MONITORING YEAR 2
ANNUAL BUFFER REPORT
FINAL

MCCLENNY ACRES MITIGATION SITE
Wayne County, NC

NCDEQ Contract No. 7423
DMS ID No. 100038
NCDWR Project Number 2018-0197

Neuse River Basin
HUC 03020201

Data Collection Period: September 2022
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PREPARED FOR:

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MCCLENNY ACRES MITIGATION SITE

Monitoring Year 2 Buffer Report

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Section 1: PROJECT OVERVIEW

1.1 Project Summary

Wildlands Engineering, Inc. (Wildlands) implemented a full delivery project at the McClenny Acres Mitigation Site (Site) for the North Carolina Department of Environmental Quality Division of Mitigation Services (DMS). A conservation easement comprised of 54.24 acres along four unnamed tributaries to the Neuse River are included in the project. A total of 8.72 acres (380,052 ft^2) were eligible and allocated towards generating riparian buffer credits via riparian restoration and riparian preservation. The Site is expected to generate a total of 196,531.361 riparian buffer credits, some of which are viable for conversion to a total maximum of 14,820.358 nutrient offset credits upon request and approval from NCDWR. The Site is located approximately four miles west of Goldsboro (Figure 1). The project resides within Hydrologic Unit Code (HUC) 03020201200030 and North Carolina Department of Water Resources (NCDWR) Sub-basin 03-04-12. The Site drains to the Neuse River, which is classified as Water Supply Waters (WS-IV) and Nutrient Sensitive Waters (NSW).

Work at the Site was planned, designed, and constructed per the McClenny Acres Mitigation Site – Riparian Buffer Mitigation Plan (Wildlands, 2019), the Consolidated Buffer Mitigation Rule 15A NCAC 02B .0295 (effective November 1, 2015), and the Neuse River Riparian Buffer Rules and Water Quality Standards (15A NCAC 02B .0233). The purpose of the riparian buffer restoration project 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, both of which are located in Appendix 1.

1.2 Project Goals and Objectives

The project is located on one parcel where a large portion had been used for row crop cultivation for decades. The remainder of the parcel is primarily wooded. A review of historic aerials shows that each of the on-site streams had been ditched or channelized since at least 1950.

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 Site addresses the TLW stressors of agricultural land use operations and the lack of protected riparian areas. The project will also address key catalog unit (CU) wide restoration goals described in the RBRP, including reduction of sediment and nutrient loads from agricultural lands by restoring and preserving wetlands, streams, and riparian buffers. 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.
- 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 riparian zone where insufficient.
- Permanently protect the Site from harmful uses - Establish a conservation easement on the Site. Protect aquatic habitat; protecting water supply waters.

The 54.24-acre Site is protected with a permanent conservation easement. Of the 54.24 acres, Neuse riparian buffer credits were generated by restoring 6.54 acres and preserving 6.59 acres (only 2.18 acres

of riparian preservation were eligible for credit generation). No buffer credit will be generated from the remaining 41.11 acres. Riparian restoration and preservation areas are within 200 feet of stream channels. Figure 3 and Table 1 in Appendix 1 detail the buffer credit generation.

1.3 Monitoring Year 2 Data Assessment

The Mitigation Plan (Wildlands, 2019) was submitted and accepted by DMS in February 2020. Construction activities by Land Mechanic Designs, Inc. was completed in September 2020, while tree planting by Bruton Natural Systems, Inc. was completed in March 2021. The baseline as-built survey was completed by Turner Land Surveying in September 2020. 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 2 monitoring (MY2) was conducted to assess the condition of the vegetation in September 2022.

1.3.1 Vegetative Assessment

The quantity of monitoring vegetation plots was determined in accordance with the Carolina Vegetation Survey-EEP Level 2 Protocol (Lee et al., 2008) such that at least 2 percent of the Site is encompassed in monitoring plots. A total of 6 vegetation plots (each 100 square meters) were established within the areas generating buffer credit. The plot corners were marked and are recoverable either through field identification or with the use of a GPS unit. Reference photographs were taken at the origin looking diagonally across the plot to the opposite corner. Trees were marked with flagging tape. Species composition, vigor, height, density, and survival rates were evaluated for each individual plot. Visual assessment was conducted to identify occurrences of invasive species.

