Pond Haven Buffer Restoration Site

Year 1 Monitoring Report
Granville County, North Carolina
Tar-Pamlico River Basin - 03020101

DMS Contract 7863
DMS Project Number 100118
DWR Project Number 20190646

Prepared for:
NC Department of Environmental Quality
Division of Mitigation Services
1652 Mail Service Center
Raleigh, NC 27699

Data Collected: October 2021
Date Submitted: February 2022

Monitoring and Design Firm

Prepared by:

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KCI ASSOCIATES OF NORTH CAROLINA, PA

ENGINEERS • SCIENTISTS • SURVEYORS • CONSTRUCTION MANAGERS

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MEMORANDUM

Date: February 2, 2022

To: Lindsay Crocker, DMS Project Manager

From: Tim Morris, Project Manager
KCI Associates of North Carolina, PA

Subject: Pond Haven Buffer Restoration Site
MY-01 Monitoring Report Comments
Tar-Pamlico River Basin CU 03020101
NCDMS Project # 100118
Contract # 7863

Please find below our responses in italics to the MY-01 Monitoring Report comments from NCDMS received on January 13, 2022, for the Pond Haven Buffer Restoration Site.

- Table 3. Replace asset table with the exact one used in the Mitigation Plan (table 1 from the Mitigation Plan).
  KCI Response: This change has been made.

- Please explain why so many species of planted stems showed up in MY1 and if this was typical MY0 mis-identification.
  KCI Response: Since MY0 vegetation monitoring was conducted before leaf out, many of the stems were identified as "Unknown." During the MY1 survey, most of these unknown stems were able to be identified to species.

Please contact me if you have any questions or would like clarification concerning these responses.

Sincerely,

Tim Morris
Project Manager

TABLE OF CONTENTS

Appendix A – Background Tables and Site Maps

Appendix B – Visual Assessment Data

Appendix C – Vegetation Plot Data

PROJECT SUMMARY

The Pond Haven Buffer Restoration Site (PHBRS) was completed in early 2021 and restored a total of 738,372 square feet of riparian buffer along stream in the Bollens and Johnson Creeks Watershed of the Tar-Pamlico River Basin (HUC 03020101010060). The buffers at this site have been historically cleared for pasture and impacted by cattle and other anthropogenic impacts. Prior to restoration, the site was an active cattle pasture that supported approximately 150 head. Tributary 1 had some existing buffer along the stream banks, which cattle had access to. Tributaries 2 and 3 were completely devoid of buffer, while Tributary 4 had some buffer along the stream banks that the cattle were excluded from. The completed project will return a functional riparian buffer to previously unbuffered and cattle impacted streams. All project assets are based on the surveyed conservation easement and top of bank.

The PHBRS is protected by a 17.49 acre permanent conservation easement, held by the State of North Carolina. It is located in central Granville County, approximately three miles northeast of Creedmoor, North Carolina. Specifically, the site is on the west side of NC-96, just south of Cannady Road. The center of the site is at approximately 36.1591 N and -78.5954 W in the Wilton USGS Quadrangle.

The mitigation work at the PHBRS was completed on February 27, 2021. This work consisted of chemical control of pasture grasses and other non-native or invasive species. Disking was used in areas of fescue or other allelopathic plants. Cattle exclusion fencing was erected around the entire easement boundary and 11,900 bare root seedlings were planted across the site with a 4' Tubex Treeshelter and a VisPore Weedmat fitted on every other tree. See Table 3 for a complete list of the species planted on site. A custom herbaceous seed mix composed of native species was spread across the site. Finally the site boundary was marked with visible signs conforming to DMS and DEQ Stewardship standards.

MONITORING PLAN

Monitoring will be conducted for a period of five years following project implementation or until performance standards have been achieved. Monitoring will consist of vegetation sampling and visual inspection to ensure the health and vigor of the planted restoration area and that the requirements of the conservation easement are being upheld. Vegetation sampling will consist of fifteen 10m x 10m plots. Eight of these plots were permanently installed during the baseline monitoring, while the other seven will be randomly placed during each monitoring visit. The species, height, and origin (planted vs. volunteer) of all trees within these plots will be recorded each year, and a photograph will be taken of each plot. Invasive stems will be recorded in each plot but will not count towards reaching performance standards.

