Tar River Headwaters Stream and Ditch Buffer

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

MY-1 (2017) Fall Monitoring Report

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

Data Collected: October 2017 Final Report: Dec 2017

	Submitted To: **N.C. Department of Environmental Quality** **DEQ Division of Mitigation Services** **1652 Mail Service Ctr, Raleigh, NC 27699-1652** --- **DMS Project Manager: Lindsay Crocker** **DEQ-DMS Contract # 007016**

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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 survivingand 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 upstream of the ford crossing is now vegetated with a dense native herbaceous cover and a high percentage of surviving planted live stems. All three vegetation plots met success criteria in Oct 2017, and the average stem density for all plots is 486 native woody stems per acre. At least seven planted tree species contribute to species richness, including river birch, musclewood, green ash, swamp blackgum, sycamore, willow oak and water oak. The ditch and stream banks appear stable and these features were observed holding water following heavy rain events throughout the fall. The project section downstream of the ford crossing along the intermittent stream contains scattered native mature trees interspersed with planted trees. 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 locations were established at representative locations along the ditch and buffer area. Two are located above the crossing and one is located below the crossing. Please refer to the CCPV for Photo Point locations in Figure 2.

Fence integrity will be 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.

United States Department of Agriculture, Natural Resources Conservation Service, 2016. Web Soil Survey. Available: http://websoilsurvey.nrcs.usda.gov/app/

