STALLINGS BUFFER RESTORATION SITE -- DMS #357
Jones County NC -- Neuse River HUC# 03020204-010050
MY-1 Annual Monitoring Report (Draft)

North Carolina Department of Environment & Natural Resources
Division of Mitigation Services (DENR-DMS) -- Contract # 5765

Data Collected: September 2014 **Final Report Submitted: June 2015**

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1.0. Project Summary

1.1. Project Goals & Objectives

The Stallings Buffer Restoration Project is located on a 146-acre parcel of former cropland in northern Jones County NC, in the Trent River sub-basin of the Neuse River Basin, USGS Cataloging Unit (CU) #03020204 (Figure 1A). The NC Department of Transportation (NCDOT) purchased this property east of Wyse Fork Rd (SR-1002) in 2003 for conservation use, and also acquired a conservation easement on 3 additional acres of farmed riparian land immediately upstream on the west side of Wyse Fork Rd.

The 2010 Neuse River Basin Restoration Priority Plan (RBRP) identifies agricultural impacts including stream channelization, wetland ditching, loss of forested riparian buffers, and nonpoint source runoff as causes of water quality degradation in the Trent River watershed. The Plan identifies "reestablishment of riparian buffers and corridors of substantial width to improve connectivity of protected areas" and "projects that address agricultural runoff" as priority goals for this watershed. Restoration Goals for CU #03020204 as identified in the 2010 plan include:

- Promote nutrient and sediment reduction in agricultural areas by restoring and preserving wetlands, streams and riparian buffers.
- Continue targeted implementation of Nutrient Offset and Riparian Buffer program projects, and focus NCDOT-sponsored restoration in areas where it will provide ecosystem functional improvement.
- Protect, augment and connect Natural Heritage Areas and other conservation lands.

The Stallings Buffer Restoration Project was identified as an opportunity to improve water quality and augment conservation lands within the Trent River watershed. The project goals include the following:

- Provide improved water quality by reducing nutrient and sediment loads to the receiving waters.
- Improve terrestrial and aquatic habitat and connectivity in the Flat Swamp Watershed.

These goals will be achieved through implementation of the following project objectives (Figure 1B):

- Restore 31.6 acres of riparian buffers by planting native tree species at a sufficient density to promote native forest succession, thus increasing riparian area root density and nutrient uptake.
- Preserve 19.1 acres of riparian riverine wetlands along Flat Swamp and its tributaries.

1.2. Project Success Criteria

Tree planting on 31.6 acres of riparian buffers along Streams A, B, and C was conducted in February to early March 2014. Post-construction annual monitoring will be conducted from 2014 through 2018 using 25 permanent CVS vegetation plots all five years, and 25 temporary warranty plots during the first three years. These plots were established by RJG&A and Mogensen Mitigation Inc. (MMI) staff during March 2014. The vegetative success of the buffer restoration site will be evaluated based on woody stem density and survival rates. The vegetation success criteria for riparian buffer mitigation units (BMUs) require a minimum of 260 planted native hardwood trees per acre at the end of 5 years, based

on the 2014 Consolidated Buffer Mitigation Rules. (The previous criterion of 320 trees per acre at three years has been rescinded).

1.3. Project Setting & Pre-Restoration Conditions

The Stallings Buffer Restoration Project is located on a 146-acre parcel of former cropland in the northern corner of Jones County NC, along the transition zone between the Inner Coastal Plain and Outer Coastal Plain, eight miles southeast of downtown Kinston NC. Traveling to the site from Kinston, drive east on US-70 into Jones County, turn right on Wyse Fork Rd (SR-1002) about 0.5 mile past the Lenoir/Jones County line, then travel south approximately 3.5 miles to Webb Farm Road (SR-1306). The Stallings site is located southeast of the intersection of Wyse Fork Road and Webb Farm Road (Figure 1A). The northern portion of the site is accessible from Webb Farm Road, and the southern portion is accessible from Wyse Fork Road near the intersection with Moore Rd (SR-1306). Elevations on the site range from 42 to 52 feet above mean seal level (NAVD-83).

The Stallings site is drained by channelized streams and ditches flowing southeastward into Flat Swamp along the eastern boundary of the site (Figures 1B-C). In May 2011 the NC Division of Water Resources (DWR) agent Chris Pullinger provided a letter and color-coded map indicating streams subject to Neuse River Buffer Rules (Appendix A). Intermittent or perennial channels subject to Buffer Rules are mapped in blue, and ephemeral channels or ditches **not** subject to Buffer Rules are mapped in red by DWR. The three streams where DMS seeks buffer credits (blue streams in DWR's map) are labeled A, B and C in Figures 1B-C. A fourth stream segment near the northeast corner of the site is also mapped in blue (Stream D in Figures 1B-C), but is not labeled on the DWR map or listed in the letter. Due to this discrepancy DMS is not seeking buffer credit along Stream D. Flat Swamp flows into Beaver Creek in the Trent River sub-basin of the Neuse River basin, USGS Cataloging Unit #03020204-010050 and DWR sub-basin 03-04-11. An adjacent protected conservation area (non-DMS) across Flat Swamp east of the Stallings site creates a combined conservation area of 307 acres. This site in turn connects with Great Dover Swamp, comprising several thousand acres of mostly undeveloped land in the Beaver Creek and Trent River watershed, between Wyse Fork Rd and US-70.

The USDA Soil Survey of Jones County (Barnhill, 1981) shows Goldsboro fine sandy loam (GoA) mapped on the higher, well-drained areas on the northern part of the site, Meggett loam (Me) on the majority of the site including the planted areas, and Stockade fine sandy loam (Sx) along the Flat Swamp floodplain. Meggett loam and Stockade fine sandy loam are designated hydric soils, although much of the area mapped as Meggett has been drained and altered by agricultural activity and is not jurisdictional wetland in its current condition. Vegetation on the former cropland areas includes a mix of grasses, herbs, shrubs, vines, and tree seedlings typical of abandoned fields. A 120-ft-wide mowed powerline right-of-way lies east-west across the middle of the site. The floodplain of Flat Swamp along the eastern edge of the site supports about 16 acres of mature bottomland hardwood and swamp forest wetlands, and the lower reaches of Streams A and C (north and south of the powerline) have about 3 acres of disturbed (previously farmed) scrub-dominated riparian wetlands. Wetland hydrology is maintained by a combination of slow drainage of rainfall and occasional overbank flooding (Stantec, 2011).

1.4. Project Design Approach, Components and Mitigation Assets

The 146-acre Stallings Buffer Restoration Site is former cropland purchased by NC Department of Transportation (NCDOT) in 2003, and is protected for conservation use by a deed restriction. The 3-acre riparian buffer on the adjacent Lee property west of Wyse Fork Rd is protected by a conservation easement. In 2003 the Stallings site had sparse cover of predominantly herbaceous old-field weeds, but vegetation density and height increased over the subsequent decade (2003 to 2013) as shrubs and sapling trees became established, especially *Baccharis*, *Morella*, *Rubus*, and *Pinus*.

