Annual Monitoring Report (MY2)

MAPLE SWAMP BUFFER MITIGATION SITE

Edgecombe County, NC
NCDEQ Contract No. 200208-01
DMS ID No. 100189
DWR Project No. 2021-0614v2
RFP No. 16-20200208

Prepared for:

Mitigation Services
ENVIRONMENTAL QUALITY

NC Department of Environmental Quality
Division of Mitigation Services
1652 Mail Service Center, Raleigh, NC 27699-1652

December 2023

ANNUAL MONITORING REPORT (MY2)

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Edgecombe County, NC
NCDEQ Contract No. 200208-01
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Tar-Pamlico River Basin
HUC 03020102

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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This Baseline Monitoring Plan has been written in conformance with the requirements of the following:

- 15A NCAC 02B.0295 Mitigation Program Requirements for Protection and Maintenance of Riparian Buffers.
- 15A NCAC 02B.0703 Nutrient Offset Credit Trading

These documents govern DMS operations and procedures for the delivery of compensatory mitigation.

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1.0 Mitigation Project Summary

The Maple Swamp Buffer Mitigation Site (Site) is a buffer restoration project located approximately 2.0 miles northeast of Leggett off North Carolina (NC) Highway (Hwy) 97 E in Edgecombe County, NC. The Site comprises approximately 8.13 acres of a 356-acre tract situated along an unnamed tributary (UT) to Maple Swamp that drains into Fishing Creek. The Site is located within North Carolina Division of Mitigation Services (DMS) identified Habitat, Hydrology, and Water Quality Targeted Resource Areas (TRA). Maple Swamp is defined as Water Supply (WS-IV) and Nutrient Sensitive Waters (NSW) according to the NC Department of Environmental Quality (DEQ) within the Tar-Pamlico River basin 14-digit hydrologic unit code (HUC) 03020102060010 and Subasin 03-03-02. According to the as-built survey and Division of Water Resources (DWR) Buffer Mitigation Calculation Tool v3 (updated August 2020), the Site is expected to generate 294,366.000 buffer mitigation units (BMU), offset 989.329 pounds of nitrogen, and offset 63.316 pounds of phosphorus (Table 2).

1.1 Project Goals

The major goals of the proposed Maple Swamp Buffer Restoration project are to address agricultural runoff, including nutrients and sediment, protect the site in perpetuity, and restore terrestrial habitat. The Site will reduce future sediment and nutrient loading into Fishing Creek watershed and the Tar-Pamlico River downstream. It will also improve terrestrial habitats along this stream by establishing a riparian corridor and allowing the land to convert to forested communities.

The project goals and objectives are consistent with those of the DMS, and the specific goals outlined in the 2018 Tar-Pamlico River Basin Restoration Priorities (RBRP). As proposed, the Maple Swamp Buffer Mitigation Project will further help DMS to meet these goals.

1.2 Existing Site Conditions

The Site is located within one parcel (356 acres) currently used for agricultural row crop production. Adjacent land use is in row crop production. In addition, there is minimal vegetated buffer exists along the length of the UT to Maple Swamp stream within the Site.

The Site was successfully planted in 2022, with appropriate trees and herbaceous vegetation, and is now at the end of the second (2nd) full growing season and early stages of successful buffer restoration. The project is restoring forested riparian buffers and adjacent riparian areas to a maximum of approximately 100 feet from the top of bank of the streams and removing rotating crops and fertilizer inputs.

The proposed restored Tar-Pamlico riparian buffer and adjacent riparian areas will filter runoff from the surrounding farm fields and provide shading to improve stream temperatures and aquatic habitat. Invasive vegetation will be treated as needed within the project area to promote native vegetation.

During biannual site inspection and first year monitoring, one area of encroachment was observed where a farmer accidentally mowed the historic farm path adjacent to the stream feature (see Figure 1). This encroachment area was replanted with hardwood trees in March 2023. This area was visually inspected during monitoring year 2 (MY2) and has re-established ground cover and tree growth is noticible.

The landowner has been informed of his responsibility for this loss of trees, and Eco Terra worked with both the landowner and tree supplier to replant as soon as possible. Most trees have sprouted back, but additional trees were supplementally planted in this area to ensure vegetation meets success criteria across the site and no further supplemental planting would be necessary following MY2.

2.0 Regulatory Considerations

Riparian buffer and adjacent riparian area restoration was accomplished in accordance with the Consolidated Buffer Mitigation Rule (15A NCAC 02B .0295) and the Nutrient Offset Credit Trading Rule (15A NCAC 02B .0703). All areas within 100+ linear feet of the top-of-bank of subject streams as measure from the top-of-bank landward were planted to generate riparian buffer mitigation credits. Areas designated for nutrient offset within 50 linear feet of the top-of-bank were planted similarly. Mitigation credits generated are found in Table 2 and are based upon DWR Buffer Mitigation Calculation Tool v3 (updated August 2020).