SUCCESS CRITERIA

Plots must achieve an average stem density of 260 stems/acre after five years with a minimum of four native hardwood tree species or four native hardwood tree and native shrub species, where no one species is greater than 50 percent of stems. Native hardwood and native shrub volunteer species may be included to meet the final performance standard of 260 stems/acre upon DWR approval.

MONITORING RESULTS

Monitoring Year 1 vegetation data was collected on October 21st and 29th of 2021. All 15 vegetation monitoring plots had greater than 260 stems/acre. The site had an average of 507 planted stems/acre and 861 total stems/acre (including volunteers). Overall, the site is well vegetated with extensive herbaceous coverage and many diverse volunteer woody species.

APPENDIX A

Background Tables and Site Maps

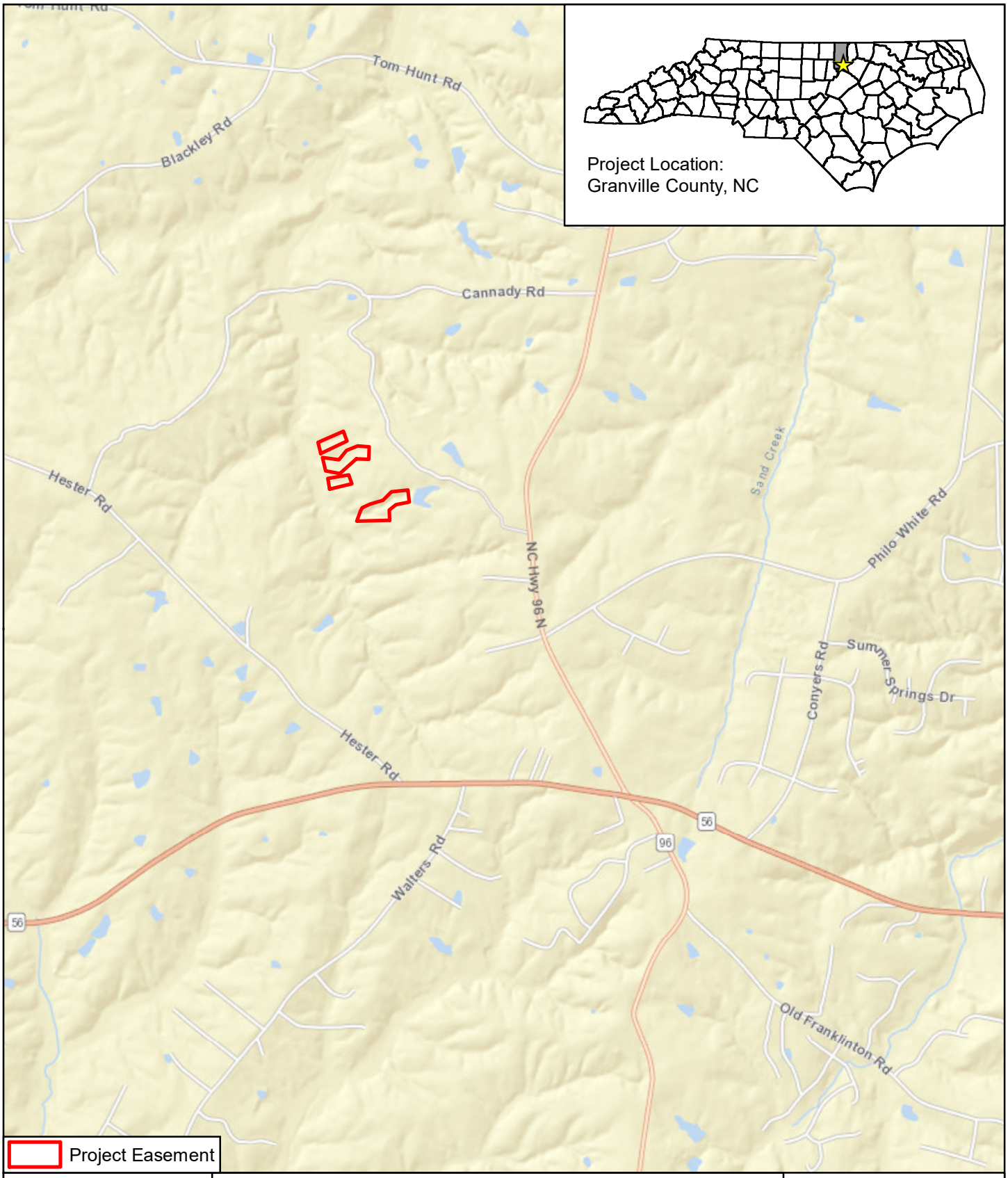

FIGURE 1. PROJECT SITE VICINITY MAP
POND HAVEN BUFFER RESTORATION SITE
GRANVILLE COUNTY, NC

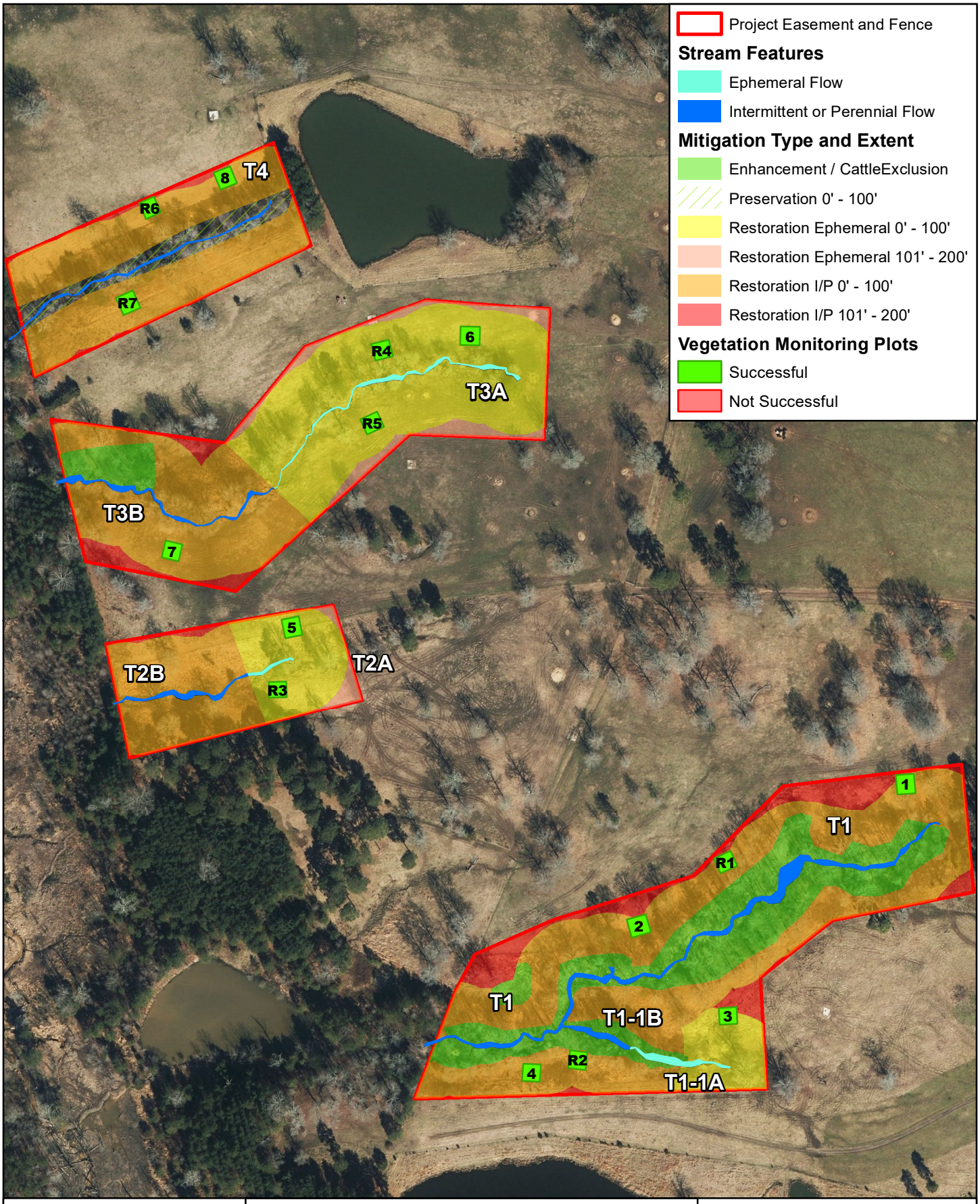

FIGURE 2. PROJECT ASSETS and CURRENT CONDITIONS
POND HAVEN BUFFER RESTORATION SITE
GRANVILLE COUNTY, NC

Sources: NC Statewide Orthoimagery, 2017.

