

Tar River Headwaters Stream and Ditch Buffer

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

MY-3 (2019) Fall Monitoring Report

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

Data Collected: October 2019

Final Report: Dec 2019



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

MOGENSEN MITIGATION, INC.
P.O. Box 690429 Charlotte, NC 28227
(704) 576-1111 Rich@MogMit.com
(919) 556-8845 GPottern@MogMit.com





January 28, 2020

Sent via email to gpottern@rjccarolina.com

Gerald Pottern

Re: Tar River Headwaters Draft Year 3 Monitoring Report
Tar-Pam 01 River Basin, Contract 006746, Person County, DMS Project No. 97071

Gerald,

The Division of Mitigation Services (DMS) received the subject report on 1/5/2020 and a site visit occurred during the growing season 2019. After review, DMS offers the following comments:

Tar River Wetlands:

1. The picture on the front page is the same as MY2. Suggest adding a new picture to represent MY3.
2. Table 2. Update Year 3 monitoring dates.
3. Table 7. Update table header to show MY3 (instead of MY2)
4. Hydroperiod (Table 8). IRT will likely want to see % for all gauges over the monitoring period. Suggest this MY and future years create a table that shows hydroperiod by gauge by year.

Tar River Stream and Ditch:

1. Project success criteria for the riparian buffer is 260 stems per acre (planted and volunteer). Update report to show project is meeting success. If needed, insert this from Mitigation Plan, *"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."*
2. During the DWR review period, Katie Merritt found an error on the MY2 asset table. Please update the report to remove the nutrient offset credit in the stream section, and add the asterisks as shown below:

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

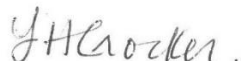
RIPARIAN BUFFER (15A NCAC 02B.0295)							NUTRIENT OFFSET (15A NCAC 02B.0240)		
Reach ID or Component	Restoration Level	Buffer Width (ft)	Creditable Area (sf)*	Initial Credit Ratio (x:1)	% Full Credit	Mitigation Credits (BMU)		Nutrient Offset: N (lbs)	Nutrient Offset: P (lbs)
Ditch TOB-50'	Restoration	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	N/A	-	-
		30-50	1,697	1	100%	1,697			
55,760									

* Creditable buffer areas are at least 30 ft wide.

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

Please submit 1 hard copy and an electronic copy of the final report, and ensure bonding is up to date before submitting your invoice. Place the DMS comment letter or response to comment behind the cover page of the monitoring report.

Kind Regards,



Lindsay Crocker, Project Manager
 NCDEQ Division of Mitigation Services

Table of Contents

1.0. Project Background Summary	3
1.1. Goals and Success Criteria.....	3
1.2. Project Setting and Pre-Restoration Conditions	3
1.3. Mitigation Approach and Expected Improvements	4
2.0. Current Site Conditions.....	4
3.0. Methods	5
4.0. References	5

APPENDIX A. Project Background Data

Figure 1. Project Vicinity Map

Table 1. Project Components and Mitigation Assets

Table 2. Project Activity and Reporting History

Table 3. Project Contacts Table

APPENDIX B. Visual Assessment Data

Figure 2. Current Conditions Plan View

Table 4. Vegetation Conditions Assessment

Figure 3. Vegetation Plot Photos

Figure 4. Photopoint Photos

APPENDIX C. Vegetation Plot Data

Table 5. Vegetation Plot Summaries

Table 6. Vegetation Success Attainment

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. The two CVS vegetation plots in this area each had 12 surviving stems in September 2019 and met success criteria. The project area downstream of the ford crossing along the intermittent stream contains scattered mature trees interspersed with planted trees. The one CVS plot in this area had seven living stems; two of the eight trees reported last year had apparently died recently due to drought; both were fully leafed out, but the leaves were dessicated. Local rain gauges recorded only 0.36 inches of precipitation during the six week period from August 25 to October 12, 2019.

All three CVS plots met the success criteria of 260 native hardwood stems per acre. Surviving planted tree species in the TRHSDB project easement include river birch, musclewood, green ash, blackgum, sycamore, willow oak, water oak, and American elm. Volunteers include willow oak, swamp white oak, American elm, persimmon, red maple and red cedar. No areas of low stem density exceeding the 0.10 acre mapping threshold were found.

