

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

Fall 2023

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Lafayette Creek – Phase I Mitigation Site Qualitative and Quantitative Monitoring November 2023

INTRODUCTION

The Lafayette Creek Phase I Mitigation Site consisting of 509 acres was obtained to compensate for the loss of wetland function from the impacts associated with re-alignment of highway US 331 in Freeport. The site is located north of SR 20 and Lafayette Creek (Figure 1). Access to the site is via Hollington Road, which is located 4.5 miles east of US 331. The gate to the site is at the north end of Hollington Road. The Phase I Mitigation Project aims to restore Sandhill (SA) to areas formerly planted with sand pine plantation and Hydric Savanna (HS) to areas formerly covered by wetland shrubs (Figure 2). Quantitative and qualitative monitoring documented the current plant species composition and vegetation structure of these targeted communities. Qualitative monitoring was used to document areas of slash pine plantation being restored to High Pine (HP) as well as the intact Bay Swamp (BS) and Stream Swamp (SS). 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 Sandhill and two in Hydric Savanna (Figure 2). In 2013, metal T-posts were installed at the ends of each transect to provide permanent reference points. In 2014, the northern metal T-post in hydric savanna Transect 2 was missing. Its position was re-established and the metal T-post was replaced. In 2015 the northern metal T-post in sandhill Transect 2 was missing. Its location was reestablished using the bearing from the remaining T-post and permanently staked in 2016. As additional markers, one-foot sections of rebar with 3-inch-square orange caps were staked at ground level at quadrats 20 and 40 along this transect, so the transect line could be recovered if the end stakes were lost in the future. 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 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. 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 reported in separate charts.

The qualitative monitoring consisted of recording species and vegetation structure observed along meandering pedestrian transects through the two target communities plus High Pine (HP), Bay Swamp (BS), and Stream Swamp (SS). Field surveys were performed by FNAI botanists Kelly Anderson, Jenna Annis, and Ethan Hughes on November 16, 27, and 28, 2023.

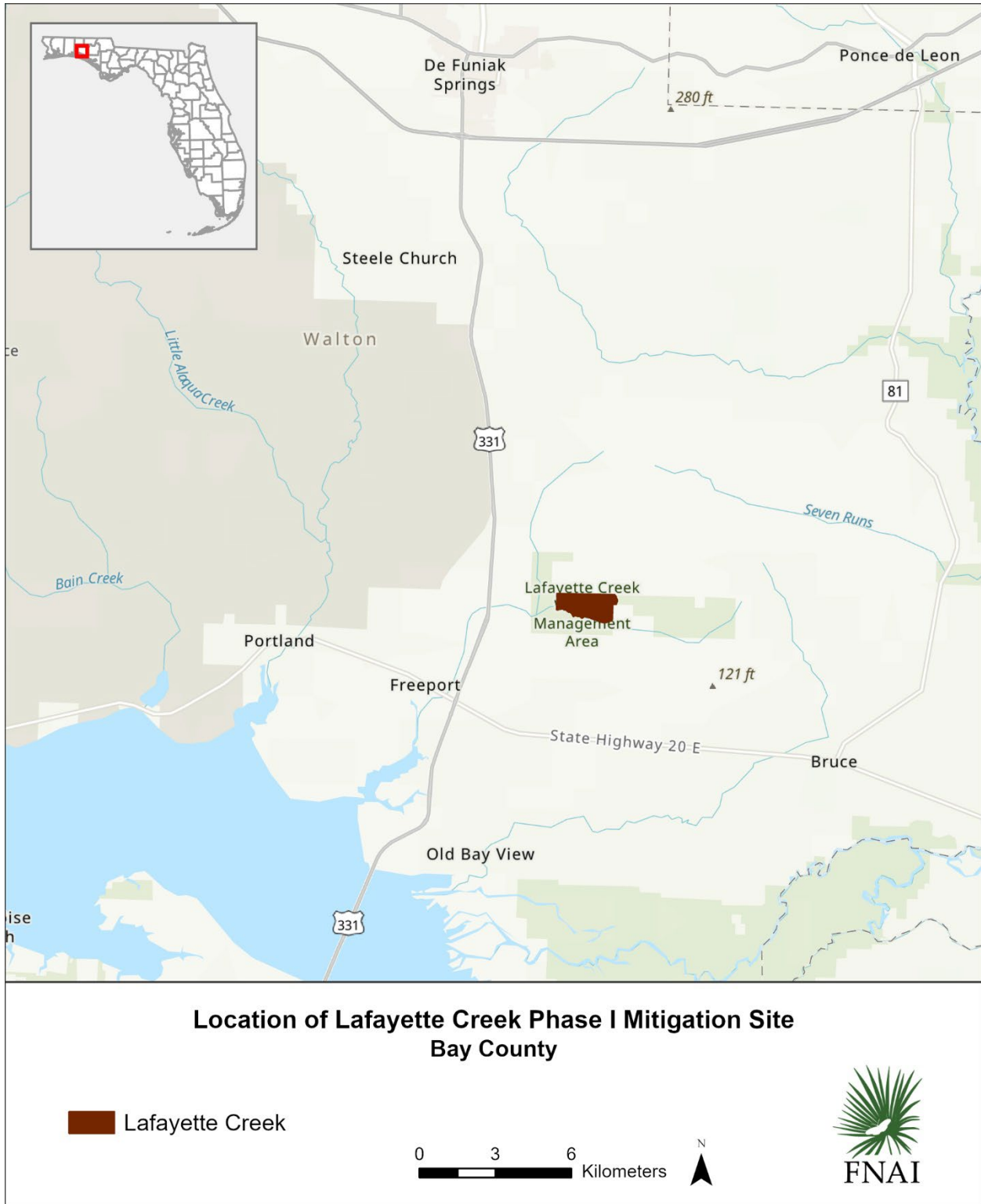


Figure 1. Location map of Lafayette Creek Phase I Mitigation Site monitored by FNAI.

