

**Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project  
2018 Monitoring Report  
Monitoring Year 5 of 5**

**Granville County, North Carolina  
Tar-Pamlico River Basin  
USGS Hydrologic Unit 03020101**

**NCDMS Project No. 95807  
NCDMS Contract No. 5153**



**Submitted to:**

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

2018 Monitoring Report – Year 5 of 5

Project Construction Completed: 2014  
Data Collection for Monitoring Year 5 of 5  
Report Submitted: November 2018

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2018 Monitoring Report  
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Tar-Pamlico River Basin**

**Submitted to:**

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Raleigh, NC 27699-1652**

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November 2018

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## 1.0 MITIGATION PROJECT SUMMARY

The Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project (the Project) site is located in Granville County in the Tar-Pamlico River Basin (Figure 1). Much of the Tar-Pamlico River Basin has a history of nutrient stressor issues. Coon Creek is located within the NC Division of Mitigation Services' (NCDMS) Fishing Creek Local Watershed Plan to address agricultural stressors and identify potential restoration opportunities. As part of the larger Tar-Pamlico River Basin, Coon Creek is located in U.S. Geological Survey (USGS) hydrologic unit code (HUC) 03020101020010, which is identified in the 2010 Tar-Pamlico River Basin Restoration Priorities Report as a Targeted Local Watershed (TLW) to promote nutrient and sediment reduction in agricultural areas by restoring and preserving wetlands, streams, and riparian buffers. Projects that reduce sediment impacts and re-establish riparian buffers are a top priority for the Fishing Creek Watershed.

The Project established 30.19 acres of buffer easement along four unnamed tributaries (UT1 through UT4) to Coon Creek, including along Crews Farm Lake, an in-line impoundment (Figure 2), and will result in a maximum of 359,996 ft<sup>2</sup> of riparian buffer mitigation and 631,826 ft<sup>2</sup> nutrient offset. Riparian mitigation activities begin at the top-of-bank and generally extend out to 100 ft, and nutrient offset mitigation activities begin at 100 ft and extend out to 200 ft.

Vegetation monitoring for Monitoring Year 5 (MY 5) has been completed for the Project, and 96 percent of the monitoring plots are meeting or exceeding success criteria (Appendix B). Of the monitoring plots meeting or exceeding success criteria, only one fails to meet requirements by more than 10% of the minimum success threshold (Appendix B). Overall, the Project is in very good condition and is on track to close out at the end of MY 5.

Table 1 below shows the timeline of completed and future project activities.

**Table 1: Project Activity and Reporting History**

Activity or Deliverable	Data Collection Complete	Completion or Delivery
<b>Institution Date</b>	Mar-13	N/A
<b>Categorical Exclusion</b>	Jul-13	Jul-13
<b>Mitigation Plan</b>	Sep-13	Nov-13
<b>Final Design – Planting Plans</b>	Nov-13	Nov-13
<b>Planting</b>	Jan -14	Feb -14
<b>As-built (Year 0 Monitoring - baseline)</b>	Feb-14	May-14
<b>Year 1 Monitoring</b>	Sept-14	Nov-14
<b>Year 2 Monitoring</b>	Sept-15	Dec-15
<b>Year 3 Monitoring</b>	Oct-16	Dec-16
<b>Year 4 Monitoring</b>	Sept-17	Jan-18
<b>Year 5 Monitoring</b>	Oct-18	Nov-18

## 2.0 ANNUAL MONITORING

### 2.1 METHODS

Annual monitoring of the parameters listed below were conducted and reported using the Riparian Buffer and Nutrient Offset Buffer Annual Monitoring Report Template (ver. 1.0; NCDMS, 2014).

**Table 2: Monitoring Efforts**

Required	Parameter	Quantity	Frequency	Notes
X	Vegetation	23 Plots (2.5% of Planted Area)	Annual	Monitoring of vegetation using the CVS-NCDMS Level 1 and 2 protocols
X	Exotic and nuisance vegetation		Annual	Identify location of exotic and nuisance vegetation
X	Project Boundary		Semi-annual	Map locations of vegetation damage, boundary encroachments, etc.

To assess whether the vegetation performance standards are achieved, the Carolina Vegetation Survey (CVS)-NCDMS Protocol for Recording Vegetation Version 4.2 (Lee *et al.*, 2008) is used to perform annual Level 2 monitoring of 23 plots distributed across the planted area (Figure 3). These plots are placed throughout the re-established buffer to get a representative sample of planted vegetation. MY 5 monitoring was conducted in October 2018 and was the last year to collect vegetation data. Individual plot data are provided to NCDMS and CVS following CVS-NCDMS guidance.

Each corner of the vegetation plots is marked with steel electrical metallic tubing (EMT) driven into the ground and capped. Pink flagging was used to mark the counted stems, orange flagging was used to mark the southwest vegetation plot corner pins, and blue flagging was used to mark the other three corners.

General visual vegetation monitoring was also performed in MY 5. This inspection was used to assess potential problems such as poor stem density areas, areas of poor growth rate/poor vigor, bare areas, and problematic invasive species.

Vegetation plots were photographed from a consistent location at the southwest corner of each plot, facing diagonal to the northeast corner (Appendix A).

Stem counts from the vegetation plots were compiled in an Access database (Appendix B). The measure of vegetative success for the site is the survival of at least 320 planted hardwood stems per acre at the end of the fifth monitoring year.

### 2.2 RESULTS AND DISCUSSION

Monitoring activities were conducted successfully, and overall the site is in very good condition. In February and March 2016, the O'Brien & Gere team (OBG) performed supplemental planting in several areas within the easement where reduced stem counts were observed in MY2. These areas were supplemented with 716 bare root seedlings and 265, 36-inch plants, consisting of either a wetland or upland mix of plants, as appropriate. Species planted were consistent with the original planting plan as described in the Mitigation Plan.

