

**Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project  
2016 Monitoring Report  
Monitoring Year 3 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

**FINAL** - 2016 Monitoring Report – Year 3 of 5

Project Construction Completed: 2014  
Data Collection for Monitoring Year 3 of 5  
Report Submitted: December 2016

**Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project  
2016 Monitoring Report  
Monitoring Year 3 of 5**

**Granville County, North Carolina  
Tar-Pamlico River Basin**

**Submitted to:**

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

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December 2016

**FINAL**

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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: Vicinity Map). 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: Project Component), and will result in a maximum of 8.1 Riparian Mitigation Units (RMUs) and 14.5 Nutrient Mitigation Units (NMUs). 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.

Monitoring Year 3 (MY 3) has been completed for the Project, and 96% of the monitoring plots are meeting or exceeding success criteria (Appendix B: CVS Vegetation Monitoring Output Tables). 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: CVS Vegetation Monitoring Output Tables). Minimal remedial action is currently required. Overall, the Project is in very good condition.

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>	TBD	TBD
<b>Year 5 Monitoring</b>	TBD	TBD



## 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	Vegetation will be monitored using the CVS-NCDMS Level 1 and 2 protocols
X	Exotic and nuisance vegetation		Annual	Locations of exotic and nuisance vegetation will be identified
X	Project Boundary		Semi-annual	Locations of vegetation damage, boundary encroachments, etc. will be mapped

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) was used to perform annual Level 2 monitoring of 23 plots distributed across the planted area (Figure 3: Year 3 Monitoring Results). These plots were placed throughout the re-established buffer to get a representative sample of planted vegetation. MY 3 monitoring was conducted in September-October 2016 (delayed because of heavy rain), and subsequent years of vegetation monitoring data will continue to be collected between June 1 and September 31. Individual plot data will be 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 3. This inspection assessed any potential problems such as poor stem density areas, areas of poor growth rate/poor vigor, bare areas, and problematic invasive species.

Photographs of vegetation plots were taken at each photo station, which is located at the southwest corner of each plot, facing diagonal to the northeast corner. Photographs can be found in Appendix A.

Vegetation data output tables can be found in Appendix B. The measure of vegetative success for the site will be the survival of at least 320 planted hardwood stems per acre at the end of the fifth monitoring year.

### 2.2 RESULTS AND DISCUSSION

All monitoring activities were conducted successfully, and overall the site is in very good condition. In February and March 2016, the O'Brien & Gere/EEE team performed supplemental planting in several areas within the easement (Figure 4) low stem density was 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 (Figure 4: MY3 Supplemental Sampling 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*

Based on observations made during MY3 monitoring activities, it appears that this supplemental planting was successful in raising the stem count in the targeted areas.

Vegetation plot data was collected on September 20 and 30, and October 4, 2016. Of the 23 plots sampled, 22 plots met or exceeded the success criteria. Of these, one plot exceeded the success criteria by less than 10% (Figure 3: Year 3 Monitoring Results and Appendix B: CVS Vegetation Monitoring Output Tables). Vegetation plot 17 did not meet success criteria for planted stems, but by only one stem. Volunteer hardwood stems in vegetation plot 17 elevate stem abundance above the 320 stems per acre minimum threshold (Appendix B: CVS Vegetation Monitoring Output Tables).

Japanese honeysuckle (*Lonicera japonica*), 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 do not appear to be compromising planted stem success at this time.

### 2.3 MAINTENANCE AND MANAGEMENT

The site is monitored annually, and physical inspection of the site will be conducted twice per year throughout the post-construction monitoring period, or until performance standards are met. During MY 3, vegetation monitoring was conducted on September 20 and 30, and October 4, 2016, and physical inspections were conducted on March 31, 2016 and September 20, 2016. Routine maintenance planned for the coming year includes the following:

**Table 3: Maintenance Activities**

Component/Feature	Maintenance Activities
<b>Vegetation</b>	Invasive plant species, areas of bare soil, and poor stem density will be monitored during annual monitoring efforts.
<b>Site Boundary</b>	Boundary markers disturbed, damaged, or destroyed will be repaired and/or replaced on an as needed basis. Gullies and fishing access encroachment near the Crews Farm Lake entrance will be monitored and remediated as appropriate.
<b>Ford Crossing</b>	The ford crossings within the site will be maintained by the landowner and only as allowed by the Conservation Easement.
<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.

### 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

All 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].



