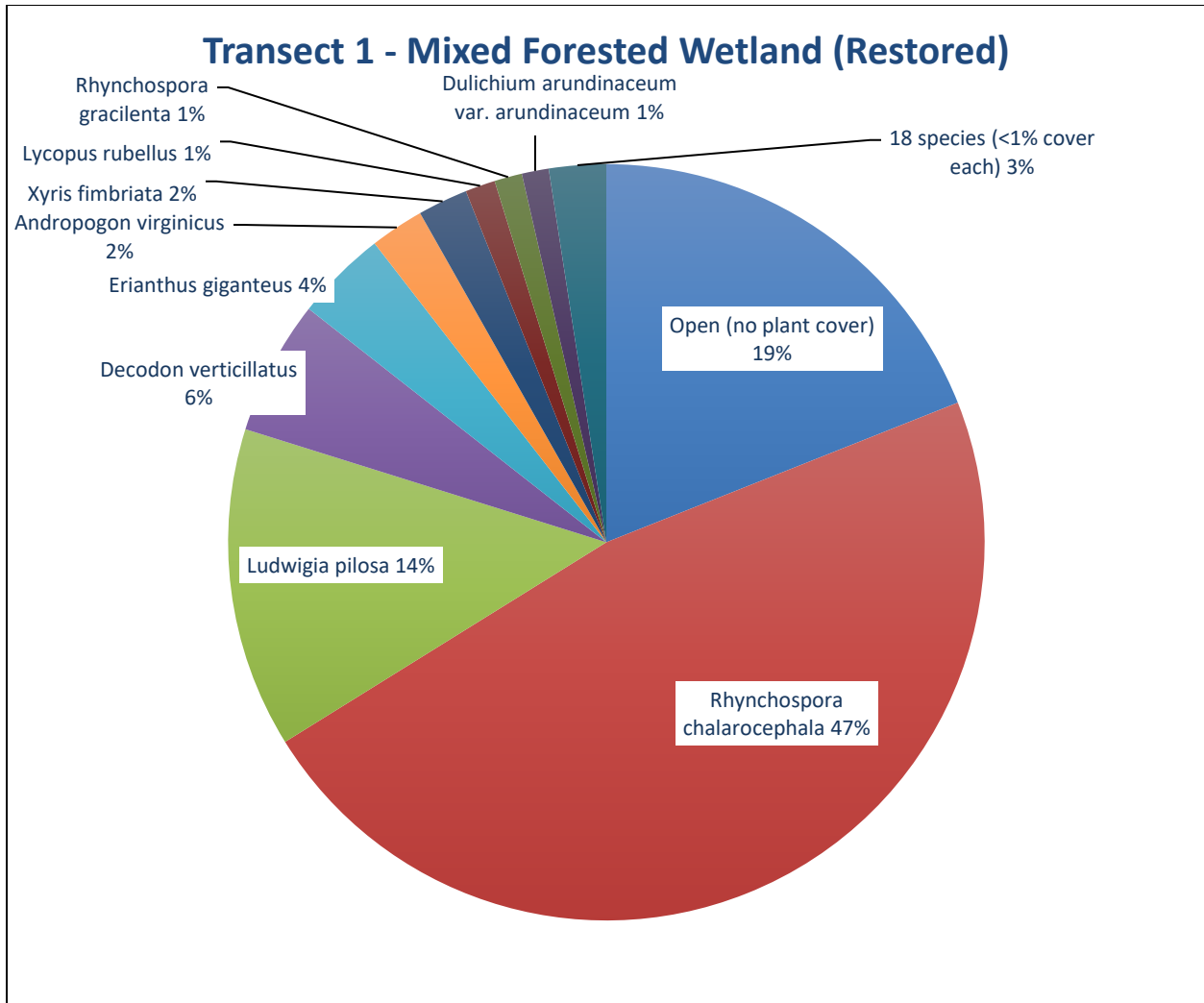


Figure 5. Percent relative cover of plant species in Mixed Forested Wetland (Restored) Transect 1.

Table 4. Percent cover of plant species in Mixed Forested Wetland (Restored) Transect 1 sampled on October 16, 2024.

