

**YEAR 1 ANNUAL MONITORING REPORT
FINAL
UT to Falls Lake (McDaniel Farm)
Riparian Buffer and Nutrient Offset Mitigation Project
Durham County, North Carolina
NC Division of Mitigation Services Project #: 95389**

**Neuse River Basin
03020201**

DWR #: 2015-0634



**Prepared for and by:
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1.0 PROJECT SUMMARY

NC Division of Mitigation Services (DMS) implemented the **UT to Falls Lake (McDaniel Farm) Project** (Project) to fulfill riparian buffer mitigation needs in the Neuse 03020201 Catalog Unit and nutrient offset mitigation needs in the Upper Falls Lake Watershed in accordance with the NC Division of Water Resources (DWR) Temporary Buffer Mitigation Rule (15A NCAC 02B .0295) effective October 24, 2014.

This project site is located off Benny Ross Road in Durham County approximately 7.5 miles east of the City of Durham and is within the Upper Falls Lake Watershed (Appendix B, Figure 1). The site is within the Lick Creek watershed (HU 3020201050030) which is comprised of sub-watersheds draining to Lick Creek, its tributary Rocky Branch, Laurel Creek, and unnamed tributaries to Falls Lake. Falls Lake is a drinking water supply watershed with additional nutrient restrictions regulated by the North Carolina Division of Water Resources. The site is in NC DWR's 03-04-01 sub-basin.

Riparian buffer mitigation activities occurred along the Project from top of bank and extending out to 200 feet, resulting in a maximum of 9.67 acres (421,385 ft²) of riparian buffer and/or nutrient offset mitigation through planting and preservation of 10.86 acres of forested buffer easement along the main unnamed tributary to Falls Lake and several water conveyances that flow to UT to Falls Lake. Refer to Appendix A, Table 1 for project mitigation components and Appendix B, Figure 2 for the project component/asset map. Due to the site's location within the Upper Falls Lake Watershed, nutrient offset mitigation from this site can only be provided to offset impacts from development within the Falls Lake Watershed. In addition, riparian buffer mitigation from this site can be used to offset permitted impacts according to the Temporary Rule (15A NCAC 02B .0295) effective October 24, 2014.

The following goals of this riparian buffer/nutrient offset mitigation project are to address stressors identified in the Project watershed through the restoration of riparian buffers along the UT and its conveyances.

- Removing nonpoint sources of pollution associated with agricultural activities
- Reducing sedimentation onsite and downstream

The success of these goals are based on the following objectives;

- Removal of horses and goats from riparian areas;
- Reducing the application of agricultural materials into and adjacent to streams;
- Establishing a vegetative buffer adjacent to streams to treat surface runoff, which may contain pollutants such as sediment and/or agricultural pollutants from the adjacent landscape;
- Reducing bank erosion associated with a lack of vegetative cover; and
- Planting a diverse hardwood vegetative buffer adjacent to Site tributaries.

Project restoration activities were completed in March 2016. Refer to Appendix A, Tables 2, 3 and 4 for detailed project activity, reporting history, project contact information and project baseline information and attributes.

Directions to the Project from Raleigh: Take US 70 West/Glenwood Avenue toward Durham. Turn Right on NC 50 North/Creedmoor Road. Exit onto NC 98 West. Turn Right onto Southview Road and follow to T intersection. Turn Right onto Baptist Road. Turn right onto Benny Ross Road Site. Travel approximately 0.3 mile to gate on the left. Access is by foot through the gate and 50 ft. access easement See Appendix D, As-Built Sheets). Coordinates: 35.998142, -78.742794

2.0 PERFORMANCE STANDARDS

Performance standards were established for native forest development and diffuse flow through the riparian buffer in accordance with DWR's Administrative Code 15A NCAC 02B.0295 (Mitigation Program Requirements for Protection and Maintenance of Riparian Buffers) (NCDWR 2014 Temporary Rule). Performance standards are dependent upon the density and survival of characteristic forest species. After five years of monitoring, an average density of 260 woody stems per acre must be surviving and diffuse flow maintained.

