



**MONITORING YEAR 3  
ANNUAL BUFFER REPORT  
Final**

**SASSARIYA SWAMP MITIGATION SITE**

Johnston County, NC  
NCDEQ Contract No. 7425  
DMS ID No. 100040  
DWR Project No. 2018-0198  
RFP No. 16-007279  
Neuse River Basin  
HUC 03020201

Data Collection Period: September 2023  
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**PREPARED FOR:**



**NC Department of Environmental Quality  
Division of Mitigation Services**

1652 Mail Service Center  
Raleigh, NC 27699-1652

**PREPARED BY:**

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**Wildlands Engineering, Inc.**  
312 West Millbrook Road, Suite 225  
Raleigh, NC 27609

**Jason Lorch**  
jlorch@wildlandseng.com  
Phone: (919) 851-9986

**SASSARIXA SWAMP MITIGATION SITE**  
Monitoring Year 3 Buffer Report

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## Section 1: PROJECT OVERVIEW

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### 1.1 Project Summary

Wildlands Engineering, Inc. (Wildlands) implemented a full delivery project at the Sassarixa Swamp Mitigation Site (Site) for the North Carolina Department of Environmental Quality (NCDEQ) Division of Mitigation Services (DMS). A conservation easement comprised of 65.06 acres along Sassarixa Creek and seven unnamed tributaries to Sassarixa Creek, along with six unnamed tributaries to Black Creek in the Neuse River Basin are included in the project. A total of 55.26 acres (2,407,138 ft<sup>2</sup>) of riparian buffer have been restored, enhanced, or preserved and are expected to generate 1,080,282.590 riparian buffer credits, with potential to convert some buffer credits to nutrient offset credits dependent on the need. The Site is located approximately six miles southwest of Smithfield and five miles north of Four Oaks (Figure 1). Project information and attributes are described in Table 4 located in Appendix 1. The Site drains to Holts Lake, which is a recreational lake classified as Nutrient Sensitive Waters (NSW). Holts Lake then drains to the Neuse River, which is a water supply for the City of Goldsboro.

Work at the Site was planned, designed, and constructed per the Sassarixa Swamp Mitigation Site – Riparian Buffer Mitigation Plan (Wildlands, 2020) and the Consolidated Buffer Mitigation Rule 15A NCAC 02B .0295 (effective November 1, 2015). The purpose of the riparian buffer restoration is to provide riparian buffer credits to compensate for buffer impacts within the Hydrologic Unit Code 03020201. The service area for the riparian buffer credits is depicted in Figure 2. The mitigation credits generated from the Site are included in Table 1 and illustrated in Figure 3 located in Appendix 1.

### 1.2 Project Goals and Objectives

The project includes several adjacent properties that have been owned and operated as a livestock farm by a single family since 1850, where livestock were continually rotated through all fields (with access to their associated streams). The western portion of the project includes Sassarixa Creek and seven unnamed tributaries to Sassarixa Creek (T1, T1A, T1B, T1C, T1D, T2, and T3) (Figure 2). The eastern portion of the site contains six unnamed tributaries to Black Creek (T4, T5, T5A, T5B, T5C, and T6). A review of historic aerials from 1950 to 2012, showed that onsite streams have existed in their approximate locations with very little change to riparian zones since 1950. Two alterations to the Site visible from aerial photography are the addition of the pond on T2 between 1964 and 1973, and the addition of the large pond below T5A, T5B, and T5C, between 1950 and 1961.

The Site is located in a new Targeted Local Watershed (TLW) that is not described in the 2010 Neuse River Basin Restoration Priorities (RBRP) Plan. The TLW was added in the 2015 Neuse 01 Cataloging Unit (CU) Update because there were more water quality issues than assets. The Site addresses the TLW stressors of agricultural land use/animal operations and the lack of protected riparian areas. The project will also address key CU wide restoration goals for the Neuse River 03020201 described in the RBRP (NC DWR 2009). Specific enhancements to water quality and ecological processes are outlined below:

- Decrease nutrient levels - Nutrient input will be decreased by filtering runoff from the agricultural fields through restored native buffer zones. The off-site nutrient input will also be absorbed on-site by dispersing flood flows through native vegetation, thereby reducing nutrient inputs to waters of the Neuse River Basin.
- Exclude cattle from project streams. - Install fencing around project areas adjacent to cattle pastures.
- Decrease water temperature and increase dissolved oxygen concentrations - Establishment and maintenance of riparian buffers will create additional long-term shading of the channel flow to reduce thermal pollution.



- Restore and enhance native floodplain vegetation - Plant native tree species in the riparian zone where they are currently insufficient.
- Permanently protect the Site from harmful uses - Establish a conservation easement on the Site. Protect aquatic habitat; by protecting water supply waters.

The 65.06-acre Site is protected with a permanent conservation easement. Of the 65.06 acres, Neuse riparian buffer credits were generated by restoring 10.03 acres, enhancing 34.41 acres, and preserving 10.82. No buffer credit will be generated from the remaining 9.80 acres. In general, riparian buffer restoration area widths on streams extend out to 50 feet from top of bank on each side of the stream channel. Figure 3 and Table 1 in Appendix 1 detail the buffer credit generation.

### 1.3 Monitoring Year 3 Data Assessment

The Mitigation Plan (Wildlands, 2019) was submitted and accepted by DMS in November 2019. Construction activities by Land Mechanic Designs, Inc. were completed in January 2021, while tree planting by Bruton Natural Systems, Inc. was completed in March 2021. The baseline as-built survey was completed by Kee Mapping and Surveying in February 2021. Refer to Appendix 1 for detailed project activity, history, contact information, and watershed/site background information.

Vegetative performance for buffer restoration areas will be in accordance with 15A NCAC 02B .0295(n)(2)(B), and (n)(4) (effective November 1, 2015). To meet success criteria, areas generating buffer mitigation credits shall include a minimum of four native hardwood tree species, where no one species is greater than 50 percent of stems, and shall have a survival of at least 260 planted stems per acre at the end of the required five-year monitoring period. For monitoring to be completed and buffer credit to be awarded, NCDWR must provide written approval of successful revegetation of buffer restoration areas. Year 3 monitoring (MY3) was conducted to assess the condition of the vegetation in September 2023.

#### 1.3.1 Vegetative Assessment

The quantity of monitoring vegetation plots was determined in accordance with the Wilmington District Stream and Wetland Compensatory Mitigation Update (NCIRT, 2016) such that at least 2 percent of the Site is encompassed in monitoring plots. A total of 10 vegetation plots (each 100 square meters) were established within the conservation easement boundaries. The plot corners have been marked and are recoverable either through field identification or with the use of a GPS unit. Reference photographs are taken at the origin looking diagonally across the plot to the opposite corner on an annual basis. Trees will be marked annually with flagging tape. Species composition, vigor, height, density, and survival rates will be evaluated by plot on an annual basis. The extent of invasive species coverage will also be monitored and controlled as necessary.

The MY3 vegetation monitoring was completed in September 2023, resulting in an average survival of 427 planted stems per acre. The Site is exceeding the final requirement of 260 stems per acre, with 9 of the 10 plots individually exceeding this requirement. The planted stem mortality was approximately 25% of the baseline stem count (566 stems per acre) in March 2021. There is an average of 10 stems per plot. Vegetation plot 2 is not on track to meet the final success requirement with 243 stems per acre, but is barely below the success criteria. Mortality is contributed to competition from dense herbaceous grass and a dry spring when the trees were originally planted in 2021. Refer to Appendix 2 for the vegetation condition assessment table, monitoring plan view maps, vegetation plot and overview photographs. Appendix 3 contains vegetation plot data and vegetation plot performance summary table.



### 1.3.2 Vegetation Areas of Concern

Approximately 0.55 acres along T1 was identified as an area of low stem density in MY2. A supplemental planting of the area was approved in MY2 and conducted in February 2023 (Figure 4a). The supplementally planted species were the same from the approved Mitigation Plan (Table 9b). Ring sprays were completed throughout the supplementally planted area and soil amendments were applied locally to replanted trees to reduce competition and aid in planted stem success. Ring sprays and soil amendments will be completed in MY4 in the supplementally planted areas as well as any areas where the herbaceous vegetation is affecting tree growth.

An invasive species treatment was completed in May 2023 to address a dense population of Chinese privet (*Ligustrum sinense*) along Sassarixa Creek Reach 3 and scattered stems throughout the remainder of the Site. A combination of methods included foliar and cut stump applications. Approximately 4.97 acres at the downstream reach of Sassarixa Creek was treated and may require additional treatment in MY4 if regrowth occurs (Figure 4a). The Site will continue to be monitored for invasive species and follow up treatments will occur if necessary.

A dense stand of sweetgum (*Liquidambar styraciflua*) and loblolly pine (*Pinus taeda*) covering approximately 0.70 acres became established along T1 and T1B. This area was treated, and individuals of both species were thinned in May 2023 by brush cutting. The Site will continue to be monitored for additional dense populations of sweetgum and loblolly pine and follow up treatments will occur if necessary.

## 1.4 Monitoring Year 3 Summary

Overall, the Site has exceeded the required vegetation success criteria for MY3. Nine of ten vegetation plots exceed the final success criteria, with vegetation plot 2 falling just short of the final success criteria. A supplemental planting on 0.55 acres was completed in February 2023 to accommodate for tree mortality along T1. Some mature trees that were avoided during construction were starting to decline in 2022, however their condition was stable in 2023 and a new understory layer is continuing to establish. An approximately 4.97 acre dense stand of Chinese privet along Sassarixa Creek Reach 3, as well as scattered stems throughout the remainder of the Site were treated in May 2023. Chinese privet throughout the Site will continue to be monitored and treated as necessary. The rest of the Site's vegetation layer established quickly and is greatly reducing the amount of nutrients and sediment entering the project streams. The Site boundary was walked, and fences are in good condition and are keeping livestock out.