3.0 Project Construction Summary

Site construction was completed in early February 2022, following mitigation plan approval. Eco Terra and supporting team members successfully planted and restored the proposed areas dedicated for riparian buffer and adjacent riparian area restoration with high quality native trees, shrubs, and herbaceous vegetation.

3.1 Riparian Area Restoration Activities

Restoration of the riparian areas involved planting bare root, one- to two-year-old trees in designated planting zones, specific to soil and Site conditions, and in accordance with the Mitigation Plan. A combination of machine and manual planting techniques were used. Approximately 6,600 stems (812 stems/ac) were planted within the riparian areas designated for restoration.

4.0 Annual Monitoring and Performance Criteria

The Mitigation Program Requirements for Protection and Maintenance of Riparian Buffers (15A NCAC 02B .0295) and RFP 16-20200208 set forth specific performance criteria for the successful development and close-out of the Maple Swamp Buffer Mitigation Site. Performance criteria monitoring includes standardized vegetation plot establishment, annual monitoring for planted stems, and individual plot photo documentation. Additional site data includes overall site photo documentation, biannual visual assessments for project status, and easement integrity including herbaceous and/or invasive species competition, stem mortality, stand health, incidental damage from agricultural equipment, and stem loss or damage from natural causes such as fire, disease, or animal predation. Figure 1 illustrates the location of project easement, permanent vegetation plots/photo points, as well as overall site photo points.

4.1 Vegetation

Six permanent vegetation plots were established according to the most recent Carolina Vegetation Survey (CVS) protocol within the restored buffer area. Representative vegetation plots were established at a minimum density of 2% of the planted area. Specifically, vegetation monitoring was obtained for all plots according to Level 1 protocols from the CVS-EEP Protocol for Recording Vegetation V4.2 (2008) manual and included tree species, height, and vitality data and sub-30 cm GPS location data. MY2 vegetation stem data is included in Table 4. The average number of trees per plot is 18, the total number of tree measured in all plots is 106. Stem densities per plot ranged from 520 to 1000 stems per acre. Based on the plot densities, MY2 stems per acre achieved 707 with an average tree height of 115 centemeters. Vigor across all plots averaged 3.8.

4.2 Photo Reference Stations

Site reference photos were taken at designated points along the conservation easement boundary providing an overall view of the project success (Appendix 2). Individual plot photos taken at the approximate southwest corner (origin) of each plot are included in this baseline monitoring report (Appendix 3). All photo points were located by survey and georeferenced for map production to provide a consistent means for photo replication annually and in the event a plot or photo location must be reestablished during the monitoirng period. Photo orientation (direction and bearing) were recorded as well as approximate vertical position for consistency in photo logging.

4.3 Visual Assessments

Additional observations were made of Site conditions and vegetation conditions outside of monitoring plots. Overall, the site is maturing as expected with minimal tree mortallity. The previous years monitoring (MY1) noted an incidental mowed area adjacent to the historic farm path. Replanting on March 1, 2023, established two rows in this area on 6-ft

by 10-ft centers. Visual inspection of the area during the annual vegetation plot monitoring noted that tree survival and growth appear normal within the two rows.

Biannual visual assessments will continue in order to appropriately monitor changing site conditions and address any issues to ensure Site success and performance criteria are met in subsequent monitoring years. Any additional Site issues will be noted and discussed in the annual reports, addressed in a remedial action plan if necessary, and monitored biannually to ensure performance criteria are met following any remedial action.

4.4 Annual Reporting Performance Criteria

All monitoring reports, including this annual report, will be compiled and submitted to DMS annually in accordance with the Riparian Buffer and Nutrient Offset Buffer Baseline and Annual Monitoring Report Template Ver. 2.0 (May 2017). Annual monitoring will occur for a minum of five years or until performance criteria are met.

4.5 Maintenance and Contingency Plans

Any Site observations identified through vegetation plots or visual assessments, whereby the performance criteria is not met, will be noted and discussed in the annual reports and addressed with a contingency plan as necessary. DMS/DWR will be notified, and if necessary, collaborate with Eco Terra to develop a contingency plan with remedial action steps to correct the performance criteria deficiency. Any contingency plan and remedial actions will occur within an agreed timeframe and monitoring adjusted accordingly, if necessary. Site problem areas will be monitored biannually to ensure performance criteria are met following any remedial action.

5.0 References

15 NCAC 02B .0295 Mitigation Program Requirements for Protection and Maintenance of Riparian Buffers. 2015.

15A NCAC 02B .0703 Nutrient Offset Trading. 2020.