Table 1. Buffer Project Attributes	
Project Name	Pond Haven Buffer Restoration Site
Hydrologic Unit Code	03020101010060
River Basin	Tar-Pamlico
Geographic Location (Lat, Long)	36.1591 N, -78.5954 W
Site Protection Instrument (DB, PG)	DB 1773 PG 770
Total Credits (BMU)	620,880.555
Types of Credits	Buffer
Mitigation Plan Date	February 20, 2020
Initial Planting Date	February 27, 2021
Baseline Report Date	April 2021
MY1 Report Date	December 2021
MY2 Report Date	December 2022
MY3 Report Date	December 2023
MY4 Report Date	December 2024
MY5 Report Date	December 2025

Table 3. Pond Haven Buffer Restoration Site, 100118, Project Mitigation Credits

Tar-Pamlico 03020101	Project Area
19.16394	N Credit Ratio (sf/credit)
297.54099	P Credit Ratio (sf/credit)

Credit Type	Location	Subject? (enter NO if ephemeral or ditch [1])	Feature Type	Mitigation Activity	Min-Max Buffer Width (ft)	Feature Name	Total Area (sf)	Total (Creditable) Area of Buffer Mitigation (sf)	Initial Credit Ratio (x:1)	% Full Credit	Final Credit Ratio (x:1)	Convertible to Riparian Buffer?	Riparian Buffer Credits	Convertible to Nutrient Offset?
Buffer	Rural	Yes	I / P	Restoration	0-100	Restoration I/P	372,012	372,012	1	100%	1.00000	Yes	372,012.000	No
Buffer	Rural	Yes	I / P	Restoration	101-200	Restoration I/P >101	45,113	45,113	1	33%	3.03030	Yes	14,887.305	No
Buffer	Rural	No	Ephemeral	Restoration	0-100	Restoration Eph	179,203	179,203	1	100%	1.00000	Yes	179,203.000	No
Buffer	Rural	No	Ephemeral	Restoration	101-200	Restoration Eph >100	17,943	1,215	1	33%	3.03030	Yes	400.950	No
Buffer	Rural	Yes	I / P	Enhancement via Cattle Exclusion	0-100	Cattle Exclusion	104,918	104,918	2	100%	2.00000	Yes	52,459.000	No
													–	
													–	
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						Totals:	719,189	702,461						

Enter Preservation Credits Below — Eligible for Preservation (sf): 234,154

Credit Type	Location	Subject?	Feature Type	Mitigation Activity	Min-Max Buffer Width (ft)	Feature Name	Total Area (sf)	Total (Creditable) Area for Buffer Mitigation (sf)	Initial Credit Ratio (x:1)	% Full Credit	Final Credit Ratio (x:1)	Riparian Buffer Credits
Buffer	Rural	Yes	I / P	Preservation	0-100	Pres inside fence	19,183	19,183	10	100%	10.00000	1,918.300
												–
												–
												–
												–
												–
												–
												–
												–
												–
												–
						Preservation Area Subtotal (sf):		19,183				
						Preservation as % Total Area of Buffer Mitigation:		2.0%				
						Ephemeral Reaches as % Total Area of Buffer Mitigation:		25.0%				

TOTAL AREA OF BUFFER MITIGATION (TABM)		
Mitigation Totals	Square Feet	Credits
Restoration:	597,543	566,503.255
Enhancement:	104,918	52,459.000
Preservation:	19,183	1,918.300
Total Riparian Buffer:	721,644	620,880.555
TOTAL NUTRIENT OFFSET MITIGATION		
Mitigation Totals	Square Feet	Credits
Nutrient Offset: Nitrogen:	0	0.000
Nutrient Offset: Phosphorus:		0.000

1. The Randleman Lake buffer rules allow some ditches to be classified as subject according to 15A NCAC 02B .0250 (5)(a).