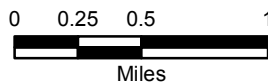


**LEGEND**

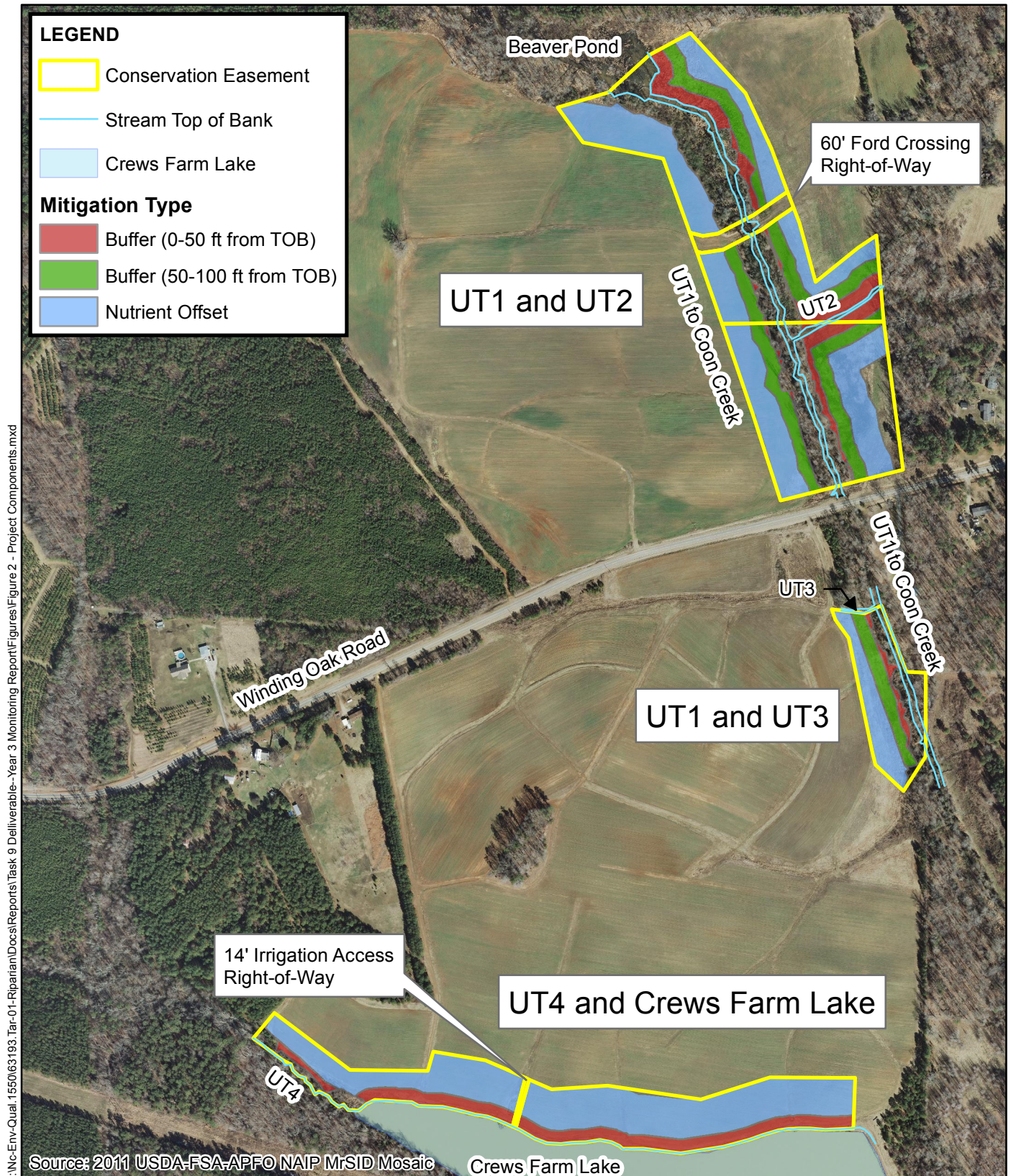
 Project Area

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

**VICINITY MAP**







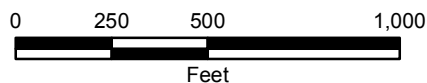
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NCDMS FULL DELIVERY PROJECT #95807  
 COON CREEK RIPARIAN BUFFER AND  
 NUTRIENT OFFSET MITIGATION PROJECT  
 GRANVILLE COUNTY, NC

