

**SACRED HEART MITIGATION
QUALITATIVE AND QUANTITATIVE MONITORING
SECOND MONITORING REPORT, SPRING 2018**



Monitoring conducted in accordance with the approved monitoring plan, April 27, 2018, by David Clayton, Environmental Scientist IV, Northwest Florida Water Management District.

Introduction

The Sacred Heart Mitigation Project was developed to offset unavoidable wetland impacts associated with construction of the Sacred Heart Hospital in Walton County, Florida. It consists of 82 acres located within the Devils Swamp section of the Northwest Florida Water Management District's (NFWFMD) Choctawhatchee River Water Management Area and is adjacent to a management access road near the unincorporated community of Bunker (Figure 1, 2). Historically a hydric pine flatwoods system, this site was converted to slash pine plantation prior to NFWFMD acquisition. The goal of this mitigation project is to restore hydric pine flatwoods to a high-quality condition.

Baseline monitoring was conducted on November 21, 2017. As the first step in the restoration process, prescribed fire was implemented on February 22, 2018. Shrub reduction and a timber harvest are scheduled for later in 2018. Quantitative and qualitative monitoring methods were used to document the current plant species composition and vegetation structure of these targeted communities. This "Second Monitoring Report" (April 27, 2018) follows the initial baseline monitoring.

Representative panoramic photos of the restoration site are posted at:

<https://www.nfwwater.com/Water-Resources/Regional-Wetland-Mitigation-Program/Umbrella-Plan/NFWFMD-Mitigation-Sites/Choctawhatchee-Watershed-Mitigation-Sites/Devils-Swamp/Sacred-Heart-Mitigation>