The upland mix consisted of:

- 30% *Diospyros virginiana*
- 20% *Nyssa sylvatica*
- 30% *Quercus phellos*
- 20% *Quercus nigra*

The wetland mix consisted of:

- 30% *Quercus michauxii*
- 25% *Quercus nigra*
- 30% *Platanus occidentalis*
- 5% *Acer rubrum*
- 10% *Betula nigra*

Data collected in MY3 indicated that the supplemental planting succeeded in raising the stem count in the targeted areas for that monitoring year. Based on observations made during MY4 and MY5, the planted stems continue to thrive.

Vegetation plot data were collected on October 3 and 8, 2018. Of the 23 plots monitored, 22 plots met or exceeded the success criteria. Of these, one plot exceeded the success criteria by less than 10% (Figure 3 and Appendix B). Vegetation plot 17 did not meet success criteria for planted stems, but by only one stem, and volunteer hardwood stems in this plot elevate stem abundance above the 320 stems per acre minimum threshold (Appendix B). This is consistent with MY3 and MY4 results.

Chinese privet (*Ligustrum sinense*), lespedeza (*Lespedeza cuneata*), hairy jointgrass (*Arthraxon hispidus*), and multiflora rose (*Rosa multiflora*) were seen sporadically throughout the site; however, these occurrences were isolated, and did not appear to be compromising planted stem success. During MY4, a moderately thick growth of Japanese honeysuckle (*Lonicera japonica*) was observed in Plot 10 and the area around it. In MY5 the same growth was observed, but it does not appear to have expanded or become a problem. One stem in Vegetation Plot 6 and two stems within Vegetation Plots 9, 10, and 15 were observed to be impacted by the Japanese honeysuckle. The majority of the woody stems in the area were large enough to not be adversely affected, therefore, no management of the Japanese honeysuckle will be necessary.

Grading into the easement was observed in September of MY4, between Vegetation Monitoring Plot 9 and 12. The grading appeared to have been done by the landowner to address a drainage problem on the farm road at the edge of the easement. This did not appear to have impacted planted stems or contributed sediment to the project stream. OBG worked with the landowner to reach an adequate solution. The area within the easement was returned to original grade, matted, and re-seeded with an appropriate native species seed mix. The farm road was reinforced with riprap, and the upslope area was stabilized to prevent further sediment from entering the easement.

Minor rill erosion was noticed along the previous fishing access road, adjacent to Vegetation Plot 18 during the January site inspection. A small amount of grading into the easement between Vegetation Plot 16 and 17 was also noticed. All these erosion issues were repaired by OBG during the first week of July 2018. Pictures were taken before and after repairs were complete (Appendix A). The repairs appeared to be successful as of the MY 5 vegetation monitoring sessions.

### 2.3 MAINTENANCE AND MANAGEMENT

Vegetation monitoring is conducted annually, and physical inspection of the site is conducted twice per year throughout the post-construction monitoring period, or until performance standards are met. During MY5, on January 26, 2018, a site meeting was held with OBG/NCDMS to discuss a strategy for fixing the grading issue and to discuss the overall condition of the site. A site assessment was conducted on May 9, 2018 to record the exact extent of the grading problems and visually check the status of all vegetation plots. The vegetation monitoring for MY5 was conducted on October 3 and 18, 2018. Maintenance planned for the remainder of the year includes the following:

**Table 3: Maintenance Activities**

Component/Feature	Maintenance Activities
<b>Vegetation</b>	OBG undertook additional, supplemental planting of trees in the area of a former road running along the lake at the south edge of the easement.
<b>Site Boundary</b>	No further maintenance activities are planned. However, OBG will address site boundary issues as needed prior to project closeout. This includes disturbed, damaged, or destroyed boundary markers, erosional features, and repaired areas.
<b>Ford Crossing</b>	The ford crossings within the site will be maintained by the landowner and only as allowed by the Conservation Easement. No maintenance activities are planned by OBG. However, OBG will address easement related issues at this location as needed prior to project closeout.
<b>Irrigation Access</b>	The mobile irrigation equipment access point to Crews Farm Lake will be maintained by the landowner and only as allowed by the Conservation Easement. No maintenance activities are planned by OBG. However, OBG will address easement related issues at this location as needed prior to project closeout.

### 3.0 REGULATORY CONSIDERATIONS

#### 3.1 PROJECT COMPONENTS AND MITIGATION CREDITS

**Table 4: Project Components and Mitigation Credits**

Component Summation		
Restoration Level	Buffer (square ft)	Nutrient Offset (square ft)
0 to 50 feet from TOB	187,216	N/A
50 to 100 feet from TOB	172,780	N/A
100 to 200 feet from TOB	N/A	631,826
Total Restoration	359,996	631,826

Credit determination for this riparian restoration site follows North Carolina Tar-Pamlico Basin rule 15A NCAC 02B.0260, effective August 1, 2000 and the Nutrient Offset Payments Rule 15A NCAC 02B.0240, amended effective September 1, 2010.

Methodology used for determining nutrient offset credits from riparian restoration is the *NC Division of Water Resources—Methodology and Calculations for Determining the Nutrient Reductions Associated With Riparian Buffer Establishment*.

Mitigation Credits			
Type	Riparian Buffer Restoration	Nitrogen Nutrient Offset	Phosphorous Nutrient Offset
<b>Totals</b>	359,996 ft <sup>2</sup> (8.3 acres)	631,826 ft <sup>2</sup> (32,970.70 lbs)	631,826 ft <sup>2</sup> (2,123.49 lbs)

Project Components					
Project Component or Reach ID	Stationing/ Location	Approach (PI, PII, etc.)	Restoration or Restoration Equivalent	Restoration Acreage	Mitigation Ratio
UT1 and UT2	North of Winding Oak Rd	Planting	Buffer Restoration	5.2	1:1
		Planting	Nutrient Offset Restoration	7.3	1:1
UT1 and UT3	South of Winding Oak Rd	Planting	Buffer Restoration	0.8	1:1
		Planting	Nutrient Offset Restoration	1.0	1:1
UT4 and Crews Farm Lake	South of Winding Oak Rd	Planting	Buffer Restoration	2.2	1:1
		Planting	Nutrient Offset Restoration	6.2	1:1

#### 3.2 SUMMARY

Mitigation activities to date have been successful. This Project is currently on track to provide the credits described in the table above.