3.0 MONITORING PLAN

3.1 Reporting

Annual monitoring data will be reported following DMS's Riparian Buffer and Nutrient Offset Buffer Annual Monitoring Report Template (ver. 1.0) dated Feb. 2, 2014. The monitoring report shall provide a project data chronology and assist in decision making regarding project close-out. The following table outlines monitoring requirements and parameters for this project.

Required	Parameter	Quantity	Frequency	Notes
Yes	Vegetation	Quantity and location of vegetation plots will be determined by Division of Mitigation Services	Annual	Vegetation will be monitored for a period of five years or until success criteria are met. During years 2, 3 and 5 random plots will be used. Visual monitoring of the site will be done all five years
Yes	Project boundary		Annual	Locations of fence damage, vegetation damage, boundary encroachments, etc. will be mapped

3.2 Vegetation Monitoring

To monitor the vegetation at this site, the NC Division of Mitigation Services will use a combination of visual monitoring and random vegetation plots. Visual monitoring will be conducted during all five years of monitoring to assess vegetative cover, diffuse flow and easement integrity. DMS will monitor ten (10) rotating, random 1,500 square foot vegetation plots in years 2, 3 and 5 to assess vegetative success representative of the entire mitigation area from top of bank to 200 feet from each tributary/conveyance. These ten (10) plots will provide coverage of 3% of the site each year used. In each sample plot, monitoring parameters will include species composition and density. As it was done for this baseline data collection, the vegetation plots will be randomly selected using a grid and random number generator or similar method for each of the monitoring years 2, 3 and 5. Visual observations of the percent cover of shrub and herbaceous species, diffuse flow and easement integrity will be documented by photograph and site visits.

Monitoring of site restoration efforts will be performed for five years or until performance standards are met. The first annual monitoring assessment (MY1) will be completed in the fall of 2016. The vegetation will be monitored for a total of five years, with the final monitoring activities concluding in 2020. The close-out for the Project will be conducted in 2021 given that the performance criteria has been met.

4.0 MAINTENANCE AND CONTINGENCY PLAN

DMS shall monitor the site and conduct a physical inspection of the site a minimum of once per year throughout the post-construction monitoring period until performance standards are met. These site inspections may identify site components and features that require routine maintenance. Routine maintenance should be expected most often in the first two years following site construction and may include the following:

Component/Feature	Maintenance through project close-out	Remedial Measures
Vegetation	Vegetation shall be maintained to ensure survival. Routine vegetation maintenance and repair activities may include supplemental planting. The site will also be evaluated to ensure diffuse flow is still occurring.	Any remedial activities performed will be documented in the annual monitoring reports.
Site Boundary	Site boundaries shall be identified in the field to ensure clear distinction between the mitigation site and adjacent properties. Boundaries may be identified by fence, marker, bollard, post, tree-blazing, or other means as allowed by site conditions and/or conservation easement. Boundary markers disturbed, damaged, or destroyed will be repaired and/or replaced on an as needed basis.	Any remedial activities performed will be documented in the annual monitoring reports.

5.0 YEAR 1 MONITORING

Year 1 annual monitoring (MY1) was conducted in October 2016. As stated in Section 3.0, year 1 monitoring activities included visual monitoring of the project verifying the presence, or lack of, invasive species; checking the integrity of the easement and fencing; and taking photographs at the established photo points. Visual monitoring by DMS staff revealed areas with low stem density most likely due to competition from a dense herbaceous layer consisting of dog fennel (*Eupatorium capillifolium*). DMS will contact the planting contractor to address planted stem mortality throughout the site and conduct supplemental planting and reducing the effects of the dog fennel as needed. In addition, a large area of lespedeza (*Lespedeza cuneata*) was treated with herbicide to reduce its potential competition with planted species. See Figure 3 in Appendix B for areas of concern. The fence installed along the easement boundary is functioning as intended and all installed signage is still in place.