N.C. Department of Water Quality Methodology for Determining Nutrient Reductions Associated with Riparian Buffer Establishment. 1998.

N.C. Department of Water Quality Buffer Interpretation/Clarification #2008-019 Memorandum August 19, 2008.

N.C. Department of Environmental Quality. Division of Water Resources. Clarified Procedures for Calculating Buffer Mitigation Credits & Nutrient Offset Credits for Riparian Projects Regulated under 15A NCAC 02B .0295 and 15A NCAC 02B .0240. November 21, 2019.

Lee, Michael T. Peet, Robert K., Steven D. Wentworth, Thomas R. 2008. CVS-EEP Protocol for Recording Vegetation Version 4.2. http://cvs.bio.unc.edu/protocol/cvs-eep-protocol-v4.2-lev1-2.pdf

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.

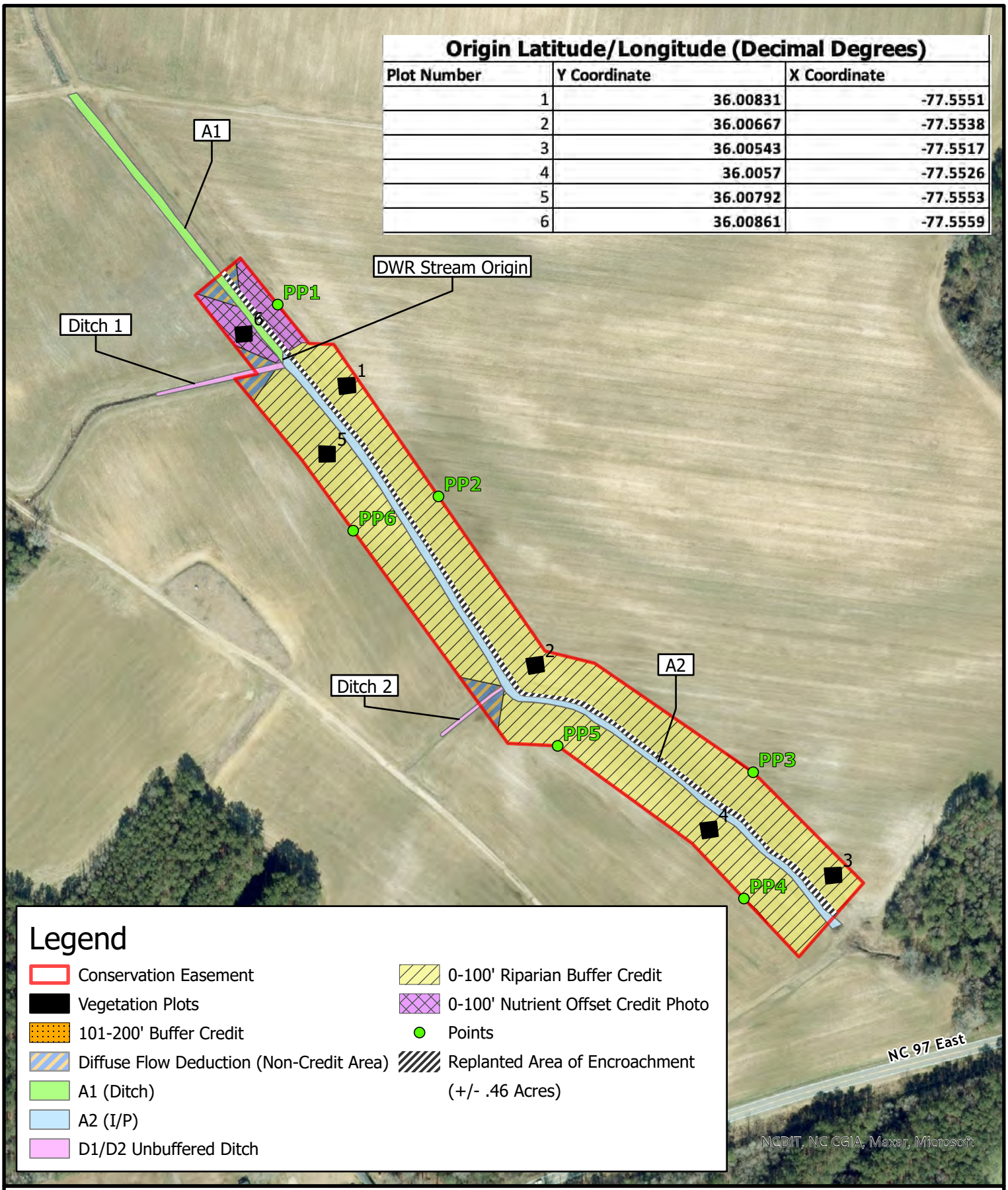
North Carolina Department of Environmental Quality. Division of Mitigation Services (NCDMS). 2018. Tar-Pamlico River Basin Restoration Priorities.