#### **4.0 REFERENCES**

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Lee, Michael T., R. K. Peet, S. D. Roberts, and T. R. Wentworth. 2008. CVS-NCDMS Protocol for Recording Vegetation, Version 4.2 Available URL: <http://cvs.bio.unc.edu/methods.htm>. [Date Accessed: 14 October 2013].



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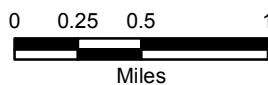
**LEGEND**

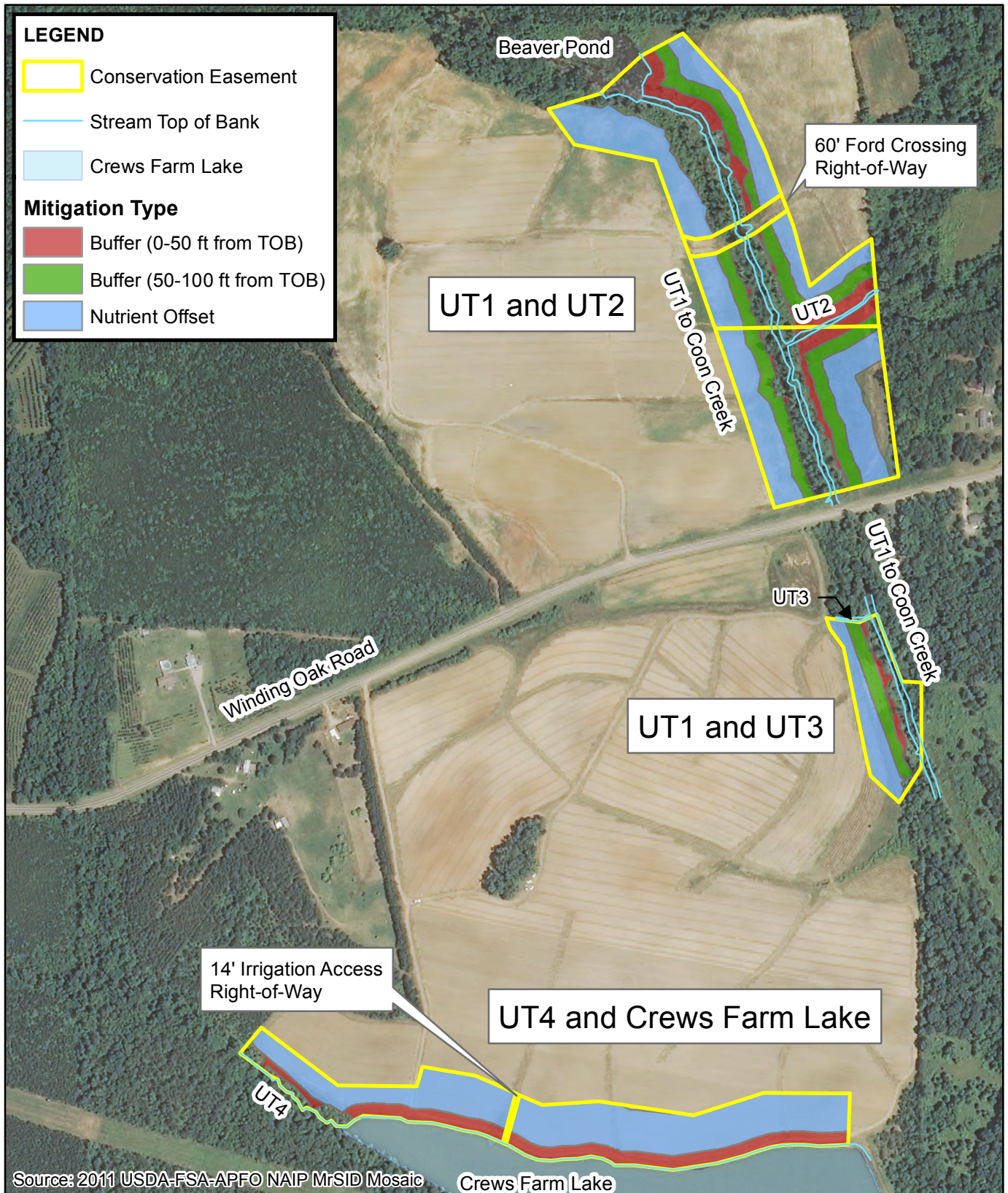
 Project Area

NCDMS FULL DELIVERY PROJECT #95807  
 COON CREEK RIPARIAN BUFFER AND  
 NUTRIENT OFFSET MITIGATION PROJECT  
 GRANVILLE COUNTY, NC



**VICINITY MAP**



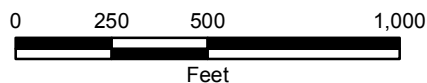


NCDMS FULL DELIVERY PROJECT #95807  
 COON CREEK RIPARIAN BUFFER AND  
 NUTRIENT OFFSET MITIGATION PROJECT  
 GRANVILLE COUNTY, NC