Scientific name	Common name	Average percent cover per quadrat
<i>Andropogon cretaceus</i>	purple bluestem	0.10
<i>Andropogon dealbatus</i>	wetland white bluestem	0.50
<i>Andropogon virginicus</i>	broomsedge bluestem	2.33
<i>Decodon verticillatus</i>	willow herb	5.83
<i>Dulichium arundinaceum</i> var. <i>arundinaceum</i>	threeway sedge	1.17
<i>Edrastrima uniflora</i>	oldenlandia	0.03
<i>Eleocharis equisetoides</i>	jointed spikerush	0.10
<i>Erianthus giganteus</i>	sugarcane plumegrass	3.97
<i>Euthamia caroliniana</i>	slender flattop goldenrod	0.27
<i>Fuirena breviseta</i>	saltmarsh umbrellasedge	0.03
<i>Habenaria repens</i>	waterspider false rein orchid	0.03

<i>Ilex myrtifolia</i>	myrtle-leaved holly	0.03
<i>Itea virginica</i>	Virginia willow	0.23
<i>Juncus canadensis</i>	Canadian rush	0.13
<i>Lachnanthes caroliniana</i>	Carolina redroot	0.03
liverwort		0.23
<i>Ludwigia pilosa</i>	hairy primrosewillow	13.87
<i>Lycopus rubellus</i>	taperleaf waterhorehound	1.30
<i>Nymphaea odorata</i> ssp. <i>odorata</i>	white waterlily	0.23
<i>Nyssa biflora</i>	swamp tupelo	0.10
<i>Persicaria hydropiperoides</i>	mild waterpepper	0.03
<i>Pinus elliottii</i>	slash pine	0.10
<i>Rhynchospora chalarocephala</i>	loosehead beaksedge	47.80
<i>Rhynchospora gracilentia</i>	slender beaksedge	1.20
<i>Taxodium ascendens</i>	pond cypress	0.03
<i>Triadenum virginicum</i>	Virginia marsh St. John's wort	0.23
<i>Xyris fimbriata</i>	fringed yellow-eyed grass	2.17
Open (no plant cover)		19.23

Wetland Forest Mixed (Preserved)

Qualitative sampling. The Preserved Wetland Forest Mixed (Figure 2) was a mature baygall forest still in recovery from storm damage several years ago. The tall canopy of large trees formed dense shade with occasional openings. Following Hurricane Michael in 2018, many trees and limbs were down in this community. Dominant species were sweetbay and swamp tupelo. The dense subcanopy was formed primarily by tree-size large gallberry, black titi, and swamp bay. The shrub layer consisted mainly of thickets of large gallberry, fetterbush, and sweet pepperbush. The sparse herb layer was primarily sphagnum moss, although there were dense pockets of species such as taperleaf waterhorehound taking advantage of light gaps. Soils were occasionally mucky and often covered by a dense layer of leaf litter. The non-native invasive Japanese climbing fern seen in prior years was not detected in 2024. We observed a total of 88 species in this community (Table 1). Many of the new species encountered in recent years were on the open, mostly herbaceous slope that is mapped as part of this community.

Quantitative sampling. Transect 2 (Figure 6, Table 5) had a total of 30 species with 44% open ground. The dominant shrubs were fetterbush, odorless bayberry, large gallberry, and downy sweet pepperbush. Woody species made up around 43% average cover per quadrat, accounting for almost ¾ of the total species cover observed. Sphagnum moss formed most of the sparse herbaceous cover.