U.S. Department of Agriculture. Natural Resources Conservation Service. 2021. Web Soil Survey. (https://websoilsurvey.nrcs.usda.gov/app/). (Accessed April 2021).

U.S. Geological Survey. 2013. Draughn and Tarboro. 1:24,000. North Carolina Topographic Quadrangle (7.5-minute series). Reston, VA: U.S. Department of the Interior, USGS, 2013.

APPENDIX 1

PROJECT DATA



Origin Latitude/Longitude (Decimal Degrees)		
Plot Number	Y Coordinate	X Coordinate
1	36.00831	-77.5551
2	36.00667	-77.5538
3	36.00543	-77.5517
4	36.0057	-77.5526
5	36.00792	-77.5553
6	36.00861	-77.5559

Legend

- Conservation Easement
- Vegetation Plots
- 101-200' Buffer Credit
- Diffuse Flow Deduction (Non-Credit Area)
- A1 (Ditch)
- A2 (I/P)
- D1/D2 Unbuffered Ditch
- 0-100' Riparian Buffer Credit
- 0-100' Nutrient Offset Credit Photo
- Points
- Replanted Area of Encroachment (+/- .46 Acres)

Current Condition Plan View
Maple Swamp Buffer Mitigation Site
Tar-Pamlico 03020102
Edgecombe County, NC
December 2023
NC Onemap Latest Orthoimagery

N W E S

0 125 250 500 Feet

Table 1: Buffer Project Attributes
Maple Swamp Buffer Mitigation Site
DMS ID No. 100189
DWR Project No. 2021-0614v2
Monitoring Year 2 – 2023

Project Name	Maple Swamp Buffer Mitigation Site
Hydrologic Unit Code	03020102
River Basin	Tar-Pamlico
Geographic Location (decimal degrees)	36.008912, -77.556057
Site Protection Instrument (BK, PG)	1750/176-186
Types of Credits	Riparian Buffer (294,193.140) Nutrient Offset (983.044 lbs N) Nutrient Offset (63.316 lbs P)
Mitigation Plan Date	September 2021
Initial Planting Date	February 2022
Baseline Report Date	April 2022
MY1 Report Date	November 2022
Supplemental Planting	March 2023
MY2 Report Date	November 2023
MY3 Report Date	November 2024
MY4 Report Date	November 2025
MY5 Report Date	November 2026
Close out Report Date/Visit	May 2027

Table 2: Buffer Project Components and Assets

Maple Swamp Buffer Mitigation Site

DMS ID No. 100189

DWR Project No. 2021-0614v2

Monitoring Year 2 – 2023

Table 2. Maple Swamp Buffer Mitigation Site, DMS No: 100189, Project Credits: 294,451.140 BMU, 983.044 lbs N, 63.316 lbs P

Tar-Pamlico 03020102	Project Area
19.16394	N Credit Conversion Ratio (ft^2/pound)
297.54099	P Credit Conversion Ratio (ft^2/pound)

Credit Type	Location	Subject? (enter NO if ephemeral or ditch [1])	Feature Type	Mitigation Activity	Min-Max Buffer Width (ft)	Feature Name	Total Area (ft^2)	Total (Creditable) Area of Buffer Mitigation (ft^2)	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	0-100	A2	294,366	294,366	1	100%	1.00000	N/A	294,366.000	Yes	15,360.411	989.329
Nutrient Offset	Rural	No	Ditch	Restoration	0-100	A1	18,839	18,839	1	100%	1.00000	No	—	Yes	983.044	63.316
Buffer	Rural	Yes	Ditch	Restoration	0-100	Ditch 2 (diffused flow reduction)	4,356	0	1	100%		No	—	No	—	—
Buffer	Rural	No	Ditch	Restoration	0-100	Ditch 1 (diffused flow reduction)	4,356	0	1	100%		No	—	No	—	—
Nutrient Offset	Rural	No	Ditch	Restoration	0-50	A1 (diffused flow reduction)	4,356	0	1	100%		No	—	No	—	—
Buffer	Rural	Yes	I / P	Restoration	101-200	A2	258	258	1	33%	3.03030	N/A	85.140	Yes	13.463	0.867
													—		—	—
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													—		—	—
						Totals (ft2):	326,531	313,463					294,451.140		16,356.918	1,053.512
						Total Buffer (ft2):	303,336	294,624								
						Total Nutrient Offset (ft2):	23,195	N/A								

Total Ephemeral Area (ft^2) for Credit:	0	0	
Total Eligible Ephemeral Area (ft^2):	75,834	0.0%	Ephemeral Reaches as % TABM
Total Eligible for Preservation (ft^2):	101,112	0.0%	Preservation as % TABM