Summary information/data related to the performance of various project and monitoring elements can be found in the tables and figures in the report appendices. Narrative background and supporting information, formerly found in these reports, can be found in the Mitigation Plan (Wildlands, 2019) available on DMS's website. All raw data supporting the tables and figures in the appendices are available from DMS upon request.



## Section 2: REFERENCES

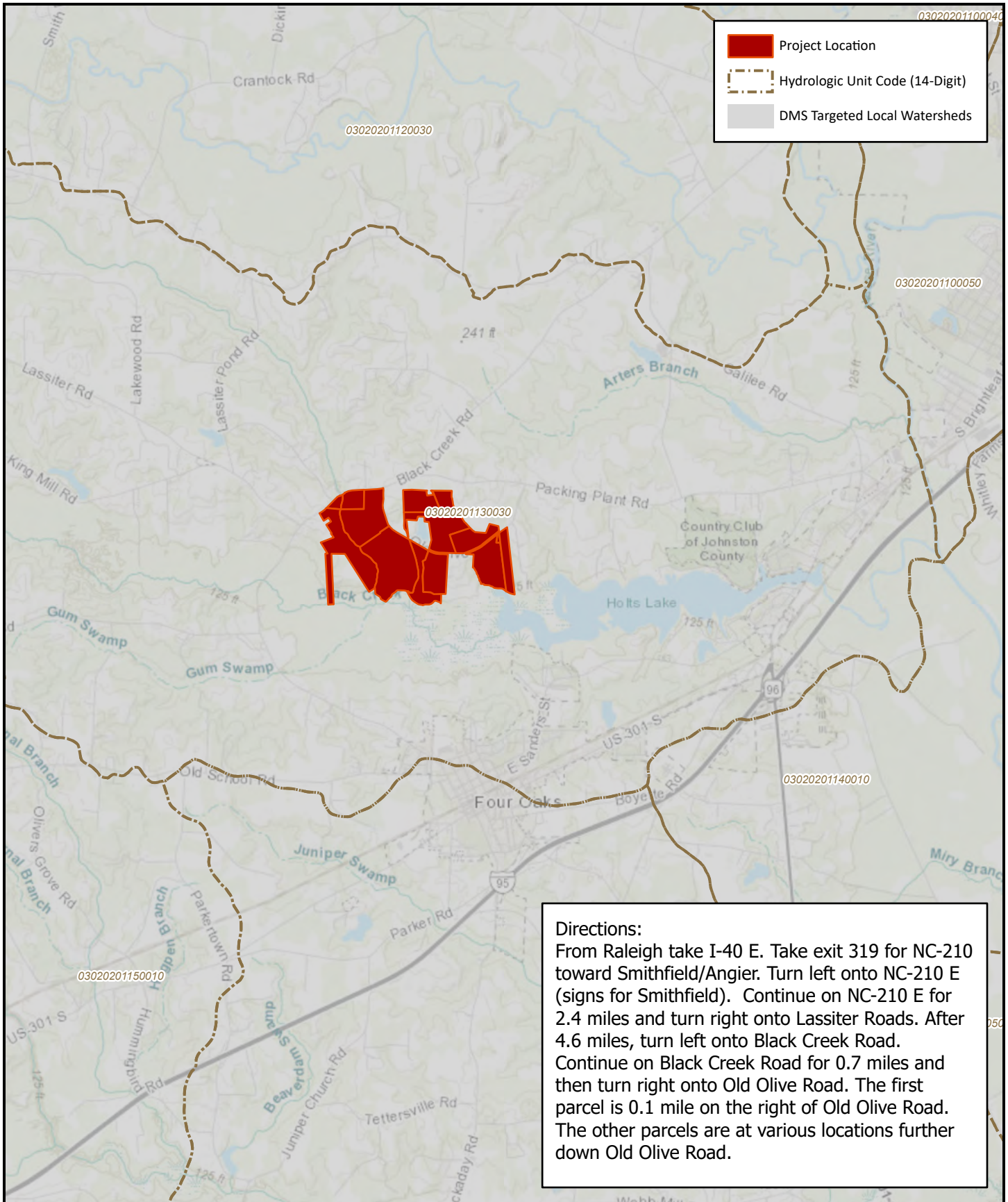
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- Breeding, R. 2010. Neuse River Basin Restoration Priorities. North Carolina Ecosystem Enhancement Program.
- Natural Resources Conservation Service (NRCS), 2011. Web Soil Survey.
- North Carolina Department of Environmental Quality, Division of Mitigation Services (NCDMS). 2017. Riparian Buffer and Nutrient Offset Buffer Baseline and Annual Monitoring Report Template version 2.0
- North Carolina Department of Environmental Quality, Division of Water Resources (NCDWR). 2000. 15A NCAC 02B .0233 Neuse River Basin: Nutrient Sensitive Waters Management Strategy: Protection and Maintenance of Existing Riparian Buffers.
- North Carolina Department of Environmental Quality, Division of Water Resources (NCDWR). 2015. 15A NCAC 02B .0295 Mitigation Program Requirements for Protection and Maintenance of Riparian Buffers.
- North Carolina Department of Environmental Quality, Division of Water Resources (NCDWR). 2011. Surface Water Classifications.
- North Carolina Interagency Review Team (NCIRT). 2016. Wilmington District Stream and Wetland Compensatory Mitigation Update.
- Wildlands Engineering, Inc. (2019). Sassarixa Swamp Mitigation Site – Riparian Buffer Mitigation Plan. North Carolina Department of Environmental Quality, Division of Mitigation Services (NCDMS), Raleigh, NC.



## **APPENDIX 1. GENERAL FIGURES AND TABLES**



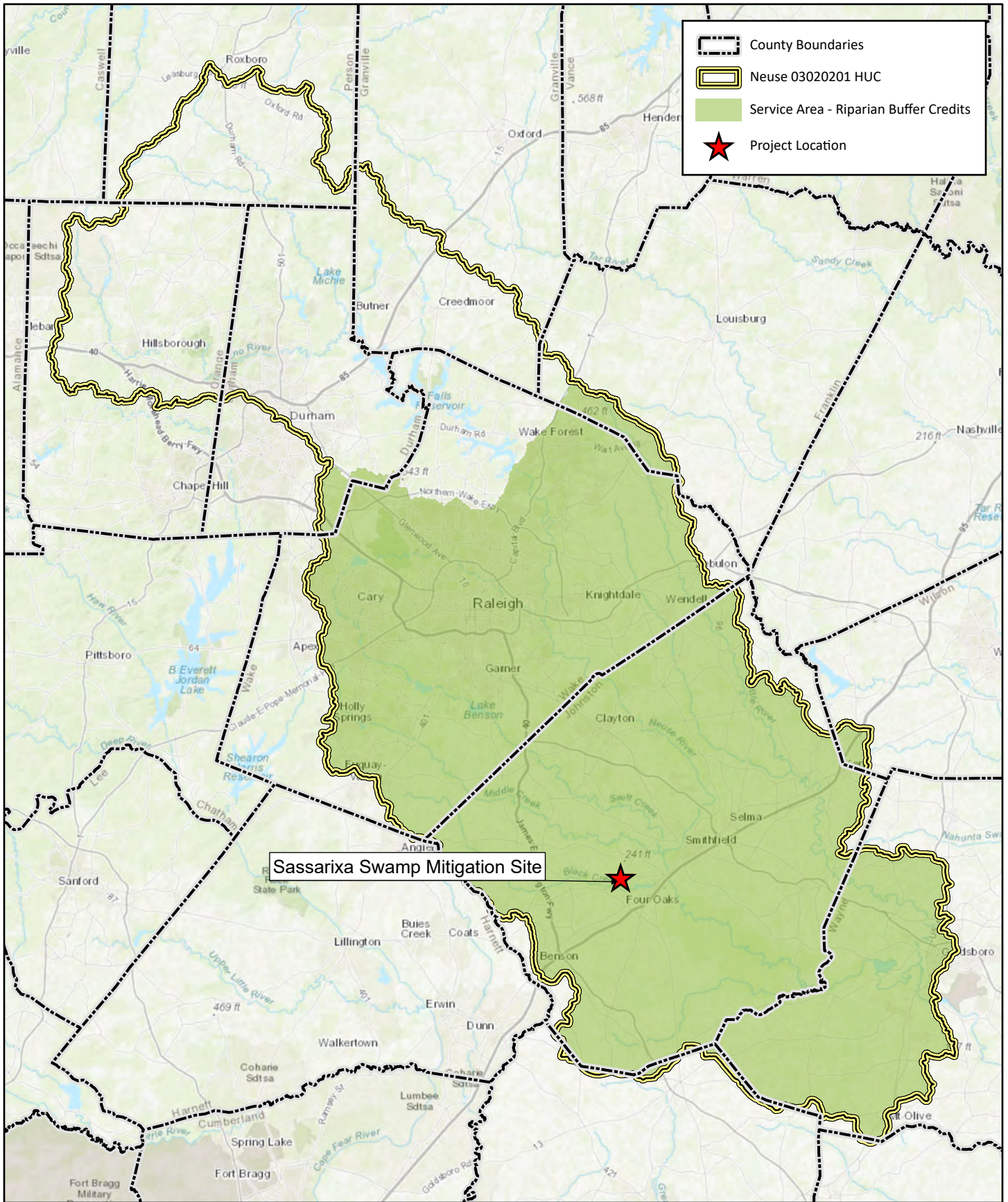


0 0.5 1 Miles



Figure 1. Vicinity Map  
 Sassarixa Swamp Mitigation Site  
 Monitoring Year 3 - 2023  
 Neuse River Basin 03020201

