STALLINGS BUFFER RESTORATION SITE -- DMS #357
Jones County NC -- Neuse River HUC# 03020204-010050

MY-3 (2016) ANNUAL MONITORING REPORT (Draft)

North Carolina Department of Environmental Quality
Division of Mitigation Services (DEQ-DMS) -- Contract # 5765

Data Collected: November 2016 **Final Report Submitted: Jan 2017**

Environmental Quality	**N.C. Department of Environmental Quality** **Division of Mitigation Services** **1652 Mail Service Center** **Raleigh, NC 27699-1652** --- **DMS Project Manager: Kristin Miguez**

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MOGENSEN MITIGATION, INC

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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. The CVS plots were established by RJG&A (now Mogensen Mitigation Inc) during March 2014. Vegetative success of the buffer restoration is evaluated based on a minimum of 320 planted native hardwood trees per acre at the end of 5 years, as specified in the project mitigation plan. (Note:

The 2015 Monitoring Report stated that the density criterion had been revised to 260 planted stems per acre at the end of 5 years, based on the 2014 Consolidated Buffer Mitigation Rules. The original criterion of 320 trees per acre has been reinstated after recent discussion between DMS and DWR).

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 upland runoff 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. 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 and grub the riparian buffer planting areas was changed to mowing only to preserve the many native volunteer saplings. Planting areas were mowed in 2014 with a bush-hog to facilitate planting and reduce competition for the planted trees. *Pinus, Liquidambar*, and shrubs were mostly mowed or cut, but other 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 *Platanus*, *Liriodendron*, *Nyssa*, and *Quercus* within the 31.6 acre buffer restoration areas using Dibble bars during late February to early March 2014. Planted areas that were not mowed are dominated by *Baccharis*, *Morella*, *Rubus*, and herbaceous plants, plus scattered *Pinus* and *Liquidambar* saplings. Planted seedlings were mostly 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 (MMI-RJGA) 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 (2016) and Performance Summary

The Stallings site was evaluated during November 14-16, 2016, about 33 months after the original planting in Feb 2014. Native volunteer shrubs and vines, especially *Morella*, *Baccharis, Rubus, Vitis, Smilax, Ampelopsis,* and *Campsis* are continuing to grow vigorously over most of the site, along with a dense herb layer dominated by *Solidago*, *Eupatorium*, *Juncus*, *Scirpus*, and grasses overtopping the planted trees. Larger volunteer *Pinus*, *Platanus*, *Liquidambar*, *Acer*, *Fraxinus*, *Celtis*, and *Ulmus* ranging from 4 to 8 inches dbh are common in some areas, especially along ditch banks.

Areas where low planted tree density was reported in 2014 received supplemental planting in February 2015 by the original planting contractor. Approximately 3,800 bare-root seedlings of *Liriodendron*, *Quercus*, and *Fraxinus* were planted on 20 acres, at densities of 109 to 242 trees per acre based on the 2014 CVS plot and warranty plot data (Appendix C, Figure 5). Only a few of these new trees were evident in CVS plots in 2016.

Ten of the 25 permanent CVS plots in 2016 had eight or more living planted trees, and met the 320 stems/acre success criterion (Tables 6 -7). The other 15 CVS plots had seven or fewer living planted stems, failing to meet the criterion. The average density of surviving planted stems for all 25 plots in 2016 was 6.7 trees per plot (271 trees per acre), similar to the 2015 average (275 trees per acre). The dense thicket of shrubs, vines and herbs in nearly all plots is considerably taller than most of the planted trees, except for *Platanus* that rise above the shrub layer in certain plots.

The 25 temporary warranty plots (107.6 x 10 ft = 100 m2) yielded a range of 1 to 10 trees (planted species) and average of 4.3 trees per plot in 2016, or 175 trees per acre (Table 8). Only two warranty plots exceeded 320 planted trees per acre. It remains difficult, as noted in the 2014 and 2015 reports, to locate un-flagged planted trees especially small-leaved species, among the dense tangle of shrubs, vines, and herbs.

Areas where the CVS plots or warranty plots had eight or more live planted stems were considered as having adequate planted stem density. Other areas where CVS plots and warranty plots had fewer than eight stems are mapped as Low Woody Density Problem Areas in Figure 2.1-2.2 and Table 5,

comprsing 14.1 acres (45% of planted area). Low vigor of planted trees is a problem throughout the remainder of the planted areas. However, adding the volunteer native hardwood trees, 20 CVS plots (80%) have eight or more total trees, and the average number of native hardwood trees per CVS plot is 10.0 (404 trees per acre). For warranty plots, 16 plots (64%) have eight or more trees, with an average of 9.0 trees per plot (364 trees per acre). These data exclude native volunteer *Morella* and *Baccharis*.

Trees greater than 150 cm tall appear likely to survive and compete successfully with the dense shrub layer, but smaller trees may be outcompeted and die over the next few years. Among the planted species, most of the trees taller than 150 cm are *Platanus*. Few planted stems of *Quercus, Nyssa, Liriodendron,* and *Fraxinus* have yet reached above the shrub layer. Volunteer stems taller than the adjacent shrubs include *Platanus, Liquidambar, Diospyros, Pinus taeda, Pinus palustrs, Prunus serotina, Acer rubrum, Acer negundo, Salix nigra, Ulmus americana, Ulmus alata,* and *Fraxinus pennsylvanica*. The largest trees beyond the ditch banks (15 cm or greater DBH) are nearly all pines. (The site was most likely a mesic to wet pine flatwoods community with shrubby understory prior to agricultural conversion many decades ago). The site will ultimately become forested, but trees planted in 2014-2015 may comprise only a fraction of the resulting forest. In terms of soil stability, nutrient uptake, water quality benefits, and habitat for early-successional stage wildlife, the existing shrub-dominated community will likely perform just as well as a forest of planted sapling trees.

Scattered small patches of invasive *Ligustrum sinense, Rosa multiflora,* and *Lonicera japonica* were noted in many areas, especially along ditch banks and roadsides, but did not appear abundant or large enough to be suppressing planted tree growth. The three large patches of invasive *Lespedeza cuneata* mapped in 2015 on the eastern portion of the site were less prominent this year, apparently due to overtopping by native *Morella*, *Baccharis, Rubus,* and vines, and were removed from "invasive areas" designation (Figure 2.1-2.2). The CVS plots containing *Lespedeza* also exhibited less cover of this invasive plant than they did last year. Small and diffuse patches of *Lespedeza* are present in many other areas elsewhere on the project site, but native shrubs appear to be outcompeting them. No invasive problem areas are plotted on the current CCPV.

No encroachment or damage from vehicles or livestock was observed on the property, other than mowing of ditch-bank vegetation (presumably by NCDOT) along Webb Farm Rd and Wyse Fork Rd. "Conservation Area" signs posted along roadsides are intact, although some are now obscured from view by shrubs and vine growth. There is no fencing around the project site.

2.0. Monitoring Methods

Baseline Monitoring and Annual Monitoring and reporting methods 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) are evaluated and photographed during late Summer or Fall each year from 2014 through 2018. For planted trees, the species, height, dbh, and qualitative vigor rating of each tree is recorded (CVS Level 1 data). For volunteer trees and shrubs, the numbers of stems of each species within each height category is recorded (CVS Level 2 data). Planted and volunteer woody species are identified using Radford et al. (1968) and Weakley (2012).

For the first three years (2014 through 2016) an additional 25 temporary vegetation warranty plots (100 m^2 each) scattered throughout the replanted buffer areas are evaluated. Warranty plots may be either square (10 x 10 m) or strip plots (107.6 x 10 ft) with locations varying from year to year to maximize the cumulative sampling area covered. These plots record the total number of surviving planted tree species only; species and size data are not be recorded. The current year's warranty plots are mapped on the CCPV figures in a contrasting color.