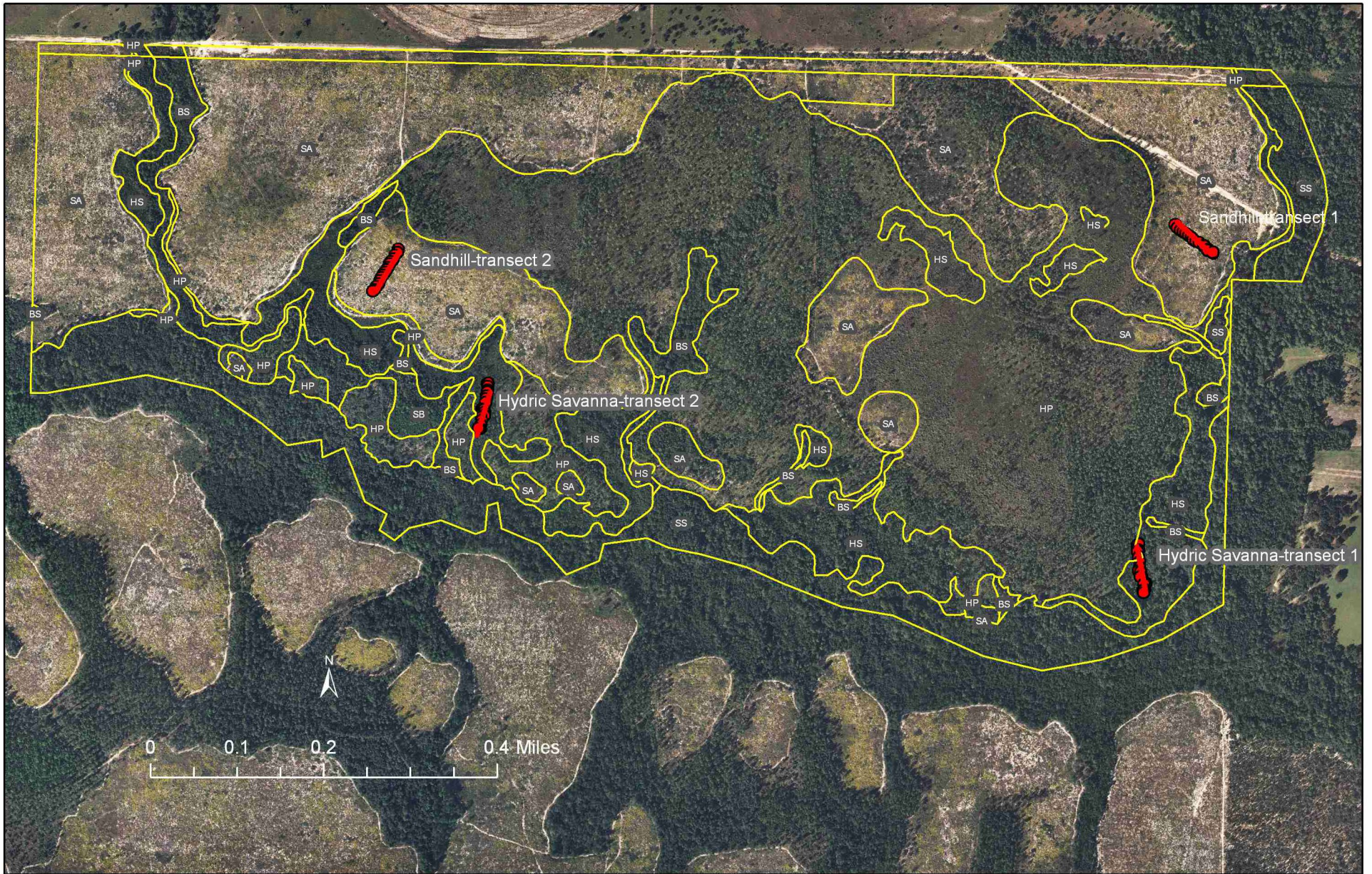


Figure 2. Location of permanent transects at Lafayette Creek – Phase I Mitigation Site. SA=Sandhill, HS=Hydric Savanna, HP=High Pine, BS=Bay Swamp, SS=Stream Swamp, SB=Shrub Bog.

RESULTS AND DISCUSSION

A total of 226 plant taxa were recorded in the surveyed areas of Lafayette Creek during the 2023 monitoring period (Table 1). Sampling occurred later in the year than usual, and many species are presumed to have senesced by mid-November. Sixteen new taxa were found during the 2023 monitoring.

Table 1. Species observed in target communities at Lafayette Creek – Phase I Mitigation Site, November 16, 27, and 28, 2023. (bold name = new species; bold X = new observation in community; * = state-listed endangered or threatened; † = non-native invasive)

Scientific Name	Common Name	Bay Swamp	High Pine	Hydric Savanna	Sandhill	Stream Swamp	Grand Total
Ageratina aromatica	lesser snakeroot				X		1
Aletris lutea	yellow colic-root		X	X			2
Alnus serrulata	hazel alder					X	1
*Andropogon arctatus	pinewoods bluestem			X			1
Andropogon gerardii	big bluestem		X				1
Andropogon glomeratus	bushy bluestem			X			1
Andropogon glomeratus var. glaucopsis	purple bluestem		X	X			2
Andropogon gyrans	Elliott's bluestem		X		X		2
Andropogon ternarius	splitbeard bluestem		X		X		2
Andropogon virginicus	broomsedge bluestem		X	X	X		3
Andropogon virginicus var. glaucus	chalky bluestem			X			1
Aristida purpurascens	arrowfeather threeawn		X		X		2
Aristida purpurascens var. tenuispica	Hillsboro threeawn			X			1
Aristida stricta	wiregrass		X	X	X		3
Arnoglossum sulcatum	Georgia Indian-plantain	X		X			2
Arundinaria gigantea	switchcane			X			1
Balduina uniflora	oneflower honeycomb-head	X					1
Baptisia lanceolata	gopherweed				X		1
Bidens mitis	smallfruit beggarticks			X		X	2
Bigelovia nudata	pineland rayless goldenrod			X			1
Bulbostylis ciliatifolia	capillary hairsedge				X		1
Burmannia capitata	southern bluethread			X			1
Callicarpa americana	American beautyberry	X	X		X		3
Carex austrodeflexa	southern sedge					X?	1
Carex glaucescens	clustered sedge			X		X	2
Carex sp.	sedge					X	1
Carphephorus odoratissimus	vanillaleaf		X				1
Ceanothus microphyllus	littleleaf buckbrush		X				1
Centella asiatica	spadeleaf			X			1
Chasmanthium laxum var. laxum	slender woodoats					X	1
Chrysoma pauciflosculosa	woody goldenrod				X		1
Chrysopsis lanuginosa	Lynn Haven goldenaster				X		1

Scientific Name	Common Name	Bay Swamp	High Pine	Hydric Savanna	Sandhill	Stream Swamp	Grand Total
<i>Chrysopsis linearifolia</i>	narrowleaf goldenaster				X		1
<i>Chrysopsis mariana</i>	Maryland goldenaster		X				1
<i>Clethra alnifolia</i>	sweet pepperbush	X		X		X	3
<i>Cliftonia monophylla</i>	black titi	X		X		X	3
<i>Coleataenia tenera</i>	bluejoint panicum			X			1
<i>Coreopsis linifolia</i>	Texas tickseed			X			1
<i>Ctenium aromaticum</i>	toothache grass	X	X	X			3
<i>Cyrilla racemiflora</i>	titi					X	1
<i>Dalea pinnata</i>	summer farewell				X		1
<i>Desmodium lineatum</i>	sand tick-trefoil		X				1
<i>Dichantherium aciculare</i>	needleleaf witchgrass		X		X		2
<i>Dichantherium acuminatum</i>	tapered witchgrass				X		1
<i>Dichantherium dichotomum</i>	cypress witchgrass	X				X	2
<i>Dichantherium ensifolium</i>	cypress witchgrass	X		X	X	X	4
<i>Dichantherium ensifolium</i> var. <i>unciphillum</i>	cypress witchgrass		X				1
<i>Dichantherium leucothrix</i>	rough witchgrass			X	X		2
<i>Dichantherium ovale</i>	eggleaf witchgrass		X		X		2
<i>Dichantherium portoricense</i>	hemlock witchgrass				X		1
<i>Dichantherium scabriusculum</i>	woolly witchgrass			X		X	2
<i>Dichantherium sphaerocarpon</i>	roundseed witchgrass				X		1
<i>Dichantherium strigosum</i>	roughhair witchgrass		X	X	X		3
<i>Digitaria filiformis</i>	slender crabgrass				X		1
<i>Diodia teres</i>	poor joe				X		1
<i>Diodia virginiana</i>	Virginia buttonweed		X				1
<i>Diospyros virginiana</i>	common persimmon					X	1
<i>Drosera capillaris</i>	pink sundew	X		X			2
<i>Elephantopus elatus</i>	tall elephantsfoot		X		X		2
<i>Eragrostis elliottii</i>	Elliott's lovegrass				X		1
<i>Erigeron vernus</i>	early whitetop fleabane			X			1
<i>Eriocaulon compressum</i>	flattened pipewort			X			1
<i>Eriocaulon decangulare</i>	tenangle pipewort	X		X		X	3
<i>Eriogonum tomentosum</i>	dogtongue wild buckwheat				X		1
<i>Eupatorium compositifolium</i>	yankeeweed		X	X	X		3
<i>Eupatorium mohrii</i>	Mohr's thoroughwort		X	X			2
<i>Eupatorium pilosum</i>	rough boneset		X	X			2
<i>Eupatorium rotundifolium</i>	roundleaf thoroughwort		X	X			2
<i>Eupatorium semiserratum</i>	smallflower thoroughwort			X	X	X	3
<i>Eupatorium x anomalum</i>	Florida thoroughwort			X?			1
<i>Euphorbia discoidalis</i>	summer spurge		X				1
<i>Eurybia eryngiifolia</i>	thistleleaf aster		X				1
<i>Euthamia caroliniana</i>	slender flattop goldenrod	X	X	X	X		4
<i>Fimbristylis puberula</i>	hairy fimbry		X				1
<i>Fuirena breviseta</i>	saltmarsh umbrellasedge			X			1