APPENDIX A
BACKGROUND TABLES

Table 1: Project Mitigation Components
UT to Falls Lake (McDaniel Farm) DMS Project #95389

Mitigation Components*										
Project Component	Existing Buffer SF	Restored Buffer SF	Creditable Buffer SF	Restoration Level	Mitigation Ratio (X:1)	Riparian Buffer Mitigation Credits (SF)		Nutrient Offset Credits Nitrogen (lbs)	Nutrient Offset Credits Phosphorus (lbs)	Notes/Comments
Buffer										
Riparian Buffer TOB-50' (Reaches A1, A2 & B) Subject Rural	0	49,393	49,393	R	1	49,393	OR	2,577.48	166.00	Restored riparian buffer for buffer or Nutrient Offset credit
Riparian Buffer 51-100' (Reaches A1, A2 & B) Subject Rural	0	82,083	82,083	R	1	82,083	OR	4,283.35	275.87	Restored riparian buffer for buffer or Nutrient Offset credit
Riparian Buffer 101-200' (Reaches A1, A2 & B) Subject Rural	0	149,557	149,557	R	1			7,804.36	502.64	Restored riparian buffer for Nutrient Offset credit only
Riparian Buffer TOB-200' Non-Subject Rural	0	72,392	72,392	R	1			3,777.65	243.30	Restored riparian buffer for Nutrient Offset credit only
Riparian Buffer TOB-100' (Reaches A1, A2 & B) Subject Rural	64,826	0	64,826	P	10	6,483				Preserved Riparian Buffer for Buffer Credit only
Riparian Buffer 101-200' (Reach A2) Subject Rural	3,134	0	3,134	P	20	157				Preserved Riparian Buffer for Buffer Credit only. Area in this zone is less than 10% of total Buffer Mitigation area. 20:1 ratio = 10:1 factoring in 50% reduction for preservation on a Subject Non-Urban stream.
Totals			421,385			138,115		18,442.85	1,187.82	
*All assets and credits generated in accordance with DWR Temporary Buffer Mitigation Rule (15A NCAC 02B .0295) effective October 24, 2014.										

Length and Area Summations by Mitigation Category					
Restoration Level	Stream	Riparian Wetland		Non-riparian Wetland	Creditable Buffer
	(linear feet)	(acres)		(acres)	(square feet)
		Riverine	Non-Riverine		
Restoration					353,425
Enhancement					
Enhancement I					
Enhancement II					
Creation					
Preservation					67,960
High Quality Pres					

Overall Assets Summary	
Asset Category	Overall Credits
Buffer¹	138,115
Nutrient Offset Nitrogen (lbs/ac/30 yr)	18,442.85
Nutrient Offset Phosphorus (lbs/ac/30 yr)	1,187.82

¹ Pursuant to 15A NCAC 02B .0295(n)(1) (2014 Temporary Rule), buffer mitigation credit used for buffer credit will not be used for nutrient offset credit

**Table 2. Project Activity and Reporting History
UT to Falls Lake (McDaniel Farm) DMS Project #95389**

Activity or Deliverable	Data Collection Complete	Completion or Delivery
Institution Date	NA	Jun-13
404 permit date	NA	NA
Restoration Plan	Jul-15	Sep-15
Final Design – Construction Plans	Jul-15	Sep-15
Construction	NA	Mar-16
Planting	Mar-16	Mar-16
Mitigation Plan / As-built (Year 0 Monitoring – baseline)	May-16	Jun-16
Year 1 Monitoring	Oct-16	Oct-16
Year 2 Monitoring		
Year 3 Monitoring		
Year 4 Monitoring		
Year 5 Monitoring		