Figure 1. Sacred Heart Mitigation Location Map

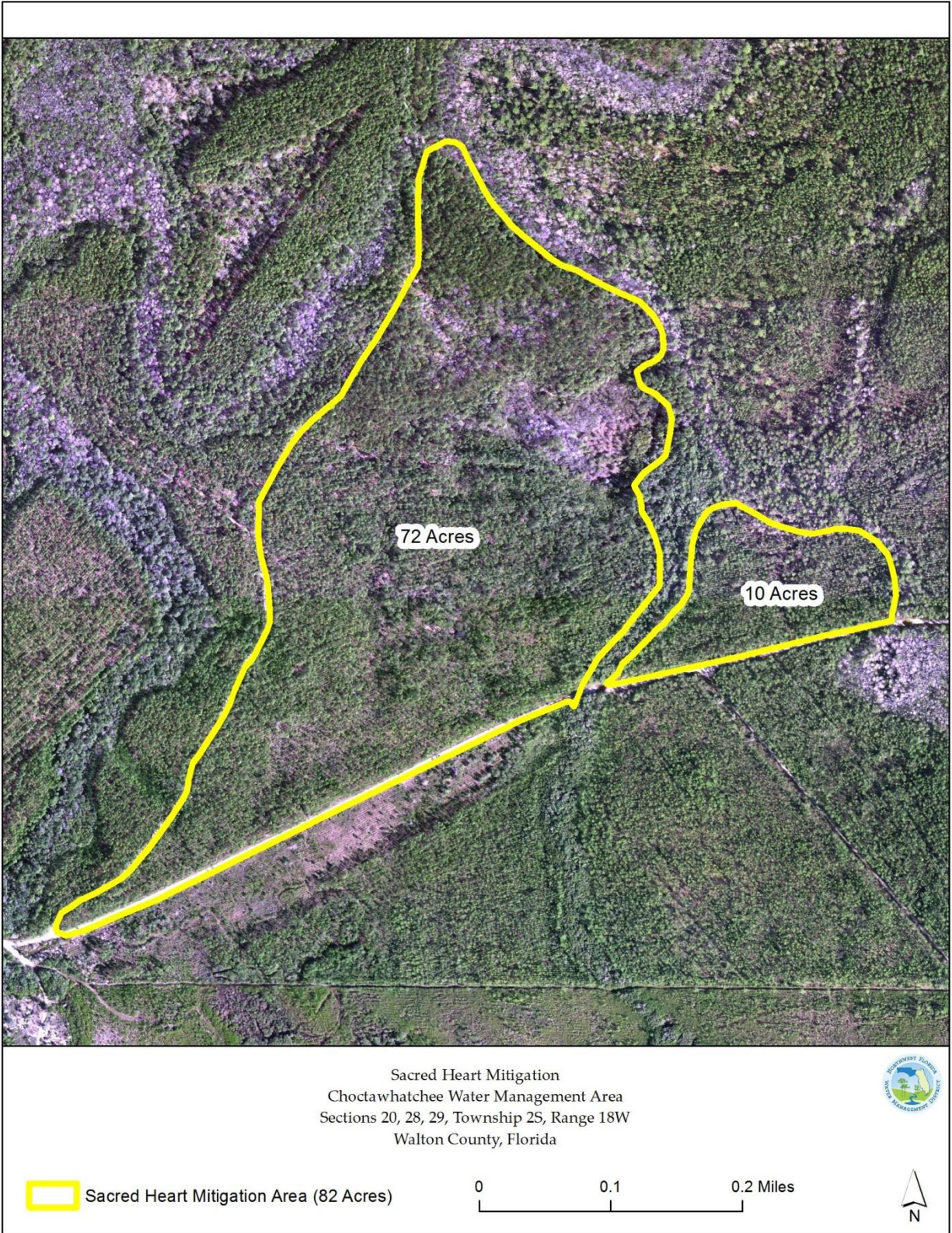


Figure 2. Sacred Heart Mitigation Area (Devils Swamp, Choctawhatchee WMA)

Methods

Qualitative Monitoring

Qualitative monitoring of vegetation includes species identification and general habitat health. Pedestrian qualitative surveys (20+ minute meandering walk-paths) increase the portion of the site monitored. Wildlife observations (direct sightings, scat, tracks, or vocalizations) are also recorded during pedestrian surveys.

The pedestrian survey conducted at this site continued for as long as species were being added; however, once additional species were not observed for five minutes the survey was deemed complete. Plants observed during the pedestrian survey (Table 1) are listed in the following categories (tree, shrub, vine or herbaceous) to give a better understanding of community composition.

Quantitative Monitoring

Percent vegetation cover was monitored at four 150-foot transects. Along each transect, one-meter square quadrats were established at 10-foot intervals. Vegetation species coverage statistics were recorded at each site. The percent coverage for each species (and bare ground or open water) was determined by adding all quadrat observations together and dividing the total coverage by the cover of each species within each transect. This represents a modified Daubenmire cover scale where vegetation species statistics are used to determine the percent cover by bare ground, water and species. These include wetland species, invasive exotic, and nuisance species present.

Shrub density was monitored using five, one-meter square quadrats, established at random within each transect. Within each quadrat the shrubs were identified by species and counted. The number of stems per square meter were determined. Representative site photos will be taken and included in the report.

Results and Discussion

Qualitative Monitoring

Hydric Pine Flatwoods (82 Acres)

Sixty-one species were observed along the pedestrian transect (Table 1). Species were representative of hydric flatwoods. Shrub species were dominant within the community and shaded out the understory. Dominant shrubs included black titi, gallberry, tall gallberry, high bush and Elliot's blueberry.

Table 1. Pedestrian Transect

Scientific Name	Common Name	Tree	Shrub	Vine	Herb
<i>Andropogon glomeratus</i>	Busy blue stem				X
<i>Andropogon sp.</i>	Bluestem				X
<i>Aristida stricta</i>	Wiregrass				X
<i>Balduina uniflora</i>	Coastalplain honeycombhead				X
<i>Bigelovia nudata</i>	Rayless goldenrod				X

Scientific Name	Common Name	Tree	Shrub	Vine	Herb
<i>Carex sp.</i>	Nutsedge				X
<i>Carphephorus odoratissimus</i>	Vanilla leaf				X
<i>Clethra alnifolia</i>	Sweet pepper bush		X		
<i>Cliftonia monophylla</i>	Black titi		X		
<i>Cyrilla racemiflora</i>	Red titi		X		
<i>Dichantheium aciculare</i>	Needleleaf witchgrass				X
<i>Dicantheium spp.</i>	Witch grass				X
<i>Drosera capillaris</i>	Pink sundew				X
<i>Erigeron vernus</i>	Early white fleabane				X
<i>Eriocaulon decangulare</i>	Tenangle pipewort				X
<i>Euphorbia floridana</i>	Florida pineland spurge				X
<i>Eubotrys racemosus</i>	Swamp dog hobble		X		
<i>Eurybia eryngiifolia</i>	Coyote-thistle aster				X
<i>Gaylussacia dumosa</i>	Dwarf huckleberry		X		
<i>Gaylussacia frondosa</i>	Blue huckleberry		X		
<i>Gaylussacia mosieri</i>	Woolly huckleberry		X		
<i>Geobalanus oblongifolius</i>	Gopher apple			X	
<i>Hibiscus aculeatus</i>	Comfortroot				X
<i>Hypericum crux-andreae</i>	St. Peter's wort				X
<i>Hypericum fasciculatum</i>	St. John's wort				X
<i>Ilex coriacea</i>	Tall gallberry		X		
<i>Ilex glabra</i>	Gallberry		X		
<i>Ilex vomitoria</i>	Yaupon		X		
<i>Ilex myrtifolia</i>	Myrtle-leaved holly	X			
<i>Kelochloa verrucosa</i>	Warty panic grass				X
<i>Lachnanthes caroliana</i>	Red root				X
<i>Lachnocaulon anceps</i>	Whitehead bogbutton				X
<i>Liquidambar styraciflua</i>	Sweet gum	X			
<i>Lycopodiella alopecuroides</i>	Foxtail club-moss				X
<i>Lycopodiella appressa</i>	Southern club-moss				X
<i>Lophiola aurea</i>	Golden crest				X
<i>Morella inodora</i>	Odorless bayberry		X		
<i>Panicum sp.</i>	Panic grass				X
<i>Persea palustris</i>	Swamp bay	X			
<i>Persea rubra</i>	Red bay	X			
<i>Pinus elliotii</i>	Slash pine	X			
<i>Polygala lutea</i>	Orange milkwort				X
<i>Pseudognaphalium obtusifolium</i>	Rabbit tobacco				X
<i>Pteridium aquilinum</i>	Brachen fern				X
<i>Quercus pumila</i>	Runner oak		X		

