

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

Fall 2023

Kimberely Alexander

Allie Heiker

Jenna Annis

Kelly Anderson

Florida Natural Area Inventory  
1018 Thomasville Road, Suite 200-C  
Tallahassee, FL 32303  
Frank Price, Director

Funding for this project was provided by the Northwest Florida Water Management District under the  
Contract #24-012 with the Florida Natural Areas Inventory  
Florida State University

# Plum Creek at Holmes Creek Mitigation Site

## Qualitative and Quantitative Monitoring

### November-December 2023

## 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). Head 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). Quantitative and qualitative monitoring documented the current plant species composition and vegetation structure of the communities targeted for restoration as well as an intact mixed forested wetland community. The site vegetation was previously monitored by FNAI biologists every fall from 2012 to 2022.

## METHODS

The quantitative monitoring utilized 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, metal T-posts were installed at the ends of each transect to provide more permanent reference points. Along each transect line, fifteen 1m x 1m quadrats were placed along the left side beginning at 0 and then spaced every 20 feet, ending at 280 feet. Data recorded in each quadrat consisted of the visually estimated 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. Bare ground was estimated in each quadrat as a percentage of ground not obscured by plant cover up to 2 m tall. Plant cover estimates were converted to mid-point values and averaged across each transect. Relative cover (in which all plant cover and bare ground is given as a proportion of 100 percent cover) was also calculated and is reported in separate pie charts.

The qualitative monitoring consisted of recording the species and vegetation structure observed along meandering pedestrian transects through each of these communities. The field surveys were performed by FNAI botanists Kim Alexander, Allie Heiker, and Kelly Anderson on November 8-9, 2023, and December 7, 2023.

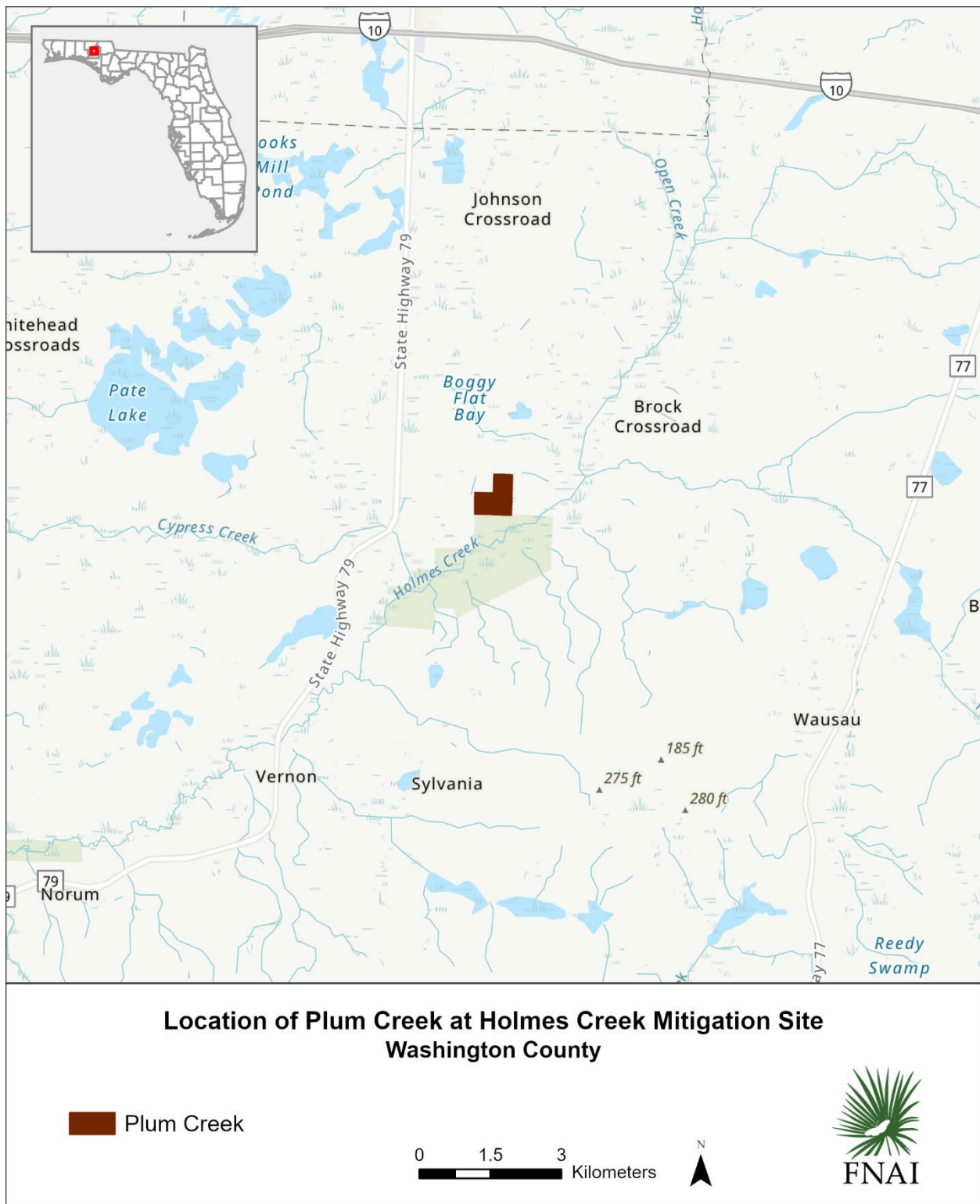


Figure 1. Location map of Plum Creek at Holmes Creek Mitigation Site monitored by FNAI.