Johnston County, NC



Sassarixa Swamp Mitigation Site

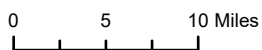
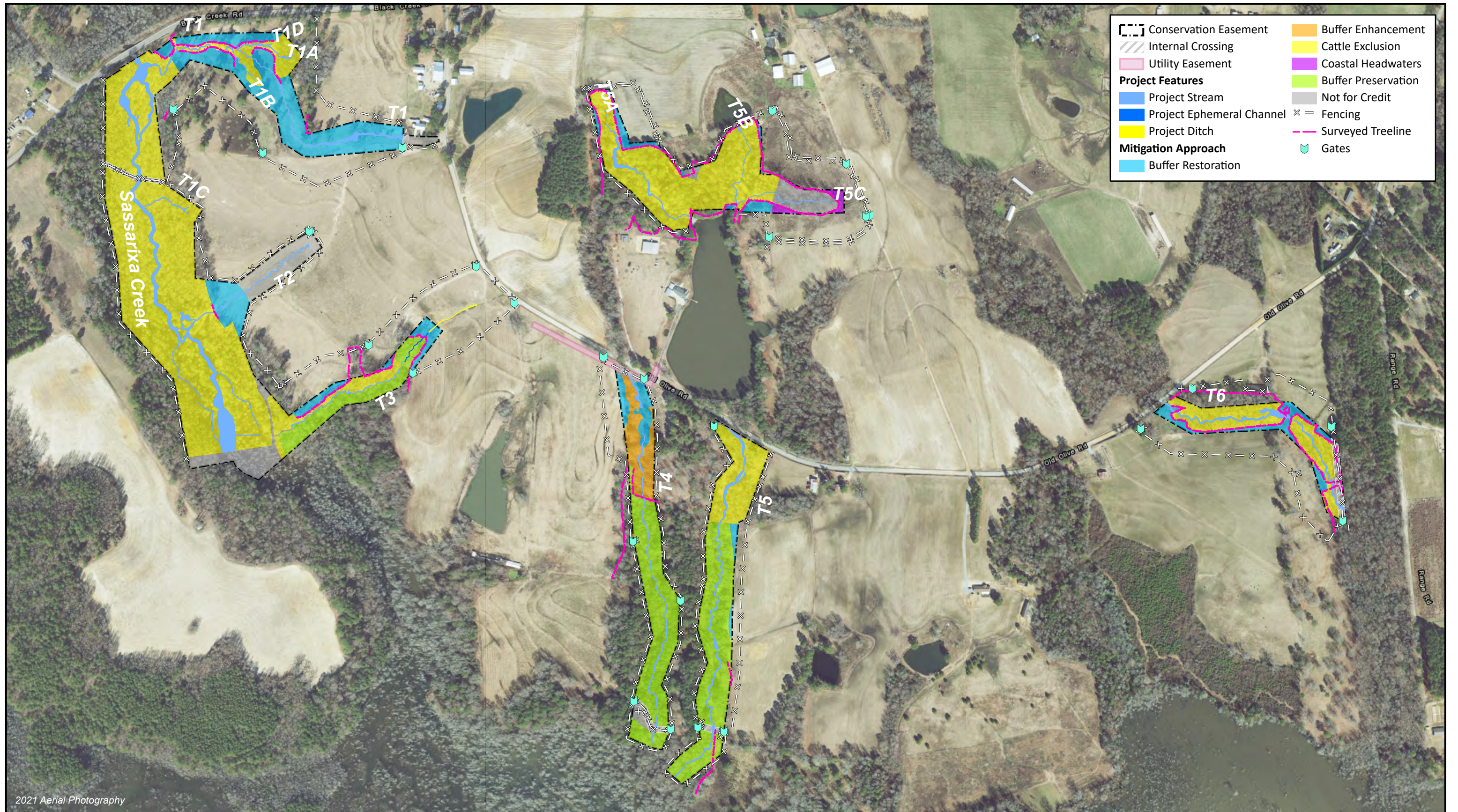


Figure 2. Service Area Map  
 Sassarixa Swamp Mitigation Site  
 Monitoring Year 3 - 2023  
 Neuse River Basin 03020201

Johnston County, NC



2021 Aerial Photography



0 500 1,000 Feet



Figure 3. Project Component / Asset Map  
 Sassarixa Swamp Mitigation Site  
 Monitoring Year 3 - 2023  
 Neuse River Basin (03020201)

Johnston County, NC

**Table 1a. Mitigation Credits**

Sassarixa Swamp Mitigation Site  
 DMS Project No. 100040  
 Monitoring Year 3 - 2023

Neuse 03020201 - Outside Falls Lake				Project Area												
#N/A				N Credit Conversion Ratio (ft <sup>2</sup> /pound)												
#N/A				P Credit Conversion Ratio (ft <sup>2</sup> /pound)												
Credit Type	Location	Subject? (enter NO if ephemeral or ditch <sup>1</sup> )	Feature Type	Mitigation Activity	Min-Max Buffer Width (ft)	Feature Name	Total Area (ft <sup>2</sup> )	Total (Creditable) Area of Buffer Mitigation (ft <sup>2</sup> )	Initial Credit Ratio (x:1)	% Full Credit	Final Credit Ratio (x:1)	Convertible to Riparian Buffer?	Riparian Buffer Credits	Convertible to Nutrient Offset?	Delivered Nutrient Offset: N (lbs)	Delivered Nutrient Offset: P (lbs)
Buffer	Rural	Yes	I / P	Restoration	0-50	T4	3,667	3,667	1	100%	1.00000	Yes	3,667.000	No	—	—
Buffer	Rural	Yes	I / P	Restoration	0-100	T1, T1A, T1B, T2, T4, T5, T5A, T5B, T6	356,716	356,716	1	100%	1.00000	Yes	356,716.000	Yes	18,613.918	—
Buffer	Rural	Yes	I / P	Restoration	101-200	T2, T4, T5A, T5B	48,375	48,375	1	33%	3.03030	Yes	15,963.766	Yes	2,524.272	—
Buffer	Rural	No	Ephemeral	Restoration	0-100	T3	15,114	15,114	1	100%	1.00000	Yes	15,114.000	Yes	788.669	—
Buffer	Rural	Yes	Coastal Headwater	Restoration	0-100	T5C	13,073	13,073	1	100%	1.00000	Yes	13,073.000	No	—	—
Buffer	Rural	Yes	I / P	Enhancement	0-50	T4	217	217	2	100%	2.00000	Yes	108.500	Yes	11.323	—
Buffer	Rural	Yes	I / P	Enhancement	0-100	T4	59,812	59,812	2	100%	2.00000	Yes	29,906.000	Yes	3,121.070	—
Buffer	Rural	Yes	I / P	Enhancement	101-200	T4	3,129	3,129	2	33%	6.06061	Yes	516.285	Yes	163.275	—
Buffer	Rural	Yes	I / P	Enhancement via Cattle Exclusion	20-29	Sassarixa Creek, T5	735	735	2	75%	2.66667	Yes	275.625	No	—	—
Buffer	Rural	Yes	I / P	Enhancement via Cattle Exclusion	0-50	Sassarixa Creek, T5, T6	6,000	6,000	2	100%	2.00000	Yes	3,000.000	No	—	—
Buffer	Rural	Yes	I / P	Enhancement via Cattle Exclusion	0-100	Sassarixa Creek, T1, T1A, T1B, T1C, T2, T3, T5, T5A, T5B, T6	1,070,780	1,070,780	2	100%	2.00000	Yes	535,390.000	No	—	—
Buffer	Rural	Yes	I / P	Enhancement via Cattle Exclusion	101-200	Sassarixa Creek, T1A, T2, T3, T5, T5A, T5C	358,197	358,197	2	33%	6.06061	Yes	59,102.467	No	—	—
<b>Totals (ft<sup>2</sup>):</b>							<b>1,935,815</b>	<b>1,935,815</b>					<b>1,032,832.642</b>	<b>25,222.527</b>		<b>—</b>
<b>Total Buffer (ft<sup>2</sup>):</b>							<b>1,935,815</b>	<b>1,935,815</b>								
<b>Total Nutrient Offset (ft<sup>2</sup>):</b>							<b>0</b>	<b>N/A</b>								

<b>Total Ephemeral Area (ft<sup>2</sup>) for Credit:</b>	<b>20,358</b>	<b>20,358</b>	
<b>Total Eligible Ephemeral Area (ft<sup>2</sup>):</b>	<b>601,785</b>	<b>0.8%</b>	<b>Ephemeral Reaches as % TABM</b>
<b>Total Eligible for Preservation (ft<sup>2</sup>):</b>	<b>645,272</b>	<b>18.3%</b>	<b>Preservation as % TABM</b>

Enter Preservation Credits Below

Credit Type	Location	Subject?	Feature Type	Mitigation Activity	Min-Max Buffer Width (ft)	Feature Name	Total Area (sf)	Total (Creditable) Area for Buffer Mitigation (ft <sup>2</sup> )	Initial Credit Ratio (x:1)	% Full Credit	Final Credit Ratio (x:1)	Riparian Buffer Credits
Buffer	Rural	Yes	I / P	Preservation	20-29	T4	750	750	10	75%	13.33333	56.250
	Rural	Yes	I / P		0-50	T4, T5	1,847	1,847	10	100%	10.00000	184.700
	Rural	Yes	I / P		0-100	T3, T4, T5	460,676	460,676	10	100%	10.00000	46,067.600
	Rural	Yes	I / P		101-200	T4	2,806	2,806	10	33%	30.30303	92.598
	Rural	No	Ephemeral		0-100	T3	5,244	5,244	5	100%	5.00000	1,048.800
<b>Preservation Area Subtotals (ft<sup>2</sup>):</b>							<b>471,323</b>	<b>471,323</b>				

**Table 1b. Total Area of Buffer and Nutrient Offset Mitigation**

Sassarixa Swamp Mitigation Site

DMS Project No. 100040

**Monitoring Year 3 - 2023**

<b>TOTAL AREA OF BUFFER MITIGATION (TABM)</b>		
<b>Mitigation Totals</b>	<b>Square Feet</b>	<b>Credits</b>
<b>Restoration:</b>	436,945	404,533.766
<b>Enhancement:</b>	1,498,870	628,298.876
<b>Preservation:</b>	471,323	47,449.948
<b>Total Riparian Buffer:</b>	2,407,138	1,080,282.590
<b>TOTAL NUTRIENT OFFSET MITIGATION</b>		
<b>Mitigation Totals</b>	<b>Square Feet</b>	<b>Credits</b>
<b>Nutrient Offset:</b>	<b>Nitrogen:</b>	0.000
	<b>Phosphorus:</b>	0.000

