Pond Haven Buffer Restoration Site

Baseline 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

Baseline Data Collected: March 2021
Date Submitted: April 2021

Monitoring and Design Firm

Prepared by:

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ENGINEERS • SCIENTISTS • SURVEYORS • CONSTRUCTION MANAGERS
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MEMORANDUM

Date: April 23, 2021

To: Lindsay Crocker, DMS Project Manager

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

Subject: Pond Haven Buffer Restoration Site
MY-00 Monitoring Report Comments
Tar-Pamlico River Basin CU 03020101
NCDMS Project # 100118
Contract # 7863

Please find below our responses in italics to the MY-00 Baseline Monitoring Report comments from NCDMS received on April 14, 2021, for the Pond Haven Buffer Restoration Site.

- Cover page: update contract number to 7863.
  KCI Response: This change has been made.

- Table 2. Replace asset table with the one used in the Mitigation Plan (table 1 from the Mitigation Plan).
  KCI Response: This change has been made.

- Page 1, the vegetation monitoring results in the narrative do not match the vegetation table averages for MY0. Update for accuracy.
  KCI Response: This error has been corrected.

- Add the shapefile of the fence that was installed and show on Figure 2 as Fence (baseline survey). Alternatively, if the surveyed easement line is the same as the fence line, please update legend to show as Surveyed project easement and fence.
  KCI Response: The surveyed easement line is the same as the fence line. The legend in Figure 2 has been updated to reflect this.

- Confirm and provide note in the text and/or figure that the project assets are based on the surveyed conservation easement and top of bank.
  KCI Response: Project assets are based on the surveyed conservation easement and top of bank. A note has been added to the text to clarify this.

- Please be advised that if the tree tubes and matting have not biodegraded by project close out, they will need to be removed from the site.
  KCI Response: While it is expected that the tubes will biodegrade throughout the life of the project, KCI is prepared to remove them from the site before closeout if necessary.

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

Sincerely,

Tim Morris
Project Manager

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PROJECT SUMMARY

The Pond Haven Buffer Restoration Site (PHBRS) was completed in March 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, impacted by cattle, and from 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 and adjacent riparian areas to 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.

BASELINE CONDTIONS

Baseline monitoring was conducted on March 30, 2021. The baseline monitoring found an average of 882 planted stems per acre and 1,095 total stems per acre. All fifteen plots had greater than 260 stems/acre and at least four native hardwood tree species, with no species making up greater than 50 percent of the stems. Since baseline vegetation monitoring was conducted before leaf out, many of the stems were identified as "Unknown." During the Monitoring Year 1 vegetation survey, these stems will be identified to species. The

cattle exclusion fencing was intact and site boundary markers were visible across the whole site. Monitoring Year 1 data collection is schedule to take place in October 2021, 6 months after the baseline data collection.

