

Tar River Headwaters Stream and Ditch Buffer

Person County NC -- Tar-Pamlico River HUC# 03020101-0102

MY-5 (2021) Fall Monitoring Report

NC-DEQ Division of Mitigation Services: DMS Project # 97071

Data Collected: September 2021

Final Report: November 2021



Submitted To:
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1.0. Project Background Summary

1.1. Project Goals and Success Criteria

The Tar River Headwaters Stream and Ditch Buffer (TRHSDB) project is a riparian buffer restoration project that connects a DMS full-delivery wetland mitigation project ('*Tar River Headwaters Wetland Restoration Site*') to an adjacent private mitigation bank project ('*Tar River Headwaters Riparian Buffer and Nutrient Offset Mitigation Bank*'). This project will provide riparian buffer and/or nutrient offset credits along approximately 460 feet of the main north-south ditch and riparian buffer credits along approximately 150 feet intermittent stream downstream of the ditch.

Performance standards were established to verify that the vegetation component supports community elements necessary for forest development and the maintenance of diffuse flow through the riparian buffer in accordance with North Carolina Division of Water Resources Administrative Code 15A NCAC 02B.0295 (Mitigation Program Requirements for Protection and Maintenance of Riparian Buffers). Performance standards are dependent upon the density and growth of at least four native hardwood tree species where no one species is greater than 50% of the stems. After five years of monitoring, an average density of 260 woody stems per acre must be surviving and diffuse flow maintained.

1.2. Project Setting and Pre-Restoration Conditions

The project is located in the Tar-Pamlico river basin, 12-digit HUC # 03020101- 0102, in eastern Person County, on a 228-acre farm owned by Roy and Joyce Huff at 333 Bunnie Huff Road, Oxford NC 27565 (Figure 1). The gravel access road into the site is at Latitude = 36.3913, Longitude = -78.8171. The TRHSDB project site and adjacent wetland restoration site (TRHWR) was a cattle pasture dominated by forage grasses interspersed with native and non-native herbs. This site was in continuous agricultural use for about 70 years, and land use in the surrounding area has changed little over the past several decades. Several drainage ditches were constructed in the 1940s to dewater the area sufficiently for pasture use.

A southward flowing ditch runs through the existing pasture and is hydrologically connected with an intermittent stream downstream of a ford crossing, which flows into a perennial stream beyond the project easement. A conservation easement was acquired on 9.98 acres, which encompasses both the TRHSDB and TRHWR projects and the upstream network of ditches. The TRHWR project occupies most of this easement area, and the TRHSDB project occupies approximately 1.3 acres in the southeastern portion of the easement, downstream of the restored wetlands.

Based on LIDAR topographic mapping (from Person County GIS) the watershed draining to the project site is approximately 50 to 80 acres with an average slope of 2%. This watershed is undeveloped, containing natural hardwood forest, planted pines, cropland, pasture, and a powerline. The only man-made structures in the watershed are two powerline towers. The project ditch feature measures between 2 and 3 ft deep and was confirmed to meet buffer requirements of (o)(8) in a 10/24/2016 DWR viability letter.

1.3. Mitigation Approach and Expected Improvements

The project includes installing livestock exclusion fencing and planting native hardwood buffer trees at a minimum of 50' from top of bank on both sides of the ditch and at a minimum of 30' from top of bank on the eastern portion of the intermittent stream. The proposed work restores approximately one acre of riparian areas. Establishment of a forested riparian area and cattle exclusion will reduce soil erosion and nutrient-enriched

runoff from the adjacent pasture within its watershed and help retain agricultural chemicals. This riparian area is also expected to improve water quality through removal of bacterial and agricultural inputs and slow surface water runoff. Habitat connectivity will be re-established between two distinct restoration areas adjacent to a regionally rare ecosystem.

2.0. Current Site Conditions

The TRHSDB project area along the ditch upstream of the ford crossing is well vegetated with a dense cover of native herbs including *Juncus*, *Dichanthelium*, *Andropogon*, *Symphiotrichum*, *Eupatorium*, *Polygonum*, and *Diodia*, and a high percentage of surviving planted trees. These include river birch, musclewood, green ash, blackgum, sycamore, willow oak, water oak, and American elm. Native volunteers include willow oak, swamp white oak, American elm, persimmon, sweetgum, green ash, red maple and red cedar. The two CVS vegetation plots upstream of the crossing had 12 and 13 surviving planted stems in September 2021.