Scientific Name	Common Name	Tree	Shrub	Vine	Herb
<i>Rhexia alifanus</i>	Meadow beauty				X
<i>Rhexia nuttallii</i>	Nuttall's meadow beauty				X
<i>Rhus copallinum</i>	Winged sumac		X		
<i>Rhynchospora plumosa</i>	Plumed nutrush				X
<i>Rhynchospora sp.</i>	Rhynchospora				X
<i>Scleria sp.</i>	Scleria				X
<i>Serenoa repens</i>	Saw palmetto		X		
<i>Seymeria cassioides</i>	Senna seymaria				X
<i>Smilax laurifolia</i>	Greenbriar			X	
<i>Smilax rotundifolia</i>	Roundleaf greenbriar			X	
<i>Solidago fistulosa</i>	Pinebarren goldenrod				X
<i>Vaccinium darrowii</i>	Darrow's blueberry		X		
<i>Vaccinium elliotii</i>	Elliot's blueberry		X		
<i>Viola lanceolata</i>	Bog white violet				X
<i>Xyris caroliniana</i>	Yellow-eyed grass				X
<i>Xyris sp.</i>	Yellow-eyed grass				X

Date: 4/27/2018
 Data Collector: David Clayton
 Area: 82 Acres
 Community: Hydric Pine Flatwoods
 Wildlife Observations: Raccoon, Pileated Woodpecker, Cardinal, Red Shouldered Hawk

Quantitative Sampling

Shrub Density

Shrub density within the hydric pine flatwoods, across four transects, for April 2018, averaged 50 stems per m² (Transect 1—42 stems per m²; Transect 2—28 stems per m²; Transect 3—72 stems per m²; Transect 4—57 stems per m²). The dominant shrub species were gallberry, and black titi (Figure 3). Not unexpectedly, the average stems per m² increased from 43 stems per m² (November 2017) to 50 stems per m² (April 2018) following the initial reintroduction of prescribed fire.

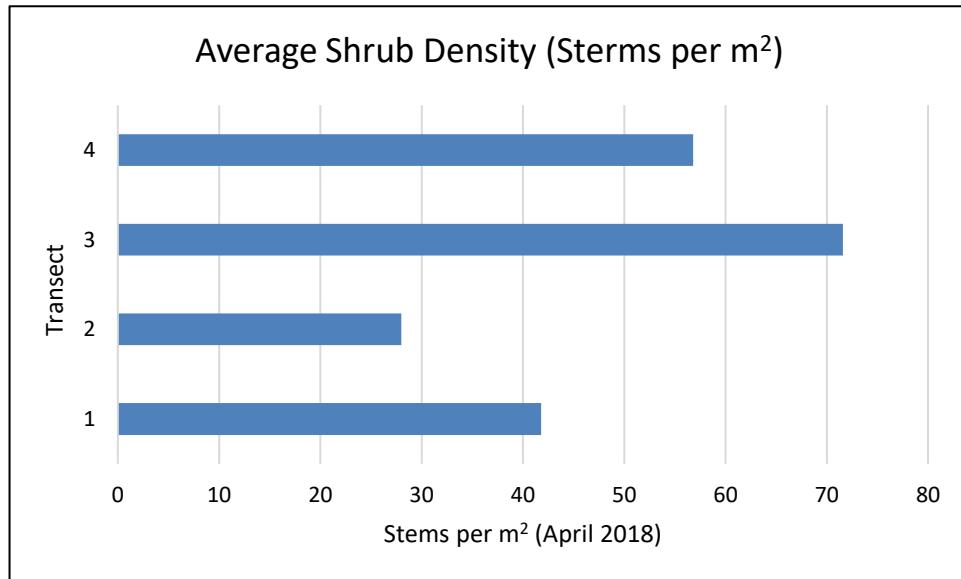


Figure 3. Shrub Density (Stems per Meter Square)