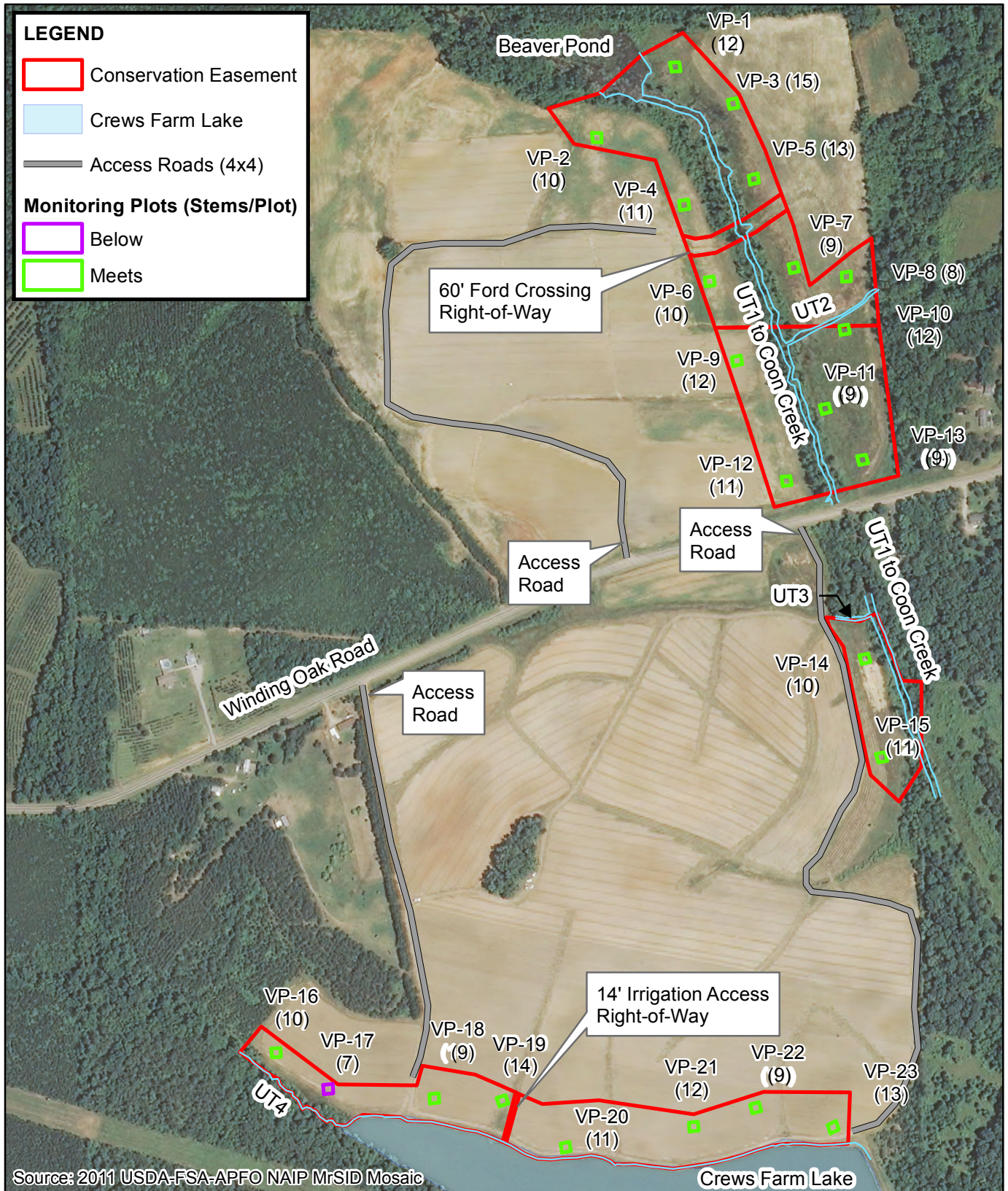
**PROJECT COMPONENTS**



11/12/18



**FIGURE 3**

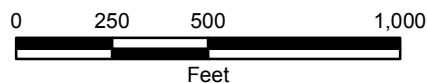


NCDMS FULL DELIVERY PROJECT #95807  
 COON CREEK RIPARIAN BUFFER AND  
 NUTRIENT OFFSET MITIGATION PROJECT  
 GRANVILLE COUNTY, NC

**YEAR 4 MONITORING RESULTS**



11/12/18




*PHOTOGRAPHIC LOG*

<b>CLIENT NAME:</b> DMS		<b>SITE LOCATION:</b> Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project	<b>PROJECT NO.</b> NCDMS No. 95807
<b>PHOTO NO.</b> 1	<b>DATE:</b> 10/8/2018	 <p><small>Date &amp; Time: Mon, Oct 08, 2018 12:44:11 EDT vp 1 sw</small></p>	
<b>DESCRIPTION</b> Vegetation Plot #1. Standing in the southwest corner, facing northeast.			

<b>CLIENT NAME:</b> DMS		<b>SITE LOCATION:</b> Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project	<b>PROJECT NO.</b> NCDMS No. 95807
<b>PHOTO NO.</b> 2	<b>DATE:</b> 10/8/2018	 <p><small>Date &amp; Time: Mon, Oct 08, 2018 11:25:00 EDT vp 2 sw</small></p>	
<b>DESCRIPTION</b> Vegetation Plot #2. Standing in the southwest corner, facing northeast.			


<b>Client Name:</b> DMS		<b>Site Location:</b> Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project	<b>Project No.</b> NCDMS No. 95807
<b>Photo No.</b> 3	<b>Date:</b> 10/8/2018	 <p><small>Date &amp; Time: Mon, Oct 08, 2018, 13:04:38 EDT vp 3 aw release</small></p>	
<b>Description</b> Vegetation Plot #3. Standing in the southwest corner, facing northeast.			

<b>Client Name:</b> DMS		<b>Site Location:</b> Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project	<b>Project No.</b> NCDMS No. 95807
<b>Photo No.</b> 4	<b>Date:</b> 10/8/2018	 <p><small>Date &amp; Time: Mon, Oct 08, 2018, 11:00:45 EDT vp 4 aw release</small></p>	
<b>Description</b> Vegetation Plot #4. Standing in the southwest corner, facing northeast.			


<b>Client Name:</b> DMS		<b>Site Location:</b> Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project	<b>Project No.</b> NCDMS No. 95807
<b>Photo No.</b> 5	<b>Date:</b> 10/8/2018		
<b>Description</b> Vegetation Plot #5. Standing in the southwest corner, facing northeast.			

<b>Client Name:</b> DMS		<b>Site Location:</b> Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project	<b>Project No.</b> NCDMS No. 95807
<b>Photo No.</b> 6	<b>Date:</b> 10/8/2018		
<b>Description</b> Vegetation Plot #6. Standing in the southwest corner, facing northeast.			


<b>Client Name:</b> DMS		<b>Site Location:</b> Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project	<b>Project No.</b> NCDMS No. 95807
<b>Photo No.</b> 7	<b>Date:</b> 10/8/2018	 <p><small>Date &amp; Time: Mon, Oct 08, 2018, 13:36:00 EDT vp 7 sw</small></p>	
<b>Description</b> Vegetation Plot #7. Standing in the southwest corner, facing northeast.			

