

**Vegetation Monitoring at Four Northwest Florida Water  
Management District Mitigation Sites  
Fall 2016**

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**December 2016**

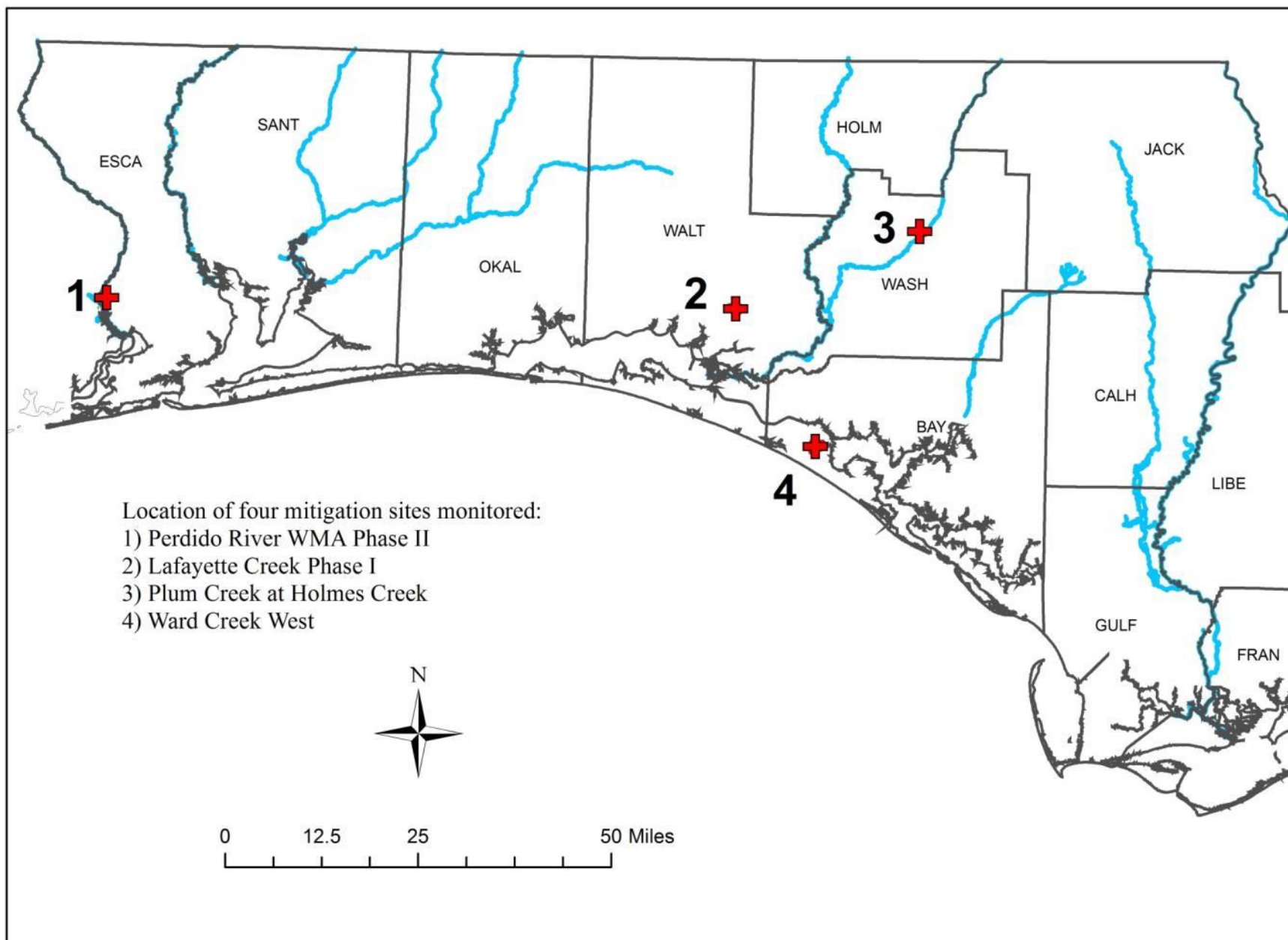
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This document contains separate qualitative and quantitative vegetation monitoring reports for four mitigation sites managed by the Northwest Florida Water Management District:

- 1) Perdido River Water Management Area – Phase II in Escambia County
- 2) Lafayette Creek – Phase I in Walton County
- 3) Plum Creek at Holmes Creek in Washington County
- 4) Ward Creek West in Bay County.

Except for the genus *Dichantheium*, taxonomy follows Wunderlin, R. P., B.F. Hanen, A.R. Franck, and F.B. Essig. 2016. Atlas of Florida Plants (<http://florida.plantatlas.usf.edu/>), Institute for Systematic Botany, University of South Florida, Tampa. *Dichantheium* follows the 2012 treatment by Freckman and Lelong in the Flora of North America (<http://herbarium.usu.edu/treatments/Dichantheium.htm#Dichantheium>).



**Lafayette Creek - Phase I Mitigation Site  
Qualitative and Quantitative Monitoring  
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**INTRODUCTION**

The Lafayette Creek Phase I Mitigation Site of 509 acres was obtained to compensate for the loss of wetland function from the impacts associated with re-alignment of highway US in Freeport. The site is located north of SR 20 and Lafayette Creek. 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 LC-1). 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 during the fall from 2012 through 2015.

**METHODS**

The quantitative monitoring utilized 300-foot permanent transect lines previously marked during the 2012 survey. Two transects were located in both the sandhill and hydric savanna areas (Figure LC-1). 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. Data recorded consisted of the visually estimated percent cover of each plant species in fifteen 1-meter square quadrats. Tree trunks in quadrats were noted in comments but not recorded as cover; canopy over 2 m in height was also not recorded as cover in quadrats. The quadrats were located to the left of the transect line, 20 feet apart, starting at 0 feet and ending at 280 feet. The qualitative monitoring consisted of recording the species and vegetation structure observed along meandering pedestrian transects through each of these two communities plus high pine (HP), bay swamp (BS), and stream swamp (SS). Field surveys were performed by FNAI botanists Gary Schultz and Ann Johnson on October 17-19, 2016.