**Table 2. Project Activity and Reporting History**

Sassarixa Swamp Mitigation Site

DMS Project No. 100040

**Monitoring Year 3 - 2023**

Activity or Deliverable	Data Collection Complete	Task Completion or Deliverable Submission
Project Instituted	NA	January 2018
Mitigation Plan Approved	November 2019	November 2019
Construction (Grading) Completed	NA	January 2021
Planting Completed	NA	March 2021
Baseline Monitoring Document (Year 0)	March 2021	July 2021
Easement Encroachment		July 2021
Year 1 Monitoring	September 2021	December 2021
UT6 Supplemental Planting		February 2022
Year 2 Monitoring	September 2022	December 2022
T1 Supplemental Planting		February 2023
Invasive Species Removal		May 2023
Sweetgum & Loblolly Thinning		May 2023
Year 3 Monitoring	September 2023	December 2023
Year 4 Monitoring	2024	December 2024
Year 5 Monitoring	2025	December 2025

**Table 3. Project Contact Table**

Sassarixa Swamp Mitigation Site

DMS Project No. 100040

**Monitoring Year 3 - 2023**

<b>Designer</b> Angela Allen, PE	<b>Wildlands Engineering, Inc.</b> 312 West Millbrook Road, Suite 225 Raleigh, NC 27609 919.851.9986
<b>Construction Contractor</b>	<b>Land Mechanic Designs, Inc.</b> 126 Circle G Lane Willow Spring, NC 27592
<b>Monitoring Performers</b> Monitoring, POC	<b>Wildlands Engineering, Inc.</b> Jason Lorch 919.851.9986

**Table 4. Project Information and Attributes**

Sassarixa Swamp Mitigation Site

DMS Project No. 100040

**Monitoring Year 3 - 2023**

Project Information	
Project Name	Sassarixa Swamp Mitigation Site
County	Johnston County
Project Coordinates (latitude and longitude)	35° 28' 19.75" N, 78° 26' 9.60" W
Project Area (acres)	65.06
Planted Acreage (acres of woody stems planted)	13.03
Project Watershed Summary Information	
Physiographic Province	Rolling Coastal Plains
River Basin	Neuse River
USGS Hydrologic Unit 8-digit	03020201
USGS Hydrologic Unit 14-digit	03020201130030
DWR Sub-basin	03-04-04
Project Drainage Area (acres)	5,024
Project Drainage Area Percentage of Impervious Area	0.9%
CGIA Land Use Classification	66% agriculture, 27% forested, 7% developed

**Table 5. Adjacent Forested Areas Existing Tree and Shrub Species**

Sassarixa Swamp Mitigation Site

DMS Project No. 100040

**Monitoring Year 3 - 2023**

Common Name	Scientific Name	Wetland Indicator Status
Red Maple	<i>Acer rubrum</i>	FAC
Sweet Gum	<i>Liquidambar styraciflua</i>	FAC
Sycamore	<i>Platanus occidentalis</i>	FACW
Ironwood	<i>Carpinus caroliniana</i>	FAC
Water Oak	<i>Quercus nigra</i>	FAC
Willow Oak	<i>Quercus phellos</i>	FACW
Black Willow	<i>Salix nigra</i>	OBL
Tulip Poplar	<i>Liriodendron tulipifera</i>	FACU

**Table 6. Planted Tree Species**

Sassarixa Swamp Mitigation Site

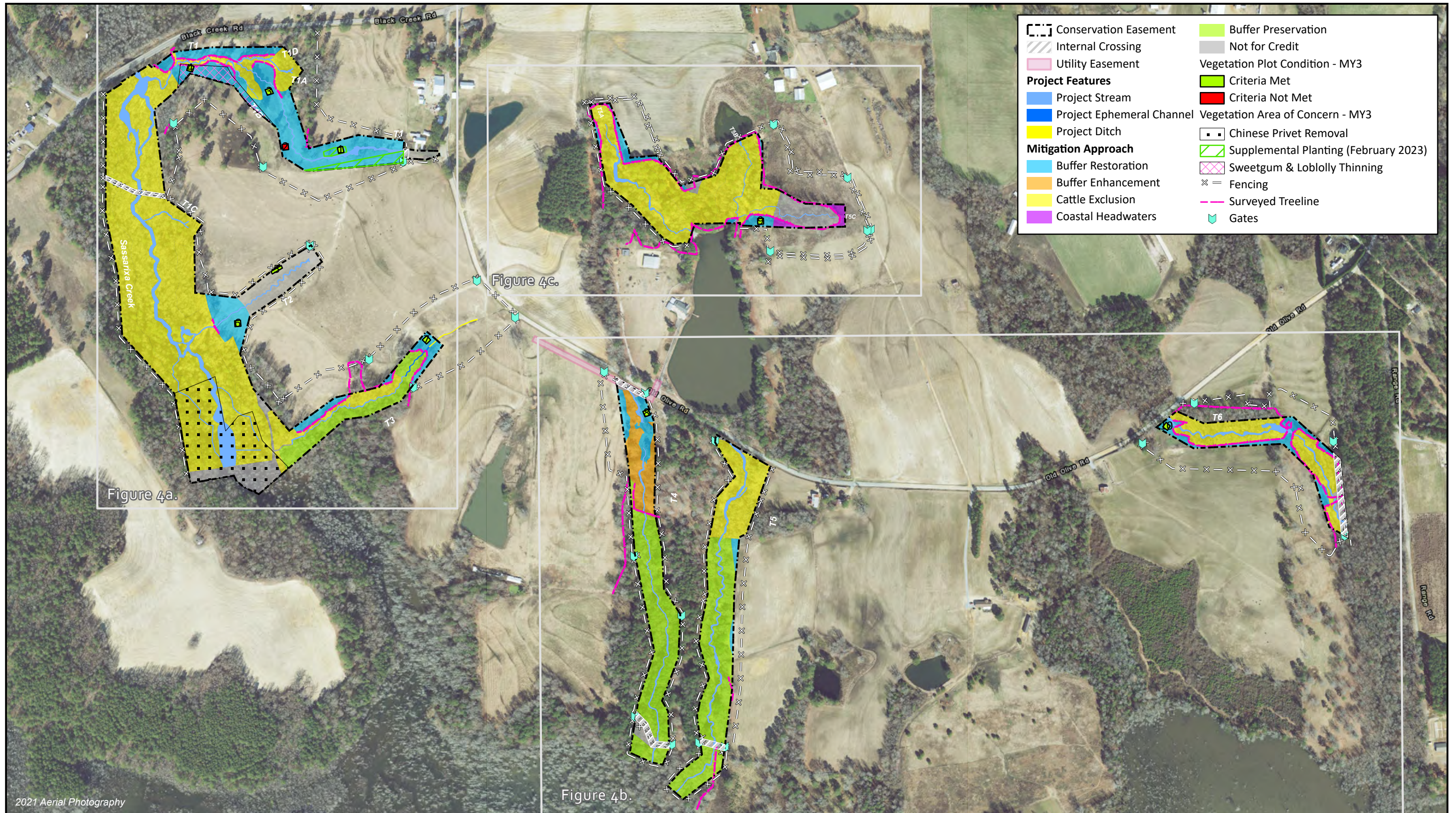
DMS Project No. 100040

**Monitoring Year 3 - 2023**

Common Name	Scientific Name	Number Planted	% of Total
Willow Oak	<i>Quercus phellos</i>	1,379	14.3%
Sycamore	<i>Platanus occidentalis</i>	1,907	19.8%
River Birch	<i>Betula nigra</i>	1,907	19.8%
Water Oak	<i>Quercus nigra</i>	551	5.7%
Swamp Chestnut Oak	<i>Quercus michauxii</i>	1,396	14.5%
Eastern Cottonwood	<i>Populus deltoides</i>	540	5.6%
Box Elder	<i>Acer negundo</i>	1,350	14.0%
Sweetbay Magnolia	<i>Magnolia virginiana</i>	463	4.8%
Cherrybark Oak	<i>Quercus pagoda</i>	66	0.7%
American Elm	<i>Ulmus alata</i>	33	0.3%
Black Willow	<i>Salix nigra</i>	55	0.6%