<b>Client Name:</b> DMS		<b>Site Location:</b> Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project	<b>Project No.</b> NCDMS No. 95807
<b>Photo No.</b> 8	<b>Date:</b> 10/8/2018	 <p><small>Date &amp; Time: Mon, Oct 08, 2018, 14:51:28 EDT vp 8 sw-relake</small></p>	
<b>Description</b> Vegetation Plot #8. Standing in the southwest corner, facing northeast.			



<b>Client Name:</b> DMS		<b>Site Location:</b> Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project	<b>Project No.</b> NCDMS No. 95807
<b>Photo No.</b> 9	<b>Date:</b> 10/8/2018		
<b>Description</b> Vegetation Plot #9. Standing in the southwest corner, facing northeast.			


<b>Client Name:</b> DMS		<b>Site Location:</b> Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project	<b>Project No.</b> NCDMS No. 95807
<b>Photo No.</b> 10	<b>Date:</b> 10/8/2018		
<b>Description</b> Vegetation Plot #10. Standing in the southwest corner, facing northeast.			


<b>Client Name:</b> DMS		<b>Site Location:</b> Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project	<b>Project No.</b> NCDMS No. 95807
<b>Photo No.</b> 11	<b>Date:</b> 10/8/2018		
<b>Description</b> Vegetation Plot #11. Standing in the southwest corner, facing northeast.			

<b>Client Name:</b> DMS		<b>Site Location:</b> Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project	<b>Project No.</b> NCDMS No. 95807
<b>Photo No.</b> 12	<b>Date:</b> 10/8/2018		
<b>Description</b> Vegetation Plot #12. Standing in the southwest corner, facing northeast.			

<b>Client Name:</b> DMS		<b>Site Location:</b> Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project	<b>Project No.</b> NCDMS No. 95807
<b>Photo No.</b> 13	<b>Date:</b> 10/8/2018		
<b>Description</b> Vegetation Plot #13. Standing in the southwest corner, facing northeast.			

<b>Client Name:</b> DMS		<b>Site Location:</b> Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project	<b>Project No.</b> NCDMS No. 95807
<b>Photo No.</b> 14	<b>Date:</b> 10/3/2018		
<b>Description</b> Vegetation Plot #14. Standing in the southwest corner, facing northeast.			

<b>Client Name:</b> DMS		<b>Site Location:</b> Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project	<b>Project No.</b> NCDMS No. 95807
<b>Photo No.</b> 15	<b>Date:</b> 10/3/2018	 <p><small>Date &amp; Time: Wed, Oct 03, 2018, 11:35:02 EDT vp.15</small></p>	
<b>Description</b> Vegetation Plot #15. Standing in the southwest corner, facing northeast.			


<b>Client Name:</b> DMS		<b>Site Location:</b> Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project	<b>Project No.</b> NCDMS No. 95807
<b>Photo No.</b> 16	<b>Date:</b> 10/3/2018	 <p><small>Date &amp; Time: Wed, Oct 03, 2018, 12:25:22 EDT vp.16-sw</small></p>	
<b>Description</b> Vegetation Plot #16. Standing in the southwest corner, facing northeast.			

<b>Client Name:</b> DMS		<b>Site Location:</b> Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project	<b>Project No.</b> NCDMS No. 95807
<b>Photo No.</b> 17	<b>Date:</b> 10/3/2018		
<b>Description</b> Vegetation Plot #17. Standing in the southwest corner, facing northeast.			


<b>Client Name:</b> DMS		<b>Site Location:</b> Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project	<b>Project No.</b> NCDMS No. 95807
<b>Photo No.</b> 18	<b>Date:</b> 10/3/2018		
<b>Description</b> Vegetation Plot #18. Standing in the southwest corner, facing northeast.			

<b>Client Name:</b> DMS		<b>Site Location:</b> Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project	<b>Project No.</b> NCDMS No. 95807
<b>Photo No.</b> 19	<b>Date:</b> 10/3/2018	 <p><small>Date &amp; Time: Wed, Oct 03, 2018, 13:53:39 EDT vp 19 sw retake</small></p>	
<b>Description</b> Vegetation Plot #19. Standing in the southwest corner, facing northeast.			

<b>Client Name:</b> DMS		<b>Site Location:</b> Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project	<b>Project No.</b> NCDMS No. 95807
<b>Photo No.</b> 20	<b>Date:</b> 10/3/2018	 <p><small>Date &amp; Time: Wed, Oct 03, 2018, 14:18:00 EDT vp 20 sw</small></p>	
<b>Description</b> Vegetation Plot #20. Standing in the southwest corner, facing northeast.			


<b>Client Name:</b> DMS		<b>Site Location:</b> Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project	<b>Project No.</b> NCDMS No. 95807
<b>Photo No.</b> 21	<b>Date:</b> 10/3/2018	 <p>Date &amp; Time: Wed, Oct 03, 2018, 14:44:32 EDT tp 21.sw</p>	
<b>Description</b> Vegetation Plot #21. Standing in the southwest corner, facing northeast.			

<b>Client Name:</b> DMS		<b>Site Location:</b> Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project	<b>Project No.</b> NCDMS No. 95807
<b>Photo No.</b> 22	<b>Date:</b> 10/3/2018	 <p>Date &amp; Time: Wed, Oct 03, 2018, 14:05:59 EDT tp 22.sw</p>	
<b>Description</b> Vegetation Plot #22. Standing in the southwest corner, facing northeast.			

<b>Client Name:</b> DMS		<b>Site Location:</b> Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project	<b>Project No.</b> NCDMS No. 95807
<b>Photo No.</b> 23	<b>Date:</b> 10/3/2018		
<b>Description</b> Vegetation Plot #23. Standing in the southwest corner, facing northeast.			

<b>Client Name:</b> DMS		<b>Site Location:</b> Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project	<b>Project No.</b> NCDMS No. 95807
<b>Photo No.</b> 24	<b>Date:</b> 10/3/2018		
<b>Description</b> Repaired rill erosion along historic fishing access road. Picture taken west of vegetation plot 18, facing south.			