The Mitigation Plan (Stantec Consulting Services, 2011) included 40.0 acres of Riparian Buffer Restoration (40.0 Mitigation Units), 27.2 acres of Nitrogen Nutrient Offset (27.2 Mitigation Units), 3.0 acres of Wetland Enhancement (1.5 Mitigation Units), 16.1 acres of Wetland Preservation (3.2 Mitigation Units), and 5,403 feet of Stream Enhancement (2,161 Mitigation Units), all on the 146-acre eastern tract. The 3-acre western tract has no mitigation credits.

During the interval between development of the 2011 Mitigation Plan and project implementation in Feb-Mar 2014, natural colonization and growth of tree saplings and shrubs continued in the fallow fields and proposed wetland enhancement areas. The Riparian Buffer Restoration area was subsequently reduced from 40.0 acres to 31.6 acres, with buffers extending 200 feet laterally from the DWR-verified stream-banks, except where limited by the powerline right-of-way, roads, and areas with adequate natural woody stem density (other than pines and exotics). DMS and DWR determined that the proposed Wetland Enhancement areas along the lower reaches of Streams A and C would instead be categorized as Wetland Preservation, since supplemental tree planting was no longer needed. Stream channel reconstruction was determined to be unnecessary and was deleted from the plan based on the engineer's calculations of shear stress and stream power, and confirmation by DWR in May 2011 that the existing channels appear relatively stable. The proposed nutrient offset buffers along the non-stream ditches were deleted, as were the proposed stream enhancement mitigation credits along Streams A, B and C.

The original plan to clear, grub, and rip the soils in the riparian buffer planting areas was changed to mowing only to preserve the many native volunteer saplings. Areas to be planted in 2014 were mowed with a bush-hog to facilitate planting and reduce competition for the planted trees. *Pinus, Liquidambar*, and most shrubs were mowed or cut, but other volunteer native hardwood trees (*Ulmus, Acer, Platanus, Fraxinus, Carpinus, Quercus* and others) were left standing to the extent practicable. Some areas were too wet and soft to effectively bush-hog, and were left as is prior to planting. The contractor planted 14,200 bare-root tree seedlings of Tulip poplar, Sycamore, Black gum, Water oak, and Red oak within the 31.6 acres of riparian buffer restoration areas using Dibble bars during late February to early March 2014. The non-mowed planted areas are dominated by *Baccharis*, *Morella*, *Rubus*, *Juncus*, *Solidago*, *Eupatorium*, and grasses, plus scattered *Pinus* and *Liquidambar* saplings. Most of the planted seedlings were 10 to 18 inches tall, with a few seedlings 24 inches or taller, and average planting density was 449 stems/acre.

The final built project as surveyed in March 2014 includes 31.6 acres of Riparian Buffer Restoration, which may be applied as either 31.6 Riparian Buffer Mitigation Credits, 31.6 Nitrogen Nutrient Offset Credits, or a combination of Riparian Buffer and Nitrogen Nutrient Offset Mitigation Credits up to a total of 31.6 (not on the same footprint) depending on mitigation need as per agreement with DWR (Table 1). The other 19.1 acres of wetland preservation, 86 acres of non-buffer upland preservation, and

3-acre conservation easement west of Wyse Fork Rd do not provide any mitigation credits, but will help improve water quality and habitat along waterways that are not subject to Neuse River Buffer Rules but may be Section 404 jurisdictional waters (Tables 1 to 4 and Figures 1A to 1C).

The monitoring contractor (RJG&A with assistance from MMI and DMS staff) installed 25 permanent CVS vegetation monitoring plots (10 x 10 meter) marked with steel conduit at the corners (including a tall pipe at the (0,0) corner) during March 11-12, 2014. The side closest to the stream was designated as the x-axis, and a photo of each plot was taken from the 0,0 corner. For each plot the latitude and longitude coordinates of the 0,0 corner were recorded with a Trimble sub-meter GPS unit, and the x-axis angle (from 0,0 corner to 10,0 corner) was recorded with a magnetic compass. The x,y coordinates of each planted tree within the plots was recorded using meter tapes laid along the plot edges, and survey flagging was tied loosely around each tree to facilitate subsequent measurements and to distinguish them from volunteer trees.

1.5. Current Conditions (2014) and Performance Summary

The Stallings site was evaluated visually and vegetation plot data collected during September 23-25, 2014, about 6.5 months after mowing and planting. The native mowed shrubs, especially *Morella*, *Baccharis*, and *Rubus* have resprouted vigorously over most of the site. These shrubs plus and a dense herb layer including *Solidago, Eupatorium, Juncus*, and grasses make it difficult to locate the planted trees. Volunteer *Pinus taeda* ranging from 4 to 7 inches dbh are also common throughout the site, but not dense. Most of the smaller pines were cut during Feb-Mar 2014 prior to planting.

Ten of the 25 permanent CVS plots (10 m x 10 m) had 5 or 6 living planted stems, and did not meet the 260 stems/acre success criteria. The other 15 CVS plots had 7 to 12 living planted stems, and exceeded the 260 stems/acre success criteria. However, it is possible that stems not yet found will be more conspicuous after another growing season, and stems counted as "dead" in 2014 may actually be alive and resprout in 2015.

The 25 temporary warranty plots (10 m x 10 m) yielded lower stem counts, as trees in these plots were not flagged in March soon after mowing and planting as those in the CVS plots were. Only two warranty plots had more than 5 planted stems found. As stated above, it is likely that many planted stems were overlooked due to their small size and sparse leaves among dense shrubs and herbs. MY-2 sampling may yield higher counts if the planted stems put on more growth during 2015. Supplemental planting was conducted in February 2015 by the planting contractor; planting data will be included in the MY-2 (2015) reports.

Scattered patches of invasive *Ligustrum sinense*, *Rosa multiflora*, *Lonicera japonica*, and *Lespedeza cuneata* were noted in many areas, especially near ditch banks and other unmowed areas. Three patches of *Lespedeza*, each 0.2 to 0.3 acre, are mapped on the eastern portion of the site. Other smaller patches will be re-evaluated in MY2 and mapped if they appear to be spreading and/or impeding growth of tree seedlings.

2.0. Monitoring Methods

Baseline Monitoring and Annual Monitoring and reporting methods shall follow the current DMS - provided templates and guidelines (Lee *et al* 2008; NC-EEP 2012). The 25 permanent CVS vegetation plots (10 x 10 meters) installed will be evaluated and photographed in Sep-Oct each year from 2014 through 2018. For planted trees, the species, height, dbh, and qualitative vigor rating of each tree will be recorded (CVS Level 1 data). For volunteer trees and shrubs, the numbers of stems of each species within each height category will be recorded (CVS Level 2 data). Planted and volunteer species will be identified using Radford et al. (1968) and Weakley (2012).