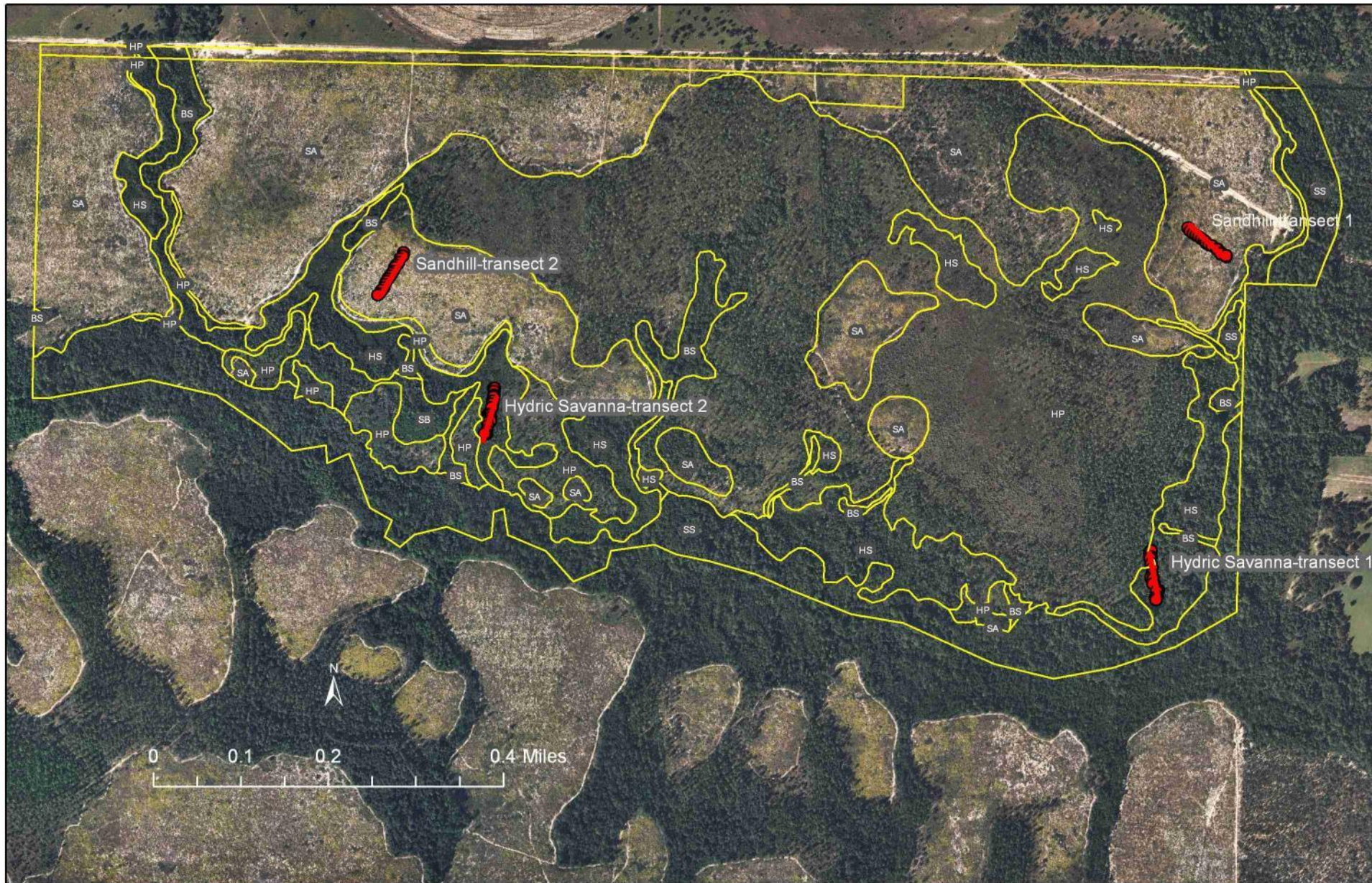


Figure LC-1. Location of permanent transects at Lafayette Creek – Phase I Mitigation Site. SA=Sandhill, HS=Hydric Savanna, HP=High Pine, BS=Bay Swamp, SS=Stream Swamp, SB=Shrub Bog.

## RESULTS AND DISCUSSION

A total of 233 plant species were recorded in the surveyed areas of Lafayette Creek during the 2016 monitoring period (Table LC-1). The increase in bare ground in the sandhill communities and the absence of species that do not as a rule re-sprout after fire (e.g. woody goldenrod) may be due a prescribed burn in the area during the 2015-16 burn season.

Table LC-1. Species observed in target communities at Lafayette Creek – Phase I Mitigation Site, October 17-19, 2016.

Scientific Name	Common Name	bay swamp	high pine	hydric savanna	Sandhill	stream swamp	Grand Total
<i>Acer rubrum</i>	red maple					X	1
<i>Agalinis fasciculata</i>	beach false foxglove				X		1
<i>Aletris lutea</i>	yellow colic-root			X			1
<i>Alnus serrulata</i>	hazel alder					X	1
<i>Amsonia ciliata</i>	fringed bluestar		X		X		2
<i>Andropogon arctatus</i>	pinewoods bluestem			X			1
<i>Andropogon glomeratus</i>	bushy bluestem		X	X			2
<i>Andropogon glomeratus</i> var. <i>glaucoptis</i>	purple bluestem			X			1
<i>Andropogon gyrans</i>	Elliott's bluestem				X		1
<i>Andropogon</i> sp.	bluestem			X	X		2
<i>Andropogon ternarius</i>	splitbeard bluestem			X	X		2
<i>Andropogon virginicus</i>	broomsedge bluestem			X	X		2
<i>Andropogon virginicus</i> var. <i>glaucus</i>	chalky bluestem			X	X		2
<i>Anthraenantia rufa</i>	purple silkscale			X			1
<i>Aristida purpurascens</i>	arrowfeather threeawn				X		1
<i>Aristida stricta</i> var. <i>beyrichiana</i>	wiregrass		X	X	X		3
<i>Arnoglossum sulcatum</i>	Georgia indian-plantain	X		X			2
<i>Arundinaria gigantea</i>	switchcane			X			1
<i>Asclepias</i> sp.	milkweed		X				1
<i>Balduina angustifolia</i>	coastalplain honeycomb-head				X		1
<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>Bigelovia nudata</i>	pineland rayless goldenrod		X	X			2
<i>Bulbostylis ciliatifolia</i>	capillary hairsedge				X		1
<i>Calamintha coccinea</i>	scarlet calamint				X		1
<i>Callicarpa americana</i>	American beautyberry		X		X		2
<i>Carex glaucescens</i>	clustered sedge	X		X		X	3
<i>Carphephorus odoratissimus</i>	vanillaleaf		X		X		2
<i>Chaptalia tomentosa</i>	sunbonnets			X			1