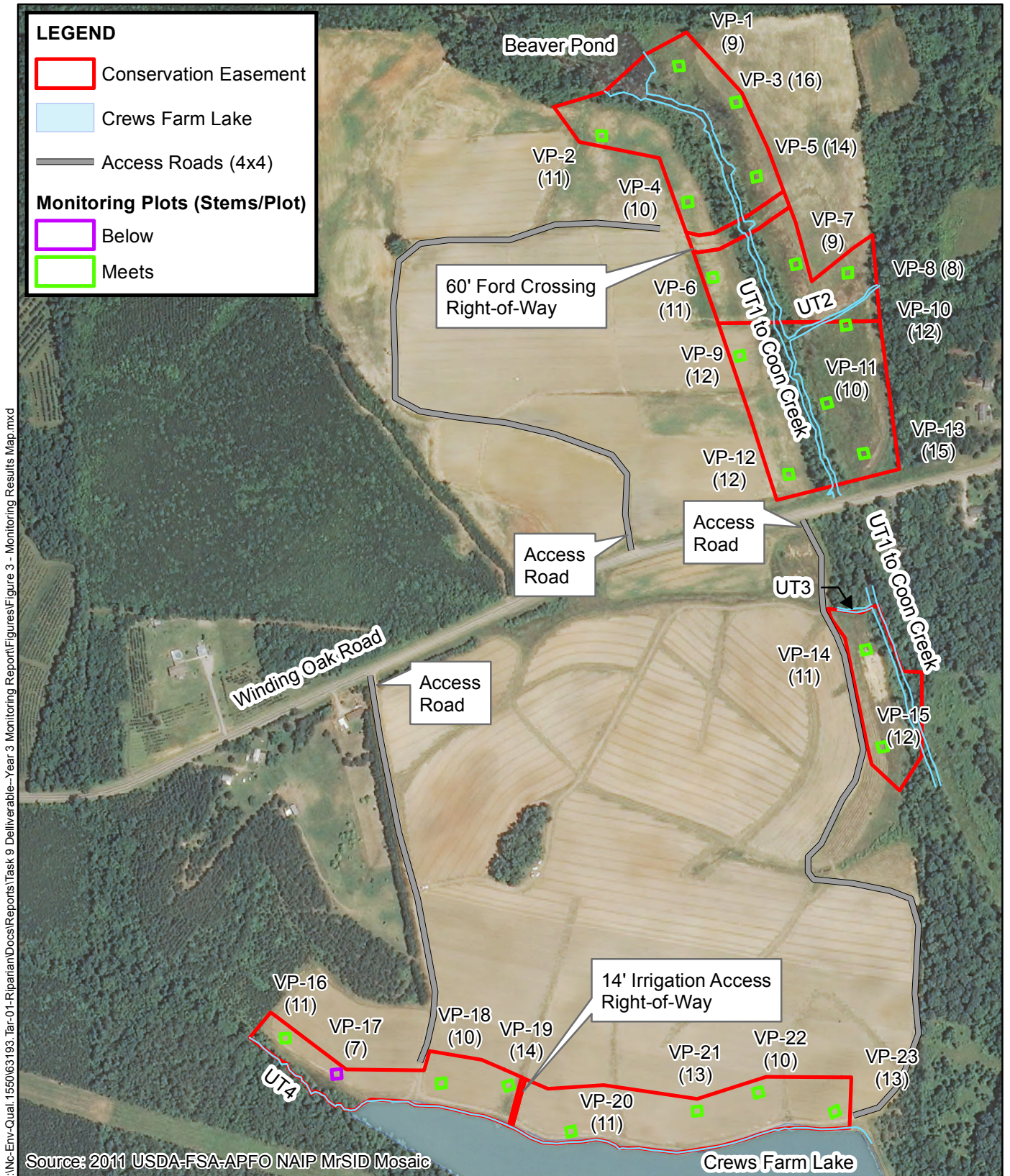
**PROJECT COMPONENTS**



11/17/16  
63193







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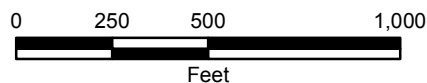
NCDMS FULL DELIVERY PROJECT #95807  
 COON CREEK RIPARIAN BUFFER AND  
 NUTRIENT OFFSET MITIGATION PROJECT  
 GRANVILLE COUNTY, NC

VP-1 (11) Vegetation Plot (MY3 Stem Count)