APPENDIX B

Visual Assessment Data

Vegetation Monitoring Plot Photos

Plot 1 MY01 – 10/29/2021

Plot 2 MY01 – 10/29/2021

Plot 3 MY01 – 10/29/2021

Plot 4 MY01 – 10/29/2021

Plot 5 MY01 – 10/21/2021

Plot 6 MY01 – 10/21/2021

Plot 7 MY01 – 10/21/2021

Plot 8 MY01 – 10/21/2021

Plot R1 MY01 – 10/29/2021

Plot R2 MY01 – 10/29/2021

Plot R3 MY01 – 10/21/2021

Plot R4 MY01 – 10/21/2021

Plot R5 MY01 – 10/21/2021

Plot R6 MY01 – 10/21/2021

Plot R7 MY01 – 10/21/2021

APPENDIX C

Vegetation Plot Data

Table 3. Species and Quantity of Planted Stems		
Common Name	Scientific Name	Quantity
Black Gum	*Nyssa sylvatica*	595
River Birch	*Betula nigra*	1190
Persimmon	*Diospyros virginiana*	1190
Silky Dogwood	*Cornus amomum*	595
Buttonbush	*Cephalanthus occidentalis*	120
Pin Oak	*Quercus palustris*	595
Tulip Poplar	*Liriodendron tulipifera*	1190
Sycamore	*Platanus occidentalis*	1190
White Oak	*Quercus alba*	1190
Swamp Chestnut Oak	*Quercus michauxii*	1190
Willow Oak	*Quercus phellos*	1665
American Elm	*Ulmus americana*	1190
Herbaceous Seed Mix		
Common Name	Scientific Name	% of mix
Autumn Bentgrass	*Agrostis perennans*	10
Big Bluestem	*Andropogon gerardii*	8
Lanceleaf Coreopsis	*Coreopsis lanceolata*	10
Virginia Wild Rye	*Elymus virginicus*	15
Soft Rush	*Juncus effusus*	3
Switchgrass	*Panicum virgatum*	10
Black-Eyed Susan	*Rudbeckia hirta*	10
Little Bluestem	*Schizachyrium scoparium*	3
Indian Grass	*Sorghastrum nutans*	3
Eastern Gamma	*Tripsacum dactyloides*	3
Rye Grain	*Secale cereal*	25

Table 4. Stem Count by Plot and Species												
	Current Plot Data (MY01 2021)											
	Plot 01		Plot 02		Plot 03		Plot 04		Plot 05		Plot 06	
Species	**Planted**	**Total**	**Planted**	**Total**	**Planted**	**Total**	**Planted**	**Total**	**Planted**	**Total**	**Planted**	**Total**
American Elm (*Ulmus americana*)	1	1	1	1	1	1	1	1	2	2	5	5
American Sycamore (*Platanus occidentalis*)	1	1	8	8	2	2	2	2				
Baccharis (*Baccharis halimifolia*)												
Black Cherry (*Prunus serotina*)		2										
Black Gum (*Nyssa sylvatica*)	2	2							5	5		
Eastern Red Cedar (*Juniperus virginiana*)												
Loblolly Pine (*Pinus taeda*)		1						4				
Mokcernut Hickory (*Carya tomentosa*)												
Northern Red Oak (*Quercus rubra*)												
Oak (*Quercus sp.*)												
Persimmon (*Diospyros virginiana*)												
Pin Oak (*Quercus palustris*)	1	1			2	2	1	1				
River Birch (*Betula nigra*)	1	1	8	8	4	4						
Silky Dogwood (*Cornus amomum*)	1	1	5	5	1	1	4	4	3	3		
Swamp Chestnut Oak (*Quercus michauxii*)			1	1	1	1	3	3			1	1
Sweetgum (*Liquidambar styraciflua*)		15		4				8				
Tulip Poplar (*Liriodendron tulipifera*)	4	4							2	2		
White Oak (*Quercus alba*)	1	37					1	1	2	2	1	1
Willow Oak (*Quercus phellos*)		1	4	4	4	4	1	1	1	1	1	1
Winged Sumac (*Rhus copallinum*)												
Unknown												
Stem count	12	67	27	31	15	15	13	25	15	15	8	8
size (ares)	1		1		1		1		1		1	
size (ACRES)	0.025		0.025		0.025		0.025		0.025		0.025	
Species count	8	12	6	7	7	7	7	9	6	6	4	4
Stems per ACRE	486	2,711	1,093	1,255	607	607	526	1,012	607	607	324	324