Scientific Name	Common Name	bay swamp	high pine	hydric savanna	Sandhill	stream swamp	Grand Total
<i>Chrysoma pauciflosculosa</i>	woody goldenrod				X		1
<i>Chrysopsis gossypina</i> ssp. <i>hyssopifolia</i>	cottony goldenaster				X		1
<i>Chrysopsis lanuginosa</i>	Lynn Haven goldenaster				X		1
<i>Chrysopsis mariana</i>	Maryland goldenaster				X		1
<i>Cladina evansii</i>	a lichen				X		1
<i>Clematis virginiana</i>	virginsbower				X		1
<i>Clethra alnifolia</i>	sweet pepperbush	X	X	X		X	4
<i>Cliftonia monophylla</i>	black titi	X		X		X	3
<i>Cnidocolus stimulosus</i>	tread softly				X		1
<i>Conyza canadensis</i>	Canadian horseweed				X		1
<i>Coreospis linifolia</i>	Texas tickseed			X			1
<i>Coreopsis pubescens</i>	star tickseed				X		1
<i>Croptilon divaricatum</i>	slender scratchdaisy				X		1
<i>Croton argyranthemus</i>	silver croton		X		X		2
<i>Ctenium aromaticum</i>	toothache grass		X	X			2
<i>Cyperus filiculmis</i>	wiry flatsedge				X		1
<i>Cyperus retrorsus</i>	pinebarren flatsedge				X		1
<i>Cyrilla racemiflora</i>	titi		X			X	2
<i>Dalea pinnata</i>	summer farewell				X		1
<i>Desmodium</i> sp.	tick trefoil				X		1
<i>Dichantherium aciculare</i>	needleleaf witchgrass				X		1
<i>Dichantherium acuminatum</i>	tapered witchgrass			X	X		2
<i>Dichantherium commutatum</i>	variable witchgrass			X	X		2
<i>Dichantherium ensifolium</i> var. <i>unciphyllum</i>	cypress witchgrass			X		X	2
<i>Dichantherium ovale</i>	eggleaf witchgrass				X	X	2
<i>Dichantherium scabriusculum</i>	woolly witchgrass			X			2
<i>Dichantherium</i> sp.	witchgrass			X	X		2
<i>Dichantherium sphaerocarpon</i>	roundseed witchgrass			X			1
<i>Dichantherium strigosum</i>	roughhair witchgrass			X	X		2
<i>Digitaria filiformis</i>	slender crabgrass				X		1
<i>Diodia teres</i>	poor joe		X		X		2
<i>Diodia virginiana</i>	Virginia buttonweed		X	X			2
<i>Diospyros virginiana</i>	common persimmon			X	X		2
<i>Drosera capillaris</i>	pink sundew			X			1
<i>Elephantopus elatus</i>	tall elephantsfoot		X				1
<i>Eragrostis elliottii</i>	Elliott's lovegrass				X		1
<i>Eragrostis pectinacea</i>	tufted lovegrass				X		1
<i>Eragrostis spectabilis</i>	purple lovegrass				X		1



Scientific Name	Common Name	bay swamp	high pine	hydric savanna	Sandhill	stream swamp	Grand Total
<i>Eragrostis virginica</i>	coastal lovegrass				X		1
<i>Eriocaulon compressum</i>	flattened pipewort	X	X	X			2
<i>Eriocaulon decangulare</i>	tenangle pipewort			X		X	2
<i>Eriogonum tomentosum</i>	dogtongue wild buckwheat				X		1
<i>Eryngium yuccifolium</i>	button rattlesnakemaster		X	X			2
<i>Eupatorium capillifolium</i>	dogfennel			X			1
<i>Eupatorium compositifolium</i>	yankeeweed			X	X		2
<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>Euphorbia discoidalis</i>	summer spurge		X		X		2
<i>Euphorbia floridana</i>	greater Florida spurge				X		1
<i>Euthamia caroliniana</i>	slender flattop goldenrod		X	X			2
<i>Fimbristylis</i> sp.	fimbry			X			1
<i>Fuirena pumila</i>	dwarf umbrellasedge			X			1
<i>Galactia minor</i>	littleleaf milkpea				X		1
<i>Gaylussacia dumosa</i>	dwarf huckleberry			X	X		2
<i>Gelsemium sempervirens</i>	yellow jessamine		X			X	2
<i>Helianthus angustifolius</i>	narrowleaf sunflower		X	X			2
<i>Helianthus radula</i>	stiff sunflower		X		X		2
<i>Hibiscus aculeatus</i>	comfortroot		X		X		2
<i>Houstonia procumbens</i>	roundleaf bluet				X		1
<i>Hypericum brachyphyllum</i>	coastalplain St. John's wort			X			1
<i>Hypericum fasciculatum</i>	peelbark St. Johns wort			X			1
<i>Hypericum gentianoides</i>	orangegrass				X		1
<i>Hypericum hypericoides</i>	St. Andrew's cross					X	1
<i>Hypericum suffruticosum</i>	pineland St. John's wprt				X		1
<i>Hypericum tetrapetalum</i>	fourpetal St. John's wort			X			1
<i>Ilex cassine</i>	dahoon	X				X	2
<i>Ilex coriacea</i>	large gallberry	X	X	X			3
<i>Ilex glabra</i>	gallberry	X	X	X			3
<i>Ilex opaca</i>	American holly		X		X		2
<i>Ilex vomitoria</i>	yaupon		X		X		2
<i>Ionactis linarifolia</i>	flaxleaf aster		X				1
<i>Ipomoea</i> sp.	morning glory				X		1
<i>Jacquemontia tamnifolia</i>	hairy clustervine				X		1
<i>Juncus canadensis</i>	Canada rush			X			1
<i>Juncus trigonocarpus</i>	redpod rush			X			1

Scientific Name	Common Name	bay swamp	high pine	hydric savanna	Sandhill	stream swamp	Grand Total
<i>Lachnanthes caroliana</i>	Carolina redroot			X			1
<i>Lachnocaulon anceps</i>	whitehead bogbutton			X			1
<i>Liatris chapmanii</i>	Chapman's gayfeather				X		1
<i>Liatris elegans</i>	pinkscale gayfeather		X		X		2
<i>Liatris gracilis</i>	slender gayfeather				X		1
<i>Liatris pauciflora</i> var. <i>secunda</i>	Piedmont gayfeather				X		1
<i>Liatris spicata</i>	dense gayfeather		X	X	X		3
<i>Liatris tenuifolia</i>	shortleaf gayfeather				X		1
<i>Licania michauxii</i>	gopher apple				X		1
<i>Liriodendron tulipifera</i>	tuliptree	X				X	2
<i>Lobelia brevifolia</i>	shortleaf lobelia		X	X			2
<i>Lobelia glandulosa</i>	glade lobelia	X					1
<i>Lobelia nuttallii</i>	Nuttall's lobelia				X		1
<i>Lophiola aurea</i>	goldcrest			X			1
<i>Ludwigia pilosa</i>	hairy primrosewillow					X	1
<i>Ludwigia virgata</i>	savannah primrosewillow			X			1
<i>Lycopodiella alopecuroides</i>	foxtail club-moss			X		X	2
<i>Lycopodiella caroliniana</i>	slender club-moss		X	X			2
<i>Lycopodiella cernua</i>	nodding clubmoss				X		1
<i>Lygodium japonicum</i>	Japanese climbing fern			X			1
<i>Lyonia lucida</i>	fetterbush	X				X	2
<i>Magnolia virginiana</i>	sweetbay	X		X		X	3
<i>Mikania scandens</i>	climbing hempvine					X	1
<i>Mimosa quadrivalvis</i>	sensitive briar				X		1
<i>Mitreola sessilifolia</i>	swamp hornpod		X				1
<i>Muhlenbergia expansa</i>	cutover muhly			X			1
<i>Myrica caroliniensis</i>	evergreen bayberry	X				X	2
<i>Nyssa sylvatica</i> var. <i>biflora</i>	swamp tupelo	X		X		X	3
<i>Oclemena reticulata</i>	whitetop aster		X				1
<i>Onclea sensibilis</i>	sensitive fern	X		X			2
<i>Opuntia humifusa</i>	pricklypear				X		1
<i>Osmanthus americanus</i>	wild olive				X		1
<i>Osmunda cinnamomea</i>	cinnamon fern	X		X		X	3
<i>Osmunda regalis</i> var. <i>spectabilis</i>	royal fern			X		X	2
<i>Panicum (Coleataenia) longifolium</i>	panicum			X			1
<i>Panicum verrucosum</i>	warty panicgrass		X	X			2
<i>Panicum virgatum</i>	switchgrass			X	X		2
<i>Paspalum floridanum</i>	Florida paspalum		X				1
<i>Paspalum setaceum</i>	thin paspalum				X		1