For the first three years (2014 through 2016) an additional 25 temporary vegetation warranty plots (10 x 10 meters) randomly located in the restored buffer areas will be evaluated. Warranty plot locations will be recorded by GPS and will vary from year to year to maximize the cumulative sampling area covered. These plots will record the total number of living hardwood trees only; species and size data will not be recorded, unless a high prevalence of invasive exotic species is observed. Warranty plots will be mapped cumulatively on the CCPV figures, with the current year's plots shown in a contrasting color.

The Stallings site does not have a perimiter fence, but the monitoring team will check the "Conservation Area" signage along the boundary roads and look for evidence of encroachment by off-road vehicles, livestock, or other potential sources of damage. Areas of invasive exotic vegetation in or adjacent to the planted areas will be mapped in accordance with current DMS guidance. No stream monitoring or hydrology monitoring is included in the Stallings project monitoring scope. Yearly monitoring reports will be submitted to DWR for approval.

3.0. References

Barnhill, W.L. (1981). *Soil Survey of Jones County, North Carolina*. USDA Soil Conservation Service (Natural Resources Conservation Service), Raleigh, NC.

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

NC Ecosystem Enhancement Program. (2014). *NC-EEP Monitoring Report Template and Guidance version 1.0, February 2014.* http://portal.ncdenr.org/web/eep/dbb-resources

NC Ecosystem Enhancement Program. (2010). *Neuse River Basin Restoration Priority Plan, Draft 2010*. http://www.nceep.net/services/restplans/DRAFT_RBRP_Neuse_201007.pdf

Radford, A.E., H.E. Ahles, and C.R. Bell (1968). *Manual of the Vascular Flora of the Carolinas*. University of North Carolina Press. Chapel Hill, NC.

Robert J. Goldstein & Associates, Inc. (2014). *Stallings Buffer Restoration Site #357 MY-0 Baseline Monitoring Report, Final, July 2014*. Prepared for NC Ecosystem Enhancement Program, Raleigh, NC.

Stantec Consulting Services, Inc. (2011). *Mitigation Plan: Stallings Buffer Restoration, EEP Project # 357, December 2011*. Prepared for NC Ecosystem Enhancement Program, Raleigh, NC.

US Army Corps of Engineers (2003) *Stream Mitigation Guidelines*. US Army Corps of Engineers, US Environmental Protection Agenmcy Region 4, USDA Natural Resources Conservation Service, NC Wildlife Resources Commission, and NC Dept. Environment & Natural Resources.

Weakley, Alan (2012). *Flora of the Carolinas, Virginia, Georgia, and Surrounding Areas*. http://www.herbarium.unc.edu/flora.htm.

Figure 1A. Project Vicinity Map, Stallings Buffer Restoration Site, EEP #357, Neuse River Basin HUC #03020204-010050, Jones County, NC. Directions to Project Site: From Kinston, drive east on US-70 into Jones County, turn right on Wyse Fork Rd (SR-1002) about 0.5 mile past the Lenoir/Jones County line, then drive south about 3.5 miles to Webb Farm Road (SR-1306). The Buffer Restoration site is located southeast of the Wyse Fork Road and Webb Farm Road intersection. The northern portion of the site can be accessed from Webb Farm Road, and the southern portion can be accessed from Wyse Fork Road near the Moore Rd intersection. An additional 3 acres of conservation easement is located on the adjacent Lee property west of Wyse Fork Road.

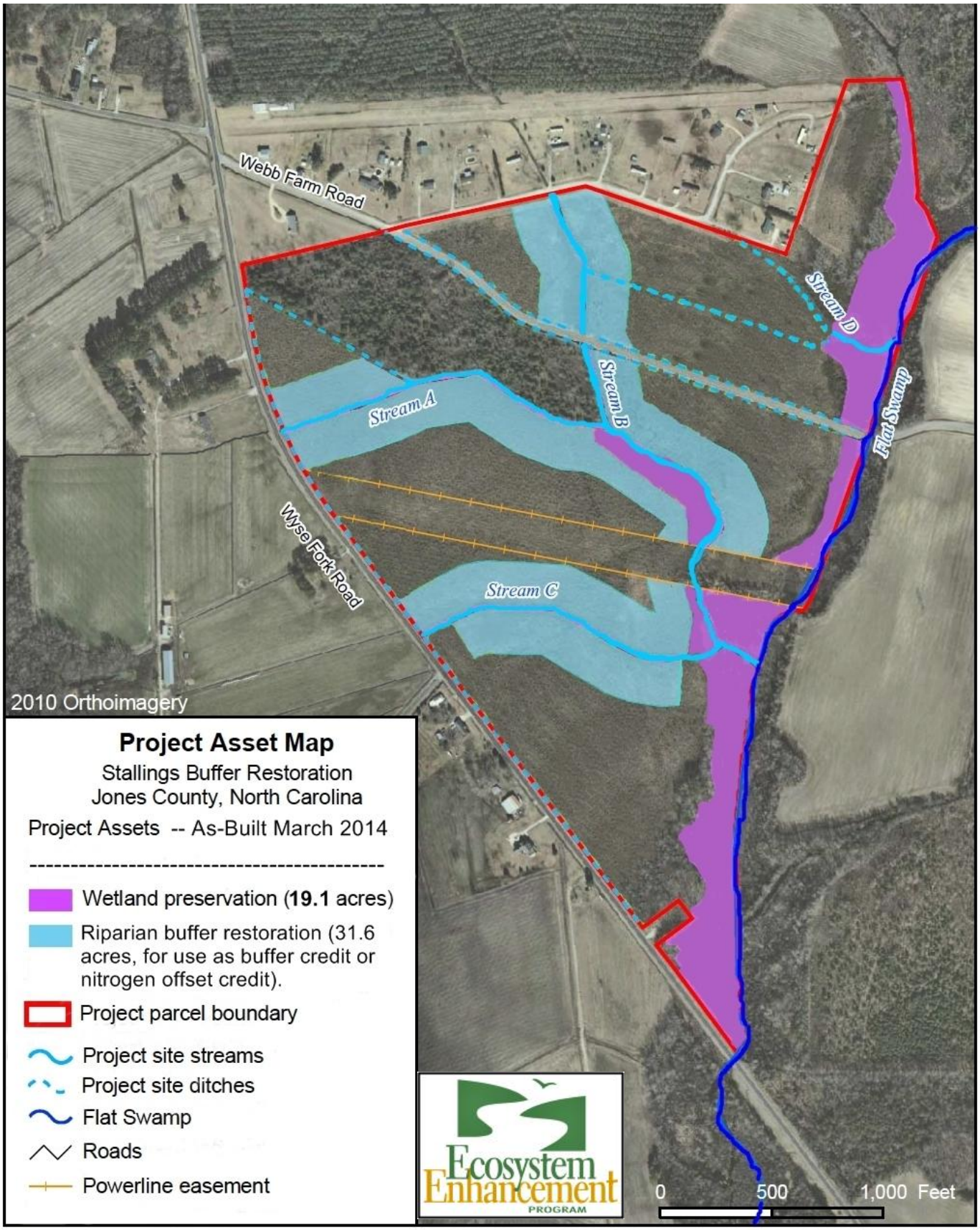

Figure 1B. Stallings Buffer Restoration # 357, Project Components and Mitigation Assets.