The Stallings site does not have a perimiter fence, but the contractor checks the condition of conservation signage along the adjacent public roads, and looks for evidence of encroachment by off-road vehicles, livestock, or other potential sources of damage. Areas of invasive exotic vegetation in the planted areas are mapped in accordance with current DMS guidance. No hydrologic or geomorphic monitoring is included in the Stallings project monitoring scope.

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, DMS #357 -- Neuse River Basin HUC #03020204-010050, Jones County, NC. Directions to Site: From Kinston, drive east on US-70, turn right on Wyse Fork Rd (SR-1002) about 0.5 mile past the Lenoir/Jones County line, then drive south 3.5 miles to Webb Farm Road (SR-1306). 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.

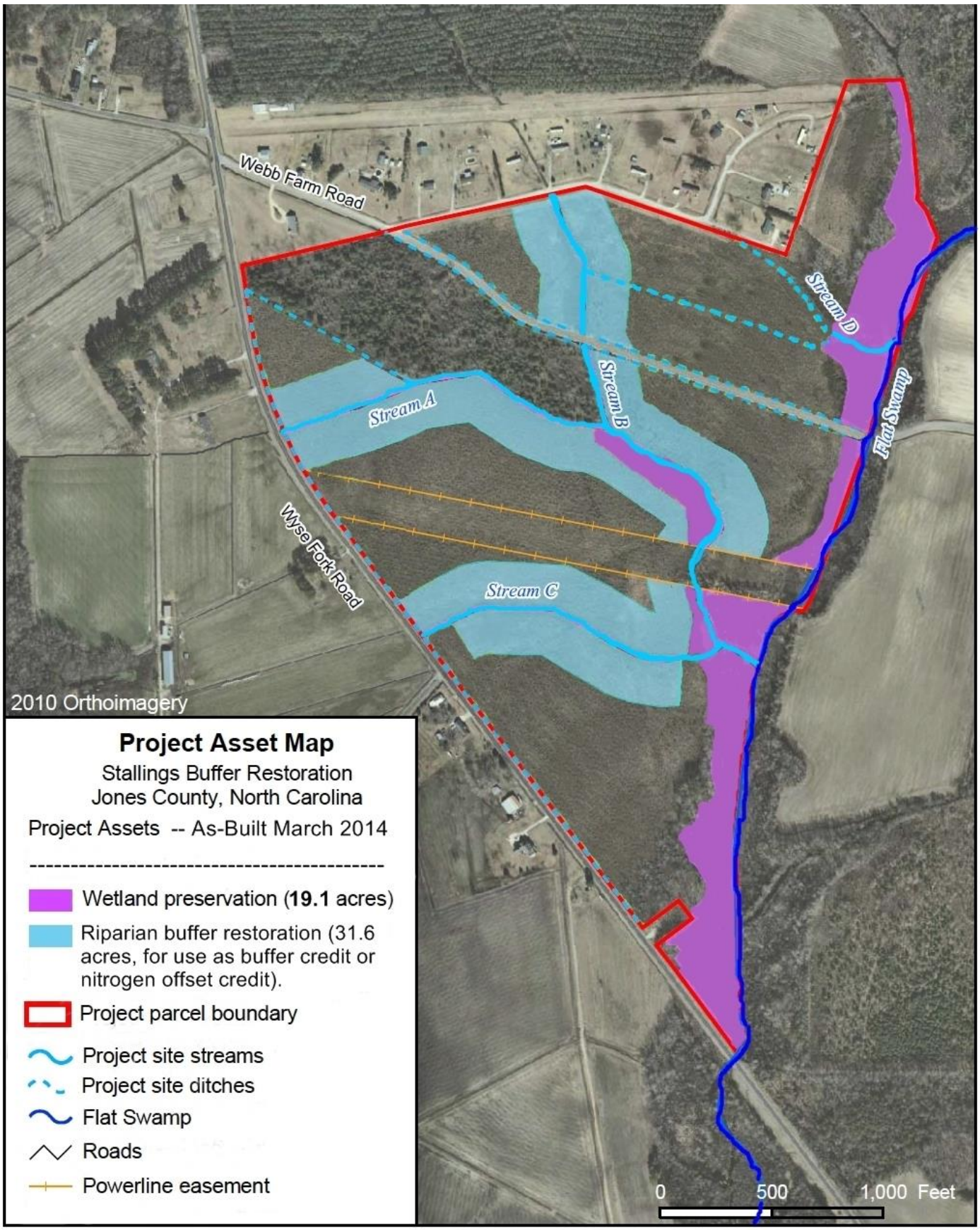


Figure 1B. Stallings Buffer Restoration #357, As-Built Project Components and Mitigation Assets Map.

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 Attributes Table

Table 1. Project Components and Mitigation Credits
Stallings Buffer Restoration, Flat Swamp, Jones County, DMS 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					**1,377,325**	
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 -- DMS #357 -- Jones County NC		
Elapsed Time Since Grading Complete: NA		
Elapsed Time Since Planting Complete: 33 Months		
Number of Reporting Years: 3		
Activity or Deliverable	**Data Collection Complete**	**Completion or Delivery**
Restoration Plan	---	Dec 2011
Construction (Mowing)	---	Jan-Feb 2014
Bare Root Tree Planting	---	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
Supplemental Tree Planting	---	Feb 2015
MY-2: Plant Warranty Plot Data	Sep 2015	Oct 2015
MY-2: 2015 Monitoring Report	Sep 2015	Nov 2015
MY-3 Plant Warranty Plot Data	Nov 2016	Nov 2016
MY-3 2016 Monitoring Report	Nov 2016	Dec 2016
MY-4 2017 Monitoring Report		
MY-5 2018 Monitoring Report		
Final Close-Our Report		

Table 3. Project Contacts Table Stallings Buffer Restoration -- DMS #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	Mogensen Mitigation Inc. - Raleigh Office 104 East Chestnut Avenue Wake Forest, NC 27587 Gerald Pottern, (919) 556-8845 --- Mogensen Mitigation Inc - Main Office P.O. 690429 Charlotte, NC 28227 Rich Mogensen, (704) 576-1111