Scientific Name	Common Name	bay swamp	high pine	hydric savanna	Sandhill	stream swamp	Grand Total
<i>Persea palustris</i>	swamp bay		X				1
<i>Photinia pyrifolia</i>	red chokeberry			X			1
<i>Pinus elliotii</i>	slash pine	X	X	X	X		4
<i>Pinus palustris</i>	longleaf pine				X		1
<i>Pinus serotina</i>	pond pine			X			1
<i>Pinus sp.</i>	pine			X			1
<i>Pityopsis aspera</i>	pineland silkgrass				X		1
<i>Pityopsis graminifolia</i>	narrowleaf silkgrass		X		X		2
<i>Pluchea baccharis</i>	rosy camphorweed			X			1
<i>Pluchea foetida</i>	stinking camphorweed					X	1
<i>Polygonella gracilis</i>	tall jointweed				X		1
<i>Polypremum procumbens</i>	rustweed				X		1
<i>Pseudognaphalium obtusifolium</i>	sweet everlasting				X		1
<i>Pteridium aquilinum</i>	bracken fern		X	X			2
<i>Pseudognaphalium obtusifolium</i>	sweet everlasting				X		1
<i>Pteridium aquilinum</i>	bracken		X	X	X		3
<i>Pterocaulon pycnostachyum</i>	blackroot		X				1
<i>Quercus geminata</i>	sand live oak		X		X		2
<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 myrtifolia</i>	myrtle oak				X		1
<i>Quercus pumila</i>	runner oak		X				1
<i>Rhexia alifanus</i>	savannah meadowbeauty		X	X			2
<i>Rhexia nuttallii</i>	Nuttall's meadowbeauty			X			1
<i>Rhexia petiolata</i>	fringed meadowbeauty			X			1
<i>Rhexia virginica</i>	handsome harry			X			1
<i>Rhus copallinum</i>	winged sumac				X		1
<i>Rhynchosia cytisoides</i>	royal snoutbean				X		1
<i>Rhynchospora cephalantha</i>	bunched beaksedge			X			1
<i>Rhynchospora chalarocephala</i>	loosehead beaksedge			X			1
<i>Rhynchospora chapmanii</i>	Chapman's beaksedge			X			1
<i>Rhynchospora compressa</i>	flatfruit beaksedge			X			1
<i>Rhynchospora corniculata</i>	shortbristle horned beaksedge					X	1
<i>Rhynchospora fascicularis</i>	fascicled beaksedge			X			1
<i>Rhynchospora gracilentata</i>	slender beaksedge			X			1
<i>Rhynchospora grayi</i>	Gray's beaksedge				X		1

Scientific Name	Common Name	bay swamp	high pine	hydric savanna	Sandhill	stream swamp	Grand Total
<i>Rhynchospora megalocarpa</i>	sandyfield beaksedge				X		1
<i>Rhynchosora plumosa</i>	plumed beaksedge			X	X		2
<i>Rhynchospora</i> sp.	beaksedge			X			1
<i>Rubus cuneifolius</i>	sand blackberry		X		X		2
<i>Sabatia brevifolia</i>	shortleaf rosegentian		X				1
<i>Sabatia difformis</i>	lanceleaf rosegentian			X			1
<i>Saccharum giganteum</i>	sugarcane plumegrass			X			1
<i>Sarracenia leucophylla</i>	white-top pitcherplant	X		X			2
<i>Schizachyrium scoparium</i>	little bluestem				X		1
<i>Schizachyrium tenerum</i>	slender bluestem				X		1
<i>Scleria ciliata</i>	fringed nutrush				X		1
<i>Scleria reticularis</i>	netted nutrush			X			1
<i>Scleria</i> sp.	nutrush			X			1
<i>Scleria triglomerata</i>	whip nutrush				X		1
<i>Scoparia dulcis</i>	licoriceweed			X			1
<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 blacksennea		X		X		2
<i>Smilax auriculata</i>	earleaf greenbrier				X		1
<i>Smilax glauca</i>	cat greenbrier			X			1
<i>Smilax laurifolia</i>	laurel greenbrier	X		X		X	3
<i>Solidago odora</i>	sweet goldenrod				X		1
<i>Solidago puberula</i> var. <i>pulverulenta</i>	downy goldenrod				X		1
<i>Solidago stricta</i>	wand goldenrod			X			1
<i>Sporobolus floridanus</i>	Florida dropseed		X				1
<i>Sporobolus junceus</i>	pineywoods dropseed				X		1
<i>Sphagnum</i> sp.	sphagnum moss	X		X		X	3
<i>Stillingia sylvatica</i>	queen's delight				X		1
<i>Symphotrichum adnatum</i>	scaleleaf aster		X				1
<i>Symphotrichum concolor</i>	eastern silver aster		X		X		2
<i>Symphotrichum dumosum</i>	rice button aster		X		X		2
<i>Syngonanthus flavidulus</i>	yellow hatpins			X			1
<i>Taxodium ascendens</i>	pond cypress					X	1
<i>Tephrosia virginiana</i>	goat's rue				X		1
<i>Tragia smallii</i>	Small's noseburn		X		X		2
<i>Trichostema dichotomum</i>	forked bluecurls				X		1
<i>Tridens ambiguus</i>	pinebarren fluffgrass			X			1
<i>Triplasis purpurea</i>	purple sandgrass				X		1