Appendix A. Project Background Tables

Table 1. Project Components & Mitigation Credits

Table 2. Project Activity and Reporting History

Table 3. Project Contacts Table

Table 4. Project Attribute Table

Table 1. Project Components and Mitigation Credits
Stallings Buffer Restoration, Flat Swamp, Jones County, EEP Project # 357

Mitigation Credits

	Stream		Riparian Wetland		Non-riparian Wetland		Buffer	Nitrogen Nutrient Offset	Phosphorous Nutrient Offset
Type	R	RE	R	RE	R	RE			
Totals							**31.6**	**(31.6) a**	

(a): Buffer restoration is applicable for Buffer Credit and/or Nutrient Offset Credit, but not both within the same footprint, up to a combined total of 31.6 units.

Project Components

Project Component or Reach ID	Stationing or Location	Existing Footage or Acreage	Approach (PI, PII etc.)	Restoration or Restoration Equivalent	Restoration Footage or Acreage	Mitigation Ratio	Mitigation Units
Stream Enhancement							
Riparian Buffer	**Streams A,B,C**	**31.6 ac**	**Rest**	**R**	**31.6 ac**	**1:1**	**31.6**
Wetland Enhancement							
Wetland Preservation	**Flat Swamp, streams A.C**	**19.1 ac**	**Pres**				**0**
Nitrogen Nutrient Offset							**(31.6) a**

(a): Combined total of 31.6 units of Buffer Credit and/or Nutrient Offset Credit, not applied within the same footprint.

Component Summation

Restoration Level	Stream (linear feet)	Riparian Wetland (acres)		Non-riparian Wetland (acres)	Buffer (square feet)	Upland (acres)
		Riverine	Non-Riverine			
Restoration					**1,376,496**	
Enhancement						
Enhancement I						
Enhancement II						
Creation						
Preservation		**19.1 ac**				
High Quality Preservation						

BMP Elements

Element	Location	Purpose/Function	Notes

BMP Elements: BR = Bioretention Cell; SF = Sand Filter; SW = Stormwater Wetland; WDP = Wet Detention Pond; DDP = Dry Detention Pond; FS = Filter Strip; S = Grassed Swale; LS = Level Spreader; NI = Natural Infiltration Area; FB = Forested Buffer

Table 2. Project Activity and Reporting History Stallings Buffer Restoration -- EEP #357 -- Jones County NC		
Elapsed Time Since Grading Complete: NA		
Elapsed Time Since Planting Complete: 9 Months		
Number of Reporting Years: 1		
Activity or Deliverable	**Data Collection Complete**	**Completion or Delivery**
Restoration Plan	---	Dec 2011
Construction (Mowing)	---	Jan-Feb 2014
Bare root tree plantings	---	Feb 2014
MY-0: As-built Baseline Survey	Mar 2014	Jul 2014
MY-1: Plant Warranty Plot Data	Sep 2014	Dec 2014
MY-1: 2014 Monitoring Report	Sep 2014	Apr 2015
MY-2: Plant Warranty Plot Data		
MY-2: 2015 Monitoring Report		
MY-3 Plant Warranty Plot Data		
MY-3 2016 Monitoring Report		
MY-4 2017 Monitoring Report		
MY-5 2018 Monitoring Report		
Final Close-Our Report		

Table 3. Project Contacts Table Stallings Buffer Restoration -- EEP #357 -- Jones County NC	
Designer	Stantec Consulting Services, Inc. P.C. 801 Jones Franklin Rd, Suite 300 Raleigh, NC 27606 (919) 851-6866
Construction Contractor	None
Survey Contractor	McKim & Creed 200 MacKenan Court Cary, NC 27511 (919) 233-8091
Planting Contractor	Carolina Silvics 908 Indian Trail Rd Edenton, NC 27932 Mary-Margaret McKinney (252) 482-8491
Nursery Stock Suppliers	ArborGen South Carolina Supertree Nursery 5594 Highway 38 South Blenheim, SC 29516 (843) 528-3203
Monitoring Performers	Robert J. Goldstein & Associates, Inc. 1221 Corporation Parkway, Suite 100 Raleigh, NC 27610 Gerald Pottern, (919) 872-1174

Table 4.0. Project Baseline Information and Attributes			
Stallings Buffer Restoration (EEP#357)			
Project Information			
Project County	Jones		
Project Area (acres)	146 ac NCDOT + 3 ac Private = 149 ac		
Project Coordinates (latitude and longitude)	35.1718 -77.4841		
Project Watershed Summary Information			
Physiographic Region	Coastal Plain		
River Basin	Neuse		
USGS HUC for Project (14 digit)	03020204-010050		
NCDWQ Sub-basin for Project	03-04-11		
Project Drainage Area (sq mi)	0.72		
Project Drainage Area % Impervious	3.80%		
CGIA Landuse Classification	Forest Land, Cultivated Land, Herbaceous Cover and Shrubland,		
Reach Summary Information			
n/a			
Wetland Summary Information			
	Wetland 1	Wetland 2	
Size of wetland (acres)	3.0 ac	16.1	
Wetland Type (non-riparian, riparian riverine or riparian non-riverine	Riparian riverine	Riparian riverine	
Mapped Soil Series	Megget loam	Megget loam & Stockade fine sandy loam	
Drainage class	Poorly drained	Poorly drained & very poorly drained	
Soil hydric status	Yes	Yes	
Source of Hydrology	Overbank flooding	Overbank flooding	
Hydrologic Impairment	None	None	
Native vegetation community	Disturbed/cutover	Riverine bottomland hardwood	
Percent composition of exotic invasive vegetation	0%	0%	
Regulatory Considerations			
Regulation	Applicable?	Resolved?	Supporting Documentation
Waters of the United States - Section 404	No	n/a	n/a
Waters of the United States - Section 401	No	n/a	n/a
Endangered Species Act	No	n/a	n/a
Historic Preservation Act	Yes	Yes	Correspondence with NC Dept. Cultural Resources
Coastal Zone Management Act (CZMA)/Coastal Aream Management Act (CAMA)	No	n/a	n/a
FEMA Floodplain Compliance	No	n/a	n/a
Essential Fisheries Habitat	No	n/a	n/a

Appendix B. Visual Assessment Data

Figure 2. Current Conditions Plan View (CCPV), Sept 2014.