During MY2 annual vegetation monitoring, planted stem densities ranging from 486 to 607 stems per acre were observed in vegetation plots. All sampled plots contained more than four planted species and no single species composed over 50% of planted stems. Herbaceous vegetation is well established, and pollinator species have been observed. Vegetation is growing well throughout the site and providing early successional ecosystem habitat. Refer to Appendix 2 for the Vegetation Condition Assessment Table, Monitoring Plan View Maps, and Vegetation Plot and Overview Photographs. Appendix 3 contains vegetation plot and summary data.

1.3.2 Vegetation Areas of Concern

Chinese privet (*Ligustrum sinense*) has invaded a 0.19 acre area near the upstream extent of UT2. This population will be treated during a future monitoring year. Additional adaptive management practices will be performed during the monitoring years to address minor issues as necessary. If during annual monitoring it is determined the project's ability to achieve performance standards are jeopardized, Wildlands will notify and work with the DMS/NCDWR to develop contingency plans and remedial actions. Any actions implemented will be designed to achieve the success criteria specified previously and will include a work schedule and updated monitoring criteria (if applicable).

1.4 Monitoring Year 2 Summary

Overall, the Site has surpassed the required vegetation success criteria for MY2 and is on track to exceed the final requirement of 260 stems per acre. Herbaceous vegetation is growing vigorously, and pollinator species have been observed. No easement encroachments have occurred.

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, 2020) available on DMS's website. All raw data supporting the tables and figures in the appendices are available from DMS upon request.

Section 2: METHODOLOGY

Planted woody vegetation was monitored in accordance with the guidelines and procedures developed by the Carolina Vegetation Survey-EEP Level 2 Protocol (Lee et al., 2008). A total of six 100 square meter vegetation plots were established within the Site conservation easement area.

Section 3: REFERENCES

Breeding, R. 2010. Neuse River Basin Restoration Priorities. North Carolina Ecosystem Enhancement Program.

Lee, Michael T. Peet, Robert K., Steven D. Wentworth, Thomas R. 2008. CVS-EEP Protocol for Recording Vegetation Version 4.2.

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

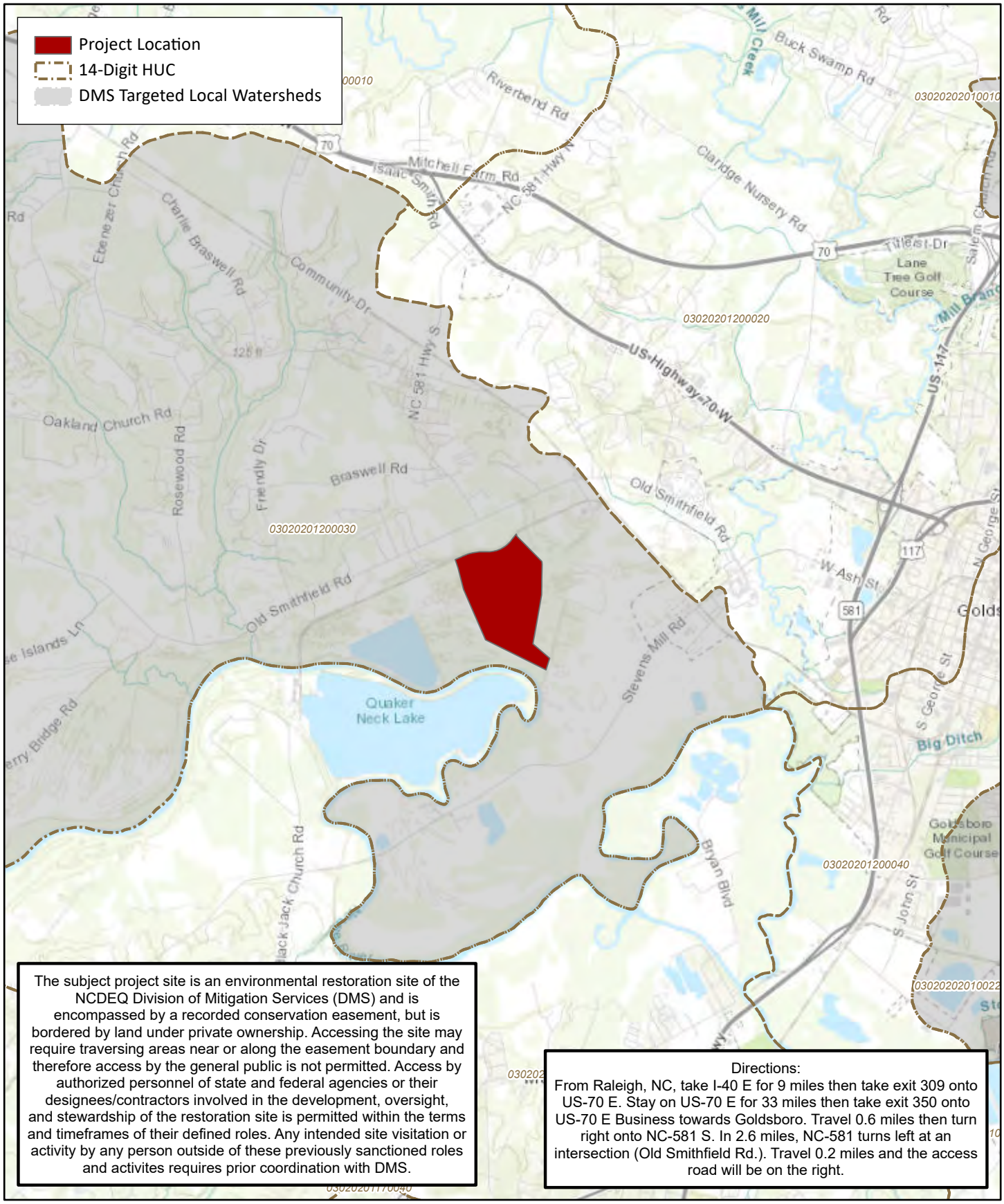
North Carolina Department of Environmental Quality, Division of Water Resources (NCDWR). 2000. 15A NCAC 02B .0233 Neuse River Basin: Nutrient Sensitive Waters Management Strategy: Protection and Maintenance of Existing Riparian Buffers.

