

WELLS CREEK #2 -- DMS #92688
Alamance County NC – Cape Fear River HUC# 03030002-050050
MY-5 (2015) Annual Monitoring Report

North Carolina Department of Environmental Quality
Division of Mitigation Services (DENR-DMS) -- Contract # 5714

Data Collected: Sep 2015

Final Report Submitted: Dec 2015



NC Division of Mitigation Services
1652 Mail Service Center
Raleigh, NC 27699-1652

Project Manager: Lindsay Crocker

Table of Contents

1.0. Project Summary	3
1.1. Project Setting & Pre-Restoration Conditions	3
1.2. Project Goals & Objectives.....	3
1.3. Project Approach, Components, and Mitigation Assets	4
1.4. Project Success Criteria	4
2.0. Monitoring Results: 2015	5
2.1. Stream Conditions.....	5
2.2. Vegetation Conditions	5
2.3. Conservation Easement Conditions	6
3.0. References	7

Figure 1. Project Vicinity Map and Directions

Appendix A. Project Background Tables

- Table 1. Project Mitigation Components
- Table 2. Project Activity and Reporting History
- Table 3. Project Contacts Table
- Table 4. Project Attributes Table

Appendix B. Visual Assessment Data

- Figure 2. Current Conditions Plan View (CCPV)
- Table 5. Vegetation Condition Visual Assessment
- Figure 3. Permanent Photo-points
- Figure 4. Vegetation Monitoring Plot Photos

Appendix C. Vegetation Plot Monitoring Data

- Table 6. CVS Plot Mitigation Success Summary
- Table 7. CVS Plot Stem Counts, Total and Planted by Species and Year
- e-Tables. CVS Plot Vegetation Raw Data Sheets Scanned



Robert J. Goldstein & Associates, Inc.
1221 Corporation Parkway, suite 100
Raleigh NC 27610 --- 919-872-1174
Project Manager: Gerald Pottern
gpottern@RJGAcarolina.com

a subsidiary of
MOGENSEN MITIGATION INC.
 P O Box 690429 Charlotte, NC 28227
 704-576-1111 rich@mogmit.com

1.0. Project Summary

1.1. Project Setting & Pre-Restoration Conditions

Wells Creek #2 (EEP Project # 92688) is a stream mitigation project located near Snow Camp in southwestern Alamance County, NC, in the Carolina Slate Belt region (Figure 1.0). The project consists of two separate parcels: 1) The Northern Reach (stream enhancement) is located along Wells Creek upstream and downstream of Carl Noah Road and along tributary UT3. The Southern Reach (stream preservation) is located along Wells Creek tributaries UT1 and UT2 downstream of Longest Acres Road, 4000 feet southwest of the Northern Reach. The stream segments immediately downstream of each project reach along Wells Creek and UT1 were previously restored (NCEEP project #414, Wells Creek). Tributary UT1 flows into Wells Creek approximately 2,000 feet downstream of the Southern Reach, just north of Beale Road. From there, Wells Creek flows southeast into Cane Creek, which in turn flows eastward into the Haw River upstream of Jordan Lake.

Wells Creek on the Northern Reach parcel is an 8- to 15-foot wide perennial stream with a mixed substratum of bedrock, cobble, gravel, sand, and silt, and low to moderate channel incision. Its tributary UT3 is intermittent, with a substratum of cobble, sand, and silt/mud, and is moderately incised toward the lower end. The banks along both streams are mostly forested with large hardwood trees, but the riparian areas were trampled and heavily grazed by cattle and hogs, with little understory or groundcover vegetation between the canopy trees prior to project implementation in 2009-2010. Rooting activity by hogs in and adjacent to UT3 had destabilized the stream banks and bed, causing frequent high turbidity and sediment load in this stream and in the Wells Creek segment downstream of UT3.

Unnamed tributary UT1 on the Southern Reach parcel is a 6- to 12-foot wide perennial stream with a rocky substratum, meandering pattern, and minimal channel incision. UT2 is a 5-foot wide intermittent stream with a cobble and clay dominated bed, moderately incised. Only the lowermost 50-ft segment of this stream is within the project easement. Like the Northern Reach, both streams in this area have mature hardwood forest along most of their banks. Minor understory damage and bank trampling by cattle or hogs was present prior to project implementation.