2.0. Key Map to CCPV Inset Maps
2.1. Stallings Buffer Restoration Site, Northern Plots
2.2. Stallings Buffer Restoration Site, Southern Plots

Figure 3. Vegetation Monitoring Plot Photos

Figure 4. Problem Areas and Other Photos

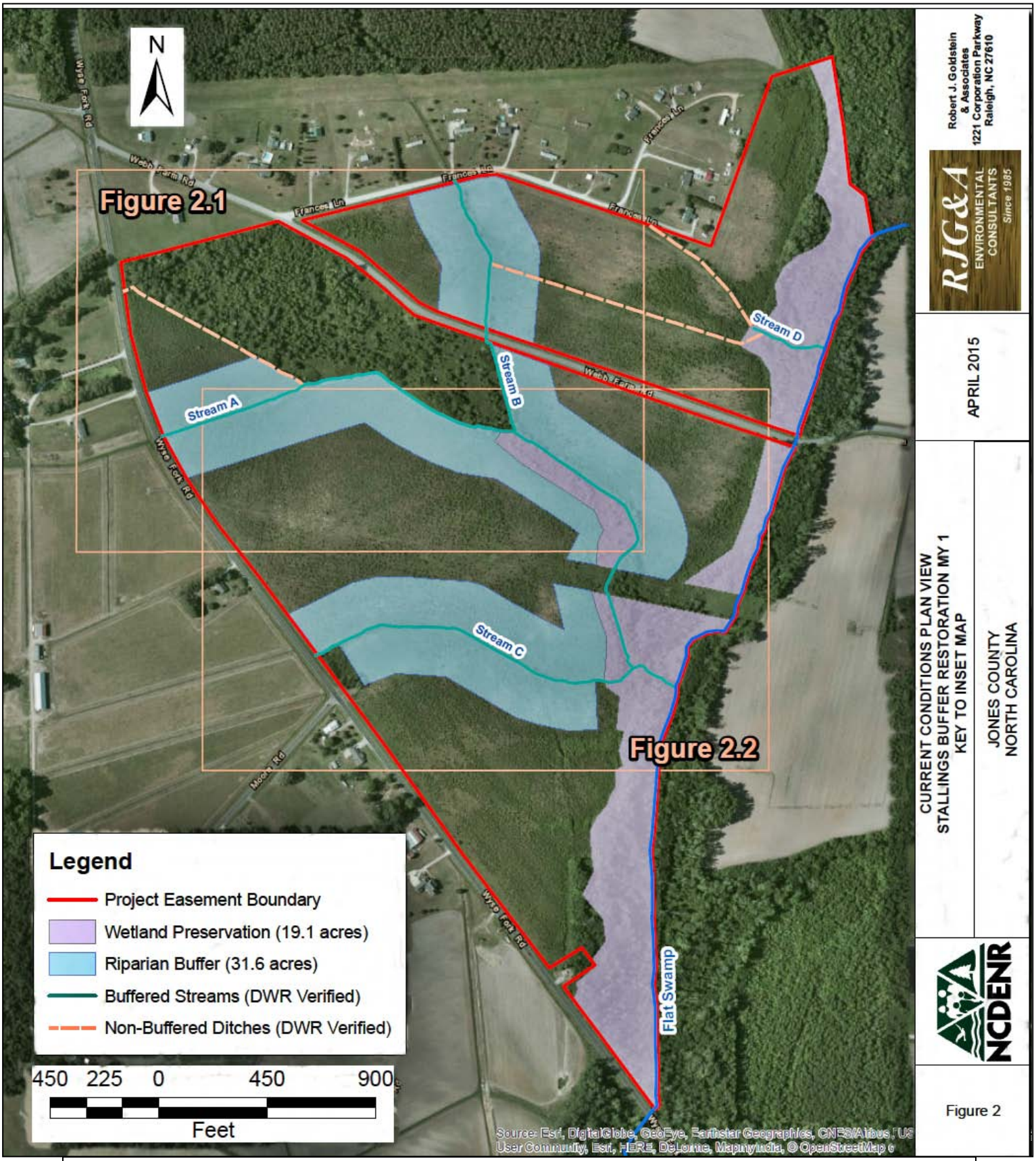

Figure 2.0. Current Conditions Plan View: Project Site Overview and Key to Inset Maps, Sep 2014. Stallings Buffer Restoration Site #357, Jones County NC.

N

Webb Farm Rd

Frances Ln

Wyse Fork Rd

5236

988

247

temp-23

VP 25

VP 23

temp-25

temp-22

VP 24

VP 22

temp-24

Stream B

temp-17

VP 17

temp-16

VP 16

temp-12

VP 12

temp-11

Stream A

VP 18

temp-18

VP 19

temp-19

temp-13

VP 11

VP 10

VP 13

temp-14

VP 14

temp-20

VP 20

temp-10

temp-15

VP 15

Legend

- Planted Buffer
- Buffered Streams (DWR Verified)
- Non-Buffered Ditches (DWR Verified)
- Project Easement Boundary
- Non-mowed Planting Area
- Wetland Preservation (No Mitig. Credit)
- CVS Permanent Veg Plots
- Invasive Vegetation (Lespedeza)
- Temporary Veg Plots

150 75 0 150 300

Feet

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community, Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors

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RJG&A ENVIRONMENTAL CONSULTANTS Since 1985

APRIL 2015

CURRENT CONDITIONS PLAN VIEW
STALLINGS BUFFER RESTORATION MY 1

JONES COUNTY
NORTH CAROLINA

NCDENR

Figure 2 1

N

temp-17
temp-11
temp-12
VP 12
VP 11
temp-13
Stream A
Stream B
VP 18
temp-18
VP 19
temp-19
VP 13
temp-14
VP 14
temp-20
VP 20
temp-15
VP 15
VP 21
temp-21
VP 6
temp-06
temp-07
VP 7
temp-09
temp-05
temp-02
VP 2
VP 9
VP 1
VP 8
VP 5
temp-08
Stream C
temp-01
temp-03
VP 3
temp-04
VP 4
Wyse Fork Rd
Webb Farm Rd

Legend

- Planted Buffer
- Buffered Streams (DWR Verified)
- Non-Buffered Ditches (DWR Verified)
- Project Easement Boundary
- Non-mowed Planting Area
- Wetland Preservation (No Mitig. Credit)
- CVS Permanent Veg Plots
- Invasive Vegetation (Lespedeza)
- Temporary Veg Plots

150 75 0 150 300
Feet

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APRIL 2015

CURRENT CONDITIONS PLAN VIEW
STALLINGS BUFFER RESTORATION MY 1

JONES COUNTY
NORTH CAROLINA

NCDENR

Figure 2 2

Table 5: Vegetation Condition Assessment Table
Stallings Site Buffer Restoration (Flat Swamp tributaries): Project #357
Monitoring Year 1 of 5 (2014)

Planted Acreage = 31.6

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 = 50.7

Vegetation Problem Category	Definitions	Mapping Threshold (SF)	CCPV Depiction	Number of Polygons	Combined Acreage	% of Easement Acreage
Invasive Areas of Concern**	Areas of points (if too small to render as polygons at map scale).	1000	gray stippled	3	0.65	1%
Easement Encroachment Areas	Areas of points (if too small to render as polygons at map scale).	none	N/A	0	0	0%

Problem areas are based on field observations in Sept 2014, six months after tree planting.