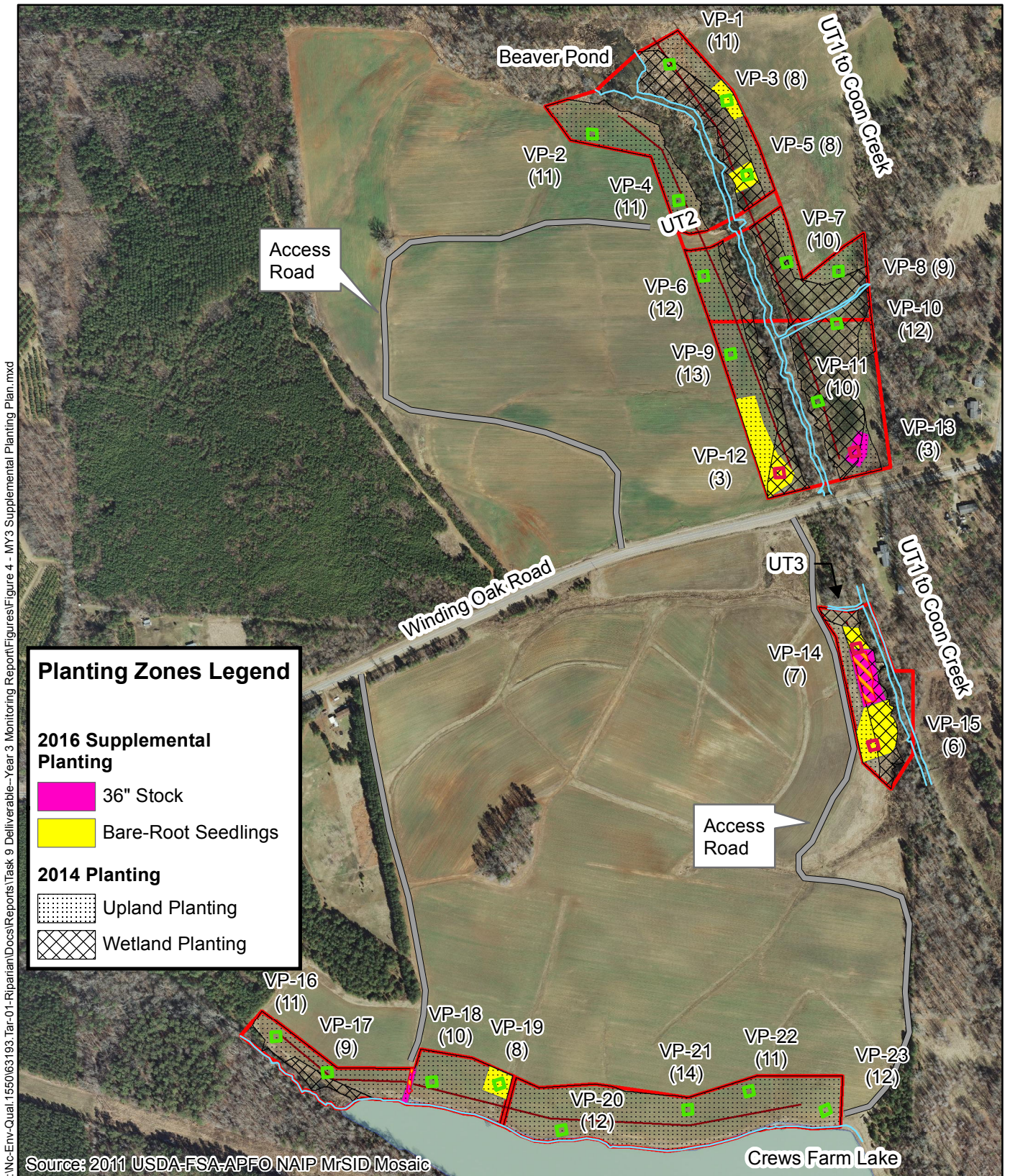
**YEAR 3 MONITORING RESULTS**



12/07/16  
63193







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

VP-1 (11) Vegetation Plot (MY2 Stem Count)



**MY3 SUPPLEMENTAL PLANTING PLAN**



12/07/16  
63193






**YEAR 3 MONITORING PHOTOGRAPHS**

<b>Client Name</b> NCDMS		<b>Site Location</b> Granville County	<b>Project No.</b> 95807
<b>Photo No.</b> 1	<b>Date</b> 10/4/16		
<b>DESCRIPTION</b> Vegetation Monitoring Plot and Photo Point 1, view northwest from southwest corner.			

<b>Client Name</b> NCDMS		<b>Site Location</b> Granville County	<b>Project No.</b> 95807
<b>Photo No.</b> 2	<b>Date</b> 9/30/16		
<b>Description</b> Vegetation Monitoring Plot and Photo Point 2, view northwest from southwest corner.			



<b>Client Name</b> NCDMS		<b>Site Location</b> Granville County	<b>Project No.</b> 95807
<b>Photo No.</b> 3	<b>Date</b> 10/4/16		
<b>Description</b> Vegetation Monitoring Plot and Photo Point 3, view northwest from southwest corner.			

<b>Client Name</b> NCDMS		<b>Site Location</b> Granville County	<b>Project No.</b> 95807
<b>Photo No.</b> 4	<b>Date</b> 9/30/16		
<b>Description</b> Vegetation Monitoring Plot and Photo Point 4, view northwest from southwest corner.			



<b>Client Name</b> NCDMS		<b>Site Location</b> Granville County	<b>Project No.</b> 95807
<b>Photo No.</b> 5	<b>Date</b> 10/4/16		
<b>Description</b> Vegetation Monitoring Plot and Photo Point 5, view northwest from southwest corner.			