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

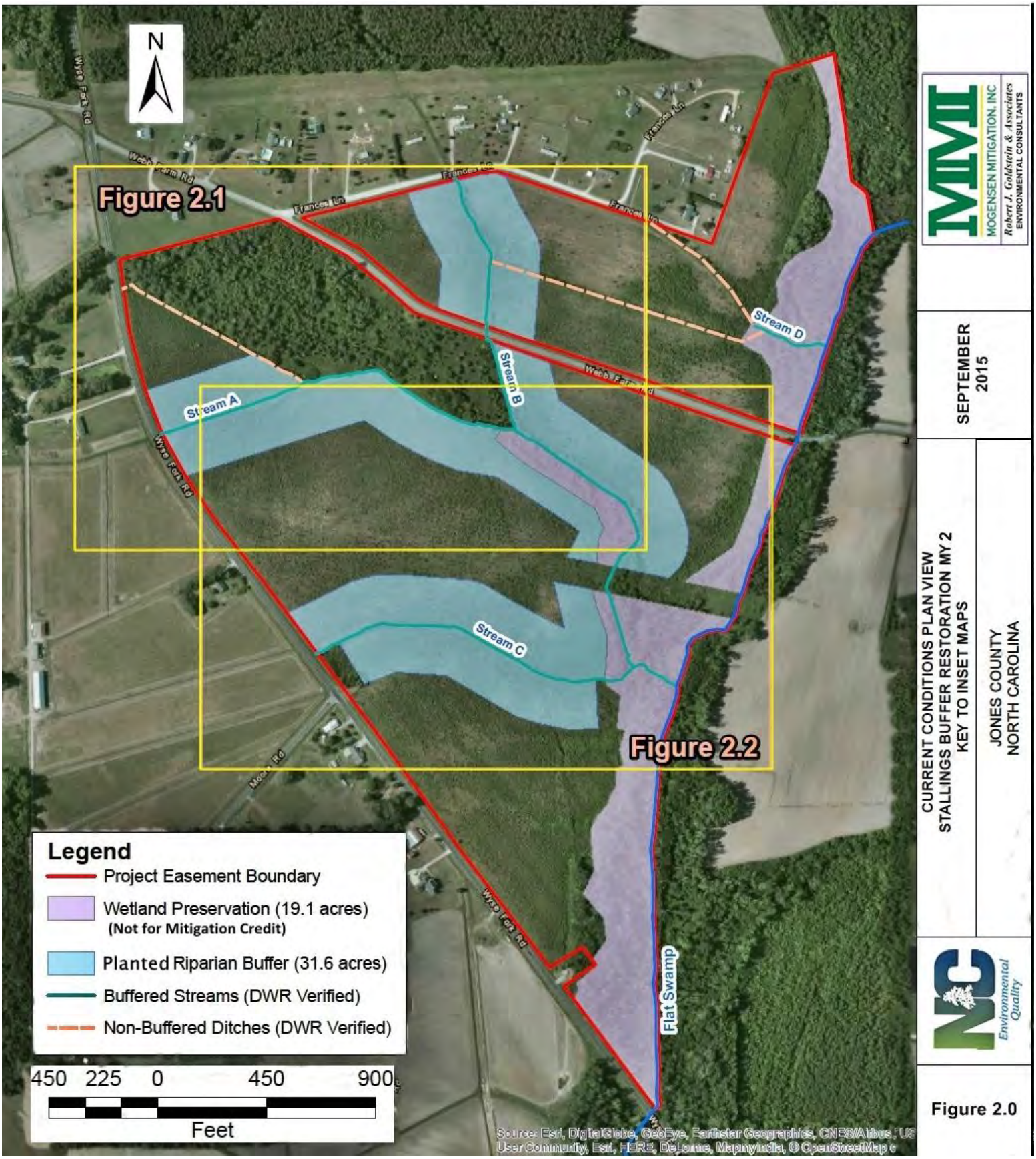
Appendix B. Visual Assessment Data

Figure 2. Current Conditions Plan View: Nov 2016

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

Table 5. Vegetation Condition Assessment Table

Figure 3. Vegetation Monitoring Plot Photos



MOGENSEN MITIGATION, INC
Robert J. Goldstein & Associates
ENVIRONMENTAL CONSULTANTS

SEPTEMBER 2015

CURRENT CONDITIONS PLAN VIEW
STALLINGS BUFFER RESTORATION MY 2
KEY TO INSET MAPS

JONES COUNTY
NORTH CAROLINA

NC Environmental Quality

Figure 2.0

Legend

- Planted Buffer
- Buffered Streams (DWR Verified)
- Non-Buffered Ditches (DWR Verified)
- Project Easement Boundary
- Wetland Preservation (No Mitg. Credit)
- Successful CVS Permanent Veg Plots
- Unsuccessful CVS Permanent Veg Plots
- Successful Temporary Veg Plots
- Unsuccessful Temporary Veg Plots
- Low Density Areas

N

Stream A

Stream B

VP-10 TP-10 VP-11 TP-11 VP-12 TP-12 TP-13 VP-13 VP-14 TP-14 VP-15 TP-15 VP-16 TP-16 TP-17 VP-17 VP-18 TP-18 VP-19 TP-19 VP-20 TP-20 VP-21 TP-21 VP-22 TP-22 VP-23 TP-23 VP-24 TP-24 VP-25 TP-25 VP-06 TP-06 VP-07 TP-07

0 75 150 300 450 600 Feet

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MMI
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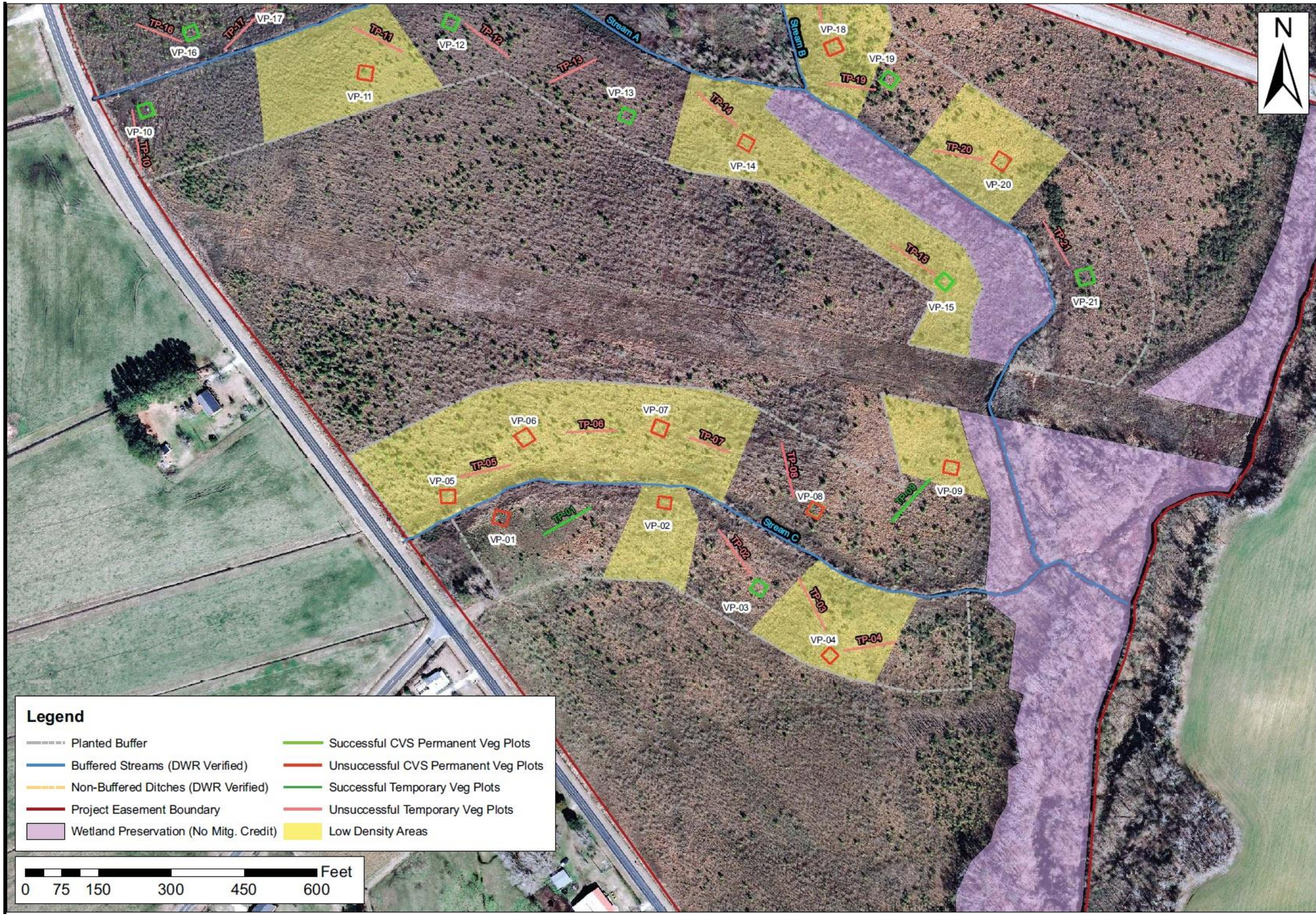
CURRENT CONDITIONS PLAN VIEW
STALLINGS BUFFER RESTORATION #357
JONES COUNTY
NORTH CAROLINA