The project area downstream of the ford crossing along the intermittent stream is partially shaded by large trees. The one plot in this area below the crossing had six surviving planted stems plus two volunteer American elms. All three CVS plots met the success criteria of 260 native hardwood stems per acre based on planted plus volunteer stems. No areas of low stem density exceeding the 0.10 acre mapping threshold were found, and no invasive exotic plant problem areas were found.

The ditch and stream banks appear stable and well-vegetated, and contained flowing water during January to March. From April through September they were mostly dry or contained isolated pools due to low rainfall, except for intermittent periods following storms in June and July. The easement fence surrounding both areas is intact and is successfully keeping livestock out of the restoration areas.

3.0. Methods

Three vegetation monitoring plots, each 10 x 10 meters (Figure 2), were marked with steel conduit pipe, and planted trees within each plot were mapped and identified following the CVS Level II protocol (Lee et al, 2008).

Three permanent photo point locations were established at representative locations along the ditch and buffer area. Two photo points are located above the ford crossing and one is located within the crossing (Figure 2). Fence integrity is assessed at each site visit and repaired if necessary.

4.0. References

Lee, Michael T., Peet, Robert K., Roberts, Steven D., Wentworth, Thomas R. (2008). *CVS-EEP Protocol for Recording Vegetation version 4.2, October 2008*. Retrieved September 2011, from: <http://cvs.bio.unc.edu/methods.htm>

LeGrand, Harry E. Jr. (2007) Natural Areas Inventory of Person County, NC. NC Natural Heritage Program, Raleigh NC.

NC Division of Mitigation Services. (2017). *NC-DMS Annual Monitoring Report Format, Data Requirments, and Content Guidance June 2017*. <http://portal.ncdenr.org/web/eep/dbb-resources>

Schafale, M.P., Weakley, A.S.,1990. Classification of the Natural Communities of North Carolina, Third Approximation. NC Natural Heritage Program, Raleigh, NC.

Sink, Larry T. (1995). *Soil Survey of Person County, North Carolina*. USDA Soil Conservation Service (Natural Resources Conservation Service), Raleigh, NC.

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United States Geological Survey, 2013. 7.5 Minute Topographic Quadrangle, *Triple Springs*.

APPENDIX A. Project Background Data

Figure 1. Project Vicinity Map

Table 1. Project Components and Mitigation Credits

Table 2. Project Activity and Reporting History

Table 3. Project Contacts Table



Figure 1. Project Vicinity Map: Tar River Headwaters Wetland Restoration Site and related mitigation projects on the Huff Farm property, Person County NC, Tar-Pamlico River HUC# 03020101-0102. DIRECTIONS: From US-158 in Berea, Granville County NC, turn right (northwest) on Old Roxboro Rd, which becomes Denny Store Rd where it crosses into Person County. Turn right (north) on Bunnie Huff Rd, go 0.4 mile, and turn left into the driveway just past the Huff Homeplace sign. Proceed through the gate at end of driveway to the project sites.

**Table 1. Project Components and Mitigation Assets
Tar River Headwaters Stream and Ditch Buffer, DMS # 97071**

| RIPARIAN BUFFER (15A NCAC 02B.0295) | | | | | | | NUTRIENT OFFSET (15A NCAC 02B.0240) | | |
|-------------------------------------|-------------------|-------------------|------------------------|----------------------------|---------------|--------------------------|-------------------------------------|-----------------------------|-----------------------------|
| Reach ID or Component | Restoration Level | Buffer Width (ft) | Creditable Area (sf) * | Initial Credit Ratio (x:1) | % Full Credit | Mitigation Credits (BMU) | | Nutrient Offset: N (lbs) ** | Nutrient Offset: P (lbs) ** |
| Ditch TOB-50' | Restoration | 0-30 | 29,621 | 1 | 100% | 29,621 | OR | 2,571 | 165 |
| | | 30-50 | 19,655 | 1 | 100% | 19,655 | | | |
| Stream TOB-50' | Restoration | 0-30 | 4,787 | 1 | 100% | 4,787 | NA | --- | --- |
| | | 30-50 | 1,697 | 1 | 100% | 1,697 | | | |
| TOTALS | | | | | | 55,760 | | | |

* Creditable buffer areas are at least 30 ft wide.