<b>Client Name</b> NCDMS		<b>Site Location</b> Granville County	<b>Project No.</b> 95807
<b>Photo No.</b> 6	<b>Date</b> 09/20/16		
<b>Description</b> Vegetation Monitoring Plot and Photo Point 6, view northwest from southwest corner.			

<b>Client Name</b> NCDMS		<b>Site Location</b> Granville County	<b>Project No.</b> 95807
<b>Photo No.</b> 7	<b>Date</b> 10/4/16	 <p>vp 7 use this one</p>	
<b>Description</b> Vegetation Monitoring Plot and Photo Point 7, view northwest from southwest corner.			

<b>Client Name</b> NCDMS		<b>Site Location</b> Granville County	<b>Project No.</b> 95807
<b>Photo No.</b> 8	<b>Date</b> 10/4/16	 <p>vp 8 use this one</p>	
<b>Description</b> Vegetation Monitoring Plot and Photo Point 8, view northwest from southwest corner.			



<b>Client Name</b> NCDMS		<b>Site Location</b> Granville County	<b>Project No.</b> 95807
<b>Photo No.</b> 9	<b>Date</b> 9/20/16		
<b>Description</b> Vegetation Monitoring Plot and Photo Point 9, view northwest from southwest corner.			

<b>Client Name</b> NCDMS		<b>Site Location</b> Granville County	<b>Project No.</b> 95807
<b>Photo No.</b> 10	<b>Date</b> 10/4/16		
<b>Description</b> Vegetation Monitoring Plot and Photo Point 10, view northwest from southwest corner.			

<b>Client Name</b> NCDMS		<b>Site Location</b> Granville County	<b>Project No.</b> 95807
<b>Photo No.</b> 11	<b>Date</b> 10/4/16		
<b>Description</b> Vegetation Monitoring Plot and Photo Point 11, view northwest from southwest corner.			


<b>Client Name</b> NCDMS		<b>Site Location</b> Granville County	<b>Project No.</b> 95807
<b>Photo No.</b> 12	<b>Date</b> 9/20/16		
<b>Description</b> Vegetation Monitoring Plot and Photo Point 12, view northwest from southwest corner.			




<b>Client Name</b> NCDMS		<b>Site Location</b> Granville County	<b>Project No.</b> 95807
<b>Photo No.</b> 13	<b>Date</b> 10/4/16		
<b>Description</b> Vegetation Monitoring Plot and Photo Point 13, view northwest from southwest corner.			


<b>Client Name</b> NCDMS		<b>Site Location</b> Granville County	<b>Project No.</b> 95807
<b>Photo No.</b> 14	<b>Date</b> 9/20/16		
<b>Description</b> Vegetation Monitoring Plot and Photo Point 14, view northwest from southwest corner.			


<b>Client Name</b> NCDMS		<b>Site Location</b> Granville County	<b>Project No.</b> 95807
<b>Photo No.</b> 15	<b>Date</b> 9/20/16		
<b>Description</b> Vegetation Monitoring Plot and Photo Point 15, view northwest from southwest corner.			

<b>Client Name</b> NCDMS		<b>Site Location</b> Granville County	<b>Project No.</b> 95807
<b>Photo No.</b> 16	<b>Date</b> 9/30/16		
<b>Description</b> Vegetation Monitoring Plot and Photo Point 16, view northwest from southwest corner.			




<b>Client Name</b> NCDMS		<b>Site Location</b> Granville County	<b>Project No.</b> 95807
<b>Photo No.</b> 17	<b>Date</b> 9/30/16		
<b>Description</b> Vegetation Monitoring Plot and Photo Point 17, view northwest from southwest corner.			


<b>Client Name</b> NCDMS		<b>Site Location</b> Granville County	<b>Project No.</b> 95807
<b>Photo No.</b> 18	<b>Date</b> 9/30/16		
<b>Description</b> Vegetation Monitoring Plot and Photo Point 18, view northwest from southwest corner.			


<b>Client Name</b> NCDMS		<b>Site Location</b> Granville County	<b>Project No.</b> 95807
<b>Photo No.</b> 19	<b>Date</b> 9/30/16		
<b>Description</b> Vegetation Monitoring Plot and Photo Point 19, view northwest from southwest corner.			

<b>Client Name</b> NCDMS		<b>Site Location</b> Granville County	<b>Project No.</b> 95807
<b>Photo No.</b> 20	<b>Date</b> 9/30/16		
<b>Description</b> Vegetation Monitoring Plot and Photo Point 20, view northwest from southwest corner.			