Competition from tall Grasses, Solidago, Eupatorium, Rubus, Baccharis, Morella, and other dense native plants may be limiting planted tree survival and growth.

Easement acreage = 31.6 acres planted + 19.1 acres preserved riparian buffers. Total conservation parcel acreage = 146 acres.

Figure 3.1 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY1 (2014)

(No Baseline Photo)

CVS VegPlot-1: MY-0 Mar 11-12, 2014

CVS VegPlot-1: MY-1 Sep 23-25, 2014

CVS VegPlot-2: MY-0 Mar 11-12, 2014

CVS VegPlot-2: MY-1 Sep 23-25, 2014

Figure 3.2 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY1 (2014)

(No Baseline Photo)

CVS VegPlot-3: MY-0 Mar 11-12, 2014

CVS VegPlot-3: MY-1 Sep 23-25, 2014

(No Baseline Photo)

CVS VegPlot-4: MY-0 Mar 11-12, 2014

CVS VegPlot-4: MY-1 Sep 23-25, 2014

Figure 3.3 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY1 (2014)

(No Baseline Photo)

CVS VegPlot-5: MY-0 Mar 11-12, 2014

CVS VegPlot-5: MY-1 Sep 23-25, 2014

(No Baseline Photo)

CVS VegPlot-6: MY-0 Mar 11-12, 2014

CVS VegPlot-6: MY-1 Sep 23-25, 2014

Figure 3.4 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY1 (2014)

CVS VegPlot-7: MY-0 Mar 11-12, 2014

CVS VegPlot-7: MY-1 Sep 23-25, 2014

CVS VegPlot-8: MY-0 Mar 11-12, 2014

CVS VegPlot-8: MY-1 Sep 23-25, 2014

Figure 3.5 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY1 (2014)

CVS VegPlot-9: MY-0 Mar 11-12, 2014

CVS VegPlot-9: MY-1 Sep 23-25, 2014

CVS VegPlot-10: MY-0 Mar 11-12, 2014

CVS VegPlot-10: MY-1 Sep 23-25, 2014

Figure 3.6 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY1 (2014)

CVS VegPlot-11: MY-0 Mar 11-12, 2014

CVS VegPlot-11: MY-1 Sep 23-25, 2014

CVS VegPlot-12: MY-0 Mar 11-12, 2014

CVS VegPlot-12: MY-1 Sep 23-25, 2014

Figure 3.7 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY1 (2014)

CVS VegPlot-13: MY-0 Mar 11-12, 2014

CVS VegPlot-13: MY-1 Sep 23-25, 2014

CVS VegPlot-14: MY-0 Mar 11-12, 2014

CVS VegPlot-14: MY-1 Sep 23-25, 2014

Figure 3.8 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY1 (2014)

CVS VegPlot-15: MY-0 Mar 11-12, 2014

CVS VegPlot-15: MY-1 Sep 23-25, 2014

CVS VegPlot-16: MY-0 Mar 11-12, 2014

CVS VegPlot-16: MY-1 Sep 23-25, 2014

Figure 3.9 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY1 (2014)

CVS VegPlot-17: MY-0 Mar 11-12, 2014

CVS VegPlot-17: MY-1 Sep 23-25, 2014

CVS VegPlot-18: MY-0 Mar 11-12, 2014

CVS VegPlot-18: MY-1 Sep 23-25, 2014

Figure 3.10 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY1 (2014)

CVS VegPlot-19: MY-0 Mar 11-12, 2014

CVS VegPlot-19: MY-1 Sep 23-25, 2014

CVS VegPlot-20: MY-0 Mar 11-12, 2014

CVS VegPlot-20: MY-1 Sep 23-25, 2014

Figure 3.11 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY1 (2014)

CVS VegPlot-21: MY-21 Mar 11-12, 2014

CVS VegPlot-21: MY-21 Sep 23-25, 2014

CVS VegPlot-22: MY-22 Mar 11-12, 2014

CVS VegPlot-22: MY-22 Sep 23-25, 2014

Figure 3.12 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY1 (2014)

CVS VegPlot-23: MY-0 Mar 11-12, 2014

CVS VegPlot-23: MY-1 Sep 23-25, 2014

CVS VegPlot-24: MY-0 Mar 11-12, 2014

CVS VegPlot-24: MY-1 Sep 23-25, 2014

Figure 3.13 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY1 (2014)

CVS VegPlot-25: MY-0 Mar 11-12, 2014

CVS VegPlot-25: MY-1 Sep 23-25, 2014

CVS VegPlot-xx: MY-0 Mar 11-12, 2014

CVS VegPlot-xx: MY-1 Sep 23-25, 2014

Figure 4.1 Problem Areas and Other Photos - Stallings Buffer Restoration #357 - MY1 (2014)

Dense Lespedeza cuneata & Solidago near CVS plot 9

Typical herb-dominated temp warranty plot (temp plot #10)

View from Frances Dr, northern easement boundary

Typical shrub-dominated temp warranty plot (temp plot #8)

Table 6. CVS Vegetation Plot Stem Densities, MY-1: SEP 2014
Stallings Buffer Site (#357) -- Flat Swamp, Neuse 03020204

Stream/Wetland, Riparian Buffer, & Total Stem Densities					
(stems per acre, MY-1: Sep 23-25, 2014)					
CVS Plot #	Stream/ Wetland Stems[2]	Volunteer Stems[3]	Total Stems[4]	Riparian Buffer Stems[1]	Buffer Success Criteria Met?
1	n/a	1133	1578	445	**yes**
2	n/a	324	647	324	**yes**
3	n/a	1942	2347	405	**yes**
4	n/a	2226	2428	202	no
5	n/a	890	1133	243	no
6	n/a	728	971	243	no
7	n/a	607	850	243	no
8	n/a	1902	2023	243	no
9	n/a	445	647	202	no
10	n/a	1659	2023	364	**yes**
11	n/a	1133	1376	243	no
12	n/a	1052	1416	364	**yes**
13	n/a	202	526	324	**yes**
14	n/a	243	486	243	no
15	n/a	3278	3561	283	**yes**
16	n/a	1902	2347	445	**yes**
17	n/a	1740	2145	405	**yes**
18	n/a	688	931	243	no
19	n/a	0	405	405	**yes**
20	n/a	647	971	324	**yes**
21	n/a	647	1133	486	**yes**
22	n/a	2266	2509	243	no
23	n/a	162	607	445	**yes**
24	n/a	2792	3237	445	**yes**
25	n/a	1052	1416	364	**yes**
Project Avg	n/a	**1187**	**1509**	**327**	**yes**

Stem Class

[1]Buffer Stems = Native planted hardwood trees. Does NOT include shrubs, pines, or vines.