The ditch and stream banks appear stable and contained flowing water during the first half of the year, but were mostly dry from July through September. 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.

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. Project Vicinity Map

Table 1. Project Components and Mitigation Credits

Table 2. Project Activity and Reporting History

Table 3. Project Contacts Table

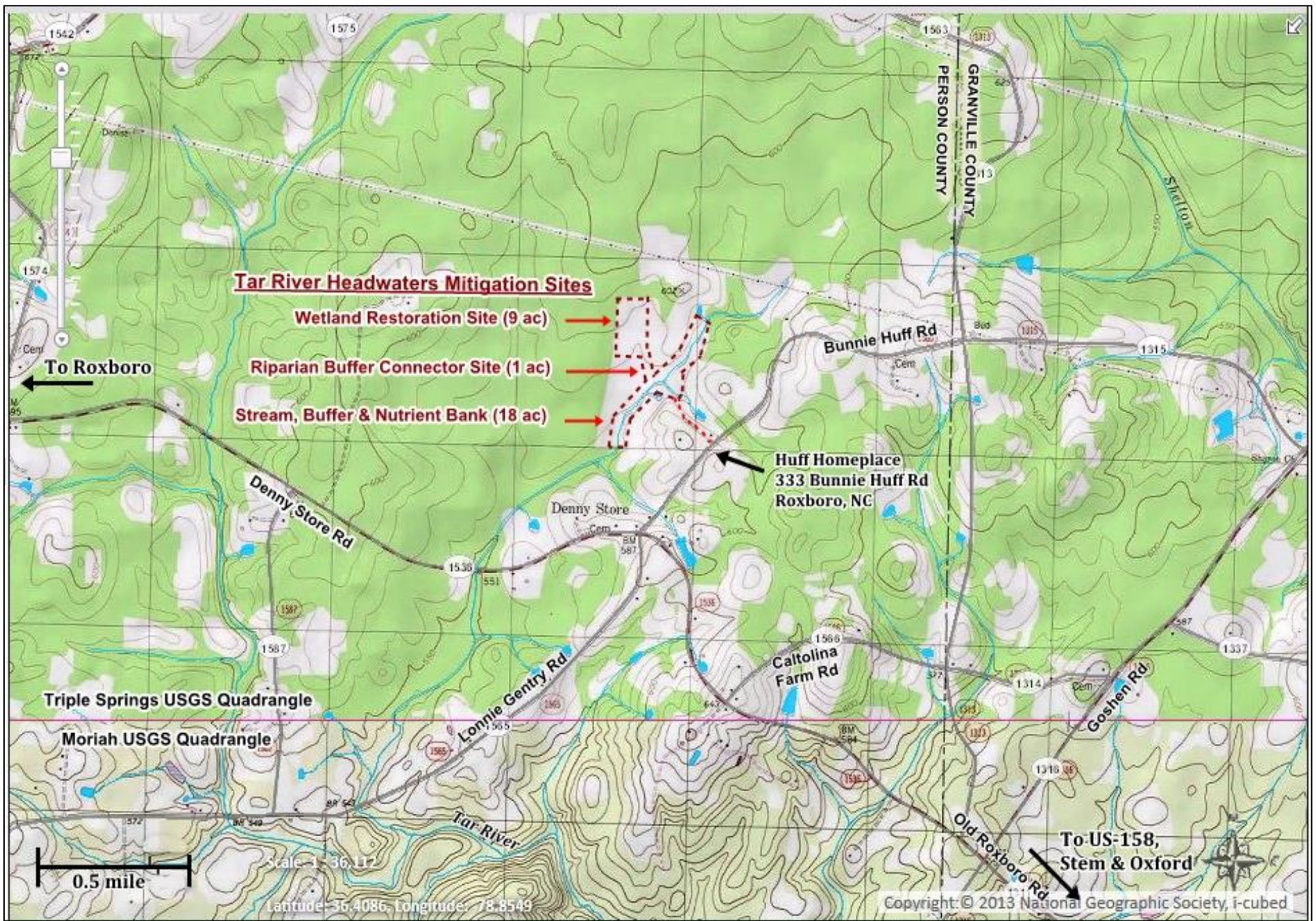


Figure 1. Project Vicinity Map: Tar River Headwaters Wetland Restoration Site and related mitigation projects on the Huff Farm property, Person County NC, Tar-Pamlico River HUC# 03020101-0102. DIRECTIONS: From US-158 in Berea, Granville County NC, turn right (northwest) on Old Roxboro Rd, which becomes 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		
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 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