Scientific Name	Common Name	Bay Swamp	High Pine	Hydric Savanna	Sandhill	Stream Swamp	Grand Total
Galactia minor	leafy milkpea				X		1
Gaylussacia dumosa	dwarf huckleberry		X	X			2
Gaylussacia frondosa var. tomentosa	blue huckleberry	X				X	2
Gaylussacia mosieri	woolly huckleberry		X	X			2
Gelsemium rankinii	swamp jessamine					X	1
Gelsemium sempervirens	yellow jessamine		X				1
Geobalanus oblongifolius	gopher apple				X		1
Gymnopogon brevifolius	shortleaf skeletongrass		X				1
Hamamelis virginiana	American witchhazel	X					1
Helianthus angustifolius	narrowleaf sunflower	X		X			2
Helianthus radula	stiff sunflower		X				1
Hieracium gronovii	queen-devil				X		1
Houstonia procumbens	roundleaf bluet				X		1
Hypericum brachyphyllum	coastalplain St. John's wort			X			1
Hypericum cistifolium	roundpod St. John's wort			X			1
Hypericum crux-andreae	St. Peter's wort		X	X			2
Hypericum fasciculatum	peelbark St. John's wort	X		X			2
Hypericum gentianoides	orangegrass				X		1
Hypericum hypericoides	St. Andrew's cross		X			X	2
Hypericum nitidum	Carolina St. John's wort					X	1
Ilex cassine	dahoon	X					1
Ilex coriacea	large gallberry	X		X		X	3
Ilex glabra	gallberry		X	X	X		3
Ilex vomitoria	yaupon	X	X	X	X		4
† Imperata cylindrica	cogon grass		X				1
Itea virginica	Virginia willow	X					1
Juncus trigonocarpus	redpod rush	X		X			2
Kelochloa verrucosa	warty panicgrass	X		X			2
Lachnocaulon anceps	whitehead bogbutton			X			1
Lechea sessiliflora	pineland pinweed				X		1
Lespedeza angustifolia	narrowleaf lespedeza		X				1
Lespedeza hirta	hairy lespedeza		X				1
Leucothoe axillaris	coastal doghobble					X	1
Liatris elegans	pinkscale gayfeather		X				1
Liatris gracilis	slender gayfeather		X		X		2
Liatris pauciflora var. secunda	Piedmont gayfeather				X		1
Liatris spicata	dense gayfeather		X	X			2
Liatris tenuifolia	shortleaf gayfeather				X		1
Liriodendron tulipifera	tuliptree					X	1
Lobelia brevifolia	shortleaf lobelia		X	X			2
Lophiola aurea	golden crest			X			1
Ludwigia pilosa	hairy primrosewillow			X		X	2
Lycopodiella alopecuroides	foxtail club-moss			X			1

Scientific Name	Common Name	Bay Swamp	High Pine	Hydric Savanna	Sandhill	Stream Swamp	Grand Total
<i>Lycopodiella appressa</i>	southern club-moss	X					1
<i>Lycopodiella caroliniana</i>	slender club-moss	X		X			2
<i>Lyonia lucida</i>	fetterbush	X				X	2
<i>Magnolia virginiana</i>	sweetbay	X	X	X		X	4
<i>Mimosa quadrivalvis</i>	sensitive briar				X		1
<i>Mitchella repens</i>	partridgeberry					X	1
<i>Mitreola sessilifolia</i>	swamp hornpod		X				1
<i>Morella caroliniensis</i>	evergreen bayberry	X	X			X	3
<i>Morella cerifera</i>	southern bayberry		X				1
<i>Morella inodora</i>	odorless bayberry	X				X	2
<i>Muhlenbergia capillaris</i> var. <i>trichopodes</i>	cutover muhly		X				1
<i>Nyssa biflora</i>	swamp tupelo	X		X		X	3
<i>Opuntia humifusa</i>	pricklypear				X		1
<i>Osmunda cinnamomea</i>	cinnamon fern	X		X		X	3
<i>Osmunda regalis</i> var. <i>spectabilis</i>	royal fern	X	X			X	3
<i>Oxydendrum arboreum</i>	sourwood	X					1
<i>Panicum virgatum</i>	switchgrass		X		X		2
<i>Paspalum setaceum</i>	thin paspalum				X		1
<i>Pediomelum canescens</i>	buckroot				X		1
<i>Persea palustris</i>	swamp bay	X					1
*<i>Pinguicula primuliflora</i>	primrose-flowered butterwort					X	1
<i>Pinus clausa</i>	sand pine				X		1
<i>Pinus elliotii</i>	slash pine		X	X		X	3
<i>Pinus palustris</i>	longleaf pine				X		1
<i>Pinus serotina</i>	pond pine	X		X			2
<i>Pityopsis aspera</i>	pineland silkgrass		X		X		2
<i>Pityopsis graminifolia</i>	narrowleaf silkgrass		X		X		2
<i>Pluchea foetida</i>	stinking camphorweed			X			1
<i>Polygala lutea</i>	orange milkwort			X			1
<i>Polygala nana</i>	candyroot		X				1
<i>Polygonella gracilis</i>	tall jointweed				X		1
<i>Pteridium aquilinum</i>	bracken fern		X	X	X		3
<i>Quercus geminata</i>	sand live oak		X		X		2
<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 minima</i>	dwarf live oak		X		X		2
<i>Quercus nigra</i>	water oak	X	X				2
<i>Quercus pumila</i>	runner oak		X				1
<i>Rhexia alifanus</i>	savannah meadowbeauty		X	X			2
<i>Rhexia petiolata</i>	fringed meadowbeauty	X		X			2
<i>Rhododendron viscosum</i>	swamp azalea	X					1

Scientific Name	Common Name	Bay Swamp	High Pine	Hydric Savanna	Sandhill	Stream Swamp	Grand Total
<i>Rhus copallinum</i>	winged sumac	X			X		2
<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
<i>Rhynchospora chapmanii</i>	Chapman's beaksedge			X			1
<i>Rhynchospora ciliaris</i>	fringed beaksedge	X		X			2
<i>Rhynchospora corniculata</i>	shortbristle horned beaksedge					X	1
<i>Rhynchospora fascicularis</i>	fascicled beaksedge			X			1
<i>Rhynchospora gracilentata</i>	slender beaksedge	X		X			2
<i>Rhynchospora harveyi</i>	Harvey's beaksedge		X				1
<i>Rhynchospora pleiantha</i>	coastal beaksedge			X			1
<i>Rhynchospora plumosa</i>	plumed beaksedge		X				1
<i>Rhynchospora pusilla</i>	fairy beaksedge			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>	azure blue sage		X				1
* <i>Sarracenia leucophylla</i>	white-top pitcherplant	X		X			2
* <i>Sarracenia rosea</i>	Gulf purple pitcherplant			X			1
<i>Schizachyrium sanguineum</i>	crimson bluestem				X		1
<i>Schizachyrium stoloniferum</i>	creeping little bluestem		X		X		2
<i>Schizachyrium tenerum</i>	slender bluestem		X		X		2
<i>Scleria ciliata</i>	fringed nutrush		X	X			2
<i>Scleria reticularis</i>	netted nutrush			X			1
<i>Scleria triglomerata</i>	whip nutrush			X	X	X	3
<i>Serenoa repens</i>	saw palmetto	X	X	X	X		4
<i>Sericocarpus tortifolius</i>	whitetop aster		X		X		2
<i>Seymeria cassioides</i>	yaupon blacksenna		X	X			2
<i>Smilax auriculata</i>	earleaf greenbrier		X		X		2
<i>Smilax glauca</i>	cat greenbrier	X	X	X			3
<i>Smilax laurifolia</i>	laurel greenbrier	X		X		X	3
<i>Smilax walteri</i>	coral greenbrier					X	1
<i>Solidago fistulosa</i>	pinebarren goldenrod	X		X			2
<i>Solidago odora</i>	sweet goldenrod		X		X		2
<i>Solidago puberula</i> var. <i>pulverulenta</i>	downy goldenrod	X	X	X			3
<i>Sorghastrum nutans</i>	yellow indiagrass		X				1
<i>Sphagnum</i> sp.	sphagnum moss			X			1
<i>Sporobolus junceus</i>	pineywoods dropseed				X		1
<i>Stillingia sylvatica</i>	queen's delight		X		X		2
<i>Symphotrichum adnatum</i>	scaleleaf aster		X		X		2
<i>Symphotrichum concolor</i>	eastern silver aster				X		1
<i>Symphotrichum dumosum</i>	rice button aster		X		X		2