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

Appendix A: Project Background Data

Figure 1. Tar River Headwaters Project Vicinity Map

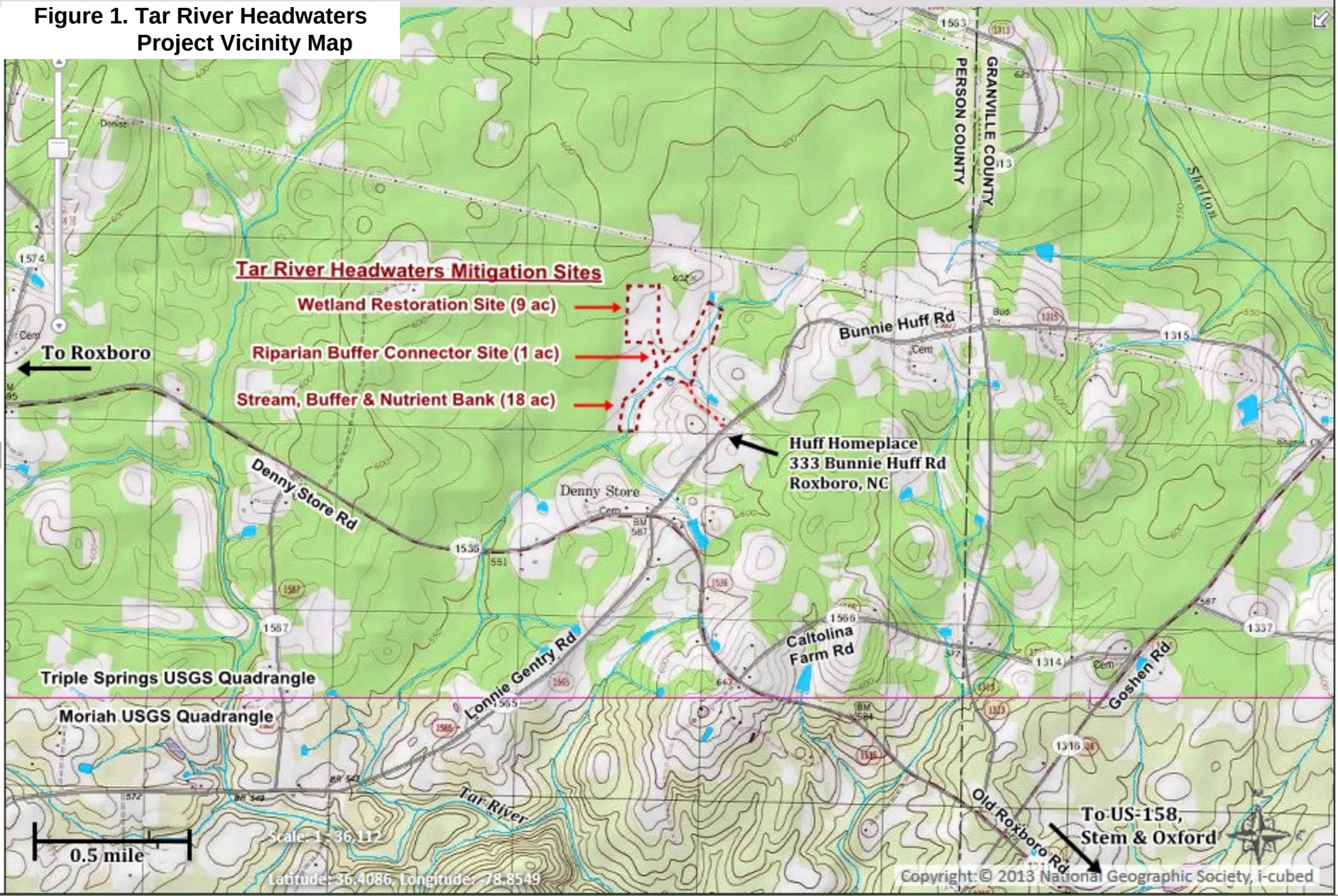

Table 1. Project Components and Mitigation Assets
Tar River Headwaters Stream and Ditch Buffer, DMS # 97071

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	OR	338	22
		30-50	1,697	1	100%	1,697			
TOTALS						**55,760**		**2,909**	**186**

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
Contract Date	NA	Oct-16
Conservation Easement Recorded	NA	Oct-16
Mitigation Plan	NA	Nov-16
Fencing and Construction	NA	Jan-17
Planting and Vegetation Plots Installed	NA	Feb-17
As-Built MY0 Baseline Monitoring	Feb-17	Apr-17
Year 1 Monitoring	Oct-17	Nov-17
Year 2 Monitoring		
Year 3 Monitoring		
Year 4 Monitoring		
Year 5 Monitoring		

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 Pottern: 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 Pottern: 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 Pottern: 919-556-8845