## **APPENDIX 2. VISUAL ASSESSMENT DATA**



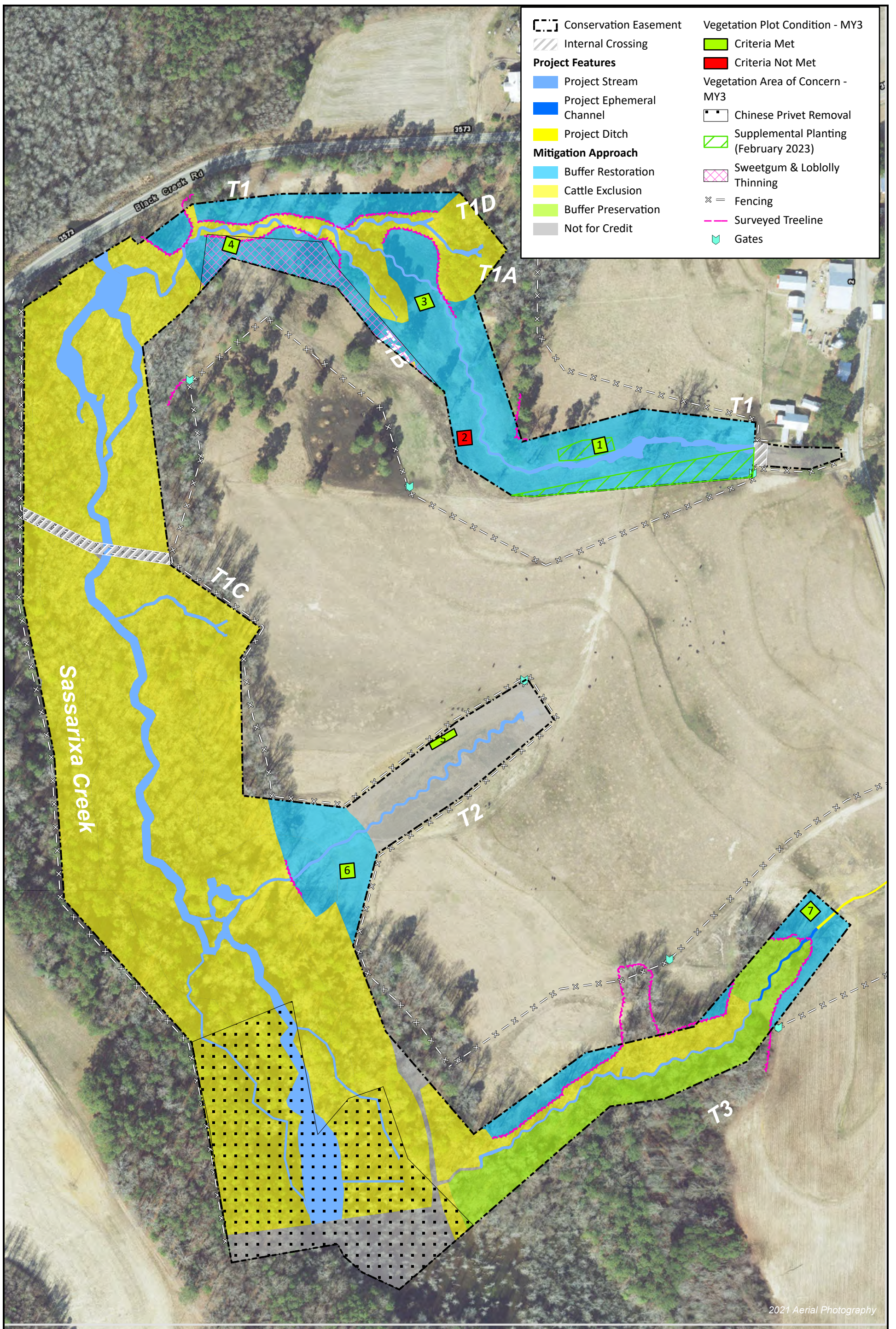


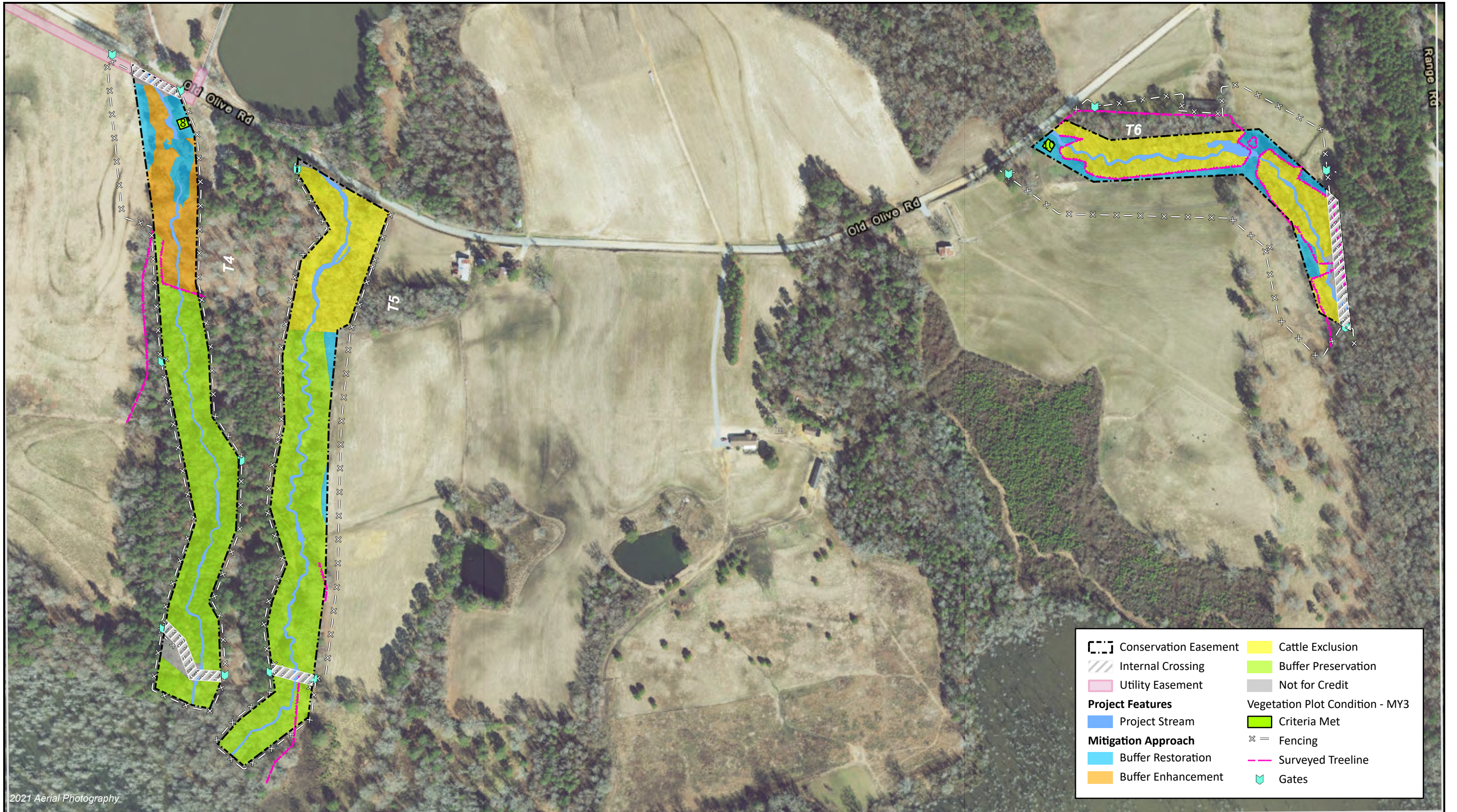
2021 Aerial Photography

0 500 1,000 Feet



Figure 4. Monitoring Plan View Map Key  
Sassarixa Swamp Mitigation Site  
Monitoring Year 3 - 2023  
Neuse River Basin (03020201)





2021 Aerial Photography

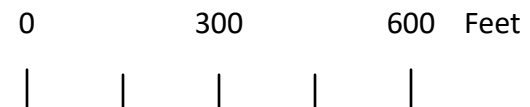
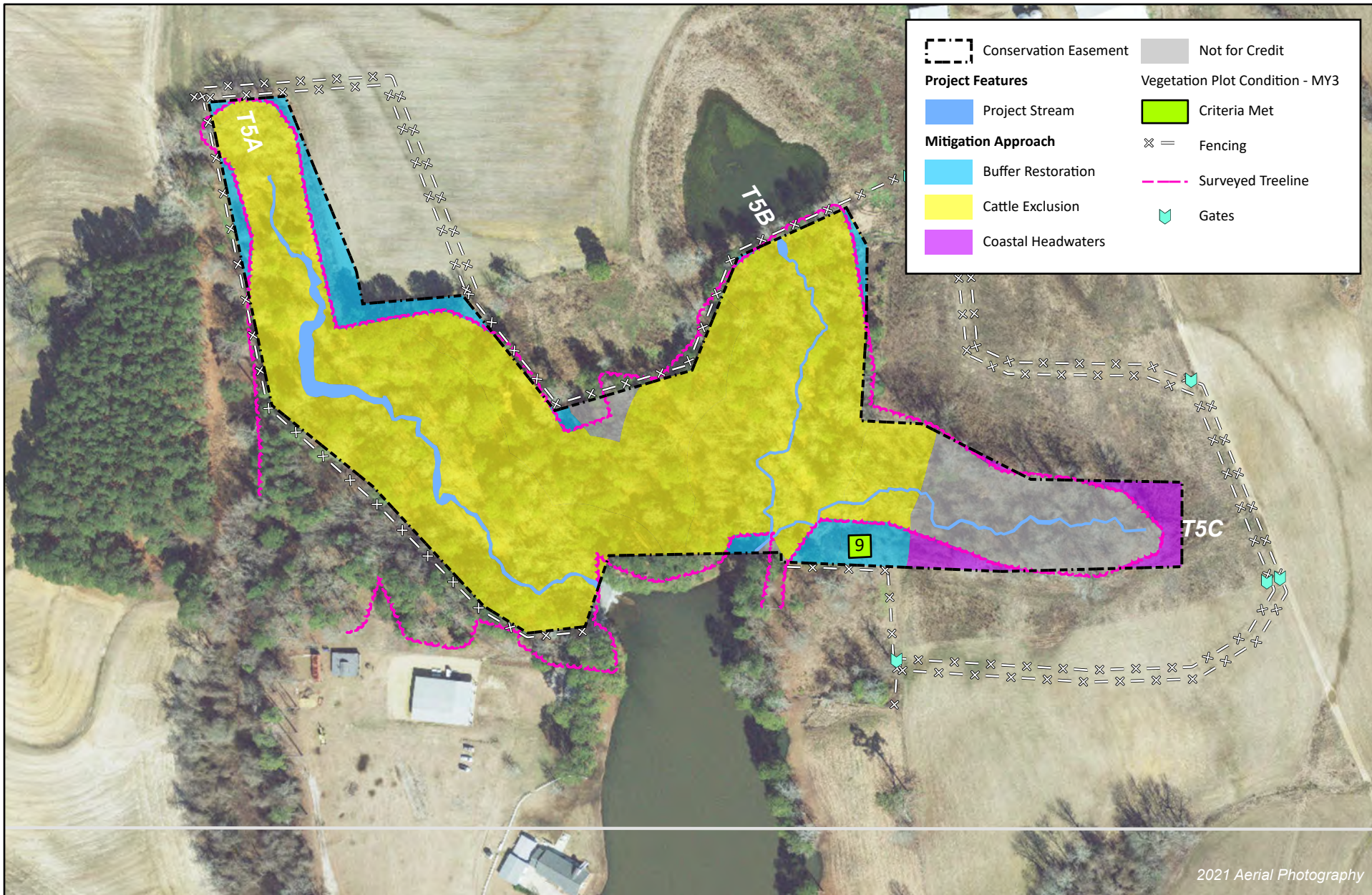