Transect Sampling

Transect 1 (Hydric Pine Flatwoods)

Sixteen species were observed along Transect 1 (Table 2, Figure 4) during the April 2018 monitoring (15 species were observed during the November 2017 baseline monitoring). Bare ground, following initial reintroduction of fire, increased from 32% to 54%. Shrub coverage, measured as stems per m², increased from 27 stems per m² to 42 stems per m². Dominant shrub cover was primarily gallberry. Estimated wiregrass coverage effectively did not change (3.7% baseline versus 4.0% post-fire). Species were typical of those found within a fire suppressed, shrub dominated hydric flatwood. Shrub removal and a fire interval of two years should greatly increase the dominance of grasses and forbs.

Table 2. Transect 1 (April 2018)

Scientific Name	Common Name	Average Percent Cover
<i>Andropogon glomeratus</i>	Bushy bluestem	1.33
<i>Aristida stricta</i>	Wiregrass	4.00
<i>Clethra alnifolia</i>	Sweet pepperbush	0.33
<i>Cliftonia monophylla</i>	Black titi	0.67
<i>Eriocaulon decangulare</i>	Pipewort	1.67
<i>Euphorbia floridana</i>	Florida pineland spurge	0.67
<i>Gaylussacia dumosa</i>	Dwarf huckleberry	5.00
<i>Ilex glabra</i>	Gallberry	14.33
<i>Lachnanthes caroliana</i>	Redroot	1.00
<i>Panicum sp.</i>	Panicum	10.00
<i>Persea borbonia</i>	Red bay	0.33
<i>Pinus elliotii</i>	Slash pine	0.33
<i>Rhexia alifanus</i>	Meadow beauty	0.67
<i>Serenoa repens</i>	Saw palmetto	4.33
<i>Smilax laurifolia</i>	Catbriar	1.00
<i>Xyris sp.</i>	Yellow eyed grass	0.33
Bare ground	Bare ground	54.00
Total		100.00