Appendix B: Visual Assessment Data

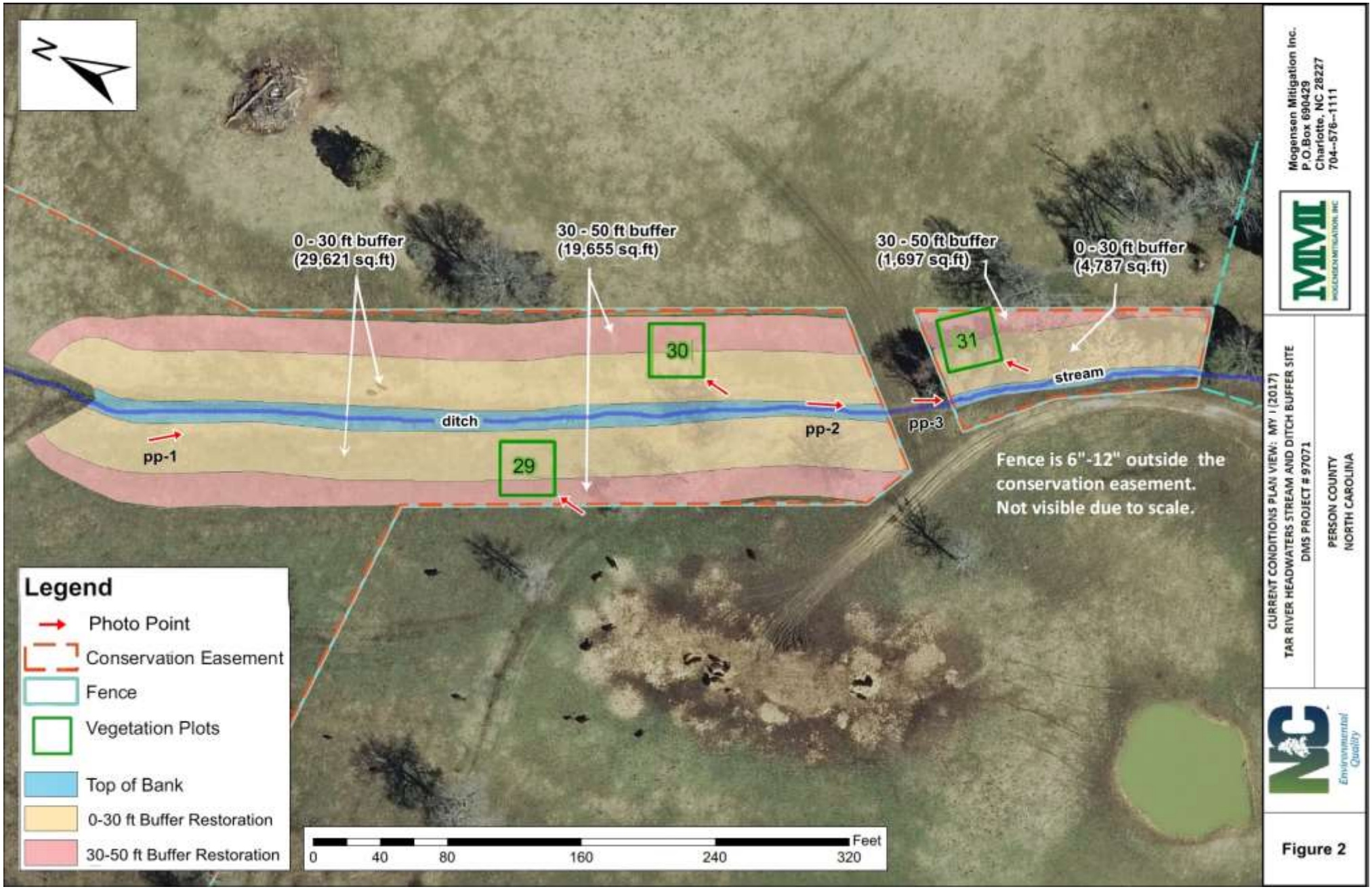
N
0 - 30 ft buffer
(29,621 sq.ft)
30 - 50 ft buffer
(19,655 sq.ft)
30 - 50 ft buffer
(1,697 sq.ft)
0 - 30 ft buffer
(4,787 sq.ft)
30
31
29
ditch
stream
pp-1
pp-2
pp-3
Fence is 6"-12" outside the conservation easement.
Not visible due to scale.
Legend
Photo Point
Conservation Easement
Fence
Vegetation Plots
Top of Bank
0-30 ft Buffer Restoration
30-50 ft Buffer Restoration
0
40
80
160
240
320
Feet
Mogensen Mitigation Inc.
P.O.Box 690429
Charlotte, NC 28227
704--576--1111
MMI
CURRENT CONDITIONS PLAN VIEW: MY 1 (2017)
TAR RIVER HEADWATERS STREAM AND DITCH BUFFER SITE
DMS PROJECT # 97071
PERSON COUNTY
NORTH CAROLINA
Environmental Quality
Figure 2

Table 4. Vegetation Conditions Assessment
Tar River Headwaters Stream and Ditch Buffer (TRHSDB) Project, DMS # 97071.
Monitoring Year 1 (Nov 2017) -- Person County NC. Tar-Pamlico HUC# 03020101-0102.