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.

Wildlands Engineering, Inc. (2019). McClenny Acres 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



The subject project site is an environmental restoration site of the NCDEQ Division of Mitigation Services (DMS) and is encompassed by a recorded conservation easement, but is bordered by land under private ownership. Accessing the site may require traversing areas near or along the easement boundary and therefore access by the general public is not permitted. Access by authorized personnel of state and federal agencies or their designees/contractors involved in the development, oversight, and stewardship of the restoration site is permitted within the terms and timeframes of their defined roles. Any intended site visitation or activity by any person outside of these previously sanctioned roles and activites requires prior coordination with DMS.

Directions:
From Raleigh, NC, take I-40 E for 9 miles then take exit 309 onto US-70 E. Stay on US-70 E for 33 miles then take exit 350 onto US-70 E Business towards Goldsboro. Travel 0.6 miles then turn right onto NC-581 S. In 2.6 miles, NC-581 turns left at an intersection (Old Smithfield Rd.). Travel 0.2 miles and the access road will be on the right.

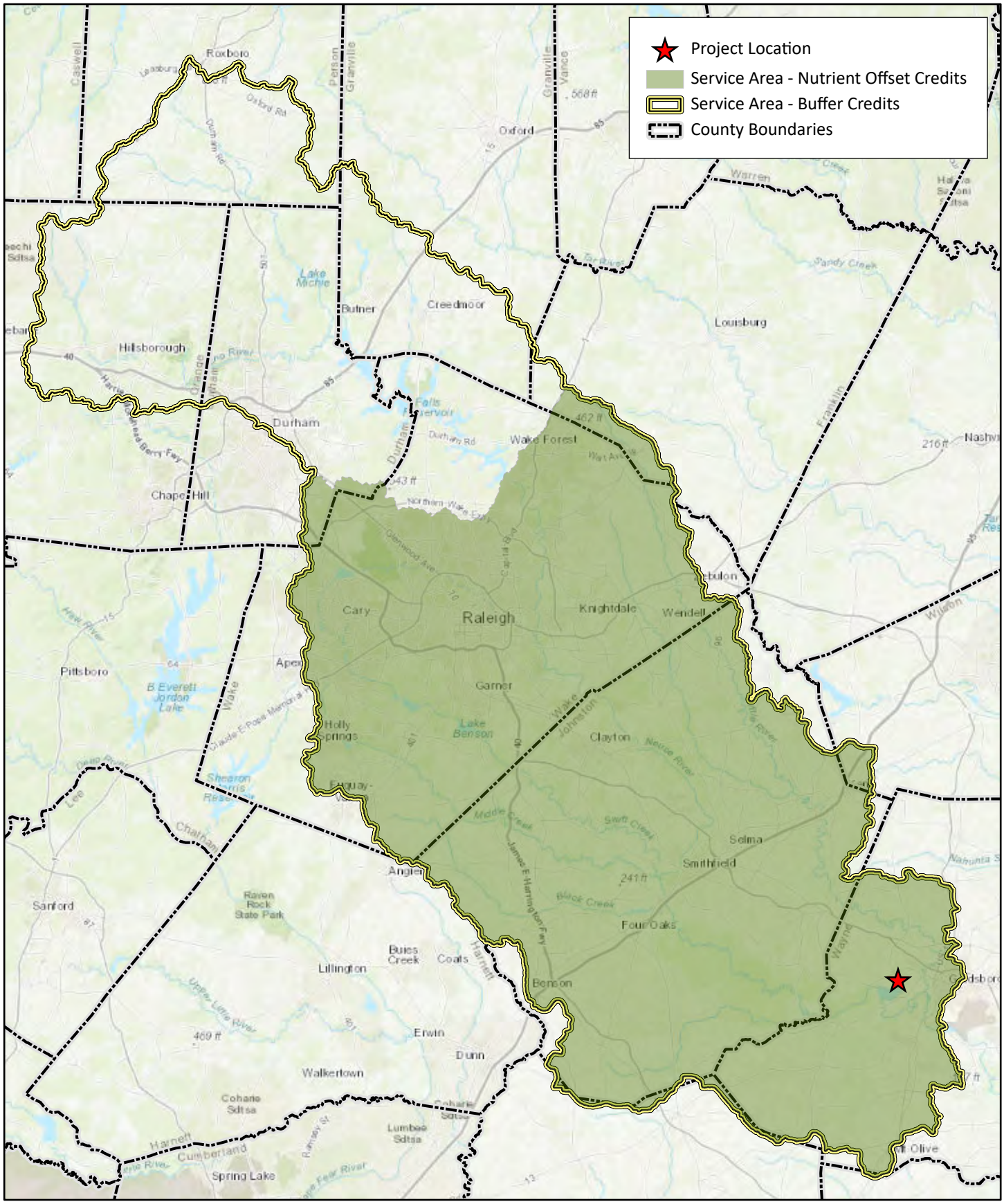
WILDLANDS ENGINEERING

0 0.5 1 Miles

N

Figure 1. Project Vicinity Map
McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 2 - 2022