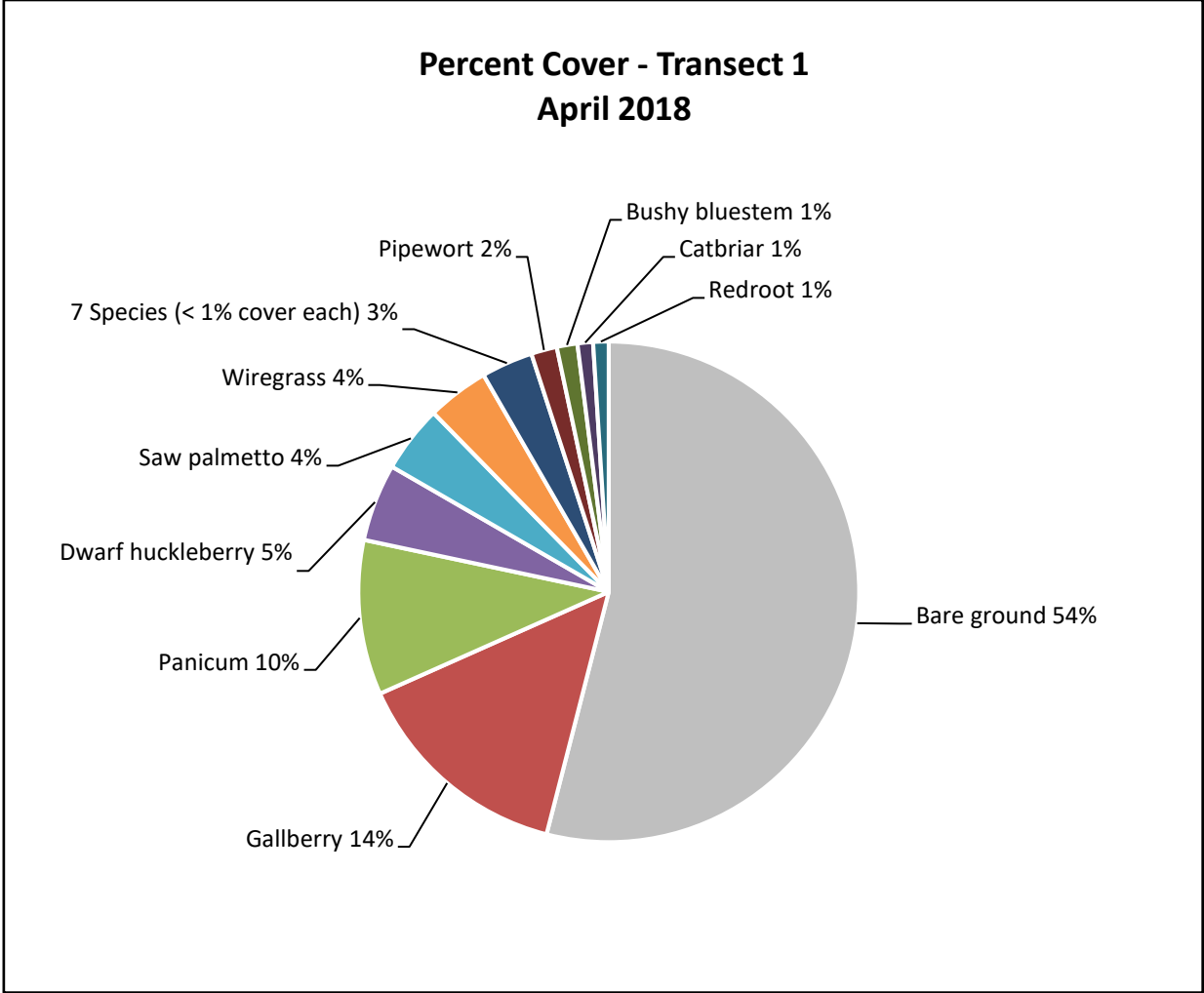


Figure 4. Transect 1, Percent Cover, April 2018

Transect 2 (Hydric Pine Flatwoods)

Thirteen species were observed along Transect 2 (Table 3, Figure 5) during the April 2018 monitoring (17 species were observed during the November 2017 baseline monitoring). Bare ground increased from 32% to 55%. Shrub coverage, measured as stems per m², decreased from 28 stems per m² to 50 stems per m². The dominant shrub was gallberry. Estimated wiregrass coverage increased from approximately 6% to 8%.

Table 3. Transect 2 (April 2018)

Scientific Name	Common Name	Average Percent Cover
<i>Andropogon glomeratus</i>	Bushy bluestem	1.33
<i>Aristida stricta</i>	Wiregrass	7.67
<i>Carex sp.</i>	Sedge	4.67
<i>Dichanthelium aciculare</i>	Needleleaf witch grass	2.33
<i>Euphorbia floridana</i>	Greater Florida spurge	1.00
<i>Gaylussacia dumosa</i>	Dwarf huckleberry	4.33
<i>Ilex glabra</i>	Gallberry	9.00
<i>Lachnanthes caroliana</i>	Redroot	1.67
<i>Panicum sp.</i>	Panic grass	8.00
<i>Pteridium aquilinum</i>	Bracken fern	2.67
<i>Rhexia alifanus</i>	Meadow beauty	1.67
<i>Smilax laurifolia</i>	Catbriar	0.33
<i>Smilax rotundifolia</i>	Roundleaf greenbriar	0.67
Bare ground	Bare ground	54.67
Total		100.00