Table 4. Stem Count by Plot and Species												
	Current Plot Data (MY01 2021)											
	Plot 07		Plot 08		Plot R1		Plot R2		Plot R3		Plot R4	
Species	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total
American Elm (*Ulmus americana*)	3	3	4	4	1	1	2	2	5	5	1	1
American Sycamore (*Platanus occidentalis*)									1	1		
Baccharis (*Baccharis halimifolia*)												
Black Cherry (*Prunus serotina*)												
Black Gum (*Nyssa sylvatica*)	2	2	1	1	1	1					2	2
Eastern Red Cedar (*Juniperus virginiana*)						3		1				
Loblolly Pine (*Pinus taeda*)						1		5				
Mokcernut Hickory (*Carya tomentosa*)								1				
Northern Red Oak (*Quercus rubra*)												1
Oak (*Quercus sp.*)											1	1
Persimmon (*Diospyros virginiana*)	3	3										
Pin Oak (*Quercus palustris*)							3	3			3	3
River Birch (*Betula nigra*)					2	2			5	5	1	1
Silky Dogwood (*Cornus amomum*)					2	2						
Swamp Chestnut Oak (*Quercus michauxii*)					1	1	3	3	2	2		
Sweetgum (*Liquidambar styraciflua*)		1				11		8				1
Tulip Poplar (*Liriodendron tulipifera*)	4	4	1	1	1	1			1	1	1	1
White Oak (*Quercus alba*)	2	2	4	4	5	5	1	1			2	2
Willow Oak (*Quercus phellos*)	5	5	3	3	1	1	8	8			2	2
Winged Sumac (*Rhus copallinum*)						25						
Unknown												
Stem count	19	20	13	13	14	54	17	32	14	14	13	15
size (ares)	1		1		1		1		1		1	
size (ACRES)	0.025		0.025		0.025		0.025		0.025		0.025	
Species count	6	7	5	5	8	12	5	9	5	5	8	10
Stems per ACRE	769	809	526	526	567	2,185	688	1,295	567	567	526	607

Table 4. Stem Count by Plot and Species										
	Current Plot Data (MY01 2021)						Annual Means			
	Plot R5		Plot R6		Plot R7		MY01 (2021)		MY00 (2021)	
Species	**Planted**	**Total**	**Planted**	**Total**	**Planted**	**Total**	**Planted**	**Total**	**Planted**	**Total**
American Elm (*Ulmus americana*)	1	1	3	3	2	2	27	27	17	17
American Sycamore (*Platanus occidentalis*)							14	14	21	21
Baccharis (*Baccharis halimifolia*)		1						1		
Black Cherry (*Prunus serotina*)								2		
Black Gum (*Nyssa sylvatica*)	3	3	3	3	3	3	18	18		
Eastern Red Cedar (*Juniperus virginiana*)						4		4		7
Loblolly Pine (*Pinus taeda*)						2		11		6
Mokcernut Hickory (*Carya tomentosa*)								1		
Northern Red Oak (*Quercus rubra*)		1						2		
Oak (*Quercus sp.*)							1	1	65	65
Persimmon (*Diospyros virginiana*)	1	1					4	4		
Pin Oak (*Quercus palustris*)	1	1					11	11		
River Birch (*Betula nigra*)	1	1					22	22	19	19
Silky Dogwood (*Cornus amomum*)							16	16	23	23
Swamp Chestnut Oak (*Quercus michauxii*)							12	12	2	2
Sweetgum (Liquidambar styraciflua)								48		41
Tulip Poplar (*Liriodendron tulipifera*)	2	2	1	1			16	16	19	19
White Oak (*Quercus alba*)	1	1	1	1	5	5	17	53	14	39
Willow Oak (*Quercus phellos*)			3	3	4	4	30	31	34	34
Winged Sumac (*Rhus copallinum*)								25		
Unknown									113	113
Stem count	17	17	27	33	26	26	188	319	327	406
size (ares)	1		1		1		15		15	
size (ACRES)	0.025		0.025		0.025		0.371		0.371	
Species count	5	5	5	6	4	4	12	20	10	13
Stems per ACRE	688	688	1,093	1,335	1,052	1,052	507	861	882	1,095