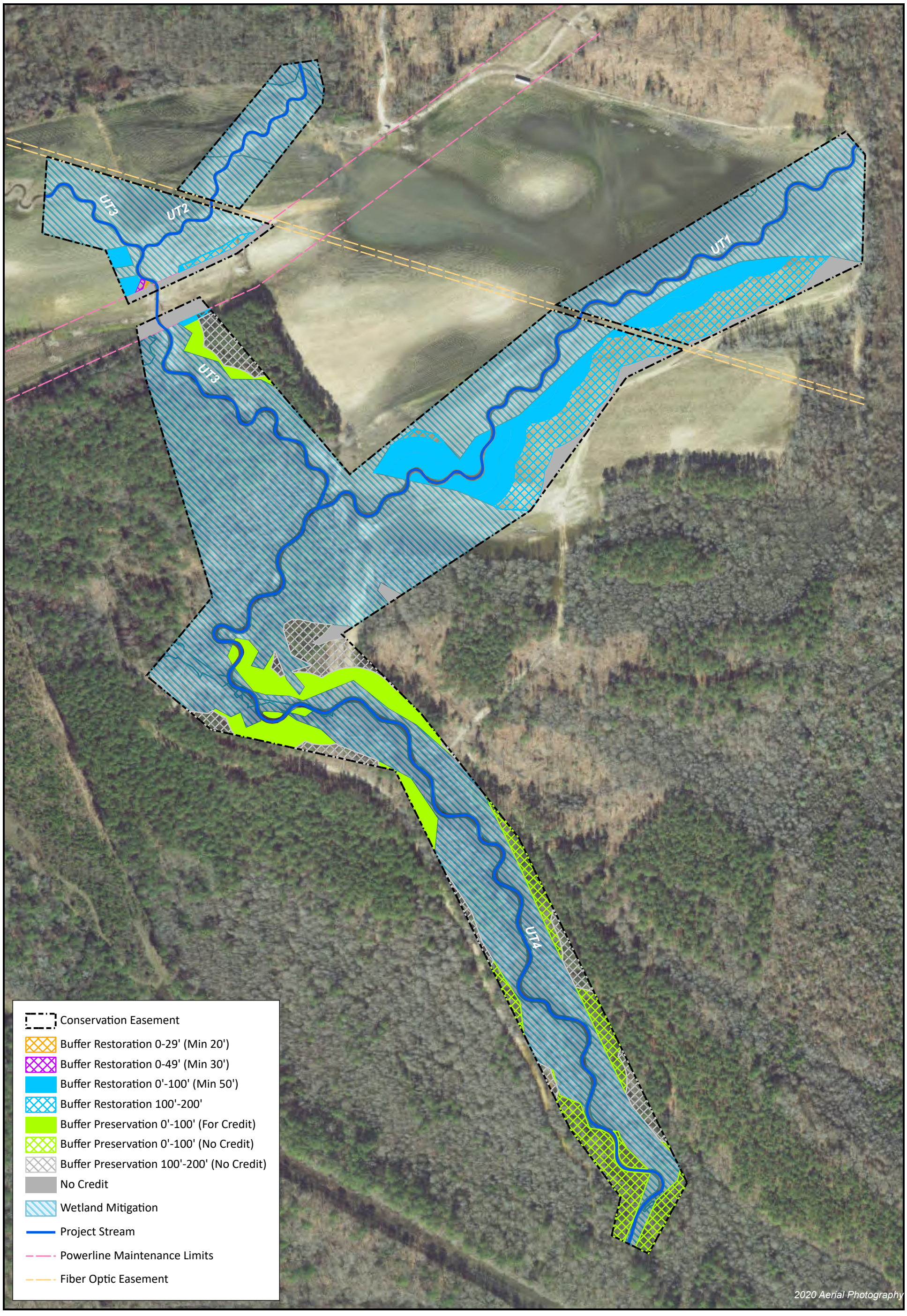
Wayne County, NC



WILDLANDS ENGINEERING

Figure 2. Service Area Map
McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 2 - 2022

Wayne County, NC



WILDLANDS ENGINEERING

0 150 300 Feet

N

Figure 3. Project Component/Asset Map
McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 2 - 2022

Wayne County, NC

Table 1. Buffer Project Area and Assets

McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 2 - 2022

Location	Jurisdictional Streams	Restoration Type	Reach ID / Component	Buffer Width (ft)	Creditable Area (sf) [1]	Initial Credit Ratio (x:1)	% Full Credit	Final Credit Ratio (x:1)	Riparian Buffer Credits (BMU)	Convertible to Nutrient Offset (Yes or No)	If Converted to Nutrient Offset	
											Nutrient Offset: N (lbs)	Nutrient Offset: P (lbs)
Rural	Subject	Restoration	UT3	0-29 (Min. 20)	335	1	75%	1.33333	251.251	No	0.000	N/A
Rural	Subject	Restoration	UT1, UT3	0-49 (Min. 30)	688	1	100%	1.00000	688.000	No	0.000	N/A
Rural	Subject	Restoration	UT1, UT2, UT3	0-100 (Min. 50)	137,859	1	100%	1.00000	137,859.000	Yes	7,193.678	N/A
Rural	Subject	Restoration	UT1, UT2, UT3	101-200	146,157	1	33%	3.03030	48,231.810	Yes	7,626.680	N/A
			SUBTOTALS		**285,039**				**187,030.061**		**14,820.358**	**N/A**

ELIGIBLE PRESERVATION AREA:	**95,013**

Location	Jurisdictional Streams	Restoration Type	Reach ID / Component	Buffer Width (ft)	Creditable Area (sf) [1]	Initial Credit Ratio (x:1)	% Full Credit	Final Credit Ratio (x:1)	Riparian Buffer Credits (BMU)
Rural	Subject	Preservation	UT4	0-100	95,013	10	100%	10.00000	9,501.300
			SUBTOTALS		**95,013**				**9,501.300**
			TOTALS		**380,052**				**196,531.361**

[1] The total buffer preservation area is 287,242 square feet.