Scientific Name	Common Name	bay swamp	high pine	hydric savanna	Sandhill	stream swamp	Grand Total
<i>Utricularia juncea</i>	southern bladderwort			X			1
<i>Vaccinium arboreum</i>	sparkleberry				X		1
<i>Vaccinium darrowii</i>	Darrow's blueberry				X		1
<i>Vaccinium myrsinites</i>	shiny blueberry			X			1
<i>Viola primulifolia</i>	primroseleaf violet			X			1
<i>Vitis rotundifolia</i>	muscadine	X	X	X	X	X	5
<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			1
<i>Xyris drummondii</i>	Drummond's yellow-eyed grass			X			1
<i>Xyris elliottii</i>	Elliott's yellow-eyed grass			X			1
<i>Xyris fimbriata</i>	fringed yellow-eyed grass			X		X	2
<i>Xyris jupicai</i>	Richard's yellow-eyed grass			X			1
<i>Xyris</i> sp.	yellow-eyed grass			X			1
<i>Yucca filamentosa</i>	Adam's needle				X		1
<b>Total number of taxa: 233</b>		22	56	111	115	32	336

## Sandhill

**Qualitative sampling.** The sandhill natural community has been degraded by past silviculture activities but retains many characteristic species. The diverse but somewhat sparse groundcover was dominated by wiregrass, needleleaf witchgrass, Lynn Haven goldenaster, little bluestem, and Piedmont gayfeather. Other common species included tapered witchgrass, broomsedge bluestem, and yankeeweed. The occasional shrubs were mainly woody goldenrod, young turkey oak, sand live oak, saw palmetto, yaupon, and sand blackberry. The vine earleaf greenbrier was common. Planted longleaf pines were common and ranged from 1 to 15 feet tall. A total of 115 plant species were identified in this community (Table LC-1).

**Quantitative sampling.** The eastern Transect 1 (Figure LC-2, Table LC-2) was located on an east-facing slope. It had a total of 52 species with 66% bare ground. Wiregrass and saw palmetto were about equally abundant. These were followed by yankeeweed, needleleaf witchgrass, and tapered witchgrass among the herbs and sand live oak among the shrubs. The western Transect 2 (Table LC-3, Figure LC-3) was situated near the top of a ridge. It had a total of 31 species with 53% bare ground. Wiregrass, broomsedge bluestem, and variable witchgrass were the dominant herbs. The open shrub stratum was composed mainly of turkey oak and seedling and sapling longleaf pine. (NB: This transect was re-established in 2015 following loss of the northern end stake.)

Figure LC-2. Percent cover of plant species in Sandhill Transect 1.

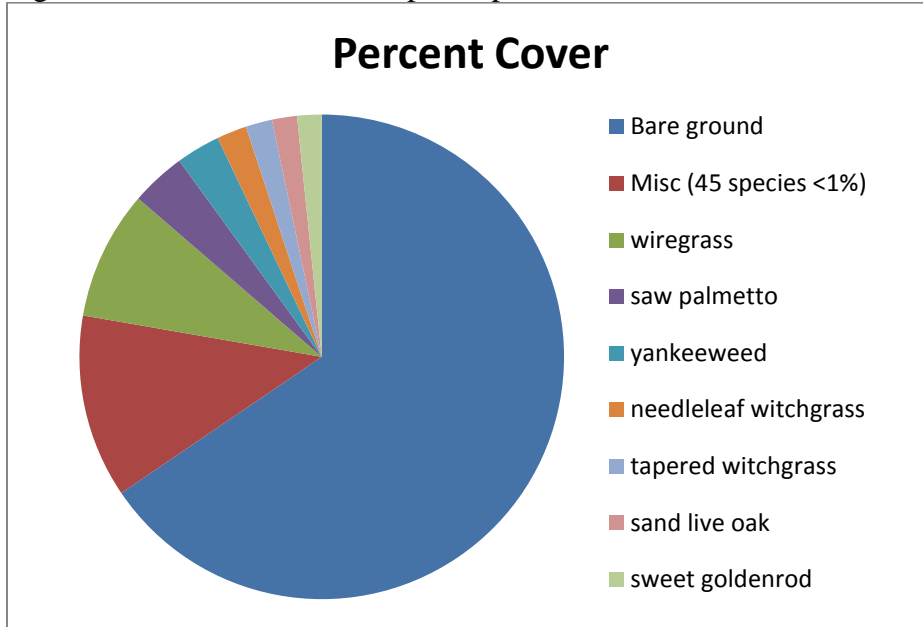


Table LC-2. Percent cover of plant species in Sandhill Transect 1 when sampled on October 17, 2016.

Scientific name	Common name	Average percent cover per quadrat
<i>Aristida stricta</i> var. <i>beyrichiana</i>	wiregrass	8.60
<i>Serenoa repens</i>	saw palmetto	3.67
<i>Eupatorium compositifolium</i>	yankeeweed	2.93
<i>Dichantherium aciculare</i>	needleleaf witchgrass	2.00
<i>Dichantherium acuminatum</i>	tapered witchgrass	1.77
<i>Quercus geminata</i>	sand live oak	1.67
<i>Solidago odora</i>	sweet goldenrod	1.63
<i>Andropogon virginicus</i>	broomsedge bluestem	0.93
<i>Rubus cuneifolius</i>	sand blackberry	0.77
<i>Paspalum setaceum</i>	thin paspalum	0.77
<i>Rhus copallinum</i>	winged sumac	0.73
<i>Pinus palustris</i>	longleaf pine	0.60
<i>Smilax auriculata</i>	earleaf greenbrier	0.50
<i>Andropogon gyrans</i>	Elliott's bluestem	0.47
<i>Licania michauxii</i>	gopher apple	0.47
<i>Quercus minima</i>	dwarf live oak	0.47
<i>Liatris tenuifolia</i>	shortleaf gayfeather	0.43
<i>Hypericum gentianoides</i>	orangegrass	0.37
<i>Pityopsis aspera</i>	pineland silkgrass	0.37
<i>Aristida purpurascens</i>	arrowfeather threeawn	0.33