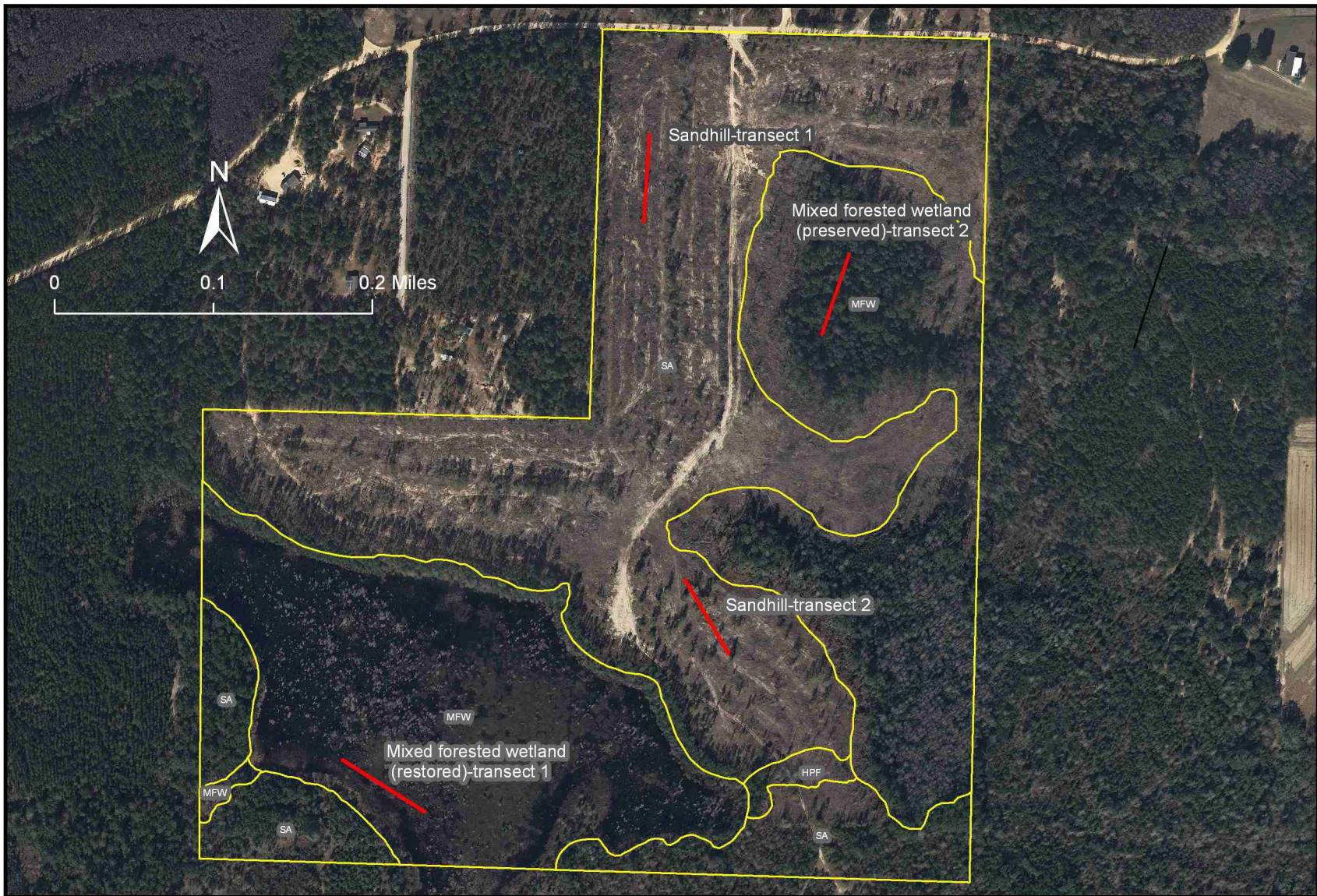


Figure 2. Location of permanent transects at Plum Creek at Holmes Creek Mitigation Site in Sandhill and Mixed Forested Wetland.

## RESULTS AND DISCUSSION

A total of 230 plant taxa were observed during the 2023 monitoring period in the target communities at Plum Creek at Holmes Creek Mitigation Site (Table 1). Seven new taxa were found during the 2023 monitoring. Taxonomy follows 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 November 8-9, 2023, and December 7, 2023. (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</i> sp.	false foxglove	X		X	2
<b><i>Aletris</i> sp.</b>	colic-root	<b>X</b>			1
<i>Ambrosia artemisiifolia</i>	common ragweed	X			1
<i>Andropogon glomeratus</i> var. <i>glaucopsis</i>	purple bluestem	X	X	X	3
<i>Andropogon gyrans</i>	Elliott's bluestem	X			1
<i>Andropogon</i> sp.	bluestem		X	X	2
<i>Andropogon ternarius</i>	splitbeard bluestem	X			1
<i>Andropogon virginicus</i>	broomsedge bluestem	X	X	X	3
<i>Apteria aphylla</i>	nodding nixie			X	1
<i>Aristida purpurascens</i>	arrowfeather threeawn	X			1
<i>Aristida stricta</i>	wiregrass	X			1
<i>Aronia arbutifolia</i>	red chokeberry		X	X	2
<i>Arundinaria gigantea</i>	switchcane			X	1
<i>Asclepias tuberosa</i>	butterflyweed	X			1
<i>Asimina spatulata</i>	paw paw	X			1
<b><i>Axonopus</i> sp.</b>	carpetgrass	<b>X</b>			1
<i>Baccharis halimifolia</i>	groundsel tree	X		<b>X</b>	2
<i>Baptisia lanceolata</i>	gopherweed	X			1
<i>Berlandiera pumila</i>	soft greeneyes	X			1
<i>Bidens mitis</i>	smallfruit beggarticks		X	X	2
<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>	Walter's sedge		X	X	2
<i>Carphephorus odoratissimus</i>	vanillaleaf	X			1
<i>Cartrema americanum</i>	wild olive	X		X	2
<i>Centella asiatica</i>	spadeleaf	X			1
<i>Chamaecrista fasciculata</i>	partridge pea	X			1

Scientific Name	Common Name	Sandhill	Wetland Forest Mixed - restoration	Wetland Forest Mixed - preserved	Grand Total
<i>Chamaecrista nictitans</i>	sensitive pea	X			1
<i>Chrysoma pauciflosculosa</i>	woody goldenrod	X			1
<i>Chrysopsis lanuginosa</i>	Lynn Haven goldenaster	X		X	2
<i>Chrysopsis mariana</i>	Maryland goldenaster	X			1
<i>Cirsium horridulum</i>	purple thistle	X			1
<i>Clethra alnifolia</i>	sweet pepperbush	X	X	X	3
<i>Cliftonia monophylla</i>	black titi		X	X	2
<i>Clitoria mariana</i>	Atlantic pigeon-wing	X			1
<i>Cnidocolus stimulosus</i>	tread softly	X			1
<i>Coleataenia anceps</i>	beaked panicum	X			1
<i>Crocanthemum carolinianum</i>	Carolina frostweed	X			1
<i>Crotalaria rotundifolia</i>	rabbitbells	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</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>Dichantherium aciculare</i>	needleleaf witchgrass	X			1
<i>Dichantherium acuminatum</i>	tapered witchgrass	X			1
<i>Dichantherium commutatum</i>	variable witchgrass	X			1
<i>Dichantherium ovale</i>	eggleaf witchgrass	X			1
<i>Dichantherium scabriusculum</i>	woolly witchgrass		X		1
<i>Dichantherium sphaerocarpon</i>	roundseed witchgrass	X			1
<i>Dichantherium strigosum</i>	roughhair witchgrass	X		X	2
<i>Dichondra carolinensis</i>	Carolina ponysfoot	X			1
<i>Digitaria filiformis</i> var. <i>filiformis</i>	slender crabgrass	X			1
<i>Diodia teres</i>	poor joe	X			1
<i>Diospyros virginiana</i>	common persimmon	X		X	2
<i>Drosera capillaris</i>	pink sundew		X	X	2
<i>Dulichium arundinaceum</i>	threeway sedge		X		1
<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>Eriocaulon decangulare</i>	tenangle pipewort		X	X	2
<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