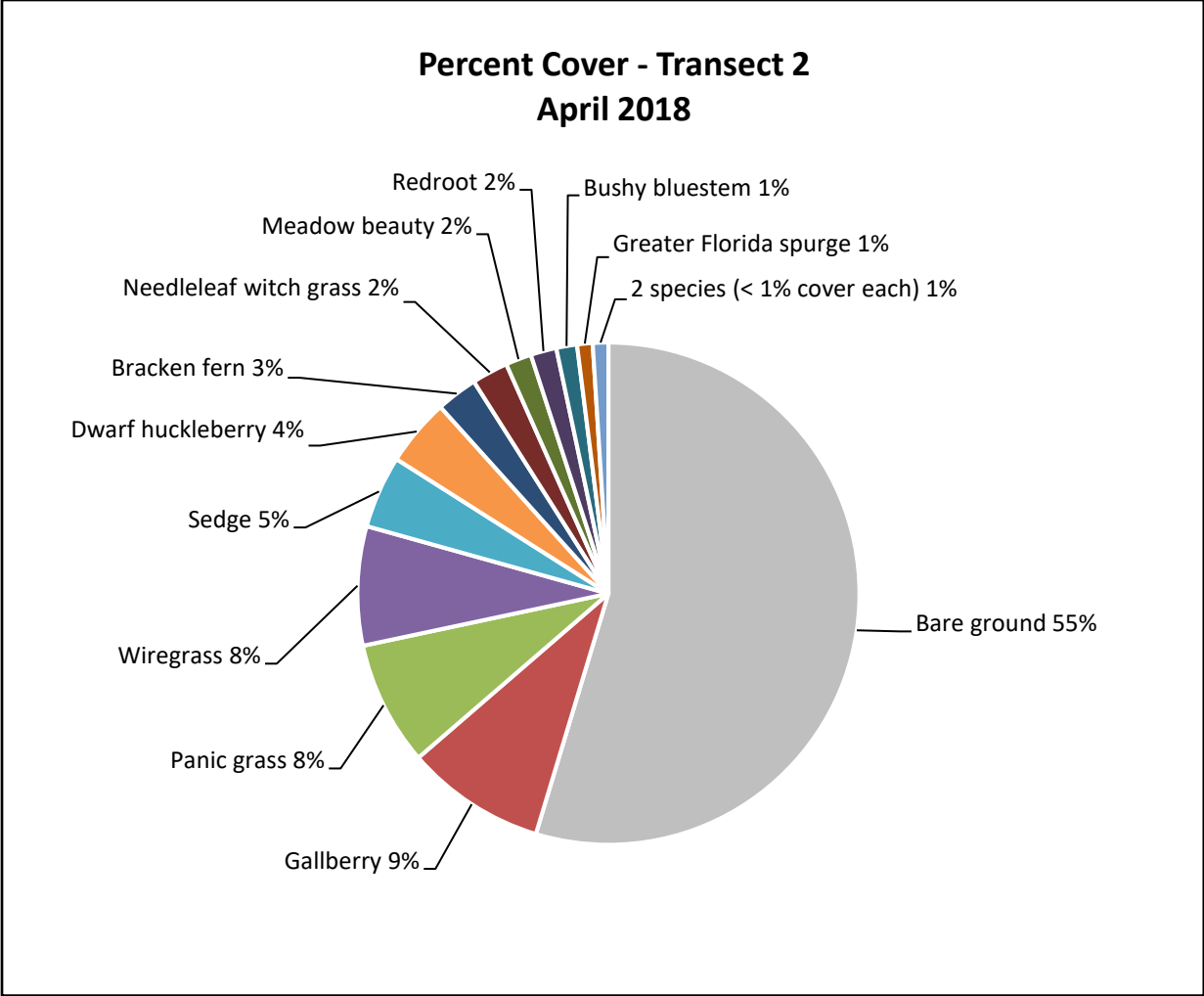


Figure 5. Transect 2, Percent Cover, April 2018

Transect 3 (Hydric Pine Flatwoods)

Eleven species were observed along Transect 3 (Table 4, Figure 6) during the April 2018 monitoring (19 species were observed during the November 2017 baseline monitoring). Bare ground increased from 24% to 56%. Shrub cover, measured as stems per m², increased from 44 stems per m² to 72 stems per m². Dominant shrub cover was primarily black titi and gallberry. Wiregrass cover decreased from 10% to 0.33%.

Table 4. Transect 3 (April 2018)

Scientific Name	Common Name	Average Percent Cover
<i>Andropogon glomeratus</i>	Bushy bluestem	0.33
<i>Aristida stricta</i>	Wiregrass	0.33
<i>Cliftonia monophylla</i>	Black titi	12.00
<i>Euphorbia floridana</i>	Greater Florida spurge	0.67
<i>Gaylussacia dumosa</i>	Dwarf huckleberry	7.00
<i>Gaylussacia frondosa</i>	Blue huckleberry	1.33
<i>Ilex glabra</i>	Gallberry	16.00
<i>Lachnanthes caroliana</i>	Redroot	1.67
<i>Panicum sp.</i>	Panic grass	1.67
<i>Quercus pumila</i>	Running oak	0.33
<i>Rhexia alifanus</i>	Savannah meadow beauty	2.33
Bare ground	Bare ground	56.33
	Total	100.00