<b>Client Name:</b> DMS		<b>Site Location:</b> Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project	<b>Project No.</b> NCDMS No. 95807
<b>Photo No.</b> 25	<b>Date:</b> 9/13/2017	 <p>grading into easement between vp 9 and 12</p>	
<b>Description</b> Pre-construction view of erosion issue between vegetation plot 9 and 12. Phot taken facing south.			

<b>Client Name:</b> DMS		<b>Site Location:</b> Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project	<b>Project No.</b> NCDMS No. 95807
<b>Photo No.</b> 26	<b>Date:</b> 10/3/2018	 <p>Date &amp; Time: Wed, Oct 03, 2018, 15:58:38 (H01) repair at vp9</p>	
<b>Description</b> Post-construction view of erosion issue between vegetation plot 9 and 12. Phot taken facing south.			

# Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project (#95807)

Year 5 (03-Oct-2018 to 08-Oct-2018)

Vegetation Plot Summary Information

Plot #	Riparian Buffer Stems <sup>1</sup>	Stream/Wetland Stems <sup>2</sup>	Live Stakes	Invasives	Volunteers <sup>3</sup>	Total <sup>4</sup>	Unknown Growth Form
1	12	n/a	0	0	25	37	0
2	10	n/a	0	0	36	46	0
3	15	n/a	0	0	39	54	0
4	11	n/a	0	0	24	35	0
5	13	n/a	0	0	46	59	0
6	10	n/a	0	0	6	16	0
7	9	n/a	0	0	27	36	0
8	8	n/a	0	0	23	31	0
9	12	n/a	0	0	7	19	0
10	12	n/a	0	0	15	27	0
11	9	n/a	0	0	10	19	0
12	11	n/a	0	0	3	14	0
13	9	n/a	0	0	27	36	0
14	10	n/a	0	0	80	90	0
15	11	n/a	0	0	14	25	0
16	10	n/a	0	0	52	62	0
17	7	n/a	0	0	15	22	0
18	9	n/a	0	0	24	33	0
19	14	n/a	0	0	13	27	0
20	11	n/a	0	0	12	23	0
21	12	n/a	0	0	11	23	0
22	9	n/a	0	0	10	19	0
23	13	n/a	0	0	7	20	0

## Wetland/Stream Vegetation Totals

(per acre)

Plot #	Stream/ Wetland Stems <sup>2</sup>	Volunteers <sup>3</sup>	Total <sup>4</sup>
1	n/a	1012	1497
2	n/a	1457	1862
3	n/a	1578	2185
4	n/a	971	1416
5	n/a	1862	2388
6	n/a	243	647
7	n/a	1093	1457
8	n/a	931	1255
9	n/a	283	769
10	n/a	607	1093
11	n/a	405	769
12	n/a	121	567
13	n/a	1093	1457
14	n/a	3237	3642
15	n/a	567	1012
16	n/a	2104	2509
17	n/a	607	890
18	n/a	971	1335
19	n/a	526	1093
20	n/a	486	931
21	n/a	445	931
22	n/a	405	769
23	n/a	283	809
<b>Project Avg</b>	n/a	<b>925</b>	<b>1360</b>

## Riparian Buffer Vegetation Totals

(per acre)

Plot #	Riparian Buffer Stems <sup>1</sup>	Success Criteria Met?
1	486	Yes
2	405	Yes
3	607	Yes
4	445	Yes
5	526	Yes
6	405	Yes
7	364	Yes
8	324	Yes
9	486	Yes
10	486	Yes
11	364	Yes
12	445	Yes
13	364	Yes
14	405	Yes
15	445	Yes
16	405	Yes
17	283	No
18	364	Yes
19	567	Yes
20	445	Yes
21	486	Yes
22	364	Yes
23	526	Yes
<b>Project Avg</b>	<b>435</b>	<b>Yes</b>

### Color for Density

Exceeds requirements by 10%

Exceeds requirements, but by less than 10%

Fails to meet requirements, by less than 10%

Fails to meet requirements by more than 10%

Stem Class	Characteristics
<sup>1</sup> Buffer Stems	Native planted hardwood trees. Does NOT include shrubs. No pines. No vines.
<sup>2</sup> Stream/Wetland Stems	Native planted woody stems. Includes shrubs, does NOT include live stakes. No vines
<sup>3</sup> Volunteers	Native woody stems. Not planted. No vines.
<sup>4</sup> Total	Planted + volunteer native woody stems. Includes live stakes. Excl. exotics. Excl. vines.

DMS Project Code 95807. Project Name: Coon Creek Riparian  
Buffer and Nutrient Offset Mitigation Project