NC Environmental Quality

FIGURE 2.1
NOV 2016
MY3 of 5



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CURRENT CONDITIONS PLAN VIEW
STALLINGS BUFFER RESTORATION #357
JONES COUNTY
NORTH CAROLINA

NC Environmental Quality

FIGURE 2.2
NOV 2016
MY3 of 5

Table 5: Vegetation Condition Assessment Table
Stallings Site Buffer Restoration #357 (Flat Swamp, Jones County)
Monitoring Year 3 of 5 (2016)

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	yellow	9	14.1	45%
			Total	**0**	**14.1**	**45%**
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	no fill *	10	17.5	55%
			Cumulative Total	0	31.6	**100%**

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	N/A	0	0	0%
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 Nov 2016, 33 months after initial 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 (Mitigation Assets) acreage = 31.6 acres planted + 19.1 acres preserved riparian buffers = 50.7 acres. Total conservation parcel acreage = 146 acres.

*** Nearly all planted areas beyond those mapped as "Low Stem Density" have low vigor of <u>planted</u> trees. No fill pattern was used for these areas because they comprise the remainder of the planted areas. However, native volunteer trees and shrubs are abundant, and all planted areas exceed the stem density criteria when volunteers are included.**

Figure 3.1 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY3 (2016)

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

CVS VegPlot-1: MY-2 Nov 14-16, 2016

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

CVS VegPlot-2: MY-2 Nov 14-16, 2016

NOTE: Current year photo may be taken from a different plot corner than (0,0) due to dense vegetation or sun angle at some plots.

Figure 3.2 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY3 (2016)

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

CVS VegPlot-3: MY-2 Nov 14-16, 2016

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

CVS VegPlot-4: MY-2 Nov 14-16, 2016

NOTE: Current year photo may be taken from a different plot corner than (0,0) due to dense vegetation or sun angle at some plots.

Figure 3.3 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY3 (2016)

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

CVS VegPlot-5: MY-2 Nov 14-16, 2016

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

CVS VegPlot-6: MY-2 Nov 14-16, 2016

NOTE: Current year photo may be taken from a different plot corner than (0,0) due to dense vegetation or sun angle at some plots.

Figure 3.4 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY3 (2016)

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

CVS VegPlot-7: MY-2 Nov 14-16, 2016

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

CVS VegPlot-8: MY-2 Nov 14-16, 2016

NOTE: Current year photo may be taken from a different plot corner than (0,0) due to dense vegetation or sun angle at some plots.

Figure 3.5 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY3 (2016)

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

CVS VegPlot-9: MY-2 Nov 14-16, 2016

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

CVS VegPlot-10: MY-2 Nov 14-16, 2016

NOTE: Current year photo may be taken from a different plot corner than (0,0) due to dense vegetation or sun angle at some plots.

Figure 3.6 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY3 (2016)

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

CVS VegPlot-11: MY-2 Nov 14-16, 2016

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

CVS VegPlot-12: MY-2 Nov 14-16, 2016

NOTE: Current year photo may be taken from a different plot corner than (0,0) due to dense vegetation or sun angle at some plots.

Figure 3.7 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY3 (2016)

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

CVS VegPlot-13: MY-2 Nov 14-16, 2016

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

CVS VegPlot-14: MY-2 Nov 14-16, 2016

NOTE: Current year photo may be taken from a different plot corner than (0,0) due to dense vegetation or sun angle at some plots.

Figure 3.8 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY3 (2016)

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

CVS VegPlot-15: MY-2 Nov 14-16, 2016

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

CVS VegPlot-16: MY-2 Nov 14-16, 2016

NOTE: Current year photo may be taken from a different plot corner than (0,0) due to dense vegetation or sun angle at some plots.

Figure 3.9 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY1 MY3 (2016)

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

CVS VegPlot-17: MY-2 Nov 14-16, 2016

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

CVS VegPlot-18: MY-2 Nov 14-16, 2016

NOTE: Current year photo may be taken from a different plot corner than (0,0) due to dense vegetation or sun angle at some plots.

Figure 3.10 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY3 (2016)

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

CVS VegPlot-19: MY-2 Nov 14-16, 2016

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

CVS VegPlot-20: MY-2 Nov 14-16, 2016

NOTE: Current year photo may be taken from a different plot corner than (0,0) due to dense vegetation or sun angle at some plots.

Figure 3.11 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY3 (2016)

CVS VegPlot-21: MY-0 Mar 11-12, 2014

CVS VegPlot-21: MY-2 Nov 14-16, 2016

CVS VegPlot-22: MY-0 Mar 11-12, 2014

CVS VegPlot-22: MY-2 Nov 14-16, 2016

NOTE: Current year photo may be taken from a different plot corner than (0,0) due to dense vegetation or sun angle at some plots.

Figure 3.12 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY3 (2016)

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

CVS VegPlot-23: MY-2 Nov 14-16, 2016

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

CVS VegPlot-24: MY-2 Nov 14-16, 2016

NOTE: Current year photo may be taken from a different plot corner than (0,0) due to dense vegetation or sun angle at some plots.

Figure 3.13 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY3 (2016)

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

CVS VegPlot-25: MY-2 Nov 14-16, 2016

NOTE: Current year photo may be taken from a different plot corner than (0,0) due to dense vegetation or sun angle at some plots.