** Creditable nutrient offset areas are at least 50 ft wide.

**Table 2. Project Activity and Reporting History
Tar River Headwaters Stream and Ditch Buffer, DMS # 97071**

| Activity or Deliverable | Data Collection Complete | Completion or Delivery |
|---|--------------------------|------------------------|
| Project Contract date | NA | Oct 2016 |
| Conservation Easement Recorded | NA | Oct 2016 |
| Mitigation Plan | NA | Nov 2016 |
| Fencing and Construction | NA | Jan 2017 |
| Planting and Vegetation Plots Installed | NA | Feb 2017 |
| As-Built MY0 Baseline Monitoring | Feb 2017 | Apr 2017 |
| Year 1 Monitoring | Oct 2017 | Nov 2017 |
| Year 2 Monitoring | Oct 2018 | Nov 2018 |
| Year 3 Monitoring | Oct 2019 | Jan 2020 |
| Year 4 Monitoring | Oct 2020 | Dec 2020 |
| Year 5 Monitoring | Sep 2021 | Nov 2021 |

Table 3. Project Contacts Table
Tar River Headwaters Stream and Ditch Buffer, DMS Project # 97071

| | |
|--------------------------------|---|
| Designer | Mogensen Mitigation Inc., Charlotte NC Rich Mogensen: 704-576-1111; Gerald Pottorn: 919-556-8845 |
| Construction Contractor | KBS Earthworks, Greensboro NC Kory Strader & Brett Strader: 336-685-4339 |
| Survey Contractor | Michael T. Brandon, PLS, Roxboro NC Michael Brandon: 336-597-8673 |
| Fence Contractor | Strader Fencing, Inc., Julian NC Kenneth Strader: 336-314-2935 |
| Herbicide and Seeding | KBS Earthworks, Greensboro NC Kory Strader & Brett Strader: 336-685-4339 |
| Planting Contractor | Mogensen Mitigation Inc, Charlotte NC Rich Mogensen: 704-576-1111; Gerald Pottorn: 919-556-8845 |
| Nursery Stock Suppliers | Mellowmarsh Farms, Siler City NC Joanie McLean: 919-742-1200 |
| Monitoring Performers | Mogensen Mitigation Inc, Charlotte NC Rich Mogensen: 704-576-1111; Gerald Pottorn: 919-556-8845 |