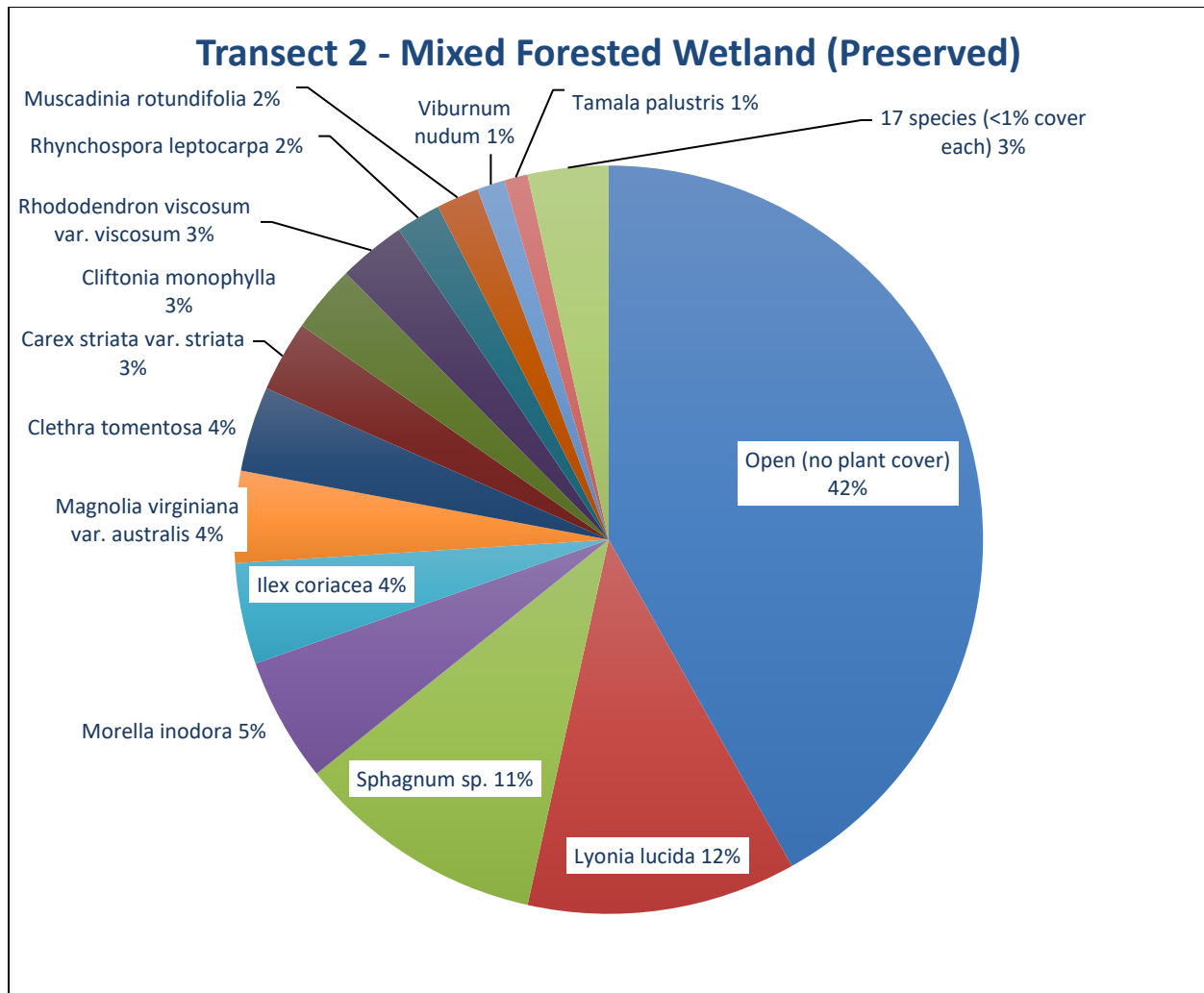


Figure 6. Percent relative cover of plant species in Mixed Forested Wetland (Preserved) Transect 2.

Table 5. Percent cover of plant species in Mixed Forested Wetland (Preserved) Transect 2 sampled on October 16, 2024.

Scientific name	Common name	Average percent cover per quadrat
<i>Anchistea virginica</i>	Virginia chain fern	0.23
<i>Andropogon cretaceus</i>	purple bluestem	0.23
<i>Andropogon sp.</i>	bluestem	0.13
<i>Andropogon virginicus</i>	broomsedge bluestem	0.10
<i>Apteria aphylla</i>	nodding nixie	0.03
<i>Carex sp.</i>	sedge	0.13
<i>Carex striata var. striata</i>	Walter's sedge	3.23
<i>Clethra tomentosa</i>	downy sweet pepperbush	3.87
<i>Cliftonia monophylla</i>	black titi	3.07
<i>Eubotrys racemosus</i>	swamp doghobble	0.10
<i>Ilex coriacea</i>	large gallberry	4.60

Scientific name	Common name	Average percent cover per quadrat
<i>Lorinseria areolata</i>	netted chain fern	0.83
<i>Lycopus rubellus</i>	taperleaf waterhorehound	0.10
<i>Lyonia lucida</i>	fetterbush	12.23
<i>Magnolia virginiana</i> var. <i>australis</i>	sweetbay	4.17
<i>Mitchella repens</i>	partridgeberry	0.03
<i>Morella inodora</i>	odorless bayberry	5.67
Bryophyta	moss	0.03
<i>Muscadinia rotundifolia</i>	muscadine	1.93
<i>Nyssa biflora</i>	swamp tupelo	0.20
<i>Rhododendron viscosum</i> var. <i>viscosum</i>	swamp azalea	3.07
<i>Rhynchospora leptocarpa</i>	brownish beaksedge	2.03
<i>Rhynchospora</i> sp.	beaksedge	0.13
<i>Smilax laurifolia</i>	laurel greenbrier	0.77
<i>Solidago fistulosa</i>	pinebarren goldenrod	0.07
<i>Sphagnum</i> sp.	sphagnum moss	11.33
<i>Tamala palustris</i>	swamp bay	1.07
<i>Vaccinium fuscatum</i>	hairy highbush blueberry	0.50
<i>Viburnum nudum</i>	possumhaw	1.27
<i>Xyris fimbriata</i>	fringed yellow-eyed grass	0.03
Open (no plant cover)		44.07