Appendix C. Vegetation Plot Monitoring Data

Figure 4. Warranty Replanting Areas, Carolina Silvics, Feb 2015

Table 6. CVS Plot Stem Density & Success Summary

Table 7. CVS Plot Stem Counts & Density by Species and Year

Table 8. Temporary (Warranty) Plot Planted Stem Counts

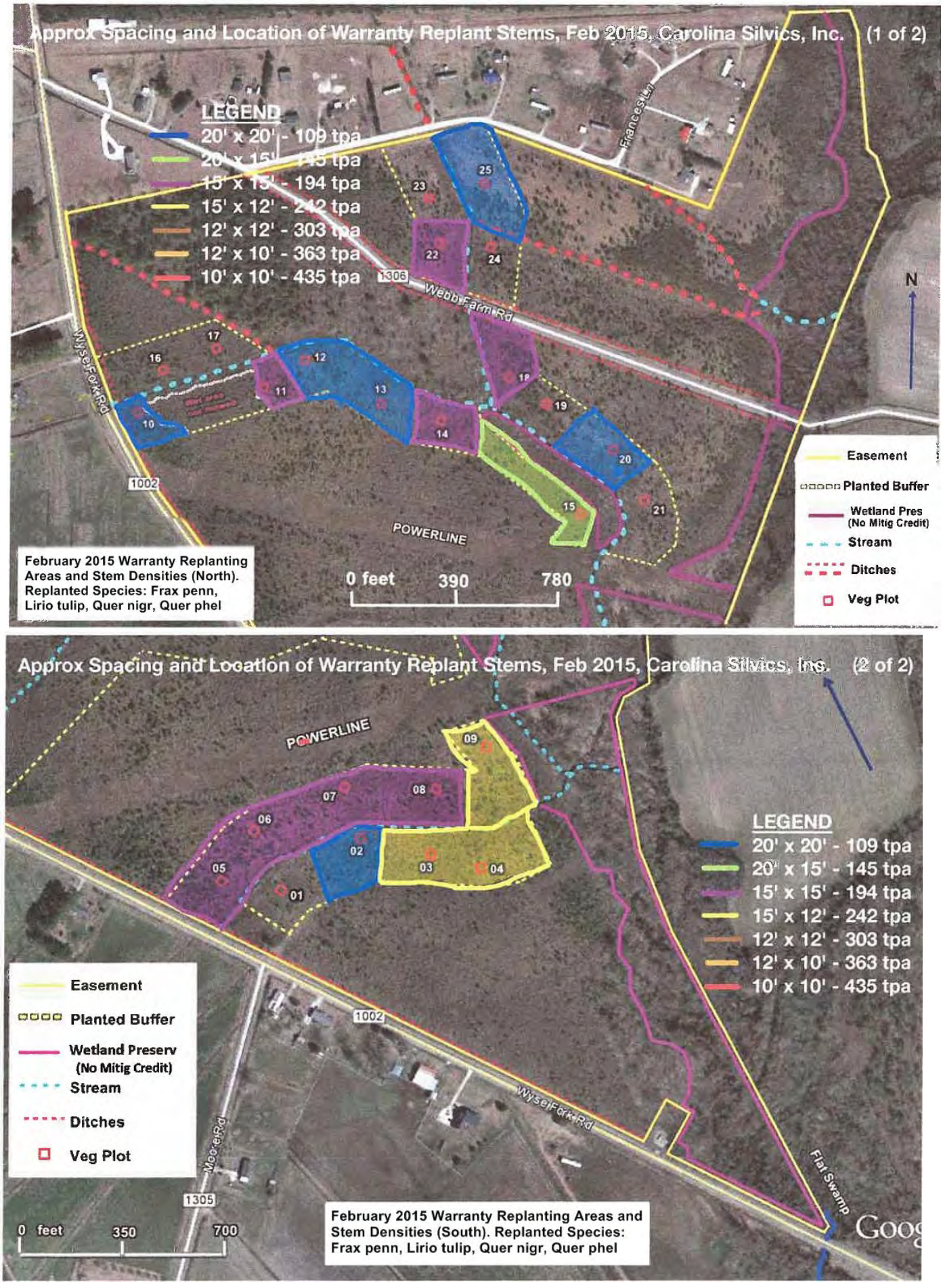


Figure П. Warranty Replanting Areas, February 2015: New trees: 1300 Liriodendron, 1900 Quercus, 600 Fraxinus.

Stallings Buffer Site (#357), Flat Swamp, Jones County

Table 6. CVS Vegetation Plot Data Summary MY-3 (Nov 2016)

CVS Plot #	Riparian Buffer Stems[1]	Stream/ Wetland Stems[2]	Live Stakes	Invasives	Volunteer Natives[3]	Planted + Vol Native Total[4]	Buffer Stem Density (per acre) & Success			
							Planted Stems Only		Planted + Volunteer	
							Riparian Buffer Density[1]	Success Criteria Met?	Total Stems Density[4]	Success Criteria Met?
0001	**6**	n/a	0	0	5	**11**	243	**no**	445	yes
0002	**4**	n/a	0	0	0	**4**	162	**no**	162	**no**
0003	**8**	n/a	0	0	3	**11**	324	yes	445	yes
0004	**2**	n/a	0	0	7	**9**	81	**no**	364	yes
0005	**5**	n/a	0	0	4	**9**	202	**no**	364	yes
0006	**3**	n/a	0	0	2	**5**	121	**no**	202	**no**
0007	**5**	n/a	0	0	5	**10**	202	**no**	405	yes
0008	**7**	n/a	0	0	6	**13**	283	**no**	526	yes
0009	**5**	n/a	0	0	3	**8**	202	**no**	324	yes
0010	**10**	n/a	0	0	1	**11**	405	yes	445	yes
0011	**3**	n/a	0	0	4	**7**	121	**no**	283	**no**
0012	**9**	n/a	0	0	7	**16**	364	yes	648	yes
0013	**8**	n/a	0	0	1	**9**	324	yes	364	yes
0014	**6**	n/a	0	0	2	**8**	243	**no**	324	yes
0015	**7**	n/a	0	0	3	**10**	283	**no**	405	yes
0016	**8**	n/a	0	0	4	**12**	324	yes	486	yes
0017	**9**	n/a	0	0	5	**14**	364	yes	567	yes
0018	**6**	n/a	0	0	1	**7**	243	**no**	283	**no**
0019	**7**	n/a	0	0	6	**13**	283	**no**	526	yes
0020	**6**	n/a	0	0	6	**12**	243	**no**	486	yes
0021	**9**	n/a	0	0	8	**17**	364	yes	688	yes
0022	**10**	n/a	0	0	2	**12**	405	yes	486	yes
0023	**14**	n/a	0	0	2	**16**	567	yes	648	yes
0024	**3**	n/a	0	0	1	**4**	121	**no**	162	**no**
0025	**8**	n/a	0	0	6	**14**	324	yes	567	yes
Project Avg	6.7				3.8	10.5	272		424	

Stem Class Characteristics **Project Success Criterion = 320 stems per acre**

[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, excluding *Morella* and *Baccharis* .

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

Stallings Buffer Site (#357), Flat Swamp, Jones County

Table 7. CVS Vegetation Plot Stem Counts & Density by Species and Year (Nov 2016)

			Current Plot Data (MY3 2016)																	
			357-01-0001			357-01-0002			357-01-0003			357-01-0004			357-01-0005			357-01-0006		
Scientific Name	Common Name	Growth Form	PnoLS	P-all	Tot	PnoLS	P-all	Tot	PnoLS	P-all	Tot	PnoLS	P-all	Tot	PnoLS	P-all	Tot	PnoLS	P-all	Tot
Acer negundo	Boxelder	Tree																		
Acer rubrum	Red maple	Tree															1			
Alnus serrulata	Hazel alder	Shrub																		
Diospyros virginiana	Persimmon	Tree																		
Fraxinus pennsylvanica	Green ash	Tree			1															
Ilex opaca	American holly	Tree																		
Ilex vomitoria	Yaupon holly	Shrub																		
Juniperus virginiana	Eastern redcedar	Tree																		
Liquidambar styraciflua	Sweetgum	Tree			3						2			4			3			2
Liriodendron tulipifera	Tuliptree	Tree													2	2	2	1	1	1
Nyssa sylvatica	Blackgum	Tree	1	1	1	1	1	1							1	1	1	2	2	2
Pinus taeda	Loblolly pine	Tree																		
Platanus occidentalis	American sycamore	Tree	5	5	6	3	3	3			1	1	1	3	2	2	2			
Prunus angustifolia	Chickasaw plum	Shrub												1						
Prunus serotina	Black cherry	Tree																		
Quercus spp	Oaks - unknown	Tree																		
Quercus nigra	Water oak	Tree																		
Quercus phellos	Willow oak	Tree							5	5	5									
Quercus rubra	Northern red oak	Tree							3	3	3	1	1	1						
Ulmus americana	American elm	Tree																		
unknown	unknown	Tree																		
Stem count			6	6	11	4	4	4	8	8	11	2	2	9	5	5	9	3	3	5
Plot size (ares)			1			1			1			1			1			1		
Plot size (acres)			0.02			0.02			0.02			0.02			0.02			0.02		
Species count			2	2	4	2	2	2	2	2	4	2	2	4	3	3	5	2	2	3
Stems per ACRE			243	243	445	162	162	162	324	324	445	81	81	364	202	202	364	121	121	202

Color codes for Plot Density & Success

Exceeds criteria by 10% or more	(352 or more)
Exceeds criteria by less than 10%	(320 - 351)
Fails criteria by less than 10%	(289 - 319)
Fails criteria by more than 10%	(288 or less)

PnoLS Stems per acre = Density & Success based on planted stems only.