Figure 4b. Monitoring Plan View Map  
 Sassarixa Swamp Mitigation Site  
 Monitoring Year 3 - 2023  
 Neuse River Basin (03020201)

Johnston County, NC



**Table 7. Vegetation Condition Assessment Table**

Sassarixa Swamp Mitigation Site  
 DMS Project No. 100040  
 Monitoring Year 3 - 2023

**Planted Acreage 13.03**

Vegetation Category	Definitions	Mapping Threshold (ac)	Combined Acreage	% of Planted Acreage
<b>Bare Areas</b>	Very limited cover of both woody and herbaceous material.	0.10	0	0%
<b>Low Stem Density Areas</b>	Woody stem densities clearly below target levels based on current MY stem count criteria.	0.10	0.55	4%
<b>Total</b>			<b>0.55</b>	<b>4%</b>
<b>Areas of Poor Growth Rates</b>	Planted areas where average height is not meeting current MY Performance Standard.	0.10	0	0%
<b>Cumulative Total</b>			<b>0.55</b>	<b>4%</b>

**Easement Acreage 65.06**

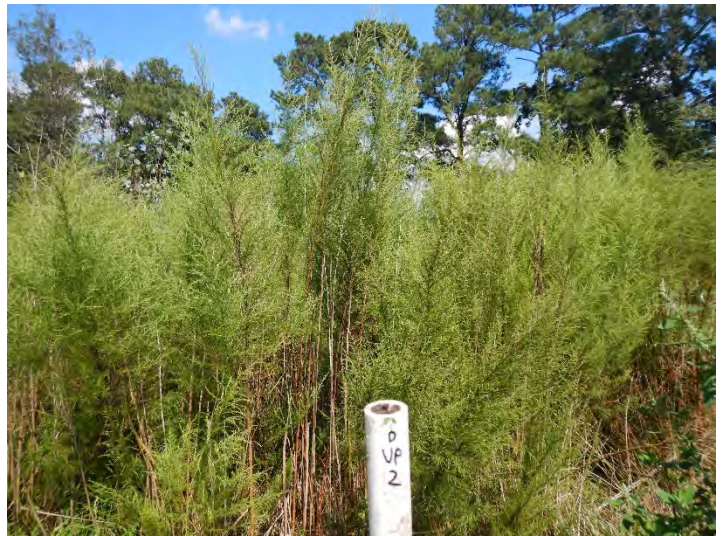
Vegetation Category	Definitions	Mapping Threshold (ac)	Combined Acreage	% of Easement Acreage
<b>Invasive Areas of Concern</b>	Invasives may occur outside of planted areas and within the easement and will therefore be calculated against the total easement acreage. Include species with the potential to directly outcompete native, young, woody stems in the short-term or community structure for existing communities. Invasive species included in summation above should be identified in report summary.	0.10	4.97*	8%
<b>Easement Encroachment Areas</b>	Encroachment may be point, line, or polygon. Encroachment to be mapped consists of any violation of restrictions specified in the conservation easement. Common encroachments are mowing, cattle access, vehicular access. Encroachment has no threshold value as will need to be addressed regardless of impact area.	none	0 acres	

\*Chinese privet (*Ligustrum sinense*) resprouted throughout an existing mature canopy forest along Sassarixa Creek and was treated March 2023.

**VEGETATION PLOT PHOTOGRAPHS**



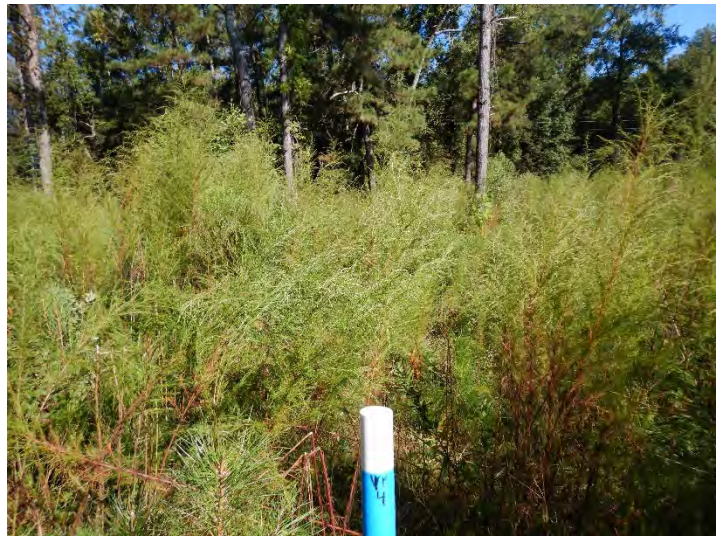
**FIXED VEG PLOT 1 (9/14/2023)**



**FIXED VEG PLOT 2 (9/14/2023)**



**FIXED VEG PLOT 3 (9/19/2023)**



**FIXED VEG PLOT 4 (9/19/2023)**



**FIXED VEG PLOT 5 (9/19/2023)**



**FIXED VEG PLOT 6 (9/19/2023)**





**FIXED VEG PLOT 7** (9/19/2023)



**FIXED VEG PLOT 8** (9/19/2023)



**FIXED VEG PLOT 9** (9/19/2023)



**FIXED VEG PLOT 10** (9/20/2023)





## **OVERVIEW PHOTOGRAPHS**



9/14/2023



9/14/2023



**Sassarixa Swamp Mitigation Site**

Appendix 2: Visual Assessment Data - Overview Photographs



9/14/2023



9/14/2023



**Sassarixa Swamp Mitigation Site**

Appendix 2: Visual Assessment Data - Overview Photographs



9/14/2023



9/14/2023



**Sassarixa Swamp Mitigation Site**

Appendix 2: Visual Assessment Data - Overview Photographs

### **APPENDIX 3. VEGETATION PLOT DATA**

**Table 8. Vegetation Plot Data**

Sassarixa Swamp Mitigation Site

DMS Project No. 100040

Monitoring Year 3 - 2023

Planted Acreage	13.03
Date of Initial Plant	2021-03-05
Date(s) of Supplemental Plant(s)	2023-02-13
Date of Current Survey	2023-09-21
Plot size (ACRES)	0.0247

	Scientific Name	Common Name	Tree/Shrub	Indicator Status	Veg Plot 1 F		Veg Plot 2 F		Veg Plot 3 F		Veg Plot 4 F		Veg Plot 5 F	
					Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total
Species Included in Approved Mitigation Plan	<i>Acer negundo</i>	boxelder	Tree	FAC	1	1			1	1	1	1	1	1
	<i>Betula nigra</i>	river birch	Tree	FACW	2	2			4	4	1	1	2	2
	<i>Magnolia virginiana</i>	sweetbay	Tree	FACW			1	1			1	1	1	1
	<i>Platanus occidentalis</i>	American sycamore	Tree	FACW	1	1	1	1	4	4	2	2	3	3
	<i>Populus deltoides</i>	eastern cottonwood	Tree	FAC			3	3			1	1	1	1
	<i>Quercus michauxii</i>	swamp chestnut oak	Tree	FACW	1	1			2	2	3	3	1	1
	<i>Quercus nigra</i>	water oak	Tree	FAC	1	1	1	1			1	1		
	<i>Quercus phellos</i>	willow oak	Tree	FACW	1	1			3	3	3	3	2	2
Sum	Performance Standard				7	7	6	6	14	14	13	13	11	11
Post Mitigation Plan Species	<i>Liquidambar styraciflua</i>	sweetgum	Tree	FAC										
Sum	Proposed Standard				7	7	6	6	14	14	13	13	11	11
Mitigation Plan Performance Standard	Current Year Stem Count					7		6		14		13		11
	Stems/Acre					283		243		567		526		445
	Species Count					6		4		5		8		7
	Dominant Species Composition (%)					29		50		29		23		27
	Average Plot Height (ft.)					2		3		3		1		3
	% Invasives					0		0		0		0		0
Post Mitigation Plan Performance Standard	Current Year Stem Count					7		6		14		13		11
	Stems/Acre					283		243		567		526		445
	Species Count					6		4		5		8		7
	Dominant Species Composition (%)					29		50		29		23		27
	Average Plot Height (ft.)					2		3		3		1		3
	% Invasives					0		0		0		0		0

**Table 8. Vegetation Plot Data**

Sassarixa Swamp Mitigation Site

DMS Project No. 100040

**Monitoring Year 3 - 2023**

Planted Acreage	13.03
Date of Initial Plant	2021-03-05
Date(s) of Supplemental Plant(s)	2023-02-13
Date of Current Survey	2023-09-21
Plot size (ACRES)	0.0247

	Scientific Name	Common Name	Tree/Shrub	Indicator Status	Veg Plot 6 F		Veg Plot 7 F		Veg Plot 8 F		Veg Plot 9 F		Veg Plot 10 F	
					Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total
Species Included in Approved Mitigation Plan	<i>Acer negundo</i>	boxelder	Tree	FAC	2	2	1	1	1	1	1	1		
	<i>Betula nigra</i>	river birch	Tree	FACW	2	2	2	2	1	1	2	2	1	1
	<i>Magnolia virginiana</i>	sweetbay	Tree	FACW	1	1	1	1	1	1			2	2
	<i>Platanus occidentalis</i>	American sycamore	Tree	FACW	2	2	3	3	2	2	4	4	2	2
	<i>Populus deltoides</i>	eastern cottonwood	Tree	FAC			1	1						
	<i>Quercus michauxii</i>	swamp chestnut oak	Tree	FACW	3	3	3	3	2	2	1	1	3	3
	<i>Quercus nigra</i>	water oak	Tree	FAC			1	1						
	<i>Quercus phellos</i>	willow oak	Tree	FACW	3	3	1	1	1	1			1	1
Sum	Performance Standard				13	13	13	13	8	8	8	8	9	9
Post Mitigation Plan Species	<i>Liquidambar styraciflua</i>	sweetgum	Tree	FAC										
Sum	Proposed Standard				13	13	13	13	8	8	8	8	9	9
Mitigation Plan Performance Standard	Current Year Stem Count					13		13		8		8		9
	Stems/Acre					526		526		324		324		364
	Species Count					6		8		6		4		5
	Dominant Species Composition (%)					23		23		25		50		33
	Average Plot Height (ft.)					1		2		2		2		1
	% Invasives					0		0		0		0		0
Post Mitigation Plan Performance Standard	Current Year Stem Count					13		13		8		8		9
	Stems/Acre					526		526		324		324		364
	Species Count					6		8		6		4		5
	Dominant Species Composition (%)					23		23		25		50		33
	Average Plot Height (ft.)					1		2		2		2		1
	% Invasives					0		0		0		0		0