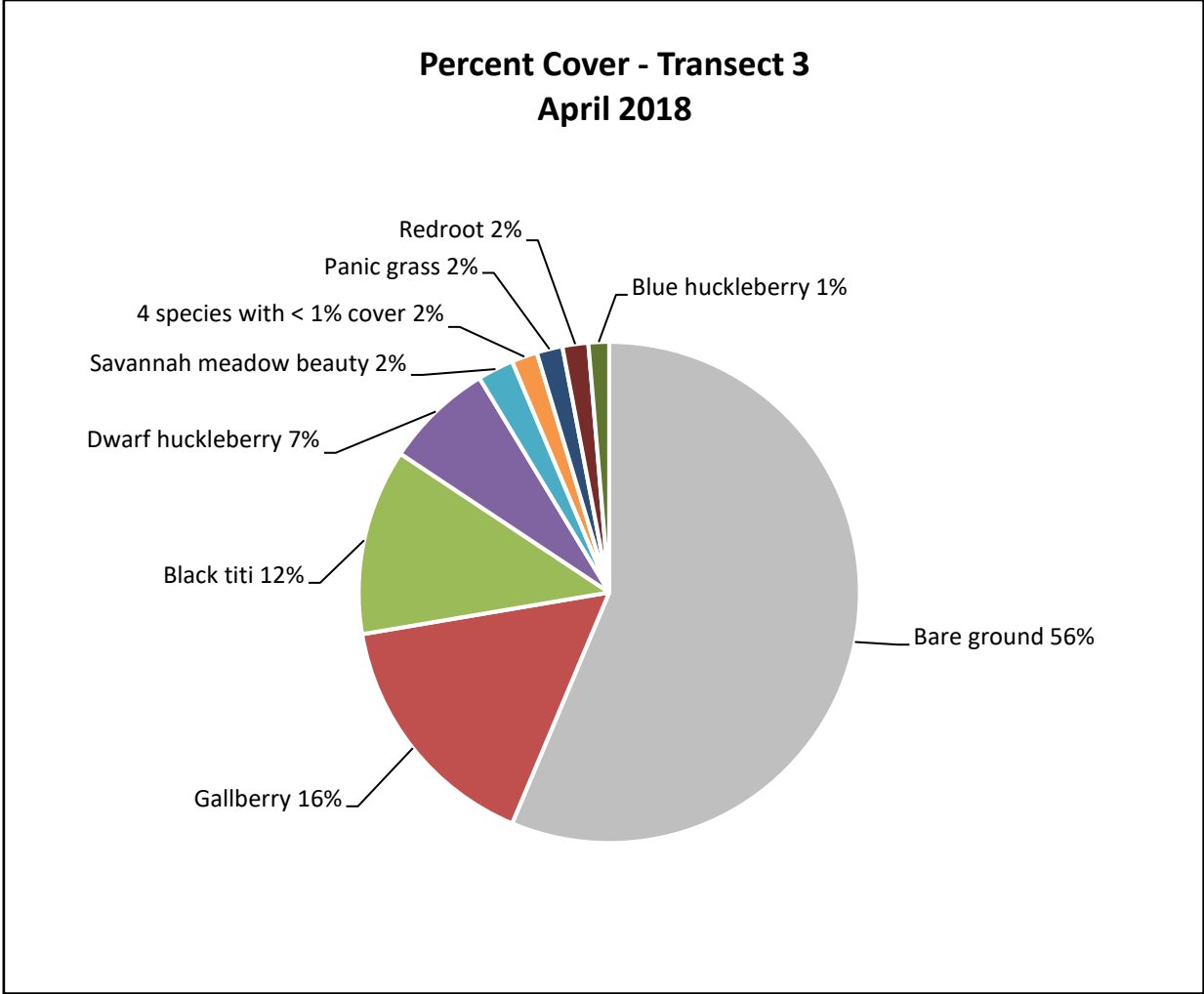


Figure 6. Transect 3, Percent Cover, April 2018

Transect 4 (Hydric Pine Flatwoods)

Nineteen species were observed along Transect 4 (Table 5, Figure 7) during the April 2018 monitoring (14 species were observed during the November 2017 baseline monitoring). Bare ground increased from 35% to 56%. Shrub cover, measured as stems per m², remained effectively constant (51 stems per m² in November 2017 versus 52 stems per m² in April 2018). Running oak and gallberry were dominant species. Wiregrass cover decreased from 5.3% to 2.3%.

Table 5. Transect 4 (April 2018)

Scientific Name	Common Name	Average Percent Cover
<i>Andropogon glomeratus</i>	Bushy bluestem	1.33
<i>Aristida stricta</i>	Wiregrass	2.33
<i>Cliftonia monophylla</i>	Black titi	2.00
<i>Dichantherium aciculare</i>	Needleleaf witch grass	0.33
<i>Euphorbia floridana</i>	Greater Florida spurge	0.33
<i>Gaylussacia dumosa</i>	Dwarf huckleberry	2.00
<i>Gaylussacia frondosa</i>	Blue huckleberry	0.33
<i>Hibiscus aculeatus</i>	Comfortroot	0.67
<i>Ilex glabra</i>	Gallberry	12.00
<i>Lachnanthes caroliana</i>	Redroot	0.67
<i>Quercus pumila</i>	Running oak	15.33
<i>Rhexia alifanus</i>	Savannah meadowbeauty	1.00
<i>Rhus copallinum</i>	Winged sumac	0.33
<i>Rhynchospora plumosa</i>	Plumed nutrush	0.33
<i>Smilax sp.</i>	Greenbriar	0.67
<i>Solidago fistulosa</i>	Pinebarren goldenrod	1.00
<i>Unknown 1</i>	Unknown 1	0.33
<i>Unknown 2</i>	Unknown 2	0.33
<i>Xyris caroliniana</i>	Carolina yelloweyed grass	3.00
<i>zBare ground</i>	Bare ground	55.67
Total		100.00