Total Stems per acre = Density & Success based on planted + volunteer stems.

Stallings Buffer Site (#357), Flat Swamp, Jones County

Table 7. CVS Vegetation Plot Stem Counts & Density by Species and Year (Nov 2016)

Scientific Name	Common Name	Growth Form	357-01-0007			357-01-0008			357-01-0009			357-01-0010			357-01-0011			357-01-0012		
			PnoLS	P-all	Tot	PnoLS	P-all	Tot	PnoLS	P-all	Tot	PnoLS	P-all	Tot	PnoLS	P-all	Tot	PnoLS	P-all	Tot
Acer negundo	Boxelder	Tree																		
Acer rubrum	Red maple	Tree																		2
Alnus serrulata	Hazel alder	Shrub			1															
Diospyros virginiana	Persimmon	Tree																		
Fraxinus pennsylvanica	Green ash	Tree	1	1	1	2	2	2				2	2	2	1	1	1			
Ilex opaca	American holly	Tree																		
Ilex vomitoria	Yaupon holly	Shrub																		
Juniperus virginiana	Eastern redcedar	Tree																		
Liquidambar styraciflua	Sweetgum	Tree			2			3			2						3			3
Liriodendron tulipifera	Tuliptree	Tree			1	2	2	2										1	1	1
Nyssa sylvatica	Blackgum	Tree																		
Pinus taeda	Loblolly pine	Tree			1			2			1									2
Platanus occidentalis	American sycamore	Tree	4	4	4	2	2	2	1	1	1	2	2	2	2	2	2	5	5	5
Prunus angustifolia	Chickasaw plum	Shrub																		
Prunus serotina	Black cherry	Tree						1												
Quercus spp	Oaks - unknown	Tree																		
Quercus nigra	Water oak	Tree										1	1	1			1			
Quercus phellos	Willow oak	Tree										3	3	3				2	2	2
Quercus rubra	Northern red oak	Tree				1	1	1	4	4	4	2	2	2				1	1	1
Ulmus americana	American elm	Tree												1						
unknown	unknown	Tree																		
Stem count			5	5	10	7	7	13	5	5	8	10	10	11	3	3	7	9	9	16
Plot size (ares)			1			1			1			1			1			1		
Plot size (acres)			0.02			0.02			0.02			0.02			0.02			0.0247		
Species count			2	2	6	4	4	7	2	2	4	5	5	6	2	2	4	4	4	7
Stems per ACRE			202	202	405	283	283	526	202	202	324	405	405	445	121	121	283	364	364	647

Color codes for Plot Density & Success

Exceeds criteria by 10% or more	(352 or more)
Exceeds criteria by less than 10%	(320 - 351)
Fails criteria by less than 10%	(289 - 319)
Fails criteria by more than 10%	(288 or less)

PnoLS Stems per acre = Density & Success based on planted stems only.

Total Stems per acre = Density & Success based on planted + volunteer stems.

Stallings Buffer Site (#357), Flat Swamp, Jones County

Table 7. CVS Vegetation Plot Stem Counts & Density by Species and Year (Nov 2016)

Scientific Name	Common Name	Growth Form	357-01-0013			357-01-0014			357-01-0015			357-01-0016			357-01-0017			357-01-0018		
			PnoLS	P-all	Tot	PnoLS	P-all	Tot	PnoLS	P-all	Tot	PnoLS	P-all	Tot	PnoLS	P-all	Tot	PnoLS	P-all	Tot
Acer negundo	Boxelder	Tree																		
Acer rubrum	Red maple	Tree																		
Alnus serrulata	Hazel alder	Shrub																		
Diospyros virginiana	Persimmon	Tree																		
Fraxinus pennsylvanica	Green ash	Tree	2	2	2			1			1									
Ilex opaca	American holly	Tree												1						
Ilex vomitoria	Yaupon holly	Shrub																		
Juniperus virginiana	Eastern redcedar	Tree																		
Liquidambar styraciflua	Sweetgum	Tree			1			1			2			2			5			
Liriodendron tulipifera	Tuliptree	Tree				1	1	1	1	1	1							1	1	1
Nyssa sylvatica	Blackgum	Tree										1	1	1	1	1	1			
Pinus taeda	Loblolly pine	Tree												1						
Platanus occidentalis	American sycamore	Tree	3	3	3	1	1	1				4	4	4	2	2	2	1	1	1
Prunus angustifolia	Chickasaw plum	Shrub																		
Prunus serotina	Black cherry	Tree																		1
Quercus spp	Oaks - unknown	Tree													1	1	1			
Quercus nigra	Water oak	Tree				1	1	1	1	1	1	1	1	1						
Quercus phellos	Willow oak	Tree				2	2	2	4	4	4	1	1	1	3	3	3	1	1	1
Quercus rubra	Northern red oak	Tree	3	3	3	1	1	1	1	1	1	1	1	1	2	2	2	3	3	3
Ulmus americana	American elm	Tree																		
unknown	unknown	Tree																		
Stem count			8	8	9	6	6	8	7	7	10	8	8	12	9	9	14	6	6	7
Plot size (ares)			1			1			1			1			1			1		
Plot size (acres)			0.0247			0.0247			0.0247			0.0247			0.0247			0.0247		
Species count			3	3	4	5	5	7	4	4	6	5	5	8	5	5	6	4	4	5
Stems per ACRE			324	324	364	243	243	324	283	283	405	324	324	486	364	364	567	243	243	283

Color codes for Plot Density & Success

Exceeds criteria by 10% or more	(352 or more)
Exceeds criteria by less than 10%	(320 - 351)
Fails criteria by less than 10%	(289 - 319)
Fails criteria by more than 10%	(288 or less)

PnoLS Stems per acre = Density & Success based on planted stems only.

Total Stems per acre = Density & Success based on planted + volunteer stems.

Stallings Buffer Site (#357), Flat Swamp, Jones County

Table 7. CVS Vegetation Plot Stem Counts & Density by Species and Year (Nov 2016)

Scientific Name	Common Name	Growth Form	357-01-0019			357-01-0020			357-01-0021			357-01-0022			357-01-0023			357-01-0024		
			PnoLS	P-all	Tot	PnoLS	P-all	Tot	PnoLS	P-all	Tot	PnoLS	P-all	Tot	PnoLS	P-all	Tot	PnoLS	P-all	Tot
Acer negundo	Boxelder	Tree																		
Acer rubrum	Red maple	Tree									2									1
Alnus serrulata	Hazel alder	Shrub																		
Diospyros virginiana	Persimmon	Tree						4												
Fraxinus pennsylvanica	Green ash	Tree	1	1	1						1									
Ilex opaca	American holly	Tree									1									
Ilex vomitoria	Yaupon holly	Shrub															1			
Juniperus virginiana	Eastern redcedar	Tree												1						
Liquidambar styraciflua	Sweetgum	Tree									1									
Liriodendron tulipifera	Tuliptree	Tree				1	1	1				1	1	1						
Nyssa sylvatica	Blackgum	Tree	1	1	1	1	1	1				2	2	2	2	2	2			
Pinus taeda	Loblolly pine	Tree												1			1			
Platanus occidentalis	American sycamore	Tree			6			2	2	2	3	6	6	6				1	1	1
Prunus angustifolia	Chickasaw plum	Shrub																		
Prunus serotina	Black cherry	Tree									2									
Quercus spp	Oaks - unknown	Tree																		
Quercus nigra	Water oak	Tree							2	2	2							1	1	1
Quercus phellos	Willow oak	Tree	1	1	1				1	1	1	1	1	1	2	2	2			
Quercus rubra	Northern red oak	Tree	4	4	4	4	4	4	4	4	4				10	10	10	1	1	1
Ulmus americana	American elm	Tree																		
unknown	unknown	Tree																		
Stem count			7	7	13	6	6	12	9	9	17	10	10	12	14	14	16	3	3	4
Plot size (ares)			1			1			1			1			1			1		
Plot size (acres)			0.0247			0.0247			0.0247			0.0247			0.0247			0.0247		
Species count			4	4	5	3	3	5	4	4	9	4	4	6	3	3	5	3	3	4
Stems per ACRE			283	283	526	243	243	486	364	364	688	405	405	486	567	567	647	121	121	162

Color codes for Plot Density & Success

Exceeds criteria by 10% or more	(352 or more)
Exceeds criteria by less than 10%	(320 - 351)
Fails criteria by less than 10%	(289 - 319)
Fails criteria by more than 10%	(288 or less)

PnoLS Stems per acre = Density & Success based on planted stems only.