<b>Client Name</b> NCDMS		<b>Site Location</b> Granville County	<b>Project No.</b> 95807
<b>Photo No.</b> 21	<b>Date</b> 9/30/16		
<b>Description</b> Vegetation Monitoring Plot and Photo Point 21, view northwest from southwest corner.			

<b>Client Name</b> NCDMS		<b>Site Location</b> Granville County	<b>Project No.</b> 95807
<b>Photo No.</b> 22	<b>Date</b> 9/30/16		
<b>Description</b> Vegetation Monitoring Plot and Photo Point 22, view northwest from southwest corner.			

<b>Client Name</b> NCDMS		<b>Site Location</b> Granville County	<b>Project No.</b> 95807
<b>Photo No.</b> 23	<b>Date</b> 9/30/16		
<b>Description</b> Vegetation Monitoring Plot and Photo Point 23, view northwest from southwest corner.			

PROJECT NAME: COON CREEK RIPARIAN BUFFER AND NUTRIENT OFFSET MITIGATION PROJECT

			Current Plot Data (MY3 2016)																							
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																								
Asimina triloba	pawpaw	Tree	1	1	1																					
Betula nigra	river birch	Tree							1	1	1				3	3	3									
Carpinus caroliniana	American hornbeam	Tree	1	1	2			1						1	1	1				1	1	1				
Carya	hickory	Tree											2													
Carya alba	mockernut hickory	Tree																								
Carya glabra	pignut hickory	Tree																								
Cercis canadensis	eastern redbud	Tree										1	1	1				1	1	1						
Cornus florida	flowering dogwood	Tree				2	2	2				4	4	4												
Diospyros virginiana	common persimmon	Tree			1	1	1	1				3	3	3	1	1	1	2	2	2						
Fraxinus pennsylvanica	green ash	Tree			8			10			19			31			85			7			25		56	
Gleditsia triacanthos	honeylocust	Tree																								
Juglans nigra	black walnut	Tree																								
Juniperus virginiana	eastern redcedar	Tree						1																		
Liquidambar styraciflua	sweetgum	Tree			24			25			17			13			1						70		5	
Liriodendron tulipifera	tuliptree	Tree						3	1	1	1			1									1	1	1	
Nyssa sylvatica	blackgum	Tree				4	4	4				1	1	1				3	3	3	2	2	2	3	3	3
Pinus taeda	loblolly pine	Tree																								
Platanus occidentalis	American sycamore	Tree	5	5	12										1	1	1						2	1	1	18
Prunus serotina	black cherry	Tree																								
Quercus falcata	southern red oak	Tree							2	2	2	1	1	1				3	3	3	2	2	2	1	1	1
Quercus michauxii	swamp chestnut oak	Tree	1	1	1				2	2	2				6	6	6							1	1	1
Quercus nigra	water oak	Tree	1	1	1	4	4	4	3	3	3				2	2	2	2	2	2	4	4	4	1	1	1
Quercus phellos	willow oak	Tree			1				7	7	7												1		4	
Salix nigra	black willow	Tree																								
Ulmus alata	winged elm	Tree			3																		1		2	
Ulmus americana	American elm	Tree																								
Ulmus rubra	slippery elm	Tree			6											6							3			
	<b>Stem count</b>		9	9	60	11	11	51	16	16	52	10	10	57	14	14	106	11	11	18	9	9	111	8	8	92
	<b>size (ares)</b>		1			1			1			1			1			1			1			1		
	<b>size (ACRES)</b>		0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02		
	<b>Species count</b>		5	5	11	4	4	9	6	6	8	5	5	9	6	6	9	5	5	6	4	4	10	6	6	10
	<b>Stems per ACRE</b>		364.2	364.2	2428	445.2	445.2	2064	647.5	647.5	2104	404.7	404.7	2307	566.6	566.6	4290	445.2	445.2	728.4	364.2	364.2	4492	323.7	323.7	3723