**Table 9a. Vegetation Performance Standards Summary Table**

Sassarixa Swamp Mitigation Site

DMS Project No. 100040

**Monitoring Year 3 - 2023**

	Veg Plot 1 F				Veg Plot 2 F				Veg Plot 3 F			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3	283	2	6	0	243	3	4	0	567	3	5	0
Monitoring Year 2	324	1	6	0	283	1	5	0	567	2	5	0
Monitoring Year 1	364	1	6	0	243	1	3	0	607	1	6	0
Monitoring Year 0	567	1	8	0	445	1	5	0	607	1	6	0
	Veg Plot 4 F				Veg Plot 5 F				Veg Plot 6 F			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3	526	1	8	0	445	3	7	0	526	1	6	0
Monitoring Year 2	526	1	8	0	486	2	7	0	526	1	6	0
Monitoring Year 1	567	1	8	0	486	1	7	0	526	1	6	0
Monitoring Year 0	607	1	8	0	486	1	7	0	567	1	6	0
	Veg Plot 7 F				Veg Plot 8 F				Veg Plot 9 F			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3	526	2	8	0	324	2	6	0	324	2	4	0
Monitoring Year 2	526	1	8	0	364	1	6	0	364	1	5	0
Monitoring Year 1	567	1	8	0	567	1	7	0	607	1	7	0
Monitoring Year 0	567	1	8	0	567	1	7	0	648	1	7	0
	Veg Plot 10 F											
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives								
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3	364	1	5	0								
Monitoring Year 2	567	1	6	0								
Monitoring Year 1	891	1	8	0								
Monitoring Year 0	607	1	8	0								

\* Fixed plots are denoted with an F.



**Table 9b. Supplementally Planted Tree Species and Quantities**

Sassarixa Swamp Mitigation Site

DMS Project No. 100040

**Monitoring Year 3 - 2023**

Scientific Name	Common Name	Number Planted	% of Total	Type
<i>Quercus phellos</i>	Willow Oak	367	15%	Bare Root
<i>Platanus occidentalis</i>	Sycamore	490	20%	Bare Root
<i>Betula nigra</i>	River Birch	490	20%	Bare Root
<i>Quercus michauxii</i>	Swamp Chestnut Oak	367	15%	Bare Root
<i>Quercus nigra</i>	Water Oak	172	7%	Bare Root
<i>Acer negundo</i>	Box Elder	245	10%	Bare Root
<i>Populus deltoides</i>	Eastern Cottonwood	172	7%	Bare Root
<i>Magnolia virginiana</i>	Sweetbay Mangolina	147	6%	Bare Root
<b>Total</b>		<b>2,450</b>	<b>100%</b>	

\* A total area of 8.51 acres were supplemented with trees in February 2023 along T1, the ditch above T3, T4, T5A, and T5C. Of that, 0.55 acres were within the Sassarixa Swamp Mitigation Site along T1.

**Table 10. Vegetation Height Data**

Sassarixa Swamp Mitigation Site

DMS Project No. 100040

**Monitoring Year 3 - 2023**

Plot	Scientific Name	Common Name	X	Y	Height (ft)	Vigor
1	<i>Platanus occidentalis</i>	American sycamore	0.2	2.7	Missing	M
1	<i>Magnolia virginiana</i>	sweetbay	0.3	5.0	Missing	M
1	<i>Betula nigra</i>	river birch	0.8	7.1	11.8	4
1	<i>Platanus occidentalis</i>	American sycamore	0.9	9.2	Missing	M
1	<i>Populus deltoides</i>	eastern cottonwood	4.3	8.8	Dead	0
1	<i>Quercus phellos</i>	willow oak	4.0	6.7	2.3	4
1	<i>Quercus michauxii</i>	swamp chestnut oak	3.6	4.8	4.3	4
1	<i>Quercus nigra</i>	water oak	3.1	2.5	Dead	0
1	<i>Betula nigra</i>	river birch	2.9	0.1	Dead	0
1	<i>Platanus occidentalis</i>	American sycamore	7.2	1.1	Dead	0
1	<i>Quercus nigra</i>	water oak	7.7	3.3	Dead	0
1	<i>Acer negundo</i>	boxelder	7.9	5.4	10.8	4
1	<i>Quercus michauxii</i>	swamp chestnut oak	8.0	7.6	Dead	0
1	<i>Betula nigra</i>	river birch	8.2	9.3	12.1	4
1	<i>Quercus nigra</i>	water oak	3.7	7.2	1.6	2
1	<i>Platanus occidentalis</i>	American sycamore	5.2	9.3	3.0	4

Vigor: 4 = excellent, 3 = good, 2 = fair, 1 = unlikely to survive year, 0 = dead, M = Missing

**Table 10. Vegetation Height Data**

Sassarixa Swamp Mitigation Site

DMS Project No. 100040

**Monitoring Year 3 - 2023**

Plot	Scientific Name	Common Name	X	Y	Height (ft)	Vigor
2	<i>Quercus phellos</i>	willow oak	5.7	2.3	Dead	0
2	<i>Quercus phellos</i>	willow oak	7.2	4.1	Missing	M
2	<i>Platanus occidentalis</i>	American sycamore	9.8	6.1	Dead	0
2	<i>Populus deltoides</i>	eastern cottonwood	6.7	9.3	13.8	4
2	<i>Magnolia virginiana</i>	sweetbay	5.4	7.5	2.7	4
2	<i>Magnolia virginiana</i>	sweetbay	4.5	5.3	Missing	M
2	<i>Populus deltoides</i>	eastern cottonwood	3.2	3.6	3.9	4
2	<i>Quercus nigra</i>	water oak	1.6	2.2	4.3	4
2	<i>Platanus occidentalis</i>	American sycamore	1.0	6.2	Dead	0
2	<i>Platanus occidentalis</i>	American sycamore	2.1	7.9	7.0	4
2	<i>Populus deltoides</i>	eastern cottonwood	3.0	10.0	8.2	4

Vigor: 4 = excellent, 3 = good, 2 = fair, 1 = unlikely to survive year, 0 = dead, M = Missing

**Table 10. Vegetation Height Data**

Sassarixa Swamp Mitigation Site

DMS Project No. 100040

**Monitoring Year 3 - 2023**

Plot	Scientific Name	Common Name	X	Y	Height (ft)	Vigor
3	<i>Betula nigra</i>	river birch	4.5	0.4	7.5	4
3	<i>Platanus occidentalis</i>	American sycamore	6.2	1.1	14.4	4
3	<i>Betula nigra</i>	river birch	8.0	2.1	16.1	4
3	<i>Quercus phellos</i>	willow oak	9.6	3.3	8.1	4
3	<i>Quercus michauxii</i>	swamp chestnut oak	9.3	7.2	7.2	4
3	<i>Betula nigra</i>	river birch	8.2	6.7	19.7	4
3	<i>Quercus phellos</i>	willow oak	6.6	5.5	5.6	4
3	<i>Platanus occidentalis</i>	American sycamore	4.7	4.3	13.1	4
3	<i>Quercus michauxii</i>	swamp chestnut oak	3.1	3.2	4.6	4
3	<i>Platanus occidentalis</i>	American sycamore	1.4	2.2	12.1	4
3	<i>Quercus phellos</i>	willow oak	0.1	5.9	5.2	4
3	<i>Betula nigra</i>	river birch	2.0	6.8	12.1	4
3	<i>Acer negundo</i>	boxelder	4.0	7.8	3.2	4
3	<i>Platanus occidentalis</i>	American sycamore	5.4	8.8	19.7	4
3	<i>Magnolia virginiana</i>	sweetbay	7.2	10.0	Missing	M

Vigor: 4 = excellent, 3 = good, 2 = fair, 1 = unlikely to survive year, 0 = dead, M = Missing

**Table 10. Vegetation Height Data**

Sassarixa Swamp Mitigation Site

DMS Project No. 100040

**Monitoring Year 3 - 2023**

Plot	Scientific Name	Common Name	X	Y	Height (ft)	Vigor
4	Quercus phellos	willow oak	0.3	4.1	1.7	4
4	Magnolia virginiana	sweetbay	1.3	6.2	2.4	4
4	Quercus michauxii	swamp chestnut oak	2.5	8.4	5.7	4
4	Quercus michauxii	swamp chestnut oak	5.7	9.5	1.0	1
4	Betula nigra	river birch	5.5	7.6	13.1	4
4	Platanus occidentalis	American sycamore	4.8	5.8	5.2	4
4	Populus deltoides	eastern cottonwood	4.2	4.0	1.5	4
4	Acer negundo	boxelder	3.1	2.1	2.0	2
4	Quercus nigra	water oak	2.1	0.3	1.1	4
4	Populus deltoides	eastern cottonwood	5.9	0.3	Dead	0
4	Quercus phellos	willow oak	7.0	2.0	3.3	4
4	Platanus occidentalis	American sycamore	7.9	3.7	6.0	4
4	Quercus michauxii	swamp chestnut oak	8.2	5.5	1.7	3
4	Quercus phellos	willow oak	9.0	7.8	2.2	4
4	Quercus michauxii	swamp chestnut oak	9.4	0.8	Dead	0