Total Stems per acre = Density & Success based on planted + volunteer stems.

Stallings Buffer Site (#357), Flat Swamp, Jones County

Table 7. CVS Vegetation Plot Stem Counts & Density by Species and Year (Nov 2016)

						Annual Means														
			357-01-0025			MY5 (2018)			MY4 (2017)			MY3 (2016)			MY2 (2015)			MY1 (2014)		
Scientific Name	Common Name	Growth Form	PnoLS	P-all	Tot	PnoLS	P-all	Tot	PnoLS	P-all	Tot	PnoLS	P-all	Tot	PnoLS	P-all	Tot	PnoLS	P-all	Tot
Acer negundo	Boxelder	Tree																		2
Acer rubrum	Red maple	Tree												6			1			
Alnus serrulata	Hazel alder	Shrub												1						
Diospyros virginiana	Persimmon	Tree												4						
Fraxinus pennsylvanica	Green ash	Tree	1	1	1							10	10	14			8			
Ilex opaca	American holly	Tree												2						1
Ilex vomitoria	Yaupon holly	Shrub												1						
Juniperus virginiana	Eastern redcedar	Tree												1						
Liquidambar styraciflua	Sweetgum	Tree												39			23			24
Liriodendron tulipifera	Tuliptree	Tree										11	11	12	19	19	19	25	25	25
Nyssa sylvatica	Blackgum	Tree	3	3	3							16	16	16	16	16	16	25	25	25
Pinus taeda	Loblolly pine	Tree												9			5			6
Platanus occidentalis	American sycamore	Tree	3	3	3							49	49	62	59	59	65	73	73	89
Prunus angustifolia	Chickasaw plum	Shrub												1						
Prunus serotina	Black cherry	Tree			6									11						14
Quercus spp	Oaks - unknown	Tree										1	1	1	2	2	2	3	3	3
Quercus nigra	Water oak	Tree										6	6	7	2	2	2	1	1	1
Quercus phellos	Willow oak	Tree	1	1	1							27	27	27	26	26	27	23	23	23
Quercus rubra	Northern red oak	Tree										46	46	46	41	41	41	51	51	52
Ulmus americana	American elm	Tree												1						
unknown	unknown	Tree													4	4	4	1	1	1
Stem count			8	8	14							166	166	261	169	169	213	202	202	266
Plot size (ares)			1									25			25			25		
Plot size (acres)			0.0247									0.6178			0.6178			0.6178		
Species count			4	4	5							8	8	19	8	8	12	8	8	13
Stems per ACRE			324	324	567							269	269	422	274	274	345	327	327	431

Color codes for Plot Density & Success

Exceeds criteria by 10% or more	(352 or more)
Exceeds criteria by less than 10%	(320 - 351)
Fails criteria by less than 10%	(289 - 319)
Fails criteria by more than 10%	(288 or less)

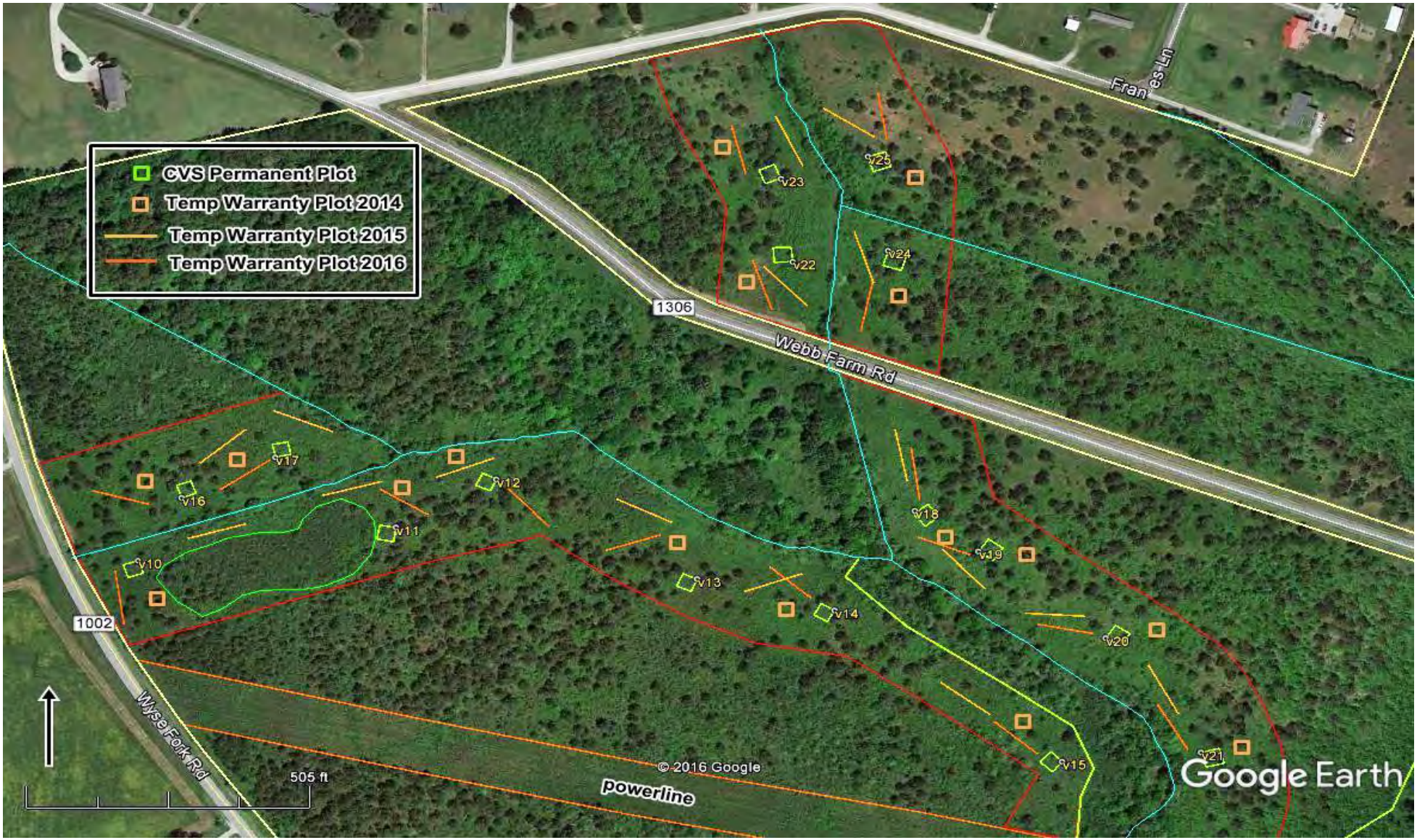
PnoLS Stems per acre = Density & Success based on planted stems only.