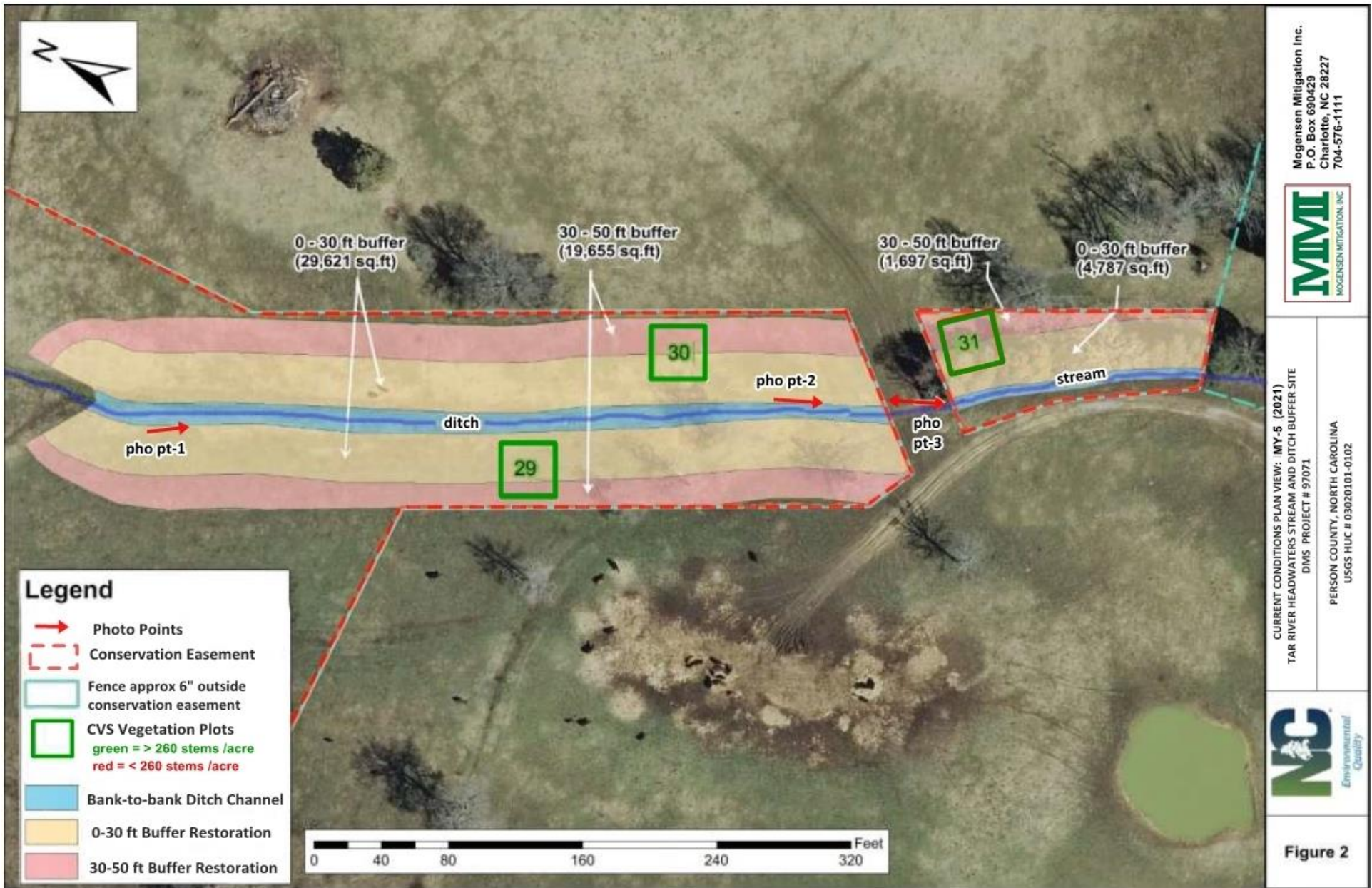
APPENDIX B. Visual Assessment Data

Figure 2. Current Conditions Plan View

Table 4. Vegetation Conditions Assessment

Figure 3. Vegetation Plot Photos

Figure 4. Photo Point Photos



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 704-576-1111



CURRENT CONDITIONS PLAN VIEW: MY-5 (2021)
 TAR RIVER HEADWATERS STREAM AND DITCH BUFFER SITE
 DMS - PROJECT # 97071
 PERSON COUNTY, NORTH CAROLINA
 USGS HUC # 03020101-0102



Figure 2

Table 4: Vegetation Condition Assessment Table -- MY-5 (2021)
Tar River Headwaters Stream and Ditch Buffer, Person County NC
DMS #97071. HUC #03020101-0102

Planted Acreage = 1.3

| Vegetation Problem Category | Definitions | Mapping Threshold (acres) | CCPV Depiction | Number of Polygons | Combined Acreage | % of Planted Acreage |
|--|---|----------------------------------|-----------------------|---------------------------|-------------------------|------------------------------|
| Bare Areas | Very limited cover of both woody and herbaceous material | 0.1 | N/A | 0 | 0 | 0% |
| Low Stem Density Areas | Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria. | 0.1 | N/A | 0 | 0 | 0% |
| Total | | | | 0 | | 0% |
| Areas of Poor Growth Rates or Vigor * | Areas with woody stems of a size class that are obviously small given the monitoring year. | 0.25 | N/A | 0 | 0 | 0% |
| Cumulative Total | | | | 0 | 0 | 0% |
| Easement Acreage = 9.98 (including wetland project) | | | | | | |
| Vegetation Problem Category | Definitions | Mapping Threshold (SF) | CCPV Depiction | Number of Polygons | Combined Acreage | % of Easement Acreage |
| Invasive Areas of Concern | Areas or points (if too small to render as polygons at map scale). | 1000 | N/A | 0 | 0 | 0% |
| Easement Encroachment Areas | Areas or points (if too small to render as polygons at map scale). | none | N/A | 0 | 0 | 0% |