Scientific name	Common name	Average percent cover per quadrat
<i>Dichanthelium commutatum</i>	variable witchgrass	0.33
<i>Eragrostis virginica</i>	coastal lovegrass	0.33
<i>Liatris pauciflora</i> var. <i>secunda</i>	Piedmont gayfeather	0.53
<i>Chrysopsis lanuginosa</i>	Lynn Haven goldenaster	0.27
<i>Dichanthelium</i> sp.	witchgrass	0.27
<i>Schizachyrium scoparium</i>	little bluestem	0.27
<i>Scleria ciliata</i>	fringed nutrush	0.27
<i>Eragrostis spectabilis</i>	purple lovegrass	0.23
<i>Opuntia humifusa</i>	pricklypear	0.23
<i>Dichanthelium ovale</i>	eggleaf witchgrass	0.20
<i>Liatris gracilis</i>	slender gayfeather	0.20
<i>Rhynchosia cytisoides</i>	royal snoutbean	0.17
<i>Bulbostylis ciliatifolia</i>	capillary hairsedge	0.13
<i>Andropogon</i> sp.	bluestem	0.10
<i>Cyperus retrorsus</i>	pinebarren flatsedge	0.10
<i>Digitaria filiformis</i>	slender crabgrass	0.10
<i>Eragrostis elliotii</i>	Elliott's lovegrass	0.10
<i>Eriogonum tomentosum</i>	dogtongue wild buckwheat	0.10
<i>Euphorbia floridana</i>	greater Florida spurge	0.10
<i>Gaylussacia dumosa</i>	dwarf huckleberry	0.10
<i>Ipomoea</i> sp.	morning glory	0.10
<i>Panicum virgatum</i>	switchgrass	0.10
<i>Schizachyrium tenerum</i>	slender bluestem	0.10
<i>Scleria triglomerata</i>	whip nutrush	0.10
<i>Polygonella gracilis</i>	tall jointweed	0.13
unknown grass	unknown grass	0.07
<i>Croton argyranthemus</i>	silver croton	0.03
<i>Cyperus filiculmis</i>	wiry flatsedge	0.03
<i>Dichanthelium strigosum</i>	roughhair witchgrass	0.03
<i>Galactia minor</i>	littleleaf milkpea	0.03
<i>Mimosa quadrivalvis</i>	sensitive briar	0.03
unknown wiry graminoid	unknown wiry graminoid	0.03
	Bare ground	65.50

Figure LC-3. Percent cover of plant species in Sandhill Transect 2.

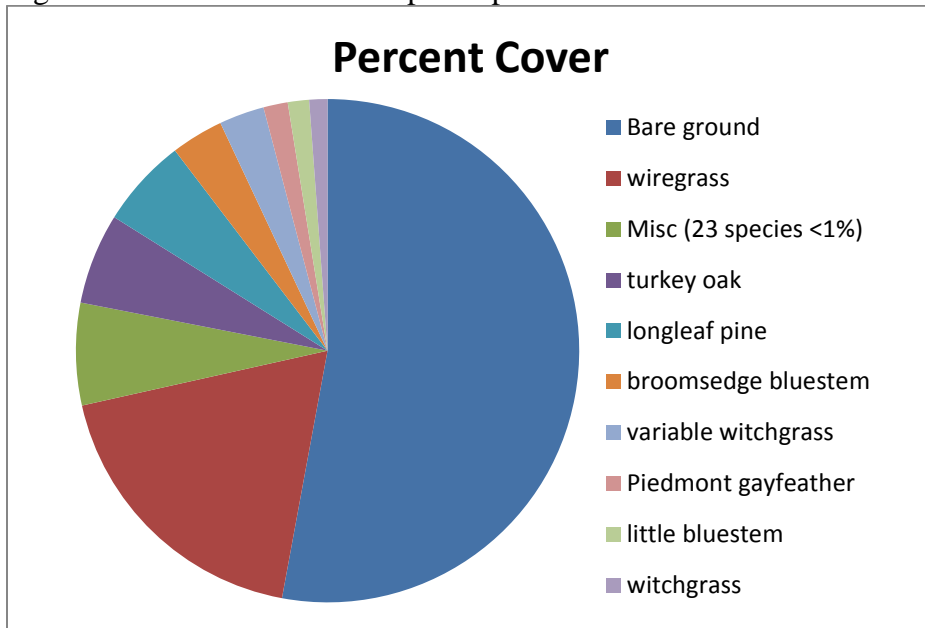


Table LC-3. Percent cover of plant species in Sandhill Transect 2 when sampled on October 18, 2016.

Scientific name	Common name	Average percent cover per quadrat
<i>Aristida stricta</i> var. <i>beyrichiana</i>	wiregrass	18.60
<i>Quercus laevis</i>	turkey oak	5.83
<i>Pinus palustris</i>	longleaf pine	5.73
<i>Andropogon virginicus</i>	broomsedge bluestem	3.37
<i>Dichanthelium commutatum</i>	variable witchgrass	2.90
<i>Liatris pauciflora</i> var. <i>secunda</i>	Piedmont gayfeather	1.57
<i>Schizachyrium scoparium</i>	little bluestem	1.37
<i>Dichanthelium</i> sp.	witchgrass	1.17
<i>Bulbostylis ciliatifolia</i>	capillary hairsedge	0.93
<i>Eupatorium compositifolium</i>	yankeeweed	0.93
<i>Galactia minor</i>	littleleaf milkpea	0.77
<i>Chrysopsis lanuginosa</i>	Lynn Haven goldenaster	0.67
<i>Aristida purpurascens</i>	arrowfeather threeawn	0.60
<i>Dichanthelium acuminatum</i>	tapered witchgrass	0.33
<i>Croton argyranthemus</i>	silver croton	0.27
<i>Andropogon gyrans</i>	Elliott's bluestem	0.23
<i>Licania michauxii</i>	gopher apple	0.23
<i>Rubus cuneifolius</i>	sand blackberry	0.23
<i>Smilax auriculata</i>	earleaf greenbrier	0.20



Scientific name	Common name	Average percent cover per quadrat
<i>Dichanthelium aciculare</i>	needleleaf witchgrass	0.17
<i>Eriogonum tomentosum</i>	dogtongue wild buckwheat	0.17
<i>Euphorbia floridana</i>	greater Florida spurge	0.17
<i>Cyperus filiculmis</i>	wiry flatsedge	0.13
<i>Dalea pinnata</i>	summer farewell	0.10
<i>Mimosa quadrivalvis</i>	sensitive briar	0.10
<i>Rhynchosia cytisoides</i>	royal snoutbean	0.10
<i>Triplasis purpurea</i>	purple sandgrass	0.10
<i>Andropogon ternarius</i>	splitbeard bluestem	0.03
<i>Dichanthelium ovale</i>	eggleaf witchgrass	0.03
<i>Hypericum gentianoides</i>	orangegrass	0.03
<i>Opuntia humifusa</i>	pricklypear	0.03
	Bare ground	52.90

## Hydric Savanna

**Qualitative sampling.** The restoration of the fire-suppressed hydric savanna was begun in 2010 by mowing down the often 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. In 2014 warty panicum and Chapman’s beaksedge colonized a portion of the formerly bare area. Occasional areas with water seepage at the bottom of the sandhill ridge had whitetop pitcher-plants and abundant beaksedges. A wide variety of herbs were colonizing the rest of the area, with beaksedges and warty panicum dominating in the wetter sections and wiregrass in the drier parts. The sparse shrubs include black titi, large gallberry, sweet pepperbush, and gallberry. Scattered mature pond pine provided an open canopy. The soil was often saturated and small areas of inundation were found at the lower elevations. A total of 111 species were recorded from this community (Table LC-1), an increase over the prior two years. Pine-woods bluestem (*Andropogon arctatus*), state-listed as threatened, was noted in this community in 2015 and 2016.