Total Stems per acre = Density & Success based on planted + volunteer stems.

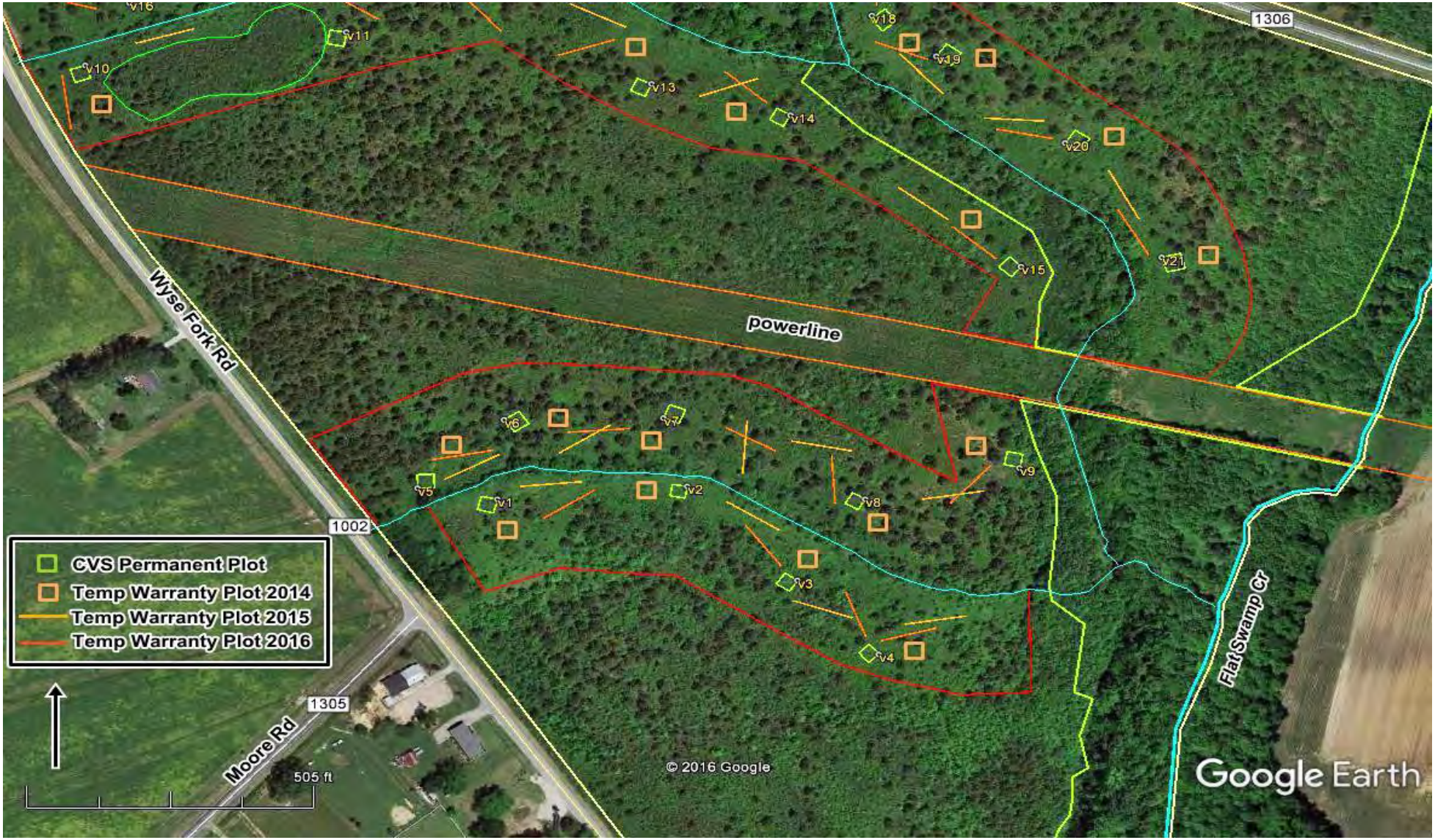
Table 8. Temporary Warranty Plots - Planted Tree Counts
Stallings Buffer Site (#357) -- Flat Swamp, Neuse 03020204

Temporary Warranty Plots (100 m2): Planted Trees							
		Sep-2014: MY-1		Sep-2015: MY-2		Nov-2016: MY-3	
Temp		plot size:	10 x 10 m	plot size:	108 x 10 ft	plot size:	108 x 10 ft
Plot #		# trees	trees/ac	# trees	trees/ac	# trees	trees/ac
1		4	162	4	162	8	324
2		3	121	3	121	3	121
3		4	162	3	121	3	121
4		4	162	5	202	2	81
5		5	202	3	121	6	243
6		2	81	6	243	1	40
7		2	81	3	121	4	162
8		6	243	4	162	7	283
9		4	162	2	81	10	405
10		5	202	5	202	4	162
11		5	202	6	243	5	202
12		4	162	6	243	3	121
13		1	40	3	121	4	162
14		4	162	7	283	6	243
15		2	81	5	202	4	162
16		8	324	4	162	3	121
17		1	40	3	121	1	40
18		2	81	2	81	3	121
19		2	81	6	243	5	202
20		2	81	4	162	4	162
21		5	202	5	202	0	0
22		3	121	9	364	6	243
23		1	40	6	243	4	162
24		4	162	5	202	7	283
25		3	121	6	243	5	202
ave		3.44	139	4.60	186	4.32	175

- 2014 and 2015 Warranty Plot data includes tree species planted in 2014 only: Liriodendron, Platanus, Nyssa, and Quercus.
- Other native volunteer trees noted (not counted) in Temp Plots include: Acer, Fraxinus, Ulmus, Celtis, Salix, Prunus, Liquidambar, Diospyros, Pinus, Juglans.
- 600 Fraxinus were planted in Feb 2015. We did not receive the re-planting list until after the fall field survey, so planted Fraxinus were not counted in 2015.
- In 2016 Liriodendron, Platanus, Nyssa, Quercus, and Fraxinus were counted.
- Baccharis and Myrica are abundant throughout the project and in all plots.
- See Attached Figure for locations of Temporary Warranty Plots 2014- 2016.



Stallings Site #357: Northern Half, CVS Vegetation Plots 10 through 25. Warranty Plot numbers correspond to their adjacent CVS Plot.



Stallings Site #357: Southern Half, CVS Vegetation Plots 1 through 9. Warranty Plot numbers correspond to their adjacent CVS Plot.

108' x 10'	Planted Species - Nov 2016					Native Volunteer Species - Nov 2016						Total Trees	
Temp VP	Liriod	Platan	Nyssa	Querc	Fraxi	Liquid	Acer	Prunus	Ulmus	Salix	Diospy	All Spp	Planted
1		6			2	4	2					14	8
2		3						1				4	3
3		3				2			1			6	3
4	1	1				1						3	2
5		6				6						12	6
6					1	4						5	1
7	3	1				5						9	4
8		2		5		10						17	7
9			1	9		7						17	10
10	1	1		2		3	2					9	4
11	1	3		1		5						10	5
12		2		1		8						11	3
13	1	1		1	1	5						9	4
14		6				1						7	6
15		2		2		3						7	4
16	1	1			1	6						9	3
17		1				4	1			1		7	1
18				1	2	1	2				1	7	3
19				5		2	3					10	5
20		2		2		3		1	1			9	4
21							2			2		4	0
22		6								2		8	6
23				4		2	1	3				10	4
24		5	1		1			4				11	7
25		3		1	1		1	3	1		1	11	5
											Average:	9.0	4.3

Stallings Site #357: Temporary Warranty Plots, Nov 14-16, 2016. Planted Species and Volunteer Species in 108 ft x 10 ft strip plots.