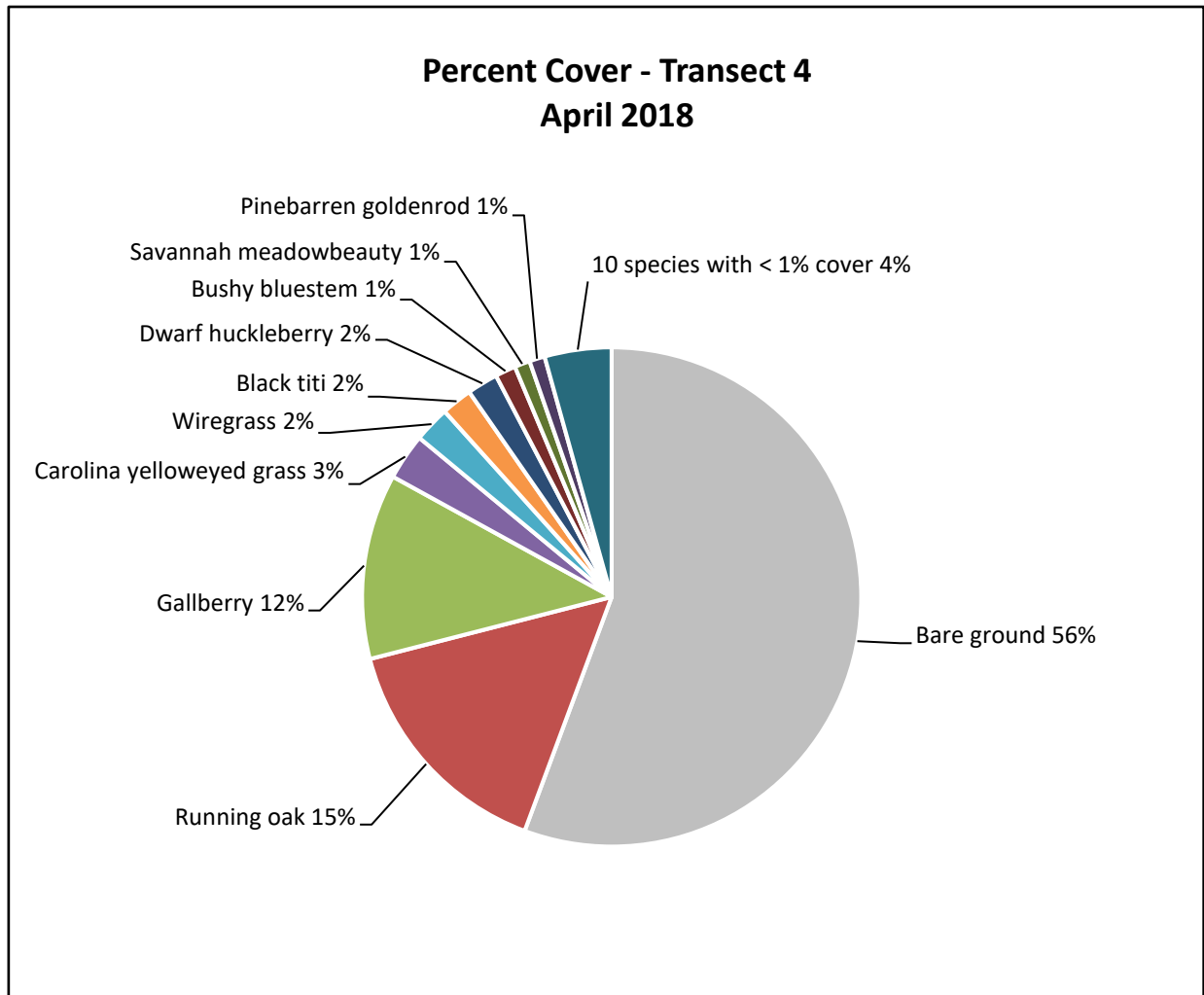


Figure 7. Transect 4, Percent Cover, April 2018

Conclusion

The Sacred Heart mitigation project is typical of natural lands that had been converted to a bedded commercial pine plantation. Most wiregrass and native vegetation were removed during bedding. Commercial tree densities shade out the understory vegetation. Currently only minor components of the natural community remain. In the absence of frequent burns, shrubs have invaded and become the dominant cover. Reduction of tree density to more natural conditions and the re-introduction of frequent burns and shrub reduction are the first steps in restoring this area to a more natural condition.