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^2)	Initial Credit Ratio (x:1)	% Full Credit	Final Credit Ratio (x:1)	Riparian Buffer Credits
	Rural	Yes	I / P		0-100				10	100%		—
	Rural	Yes	Ephemeral		0-100				10	100%		—
												—
												—
												—
						Preservation Area Subtotals (ft^2):	0	0				

TOTAL AREA OF BUFFER MITIGATION (TABM)			
Mitigation Totals		Square Feet	Credits
Restoration:		294,624	294,451.140
Enhancement:		0	0.000
Preservation:		0	0.000
Total Riparian Buffer:		294,624	294,451.140
TOTAL NUTRIENT OFFSET MITIGATION			
Mitigation Totals		Square Feet	Credits
Nutrient Offset:	Nitrogen:	23,195	983.044
	Phosphorus:		63.316

Credit conversions must be calculated using the guidance provided in the Clarified Procedures for Calculating Buffer Mitigation Credits and Nutrient Offset Credits letter issued by the DWR in November 2019 and located at: https://files.nc.gov/ncdeq/Water%20Quality/Surface%20Water%20Protection/401/Mitigation/Issues---Resolutions-Ver-1.0-buffer-mitigation-nutrient-offset.pdf

Table 3: Visual Vegetation Assessment
Maple Swamp Buffer Mitigation Site
DMS ID No. 100189
DWR Project No. 2021-0614v2
Monitoring Year 2 – 2023

Planted Acreage = 8.07 ac

Vegetation Category	Definitions	Mapping Threshold	Combined Acreage	% of Planted Acreage
Bare Areas	Very limited cover of both woody and herbaceous material.	0.10 acres	0.00	0.0%
Low Stem Density Areas	Woody stem densities clearly below target levels based on current MY stem count criteria.	0.10 acres	0.00	0.0%
		Total	0.00	0.0%
Areas of Poor Growth Rates	Planted areas where average height is not meeting current MY Performance Standard.	0.10 acres	0.00	0.0%
		Cumulative Total	0.00	0.0%

Easement Acreage = 8.13 ac

Vegetation Category	Definitions	Mapping Threshold	Combined Acreage	% of Easement Acreage
Invasive Areas of Concern	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. Species included in summation above should be identified in report summary.	0.10 acres	0.00	0.0%
Easement Encroachment Areas	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.	0.10 acres	0.46	3.0%

APPENDIX 2

SITE PHOTO-POINTS

Maple Swamp Buffer
DMS ID # 100189
DWR Project # 2021-0614v2

MY2 2023 PHOTO STATION PHOTOS

MY2	MY1

Photo #1
Date: 09/18/2023
Feature: Photo Station 1
Direction: East

Photo #2
Date: 09/18/2023
Feature: Photo Station 2
Direction: East

Photo #3
Date: 09/18/2023
Feature: Photo Station 3
Direction: East

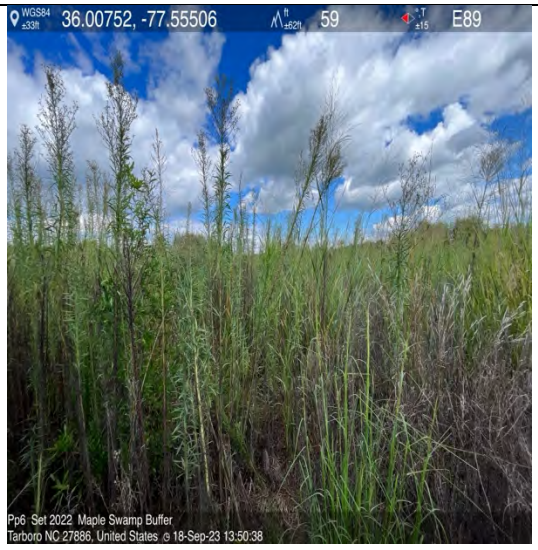
MY2 2023 PHOTO STATION PHOTOS

MY2	MY1

Photo #4
Date: 09/18/2023
Feature: Photo Station 4
Direction: East

Photo #5
Date: 09/18/2023
Feature: Photo Station 5
Direction: East

Photo #6
Date: 09/18/2023
Feature: Photo Station 6
Direction: East



APPENDIX 3

MONITORING PLOT DATA

MONITORING PLOT PHOTOGRAPHS

Table 4: Planted and Total Stems
Maple Swamp Buffer Mitigation Site
DMS ID No. 100189
DWR Project No. 2021-0614v2
Monitoring Year 2 - 2023