Scientific Name	Common Name	Bay Swamp	High Pine	Hydric Savanna	Sandhill	Stream Swamp	Grand Total
<i>Syngonanthus flavidulus</i>	yellow hatpins			X			1
* <i>Tephrosia mohrii</i>	pineland hoary-pea				X		1
<i>Tephrosia spicata</i>	spiked hoary-pea		X				1
<i>Tiedemannia filiformis</i> ssp. <i>filiformis</i>	water cowbane			X			1
<i>Triplasis americana</i>	perennial sandgrass				X		1
<i>Utricularia juncea</i>	southern bladderwort			X			1
<i>Vaccinium arboreum</i>	sparkleberry		X		X		2
<i>Vaccinium corymbosum</i>	highbush blueberry	X					1
<i>Vaccinium myrsinites</i>	shiny blueberry		X		X		2
<i>Vernonia angustifolia</i>	tall ironweed				X		1
<i>Viburnum nudum</i>	possumhaw	X				X	2
<i>Viola palmata</i>	early blue violet			X			1
<i>Viola primulifolia</i>	primroseleaf violet			X		X	2
<i>Vitis rotundifolia</i>	muscadine	X	X			X	3
<i>Woodwardia areolata</i>	netted chain fern					X	1
<i>Xyris ambigua</i>	coastalplain yellow-eyed grass			X			1
<i>Xyris brevifolia</i>	shortleaf yellow-eyed grass			X			1
<i>Xyris caroliniana</i>	Carolina yellow-eyed grass		X	X			2
<i>Xyris elliotii</i>	Elliott's yellow-eyed grass	X		X			2
<i>Xyris fimbriata</i>	fringed yellow-eyed grass	X		X			2
<i>Xyris platylepis</i>	tall yellow-eyed grass	X		X			2
<i>Yucca filamentosa</i>	Adam's needle				X		1
Total number of taxa: 226		54	83	98	80	41	356

Sandhill

Qualitative sampling. The sandhill natural community has been degraded by past silviculture activities but retains many characteristic species. There was much exposed, bare sand. The diverse but somewhat sparse groundcover was dominated by wiregrass, with Lynn Haven goldenaster and woody goldenrod also frequent. Scattered shrubs and small trees include saw palmetto, sand live oak, and turkey oak. Planted longleaf pines were frequent but nicely spaced, ranging from 1 to 20 feet tall, and a few mature sand pines were mixed in the canopy layer. The state-listed threatened pineland hoary-pea (*Tephrosia mohrii*), known from both the eastern and far northwestern sections of sandhil, was observed again this year. A large group of feral hogs were seen in the open sandhill. A total of 80 plant species were identified in this community (Table 1).

Quantitative sampling. The eastern Transect 1 (Figure 3, Table 2) was located on an east-facing slope. It had a total of 39 species with 35% average bare ground cover. Species cover was over half herbaceous. Wiregrass increased slightly from last year and had the highest cover of all species on the transect, with saw palmetto and sand live oak also contributing significant cover. Woody species made up around 21% average cover per quadrat. Although species diversity somewhat reduced, this may be attributable to

the later survey date. Otherwise, vegetation composition along the transect was very similar to that measured in 2022. Fruticose lichens were observed in two quadrats.

The western Transect 2 (Table 3, Figure 4) was situated near the top of a ridge. It had a total of 29 species with 51% average bare ground cover. Dominant species were almost entirely herbaceous. Wiregrass was the dominant species by far and had a similar cover to last year. Woody species made up around 5% average cover per quadrat. Vegetation composition along the transect was very similar to that measured in 2022.

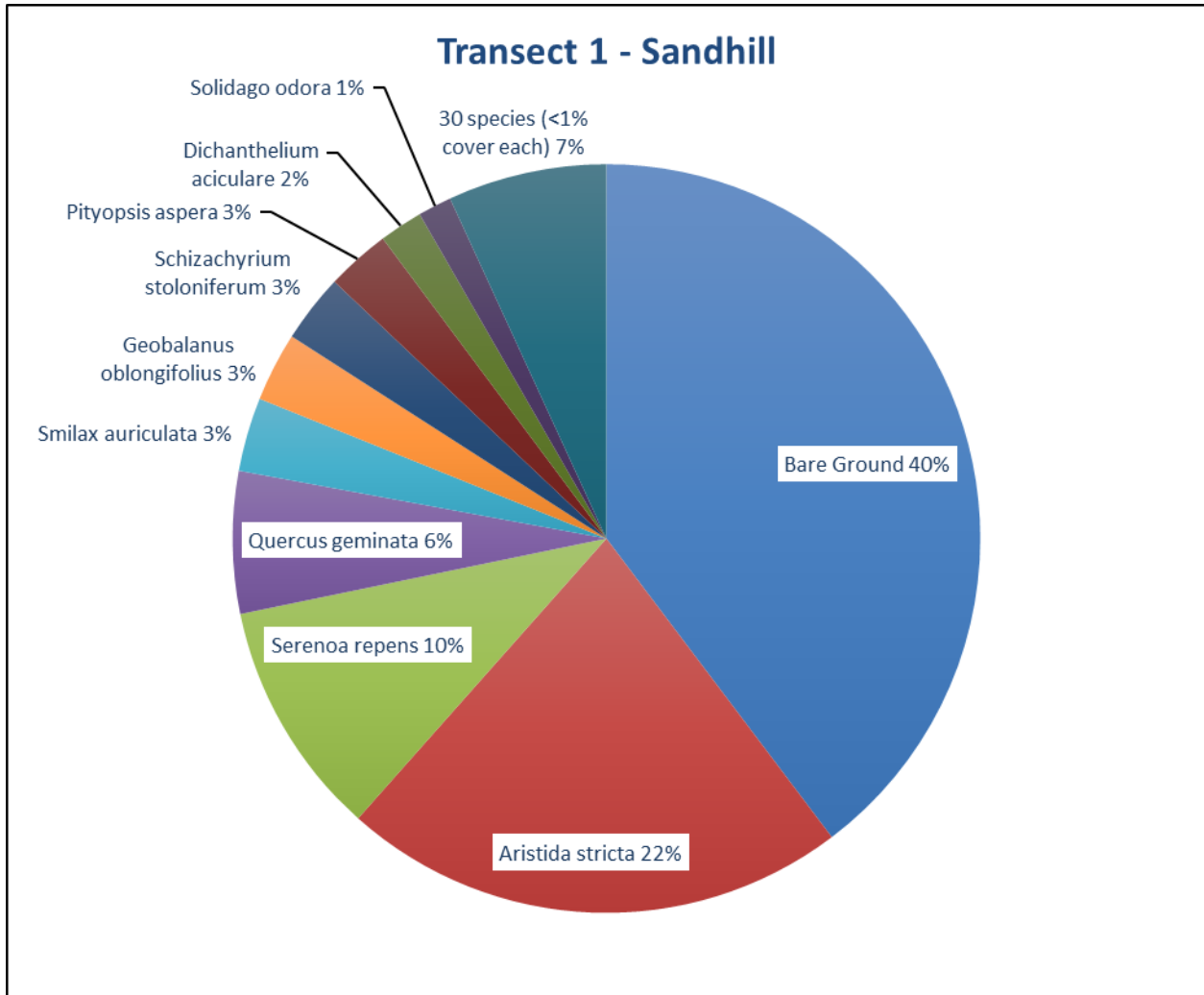


Figure 3. Percent relative cover of plant species in Sandhill Transect 1.