[2]Stream/Wetland Stems = Native planted trees and shrubs. Does NOT include live stakes or vines.

[3]Volunteers = Native volunteer trees and shrubs. Does NOT include vines or planted stems.

[4]Total = Planted + volunteer native woody stems, including live stakes. Excludes exotics & vines.

Buffer Success Criteria = 260 planted trees per acre, per 2014 Consolidated Buffer Mitigation Rules.

Table 7a. CVS Vegetation Plot Stem Counts by Species, MY-1: SEP 2014
Stallings Buffer Site (#357) -- Flat Swamp, Neuse 03020204

			EEP # 357: Stallings Buffer Restoration Site, Flat Swamp, Jones County -- Current Plot Data (MY1- Sep 2014)																	
Scientific Name	**Common Name**	**Type**	**357-01-0001**			**357-01-0002**			**357-01-0003**			**357-01-0004**			**357-01-0005**			**357-01-0006**		
			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 negundo	Boxelder	Tree												2						
Baccharis	Baccharis	Shrub			19			8			13			20			19			18
Ilex opaca	American holly	Tree																		
Liquidambar styraciflua	Sweetgum	Tree			9						4									
Liriodendron tulipifera	Tuliptree	Tree				2	2	2							2	2	2	3	3	3
Morella cerifera	Wax myrtle	Shrub									30			28			3			
Nyssa sylvatica	Blackgum	Tree	6	6	6	1	1	1							1	1	1	3	3	3
Pinus taeda	Loblolly pine	Tree																		
Platanus occidentalis	American sycamore	Tree	5	5	5	5	5	5	1	1	2	3	3	7	3	3	3			
Prunus serotina	Black cherry	Tree																		
Quercus	Oak (sp unk)	Tree																		
Quercus nigra	Water oak	Tree																		
Quercus phellos	Willow oak	Tree							6	6	6									
Quercus rubra	Northern red oak	Tree							3	3	3	2	2	2						
Unknown		Tree or Shrub																		
		Stem count	11	11	39	8	8	16	10	10	58	5	5	59	6	6	28	6	6	24
		size (ares)	1			1			1			1			1			1		
		size (ACRES)	0.0247			0.0247			0.0247			0.0247			0.0247			0.0247		
		Species count	2	2	4	3	3	4	3	3	6	2	2	5	3	3	5	2	2	3
		Stems per ACRE	445	445	1578	324	324	647	405	405	2347	202	202	2388	243	243	1133	243	243	971

Color Codes for Planted Tree Density

Exceeds 260 trees/acre requirements by 10% or more (286+)
Exceeds 260 trees/acre requirements, by less than 10% (260 - 285)
Fails to meet 260 trees/acre requirements, by less than 10% (234 - 259)
Fails to meet 260 trees/acre requirements by more than 10% (0 - 233)

Table 7b. CVS Vegetation Plot Stem Counts by Species, MY-1: SEP 2014
Stallings Buffer Site (#357) -- Flat Swamp, Neuse 03020204

			EEP # 357: Stallings Buffer Restoration Site, Flat Swamp, Jones County -- Current Plot Data (MY1- Sep 2014)																	
Scientific Name	Common Name	Type	357-01-0007			357-01-0008			357-01-0009			357-01-0010			357-01-0011			357-01-0012		
			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 negundo	Boxelder	Tree																		
Baccharis	Baccharis	Shrub			14			25			9			37			16			11
Ilex opaca	American holly	Tree																		
Liquidambar styraciflua	Sweetgum	Tree			1			6			2									
Liriodendron tulipifera	Tuliptree	Tree				2	2	2												
Morella cerifera	Wax myrtle	Shrub						10						4			11			14
Nyssa sylvatica	Blackgum	Tree	1	1	1	1	1	1												
Pinus taeda	Loblolly pine	Tree						2												1
Platanus occidentalis	American sycamore	Tree	5	5	5	2	2	2	1	1	1	1	1	1	4	4	4	6	6	6
Prunus serotina	Black cherry	Tree						1												
Quercus	Oak (sp unk)	Tree																		
Quercus nigra	Water oak	Tree																		
Quercus phellos	Willow oak	Tree							1	1	1	4	4	4				2	2	2
Quercus rubra	Northern red oak	Tree				1	1	1	3	3	3	4	4	4	2	2	3	1	1	1
Unknown		Tree or Shrub																		
		Stem count	6	6	21	6	6	50	5	5	16	9	9	50	6	6	34	9	9	35
		size (ares)	1			1			1			1			1			1		
		size (ACRES)	0.0247			0.0247			0.0247			0.0247			0.0247			0.0247		
		Species count	2	2	4	4	4	9	3	3	5	3	3	5	2	2	4	3	3	6
		Stems per ACRE	243	243	850	243	243	2023	202	202	647	364	364	2023	243	243	1376	364	364	1416

Color Codes for Planted Tree Density

Exceeds 260 trees/acre requirements by 10% or more (286+)
Exceeds 260 trees/acre requirements, by less than 10% (260 - 285)
Fails to meet 260 trees/acre requirements, by less than 10% (234 - 259)
Fails to meet 260 trees/acre requirements by more than 10% (0 - 233)

Table 7c. CVS Vegetation Plot Stem Counts by Species, MY-1: SEP 2014
Stallings Buffer Site (#357) -- Flat Swamp, Neuse 03020204

			EEP # 357: Stallings Buffer Restoration Site, Flat Swamp, Jones County -- Current Plot Data (MY1- Sep 2014)																	
Scientific Name	Common Name	Type	357-01-0013			357-01-0014			357-01-0015			357-01-0016			357-01-0017			357-01-0018		
			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 negundo	Boxelder	Tree																		
Baccharis	Baccharis	Shrub			5			6			30			28			31			5
Ilex opaca	American holly	Tree																		
Liquidambar styraciflua	Sweetgum	Tree									1									
Liriodendron tulipifera	Tuliptree	Tree													1	1	1	2	2	2
Morella cerifera	Wax myrtle	Shrub												18			12			5
Nyssa sylvatica	Blackgum	Tree										1	1	1	2	2	2			
Pinus taeda	Loblolly pine	Tree												1						
Platanus occidentalis	American sycamore	Tree	4	4	4	4	4	4	2	2	2	7	7	7	3	3	3	1	1	8
Prunus serotina	Black cherry	Tree																		
Quercus	Oak (sp unk)	Tree																		
Quercus nigra	Water oak	Tree																		
Quercus phellos	Willow oak	Tree				1	1	1	3	3	3	1	1	1						
Quercus rubra	Northern red oak	Tree	4	4	4	1	1	1	2	2	2	1	1	1	4	4	4	3	3	3
Unknown		Tree or Shrub										1	1	1						
Stem count			8	8	13	6	6	12	7	7	38	11	11	58	10	10	53	6	6	23
size (ares)			1			1			1			1			1			1		
size (ACRES)			0.0247			0.0247			0.0247			0.0247			0.0247			0.0247		
Species count			2	2	3	3	3	4	3	3	5	5	5	8	4	4	6	3	3	5
Stems per ACRE			324	324	526	243	243	486	283	283	1538	445	445	2347	405	405	2145	243	243	931