Figure 3. Vegetation Plots: Tar River Headwaters Stream & Ditch Buffer Site #97071 MY-5 (Sept 2021)



Veg Plot 29: 23 Feb 2017

CVS VegPlot-29: MY-0 Spring 2017



VP-29 24.Sep.2021

CVS VegPlot-29: MY-5 Sept 2021



Veg Plot 30: 23 Feb 2017

CVS VegPlot-30: MY-0 Spring 2017



VP-30 24.Sep.2021

CVS VegPlot-30: MY-5 Sept 2021

Figure 3. Vegetation Plots: Tar River Headwaters Stream & Ditch Buffer Site #97071 MY-5 (Sept 2021)



Veg Plot 31: 23 Feb 2017

CVS VegPlot-31: MY-0 Spring 2017



VP-31 24 Sept 2021

CVS VegPlot-31: MY-5 Sept 2021 (from SW corner)



VP-31 24 Sep 2021

CVS VegPlot-31: MY-5 Sept 2021 (from NE corner)

Figure 4. Photo Points: Tar River Headwaters Stream & Ditch Buffer Site #97071 MY-5 (Sept 2021)



Photo Point 1: MY-0 Spring 2017



PhotoPt-1 Dnst 24 Sep 2021

Photo Point 1: MY-5 Sept 2021



Photo Point 2: MY-0 Spring 2017



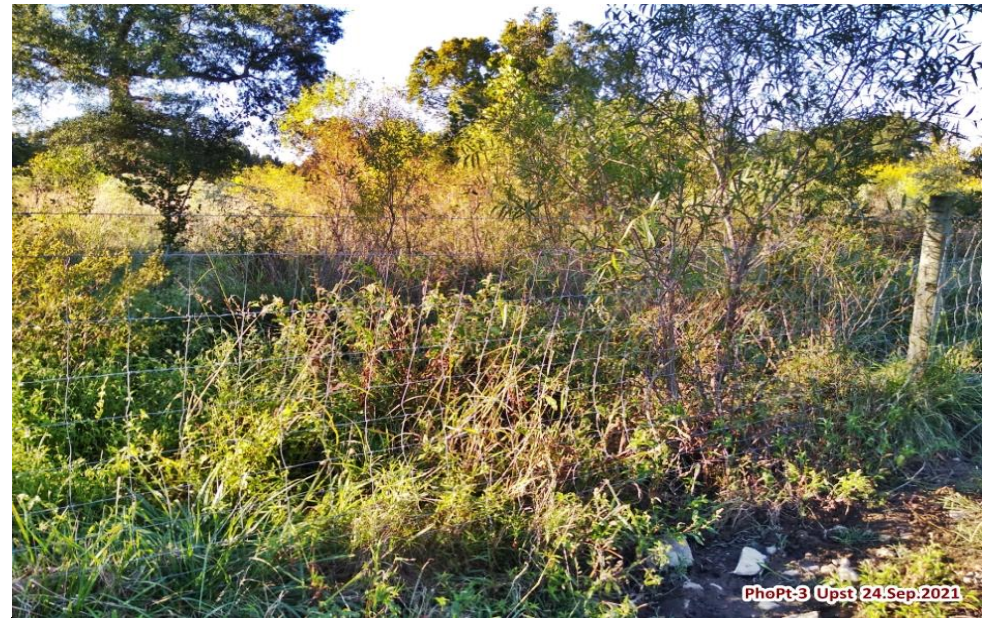
PhotoPt-2 Dnst 24 Sep 2021

Photo Point 2: MY-5 Sept 2021

Figure 4. Photo Points: Tar River Headwaters Stream & Ditch Buffer Site #97071 MY-5 (Sept 2021)



Photo Point 3: MY-0 Spring 2017



PhotoPt-3 Upst | 24.Sep.2021

Photo Point 3: MY-5 Sept 2021



Photo Point 3: MY-0 Spring 2017



PhotoPt-3 Dnst | 24.Sep.2021

Photo Point 3: MY-5 Sept 2021

APPENDIX C. Vegetation Plot Data

Table 5. Vegetation Plot Stem Count Data by Year

Table 6. Vegetation Plot Success Summary

Tar River Headwaters Stream and Ditch Buffer (TRHSDB) Project, DMS # 97071.
Monitoring Year 5 (2021) -- Person County NC.