**Quantitative sampling.** The eastern Transect 1 (Table LC-4, Figure LC-4) was on a south-facing slope and had a total of 55 species with 45% bare ground. Herbaceous cover made up most of the transect. The most abundant herbs were warty panicgrass, bushy bluestem, roughhair witchgrass, and wiregrass. The western Transect 2 (Table LC-5, Figure LC-5) was also on a south facing slope. It had a total of 45 species with 50% bare ground. 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 dominated by Chapman’s beaksedge and warty panicgrass.

Figure LC-4. Percent cover of plant species in Hydric Savanna Transect 1.

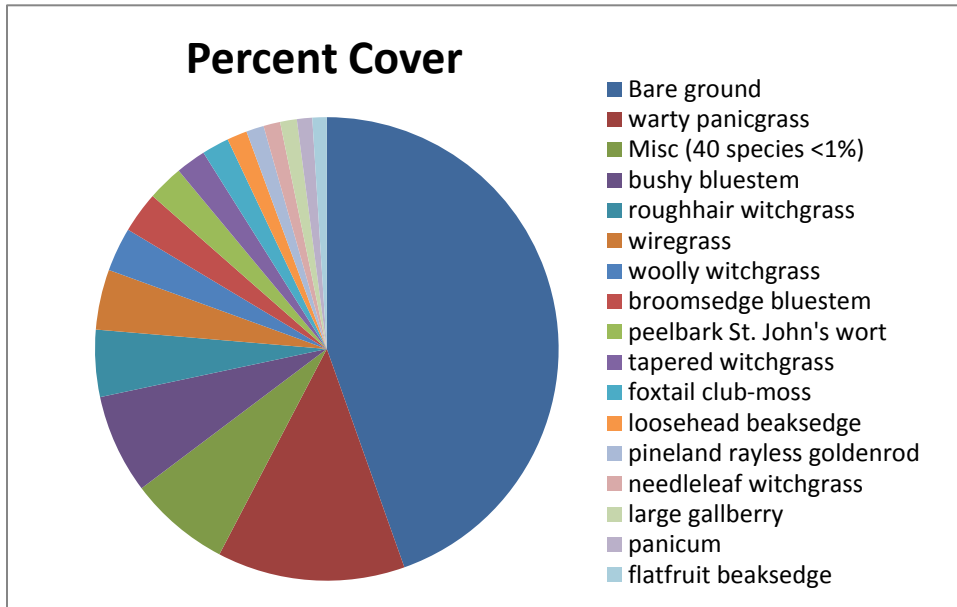


Table LC-4. Percent cover of plant species in Hydric Savanna Transect 1 when sampled on October 19, 2016.

Scientific name	Common name	Average percent cover per quadrat
<i>Panicum verrucosum</i>	warty panicgrass	13.10
<i>Andropogon glomeratus</i>	bushy bluestem	6.93
<i>Dichantherium strigosum</i>	roughhair witchgrass	4.67
<i>Aristida stricta</i> var. <i>beyrichiana</i>	wiregrass	4.20
<i>Dichantherium scabriusculum</i>	woolly witchgrass	3.07
<i>Andropogon virginicus</i>	broomsedge bluestem	2.87
<i>Hypericum fasciculatum</i>	peelbark St. John's wort	2.50
<i>Dichantherium acuminatum</i>	tapered witchgrass	2.10
<i>Lycopodiella alopecuroides</i>	foxtail club-moss	1.90
<i>Rhynchospora chalarocephala</i>	loosehead beaksedge	1.40
<i>Bigelovia nudata</i>	pineland rayless goldenrod	1.23
<i>Dichantherium aciculare</i>	needleleaf witchgrass	1.17
<i>Ilex coriacea</i>	large gallberry	1.17
<i>Panicum longifolium</i>	panicum	1.07
<i>Rhynchospora compressa</i>	flatfruit beaksedge	1.00
<i>Smilax glauca</i>	cat greenbrier	0.80
<i>Andropogon glomeratus</i> var. <i>glaucopsis</i>	purple bluestem	0.73
<i>Rhynchospora chapmanii</i>	Chapman's beaksedge	0.73
<i>Cliftonia monophylla</i>	black titi	0.50
<i>Xyris ambigua</i>	coastalplain yellow-eyed grass	0.43
<i>Eupatorium pilosum</i>	rough boneset	0.40

Scientific name	Common name	Average percent cover per quadrat
<i>Coreopsis linifolia</i>	Texas tickseed	0.23
<i>Dichanthelium sphaerocarpon</i>	roundseed witchgrass	0.23
<i>Eriocaulon compressum</i>	flattened pipewort	0.23
<i>Liatris spicata</i>	dense gayfeather	0.23
<i>Osmunda regalis var. spectabilis</i>	royal fern	0.23
<i>Aletris lutea</i>	yellow colic-root	0.20
<i>Pinus elliotii</i>	slash pine	0.13
<i>Andropogon virginicus var. glaucus</i>	chalky bluestem	0.10
<i>Diodia virginiana</i>	Virginia buttonweed	0.10
<i>Eupatorium rotundifolium</i>	roundleaf thoroughwort	0.10
<i>Eupatorium sp.</i>	thoroughwort	0.10
<i>Fimbristylis sp.</i>	fimbry	0.10
<i>Hypericum brachyphyllum</i>	coastalplain St. John's wort	0.10
<i>Ilex glabra</i>	gallberry	0.10
<i>Lobelia brevifolia</i>	shortleaf lobelia	0.10
<i>Pinus sp.</i>	pine	0.10
<i>Rhexia petiolata</i>	fringed meadowbeauty	0.13
<i>Solidago stricta</i>	wand goldenrod	0.10
unknown herb	unknown herb	0.10
unknown shrub	unknown shrub	0.10
<i>Vaccinium myrsinites</i>	shiny blueberry	0.10
<i>Xyris sp.</i>	yellow-eyed grass	0.10
<i>Rhexia alifanus</i>	savannah meadowbeauty	0.07
<i>Andropogon sp.</i>	bluestem	0.03
<i>Ctenium aromaticum</i>	toothache grass	0.03
<i>Drosera capillaris</i>	pink sundew	0.03
<i>Eupatorium capillifolium</i>	dogfennel	0.03
<i>Gaylussacia dumosa</i>	dwarf huckleberry	0.03
<i>Helianthus angustifolius</i>	narrowleaf sunflower	0.03
<i>Rhexia mariana</i>	pale meadowbeauty	0.03
<i>Scleria reticularis</i>	netted nutrush	0.03
<i>Smilax auriculata</i>	earleaf greenbrier	0.03
<i>Smilax laurifolia</i>	laurel greenbrier	0.03
<i>Vaccinium arboreum</i>	sparkleberry	0.03
	Bare ground	44.57