Scientific Name	Common Name	Sandhill	Wetland Forest Mixed - restoration	Wetland Forest Mixed - preserved	Grand Total
<i>Eupatorium semiserratum</i>	smallflower thoroughwort		X	X	2
<i>Euphorbia discoidalis</i>	summer spurge	X			1
<i>Euthamia caroliniana</i>	slender flattop goldenrod	X	X	X	3
<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>Galium hispidulum</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	X	3
<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>Hibiscus aculeatus</i>	comfortroot	X			1
<i>Houstonia procumbens</i>	roundleaf bluet	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		X	2
<b>Hypericum fasciculatum</b>	peelbark St. John's wort		X		1
<i>Hypericum gentianoides</i>	orangegrass	X			1
<i>Hypericum hypericoides</i>	St. Andrew's cross	X			1
<i>Hypericum setosum</i>	hairy St. John's wort	X			1
<b>Hypoxis juncea</b>	fringed yellow stargrass	X			1
<i>Ilex cassine</i> var. <i>myrtifolia</i>	myrtle-leaved holly		X	X	2
<i>Ilex coriacea</i>	large gallberry	X	X	X	3
<i>Ilex glabra</i>	gallberry	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>Juncus canadensis</i>	Canadian rush		X		1
<i>Juncus marginatus</i>	grassleaf rush			X	1
<i>Juncus scirpoides</i>	needlepod rush		X	X	2
<i>Juniperus virginiana</i>	red cedar	X		X	2
<i>Kelochloa verrucosa</i>	warty panicgrass	X	X	X	3
<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>Lechea</i> sp.	pinweed	X			1
<b>Lechea torreyi</b>	Piedmont 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>Liatris spicata</i>	dense gayfeather	X			1

Scientific Name	Common Name	Sandhill	Wetland Forest Mixed - restoration	Wetland Forest Mixed - preserved	Grand Total
<i>Liquidambar styraciflua</i>	sweetgum	X	X	X	3
<i>Ludwigia maritima</i>	seaside primrosewillow	X			1
<i>Ludwigia pilosa</i>	hairy primrosewillow		X	X	2
<i>Lycopodiella alopecuroides</i>	foxtail club-moss		X	X	2
<i>Lycopodiella caroliniana</i>	slender club-moss		X	X	2
<i>Lycopus rubellus</i>	taperleaf waterhorehound		X	X	2
† <i>Lygodium japonicum</i>	Japanese climbing fern	X		X	2
<i>Lyonia lucida</i>	fetterbush		X	X	2
<i>Magnolia virginiana</i>	sweetbay	X	X	X	3
<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
moss				X	1
<i>Nymphaea odorata</i>	white waterlily		X		1
<i>Nyssa biflora</i>	swamp tupelo		X	X	2
<i>Oenothera filipes</i>	slenderstalk beeblossom	X			1
<i>Oldenlandia uniflora</i>	clustered mille grains		X		1
<i>Osmunda cinnamomea</i>	cinnamon fern			X	1
<i>Panicum hemitomon</i>	maidencane		X		1
<i>Panicum virgatum</i>	switchgrass	X			1
<i>Penstemon multiflorus</i>	manyflower beardtongue	X			1
<i>Persea palustris</i>	swamp bay		X	X	2
<i>Pinus clausa</i>	sand pine	X			1
<i>Pinus elliottii</i>	slash pine	X	X	X	3
<i>Pinus palustris</i>	longleaf pine	X		X	2
<i>Pityopsis aspera</i>	pineland silkgrass	X			1
<i>Pityopsis graminifolia</i>	narrowleaf silkgrass	X			1
<i>Pluchea foetida</i>	stinking camphorweed			X	1
<i>Polygala nana</i>	candyroot	X			1
<i>Polygonella gracilis</i>	tall jointweed	X			1
<i>Polygonella polygama</i>	october flower	X			1
<i>Polypremum procumbens</i>	rustweed	X			1
<i>Prunus serotina</i>	black cherry			X	1
<i>Pseudognaphalium obtusifolium</i>	sweet everlasting	X			1
<i>Pteridium aquilinum</i>	bracken fern	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 margarettae</i>	sand post oak	X			1
<i>Quercus nigra</i>	water oak	X		X	2
<i>Quercus virginiana</i>	live oak	X			1



Scientific Name	Common Name	Sandhill	Wetland Forest Mixed - restoration	Wetland Forest Mixed - preserved	Grand Total
<i>Rhexia mariana</i>	pale meadowbeauty	X	X		2
<i>Rhexia petiolata</i>	fringed meadowbeauty			X	1
<i>Rhododendron viscosum</i>	swamp azalea		X	X	2
<i>Rhus copallinum</i>	winged sumac	X			1
<i>Rhynchosia cytisoides</i>	royal snoutbean	X			1
<i>Rhynchosia reniformis</i>	dollarleaf	X			1
<i>Rhynchospora cephalantha</i>	bunched beaksedge		X	X	2
<i>Rhynchospora chalarocephala</i>	loosehead beaksedge		X	X	2
<b><i>Rhynchospora ciliaris</i></b>	fringed beaksedge			<b>X</b>	1
<i>Rhynchospora gracilentata</i>	slender beaksedge		X	X	2
<i>Rhynchospora harveyi</i>	Harvey's beaksedge	X			1
<i>Rhynchospora inundata</i>	narrowfruit horned beaksedge		X		1
<i>Rhynchospora leptocarpa</i>	brownish beaksedge			X	1
<i>Rhynchospora</i> sp.	beaksedge	X	X	X	3
<i>Richardia</i> sp.	Mexican clover	X			1
<i>Rubus cuneifolius</i>	sand blackberry	X	X		2
<i>Rubus flagellaris</i>	northern dewberry	<b>X</b>	X		2
<i>Rubus pensilvanicus</i>	sawtooth blackberry	X		X	2
<i>Saccharum giganteum</i>	sugarcane plumegrass	X	X	X	3
<i>Schizachyrium sanguineum</i>	crimson bluestem	X			1
<i>Schizachyrium stoloniferum</i>	creeping little bluestem	X			1
<i>Schizachyrium tenerum</i>	slender bluestem	X			1
<i>Scirpus cyperinus</i>	woolgrass		<b>X</b>		1
<i>Scleria ciliata</i>	fringed nutrush	X			1
<i>Scleria</i> sp.	nutrush		X		1
<i>Scleria triglomerata</i>	whip nutrush	X			1
<i>Serenoa repens</i>	saw palmetto	X			1
<i>Sericocarpus tortifolius</i>	whitetop aster	X			1
<i>Smilax auriculata</i>	earleaf greenbrier	X			1
<i>Smilax bona-nox</i>	saw greenbrier	X		<b>X</b>	2
<i>Smilax glauca</i>	cat greenbrier	X		X	2
<i>Smilax laurifolia</i>	laurel greenbrier	X		X	2
<i>Smilax pumila</i>	sarsaparilla vine	X			1
<i>Smilax walteri</i>	coral greenbrier		X		1
<i>Solidago fistulosa</i>	pinebarren goldenrod	X	X	X	3
<i>Solidago odora</i>	sweet goldenrod	X			1
<i>Solidago petiolaris</i>	downy ragged goldenrod	X			1
<i>Sorghastrum secundum</i>	lopsided indiagrass	X			1
<b><i>Sorghum halepense</i></b>	johnsongrass	<b>X</b>			1
<i>Sphagnum</i> sp.	sphagnum moss		X	X	2
<i>Stillingia sylvatica</i>	queen's delight	X			1
<i>Stylisma patens</i>	coastalplain dawnflower	X			1
<i>Symphotrichum dumosum</i>	rice button aster	X		X	2