Table 3. Project Contacts Table

UT to Falls Lake (McDaniel Farm) DMS Project #95389

Designer Jeff Schaffer, DMS	NC Division of Mitigation Services 217 W Jones Street, Raleigh, NC 27603 (919) 707-8308
Construction Contractor Andrew Dimmette	Wright Contracting, LLC PO Box 545, Siler City, NC 27344 (704) 219-0486
Planting Contractor Charlie Bruton	Bruton Natural Systems, Inc. PO Box 1197, Fremont, NC 27830 (919) 242-6555
Monitoring Performers Jeff Schaffer, DMS	NC Division of Mitigation Services 217 W Jones Street, Raleigh, NC 27603 (919) 707-8308

Table 4: Project Attributes Table

UT to Falls Lake (McDaniel Farm) DMS Project #95389

Project Information			
Project Name		UT to Falls Lake (McDaniel Farm)	
County		Durham	
Project Area (acres)		10.86	
Project Coordinates (latitude and longitude)		35.998142, -78.742794	
Planted Acreage (Acres of Woody Stems Planted)		10.86	
Project Watershed Summary Information			
Physiographic Province			
River Basin		Neuse	
USGS Hydrologic Unit 8-digit	3020201	USGS Hydrologic Unit 14-digit	03020201050030
DWR Sub-basin		03-04-01	
Project Drainage Area (acres)		21.5	
Project Drainage Area Percentage of Impervious Area		< 5%	
CGIA Land Use Classification		Majority Forested, some pasture	
Regulatory Considerations			
Parameters	Applicable?	Resolved?	Supporting Docs?
Water of the United States - Section 404	No		
Water of the United States - Section 401	No		
Endangered Species Act	No		
Historic Preservation Act	No		
Coastal Zone Management Act (CZMA or CAMA)	No		
FEMA Floodplain Compliance	No		
Essential Fisheries Habitat	No		