[2] Credits in the Buffer Mitigation Plan and As-built Report were calculated using NCDWR template version *Buffer_Mitigation_Tables_1.0_2018_12_20.*

Table 2. Project Activity and Reporting History

McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 2 - 2022

Activity or Deliverable	Data Collection Complete	Task Completion or Deliverable Submission
Project Instituted	NA	March 2018
Mitigation Plan Approved	February 2020	February 2020
Construction (Grading) Completed	NA	September 2020
Planting Completed	NA	March 2021
Baseline Monitoring Document (Year 0)	March 2021	May 2021
Year 1 Monitoring	September 2021	December 2021
Year 2 Monitoring	September 2022	December 2022
Year 3 Monitoring	2023	December 2023
Year 4 Monitoring	2024	December 2024
Year 5 Monitoring	2025	December 2025

Table 3. Project Contact Table

McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 2 - 2022

Designer **Nicole Macaluso Millins**, PE	**Wildlands Engineering, Inc.** 312 West Millbrook Road, Suite 225 Raleigh, NC 27609 919.851.9986
Construction Contractor	**Land Mechanic Designs, Inc.** 126 Circle G Lane Willow Spring, NC 27592
Monitoring Performers Monitoring, POC	**Wildlands Engineering, Inc.** Jason Lorch 919.851.9986

Table 4. Project Information and Attributes

McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 2 - 2022

Project Information	
Project Name	McClenny Acres Mitigation Site
County	Wayne County
Project Coordinates (latitude and longitude)	35° 23' 25" N, 78° 03' 15" W
Project Area (acres)	54.24 [1]
Planted Acreage (acres of woody stems planted)	34.56 [1]
Project Watershed Summary Information	
Physiographic Province	Inner Coastal Plain
River Basin	Neuse River
USGS Hydrologic Unit 8-digit	03020201
USGS Hydrologic Unit 14-digit	03020201200030
DWR Sub-basin	03-04-12
Project Drainiage Area (acres)	787
Project Drainage Area Percentage of Impervious Area	2.1%
CGIA Land Use Classification	38% Agriculture, 21% Forested, 15% Wetlands, 17% Scrub/shrub, 9% Residential

[1] Areas also include components of a stream and wetland mitigation project.