Scientific Name	Common Name	Sandhill	Wetland Forest Mixed - restoration	Wetland Forest Mixed - preserved	Grand Total
<i>Taxodium ascendens</i>	pond cypress		X	X	2
<i>Tephrosia spicata</i>	spiked hoary-pea	X			1
<i>Tillandsia usneoides</i>	Spanish moss		X		1
<i>Toxicodendron radicans</i>	eastern poison ivy			X	1
<i>Tragia smallii</i>	Small's noseburn	X			1
<i>Triadenum virginicum</i>	Virginia marsh St. John's wort			X	1
<i>Trichostema dichotomum</i>	forked bluecurls	X			1
<i>Trichostema setaceum</i>	narrowleaf bluecurls	X			1
<i>Tridens flavus</i> var. <i>flavus</i>	tall redtop	X			1
<i>Utricularia</i> sp.	bladderwort		X	X	2
<i>Vaccinium arboreum</i>	sparkleberry	X			1
<i>Vaccinium corymbosum</i>	highbush blueberry	X	X	X	3
<i>Vaccinium elliotii</i>	Elliott's blueberry	X	X	X	3
<i>Vaccinium myrsinites</i>	shiny blueberry	X			1
<i>Vaccinium stamineum</i>	deerberry	X			1
<i>Viburnum nudum</i>	possumhaw			X	1
<i>Viola</i> sp.	violet	X			1
<i>Vitis rotundifolia</i>	muscadine	X		X	2
<i>Woodwardia areolata</i>	netted chain fern			X	1
<i>Woodwardia virginica</i>	Virginia chain fern		X	X	2
<i>Xyris ambigua</i>	coastalplain yellow-eyed grass		X	X	2
<i>Xyris baldwiniana</i>	Baldwin's yellow-eyed grass			X	1
<i>Xyris brevifolia</i>	shortleaf 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	2
<i>Xyris flabelliformis</i>	savannah yellow-eyed grass		X	X	2
<i>Yucca filamentosa</i>	Adam's needle	X			1
<b>Total number of taxa: 230</b>		156	73	92	321

## Sandhill

**Qualitative sampling.** The sandhill natural community has been degraded by past silviculture activities but retains many characteristic species. Young planted longleaf pines ca. 20 feet tall 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 is dominated by a mix of broomsedge bluestem and wiregrass, with many other species scattered throughout, including Lynn Haven goldenaster, yankeeweed, blue curls, and witchgrasses. Wiregrass, although dominant, was very sparse and native weedy species constituted most of the herb layer. The occasional shrubs were mainly yaupon, turkey oak, sparkleberry, and sand blackberry. Earleaf greenbrier 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 2023. A total of 156 plant taxa were identified 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 66 species with 43% bare ground. The ground layer consisted of mainly herbaceous species with scattered shrubs. Yaupon had the highest individual percent cover, followed by wiregrass, needleleaf witchgrass, and earleaf greenbrier. Broomsedge bluestem was reduced since last year, but this may be attributable to the late season. Wiregrass was present at around 11% cover, similar to 2022. Woody species made up around 19% 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 56 species with 47% bare ground. The highest herbaceous cover contributions were from pineland silkgrass and broomsedge bluestem. Yellow jessamine, saw palmetto, earleaf greenbrier, and laurel oak formed most of the woody cover which made up around 25% average cover per quadrat, a slight decrease from 2022. Although not recorded as cover, fruticose lichens were observed in two quadrats.

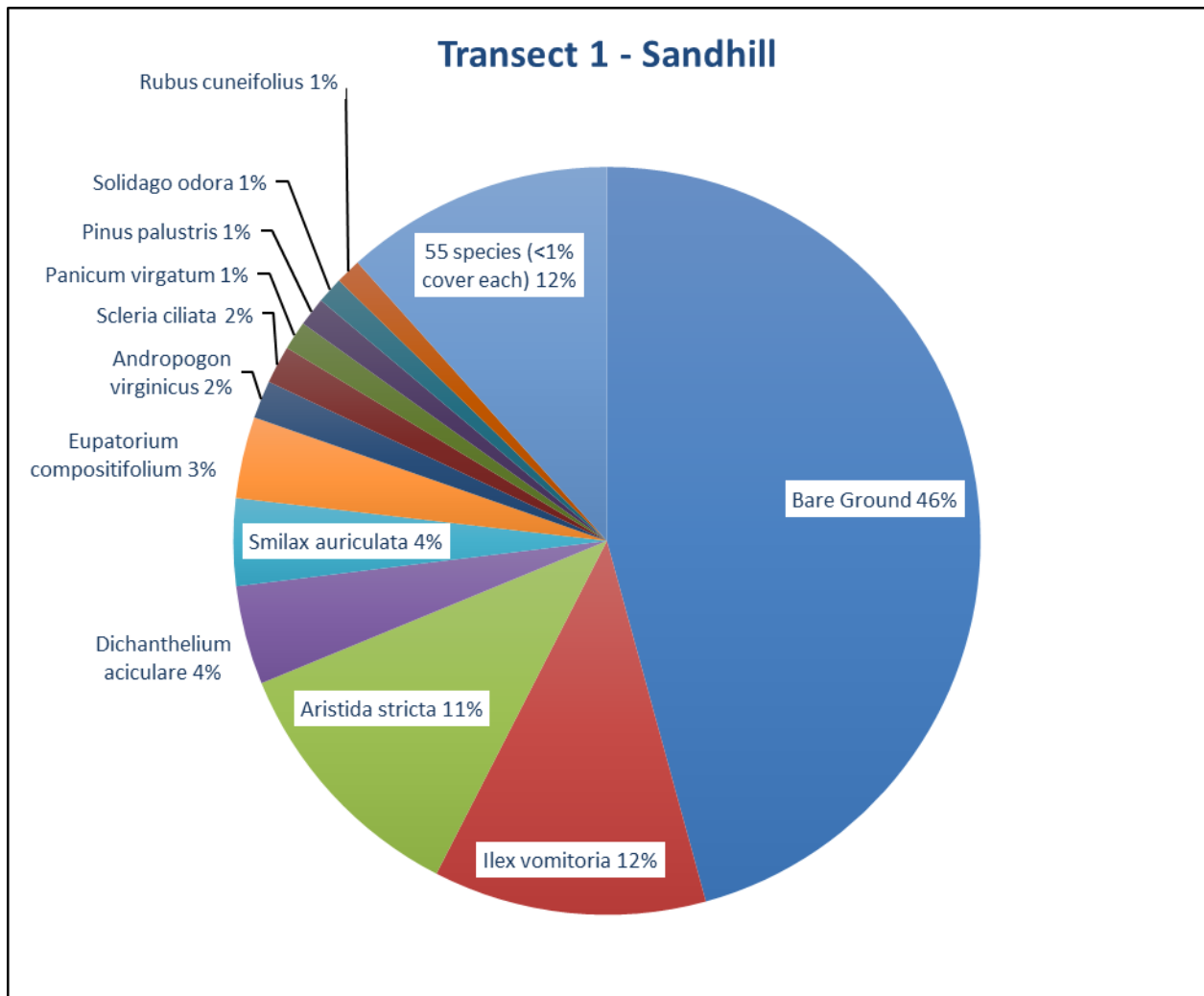


Figure 3. Percent relative cover of plant species in Sandhill Transect 1.