| Table 5. CVS Plot Stem Counts and Density by Species. | | | Current Plot Data (MY4 - Sep-Oct 2020) | | | | | | Annual Means | | | | | | | | | |
|---|-----------------|-------------|--|-------|----------|-------|----------|-------|--------------|-------|------------|-------|------------|-------|------------|-------|------------|-------|
| Scientific Name | Common Name | Growth Type | 97071-29 | | 97071-30 | | 97071-31 | | MY0 (2016) | | MY1 (2017) | | MY2 (2018) | | MY3 (2019) | | MY4 (2020) | |
| | | | Plant | Total | Plant | Total | Plant | Total | Plant | Total | Plant | Total | Plant | Total | Plant | Total | Plant | Total |
| Betula nigra | River Birch | Tree (P) | | | | | | | | | 1 | 1 | | | | | | |
| Carpinus caroliniana | Musclewood | Tree (P) | 1 | 1 | 5 | 5 | 4 | 4 | 14 | 14 | 13 | 13 | 11 | 11 | 10 | 10 | 10 | 10 |
| Diospyros virginiana | Persimmon | Tree (P) | | | | | | | | | | | | | | 1 | | 0 |
| Fraxinus pennsylvanica | Green Ash | Tree (P) | 4 | 4 | 3 | 3 | | | 7 | 7 | 7 | 7 | 5 | 5 | 6 | 6 | 7 | 7 |
| Liriodendron tulipifera | Tulip Poplar | Tree (P) | | | | | | | 1 | 1 | | | | | | | | |
| Nyssa sylvatica | Swamp Blackgum | Tree (P) | 1 | 1 | | | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Platanus occidentalis | Sycamore | Tree (P) | 3 | 3 | | | | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Quercus bicolor | Swamp White Oak | Tree (P) | 1 | 1 | | | | | 1 | 1 | 1 | 1 | | | 1 | 1 | 1 | 1 |
| Quercus phellos | Willow Oak | Tree (P) | 2 | 2 | 4 | 4 | 1 | 1 | 8 | 8 | 8 | 8 | 8 | 8 | 7 | 7 | 7 | 7 |
| Quercus nigra | Water Oak | Tree (P) | 1 | 1 | | | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Ulmus americana | American Elm | Tree (P) | | | | 3 | 1 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 6 |
| Stem count | | | 13 | 13 | 12 | 15 | 6 | 8 | 37 | 37 | 36 | 36 | 30 | 30 | 30 | 32 | 31 | 36 |
| ares | | | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| acres | | | 0.025 | 0.025 | 0.025 | 0.025 | 0.025 | 0.025 | 0.074 | 0.074 | 0.074 | 0.074 | 0.074 | 0.074 | 0.074 | 0.074 | 0.074 | 0.074 |
| Species count | | | 7 | 7 | 3 | 4 | 3 | 3 | 9 | 9 | 9 | 9 | 7 | 7 | 8 | 9 | 8 | 9 |
| Stems per ACRE | | | 526 | 526 | 486 | 607 | 243 | 324 | 499 | 499 | 486 | 486 | 405 | 405 | 405 | 432 | 418 | 486 |

Plant = Planted Stems; Total = Planted + Volunteer Stems

Color codes for Plot Density & Success

| | |
|-----------------------------------|---------------|
| Exceeds criteria by 10% or more | (286 or more) |
| Exceeds criteria by less than 10% | (260 - 285) |
| Fails criteria by less than 10% | (234 - 259) |
| Fails criteria by more than 10% | (233 or less) |

Table 6. CVS Plot Stem Density and Success Summary.

| MY-5 Sept 2021 | | success = min 260 stems/acre | | |
|-----------------|----------------------------------|------------------------------|--------------|-----|
| CVS Plot Number | Planted + Volunteer Native Stems | invasive stems | success met? | |
| | per plot | per acre | | |
| 97071-29 | 13 | 526 | 0 | Yes |
| 97071-30 | 15 | 607 | 0 | Yes |
| 97071-31 | 8 | 324 | 0 | Yes |
| average | 12.0 | 486 | 0 | Yes |