Planted Acreage **1.3**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage
1. Bare Areas	Very limited cover of both woody and herbaceous material.	0.1 acres	N/A	0	0.00	0.0%
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY4 criteria.	0.1 acres	N/A	0	0.00	0.0%
			Total	0	0.00	0.0%
3. 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 acres	N/A	0	0.00	0.0%
			Cumulative Total	0	0.00	0.0%

Easement Acreage **9.98**

Vegetation Category	Definitions	Mapping Threshold (SF)	CCPV Depiction	Number of Polygons	Combined Acreage	% of Easement Acreage
4. Invasive Areas of Concern	Areas or points (if too small to render as polygons at map scale).	0	N/A	0	0.00	0.0%
5. Easement Encroachment Areas	Areas or points (if too small to render as polygons at map scale).	0	N/A	0	0.00	0.0%

Vegetation Plots: Tar River Headwaters Stream and Ditch Buffer DMS #97071 MY-1 (2017)

CVS VegPlot-29: MY-0 Spring 2017

CVS VegPlot-29: MY-1 Fall 2017

CVS VegPlot-30: MY-0 Spring 2017

CVS VegPlot-30: MY-1 Fall 2017

Vegetation Plots: Tar River Headwaters Stream and Ditch Buffer DMS #97071 MY-1 (2017)

CVS VegPlot-31: MY-0 Spring 2017

CVS VegPlot-31: MY-1 Fall 2017

Photo Points: Tar River Headwaters Stream and Ditch Buffer DMS #97071 MY-1 (2017)

PhotoPoint 1: MY-0 Spring 2017

PhotoPoint 1: MY-1 Fall 2017

PhotoPoint 2: MY-0 Spring 2017

PhotoPoint 2: MY-1 Fall 2017

Photo Points: Tar River Headwaters Stream and Ditch Buffer DMS #97071 MY-1 (2017)

PhotoPoint 3: MY-0 Spring 2017

PhotoPoint 3: MY-1 Fall 2017

Appendix C: Vegetation Plot Data

Table 5. CVS Plot Stem Counts and Density by Species.

			Current Plot Data (MY1 - Feb 2017)						Annual Means			
			97071-29		97071-30		97071-31		MY0 (2017)		MY1 (2017)	
Scientific Name	Common Name	Growth Type	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total
Betula nigra	River Birch	Tree (P)					1	1	0	0	1	1
Carpinus caroliniana	Musclewood	Tree (P)	3	3	5	5	5	5	14	14	13	13
Diospyros virginiana	Persimmon	Tree (P)							0	0	0	0
Fraxinus pennsylvanica	Green Ash	Tree (P)	4	4	3	3			7	7	7	7
Liriodendron tulipifera	Tulip Poplar	Tree (P)							1	1	0	0
Nyssa biflora	Swamp Blackgum	Tree (P)	1	1					1	1	1	1
Platanus occidentalis	Sycamore	Tree (P)	3	3					3	3	3	3
Quercus bicolor	Swamp White Oak	Tree (P)	1	1					1	1	1	1
Quercus phellos	Willow Oak	Tree (P)	2	2	4	4	2	2	8	8	8	8
Quercus nigra	Water Oak	Tree (P)	1	1					1	1	1	1
Ulmus americana	American Elm	Tree (P)					1	1	1	1	1	1
		Stem count	15	15	12	12	9	9	37	37	36	36
		ares	1	1	1	1	1	1	3	3	3	3
(P) = planted species		**acres**	0.025	0.025	0.025	0.025	0.025	0.025	0.074	0.074	0.074	0.074
Total = Planted + Volunteer Stems		**Species count**	7	7	3	3	4	4	11	11	11	11
		Stems per ACRE	607	607	486	486	364	364	499	499	486	486

Color codes for Plot Density & Success

Exceeds criteria by 10% or more	(352 or more)
Exceeds criteria by less than 10%	(320 - 351)
Fails criteria by less than 10%	(289 - 319)
Fails criteria by more than 10%	(288 or less)

Table 6. CVS Plot Stem Density and Success Summary

CVS Plot #	Planted + Volunteer Native Stems		Invasive Woody Stems	Success Criteria Met?
	per plot	per acre		
97071- 29	15	607	0	Yes
97071- 30	12	486	0	Yes
97071- 31	9	364	0	Yes
Project Avg	12	486	0	Yes