Table 2. Percent cover of plant species in Sandhill Transect 1 sampled on November 9, 2023.

Scientific name	Common name	Average percent cover per quadrat
<i>Acalypha gracilens</i>	slender threeseed mercury	0.07
<i>Andropogon ternarius</i>	splitbeard bluestem	0.23
<i>Andropogon virginicus</i>	broomsedge bluestem	1.53
<i>Aristida purpurascens</i>	arrowfeather threeawn	0.53
<i>Aristida stricta</i>	wiregrass	10.53
<i>Asclepias tuberosa</i>	butterflyweed	0.07
<i>Baptisia lanceolata</i>	gopherweed	0.27
<i>Berlandiera pumila</i>	soft greeneyes	0.03
<i>Bulbostylis ciliatifolia</i>	capillary hairsedge	0.20
<i>Chrysopsis lanuginosa</i>	Lynn Haven goldenaster	0.23
<i>Cnidocolus stimulosus</i>	tread softly	0.13
<i>Croton argyranthemus</i>	silver croton	0.03
<i>Ctenium aromaticum</i>	toothache grass	0.20
<i>Cyperus</i> sp.	flatsedge	0.03
<i>Dichantherium aciculare</i>	needleleaf witchgrass	4.00
<i>Dichantherium ovale</i>	eggleaf witchgrass	0.87
<i>Dichantherium sphaerocarpon</i>	roundseed witchgrass	0.07
<i>Diospyros virginiana</i>	common persimmon	0.10
<i>Elephantopus elatus</i>	tall elephantsfoot	0.10
<i>Eupatorium compositifolium</i>	yankeeweed	3.30
<i>Euphorbia discoidalis</i>	summer spurge	0.10
<i>Euphorbia</i> sp.	spurge	0.03
<i>Euthamia caroliniana</i>	slender flattop goldenrod	0.23
<i>Galactia minor</i>	leafy milkpea	0.17
<i>Galactia</i> sp.	milkpea	0.27
<i>Galium hispidulum</i>	coastal bedstraw	0.03
<i>Galium pilosum</i>	hairy bedstraw	0.03
<i>Gelsemium sempervirens</i>	yellow jessamine	0.90
<i>Hibiscus aculeatus</i>	comfortroot	0.03
<i>Hypericum gentianoides</i>	orangegrass	0.60
<i>Hypericum hypericoides</i>	St. Andrew's cross	0.30
<i>Hypoxis juncea</i>	fringed yellow stargrass	0.03
<i>Ilex vomitoria</i>	yaupon	11.07
<i>Lechea sessiliflora</i>	pineland pinweed	0.10
<i>Lechea</i> sp.	pinweed	0.07
<i>Liatris gracilis</i>	slender gayfeather	0.23
<i>Liatris</i> sp.	blazing star	0.03
<i>Oenothera filipes</i>	slenderstalk beeblossom	0.30
<i>Panicum virgatum</i>	switchgrass	1.17
<i>Penstemon multiflorus</i>	manyflower beardtongue	0.07
<i>Pinus palustris</i>	longleaf pine	1.17
<i>Pityopsis aspera</i>	pineland silkgrass	0.63
<i>Polygala nana</i>	candyroot	0.03
<i>Polygonella gracilis</i>	tall jointweed	0.13
<i>Polyprenum procumbens</i>	rustweed	0.50
<i>Pseudognaphalium obtusifolium</i>	sweet everlasting	0.07

Scientific name	Common name	Average percent cover per quadrat
<i>Pteridium aquilinum</i>	bracken	0.20
<i>Quercus hemisphaerica</i>	laurel oak	0.07
<i>Quercus margarettae</i>	sand post oak	0.10
<i>Rhus copallinum</i>	winged sumac	0.03
<i>Rhynchosia reniformis</i>	dollarleaf	0.07
<i>Rubus cuneifolius</i>	sand blackberry	1.03
<i>Rubus flagellaris</i>	northern dewberry	0.03
<i>Schizachyrium tenerum</i>	slender bluestem	0.10
<i>Scleria ciliata</i>	fringed nutrush	1.53
<i>Sericocarpus tortifolius</i>	whiteweed aster	0.10
<i>Smilax auriculata</i>	earleaf greenbrier	3.53
<i>Smilax glauca</i>	cat greenbrier	0.27
<i>Solidago odora</i>	anisescented goldenrod	1.07
<i>Solidago petiolaris</i>	downy ragged goldenrod	0.23
<i>Symphotrichum dumosum</i>	rice button aster	0.10
<i>Trichostema dichotomum</i>	forked bluecurls	0.80
<i>Trichostema setaceum</i>	narrowleaf bluecurls	0.10
<i>Vaccinium stamineum</i>	deerberry	0.37
<i>Viola</i> sp.	violet	0.03
<i>Vitis rotundifolia</i>	muscadine	0.23
Bare Ground		42.83