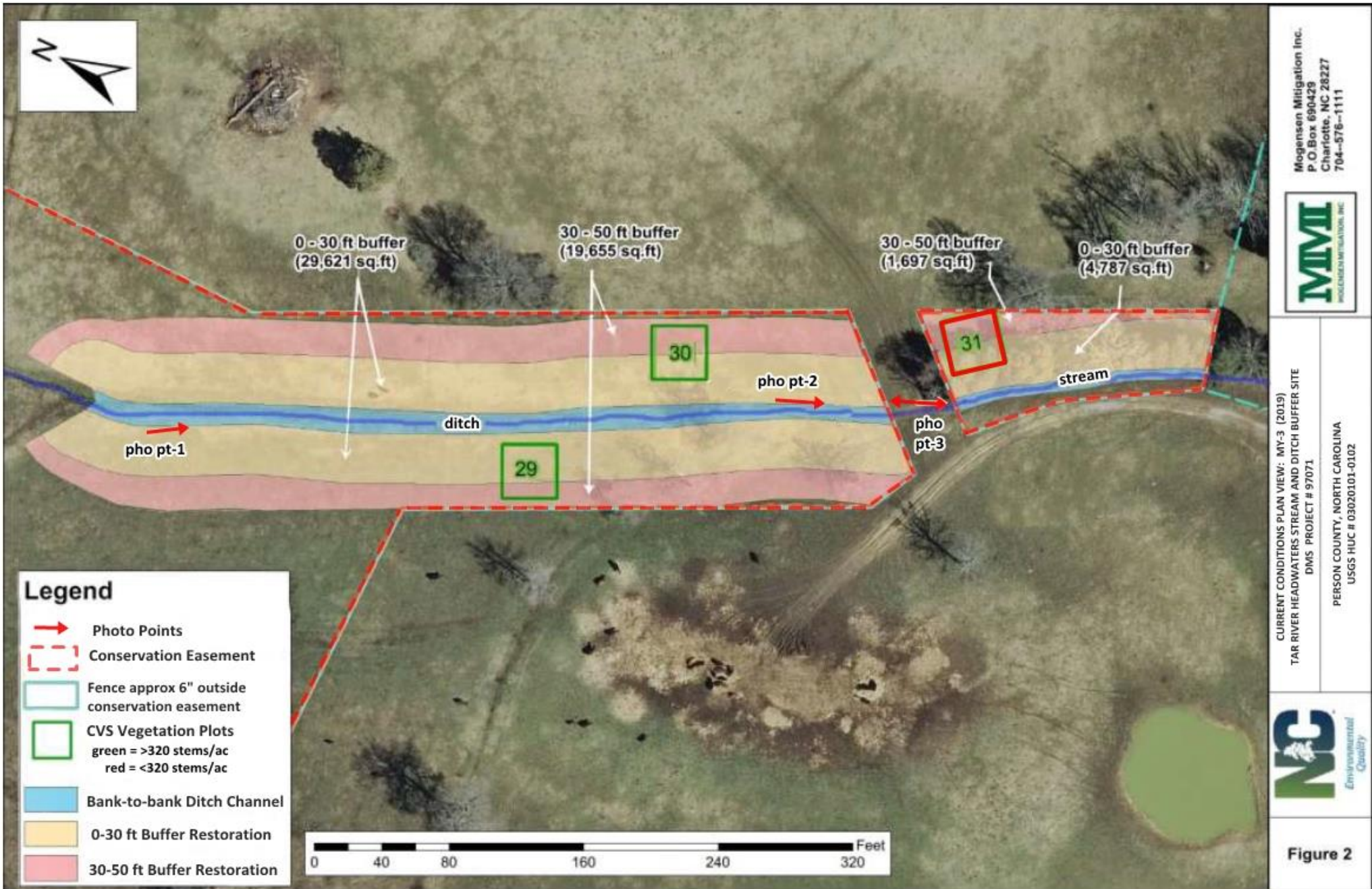
APPENDIX B. Visual Assessment Data

Figure 2. Current Conditions Plan View

Table 4. Vegetation Conditions Assessment

Figure 3. Vegetation Plot Photos

Figure 4. Photo Point Photos



Mogensen Mitigation Inc.
 P.O. Box 690429
 Charlotte, NC 28227
 704-576-1111



CURRENT CONDITIONS PLAN VIEW: MY-3 (2019)
 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-3 (2019)
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	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-3 (Sep 2019)



VegPlot 29: 23 Feb 2017

CVS VegPlot-29: MY-0 Spring 2017



VegPlot-29 - Sep 2019

CVS VegPlot-29: MY-3 Sept 2019



VegPlot 30: 23 Feb 2017

CVS VegPlot-30: MY-0 Spring 2017



VegPlot-30 - Sep 2019

CVS VegPlot-30: MY-3 Sept 2019

Figure 3. Vegetation Plots: Tar River Headwaters Stream & Ditch Buffer Site #97071 MY-3 (Sep 2019)



CVS VegPlot-31: MY-0 Spring 2017



CVS VegPlot-31: MY-3 Sept 2019

Figure 4. Photo Points: Tar River Headwaters Stream & Ditch Buffer Site #97071 MY-3 (Sep 2019)



Photo Point-1: MY-0 Spring 2017



Photo Point-1: MY-3 22-Sep-2019

Photo Point-1: MY-3 Sept 2019



Photo Point-2: MY-0 Spring 2017



Photo Point-2 face downstream Sept 2019

Photo Point-2: MY-3 Sept 2019

Figure 4. Photo Points: Tar River Headwaters Stream & Ditch Buffer Site #97071 MY-3 (Sep 2019)



Photo Point-3A upst: MY-0 Spring 2017



Photo Point-3A upst: MY-3 Sept 2019



Photo Point-3B dnst: MY-0 Spring 2017



Photo Point-3B dnst: MY-3 Sept 2019