Table 5. Adjacent Forested Areas Existing Tree and Shrub Species

McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 2 - 2022

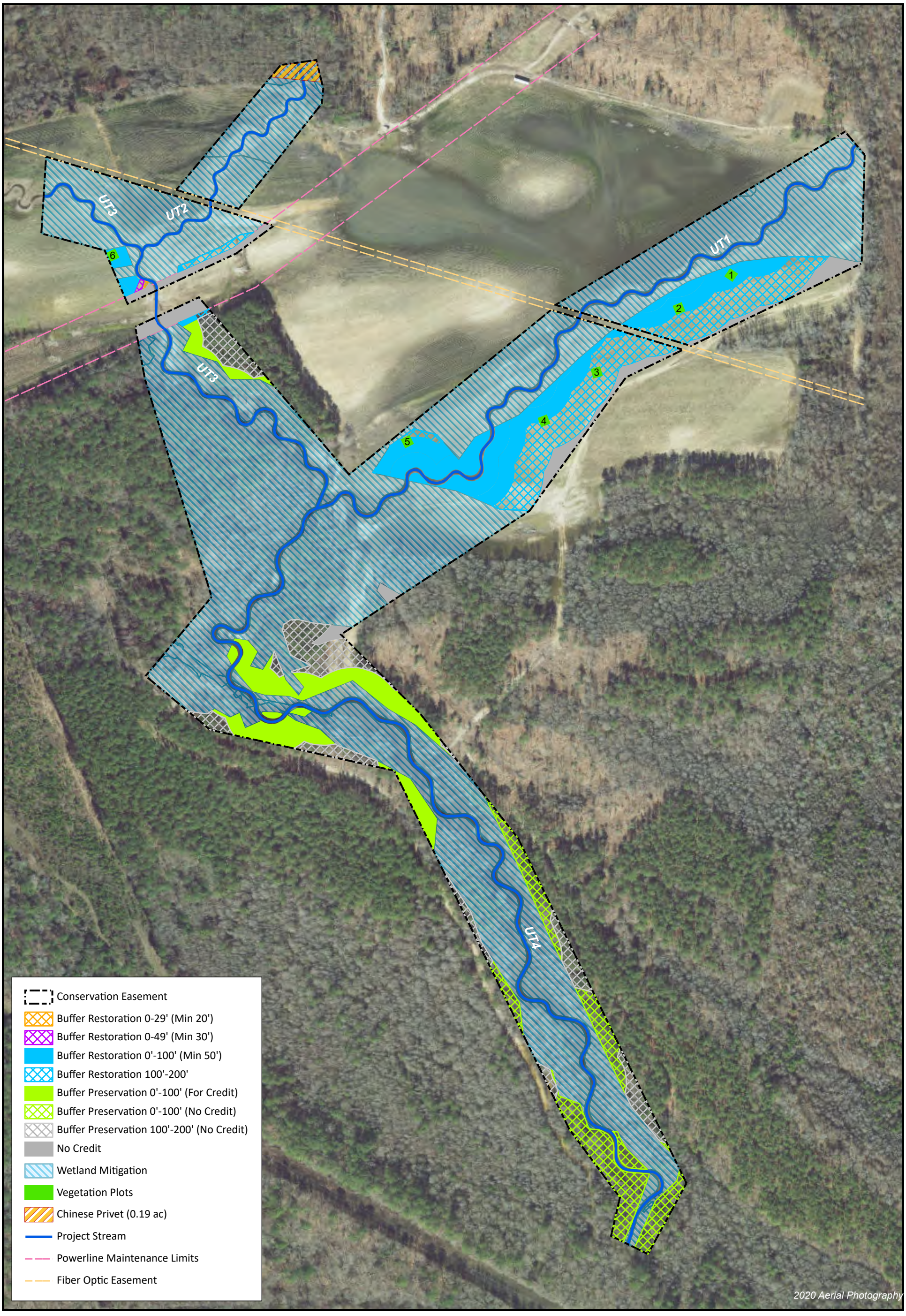
Common Name	Scientific Name	Wetland Indicator Status
Red Maple	*Acer rubrum*	FAC
Sweet Gum	*Liquidambar styraciflua*	FAC
Black Walnut	*Juglans nigra*	UPL
River Birch	*Betula nigra*	FACW
Water Oak	*Quercus nigra*	FAC
Willow Oak	*Quercus phellos*	FACW
Loblolly Pine	*Pinus taeda*	FAC
Tulip Poplar	*Lirodendron tulipifera*	FACU

Table 6. Planted Tree Species

McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 2 - 2022

Common Name	Scientific Name	Number Planted	% of Total
Willow Oak	*Quercus phellos*	695	15%
Sycamore	*Platanus occidentalis*	927	20%
River Birch	*Betula nigra*	927	20%
Bald Cypress	*Taxodium distichum*	232	5%
Swamp Chestnut Oak	*Quercus michauxii*	463	10%
Eastern Cottonwood	*Populus deltoides*	232	5%
Common Persimmon	*Diospryos virginiana*	232	5%
Sweetbay Magnolia	*Magnolia virginiana*	232	5%
Cherrybark Oak	*Quercus pagoda*	463	10%
Green Ash	*Fraxinus pennsylvannica*	231	5%

APPENDIX 2. VISUAL ASSESSMENT DATA



WILDLANDS ENGINEERING

0 150 300 Feet

N

Figure 4. Monitoring Map
McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 2 - 2022

Wayne County, NC

Table 7. Vegetation Condition Assessment Table
McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 2 - 2022

Planted Acreage **34.56**

Vegetation Category	Definitions	Mapping Threshold (ac)	Combined Acreage	% of Planted Acreage
Bare Areas	Very limited cover of both woody and herbaceous material.	0.10	0	0%
Low Stem Density Areas	Woody stem densities clearly below target levels based on current MY stem count criteria.	0.10	0	0%
		Total	**0**	**0%**
Areas of Poor Growth Rates	Planted areas where average height is not meeting current MY Performance Standard.	0.10	0	0%
		Cumulative Total	**0.0**	**0%**

Easement Acreage **54.24**

Vegetation Category	Definitions	Mapping Threshold (ac)	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. Invasive species included in summation above should be identified in report summary.	0.10	0.19	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.	None	0%	