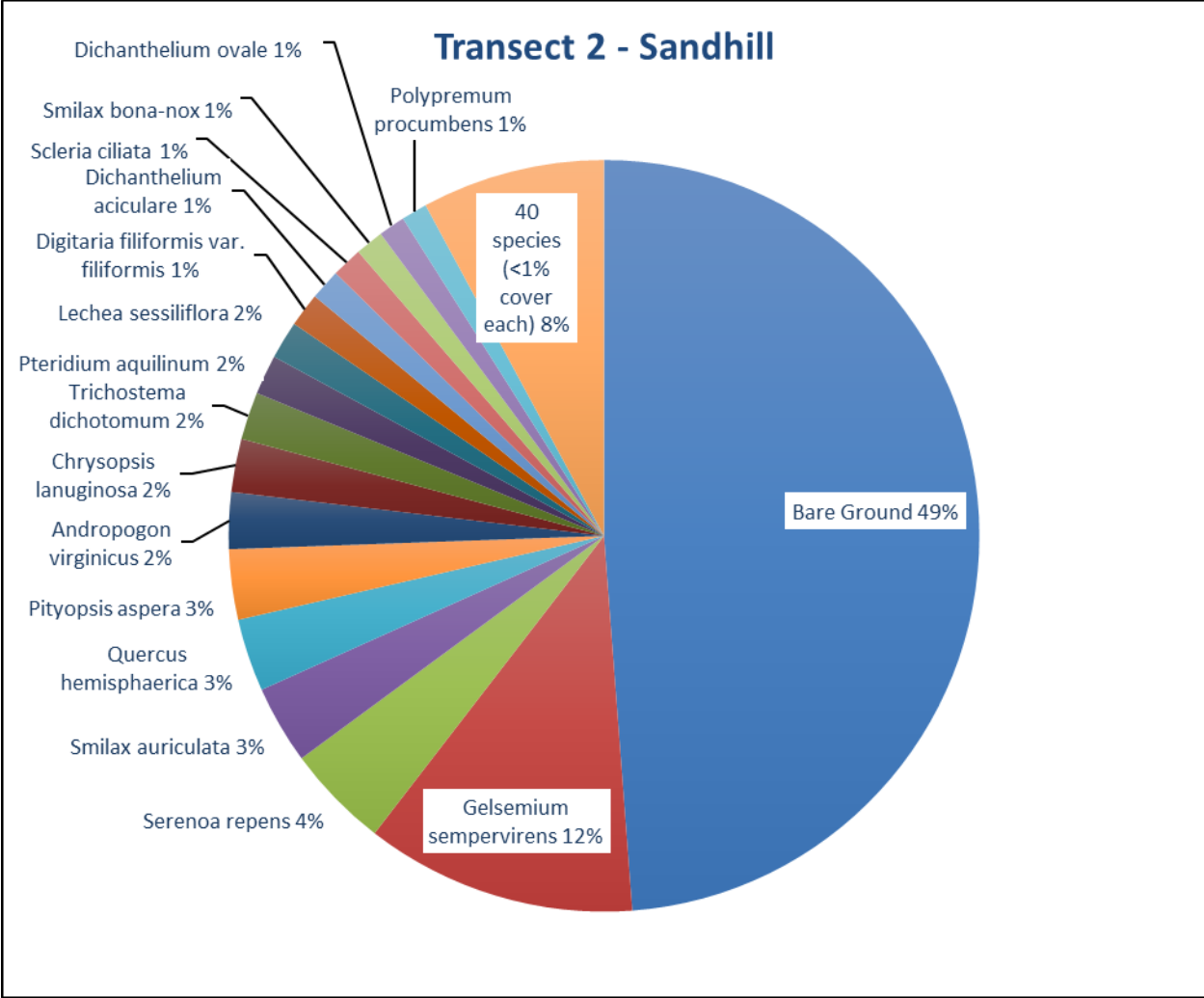


Figure 4. Percent relative cover of plant species in Sandhill Transect 2.

Table 3. Percent cover of plant species in Sandhill Transect 2 sampled on November 8-9, 2023.

Scientific name	Common name	Average percent cover per quadrat
<i>Acalypha gracilens</i>	slender threeseed mercury	0.13
<i>Andropogon sp.</i>	bluestem	0.03
<i>Andropogon virginicus</i>	broomsedge bluestem	2.33
<i>Aristida purpurascens</i>	arrowfeather threeawn	0.67
<i>Aristida stricta</i>	wiregrass	0.23
<i>Asteraceae</i>		0.03
<i>Bulbostylis ciliatifolia</i>	capillary hairsedge	0.07
<i>Chamaecrista nictitans</i>	sensitive pea	0.03
<i>Chrysopsis lanuginosa</i>	Lynn Haven goldenaster	2.20
<i>Crocanthemum carolinianum</i>	Carolina frostweed	0.13
<i>Crotalaria rotundifolia</i>	rabbitbells	0.03
<i>Croton glandulosus</i>	vente conmigo	0.23

Scientific name	Common name	Average percent cover per quadrat
<i>Cyperus</i> sp.	flatsedge	0.03
<i>Dichantherium aciculare</i>	needleleaf witchgrass	1.27
<i>Dichantherium commutatum</i>	variable witchgrass	0.30
<i>Dichantherium ovale</i>	eggleaf witchgrass	1.10
<i>Dichantherium sphaerocarpon</i>	roundseed witchgrass	0.03
<i>Dichantherium strigosum</i>	roughhair witchgrass	0.03
<i>Dichondra carolinensis</i>	Carolina ponysfoot	0.03
<i>Digitaria filiformis</i> var. <i>filiformis</i>	slender crabgrass	1.40
<i>Diodia teres</i>	poor joe	0.10
<i>Diospyros virginiana</i>	common persimmon	0.07
<i>Eupatorium compositifolium</i>	yankeeweed	0.10
<i>Euthamia caroliniana</i>	slender flattop goldenrod	0.17
<i>Galactia minor</i>	leafy milkpea	0.23
<i>Gelsemium sempervirens</i>	yellow jessamine	11.20
<i>Hibiscus aculeatus</i>	comfortroot	0.07
<i>Houstonia procumbens</i>	roundleaf bluet	0.07
<i>Hypericum gentianoides</i>	orangegrass	0.50
<i>Hypericum hypericoides</i>	St. Andrew's cross	0.10
<i>Lechea minor</i>	thymeleaf pinweed	0.27
<i>Lechea sessiliflora</i>	pineland pinweed	1.57
<i>Lespedeza hirta</i>	hairy lespedeza	0.03
<i>Liatris elegans</i>	pinkscale gayfeather	0.03
<i>Liatris gracilis</i>	slender gayfeather	0.23
<i>Pinus palustris</i>	longleaf pine	0.73
<i>Pityopsis aspera</i>	pineland silkgrass	2.90
<i>Polygala nana</i>	candyroot	0.03
<i>Polypremum procumbens</i>	rustweed	1.07
<i>Pteridium aquilinum</i>	bracken	1.63
<i>Quercus hemisphaerica</i>	laurel oak	3.00
<i>Rhus copallinum</i>	winged sumac	0.33
<i>Rubus cuneifolius</i>	sand blackberry	0.40
<i>Scleria ciliata</i>	fringed nutrush	1.27
<i>Serenoa repens</i>	saw palmetto	4.27
<i>Sericocarpus tortifolius</i>	whiteweed aster	0.10
<i>Smilax auriculata</i>	earleaf greenbrier	3.23
<i>Smilax bona-nox</i>	saw greenbrier	1.17
<i>Smilax glauca</i>	cat greenbrier	0.20
<i>Smilax pumila</i>	sarsaparilla vine	0.10
<i>Solidago odora</i>	anisescented goldenrod	0.70
<i>Solidago petiolaris</i>	downy ragged goldenrod	0.10
<i>Symphotrichum dumosum</i>	rice button aster	0.57
<i>Tragia smallii</i>	Small's noseburn	0.03
<i>Trichostema dichotomum</i>	forked bluecurls	1.97
<i>Vaccinium arboreum</i>	sparkleberry	0.27
Bare Ground		46.83

## Wetland Forest Mixed (Restoration)

**Qualitative sampling.** The Wetland Forest Mixed Restoration area (Figure 2) resembled a marsh due to its sparse tree cover. The muck soil of the former beaver pond was mostly dry at the time of the survey, similar to 2022. The vegetative cover in the central portions in the vicinity of the transect consisted primarily of hairy primrosewillow. Willow herb, a low shrub with woody base and herbaceous stems that arch over to form a nearly impenetrable interlacing thicket, was somewhat reduced this year, possibly owing to the drier conditions. White waterlily is common, but only in the deepest, frequently inundated parts of the marsh. Interspersed with the low groundcover were patches of young cypress 2 to 8 feet tall with occasional swamp tupelo, sweetbay, and red maple. Shallower areas near the shore were lined with a diverse set of wetland herbs, including taperleaf waterhorehound, loosehead beaksedge, and maidencane. Shrubs and small trees dominated the ecotone to the adjacent uplands. Hog damage was observed throughout the area. The total number of species observed in this community was 73 (Table 1).