Vigor: 4 = excellent, 3 = good, 2 = fair, 1 = unlikely to survive year, 0 = dead, M = Missing

**Table 10. Vegetation Height Data**

Sassarixa Swamp Mitigation Site

DMS Project No. 100040

**Monitoring Year 3 - 2023**

Plot	Scientific Name	Common Name	X	Y	Height (ft)	Vigor
5	<i>Betula nigra</i>	river birch	3.5	0.6	11.3	4
5	<i>Quercus michauxii</i>	swamp chestnut oak	3.4	3.2	10.5	4
5	<i>Platanus occidentalis</i>	American sycamore	3.3	4.9	13.1	4
5	<i>Platanus occidentalis</i>	American sycamore	6.6	3.7	Missing	M
5	<i>Magnolia virginiana</i>	sweetbay	6.7	1.9	6.3	4
5	<i>Platanus occidentalis</i>	American sycamore	9.9	2.2	13.1	4
5	<i>Populus deltoides</i>	eastern cottonwood	9.9	3.9	9.5	4
5	<i>Acer negundo</i>	boxelder	13.3	3.4	2.4	4
5	<i>Quercus phellos</i>	willow oak	13.3	1.3	6.2	4
5	<i>Platanus occidentalis</i>	American sycamore	16.9	1.5	9.2	4
5	<i>Quercus phellos</i>	willow oak	17.0	3.4	5.6	4
5	<i>Betula nigra</i>	river birch	17.0	4.9	5.6	4

Vigor: 4 = excellent, 3 = good, 2 = fair, 1 = unlikely to survive year, 0 = dead, M = Missing

**Table 10. Vegetation Height Data**

Sassarixa Swamp Mitigation Site

DMS Project No. 100040

**Monitoring Year 3 - 2023**

Plot	Scientific Name	Common Name	X	Y	Height (ft)	Vigor
6	<i>Quercus michauxii</i>	swamp chestnut oak	0.4	1.2	5.0	4
6	<i>Quercus michauxii</i>	swamp chestnut oak	2.8	0.6	1.8	4
6	<i>Magnolia virginiana</i>	sweetbay	5.2	0.4	2.3	4
6	<i>Quercus phellos</i>	willow oak	8.2	2.4	3.2	4
6	<i>Betula nigra</i>	river birch	6.1	3.2	4.0	4
6	<i>Platanus occidentalis</i>	American sycamore	4.0	3.9	3.9	4
6	<i>Quercus phellos</i>	willow oak	1.7	4.7	1.2	4
6	<i>Acer negundo</i>	boxelder	0.3	5.6	1.1	4
6	<i>Quercus phellos</i>	willow oak	0.6	8.8	2.0	4
6	<i>Betula nigra</i>	river birch	2.5	7.9	5.7	4
6	<i>Acer negundo</i>	boxelder	4.7	7.8	1.2	4
6	<i>Platanus occidentalis</i>	American sycamore	6.3	7.2	3.1	2
6	<i>Quercus michauxii</i>	swamp chestnut oak	7.9	6.9	Dead	0
6	<i>Quercus michauxii</i>	swamp chestnut oak	9.6	6.4	4.3	4

Vigor: 4 = excellent, 3 = good, 2 = fair, 1 = unlikely to survive year, 0 = dead, M = Missing

**Table 10. Vegetation Height Data**

Sassarixa Swamp Mitigation Site

DMS Project No. 100040

**Monitoring Year 3 - 2023**

Plot	Scientific Name	Common Name	X	Y	Height (ft)	Vigor
7	<i>Betula nigra</i>	river birch	2.0	2.8	10.7	4
7	<i>Populus deltoides</i>	eastern cottonwood	4.1	2.1	3.2	4
7	<i>Quercus michauxii</i>	swamp chestnut oak	6.3	1.2	3.2	4
7	<i>Magnolia virginiana</i>	sweetbay	9.4	1.2	3.3	4
7	<i>Quercus phellos</i>	willow oak	9.5	4.0	Dead	0
7	<i>Platanus occidentalis</i>	American sycamore	6.5	4.5	13.1	4
7	<i>Acer negundo</i>	boxelder	4.4	5.2	3.3	4
7	<i>Quercus phellos</i>	willow oak	2.3	5.5	3.0	4
7	<i>Quercus michauxii</i>	swamp chestnut oak	0.4	5.8	3.3	4
7	<i>Quercus michauxii</i>	swamp chestnut oak	0.4	9.1	2.4	4
7	<i>Platanus occidentalis</i>	American sycamore	2.5	8.9	14.4	4
7	<i>Quercus nigra</i>	water oak	4.6	8.3	4.7	4
7	<i>Betula nigra</i>	river birch	6.5	8.1	10.2	4
7	<i>Platanus occidentalis</i>	American sycamore	9.2	7.9	9.5	4

Vigor: 4 = excellent, 3 = good, 2 = fair, 1 = unlikely to survive year, 0 = dead, M = Missing



**Table 10. Vegetation Height Data**

Sassarixa Swamp Mitigation Site

DMS Project No. 100040

**Monitoring Year 3 - 2023**

Plot	Scientific Name	Common Name	X	Y	Height (ft)	Vigor
8	<i>Quercus michauxii</i>	swamp chestnut oak	0.5	2.3	5.1	4
8	<i>Magnolia virginiana</i>	sweetbay	2.7	1.9	5.5	4
8	<i>Quercus michauxii</i>	swamp chestnut oak	4.8	1.5	5.3	4
8	<i>Quercus michauxii</i>	swamp chestnut oak	6.7	1.0	Dead	0
8	<i>Platanus occidentalis</i>	American sycamore	9.8	0.4	11.2	4
8	<i>Populus deltoides</i>	eastern cottonwood	9.9	3.9	Dead	0
8	<i>Betula nigra</i>	river birch	6.6	4.2	5.3	4
8	<i>Platanus occidentalis</i>	American sycamore	4.9	4.7	Dead	0
8	<i>Acer negundo</i>	boxelder	3.4	4.7	5.0	4
8	<i>Quercus phellos</i>	willow oak	1.8	5.1	6.7	4
8	<i>Acer negundo</i>	boxelder	1.5	8.2	Dead	0
8	<i>Platanus occidentalis</i>	American sycamore	3.7	7.8	5.3	4
8	<i>Quercus michauxii</i>	swamp chestnut oak	6.0	7.3	Dead	0
8	<i>Quercus phellos</i>	willow oak	9.4	7.3	Missing	M

Vigor: 4 = excellent, 3 = good, 2 = fair, 1 = unlikely to survive year, 0 = dead, M = Missing

**Table 10. Vegetation Height Data**

Sassarixa Swamp Mitigation Site

DMS Project No. 100040

**Monitoring Year 3 - 2023**

Plot	Scientific Name	Common Name	X	Y	Height (ft)	Vigor
9	Platanus occidentalis	American sycamore	0.4	0.3	12.3	4
9	Quercus michauxii	swamp chestnut oak	0.5	2.1	4.0	4
9	Platanus occidentalis	American sycamore	0.5	3.7	6.9	4
9	Acer negundo	boxelder	0.5	5.3	4.4	4
9	Betula nigra	river birch	0.6	7.4	10.5	4
9	Acer negundo	boxelder	0.5	9.6	Dead	0
9	Magnolia virginiana	sweetbay	3.4	9.1	Missing	M
9	Quercus phellos	willow oak	3.4	6.5	Dead	0
9	Betula nigra	river birch	3.5	4.0	1.9	4
9	Acer negundo	boxelder	3.9	2.1	Dead	0
9	Platanus occidentalis	American sycamore	6.7	2.2	Missing	M
9	Populus deltoides	eastern cottonwood	6.5	4.9	Missing	M
9	Populus deltoides	eastern cottonwood	6.3	7.2	Missing	M
9	Platanus occidentalis	American sycamore	6.5	9.9	3.6	4
9	Betula nigra	river birch	9.3	3.3	Dead	0
9	Platanus occidentalis	American sycamore	9.3	2.1	5.4	4

Vigor: 4 = excellent, 3 = good, 2 = fair, 1 = unlikely to survive year, 0 = dead, M = Missing

**Table 10. Vegetation Height Data**

Sassarixa Swamp Mitigation Site

DMS Project No. 100040

**Monitoring Year 3 - 2023**

Plot	Scientific Name	Common Name	X	Y	Height (ft)	Vigor
10	<i>Populus deltoides</i>	eastern cottonwood	2.1	0.7	Dead	0
10	<i>Quercus phellos</i>	willow oak	4.2	0.7	2.3	4
10	<i>Quercus nigra</i>	water oak	6.0	0.6	Missing	M
10	<i>Magnolia virginiana</i>	sweetbay	8.0	0.7	4.7	4
10	<i>Quercus michauxii</i>	swamp chestnut oak	9.9	0.7	5.3	4
10	<i>Quercus michauxii</i>	swamp chestnut oak	8.7	4.0	2.2	4
10	<i>Populus deltoides</i>	eastern cottonwood	6.6	4.0	Dead	0
10	<i>Platanus occidentalis</i>	American sycamore	4.4	4.0	10.0	4
10	<i>Quercus phellos</i>	willow oak	2.6	4.1	Dead	0
10	<i>Platanus occidentalis</i>	American sycamore	0.7	4.2	Dead	0
10	<i>Platanus occidentalis</i>	American sycamore	0.1	7.5	7.6	4
10	<i>Acer negundo</i>	boxelder	2.1	7.5	Dead	0
10	<i>Betula nigra</i>	river birch	4.0	7.4	Dead	0
10	<i>Magnolia virginiana</i>	sweetbay	6.1	7.4	2.4	4
10	<i>Betula nigra</i>	river birch	8.1	7.3	Missing	M
10	<i>Betula nigra</i>	river birch	8.3	3.4	4.3	4
10	<i>Quercus michauxii</i>	swamp chestnut oak	0.4	9.1	3.7	4

Vigor: 4 = excellent, 3 = good, 2 = fair, 1 = unlikely to survive year, 0 = dead, M = Missing