			Current Plot Data (MY5 2018)																										
Scientific Name	Common Name	Species Type	95807-01-0001			95807-01-0002			95807-01-0003			95807-01-0004			95807-01-0005			95807-01-0006			95807-01-0007			95807-01-0008					
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T			
Acer rubrum	red maple	Tree																							2				
Asimina triloba	pawpaw	Tree	1	1	1																								
Betula nigra	river birch	Tree							1	1	1		4		3	3	4												
Carpinus caroliniana	American hornbeam	Tree	1	1	2										1	1	1					1	1	1					
Carya	hickory	Tree																											
Carya alba	mockernut hickory	Tree																											
Carya glabra	pignut hickory	Tree																											
Celtis occidentalis	common hackberry	Tree																											
Cercis canadensis	eastern redbud	Tree										1	1	2				1	1	1									
Cornus florida	flowering dogwood	Tree				2	2	2				4	4	4															
Diospyros virginiana	common persimmon	Tree										3	3	3				2	2	2									
Fraxinus pennsylvanica	green ash	Tree			5			15			23			10			42			5				9			20		
Gleditsia triacanthos	honeylocust	Tree																											
Juglans nigra	black walnut	Tree																											
Juniperus virginiana	eastern redcedar	Tree						1						2															
Liquidambar styraciflua	sweetgum	Tree			13			16					6			1			1				14				1		
Liriodendron tulipifera	tuliptree	Tree				2	1	1	1															1	1	1	1		
Nyssa sylvatica	blackgum	Tree				4	4	4				2	2	2				3	3	3	2	2	2	3	3	3	3		
Pinus taeda	loblolly pine	Tree						1																					
Pinus virginiana	Virginia pine	Tree																											
Platanus occidentalis	American sycamore	Tree	7	7	12										1	1	1							1	1	2	2		
Prunus serotina	black cherry	Tree																											
Quercus falcata	southern red oak	Tree							2	2	2	1	1	1				2	2	2	2	2	2	1	1	1	1		
Quercus michauxii	swamp chestnut oak	Tree	1	1	1				2	2	2				6	6	6							1	1	1	1		
Quercus nigra	water oak	Tree	2	2	2	4	4	4	3	3	3			2	2	2	2	2	2	4	4	4	1	1	1	1	1		
Quercus phellos	willow oak	Tree							6	6	6																		
Salix nigra	black willow	Tree																											
Sambucus canadensis	Common Elderberry	Shrub												1															
Ulmus alata	winged elm	Tree			1			1																					
Ulmus americana	American elm	Tree																											
Ulmus rubra	slippery elm	Tree														2							2				1		
Stem count			12	12	37	10	10	46	15	15	54	11	11	35	13	13	59	10	10	16	9	9	36	8	8	31	31		
size (ares)			1			1			1			1			1			1			1			1			1		
size (ACRES)			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02		
Species count			5	5	8	3	3	9	6	6	8	5	5	10	5	5	8	5	5	7	4	4	8	6	6	9	9		
Stems per ACRE			485.6	485.6	1497	404.7	404.7	1862	607	607	2185	445.2	445.2	1416	526.1	526.1	2388	404.7	404.7	647.5	364.2	364.2	1457	323.7	323.7	1255	1255		

DMS Project Code 95807. Project Name: Coon Creek Riparian  
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			Current Plot Data (MY5 2018)																							
Scientific Name	Common Name	Species Type	95807-01-0009			95807-01-0010			95807-01-0011			95807-01-0012			95807-01-0013			95807-01-0014			95807-01-0015			95807-01-0016		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer rubrum	red maple	Tree													1	1	1			4			2			2
Asimina triloba	pawpaw	Tree				3	3	3		1	1	1														
Betula nigra	river birch	Tree											3	3	6	2	2	2	2	2	2	2	2	2	3	
Carpinus caroliniana	American hornbeam	Tree				3	3	3													1	1	1			
Carya	hickory	Tree																								
Carya alba	mockernut hickory	Tree																								
Carya glabra	pignut hickory	Tree																								
Celtis occidentalis	common hackberry	Tree																								
Cercis canadensis	eastern redbud	Tree	1	1	1																					
Cornus florida	flowering dogwood	Tree	2	2	2																			3	3	3
Diospyros virginiana	common persimmon	Tree	4	4	4				1	1	1									1	1	1	1	2	2	2
Fraxinus pennsylvanica	green ash	Tree			3			4			5						13			9			1			4
Gleditsia triacanthos	honeylocust	Tree																								
Juglans nigra	black walnut	Tree																								
Juniperus virginiana	eastern redcedar	Tree			1																					
Liquidambar styraciflua	sweetgum	Tree			3			10							6					11			7			7
Liriodendron tulipifera	tuliptree	Tree				2	2	2	2	2	2	2									1	1	1	1	1	3
Nyssa sylvatica	blackgum	Tree	2	2	2																					
Pinus taeda	loblolly pine	Tree																			3					36
Pinus virginiana	Virginia pine	Tree																								1
Platanus occidentalis	American sycamore	Tree				1	1	2	4	4	6	3	3	3	1	1	1	2	2	25			3			
Prunus serotina	black cherry	Tree																								
Quercus falcata	southern red oak	Tree	1	1	1																			2	2	2
Quercus michauxii	swamp chestnut oak	Tree				2	2	2				4	4	4	3	3	3	6	6	6	3	3	3			
Quercus nigra	water oak	Tree	2	2	2	1	1	1	1	1	1	1	1	1	2	2	2							2	2	2
Quercus phellos	willow oak	Tree																			3	3	3			
Salix nigra	black willow	Tree																			28					
Sambucus canadensis	Common Elderberry	Shrub																		1						
Ulmus alata	winged elm	Tree															5									
Ulmus americana	American elm	Tree																								
Ulmus rubra	slippery elm	Tree									3						3									
Stem count			12	12	19	12	12	27	9	9	19	11	11	14	9	9	36	10	10	90	11	11	25	10	10	62
size (ares)			1			1			1			1			1			1			1			1		
size (ACRES)			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02		
Species count			6	6	9	6	6	8	5	5	7	4	4	4	5	5	9	3	3	10	6	6	10	5	5	10
Stems per ACRE			485.6	485.6	768.9	485.6	485.6	1093	364.2	364.2	768.9	445.2	445.2	566.6	364.2	364.2	1457	404.7	404.7	3642	445.2	445.2	1012	404.7	404.7	2509

DMS Project Code 95807. Project Name: Coon Creek Riparian  
Buffer and Nutrient Offset Mitigation Project