APPENDIX A

Background Tables and Site Maps

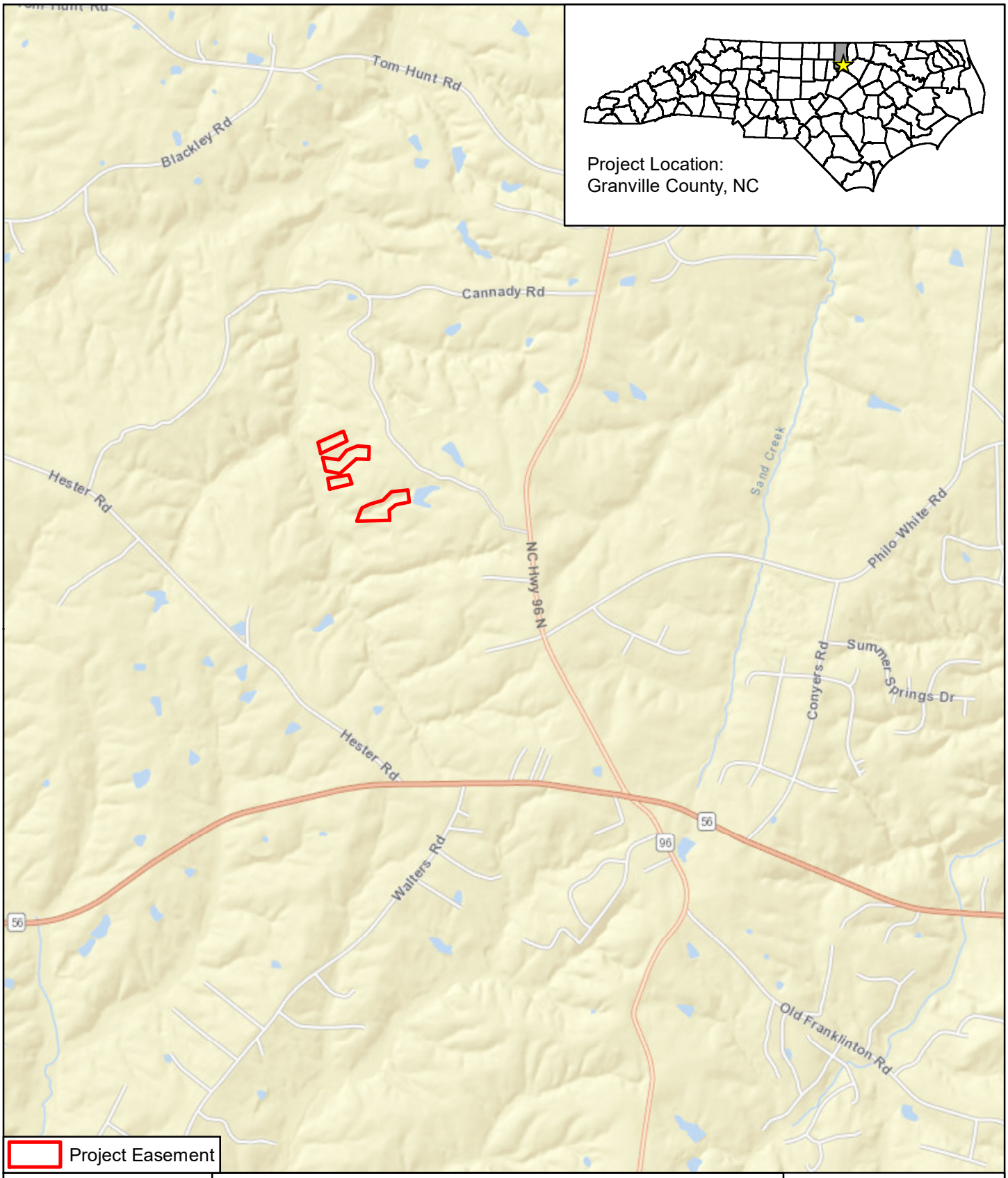
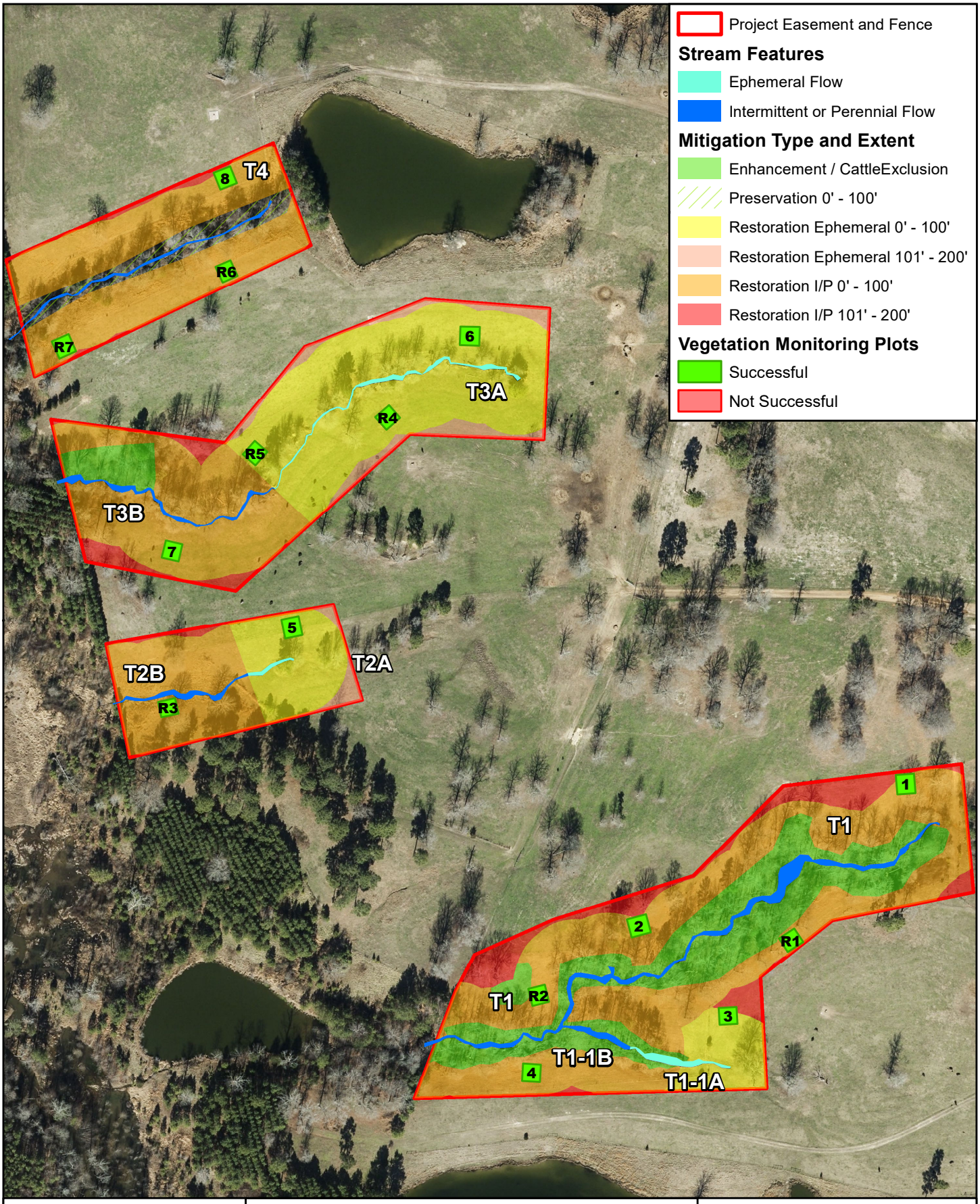


FIGURE 1. PROJECT SITE VICINITY MAP
POND HAVEN BUFFER RESTORATION SITE
GRANVILLE COUNTY, NC



0 100 200 300 Feet

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

N

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	N/A	372,012.000	No
Buffer	Rural	Yes	I / P	Restoration	101-200	Restoration I/P > 101	45,113	45,113	1	33%	3.03030	N/A	14,887.305	No
Buffer	Rural	No	Ephemeral	Restoration	0-100	Restoration Eph	179,203	179,203	1	100%	1.00000	N/A	179,203.000	No
Buffer	Rural	No	Ephemeral	Restoration	101-200	Restoration Eph >100	17,943	1,215	1	33%	3.03030	N/A	400.950	No
Buffer	Rural	Yes	I / P	Enhancement via Cattle Exclusion	0-100	Cattle Exclusion	104,918	104,918	2	100%	2.00000	N/A	52,459.000	No
												N/A	—	No
												N/A	—	No
												N/A	—	No
						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

APPENDIX B

Visual Assessment Data

Vegetation Monitoring Plot Photos

Plot 1 MY00 – 3/30/2021

Plot 2 MY00 – 3/29/2021

Plot 3 MY00 – 3/30/2021

Plot 4 MY00 – 3/30/2021

Plot 5 MY00 – 3/30/2021

Plot 6 MY00 – 3/30/2021

Plot 7 MY00 – 3/30/2021

Plot 8 MY00 – 3/30/2021

Plot R1 MY00 – 3/30/2021

Plot R2 MY00 – 3/30/2021

Plot R3 MY00 – 3/29/2021

Plot R4 MY00 – 3/30/2021

Plot R5 MY00 – 3/30/2021

Plot R6 MY00 – 3/30/2021

Plot R7 MY00 – 3/30/2021

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 (MY00 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	5	5
American Sycamore *(Platanus occidentalis*)	1	1	8	8	5	5	6	6				
Eastern Red Cedar (*Juniperus virginiana*)								3				
Loblolly Pine (*Pinus taeda*)												
Oak (*Quercus sp.*)	2	2	4	4	4	4	7	7	6	6	5	5
River Birch (*Betula nigra*)	1	1	6	6	6	6	3	3			1	1
Silky Dogwood (*Cornus amomum*)			6	6	1	1	4	4	3	3	1	1
Swamp Chestnut Oak (*Quercus michauxii*)											1	1
Sweetgum (*Liquidambar styraciflua*)								8				
Tulip Poplar (*Liriodendron tulipifera*)	2	2							3	3	2	2
White Oak (*Quercus alba*)		25										
Willow Oak (*Quercus phellos*)	2	2	6	6	5	5	1	1	4	4	1	1
Unknown	16	16	3	3	7	7	9	9	6	6	6	6
Stem count	24	49	34	34	28	28	30	41	23	23	22	22
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	7	7	6	6	6	8	6	6	8	8
Stems per ACRE	971	1,983	1,376	1,376	1,133	1,133	1,214	1,659	931	931	890	890

Table 4. Stem Count by Plot and Species												
	Current Plot Data (MY00 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	2	2			1	1			2	2
American Sycamore *(Platanus occidentalis*)					1	1						
Eastern Red Cedar (*Juniperus virginiana*)						1		3				
Loblolly Pine (*Pinus taeda*)								6				
Oak (*Quercus sp.*)	4	4	4	4	4	4	7	7	5	5	4	4
River Birch (*Betula nigra*)							2	2				
Silky Dogwood (*Cornus amomum*)					1	1	4	4	1	1	2	2
Swamp Chestnut Oak (*Quercus michauxii*)												
Sweetgum (*Liquidambar styraciflua*)								27				
Tulip Poplar (*Liriodendron tulipifera*)	5	5	3	3	3	3			1	1	1	1
White Oak (*Quercus alba*)					11	11	3	3				
Willow Oak (*Quercus phellos*)	3	3	2	2	2	2	3	3	2	2	2	2
Unknown	11	11	15	15	7	7	7	7	5	5	15	15
Stem count	26	26	26	26	29	30	27	63	14	14	26	26
size (ares)	1		1		1		1		1		1	
size (ACRES)	0.025		0.025		0.025		0.025		0.025		0.025	
Species count	5	5	5	5	7	8	7	10	5	5	6	6
Stems per ACRE	1,052	1,052	1,052	1,052	1,174	1,214	1,093	2,550	567	567	1,052	1,052

Table 4. Stem Count by Plot and Species								
	Current Plot Data (MY00 2021)						Annual Means	
	Plot R5		Plot R6		Plot R7		MY00 (2021)	
Species	**Planted**	**Total**	**Planted**	**Total**	**Planted**	**Total**	**Planted**	**Total**
American Elm (*Ulmus americana*)			4	4			17	17
American Sycamore (*Platanus occidentalis*)							21	21
Eastern Red Cedar (*Juniperus virginiana*)								7
Loblolly Pine (*Pinus taeda*)								6
Oak (*Quercus sp.*)	5	5	8	8	14	14	65	65
River Birch (*Betula nigra*)							19	19
Silky Dogwood (*Cornus amomum*)							23	23
Swamp Chestnut Oak (*Quercus michauxii*)	1	1					2	2
Sweetgum (*Liquidambar styraciflua*)				6				41
Tulip Poplar (*Liriodendron tulipifera*)	1	1	1	1	2	2	19	19
White Oak (*Quercus alba*)							14	39
Willow Oak (*Quercus phellos*)	2	2	1	1	3	3	34	34
Unknown	8	8	13	13	7	7	113	113
Stem count	17	17	27	33	26	26	327	406
size (ares)	1		1		1		15	
size (ACRES)	0.025		0.025		0.025		0.371	
Species count	5	5	5	6	4	4	10	13
Stems per ACRE	688	688	1,093	1,335	1,052	1,052	882	1,095