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 3 (Feb 2019) -- Person County NC.**

Scientific Name			Common Name			Growth Type			Current Plot Data (MY3 - Sept 2019)						Annual Means							
									97071-29		97071-30		97071-31		MY0 (2016)		MY1 (2017)		MY2 (2018)		MY3 (2019)	
									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						
Diospyros virginiana	Persimmon	Tree (P)						1								1						
Fraxinus pennsylvanica	Green Ash	Tree (P)	3	3	3	3			7	7	7	7	5	5	6	6						
Liriodendron tulipifera	Tulip Poplar	Tree (P)							1	1												
Nyssa sylvatica	Swamp Blackgum	Tree (P)	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						
Quercus bicolor	Swamp White Oak	Tree (P)	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						
Quercus nigra	Water Oak	Tree (P)	1	1					1	1	1	1	1	1	1	1						
Ulmus americana	American Elm	Tree (P)				1	1	1	1	1	1	1	1	1	1	2						
(P) = planted species			Stem count			12	12	12	13	6	7	37	37	36	36	30	30	30	32			
			ares			1	1	1	1	1	1	1	3	3	3	3	3	3	3	3		
			acres			0.025	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		
			Species count			7	7	3	4	3	4	9	9	9	9	7	7	8	9			
Stems per ACRE			486	486	486	526	243	283	499	499	486	486	405	405	405	432						

MY-3 September 2019		success = min 260 stems/acre		
CVS Plot Number	Planted + Volunteer Native Stems	invasive stems	success met?	
	per plot	per acre		
97071-29	12	486	0	Yes
97071-30	12	486	0	Yes
97071-31	7	283	0	Yes
average	10.3	418	0	Yes

Plant = Planted Stems; Total = Planted + Volunteer Stems

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)