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

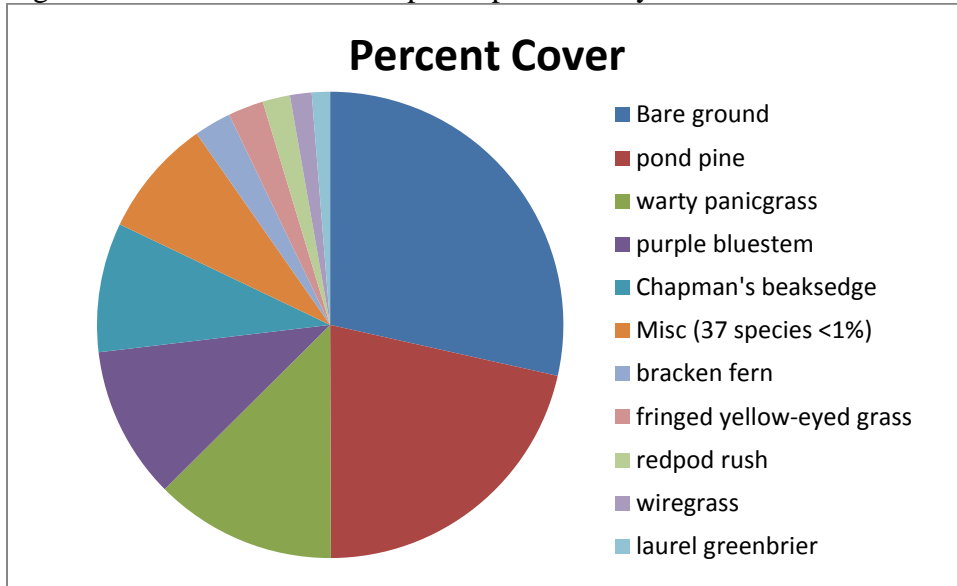


Table LC-5. Percent cover of plant species in Hydric Savanna Transect 2 when sampled on October 18, 2016.

Scientific name	Common name	Average percent cover per quadrat
<i>Pinus serotina</i>	pond pine	21.43
<i>Panicum verrucosum</i>	warty panicgrass	12.60
<i>Andropogon glomeratus</i> var. <i>glaucopsis</i>	purple bluestem	10.57
<i>Rhynchospora chapmanii</i>	Chapman's beaksedge	8.97
<i>Pteridium aquilinum</i>	bracken fern	2.57
<i>Xyris fimbriata</i>	fringed yellow-eyed grass	2.47
<i>Juncus trigonocarpus</i>	redpod rush	1.90
<i>Aristida stricta</i> var. <i>beyrichiana</i>	wiregrass	1.50
<i>Smilax laurifolia</i>	laurel greenbrier	1.27
<i>Andropogon glomeratus</i>	bushy bluestem	0.87
<i>Cliftonia monophylla</i>	black titi	0.73
<i>Magnolia virginiana</i>	sweetbay	0.73
<i>Dichanthelium acuminatum</i>	tapered witchgrass	0.57
<i>Smilax glauca</i>	cat greenbrier	0.57
<i>Eriocaulon compressum</i>	flattened pipewort	0.50
<i>Lachnanthes caroliniana</i>	Carolina redroot	0.50
<i>Rhexia alifanus</i>	savannah meadowbeauty	0.37
<i>Andropogon virginicus</i>	broomsedge bluestem	0.33
<i>Hypericum fasciculatum</i>	peelbark St. John's wort	0.30
<i>Rhynchospora gracilentia</i>	slender beaksedge	0.27

Scientific name	Common name	Average percent cover per quadrat
<i>Andropogon ternarius</i>	splitbeard bluestem	0.23
<i>Osmunda cinnamomea</i>	cinnamon fern	0.23
<i>Rhynchospora</i> sp.	beaksedge	0.23
<i>Ilex coriacea</i>	large gallberry	0.13
<i>Rhynchospora fascicularis</i>	fascicled beaksedge	0.13
<i>Clethra alnifolia</i>	sweet pepperbush	0.10
<i>Dichanthelium commutatum</i>	variable witchgrass	0.10
<i>Dichanthelium scabriusculum</i>	woolly witchgrass	0.10
<i>Eupatorium compositifolium</i>	yankeeweed	0.10
<i>Euthamia caroliniana</i>	slender flattop goldenrod	0.10
<i>Fuirena pumila</i>	dwarf umbrellasedge	0.10
<i>Gaylussacia dumosa</i>	dwarf huckleberry	0.10
<i>Lycopodiella alopecuroides</i>	foxtail club-moss	0.10
<i>Nyssa sylvatica</i> var. <i>biflora</i>	swamp tupelo	0.10
<i>Scleria reticularis</i>	netted nutrush	0.10
<i>Andropogon</i> sp.	bluestem	0.07
<i>Rhexia nuttallii</i>	Nuttall's meadowbeauty	0.07
<i>Viola primulifolia</i>	primroseleaf violet	0.07
<i>Xyris</i> sp.	yellow-eyed grass	0.07
<i>Carex glaucescens</i>	clustered sedge	0.03
<i>Dichanthelium</i> sp.	witchgrass	0.03
<i>Ilex glabra</i>	gallberry	0.03
<i>Lachnocaulon anceps</i>	whitehead bogbutton	0.03
<i>Lygodium japonicum</i>	Japanese climbing fern	0.03
<i>Photinia pyrifolia</i>	red chokeberry	0.03
<i>Rhynchospora ciliaris</i>	fringed beaksedge	0.03
	Bare ground	28.50

## High Pine

**Qualitative sampling.** Mature slash pine plantation still covers most of the area being restored to high pine. Thinning of the pines and prescribed fire has opened up the canopy in some sections. An often dense shrub layer was dominated by gallberry, yaupon, American beautyberry, and large gallberry. More open areas had wiregrass plus many other herbs, including toothache grass, scaleleaf aster, rough boneset, and vanillaleaf. The total number of species observed in this community was 56 (Table LC-1).

## Bay Swamp

**Qualitative sampling.** This relatively undisturbed natural community occurs as a narrow band along the small stream tributaries to Lafayette Creek. The often dense canopy consisted of

sweetbay, black titi, tuliptree, and swamp tupelo. The frequently dense shrub layer was primarily composed of fetterbush, large gallberry, black titi, and evergreen bayberry. Cinnamon fern and Georgia Indian plantain were in the sparse herb stratum and laurel greenbrier was a common vine. The total number of species observed in this community was 22 (Table LC-1).

### Stream Swamp

**Qualitative sampling.** This relatively undisturbed natural community occurred along the narrow floodplain of Lafayette Creek and its major tributary, Wolf Creek. The closed canopy was composed of pond cypress, swamp tupelo, and sweetbay. The often dense shrubs consisted of titi, black titi, large gallberry, and fetterbush. Sphagnum moss, cinnamon fern, royal fern, and tenangle pipewort made up the sparse groundcover. The total number of species observed in this community was 32 (Table LC-1).