Table 2. Percent cover of plant species in Sandhill Transect 1 sampled on November 27, 2023.

Scientific name	Common name	Average percent cover per quadrat
<i>Andropogon gyrans</i>	Elliott's bluestem	0.57
<i>Andropogon virginicus</i>	broomsedge bluestem	0.57
<i>Aristida purpurascens</i>	arrowfeather threeawn	0.03

Scientific name	Common name	Average percent cover per quadrat
<i>Aristida stricta</i>	wiregrass	19.00
<i>Bulbostylis ciliatifolia</i>	capillary hairsedge	0.10
<i>Chrysoma pauciflosculosa</i>	woody goldenrod	0.10
<i>Chrysopsis lanuginosa</i>	Lynn Haven goldenaster	0.10
<i>Dichantherium aciculare</i>	needleleaf witchgrass	1.63
<i>Dichantherium ensifolium</i>	cypress witchgrass	0.10
<i>Dichantherium leucothrix</i>	rough witchgrass	0.03
<i>Dichantherium strigosum</i>	roughhair witchgrass	0.50
<i>Eragrostis elliottii</i>	Elliott's lovegrass	0.17
<i>Eriogonum tomentosum</i>	dogtongue wild buckwheat	0.03
<i>Eupatorium compositifolium</i>	yankeeweed	0.33
<i>Euthamia caroliniana</i>	slender flattop goldenrod	0.03
<i>Galactia minor</i>	leafy milkpea	0.10
<i>Geobalanus oblongifolius</i>	gopher apple	2.60
<i>Hieracium gronovii</i>	queen-devil	0.03
<i>Houstonia procumbens</i>	roundleaf bluet	0.07
<i>Lechea sessiliflora</i>	pineland pinweed	0.10
<i>Liatris pauciflora var. secunda</i>	Piedmont gayfeather	0.17
<i>Liatris tenuifolia</i>	shortleaf gayfeather	0.03
<i>Panicum virgatum</i>	switchgrass	0.53
<i>Paspalum setaceum</i>	thin paspalum	0.10
<i>Pinus palustris</i>	longleaf pine	0.47
<i>Pityopsis aspera</i>	pineland silkgrass	2.40
<i>Quercus geminata</i>	sand live oak	5.33
<i>Quercus hemisphaerica</i>	laurel oak	0.03
<i>Quercus minima</i>	dwarf live oak	0.73
<i>Rhus copallinum</i>	winged sumac	0.13
<i>Rubus cuneifolius</i>	sand blackberry	0.17
<i>Schizachyrium sanguineum</i>	crimson bluestem	0.10
<i>Schizachyrium stoloniferum</i>	creeping little bluestem	2.57
<i>Schizachyrium tenerum</i>	slender bluestem	0.47
<i>Scleria triglomerata</i>	whip nutrush	0.03
<i>Serenoa repens</i>	saw palmetto	8.87
<i>Smilax auriculata</i>	earleaf greenbrier	2.77
<i>Solidago odora</i>	anisescented goldenrod	1.27
Unknown Herb		0.03
Bare Ground		34.50

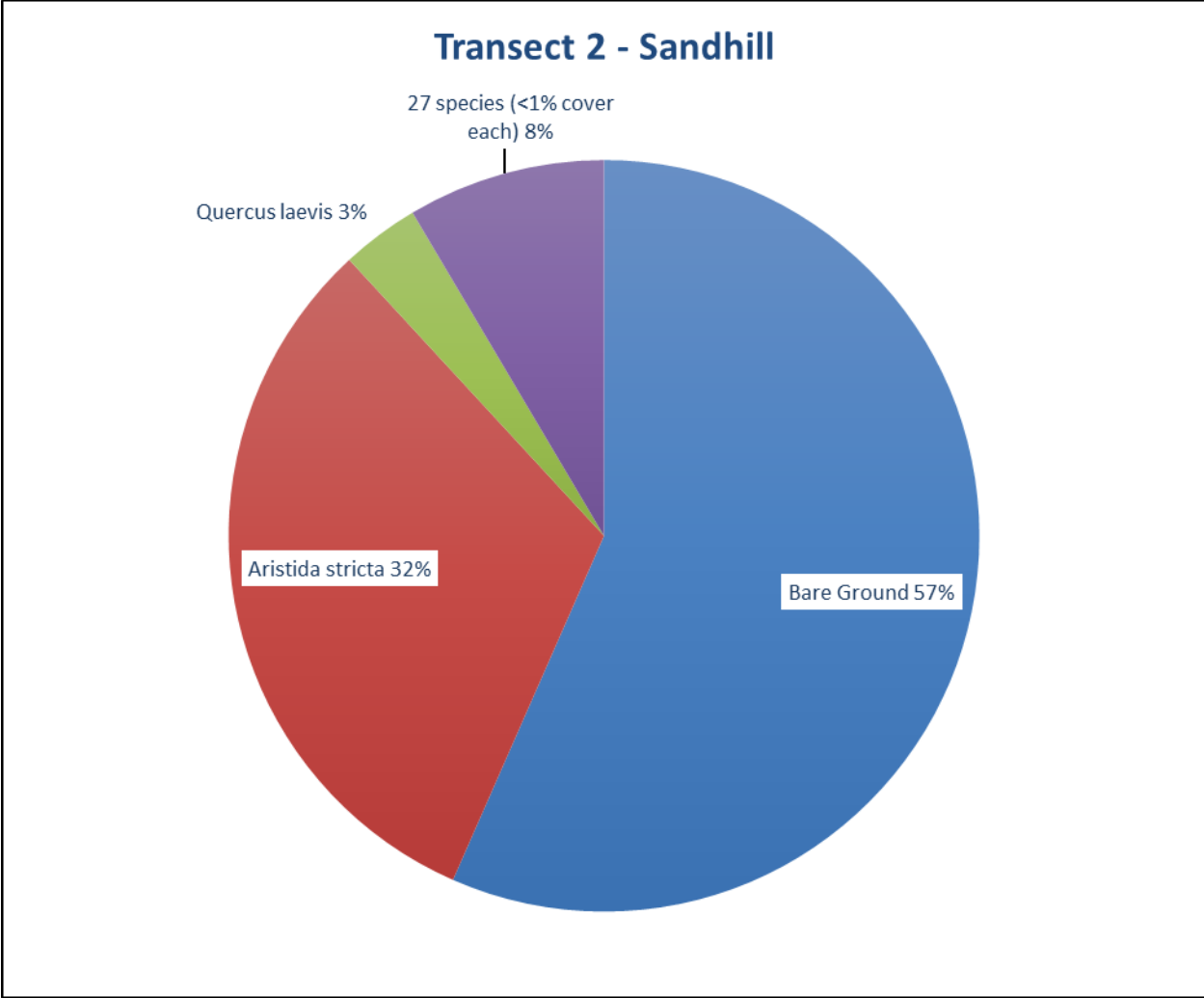


Figure 4. Percent relative cover of plant species in Sandhill Transect 2.