			Current Plot Data (MY2-2023)						Annual Summary		
Scientific Name	**Common Name**	**Species Type**	**MP1**	**MP2**	**MP3**	**MP4**	**MP5**	**MP6**	**MY2 (2023)**	**MY1 (2022)**	**MY0 (2022)**
Betula nigra	River Birch	Tree	3		1	1	4	2	11	10	10
Fraxinus pennsylvanica	Green Ash	Tree			1				1	1	2
Liriodendron tulipifera	Yellow Poplar	Tree								1	3
Quercus laurifolia	Laurel Oak	Tree	2	3	1	3			9	9	9
Quercus michauxii	Swamp Chestnut Oak	Tree	6	7	7	2	6	3	31	28	29
Quercus nigra	Water Oak	Tree	1	2	1	7	5	4	20	10	13
Quercus phellos	Willow Oak	Tree				3	6	9	18	22	16
Quercus shumardii	Shumard Oak	Tree	3			1	1	1	6	11	17
Taxodium distichum	Bald-cypress	Tree	1	1	3		3	2	10	10	11
		Stem count	16	13	14	17	25	21	106	102	110
		size (ares)	1	1	1	1	1	1	6	6	6
		Size (acres)	0.025	0.025	0.025	0.025	0.025	0.025	0.15	0.15	0.15
		Species count	6	4	6	6	6	6	8	9	9
		Vigor	3.9	3.6	3.7	4.0	3.8	4.0	3.8	3.5	4
		Height (cm)	101	101	110	127	128	123	115	58	46
		Stems/acre	640	520	560	680	1000	840	707	680	733

Color for Density

Exceeds requirements by 10%
Exceeds requirements, but by less than 10%
Fails to meet requirements, by less than 10%
Fails to meet requirements by more than 10%

Plot Size (ares/ac): 1 / 0.025

MAPLE SWAMP BUFFER MY2 TREE DATA BY PLOT

Latitude	Longitude	Species	- Tree Height	Vigor MY2	Plot Number
36.00834314	-77.55503449	Swamp Chestnut Oak (Quercus michauxii)	111	3	1
36.00831821	-77.55509197	Shumard Oak (Quercus shumardii)	81	4	1
36.00834936	-77.55512174	Laurel Oak (Quercus laurifolia)	112	4	1
36.00836323	-77.55513563	Swamp Chestnut Oak (Quercus michauxii)	135	4	1
36.00837788	-77.55515108	River Birch (Betula nigra)	105	4	1
36.00839834	-77.55513182	Water Oak (Quercus nigra	38	4	1
36.00831917	-77.55513436	Shumard Oak (Quercus shumardii)	90	4	1
36.00838722	-77.55511983	Swamp Chestnut Oak (Quercus michauxii)	63	4	1
36.00835682	-77.55508628	Swamp Chestnut Oak (Quercus michauxii)	62	4	1
36.00834522	-77.55507527	Shumard Oak (Quercus shumardii)	65	4	1
36.00836925	-77.55505737	Bald Cypress (Taxodium distichum)	122	4	1
36.00832848	-77.55505724	Swamp Chestnut Oak (Quercus michauxii)	70	4	1
36.00838221	-77.55506848	River Birch (Betula nigra)	209	4	1
36.00838973	-77.55504291	River Birch (Betula nigra)	243	4	1
36.00841422	-77.55509863	Laurel Oak (Quercus laurifolia)	50	4	1
36.00839676	-77.55508398	Swamp Chestnut Oak (Quercus michauxii)	62	4	1
		trees /ac	640		
		# of Individuals	16		
		# of Species	7		
		Min Ht	38		
		Max Ht	243		
		Avg Ht. - Avg Vigor	101	3.9	

Latitude	Longitude	Species	- Tree Height	Vigor MY2	Plot Number
36.00573296	-77.55258935	Willow Oak (Quercus phellos)	190	4	4
36.00572145	-77.55256865	River Birch (Betula nigra)	143	4	4
36.00571303	-77.55255336	Shumard Oak (Quercus shumardii)	88	4	4
36.00572494	-77.55253856	Willow Oak (Quercus phellos)	146	4	4
36.00573778	-77.5525593	Water Oak (Quercus nigra	176	4	4
36.00575023	-77.55257521	Water Oak (Quercus nigra	170	4	4
36.00575874	-77.55259226	Laurel Oak (Quercus laurifolia)	95	4	4
36.00577776	-77.55256746	Swamp Chestnut Oak (Quercus michauxii)	114	4	4
36.00576672	-77.55254922	Water Oak (Quercus nigra	96	4	4
36.00575443	-77.55253133	Water Oak (Quercus nigra	168	4	4
36.00576947	-77.5525029	Laurel Oak (Quercus laurifolia)	95	4	4
36.00577975	-77.55251787	Laurel Oak (Quercus laurifolia)	83	4	4
36.00573687	-77.55250562	Water Oak (Quercus nigra	158	4	4
36.00572372	-77.5524843	Swamp Chestnut Oak (Quercus michauxii)	116	4	4
36.00578724	-77.55252584	Willow Oak (Quercus phellos)	117	4	4
36.00579484	-77.5525397	Water Oak (Quercus nigra	93	4	4
36.0058015	-77.55255222	Water Oak (Quercus nigra	118	4	4
		trees /ac	680		
		# of Individuals	17		
		# of Species	6		
		Min Ht	83		
		Max Ht	190		
		Avg Ht. - Avg Vigor	127	4.0	