Color Codes for Planted Tree Density

Exceeds 260 trees/acre requirements by 10% or more (286+)
Exceeds 260 trees/acre requirements, by less than 10% (260 - 285)
Fails to meet 260 trees/acre requirements, by less than 10% (234 - 259)
Fails to meet 260 trees/acre requirements by more than 10% (0 - 233)

Table 7d. CVS Vegetation Plot Stem Counts by Species, MY-1: SEP 2014
Stallings Buffer Site (#357) -- Flat Swamp, Neuse 03020204

			EEP # 357: Stallings Buffer Restoration Site, Flat Swamp, Jones County -- Current Plot Data (MY1- Sep 2014)																	
Scientific Name	Common Name	Type	357-01-0019			357-01-0020			357-01-0021			357-01-0022			357-01-0023			357-01-0024		
			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 negundo	Boxelder	Tree																		
Baccharis	Baccharis	Shrub						11			3			25						7
Ilex opaca	American holly	Tree									1									
Liquidambar styraciflua	Sweetgum	Tree									1									
Liriodendron tulipifera	Tuliptree	Tree	3	3	3	3	3	3	2	2	2	1	1	1				3	3	3
Morella cerifera	Wax myrtle	Shrub									8			30			3			62
Nyssa sylvatica	Blackgum	Tree	2	2	2	1	1	1										2	2	2
Pinus taeda	Loblolly pine	Tree												1			1			
Platanus occidentalis	American sycamore	Tree	2	2	2			3	3	3	4	5	5	5				2	2	2
Prunus serotina	Black cherry	Tree						2			2									
Quercus	Oak (sp unk)	Tree				3	3	3												
Quercus nigra	Water oak	Tree																1	1	1
Quercus phellos	Willow oak	Tree							3	3	3				2	2	2			
Quercus rubra	Northern red oak	Tree	3	3	3	1	1	1	4	4	4				9	9	9	3	3	3
Unknown		Tree or Shrub																		
		Stem count	10	10	10	8	8	24	12	12	28	6	6	62	11	11	15	11	11	80
		size (ares)	1			1			1			1			1			1		
		size (ACRES)	0.0247			0.0247			0.0247			0.0247			0.0247			0.0247		
		Species count	4	4	4	4	4	7	4	4	9	2	2	5	2	2	4	5	5	7
		Stems per ACRE	405	405	405	324	324	971	486	486	1133	243	243	2509	445	445	607	445	445	3237

Color Codes for Planted Tree Density

Exceeds 260 trees/acre requirements by 10% or more (286+)

Exceeds 260 trees/acre requirements, by less than 10% (260 - 285)

Fails to meet 260 trees/acre requirements, by less than 10% (234 - 259)

Fails to meet 260 trees/acre requirements by more than 10% (0 - 233)

Table 7e CVS Vegetation Plot Stem Counts by Species, MY-1: SEP 2014
Stallings Buffer Site (#357) -- Flat Swamp, Neuse 03020204

			EEP # 357: Stallings Buffer Restoration Site -- Current Plot Data (MY1- Sep 2014) and Annual Totals & Means																		
Scientific Name	Common Name	Type	357-01-0025			MY1 (9/2014) Total			MY0 (4/2014) Total												
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T										
Acer negundo	Boxelder	Tree						2													
Baccharis	Baccharis	Shrub						360													
Ilex opaca	American holly	Tree						1													
Liquidambar styraciflua	Sweetgum	Tree						24													
Liriodendron tulipifera	Tuliptree	Tree	1	1	1	25	25	25	33	33	33										
Morella cerifera	Wax myrtle	Shrub			17			255													
Nyssa sylvatica	Blackgum	Tree	4	4	4	25	25	25	22	22	22										
Pinus taeda	Loblolly pine	Tree						6													
Platanus occidentalis	American sycamore	Tree	4	4	4	73	73	89	28	28	28										
Prunus serotina	Black cherry	Tree			9			14													
Quercus	Oak (sp unk)	Tree				3	3	3	42	42	42										
Quercus nigra	Water oak	Tree				1	1	1													
Quercus phellos	Willow oak	Tree				23	23	23													
Quercus rubra	Northern red oak	Tree				51	51	52													
Unknown		Tree or Shrub				1	1	1	143	143	143										
Stem count			9	9	35	202	202	881	268	268	268										
size (ares)			1			25			25												
size (ACRES)			0.0247			0.6178			0.6178												
Species count			3	3	5	8	8	15	5	5	5										
Stems per ACRE			364	364	1416	327	327	1426	434	434	434										

Color Codes for Planted Tree Density

Exceeds 260 trees/acre requirements by 10% or more (286+)
Exceeds 260 trees/acre requirements, by less than 10% (260 - 285)
Fails to meet 260 trees/acre requirements, by less than 10% (234 - 259)
Fails to meet 260 trees/acre requirements by more than 10% (0 - 233)

MY-0 Note: Many newly planted trees were not distinguishable from volunteer trees; many volunteers are included in "PnoLS" and "P-all".

Table 8. Temporary (Warranty) Vegetation Plot Stem Counts, MY-1: SEP 2014
Stallings Buffer Site (#357) -- Flat Swamp, Neuse 03020204

Planted Tree Count per 100 m2 Temporary Plots - Sept 23-25, 2014								
Temp		Liriodendro	Platanus	Nyssa	Quercus		planted	staff
Plot #		tulip poplar	sycamore	blackgum	oaks		total	
1		1	3				4	paul+adam
2			1	1	1		3	paul+adam
3			1		3		4	paul+adam
4			2		2		4	paul+adam
5		3		2			5	paul+adam
6		1	1				2	paul+adam
7				1	1		2	paul+adam
8		1	4		1		6	paul+adam
9		2	2				4	paul+adam
10			2		3		5	paul+adam
11			2		3		5	paul+adam
12			2		2		4	paul+adam
13					1		1	paul+adam
14			2		2		4	paul+adam
15			1		1		2	paul+adam
16		2	5		1		8	paul+adam
17					1		1	paul+adam
18		2					2	gerald+rich
19			1		1		2	gerald+rich
20		1	1				2	gerald+rich
21		1	2		2		5	gerald+rich
22			1		2		3	gerald+rich
23			1				1	gerald+rich
24		2	1		1		4	gerald+rich
25			3				3	gerald+rich
Temp Plot Dimensions = 10m x 10m							3.44	average

NOTE: Planted stems were difficult to locate among the dense natural vegetation, especially Nyssa which sheds early and has less conspicuous leaves. It is likely that many planted stems were overlooked this first year, and the data above may underestimate the true density of planted stems.