Table 3. Percent cover of plant species in Sandhill Transect 2 sampled on November 27, 2023.

Scientific name	Common name	Average percent cover per quadrat
<i>Andropogon gyrans</i>	Elliott's bluestem	0.83
<i>Andropogon virginicus</i>	broomsedge bluestem	0.43
<i>Aristida purpurascens</i>	arrowfeather threeawn	0.03
<i>Aristida stricta</i>	wiregrass	28.23
<i>Bulbostylis ciliatifolia</i>	capillary hairsedge	0.53
<i>Chrysoma pauciflosculosa</i>	woody goldenrod	0.53
<i>Chrysopsis lanuginosa</i>	Lynn Haven goldenaster	0.07
<i>Dalea pinnata</i>	summer farewell	0.10
<i>Dichanthelium aciculare</i>	needleleaf witchgrass	0.33
<i>Dichanthelium acuminatum</i>	tapered witchgrass	0.03
<i>Dichanthelium ensifolium</i>	cypress witchgrass	0.40
<i>Dichanthelium portoricense</i>	hemlock witchgrass	0.10
<i>Dichanthelium strigosum</i>	roughhair witchgrass	0.73

Scientific name	Common name	Average percent cover per quadrat
<i>Eriogonum tomentosum</i>	dogtongue wild buckwheat	0.20
<i>Eupatorium compositifolium</i>	yankeeweed	0.10
<i>Galactia minor</i>	leafy milkpea	0.17
<i>Geobalanus oblongifolius</i>	gopher apple	0.23
<i>Hypericum gentianoides</i>	orangegrass	0.23
<i>Lechea sessiliflora</i>	pineland pinweed	0.10
<i>Liatris pauciflora</i> var. <i>secunda</i>	Piedmont gayfeather	0.40
<i>Mimosa quadrivalvis</i>	sensitive brier	0.03
<i>Pinus palustris</i>	longleaf pine	0.23
<i>Pityopsis aspera</i>	pineland silkgrass	0.03
<i>Polygonella gracilis</i>	tall jointweed	0.03
<i>Quercus laevis</i>	turkey oak	3.00
<i>Rubus cuneifolius</i>	sand blackberry	0.10
<i>Schizachyrium stoloniferum</i>	creeping little bluestem	0.60
<i>Smilax auriculata</i>	earleaf greenbrier	0.93
<i>Solidago odora</i>	anisescented goldenrod	0.10
Bare Ground		50.67

Hydric Savanna

Qualitative sampling. The restoration of the fire-suppressed hydric savanna was begun in 2010 by mowing down the dense shrubs with a Gyro-Trac machine. Follow-up prescribed burning further reduced the shrub strata. As a result, much of the ground was bare or sparsely vegetated and there was some disturbance by vehicle tracks in the two sampling periods prior to 2014. Fires and hog rooting have created continual shifts in the herbaceous vegetation, primarily in the lowest, wettest portions of the community. A wide variety of herbs have been observed colonizing the area, with mainly beaksedges and warty panicum dominating in the wetter sections and wiregrass in the drier parts, although purple bluestem remains a dominant in the driest areas in the vicinity of Transect 2. In addition to the state-endangered white-top pitcherplant found most years including 2023, the state-threatened Gulf purple pitcherplant was detected for the first time during the 2021 sampling effort and was again found this year. Scattered shrubs included black titi, large gallberry, sweet pepperbush, and gallberry. A total of 98 species were recorded from this community (Table 1).

Quantitative sampling. The eastern Transect 1 (Table 4, Figure 5) was on a south-facing slope and had a total of 57 species with 20% average bare ground cover. Herbaceous species made up most of the transect cover, and wiregrass cover was similar to the 2022 sample. The southern end of the transect remained heavily damaged from hog rooting. Woody species made up around 3% average cover per quadrat, similar to last year. Although species diversity was somewhat reduced, this may be attributable to the later survey date. Cover of toothache grass increased somewhat, but otherwise vegetation composition and cover were similar to the 2022 sample.

The western Transect 2 (Table 5, Figure 6) was also on a south facing slope. It had a total of 56 species with 31% average bare ground cover. The drier north end had abundant purple bluestem and wiregrass and was shaded by pond pine, while the wetter and more open south end was more disturbed from hog

rooting and largely dominated by beaksedges. Woody species made up around 4% average cover per quadrat. Although species diversity was somewhat reduced, this may be attributable to the later survey date. Otherwise, vegetation composition and cover were similar to the 2022 sample.

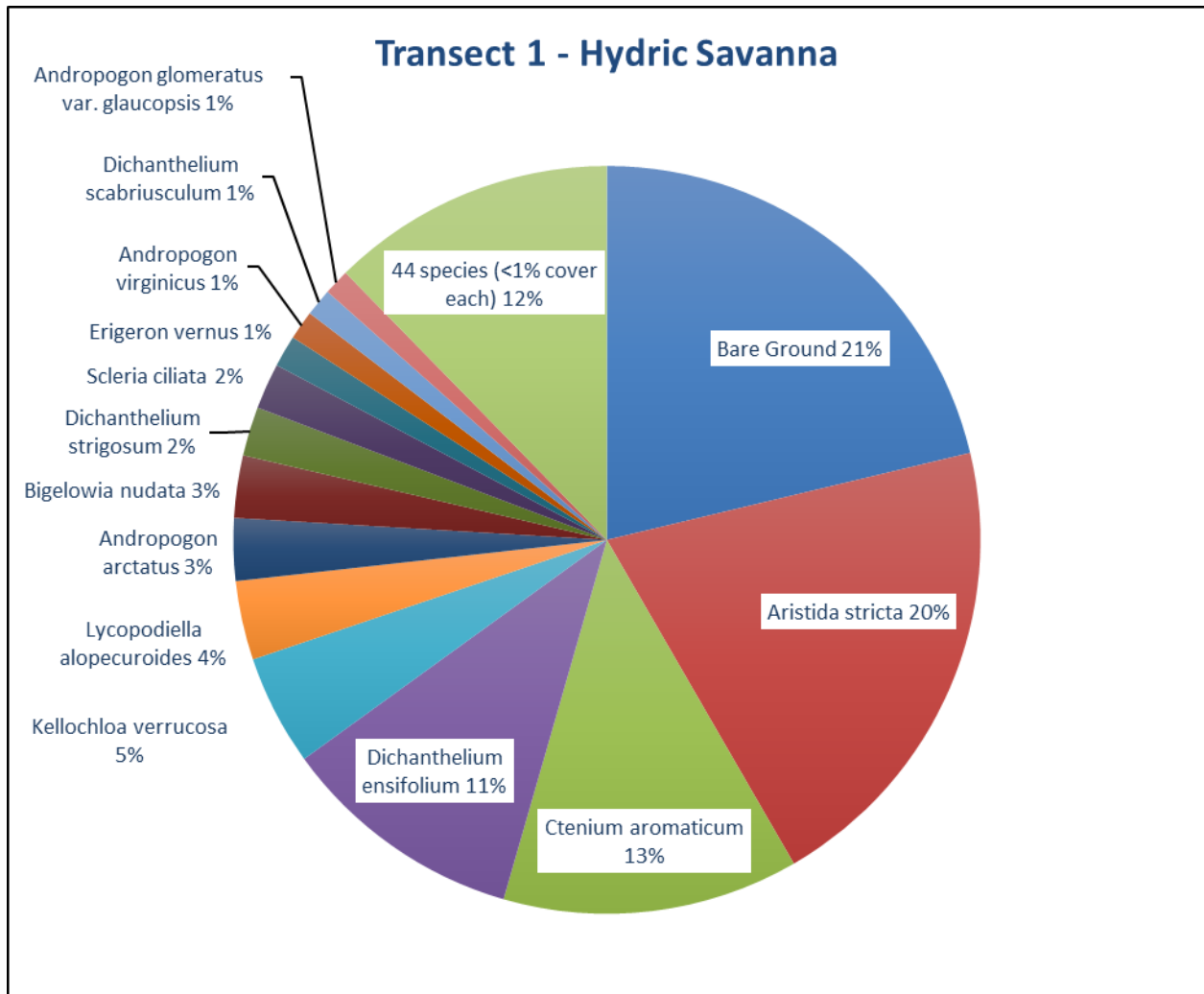


Figure 5. Percent relative cover of plant species in Hydric Savanna Transect 1.