1.2. Project Goals & Objectives

The Wells Creek #2 project is in Cape Fear River Basin HUC #03030002-050050, designated as a Targeted Local Watershed in the 2009 Cape Fear River Basin Restoration Priority report. The goals of the project are to improve and protect stream bank stability, water quality and riparian habitat. To achieve these goals, the project has the following objectives:

- Reduce direct nutrient loading and fecal coliform inputs into the streams by fencing out cattle and hogs and providing an alternative livestock water system;
- Reduce excess sedimentation into the streams by eliminating livestock impacts from hoof shear to forest floor and stream banks;

- Reestablish and enhance native forested buffers by planting native plants, removing invasive exotic vegetation, and preventing future negative impacts within the buffer;
- Increase surface runoff infiltration and non-point pollutant removal through the buffer, and preserve existing well-established riparian plant communities.

1.3. Project Approach, Components, and Mitigation Assets

Mitigation components for the project include 1,897 feet of stream enhancement (EII) and 1,616 feet of stream preservation, providing 1,082 stream mitigation units (SMU) assets. Total conservation easement area is 12.14 acres. Farm BMPs installed in December 2009 at the Northern Reach include 2,610 feet of cattle exclusion fencing, 1,958 feet of hog exclusion fencing, two troughs and water lines for cattle and two troughs and water lines for pigs. Farm BMPs at the Southern Reach consist of 683 feet of cattle exclusion fencing.

Patches of invasive exotic weeds (mainly *Ligustrum sinense* and *Rosa multiflora*) along both reaches received herbicide treatments in August 2010 and again in May 2011. The Northern Reach (enhancement areas) received tree and shrub plantings in non-forested (former pasture) areas along Wells Creek south of Carl Noah Rd, and understory shrubs were planted beneath the forest canopy along UT3 where livestock had destroyed nearly all of the understory. Planting was done between Nov 2010 and Apr 2011, using existing plant communities along UT1 (Piedmont Alluvial Forest, Mesic Mixed Hardwood Forest, and Dry-Mesic Oak-Hickory Forest) as a reference for tree and shrub species selection (Schafale and Weakley 1990). Non-forested areas were planted at a density of 436 stems/acre with potted stock. Areas with mature canopy were planted with understory shrubs to achieve 436 stems/acre total density of existing and planted vegetation. Stream banks along UT3 were planted at a density of 681 stems/acre within 10 feet of the channel. Additional wetland shrubs and herbs were planted in a muddy hog-wallow area along UT3.

1.4. Project Success Criteria

Wells Creek #2 success criteria are based on vegetation survival, success of livestock exclusion, and invasive treatment success as evidenced by a visual assessment, and documented through permanent photo points.

Quantitative survival and growth data for planted woody stems are collected from two CVS monitoring plots established along Wells Creek in the Northern Reach (Figure 1.1). Following the 2003 USACE Stream Mitigation Guidelines, vegetation success in the riparian buffer will be based upon an average density of 320 stems per acre at the end of three years of monitoring. A tolerance of 10% mortality rate will be acceptable for year four (288 stems/acre) and year five (260 stems/acre) (USACE 2003).

2.0. Monitoring Results: 2015

2.1. Stream Conditions

No stream-bank instability problem or significant loss of riparian vegetation was observed along Wells Creek, UT1 or UT2 during the Apr 30 and Sep 22, 2015 site visits. These stream segments appeared unchanged from last year's observations. The stream pattern adjustment noted in 2014 along the upper reach of UT3 (in response to fallen trees during a 2013-14 winter storm) appears stable. The lower end of UT3 near its confluence with Wells Creek remains incised with steep and sparsely wooded banks, similar to its pre-project condition (as reported in previous years), but does not appear to have eroded further since the 2011 baseline report. The livestock exclusion fence in this area is close to the stream bank, which limits the potential for woody vegetation recovery along this bank segment.

2.2. Vegetation Conditions

CVS Plots: The two CVS vegetation monitoring plots met the project success criteria for year 5, with 405 and 567 (average = 486) surviving planted stems per acre. However, many trees showed minimal growth and fair to poor vigor, especially in VP-1, perhaps due to low rainfall during Mar to May. