ANNUAL MONITORING REPORT (MY1)

WICOMICO BUFFER MITIGATION SITE
EDGECOMBE COUNTY, NORTH CAROLINA

DMS PROJECT NO.100188
NCDEQ CONTRACT NO. 200209-01
DWR PROJECT NO. 2021-0750 VERSION 2

Tar Pamlico River Basin
Cataloging Unit 03020103
RFP#:16-20200209

Data Collection: September 2023
Submission: January 2024

Prepared for:

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

FREESE AND NICHOLS
Innovative approaches
Practical results
Outstanding service

531 N. Liberty St. + Winston-Salem, North Carolina 27101 + 336-790-6744 + FAX 817-735-7491 www.freese.com

January 3, 2024

Emily Dunnigan
Project Manager – Eastern Region
Division of Mitigation Services
217 West Jones St
Raleigh, NC 27603

Re: Response to NC DMS Comments on Draft MY1 Report Submittal
Wicomico Riparian Buffer Mitigation Site, Edgecombe County, NC
Tar Pamlico River 03020103
DMS Project No. 100188

Dear Ms. Dunnigan,

Freese and Nichols, Inc. received comments from you on November 20, 2023 on the Wicomico Draft MY1 report. This letter provides our response to those comments (in blue below).

1. Cover Page: Please update the submission date and page footers to November 2023 or whichever month is accurate when you submit the final.

   ❖ The submission date has been updated to reflect the month of final report submittal.

2. Pg. 7, Section 4.1: Based on the data provided it looks like there are a lot of volunteer sweetgum and red maple. These two species cannot be used to count toward success criteria because of their ability to rapidly colonize and outcompete the planted stems. When found in large numbers DMS typically requires these species be thinned to provide better success for planted stems and to allow greater species diversity. Do you anticipate needing to thin these for planted trees to survive? Please update the narrative and remove language indicating potential inclusion of these species for meeting success criteria. American Elm could potentially be counted toward success but would require approval by DWR since it was not a species included in the approved mitigation plan.

   ❖ Reference to potential inclusion of volunteer stems of sweetgum, red maple, and American elm has been removed from report. The volunteers will be monitored during MY2, and if additional management is required to reduce stem numbers, this action will be included in the MY2 report and an appropriate management plan will be submitted to DMS. IF warranted, FNI will provide a request to include American Elm as an additional approved species at MY3.

3. Pg. 7, Section 4.1: Multiple areas of invasives were noted in this section and treatment (mowing/herbicide) will occur in MY2. Do you anticipate needing to replant these areas after treatment, particularly areas to be mowed? If areas of invasives are not hindering survival of

planted stems, and the invasive species will likely not survive well in shaded conditions, consider a less destructive approach. Please update the narrative and ensure that any supplemental plantings will be completed with species from the approved mitigation plan.

- ❖ No planted woody stems were observed with the areas of sericea lespedeza, and it is not expected that any volunteer species will colonize those areas as the high stem and foliage density of the invasive species prevents establishment of other plants. While sericea lespedeza is predominantly shade intolerant, canopy closure will only reduce the vigor of the species and will not effectively limit the spread within the understory, particularly along the edge of the site. Early management, including mechanical removal of the large aboveground biomass, are critical to reduce spread of the species. Areas of mechanical and chemical treatment will be replanted with native species seed mix and if woody stem supplementation is needed, planting will be conducted with approved species from the mitigation plan.

4. Pg. 7, Section 4.2: Please italicize scientific names.

   - ❖ There are no scientific names in this section. Sericea lespedeza is the common name for *Lespedeza cuneata*.

5. Pg. 7, Section 4.2: How tall are the chinaberry volunteers? Depending on their size at the time of treatment a cut-stump method might work best to limit herbicide impacts to surrounding desirable vegetation

   - ❖ The chinaberry volunteers were approximately 3 feet tall during MY1. Language has been updated to include cut-stump method rather than hack and squirt. Either method will be effective in treating the observed volunteers, and both are preferable to foliar applications, as they are targeted to only the trees in question and will not be broadcast on adjacent desirable vegetation.

6. Appendix B, Table 5 & Table 6: Please use the tables provided by the output shiny tool. The provided tables have been edited making review difficult. For example, VP01 says it has 13 stems, but that includes the invasive chinaberry, and the total stems per acre for the plot is incorrect. Please also include the provided footnotes with the tables.

   - ❖ Tables have been updated to include the output from the Shiny Tool.

7. Appendix B, Table 5: Though it's early in monitoring DMS is concerned with plots 4 & 5 and lack of species diversity. Both plots have greater than 50% of a single species and only 2 species total. Do you anticipate needing to supplementally plant these areas? Is greater species diversity and survival represented in the areas outside of the veg plots?

   - ❖ VP 4 and VP 5 will be monitored during MY2, and if species composition is still trending toward a monoculture, a supplemental planting plan will be created to address the deficiencies. The species diversity in the northern section of the site are more diverse than reflected in the plots. An additional random vegetation plot will be added for MY2 to document conditions outside of VP 4 and VP 5. Section 4.2 has been updated to reflect the addition of the random plot for MY2.

8. Appendix B, Table 5: Three of the species planted (beautyberry, chinkapin, and spicebush) are

no longer surviving in any vegetation plots and some species have very little representation (water oak, silky dogwood). Are these species surviving on site outside of the vegetation plots? If supplemental planting is anticipated at any time during the monitoring period, please use caution using these species if survival is unlikely or use older stock to increase survivability.

- ❖ Beautyberry has been observed in quantities representative of the percentage in the planting plan outside of the vegetation plots. Chinkapin and spicebush are relatively sparse within the site and will not be included in any supplemental planting plans. Water oak were observed outside of the vegetation plots. Oak species that are planted in an afforestation scenario have lower heights due to the biology of the species, so many of the stems are still small and difficult to observe during the growing season. Water oak will only be in small quantities in any supplemental planting plans for the site.

9. Please provide documentation of fence removal in the MY2 report. Failure to remove the fence will result in delayed approval to invoice for Task 6.

   - ❖ The fence was removed on December 13, 2023. Photographs of the fenceless area are attached.

10. DWR has requested raw vegetation data (individual tree heights and species by plot) so they can get a better idea of tree conditions. The veg plot input tables used in the Shiny App easily fulfill this need. This should be included in an Appendix.

    - ❖ Raw vegetation data has been included in Appendix C.

We hope that these responses adequately address the NC DMS comments, and we look forward to working with NC DMS during the next phases of this important project.

Sincerely,

Ian Jewell
Project Manager
Ian.Jewell@freese.com

Baseline Monitoring Report

Wicomico Riparian Buffer Mitigation Site
Edgecombe County, NC

DMS Project No. 100188
DMS Contract No. 200209-01
DWR Project No. 2021-0750 version 2

Tar Pamlico Watershed
HUC 03020103

Prepared for:

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

Prepared by:

Freese and Nichols, Inc.
531 N Liberty St
Winston-Salem, NC 27101

This mitigation 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 Trading Rule, amended effective September 1, 2010
- NCDEQ Division of Mitigation Services In-Lieu Fee Instrument signed and dated July 28, 2010.

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

Contributing Staff:

Bryan Dick, PhD, PE, PH	*Lead Technical Professional/ Lead Quality Assurance*
Ian Jewell, JD	*Project Manager*
Emily Brown, PE, ENV SP, CFM	*Monitoring Lead*
Melissa Mitchell	*Field Monitoring Team*
Annamarie Eustice, EIT	*Field Monitoring Team*
Jason Steele, PhD, PWS	*Monitoring Report*

Contents

Page

List of Figures iv
List of Tables iv
1.0 MITIGATION PROJECT SUMMARY 1
1.1 PROJECT DESCRIPTION 1
1.2 PROJECT GOALS 1
2.0 REGULATORY CONSIDERATIONS 2
3.0 PERFORMANCE CRITERIA AND MONITORING PROTOCOLS 2
4.0 MONITORING YEAR 1 – RESULTS 3
4.1 VEGETATION ASSESSMENT SUMMARY 3
4.2 MAINTENANCE AND MANAGEMENT 4
5.0 REFERENCES 5

Appendices:

Appendix A	Figures
Appendix B	Vegetation Plot Data
Appendix C	Shiny Tool Vegetation Plot Input Tables

Figures

Figure 1	Buffer Mitigation Concept Map & Plot Locations
Figure 2	MY1 Buffer Monitoring Areas of Concern

Tables

	Description	**Location**
Table 1	Project Attributes	Appendix A
Table 2	Planted Tree Species	Appendix A
Table 3	Project Areas and Assets	Appendix A
Table 4	Monitoring Components	Appendix A
Table 5	Vegetation Plot Data	Appendix B
Table 6	Vegetation Performance Standards Table	Appendix B
Tables 7 - 11	Shiny Tool Input Tables for Vegetation Plots 1-5	Appendix C

1.0 MITIGATION PROJECT SUMMARY

1.1 PROJECT DESCRIPTION

The Wicomico Riparian Buffer Mitigation Site (Site) is a buffer restoration project located approximately 4.5 miles south of Speed and 5 miles east of Tarboro in Edgecombe County, North Carolina (**Figure 1**). The Site is within a Targeted Local Watershed (TLW) and is discussed in the Tar-Pamlico River Basin RBRP. The Site involves riparian restoration of 3.74 acres along an unnamed tributary of the Tar River (UT1) that flows adjacent to the site and eventually flows into the Tar River approximately 4.1 river miles downstream. Based upon the as-built survey, the Site is expected to generate 162,804.000 riparian buffer credits in the Tar-Pamlico 03020103 hydrologic unit code (HUC) (**Appendix A, Table 3**).

Prior to planting, the buffer restoration area was mainly used to produce cotton and soybeans. The drainage culvert that was located in the southern portion of the Site was removed during site preparation activities and any associated drainage swales were graded and disked to remove concentrated flow areas within the riparian buffer area. The Site was subsoiled and disked to reduce soil compaction, and the area was immediately seeded with a native seed mix. The first seeding was to provide a seed bank, but it was anticipated that the broadleaf herbicide used for the previous small grain row crop would be detrimental to the 2022 seeding. Thus, 1/3 of the seed mix was held till 2023 seeding date to improve survivability. Areas with poor herbaceous cover were sown with additional seed in March 2023.

Riparian area restoration involved the planting of native tree and shrub species along the riparian corridor. The species composition planted was selected based on the community type, observed species in riparian areas adjacent to the Site, wildlife habitat goals, best professional judgement on species establishment and anticipated successional vegetation changes resulting from changes in Site conditions following project implementation. Woody species were planted at a density sufficient to meet the performance standards outlined in 15A NCAC 02B .0295 of 260 trees per acre at the end of five years. No one tree species was greater than 50% of the established stems. Planting was completed on March 18, 2022. The planting date was selected at the request of the landowner, which was prior to the approval of the final mitigation plan. Even though planting was conducted in the spring of 2022, monitoring activities for Monitoring Year 1 (MY1) were conducted in September 2023.

Tables 1 and 2 (**Appendix A**) provide more detailed Site background information. Additional project history, location, and design are presented in the Wicomico Buffer Mitigation Site Baseline Monitoring Report (Freese and Nichols, Inc., 2023).

1.2 PROJECT GOALS

The major goals of the riparian restoration project are to provide ecological and water quality enhancements to the Tar-Pamlico River Basin by creating a functional riparian corridor and restoring the riparian area.

This buffer restoration project will reduce sediment and nutrient loading, provide and improve terrestrial and in stream habitats, and improve stream and bank stability. The area surrounding the streams was previously agricultural fields, typically used to grow hay, soybeans, and cotton. Restoring up to 100 feet of vegetative buffer along the channels has removed the crops and fertilizer inputs within the project area. The restored floodplain areas will assist in filtering sediment during high rainfall events. The establishment of riparian areas will create shading to minimize thermal heating. Finally, invasive vegetation will be treated as needed within the Site and the newly planted native vegetation will provide cover and food for wildlife. Specific enhancements to water quality and ecological processes are outlined below.

- Decrease nutrient inputs from on and off-site by filtering runoff from agricultural fields through restored native buffer zones.
- Sediment from on and off-site sources will be deposited on restored floodplain areas where native vegetation will slow overland flow velocities.
- Remove areas of flow concentration and allow overland flow velocities to further slow by entering native vegetation buffer.
- Permanently protect the Site by establishing a conservation easement on the Site that will protect the riparian area in perpetuity.

Mitigation credits are presented in **Table 3** in **Appendix A** and are based upon the as-built survey included in the Wicomico Buffer Mitigation Site Baseline Monitoring Report (Freese and Nichols, Inc., 2023).

2.0 REGULATORY CONSIDERATIONS

Riparian buffer restoration was accomplished in accordance with the Consolidated Buffer Rule (15A NCAC 02B .0295). All areas within 100+ linear feet of the top of bank of the subject stream as measured from top of bank landward were planted and devoted to generating riparian buffer mitigation credits. Mitigation credits generated are listed in **Table 3** and are based upon the DWR Buffer Mitigation Calculation Tool v3 (October 2020) (**Appendix A**).

3.0 PERFORMANCE CRITERIA AND MONITORING PROTOCOLS

The performance criteria for the Site follows approved performance criteria presented in the Wicomico Buffer Mitigation Site Mitigation Plan (Freese and Nichols, Inc., 2022), guidance documents outlined in RFP 16-20200209 and the Consolidated Buffer Rule (15A NCAC 02B .0295), and the NC DMS Riparian Buffer and Nutrient Offset Buffer Baseline & Annual Monitoring Report Template, Version 2.0 (May 2017). Annual monitoring and semi-annual Site visits will be conducted to assess the condition of the finished project.

The buffer restoration project has been assigned specific performance criteria for vegetation. Performance criteria will be evaluated throughout the five year post-construction monitoring period. The monitoring period will extend for five years beyond the completion of construction or until performance criteria have been met.

The final vegetative success criteria will be the survival of 260 stems per acre in the riparian corridor at the end of monitoring year 5. The final performance standard shall include a minimum of four native hardwood tree species, where no one species is greater than 50 percent of stems. Native hardwood volunteer species may be included to meet the final performance standard of 260 stems per acre. Methodology for annual monitoring is presented in the Wicomico Buffer Mitigation Site Baseline Monitoring Report (Freese and Nichols, Inc., 2023).

4.0 MONITORING YEAR 1 – RESULTS

4.1 VEGETATION ASSESSMENT SUMMARY

The MY1 vegetation assessment of 5 vegetation plots was completed on September 27, 2023. Vegetation monitoring resulted in a sitewide stem density average of 421 planted stems per acre, above the requirement of 260 trees per acre by MY5. Stem densities in individual monitoring plots ranged from 364 to 486 planted stems per acre with stem counts in individual plots ranging from 9 to 12 stems with an average of 11 planted stems per plot. Permanent vegetation plots (VP) 1, 2, and 3 met the MY5 success criteria. The average tree height observed was 3 feet. **Appendix B** includes vegetation plot photographs and vegetation plot data. VP 4 and VP 5 had low species diversity in MY1, however, the area around the plots reflected more woody species diversity. No additional vegetation areas of concern were identified within the vegetation plots during MY1. Vegetation establishment across the site appears to be on target to meet success criteria. Several woody vegetation volunteers comprised primarily of red maple (*Acer rubrum*), sweetgum (*Liquidambar styraciflua*) and American elm (*Ulmus americana*) were observed in all the vegetation plots during MY1 field activities. However, the seedlings were below 1 foot in height, and the species are not included on the approved mitigation plan planting list. The areas with high concentrations of these species will be monitored in MY2 to determine if additional management measures are required to meet site species diversity goals.

Visual assessment of vegetation outside of the monitoring plots indicates that the herbaceous vegetation is becoming well established, with only a few areas where herbaceous vegetation remains sparse. Photographs of these areas, as well as areas of observed invasive species establishment, are included in **Appendix B**. Sericea lespedeza (*Lespedeza cuneata*) was observed in a 14,000 square foot area along the western boundary of the Site and a 900 square foot area south of VP-01. Japanese stiltgrass (*Microstegium vimineum*) was observed in an 80 square foot area northwest of VP-03, and several individual saplings of chinaberry (*Melia azedarach*) that were approximately 3 feet in height were observed, and one stem was observed within VP-01. (**Figure 2, Appendix A**). Given the aggressive growth and large seed bank production of the sericea lespedeza, stiltgrass, and chinaberry, chemical control and mowing is

recommended until tree canopy closure decreases resource availability for these species. Mowed areas will be planted with seed mix after treatment and evaluated for woody stem requirements during MY2. If additional woody stems are needed to meet requirements, all supplemental planting will be completed with species from the approved mitigation plan. Further management options are outlined in **Section 4.2**.

Easement boundary markers and signs are clearly visible and in good condition. There are no signs of encroachment or undocumented concentrated flow in the easement area. The elevated hunting blind that was present within the easement during baseline monitoring activities was removed after the MY1 site visit, and no other structures are present within the easement area. The fence that was present at the northern edge of the easement area was removed on December 13, 2023; **Appendix B** includes representative photographs of fence removal. Current credible area of buffer mitigation is 3.74 acres (162,804.000 square feet), resulting in no change of buffer mitigation credits from the 162,804.000 established with the as-built survey.

4.2 MAINTENANCE AND MANAGEMENT

Sericea lespedeza

Sericea lespedeza is a perennial legume native to Asia and was introduced in the United States in the 1890s for soil conservation and wildlife forage. While originally introduced as wildlife forage, the high tannin content of the woody stems makes it unpalatable for most wildlife and livestock. It has been a primary constituent of highway soil stabilization seed mixes, which has resulted in a geographically extensive seed bank that will remain viable for decades. The complete elimination of the species from natural areas is extremely difficult due to the large numbers of viable seeds in the surrounding landscape. The species can tolerate shade; however, vigor is greatly reduced as the tree canopy becomes denser (Cummings, et al., 2007). Chemical control of the species, particularly with triclopyr for post-emergence application, has been shown to be an effective method of reducing spread of the species (Farris and Murray, 2009), however post-emergence herbicide application does not provide a long-term solution to species management (Sherrill, et al., 2022). Given the concentrated population of the lespedeza observed at the Site, a mechanical and chemical control approach will be applied. The existing area of lespedeza will be mowed in the late fall/early winter after seed drop to reduce biomass within the Site, and a pre-emergence herbicide containing aminocyclopyrachlor (e.g., Streamline) will be applied to the mowed area in early March. Aminocyclopyrachlor is a selective herbicide that has minimal negative effects on cool and warm season grasses (Turner, et al., 2023). A triclopyr herbicide (e.g., Crossbow, Garlon 3A) in a 2% solution will be applied during June to mid-July when lespedeza plants are still vegetative and during early flowering. All herbicides will be applied by licensed applicators and will adhere to product label specifications. Areas of sericea lespedeza infestation will be monitored during MY2. Areas of mechanical and chemical treatment will be replanted with native species seed mix and if woody stem supplementation is needed, planting will be conducted with approved species from the mitigation plan.

Chinaberry

Chinaberry is a fast-growing tree with allelopathic roots and leaves that can form dense thickets that crowd out native vegetation. The tree was introduced as a medicinal plant in the late 18th century but has since spread prolifically throughout riparian areas of southeastern states, spreading primarily from root sprouts and bird-dispersed seeds (Miller, 2003; Plant Conservation Alliance, 2008). Given the propensity of the plant to colonize sites quickly, chemical controls will be applied in conjunction with the foliar treatment of lespedeza at the site. Chinaberry trees will be cut, and a cut-stump application of triclopyr herbicide (Garlon 3A or Garlon 4) in a 2% solution will be applied during June to mid-July when the trees are vegetative but before fruiting. Herbicides will be applied by licensed applicators and will adhere to product label specifications. Areas of chinaberry infestation will be monitored during MY2.

Japanese Stiltgrass

Japanese stiltgrass is an annual grass that was first documented around 1919 in Tennessee and has since spread to 25 states. Individual plants produce between 100 and 1,000 seeds annually, with seed viability extending beyond five years (Plant Conservation Alliance, 2007). Chemical control through use of systemic herbicides is the recommended chemical control for stiltgrass. Treatment in riparian areas should use glyphosate specifically formulated for aquatic sites to reduce potential stream impacts. A 2% solution of glyphosate (Rodeo or other formulations for aquatic sites) and a surfactant will be applied in late summer to identified areas of stiltgrass infestation. Herbicides will be applied by licensed applicators and will adhere to product label specifications. Areas of Japanese stiltgrass infestation will be monitored during MY2.

Vegetation Plots 4 and 5

The results of MY1 woody vegetation monitoring indicated that VP 4 and VP 5 had poor species diversity, as illustrated by the >50% of American sycamore (*Platanus occidentalis*) in VP 4 and swamp chestnut oak (*Quercus michauxii*) in VP 5. The surrounding area had higher observed species diversity than what was reflected in the plot data. A random vegetation plot will be included in the area between VP 4 and VP 5 for MY2 to provide additional data to inform vegetation management.

5.0 REFERENCES

Cummings, D.C., Bidwell, T.G., Medlin, C.R., Fuhlendorf, S.D., Elmore, R.D. and Weir, J.R., 2007. *Ecology and management of Sericea lespedeza*. Oklahoma Cooperative Extension Service.

Farris, R.L. and Murray, D.S., 2009. Control of seedling sericea lespedeza (Lespedeza cuneata) with herbicides. *Invasive Plant Science and Management*, *2*(4), pp.337-344.

Freese and Nichols, Inc. (2022). Wicomico Buffer Mitigation Site – Mitigation Plan. North Carolina Department of Environmental Quality, Division of Mitigation Services (NCDMS), Raleigh, NC.

Freese and Nichols, Inc. (2023). Wicomico Buffer Mitigation Site – Baseline (MY0) Monitoring Report. North Carolina Department of Environmental Quality, Division of Mitigation Services (NCDMS), Raleigh, NC.

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

Miller, J.H., 2003. Nonnative invasive plants of southern forests: a field guide for identification and control [Revised]. *Gen. Tech. Rep. SRS-62. Asheville, NC: US Department of Agriculture, Forest Service, Southern Research Station. 93p.*, *62*.

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

Plant Conservation Alliance. Fact Sheet: Chinaberry. March 18, 2008.

Plant Conservation Alliance. Fact Sheet: Japanese Stiltgrass. April 9, 2007.

Sherrill, C.W., Fuhlendorf, S.D., Goodman, L.E., Elmore, R.D. and Hamilton, R.G., 2022. Managing an invasive species while simultaneously conserving native plant diversity. *Rangeland Ecology & Management*, *80*, pp.87-95.

Turner, M.A., Powell, B.L., Wade GeFellers, J., Bones, J.T., Marshall, S.G. and Harper, C.A., 2023. Sericea lespedeza control with postemergence and preemergence herbicide applications in fields managed for northern bobwhite. *Wildlife Society Bulletin*, p.e1442.

Appendix A

Figures and Tables

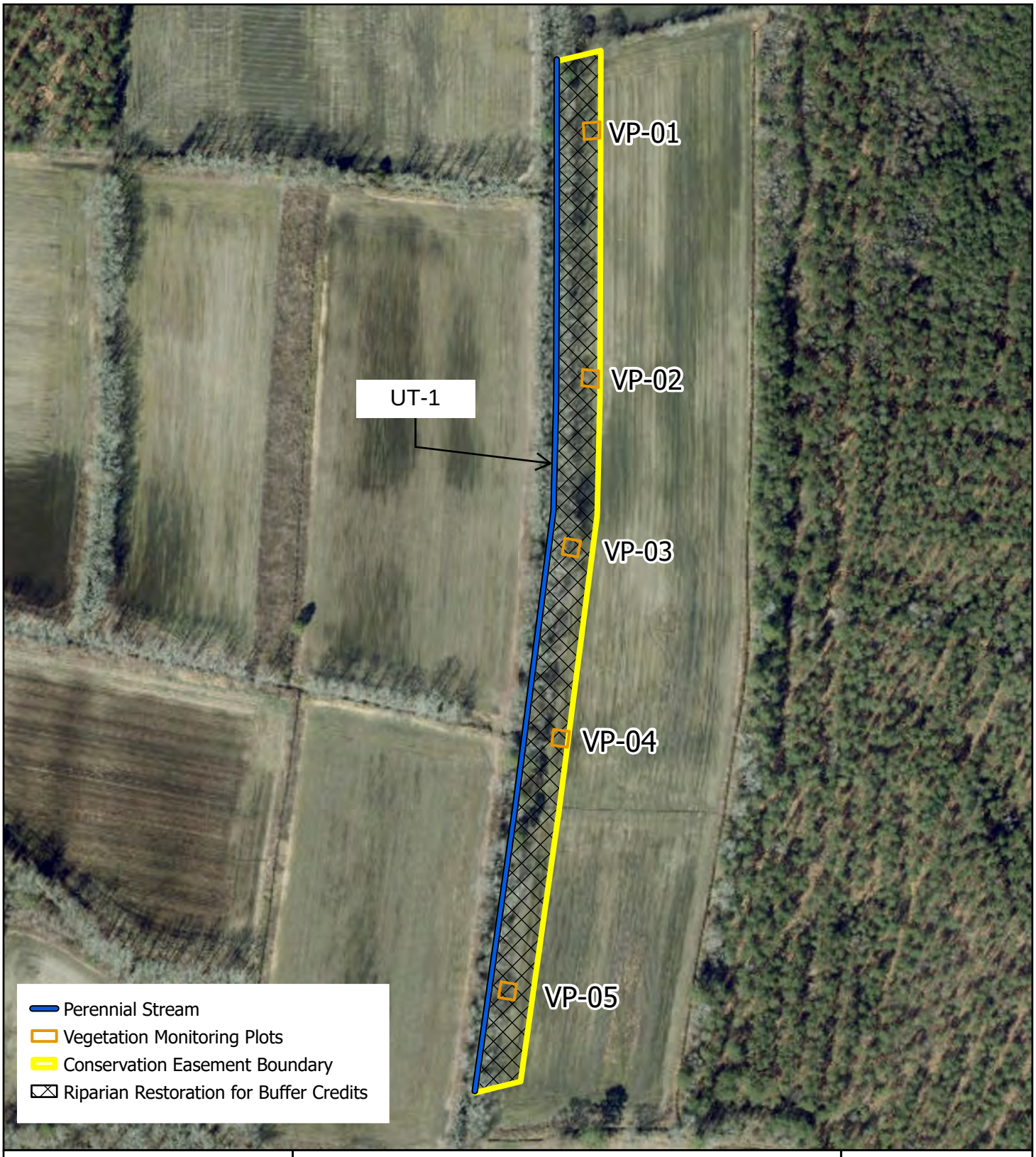

Figure 1
Buffer Mitigation Map and Plot Locations

Wicomico Buffer Mitigation Site
Edgecombe County, NC

Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere

N

0 175 350 Feet

FREESE AND NICHOLS

531 N. Liberty St
Winston-Salem, NC 27101

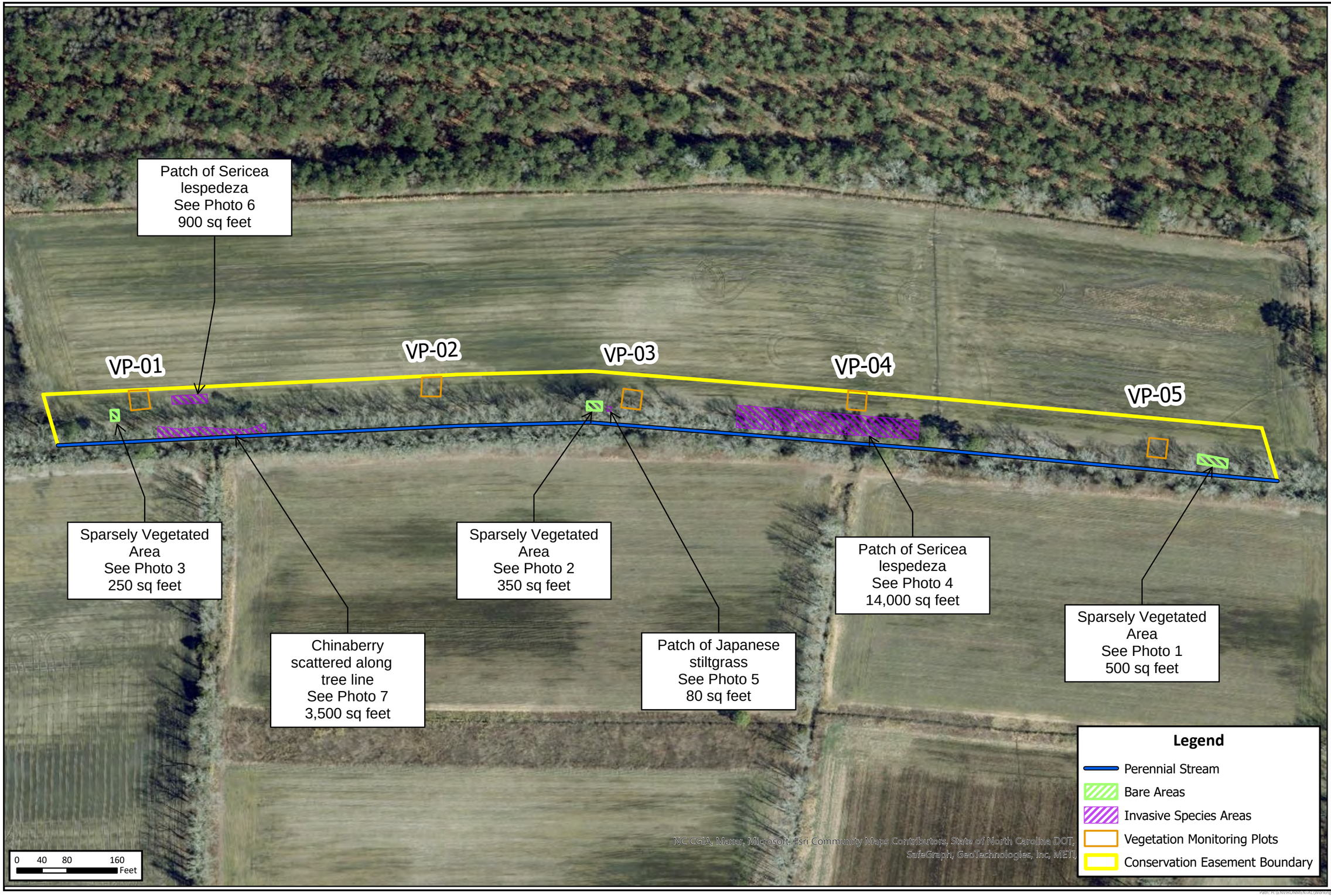

FIGURE 2

Monitoring Year 1
Areas of Concern and Plot Locations

Wicomico Buffer Mitigation Site
Edgecombe County, NC

FREESE AND NICHOLS

Path: H:\ENVIRONMENTAL\Working\MNW working\wicomico\Wicomico_figs.aprx

Table 1. Project attributes for the Wicomico Buffer Mitigation Site, Year 1 Monitoring (MY1), 2023.

Project Name	Wicomico Buffer Mitigation Site
River Basin	Tar Pamlico
USGS Hydrologic Unit 8-digit/Credit Service Area	03020103
USGS Hydrologic Unit 14-digit	03020103010010
NCDWR River Sub-basin	Lower Tar
Geographic Location (Lat/ Long DD)	35.90712,-77.44034
Site Protection Instrument (DB, PG)	1769, 391
Total Credits (BMU)	162,804.000
Type of Credits	Riparian Buffer with flexibility to convert into nutrient offsets
Mitigation Plan Date	February 2022
Initial Planting Date	March 2022
Baseline Report Date	May 2023
MY1 Report Date	November 2023
MY2 Report Date	November 2024
MY 3 Report Date	November 2025
MY 4 Report Date	November 2026
MY 5 Report Date	November 2027

Table 2. Planted tree species for the Wicomico Buffer Mitigation Site, Year 1 Monitoring (MY1), 2023.

Scientific Name	Common Name	Tree/ Shrub	Quantity	% Composition
Platanus occidentalis	American sycamore	Tree	325	16%
Callicarpa americana	American beautyberry	Shrub	152	7%
Cornus amomum	Silky Dogwood	Shrub	110	5%
Lindera benzoin	Spicebush	Shrub	175	9%
Quercus pagoda	Cherrybark Oak	Tree	194	9%
Quercus michauxii	Swamp chestnut oak	Tree	330	16%
Quercus nigra	Water oak	Tree	220	11%
Sambucus canadensis	Elderberry	Shrub	109	5%
Castanea pumila	Allegheny Chinkapin	Shrub	110	6%
Diospyros virginiana	American persimmon	Tree	330	16%

Table 3. Project areas and assets for the Wicomico Buffer Mitigation Site, Year 1 Monitoring (MY1), 2023.

Tar-Pamlico 03020103	**Project Area**
19.16394	**N Credit Conversion Ratio (ft²/pound)**
297.54099	**P Credit Conversion Ratio (ft²/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 (ft²)	Total (Creditable) Area of Buffer Mitigation (ft²)	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	Stream A	162,804	162,804	1	100%	1.00000	Yes	162,804	Yes	8,495.330	547.165
						Totals (ft2):	**162,804**	**162,804**					**162,804.000**		**8,495.330**	**547.165**
						Total Buffer (ft2):	**162,804**	**162,804**								
						Total Nutrient Offset (ft2):	**0**	**N/A**								

Total Ephemeral Area (ft²) for Credit:	**0**	**0**
Total Eligible Ephemeral Area (ft²):	**40,701**	**0.0%**
Total Eligible for Preservation (ft²):	**54,268**	**0.0%**

Ephemeral Reaches as % TABM

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 (ft²)	Initial Credit Ratio (x:1)	% Full Credit	Final Credit Ratio (x:1)	Riparian Buffer Credits
												—
						Preservation Area Subtotals (ft²):	**0**	**0**				

TOTAL AREA OF BUFFER MITIGATION (TABM)			
Mitigation Totals		**Square Feet**	**Credits**
Restoration:		162,804	162,804.000
Enhancement:		0	0.000
Preservation:		0	0.000
Total Riparian Buffer:		162,804	162,804.000
TOTAL NUTRIENT OFFSET MITIGATION			
Mitigation Totals		**Square Feet**	**Credits**
Nutrient Offset:	**Nitrogen:**	0	0.000
	Phosphorus:		0.000

Table 4. Monitoring components for Wicomico Buffer Mitigation Site, Year 1 Monitoring (MY1), 2023.

Parameter	Monitoring Feature	Quantity	Frequency
Vegetation	CVS Level 2 Quadrant	5	Annual
Visual Assessment		Yes	Annual
Exotic and Nuisance Vegetation			Annual
Project Boundary			Annual

Appendix B

Vegetation Plot Data

Planted Acreage	3.74
Date of Initial Plant	3/18/2022
Date(s) of Supplemental Plant(s)	NA
Date(s) Mowing	NA
Date of Current Survey	2023-09-27
Plot size (ACRES)	0.0247

Table 5. Vegetation Plot Data for the Wicomico Buffer Mitigation Site (MY1)

	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	Cornus amomum	silky dogwood	Shrub	FACW	3	3								
	Diospyros virginiana	common persimmon	Tree	FAC	4	4	1	3		5			4	4
	Platanus occidentalis	American sycamore	Tree	FACW	4	4		2		1	2	6		
	Quercus michauxii	swamp chestnut oak	Tree	FACW			3	3	3	3		5	1	7
	Quercus nigra	water oak	Tree	FAC	1	1								
	Quercus pagoda	cherrybark oak	Tree	FACW			1	1	3	3				
Sum	Performance Standard				12	12	5	9	6	12	2	11	5	11
Invasives	*Melia azedarach*	*Chinaberrytree*	*Shrub*	*UPL*		*1*								
Mitigation Plan Performance Standard	Current Year Stem Count					12		9		12		11		11
	Stems/Acre					486		364		486		405		364
	Species Count					4		4		4		2		2
	Dominant Species Composition (%)					31		33		42		55		64
	Average Plot Height (ft.)					4		3		2		3		3
	% Invasives					8		0		0		0		0

Table 5. Vegetation Plot Data for the Wicomico Buffer Mitigation Site (MY1)

Post Mitigation Plan Performance Standard	Current Year Stem Count				12		9		12		11		11
	Stems/Acre				486		364		486		405		364
	Species Count				4		4		4		2		2
	Dominant Species Composition (%)				31		33		42		55		64
	Average Plot Height (ft.)				4		3		2		3		3
	% Invasives				8		0		0		0		0

1). Bolded species are proposed for the current monitoring year, italicized species are not approved, and a regular font indicates that the species has been approved.
2). The "Species Included in Approved Mitigation Plan" section contains only those species that were included in the original approved mitigation plan. The "Post Mitigation Plan Species" section includes species that are being proposed through a mitigation plan addendum for the current monitoring year (bolded) , species that have been approved in prior monitoring years through a mitigation plan addendum (regular font), and species that are not approved (italicized).
3). The "Mitigation Plan Performance Standard" section is derived only from stems included in the original mitigation plan, whereas the "Post Mitigation Plan Performance Standard" includes data from mitigation plan approved, post mitigation plan approved, and proposed stems.

Table 6. Summary of Vegetation Performance Standards for the Wicomico Buffer Site (MY1)

Vegetation Performance Standards Summary Table												
	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												
Monitoring Year 2												
Monitoring Year 1	486	4	4	8	364	3	4	0	486	2	4	0
Monitoring Year 0	364	2	3	10	364	2	4	0	364	1	4	0
	Veg Plot 4 F				Veg Plot 5 F							
	Stems/ Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/ Ac.	Av. Ht. (ft)	# Species	% Invasives				
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2												
Monitoring Year 1	405	3	2	0	364	3	2	0				
Monitoring Year 0	364	2	2	0	324	2	2	0				

*Each monitoring year represents a different plot for the random vegetation plot "groups". Random plots are denoted with an R, and fixed plots with an F.

Areas of Concern
Wicomico Buffer Mitigation Site
Year 1 (MY1) 2023

Photo 1. Sparsely vegetated area near the southern boundary of easement.

Area has been noted and will be monitored during MY2.

Photo 2. Sparsely vegetated area near middle of easement.

Area has been noted and will be monitored during MY2.

Areas of Concern
Wicomico Buffer Mitigation Site
Year 1 (MY1) 2023

Photo 3. Sparsely vegetated area near the northern boundary of the easement.

Area has been noted and will be monitored during MY2.

Photo 4. Patch of Invasive Sericea lespedeza *(Lespedeza cuneata)* adjacent to VP-04. Approximately 14,000 square feet.

Management tasks have been detailed in the MY1 report.

Areas of Concern
Wicomico Buffer Mitigation Site
Year 1 (MY1) 2023

Photo 5. Patch of Invasive Japanese stiltgrass *(Microstegium vimineum)* near the middle of the easement. Approximately 80 square feet.

Management tasks have been detailed in the MY1 report.

Photo 6. Patch of Invasive Sericea lespedeza *(Lespedeza cuneata)* near the northern boundary of the easement. Approximately 900 square feet.

Management tasks have been detailed in the MY1 report.

Areas of Concern
Wicomico Buffer Mitigation Site
Year 1 (MY1) 2023

Photo 7. Chinaberry (Melia azedarach) scattered throughout the western tree line in the northern terminus of the easement. Approximately 3,500 square feet.

Management tasks have been detailed in the MY1 report.

Photo 8. Pile of barbed wire during active fence removal on December 13, 2023.

Areas of Concern
Wicomico Buffer Mitigation Site
Year 1 (MY1) 2023

Photo 9. Previous location of the barbed wire fence.

Appendix C

Shiny Tool Vegetation Plot Input Tables

Table 7. Shiny Tool Input Table for Vegetation Plot 1

Plot ID	Scientific Name	Performance Standard Approval	Planted or Volunteer?	X Coordinate (m)	Y Coordinate (m)	MY0 Height	MY1 Height	Map_ID
1	Cornus amomum	Approved Mit Plan	Planted	1.06	0.17	0.7	1	VP1-01
1	Cornus amomum	Approved Mit Plan	Planted	1.95	3.94	0.8	1.3	VP1-04
1	Cornus amomum	Approved Mit Plan	Planted	2.59	5.94	0.7	1	VP1-07
1	Diospyros virginiana	Approved Mit Plan	Planted	2.68	2.18	1.2	1.6	VP1-02
1	Diospyros virginiana	Approved Mit Plan	Planted	2.41	5.5	2	4	VP1-05
1	Diospyros virginiana	Approved Mit Plan	Planted	2.82	5.47	2	4	VP1-06
1	Diospyros virginiana	Approved Mit Plan	Planted	0.78	1.55	1	1.6	VP1-12
1	Platanus occidentalis	Approved Mit Plan	Planted	4.74	5.63	3	6	VP1-08
1	Platanus occidentalis	Approved Mit Plan	Planted	6.74	6.85	3.8	7	VP1-09
1	Platanus occidentalis	Approved Mit Plan	Planted	7.53	3.28	4.6	10	VP1-10
1	Platanus occidentalis	Approved Mit Plan	Planted	6.51	1.28	3.7	8	VP1-11
1	Quercus nigra	Approved Mit Plan	Planted	8.33	4.98	1.2	1.6	VP1-03
1	Melia azedarach	Not Approved - Invasive or Exotic	Volunteer			1	3	VP1-13

Table 8. Shiny Tool Input Table for Vegetation Plot 2

Plot ID	Scientific Name	Performance Standard Approval	Planted or Volunteer?	X Coordinate (m)	Y Coordinate (m)	MY0 Height	MY1 Height	Map_ID
2	Diospyros virginiana	Approved Mit Plan	Planted	7.49	8.91	1.5	2.8	VP2-04
2	Diospyros virginiana	Approved Mit Plan	Volunteer	5.86	7.64	1.5	2.8	VP2-05
2	Diospyros virginiana	Approved Mit Plan	Volunteer	0.51	2.31	1.5	2.8	VP2-08
2	Platanus occidentalis	Approved Mit Plan	Volunteer	5.73	1.94	2.7	4	VP2-02
2	Platanus occidentalis	Approved Mit Plan	Volunteer	8.33	4.98	3.5	7	VP2-03
2	Quercus michauxii	Approved Mit Plan	Planted	1.38	0.64	1.5	2.8	VP2-01
2	Quercus michauxii	Approved Mit Plan	Planted	1.37	6.55	2.4	3.4	VP2-06
2	Quercus michauxii	Approved Mit Plan	Planted	1.79	7.76	2	3	VP2-07
2	Quercus pagoda	Approved Mit Plan	Planted	0.21	8.51	1	1.8	VP2-09

Table 9. Shiny Tool Input Table for Vegetation Plot 3

Plot ID	Scientific Name	Performance Standard Approval	Planted or Volunteer?	X Coordinate (m)	Y Coordinate (m)	MY0 Height	MY1 Height	Map_ID
3	Quercus pagoda	Approved Mit Plan	Planted	5.56	5.38	1	2	VP3-02
3	Quercus pagoda	Approved Mit Plan	Planted	3.54	4.67	1	2	VP3-03
3	Quercus pagoda	Approved Mit Plan	Planted	5.1	0.93	1.5	2.8	VP3-09
3	Platanus occidentalis	Approved Mit Plan	Volunteer	10.44	7.53	2.2	4	VP3-01
3	Quercus michauxii	Approved Mit Plan	Planted	1.82	8.98	1	2	VP3-04
3	Quercus michauxii	Approved Mit Plan	Planted	1.72	6	0.7	1	VP3-05
3	Diospyros virginiana	Approved Mit Plan	Volunteer	2.65	1.43	1.2	2	VP3-06
3	Diospyros virginiana	Approved Mit Plan	Volunteer	2.85	0.72	1	2	VP3-07
3	Diospyros virginiana	Approved Mit Plan	Volunteer	4.11	0.55	1.5	2.3	VP3-08
3	Diospyros virginiana	Approved Mit Plan	Volunteer	7.06	0.74	1	2	VP3-10
3	Diospyros virginiana	Approved Mit Plan	Volunteer	6.77	1.34	0.6	2	VP3-11
3	Quercus michauxii	Approved Mit Plan	Planted	1.62	0.96	0.8	2	VP3-12

Table 10. Shiny Tool Input Table for Vegetation Plot 4

Plot ID	Scientific Name	Performance Standard Approval	Planted or Volunteer?	X Coordinate (m)	Y Coordinate (m)	MY0 Height	MY1 Height	Map_ID
4	Platanus occidentalis	Approved Mit Plan	Planted	9.56	3.78	3	5.4	VP4-04
4	Platanus occidentalis	Approved Mit Plan	Planted	7.46	3.61	2.5	4.2	VP4-06
4	Platanus occidentalis	Approved Mit Plan	Volunteer	4.01	8.5	3.8	6.5	VP4-09
4	Platanus occidentalis	Approved Mit Plan	Volunteer	3.57	0.38	2	4.2	VP4-08
4	Platanus occidentalis	Approved Mit Plan	Volunteer	5.64	0.06	1.8	3	VP4-07
4	Platanus occidentalis	Approved Mit Plan	Volunteer	5.42	3.03	1.5	3	VP4-11
4	Quercus michauxii	Approved Mit Plan	Volunteer	5.52	6.18	1.5	3	VP4-10
4	Quercus michauxii	Approved Mit Plan	Volunteer	7.99	0.84	1.7	3	VP4-01
4	Quercus michauxii	Approved Mit Plan	Volunteer	8.9	0.8	1	1.8	VP4-02
4	Quercus michauxii	Approved Mit Plan	Volunteer	9.65	2.24	1	2	VP4-03
4	Quercus michauxii	Approved Mit Plan	Volunteer	9.79	7.9	0.8	2	VP4-05

Table 11. Shiny Tool Input Table for Vegetation Plot 5

Plot ID	Scientific Name	Performance Standard Approval	Planted or Volunteer?	X Coordinate (m)	Y Coordinate (m)	MY0 Height	MY1 Height	Map_ID
5	Quercus michauxii	Approved Mit Plan	Planted	6.26	8.03	1	2	VP05-23
5	Quercus michauxii	Approved Mit Plan	Volunteer	9.37	6.28	1	2	VP05-21
5	Quercus michauxii	Approved Mit Plan	Volunteer	1.02	6.11	1.2	2	VP05-03
5	Quercus michauxii	Approved Mit Plan	Volunteer	3.55	7.99	1	1.8	VP05-06
5	Quercus michauxii	Approved Mit Plan	Volunteer	3.25	3.07	0.7	1.8	VP05-07
5	Quercus michauxii	Approved Mit Plan	Volunteer	6.33	1.19	0.7	1.3	VP05-08
5	Quercus michauxii	Approved Mit Plan	Volunteer	0.33	0.81	0.9	1.5	VP05-01
5	Diospyros virginiana	Approved Mit Plan	Planted	1.44	1.54	3.2	6.3	VP5-02
5	Diospyros virginiana	Approved Mit Plan	Planted	1.58	8.18	2	3.5	VP5-04
5	Diospyros virginiana	Approved Mit Plan	Planted	1.65	8.8	1.5	2.8	VP5-05
5	Diospyros virginiana	Approved Mit Plan	Planted	6.54	6.01	3.2	6.1	VP5-22