VEGETATION PLOT PHOTOGRAPHS

VEGETATION PLOT 1 ***(9/12/2022)***

VEGETATION PLOT 2 ***(9/12/2022)***

VEGETATION PLOT 3 ***(9/12/2022)***

VEGETATION PLOT 4 ***(9/12/2022)***

VEGETATION PLOT 5 ***(9/12/2022)***

VEGETATION PLOT 6 ***(9/12/2022)***

OVERVIEW PHOTOGRAPHS

APPENDIX 3. VEGETATION PLOT DATA

Table 8. Vegetation Plot Criteria Attainment Table

McClenny Acres Mitigation Site

DMS ID No. 100038

Monitoring Year 2 - 2022

Plot	Success Criteria Met *	Tract Mean
Vegetation Plot 1	Yes	100%
Vegetation Plot 2	Yes	
Vegetation Plot 3	Yes	
Vegetation Plot 4	Yes	
Vegetation Plot 5	Yes	
Vegetation Plot 6	Yes	

*Success Criteria Met is based on the final success criteria for MY5 of 260 stems per acre.

Table 9. Vegetation Plot Data
McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 2 - 2022

Planted Acreage	34.56
Date of Initial Plant	2021-02-08
Date of Current Survey	2022-09-12
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		Veg Plot 6 F	
					Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total
Species Included in Approved Mitigation Plan	*Betula nigra*	river birch	Tree	FACW	4	4	3	3	3	3	4	4	1	1	1	1
	Diospyros virginiana	common persimmon	Tree	FAC			1	1	1	1	1	1			1	1
	Fraxinus pennsylvanica	green ash	Tree	FACW	2	2					1	1	1	1		
	Magnolia virginiana	sweetbay	Tree	FACW	1	1					1	1	1	1	1	1
	Nyssa biflora	swamp tupelo	Tree	OBL												
	Platanus occidentalis	American sycamore	Tree	FACW	2	2	3	3	3	3	3	3	5	5	3	3
	Populus deltoides	eastern cottonwood	Tree	FAC	1	1	1	1			1	1				
	Quercus lyrata	overcup oak	Tree	OBL												
	Quercus michauxii	swamp chestnut oak	Tree	FACW			1	1	1	1			2	2	4	4
	Quercus pagoda	cherrybark oak	Tree	FACW	1	1	2	2	1	1			1	1	2	2
	Quercus phellos	willow oak	Tree	FACW	3	3	1	1	6	6	2	2	2	2	1	1
	Salix nigra	black willow	Tree	OBL												
	Taxodium distichum	bald cypress	Tree	OBL							1	1	2	2		
	Ulmus alata	winged elm	Tree	FACU												
Sum	Performance Standard				14	14	12	12	15	15	14	14	15	15	13	13
Mitigation Plan Performance Standard	Current Year Stem Count					14		12		15		14		15		13
	Stems/Acre					567		486		607		567		607		526
	Species Count					7		7		6		8		8		7
	Dominant Species Composition (%)					29		25		40		29		33		31
	Average Plot Height (ft.)					3		3		3		3		3		3
	% Invasives					0		0		0		0		0		0
Post Mitigation Plan Performance Standard	Current Year Stem Count					14		12		15		14		15		13
	Stems/Acre					567		486		607		567		607		526
	Species Count					7		7		6		8		8		7
	Dominant Species Composition (%)					29		25		40		29		33		31
	Average Plot Height (ft.)					3		3		3		3		3		3
	% Invasives					0		0		0		0		0		0

Table 10. Vegetation Performance Standards Summary Table

McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 2 - 2022

	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 5												
Monitoring Year 4												
Monitoring Year 3												
Monitoring Year 2	567	3	7	0	486	3	7	0	607	3	6	0
Monitoring Year 1	567	3	7	0	567	3	7	0	607	2	6	0
Monitoring Year 0	567	3	7	0	567	3	7	0	607	2	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 5												
Monitoring Year 4												
Monitoring Year 3												
Monitoring Year 2	567	3	8	0	607	3	8	0	526	3	7	0
Monitoring Year 1	567	2	8	0	647	3	8	0	567	2	7	0
Monitoring Year 0	607	3	8	0	647	3	8	0	607	2	7	0

*Fixed plots are donoted with an F and Random plots with an R.