			Current Plot Data (MY5 2018)																				
Scientific Name	Common Name	Species Type	95807-01-0017			95807-01-0018			95807-01-0019			95807-01-0020			95807-01-0021			95807-01-0022			95807-01-0023		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer rubrum	red maple	Tree																					
Asimina triloba	pawpaw	Tree																					
Betula nigra	river birch	Tree																					
Carpinus caroliniana	American hornbeam	Tree																					
Carya	hickory	Tree																					
Carya alba	mockernut hickory	Tree																			2		1
Carya glabra	pignut hickory	Tree																					
Celtis occidentalis	common hackberry	Tree																					
Cercis canadensis	eastern redbud	Tree									1	1	1										
Cornus florida	flowering dogwood	Tree																					
Diospyros virginiana	common persimmon	Tree				1	1	1	7	7	7		1	2	2	3	2	2	2	1	1	1	1
Fraxinus pennsylvanica	green ash	Tree			4			7			3												
Gleditsia triacanthos	honeylocust	Tree									1												
Juglans nigra	black walnut	Tree																			1	1	1
Juniperus virginiana	eastern redcedar	Tree						1								1							
Liquidambar styraciflua	sweetgum	Tree			4						2			1						1			
Liriodendron tulipifera	tuliptree	Tree	2	2	4	1	1	1	1	1	3	2	2	3	1	1	1	1	1	1	3	3	5
Nyssa sylvatica	blackgum	Tree				2	2	2	4	4	4	3	3	3	2	2	2	2	2	2	3	3	3
Pinus taeda	loblolly pine	Tree			2			15			4			9			8			7			4
Pinus virginiana	Virginia pine	Tree																					
Platanus occidentalis	American sycamore	Tree			3			1															
Prunus serotina	black cherry	Tree																					
Quercus falcata	southern red oak	Tree	2	2	2							4	4	4	1	1	1	1	1	1	1	1	1
Quercus michauxii	swamp chestnut oak	Tree																					
Quercus nigra	water oak	Tree	3	3	3	5	5	5	2	2	3	1	1	1	6	6	6	3	3	3	4	4	4
Quercus phellos	willow oak	Tree																					
Salix nigra	black willow	Tree																					
Sambucus canadensis	Common Elderberry	Shrub																					
Ulmus alata	winged elm	Tree																					
Ulmus americana	American elm	Tree																					
Ulmus rubra	slippery elm	Tree																					
Stem count			7	7	22	9	9	33	14	14	27	11	11	23	12	12	23	9	9	19	13	13	20
size (ares)			1			1			1			1			1			1			1		
size (ACRES)			0.02			0.02			0.02			0.02			0.02			0.02			0.02		
Species count			3	3	7	4	4	8	4	4	8	5	5	8	5	5	8	5	5	8	6	6	8
Stems per ACRE			283.3	283.3	890.3	364.2	364.2	1335	566.6	566.6	1093	445.2	445.2	930.8	485.6	485.6	930.8	364.2	364.2	768.9	526.1	526.1	809.4

DMS Project Code 95807. Project Name: Coon Creek Riparian  
Buffer and Nutrient Offset Mitigation Project

Scientific Name	Common Name	Species Type	Annual Means																	
			MYS (2018)			MY4 (2017)			MY3 (2016)			MY2 (2015)			MY1 (2014)			MY0 (2014)		
			P-no	P-all	T	P-no	P-all	T	P-no	P-all	T	P-no	P-all	T	P-no	P-all	T	P-no	P-all	T
Acer rubrum	red maple	Tree	1	1	11	1	1	9	1	1	32			4			2			
Asimina triloba	pawpaw	Tree	5	5	5	5	5	6	5	5	5	5	5	5	6	6	6	24	24	24
Betula nigra	river birch	Tree	13	13	22	13	13	16	13	13	14									
Carpinus caroliniana	American hornbeam	Tree	7	7	8	7	7	9	8	8	10	8	8	9	9	9	9	10	10	10
Carya	hickory	Tree									2									
Carya alba	mockernut hickory	Tree			3			1									2			
Carya glabra	pignut hickory	Tree											4							
Celtis occidentalis	common hackberry	Tree						1												
Cercis canadensis	eastern redbud	Tree	4	4	5	5	5	5	5	5	5	5	5	5	8	8	8	13	13	13
Cornus florida	flowering dogwood	Tree	11	11	11	10	10	10	11	11	11	15	15	15	17	17	17	25	25	25
Diospyros virginiana	common persimmon	Tree	26	26	29	28	28	29	29	29	30	27	27	29	31	31	31	40	40	40
Fraxinus pennsylvanica	green ash	Tree			182			336			298			240			72			
Gleditsia triacanthos	honeylocust	Tree			1						1									
Juglans nigra	black walnut	Tree	1	1	1	1	1	1	1	1	1				1	1	1	4	4	4
Juniperus virginiana	eastern redcedar	Tree			6			7			5									
Liquidambar styraciflua	sweetgum	Tree			121			277			258			203			40			
Liriodendron tulipifera	tuliptree	Tree	19	19	30	20	20	27	21	21	30	23	23	30	30	30	33	49	49	49
Nyssa sylvatica	blackgum	Tree	32	32	32	32	32	32	33	33	33	35	35	35	35	35	35	27	27	27
Pinus taeda	loblolly pine	Tree			89			117			144			30						
Pinus virginiana	Virginia pine	Tree			1															
Platanus occidentalis	American sycamore	Tree	20	20	59	21	21	79	21	21	85	15	15	69	12	12	52	16	16	16
Prunus serotina	black cherry	Tree												1						
Quercus falcata	southern red oak	Tree	20	20	20	21	21	21	21	21	21	20	20	20	25	25	25	23	23	23
Quercus michauxii	swamp chestnut oak	Tree	28	28	28	31	31	31	32	32	32	20	20	20	20	20	20	24	24	24
Quercus nigra	water oak	Tree	51	51	52	51	51	51	50	50	50	48	48	48	53	53	53	63	63	63
Quercus phellos	willow oak	Tree	9	9	9	9	9	10	10	10	17			4						
Salix nigra	black willow	Tree			28			53			119			66			36			
Sambucus canadensis	Common Elderberry	Shrub			2															
Ulmus alata	winged elm	Tree			7			3			15			16			19			
Ulmus americana	American elm	Tree												25						
Ulmus rubra	slippery elm	Tree			11			33			48									
Stem count			247	247	773	255	255	1164	261	261	1266	221	221	878	247	247	461	318	318	318
size (ares)			23			23			23			23			23			23		
size (ACRES)			0.57			0.57			0.57			0.57			0.57			0.57		
Species count			15	15	26	15	15	24	15	15	24	11	11	21	12	12	18	12	12	12
Stems per ACRE			434.6	434.6	1360	448.7	448.7	2048	459.2	459.2	2228	388.9	388.9	1545	434.6	434.6	811.1	559.5	559.5	559.5