PROJECT NAME: COON CREEK RIPARIAN BUFFER AND NUTRIENT OFFSET MITIGATION PROJECT

			Current Plot Data (MY3 2016)																							
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	1			2						7
Asimina triloba	pawpaw	Tree				3	3	3	1	1	1															
Betula nigra	river birch	Tree									1	4	4	4	2	2	2	1	1	1	2	2	2			
Carpinus caroliniana	American hornbeam	Tree				3	3	3										1	1	1	1	1	1			
Carya	hickory	Tree																								
Carya alba	mockernut hickory	Tree																								
Carya glabra	pignut hickory	Tree																								
Cercis canadensis	eastern redbud	Tree	1	1	1																			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	2	2	2	
Fraxinus pennsylvanica	green ash	Tree						2			9				8			3								10
Gleditsia triacanthos	honeylocust	Tree																								
Juglans nigra	black walnut	Tree																								
Juniperus virginiana	eastern redcedar	Tree									1															
Liquidambar styraciflua	sweetgum	Tree			2						48				5			10				5				15
Liriodendron tulipifera	tuliptree	Tree				2	2	2	3	3	3				1	1	1				1	1	1	1	1	4
Nyssa sylvatica	blackgum	Tree	2	2	2																					
Pinus taeda	loblolly pine	Tree																								77
Platanus occidentalis	American sycamore	Tree				1	1	3	4	4	9	3	3	3	4	4	5	2	2	29			2			
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	5	5	5	7	7	7	4	4	4			
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			1															3	3	3				
Salix nigra	black willow	Tree																								119
Ulmus alata	winged elm	Tree																								3
Ulmus americana	American elm	Tree																								
Ulmus rubra	slippery elm	Tree																								25
<b>Stem count</b>			12	12	15	12	12	65	10	10	58	12	12	12	15	15	43	11	11	173	12	12	19	11	11	123
<b>size (ares)</b>			1			1			1			1			1			1			1			1		
<b>size (ACRES)</b>			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02		
<b>Species count</b>			6	6	8	6	6	9	5	5	11	4	4	4	6	6	10	4	4	9	6	6	8	6	6	10
<b>Stems per ACRE</b>			485.6	485.6	607	485.6	485.6	2630	404.7	404.7	2347	485.6	485.6	485.6	607	607	1740	445.2	445.2	7001	485.6	485.6	768.9	445.2	445.2	4978

			Current Plot Data (MY3 2016)																				
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			17			1								2			1				
Asimina triloba	pawpaw	Tree																					
Betula nigra	river birch	Tree																					
Carpinus caroliniana	American hornbeam	Tree																					
Carya	hickory	Tree																					
Carya alba	mockernut hickory	Tree																					
Carya glabra	pignut hickory	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				3	3	3	2	2	2	1	1	1
Fraxinus pennsylvanica	green ash	Tree			19			3			3												
Gleditsia triacanthos	honeylocust	Tree									1												
Juglans nigra	black walnut	Tree																		1	1	1	
Juniperus virginiana	eastern redcedar	Tree													2					1			
Liquidambar styraciflua	sweetgum	Tree			10			2			1									1			
Liriodendron tulipifera	tuliptree	Tree	2	2	3	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	3	3	4
Nyssa sylvatica	blackgum	Tree				3	3	3	4	4	4	3	3	3	2	2	2	3	3	3	3	3	3
Pinus taeda	loblolly pine	Tree			39			9			2			3			3			1			9
Platanus occidentalis	American sycamore	Tree			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	2	1	1	1	6	6	6	3	3	3	4	4	4
Quercus phellos	willow oak	Tree																					
Salix nigra	black willow	Tree																					
Ulmus alata	winged elm	Tree																					
Ulmus americana	American elm	Tree																					
Ulmus rubra	slippery elm	Tree																					
<b>Stem count</b>			7	7	94	10	10	25	14	14	21	11	11	14	13	13	20	10	10	14	13	13	23
<b>size (ares)</b>			1			1			1			1			1			1			1		
<b>size (ACRES)</b>			0.02			0.02			0.02			0.02			0.02			0.02			0.02		
<b>Species count</b>			3	3	8	4	4	8	4	4	8	5	5	6	5	5	8	5	5	9	6	6	7
<b>Stems per ACRE</b>			283.3	283.3	3804	404.7	404.7	1012	566.6	566.6	849.8	445.2	445.2	566.6	526.1	526.1	809.4	404.7	404.7	566.6	526.1	526.1	930.8