Table 4. Percent cover of plant species in Hydric Savanna Transect 1 sampled on November 27, 2023.

Scientific name	Common name	Average percent cover per quadrat
<i>Aletris lutea</i>	yellow colic-root	0.60
<i>Andropogon arctatus</i>	pinewoods bluestem	2.50
<i>Andropogon glomeratus</i>	bushy bluestem	0.13
<i>Andropogon glomeratus var. glaucopsis</i>	purple bluestem	1.03
<i>Andropogon virginicus</i>	broomsedge bluestem	1.17
<i>Aristida stricta</i>	wiregrass	18.90
<i>Arundinaria gigantea</i>	switchcane	0.10
<i>Bigelowia nudata</i>	pineland rayless goldenrod	2.50

Scientific name	Common name	Average percent cover per quadrat
<i>Centella asiatica</i>	spadeleaf	0.10
<i>Cliftonia monophylla</i>	black titi	0.10
<i>Coleataenia tenera</i>	bluejoint panicum	0.07
<i>Coreopsis linifolia</i>	Texas tickseed	0.47
<i>Ctenium aromaticum</i>	toothache grass	11.87
<i>Dichantherium ensifolium</i>	cypress witchgrass	9.80
<i>Dichantherium scabriusculum</i>	woolly witchgrass	1.10
<i>Dichantherium strigosum</i>	roughhair witchgrass	1.97
<i>Drosera capillaris</i>	pink sundew	0.13
<i>Erigeron vernus</i>	early whitetop fleabane	1.27
<i>Eupatorium pilosum</i>	rough boneset	0.60
<i>Eupatorium rotundifolium</i>	roundleaf thoroughwort	0.57
<i>Euthamia caroliniana</i>	slender flattop goldenrod	0.37
<i>Gaylussacia mosieri</i>	woolly huckleberry	0.70
<i>Helianthus angustifolius</i>	narrowleaf sunflower	0.83
<i>Hypericum brachyphyllum</i>	coastalplain St. John's wort	0.50
<i>Hypericum crux-andreae</i>	St. Peter's wort	0.17
<i>Ilex coriacea</i>	large gallberry	0.10
<i>Ilex glabra</i>	gallberry	0.10
<i>Juncus trigonocarpus</i>	redpod rush	0.23
<i>Kelochloa verrucosa</i>	warty panicgrass	4.43
<i>Lachnocaulon anceps</i>	whitehead bogbutton	0.03
<i>Liatris spicata</i>	dense gayfeather	0.60
<i>Lobelia brevifolia</i>	shortleaf lobelia	0.03
<i>Lophiola aurea</i>	golden crest	0.03
<i>Lycopodiella alopecuroides</i>	foxtail club-moss	3.17
<i>Lycopodiella caroliniana</i>	slender club-moss	0.10
<i>Rhexia alifanus</i>	savannah meadowbeauty	0.37
<i>Rhexia petiolata</i>	fringed meadowbeauty	0.10
<i>Rhynchospora cephalantha</i>	bunched beaksedge	0.33
<i>Rhynchospora chapmanii</i>	Chapman's beaksedge	0.13
<i>Rhynchospora ciliaris</i>	fringed beaksedge	0.03
<i>Rhynchospora gracilentia</i>	slender beaksedge	0.47
<i>Rhynchospora pleiantha</i>	coastal beaksedge	0.40
<i>Rhynchospora plumosa</i>	plumed beaksedge	0.07
<i>Rhynchospora pusilla</i>	fairy beaksedge	0.50
<i>Rubus pensilvanicus</i>	sawtooth blackberry	0.30
<i>Scleria ciliata</i>	fringed nutrush	1.83
<i>Scleria reticularis</i>	netted nutrush	0.30
<i>Seymeria cassioides</i>	yaupon blacksenna	0.20
<i>Smilax glauca</i>	cat greenbrier	0.37
<i>Smilax laurifolia</i>	laurel greenbrier	0.03
<i>Solidago fistulosa</i>	pinebarren goldenrod	0.03
<i>Sphagnum</i> sp.	sphagnum moss	0.07
<i>Tiedemannia filiformis</i> ssp. <i>filiformis</i>	water cowbane	0.23
<i>Viola palmata</i>	early blue violet	0.03
<i>Viola primulifolia</i>	primroseleaf violet	0.07

Scientific name	Common name	Average percent cover per quadrat
<i>Xyris ambigua</i>	coastalplain yellow-eyed grass	0.60
<i>Xyris caroliniana</i>	Carolina yellow-eyed grass	0.13
Bare Ground		19.70

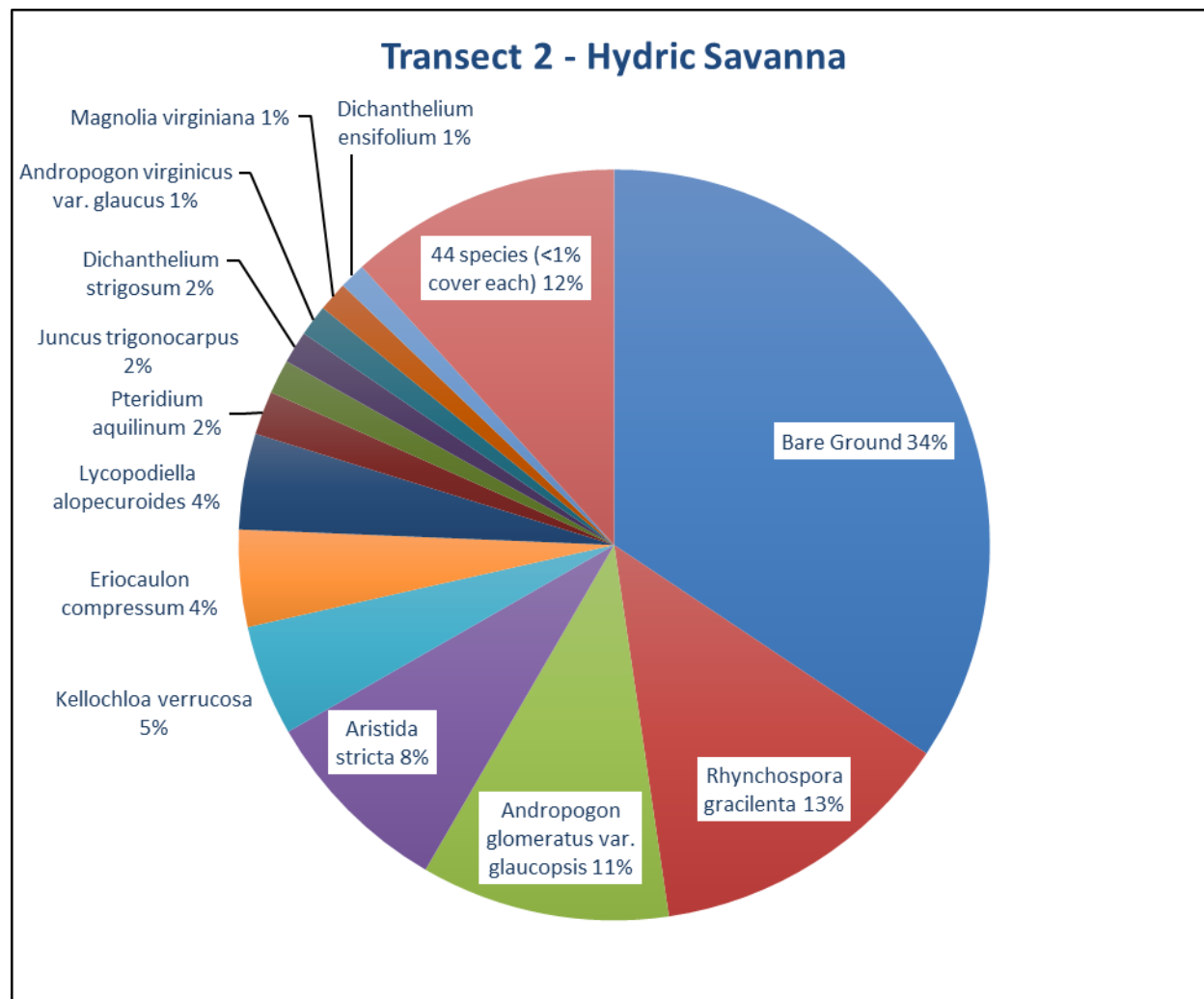


Figure 6. Percent relative cover of plant species in Hydric Savanna Transect 2.

Table 5. Percent cover of plant species in Hydric Savanna Transect 2 sampled on November 28, 2023.

Scientific name	Common name	Average percent cover per quadrat
<i>Andropogon arctatus</i>	pinewoods bluestem	0.53
<i>Andropogon glomeratus</i>	bushy bluestem	0.10
<i>Andropogon glomeratus var. glaucopsis</i>	purple bluestem	9.50
<i>Andropogon virginicus</i>	broomsedge bluestem	0.33
<i>Andropogon virginicus var. glaucus</i>	chalky bluestem	1.20

Scientific name	Common name	Average percent cover per quadrat
<i>Aristida stricta</i>	wiregrass	7.40
<i>Burmannia capitata</i>	southern bluethread	0.03
<i>Centella asiatica</i>	spadeleaf	0.50
<i>Clethra alnifolia</i>	sweet pepperbush	0.37
<i>Ctenium aromaticum</i>	toothache grass	0.10
<i>Dichantherium ensifolium</i>	cypress witchgrass	1.00
<i>Dichantherium leucothrix</i>	rough witchgrass	0.50
<i>Dichantherium scabriusculum</i>	woolly witchgrass	0.27
<i>Dichantherium</i> sp.	witchgrass	0.10
<i>Dichantherium strigosum</i>	roughhair witchgrass	1.23
<i>Drosera capillaris</i>	pink sundew	0.07
<i>Eriocaulon compressum</i>	flattened pipewort	3.70
<i>Eriocaulon decangulare</i>	tenangle pipewort	0.10
<i>Eupatorium compositifolium</i>	yankeeweed	0.27
<i>Eupatorium pilosum</i>	rough boneset	0.13
<i>Euthamia caroliniana</i>	slender flattop goldenrod	0.17
<i>Gaylussacia dumosa</i>	dwarf huckleberry	0.13
<i>Hypericum crux-andreae</i>	St. Peter's wort	0.07
<i>Hypericum fasciculatum</i>	peelbark St. John's wort	0.07
<i>Ilex glabra</i>	gallberry	0.03
<i>Ilex vomitoria</i>	yaupon	0.20
<i>Juncus trigonocarpus</i>	redpod rush	1.30
<i>Kelochloa verrucosa</i>	warty panicgrass	4.23
<i>Lycopodiella alopecuroides</i>	foxtail club-moss	3.67
<i>Magnolia virginiana</i>	sweetbay	1.13
<i>Nyssa biflora</i>	swamp tupelo	0.07
<i>Pinus elliotii</i>	slash pine	0.10
<i>Pinus serotina</i>	pond pine	0.07
<i>Polygala lutea</i>	orange milkwort	0.07
<i>Pteridium aquilinum</i>	bracken	1.67
<i>Rhexia alifanus</i>	savannah meadowbeauty	0.37
<i>Rhexia petiolata</i>	fringed meadowbeauty	0.03
<i>Rhynchospora cephalantha</i>	bunched beaksedge	0.93
<i>Rhynchospora chalarocephala</i>	loosehead beaksedge	0.23
<i>Rhynchospora chapmanii</i>	Chapman's beaksedge	0.33
<i>Rhynchospora gracilentia</i>	slender beaksedge	11.80
<i>Rhynchospora</i> sp.	beaksedge	0.03
<i>Rubus flagellaris</i>	northern dewberry	0.23
<i>Scleria ciliata</i>	fringed nutrush	0.70
<i>Scleria reticularis</i>	netted nutrush	0.33
<i>Smilax glauca</i>	cat greenbrier	0.90
<i>Smilax laurifolia</i>	laurel greenbrier	0.67
<i>Solidago fistulosa</i>	pinebarren goldenrod	0.10
<i>Sphagnum</i> sp.	sphagnum moss	0.17
<i>Utricularia juncea</i>	southern bladderwort	0.10
<i>Viola primulifolia</i>	primroseleaf violet	0.03
<i>Xyris ambigua</i>	coastalplain yellow-eyed grass	0.20
<i>Xyris brevifolia</i>	shortleaf yellow-eyed grass	0.13

Scientific name	Common name	Average percent cover per quadrat
<i>Xyris elliotii</i>	Elliott's yellow-eyed grass	0.23
<i>Xyris fimbriata</i>	fringed yellow-eyed grass	0.27
<i>Xyris</i> sp.	yellow-eyed grass	0.03
Bare Ground		30.50

High Pine

Qualitative sampling. Mature slash pine plantation once covered most of the area being restored to high pine, but pine thinning and prescribed fire have much improved the community from even a few years ago. The canopy is now very open with a basal area of around 20 ft² per acre. Shrubs are shorter, and herbs and grasses more prevalent throughout. The understory may be either shrub dominated, usually by yaupon, or an open grassy groundlayer of wiregrass with widely scattered saw palmetto and gallberry, neither of which usually exceed 5% cover. Nearer the ecotone with hydric savanna and in open, flat areas of the community, many other herbs are found with the wiregrass, including pinkscale gayfeather, narrowleaf silkgrass, sweet goldenrod, scaleleaf aster, and rough boneset. The non-native invasive cogon grass was seen this year in high pine. The total number of species observed in this community was 83 (Table 1).

Bay Swamp

Qualitative sampling. This natural community occurs as a narrow band along the small stream tributaries to Lafayette Creek. The open to dense canopy consisted of sweetbay, titi, and swamp tupelo. The frequently dense and tall shrub layers were primarily composed of fetterbush, dahoon holly, large gallberry, and black titi. The herb stratum is relatively sparse in more shaded areas with clustered sedge and cinnamon fern seen most frequently. However, cleared areas of bay swamp along road crossings contain many more herb species that tend to be weedy. The narrow bay swamp in the vicinity of Hydric Savanna Transect 2 burned through several years ago and lost most of its canopy components. The state-endangered white-top pitcherplant is known from this community and was again seen in 2023. Peruvian primrosewillow, a FISC Category I invasive non-native plant species, has been observed near the road, but was not noted this year. Laurel greenbrier is a common vine. The total number of species observed in this community was 54 (Table 1).

Stream Swamp

Qualitative sampling. This relatively undisturbed natural community occurs along the narrow floodplain of Lafayette Creek and its major tributary, Wolf Creek. On the west side of the site, the closed canopy was composed of mature red maple, swamp tupelo, water oak, and sweetbay. The often dense shrubs consisted of coastal doghobble, yaupon holly, sweet pepperbush, titi, black titi, and large gallberry. Sphagnum moss and cinnamon fern made up most of the sparse groundcover. The state-endangered primrose-flowered butterwort was identified in stream swamp for the first time this year. The total number of species observed in this community was 41 (Table 1).