APPENDIX B
VISUAL ASSESSMENT DATA

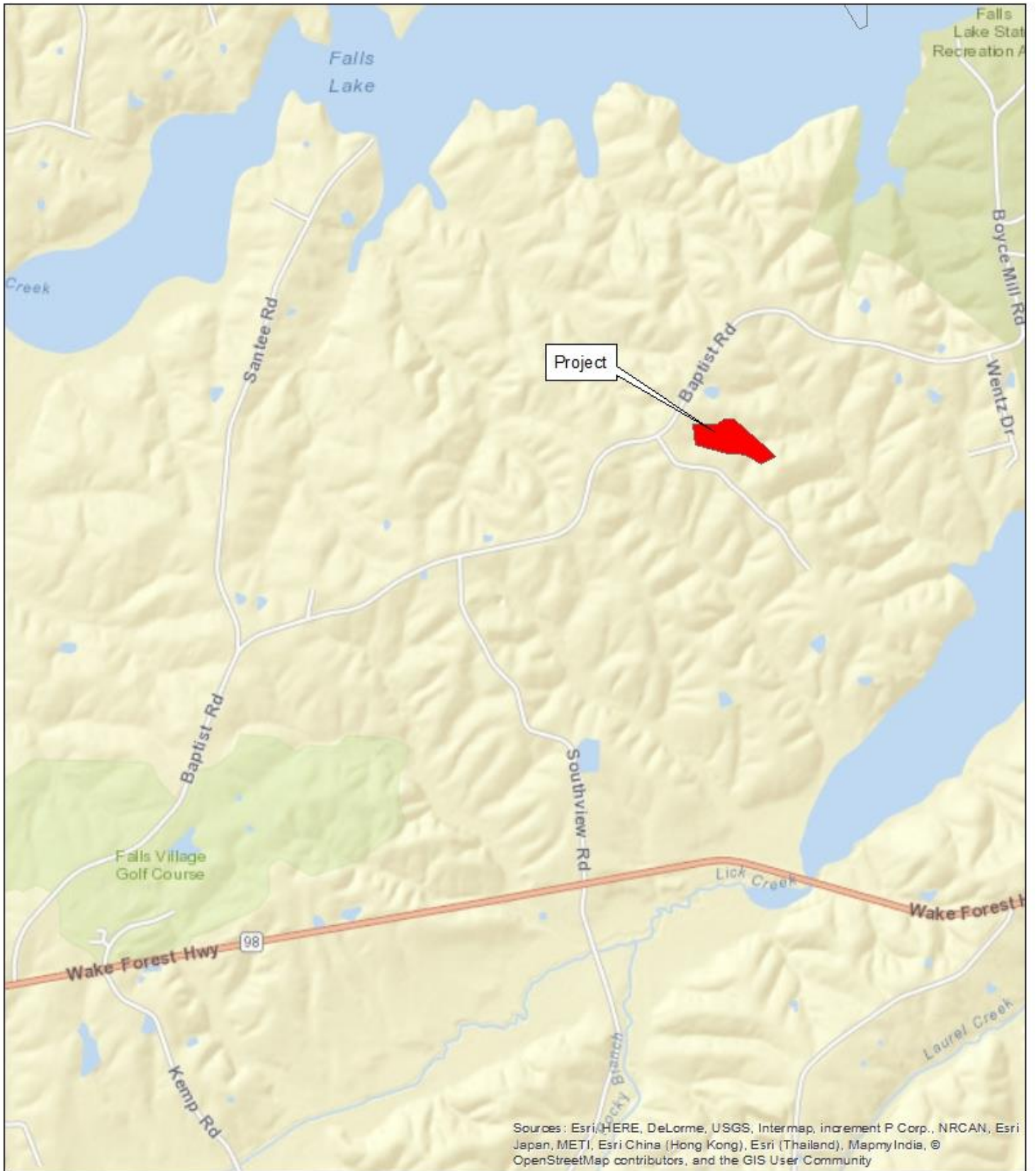
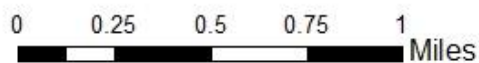
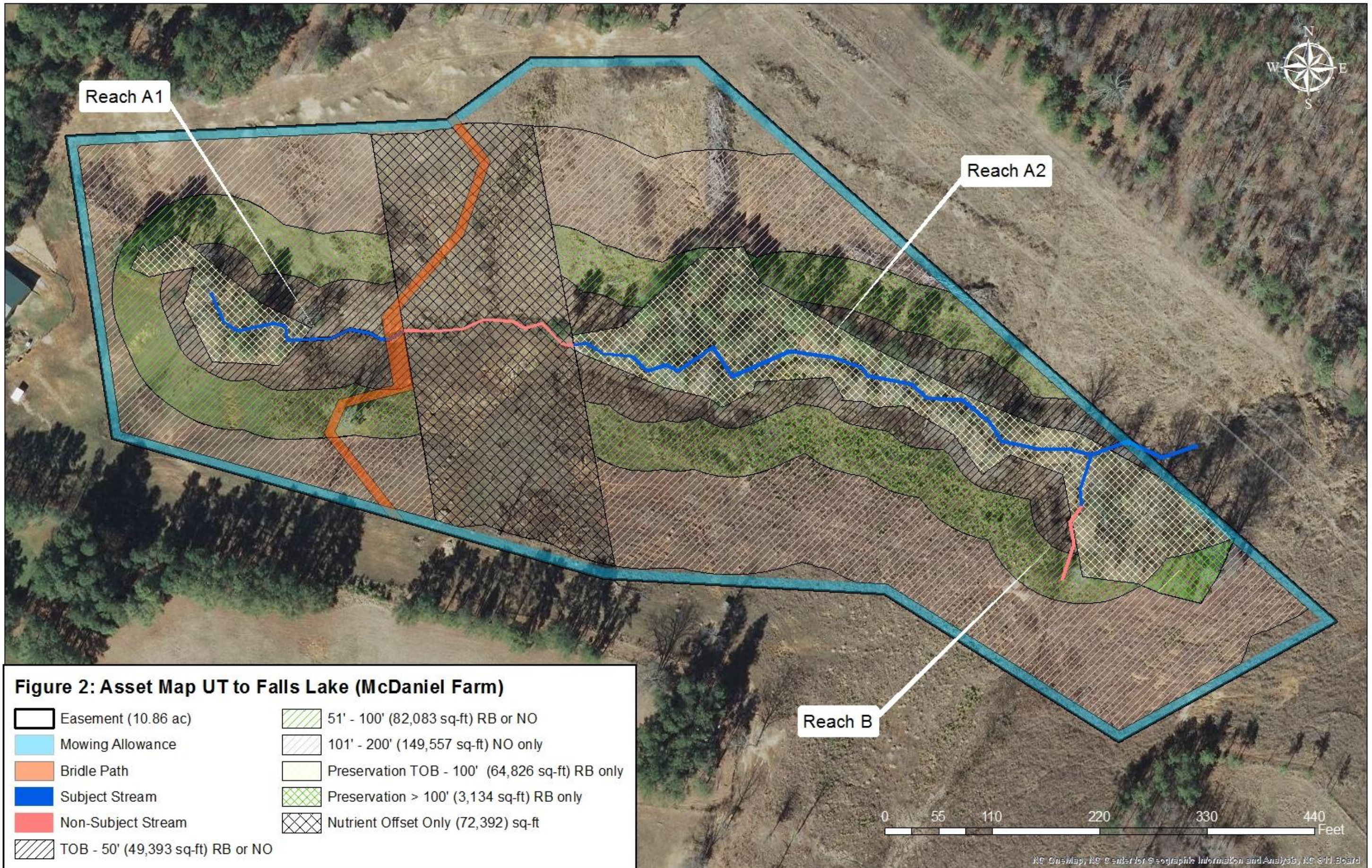