PROJECT NAME: COON CREEK RIPARIAN BUFFER AND NUTRIENT OFFSET MITIGATION PROJECT

Scientific Name	Common Name	Species Type	Annual Means											
			MY3 (2016)			MY2 (2015)			MY1 (2014)			MY0 (2014)		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer rubrum	red maple	Tree	1	1	32			4			2			
Asimina triloba	pawpaw	Tree	5	5	5	5	5	5	6	6	6	24	24	24
Betula nigra	river birch	Tree	13	13	14									
Carpinus caroliniana	American hornbeam	Tree	8	8	10	8	8	9	9	9	9	10	10	10
Carya	hickory	Tree			2									
Carya alba	mockernut hickory	Tree									2			
Carya glabra	pignut hickory	Tree						4						
Cercis canadensis	eastern redbud	Tree	5	5	5	5	5	5	8	8	8	13	13	13
Cornus florida	flowering dogwood	Tree	11	11	11	15	15	15	17	17	17	25	25	25
Diospyros virginiana	common persimmon	Tree	29	29	30	27	27	29	31	31	31	40	40	40
Fraxinus pennsylvanica	green ash	Tree			298			240			72			
Gleditsia triacanthos	honeylocust	Tree			1									
Juglans nigra	black walnut	Tree	1	1	1				1	1	1	4	4	4
Juniperus virginiana	eastern redcedar	Tree			5									
Liquidambar styraciflua	sweetgum	Tree			258			203			40			
Liriodendron tulipifera	tuliptree	Tree	21	21	30	23	23	30	30	30	33	49	49	49
Nyssa sylvatica	blackgum	Tree	33	33	33	35	35	35	35	35	35	27	27	27
Pinus taeda	loblolly pine	Tree			144			30						
Platanus occidentalis	American sycamore	Tree	21	21	85	15	15	69	12	12	52	16	16	16
Prunus serotina	black cherry	Tree						1						
Quercus falcata	southern red oak	Tree	21	21	21	20	20	20	25	25	25	23	23	23
Quercus michauxii	swamp chestnut oak	Tree	32	32	32	20	20	20	20	20	20	24	24	24
Quercus nigra	water oak	Tree	50	50	50	48	48	48	53	53	53	63	63	63
Quercus phellos	willow oak	Tree	10	10	17			4						
Salix nigra	black willow	Tree			119			66			36			
Ulmus alata	winged elm	Tree			15			16			19			
Ulmus americana	American elm	Tree						25						
Ulmus rubra	slippery elm	Tree			48									
<b>Stem count</b>			261	261	1266	221	221	878	247	247	461	318	318	318
<b>size (ares)</b>			23			23			23			23		
<b>size (ACRES)</b>			0.57			0.57			0.57			0.57		
<b>Species count</b>			15	15	24	11	11	21	12	12	18	12	12	12
<b>Stems per ACRE</b>			459.2	459.2	2228	388.9	388.9	1545	434.6	434.6	811.1	559.5	559.5	559.5



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

Year 3 (20-Sep-2016 to 04-Oct-2016)

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	9	n/a	0	0	51	60	0
2	11	n/a	0	0	40	51	0
3	16	n/a	0	0	36	52	0
4	10	n/a	0	0	47	57	0
5	14	n/a	0	0	92	106	0
6	11	n/a	0	0	7	18	0
7	9	n/a	0	0	102	111	0
8	8	n/a	0	0	84	92	0
9	12	n/a	0	0	3	15	0
10	12	n/a	0	0	53	65	0
11	10	n/a	0	0	48	58	0
12	12	n/a	0	0	0	12	0
13	15	n/a	0	0	28	43	0
14	11	n/a	0	0	162	173	0
15	12	n/a	0	0	7	19	0
16	11	n/a	0	0	112	123	0
17	7	n/a	0	0	87	94	0
18	10	n/a	0	0	15	25	0
19	14	n/a	0	0	7	21	0
20	11	n/a	0	0	3	14	0
21	13	n/a	0	0	7	20	0
22	10	n/a	0	0	4	14	0
23	13	n/a	0	0	10	23	0

## Wetland/Stream Vegetation Totals

(per acre)

Plot #	Stream/ Wetland Stems <sup>2</sup>	Volunteers <sup>3</sup>	Total <sup>4</sup>	Success Criteria Met?
1	n/a	2064	2428	
2	n/a	1619	2064	
3	n/a	1457	2104	
4	n/a	1902	2307	
5	n/a	3723	4290	
6	n/a	283	728	
7	n/a	4128	4492	
8	n/a	3399	3723	
9	n/a	121	607	
10	n/a	2145	2630	
11	n/a	1942	2347	
12	n/a	0	486	
13	n/a	1133	1740	
14	n/a	6556	7001	
15	n/a	283	769	
16	n/a	4532	4978	
17	n/a	3521	3804	
18	n/a	607	1012	
19	n/a	283	850	
20	n/a	121	567	
21	n/a	283	809	
22	n/a	162	567	
23	n/a	405	931	
<b>Project Avg</b>	n/a	<b>1768</b>	<b>2228</b>	

## Riparian Buffer Vegetation Totals

(per acre)

Plot #	Riparian Buffer Stems <sup>1</sup>	Success Criteria Met?
1	364	Yes
2	445	Yes
3	647	Yes
4	405	Yes
5	567	Yes
6	445	Yes
7	364	Yes
8	324	Yes
9	486	Yes
10	486	Yes
11	405	Yes
12	486	Yes
13	607	Yes
14	445	Yes
15	486	Yes
16	445	Yes
17	283	No
18	405	Yes
19	567	Yes
20	445	Yes
21	526	Yes
22	405	Yes
23	526	Yes
<b>Project Avg</b>	<b>459</b>	<b>Yes</b>

### 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.

### 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%