Latitude	Longitude	Species	- Tree Height	Vigor MY2	Plot Number
36.00675521	-77.55372707	Bald Cypress (Taxodium distichum)	60	4	2
36.00676833	-77.55381089	Water Oak (Quercus nigra	105	4	2
36.00675301	-77.5537971	Water Oak (Quercus nigra	150	4	2
36.00673598	-77.55376884	Laurel Oak (Quercus laurifolia)	98	4	2
36.00669145	-77.55380074	Swamp Chestnut Oak (Quercus michauxii)	80	3	2
36.00672582	-77.55374376	Laurel Oak (Quercus laurifolia)	75	4	2
36.0067189	-77.55371538	Laurel Oak (Quercus laurifolia)	25	3	2
36.00670142	-77.55381832	Swamp Chestnut Oak (Quercus michauxii)	114	4	2
36.0066942	-77.55373064	Swamp Chestnut Oak (Quercus michauxii)	25	3	2
36.00669973	-77.55375056	Swamp Chestnut Oak (Quercus michauxii)	133	4	2
36.00673508	-77.55381819	Swamp Chestnut Oak (Quercus michauxii)	157	3	2
36.00670904	-77.55377676	Swamp Chestnut Oak (Quercus michauxii)	154	4	2
36.00671846	-77.55379498	Swamp Chestnut Oak (Quercus michauxii)	131	3	2
		trees /ac	520		
		# of Individuals	13		
		# of Species	5		
		Min Ht	25		
		Max Ht	157		
		Avg Ht. - Avg Vigor	101	3.6	

Latitude	Longitude	Species	- Tree Height	Vigor MY2	Plot Number
36.00793136	-77.55529107	River Birch (Betula nigra)	165	4	5
36.00793824	-77.55526292	Bald Cypress (Taxodium distichum)	148	4	5
36.00793132	-77.55522605	Swamp Chestnut Oak (Quercus michauxii)	20	3	5
36.00794583	-77.55526991	Willow Oak (Quercus phellos)	38	3	5
36.00795509	-77.55527862	Water Oak (Quercus nigra	182	4	5
36.00796957	-77.55528869	Water Oak (Quercus nigra	100	4	5
36.00801463	-77.55529035	River Birch (Betula nigra)	230	4	5
36.00801048	-77.55526032	Shumard Oak (Quercus shumardii)	164	4	5
36.00799779	-77.55525014	Swamp Chestnut Oak (Quercus michauxii)	141	4	5
36.00797851	-77.55523214	River Birch (Betula nigra)	182	4	5
36.00796322	-77.55522064	Swamp Chestnut Oak (Quercus michauxii)	99	4	5
36.00794998	-77.55520784	Bald Cypress (Taxodium distichum)	115	4	5
36.00792977	-77.55519395	Willow Oak (Quercus phellos)	75	4	5
36.00795141	-77.55524182	River Birch (Betula nigra)	167	4	5
36.0079616	-77.5552488	Willow Oak (Quercus phellos)	96	4	5
36.00796603	-77.5552533	Water Oak (Quercus nigra	73	4	5
36.0079864	-77.55526829	Water Oak (Quercus nigra	112	4	5
36.0079875	-77.55524082	Bald Cypress (Taxodium distichum)	59	3	5
36.00800796	-77.5552323	Willow Oak (Quercus phellos)	110	4	5
36.00799187	-77.55521803	Water Oak (Quercus nigra	250	4	5
36.0079781	-77.5552095	Willow Oak (Quercus phellos)	140	4	5
36.00796207	-77.55519495	Swamp Chestnut Oak (Quercus michauxii)	135	4	5
36.0079444	-77.55518133	Swamp Chestnut Oak (Quercus michauxii)	136	3	5
36.00797965	-77.55517772	Swamp Chestnut Oak (Quercus michauxii)	120	3	5
36.00799654	-77.55519029	Willow Oak (Quercus phellos)	145	4	5
		trees /ac	1000		
		# of Individuals	25		
		# of Species	6		
		Min Ht	20		
		Max Ht	250		
		Avg Ht. - Avg Vigor	128	3.8	