**Quantitative sampling.** Transect 1 (Figure 5, Table 4) had a total of 24 species with 13% bare ground). The area was quite dry during the 2023 sampling effort, with no standing water along the transect, similar to 2022. In general, the western end of the transect is shallower than the eastern end where hummocks are common. The highest percent cover was loosehead beaksedge, a species that has quadrupled in cover due to the drier conditions. Hairy primrosewillow is also abundant, followed by, fringed yellow-eyed gras, slender beaksedge, and taperleaf waterhorehound. Willow herb and white waterlily, once dominants along this transect, continue to be much reduced. Woody species made around 3% average cover per quadrat, a reduction from last year mainly attributable to the decrease in willow herb.

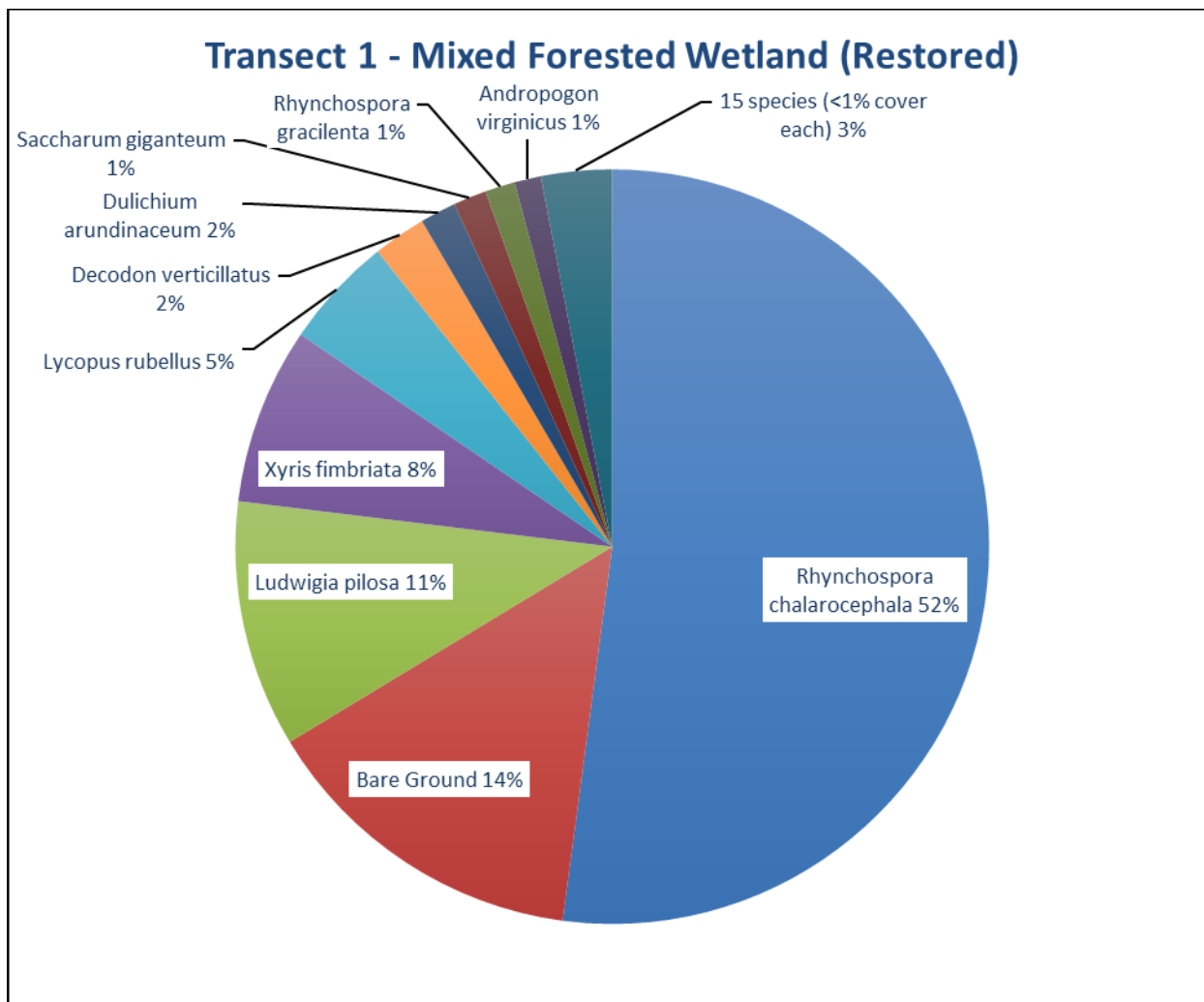


Figure 5. Percent relative cover of plant species in Mixed Forested Wetland (Restored) Transect 1.

Table 4. Percent cover of plant species in Mixed Forested Wetland (Restored) Transect 1 sampled on November 8, 2023.

Scientific name	Common name	Average percent cover per quadrat
<i>Andropogon sp.</i>	bluestem	0.27
<i>Andropogon virginicus</i>	broomsedge bluestem	1.03
<i>Decodon verticillatus</i>	willow herb	2.07
<i>Dulichium arundinaceum</i>	threeway sedge	1.40
<i>Eleocharis equisetoides</i>	jointed spikerush	0.20
<i>Eupatorium semiserratum</i>	smallflower thoroughwort	0.03
<i>Euthamia caroliniana</i>	slender flattop goldenrod	0.13
<i>Fuirena sp.</i>	umbrellasedge	0.03
<i>Ilex cassine var. myrtifolia</i>	myrtle-leaved holly	0.03
<i>Itea virginica</i>	Virginia willow	0.50
<i>Juncus canadensis</i>	Canadian rush	0.40

<i>Ludwigia pilosa</i>	hairy primrosewillow	9.63
<i>Lycopus rubellus</i>	taperleaf waterhorehound	4.37
<i>Nymphaea odorata</i>	white waterlily	0.13
<i>Nyssa biflora</i>	swamp tupelo	0.27
<i>Oldenlandia uniflora</i>	clustered mille grains	0.03
<i>Rhynchospora cephalantha</i>	bunched beaksedge	0.03
<i>Rhynchospora chalarocephala</i>	loosehead beaksedge	47.43
<i>Rhynchospora gracilentia</i>	slender beaksedge	1.17
<i>Saccharum giganteum</i>	sugarcane plumegrass	1.30
<i>Taxodium ascendens</i>	pond cypress	0.33
<i>Utricularia sp.</i>	bladderwort	0.03
<i>Xyris ambigua</i>	coastalplain yellow-eyed grass	0.33
<i>Xyris fimbriata</i>	fringed yellow-eyed grass	6.90
<b>Bare Ground</b>		<b>12.97</b>

### 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 black titi, and swamp bay. The moderately dense shrub layer consisted mainly of large gallberry, fetterbush, and sweet pepperbush. The sparse herb layer was primarily sphagnum moss. A small amount of the non-native invasive Japanese climbing fern, seen also in prior years, was found in 2023. The total number of species observed in this community was 92 (Table 1). Many of the new species encountered in recent years are 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 32 species with 40% bare ground. The dominant shrubs were fetterbush, sweet pepperbush, and large gallberry. Woody species made around 42% average cover per quadrat, accounting for almost  $\frac{3}{4}$  of the total species cover observed. Sphagnum moss formed most of the sparse herbaceous cover.