FIGURE 1
Project Location Map
UT TO FALLS LAKE (McDANIEL FARM)
Durham County, NC







Site Photos



Photo Point 1



Photo Point 2A-NW



Photo Point 2B-NE



Photo Point 3A-SW



Photo Point 3B-NW



Photo Point 4

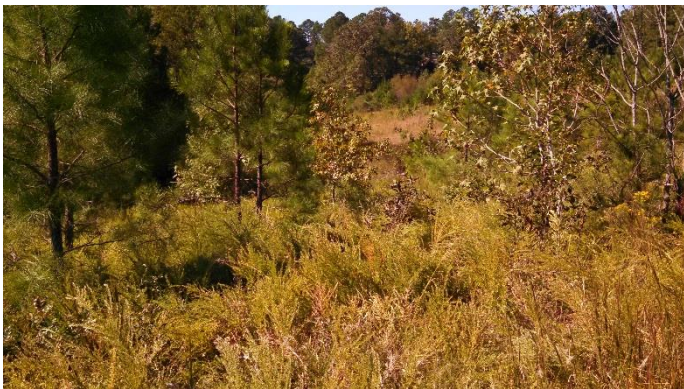


Photo Point 5



Photo Point 6



Photo Point 7A-SE



Photo Point 7B-E



Photo Point 8A-NW



Photo Point 8B-SE



Photo Point 9



Photo Point 10

UT to Falls Lake (McDaniel Farm) DMS Project #95389
 Planted Acreage 10.86

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	Pattern and Color	0	0.00	0.0%
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.1 acres	Pattern and Color	2	1.30	12.0%
Total				2	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	Pattern and Color	0	0.00	0.0%
Cumulative Total				2	1.30	12.0%

Easement Acreage 10.86

Vegetation Category	Definitions	Mapping Threshold	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).	1000 SF	Pattern and Color	1	1.20	11.0%
Total				1	1.20	11.0%
5. Easement Encroachment Areas	Areas or points (if too small to render as polygons at map scale).	none	Pattern and Color	0	0.00	0.0%
Cumulative Total				1	1.20	11.0%