Latitude	Longitude	Species	- Tree Height	Vigor MY2	Plot Number
36.00546558	-77.55161239	Water Oak (Quercus nigra	20	2	3
36.00550742	-77.55161066	Swamp Chestnut Oak (Quercus michauxii)	100	4	3
36.00545365	-77.55168442	Laurel Oak (Quercus laurifolia)	120	4	3
36.00552356	-77.55162841	Bald Cypress (Taxodium distichum)	100	4	3
36.0054513	-77.55163671	Green Ash (Fraxinus pennsylvanica)	203	4	3
36.0054775	-77.55162858	Swamp Chestnut Oak (Quercus michauxii)	74	4	3
36.00548951	-77.55164203	Swamp Chestnut Oak (Quercus michauxii)	133	4	3
36.0054611	-77.55164743	Swamp Chestnut Oak (Quercus michauxii)	91	4	3
36.00547272	-77.55165826	Swamp Chestnut Oak (Quercus michauxii)	154	4	3
36.00550604	-77.55165607	River Birch (Betula nigra)	170	4	3
36.0055217	-77.55166948	Swamp Chestnut Oak (Quercus michauxii)	126	4	3
36.00551709	-77.5517057	Bald Cypress (Taxodium distichum)	71	3	3
36.00550321	-77.55169329	Bald Cypress (Taxodium distichum)	72	3	3
36.00549674	-77.55168479	Swamp Chestnut Oak (Quercus michauxii)	102	4	3
		trees /ac	560		
		# of Individuals	14		
		# of Species	6		
		Min Ht	20		
		Max Ht	203		
		Avg Ht. - Avg Vigor	110	3.7	

Latitude	Longitude	Species	- Tree Height	Vigor MY2	Plot Number
36.00862946	-77.55585777	Willow Oak (Quercus phellos)	100	4	6
36.00863389	-77.55582102	Willow Oak (Quercus phellos)	158	4	6
36.00864189	-77.55582741	Bald Cypress (Taxodium distichum)	95	4	6
36.00864913	-77.55583335	Willow Oak (Quercus phellos)	108	4	6
36.00865941	-77.5558452	Water Oak (Quercus nigra	160	4	6
36.00867459	-77.55585942	Swamp Chestnut Oak (Quercus michauxii)	160	4	6
36.00868418	-77.55586766	Water Oak (Quercus nigra	139	4	6
36.00870032	-77.55584724	Water Oak (Quercus nigra	165	4	6
36.00868627	-77.55583309	Willow Oak (Quercus phellos)	146	4	6
36.00867255	-77.55581992	Willow Oak (Quercus phellos)	107	4	6
36.00865777	-77.55580492	Willow Oak (Quercus phellos)	162	4	6
36.00864342	-77.55578991	River Birch (Betula nigra)	106	4	6
36.00864293	-77.55575977	Willow Oak (Quercus phellos)	106	4	6
36.00865992	-77.55577134	Willow Oak (Quercus phellos)	65	4	6
36.00867407	-77.55578402	Willow Oak (Quercus phellos)	127	4	6
36.00868209	-77.55579144	Bald Cypress (Taxodium distichum)	85	4	6
36.00869242	-77.55580361	Water Oak (Quercus nigra	125	4	6
36.00870471	-77.55581391	River Birch (Betula nigra)	81	4	6
36.00871458	-77.55578962	Swamp Chestnut Oak (Quercus michauxii)	169	4	6
36.0087026	-77.55577832	Shumard Oak (Quercus shumardii)	101	4	6
36.00868919	-77.55576495	Swamp Chestnut Oak (Quercus michauxii)	121	4	6
		trees /ac	840		
		# of Individuals	21		
		# of Species	6		
		Min Ht	65		
		Max Ht	169		
		Avg Ht. - Avg Vigor	123	4.0	

Maple Swamp Buffer
DMS ID # 100189
DWR Project # 2021-0614v2

MY2 MONITORING PLOT PHOTOS

MY2	MY1

Photo #1
Date: 09/18/2023
Feature: Plot 1
Direction: East

Photo #2
Date: 09/18/2023
Feature: Plot 2
Direction: East

Photo #3
Date: 09/18/2023
Feature: Plot 3
Direction: East

Maple Swamp Buffer
DMS ID # 100189
DWR Project # 2021-0614v2

MY2 MONITORING PLOT PHOTOS

MY2	MY1

Photo #4
Date: 09/18/2023
Feature: Plot 4
Direction: East

Photo #5
Date: 09/18/2023
Feature: Plot 5
Direction: East

Photo #6
Date: 09/18/2023
Feature: Plot 6
Direction: Northeast