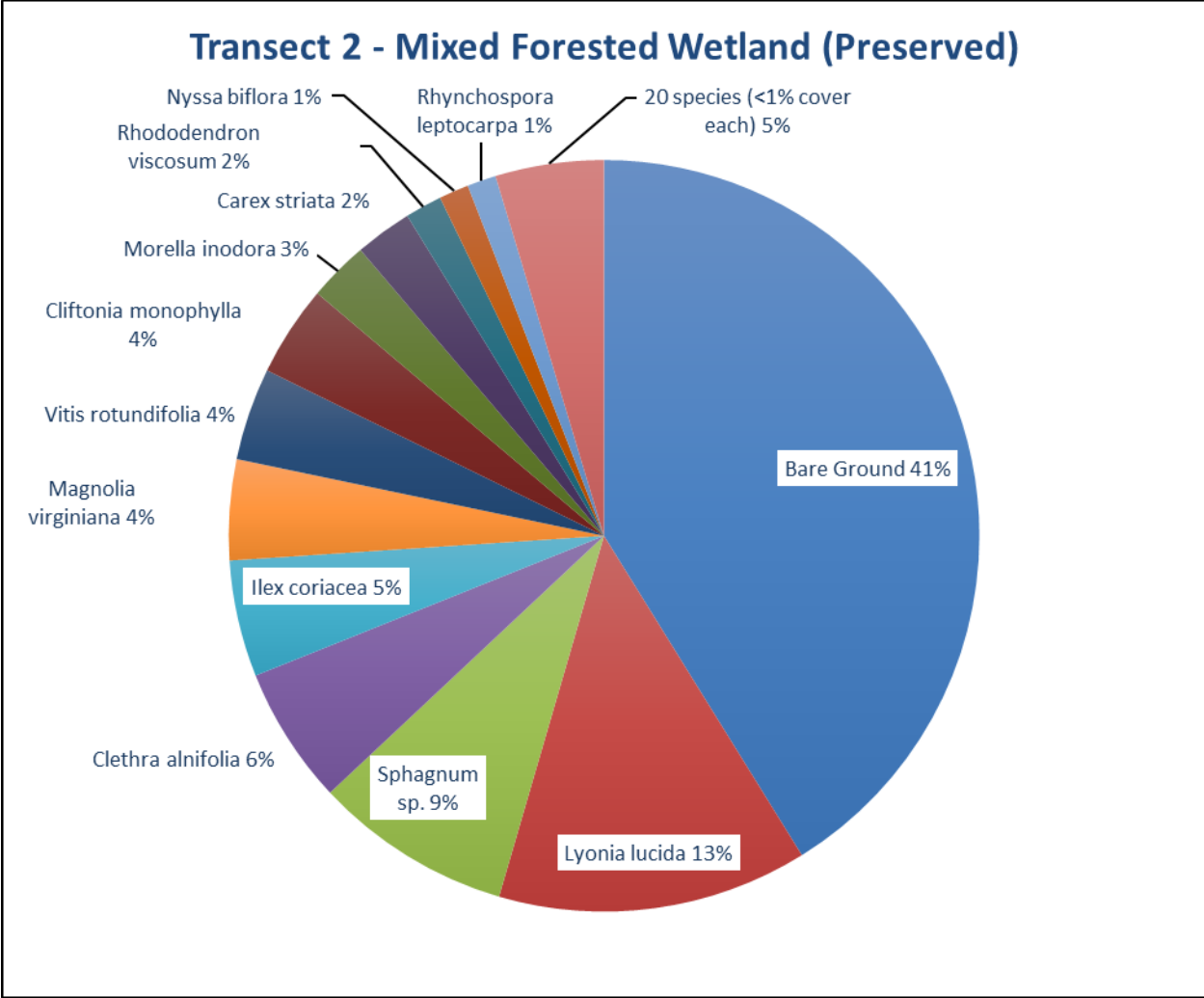


Figure 6. Percent relative cover of plant species in Mixed Forested Wetland (Preserved) Transect 2.

Table 5. Percent cover of plant species in Mixed Forested Wetland (Preserved) Transect 2 sampled on November 9, 2023.

Scientific name	Common name	Average percent cover per quadrat
<i>Andropogon glomeratus var. glaucopsis</i>	purple bluestem	0.10
<i>Andropogon sp.</i>	bluestem	0.03
<i>Andropogon virginicus</i>	broomsedge bluestem	0.03
<i>Apteria aphylla</i>	nodding nixie	0.03
<i>Aronia arbutifolia</i>	red chokeberry	0.03
<i>Bidens mitis</i>	smallfruit beggarticks	0.03
<i>Carex sp.</i>	sedge	0.03
<i>Carex striata</i>	Walter's sedge	2.37
<i>Clethra alnifolia</i>	sweet pepperbush	5.70
<i>Cliftonia monophylla</i>	black titi	3.77
<i>Eubotrys racemosus</i>	swamp doghobble	0.10

Scientific name	Common name	Average percent cover per quadrat
<i>Ilex coriacea</i>	large gallberry	4.83
<i>Lycopus rubellus</i>	taperleaf waterhorehound	0.03
<i>Lyonia lucida</i>	fetterbush	12.87
<i>Magnolia virginiana</i>	sweetbay	4.17
<i>Morella inodora</i>	odorless bayberry	2.50
moss	unknown moss	0.70
<i>Nyssa biflora</i>	swamp tupelo	1.23
<i>Osmunda cinnamomea</i>	cinnamon fern	0.50
<i>Persea palustris</i>	swamp bay	0.03
<i>Pinus elliotii</i>	slash pine	0.03
<i>Rhododendron viscosum</i>	swamp azalea	1.53
<i>Rhynchospora leptocarpa</i>	brownish beaksedge	1.20
<i>Rhynchospora sp.</i>	beaksedge	0.27
<i>Saccharum giganteum</i>	sugarcane plumegrass	0.03
<i>Smilax laurifolia</i>	laurel greenbrier	0.93
<i>Solidago fistulosa</i>	pinebarren goldenrod	0.03
<i>Sphagnum sp.</i>	sphagnum moss	8.20
<i>Vaccinium corymbosum</i>	highbush blueberry	0.83
<i>Viburnum nudum</i>	possumhaw	0.07
<i>Vitis rotundifolia</i>	muscadine	3.83
<i>Woodwardia areolata</i>	netted chain fern	0.63
Bare Ground		39.67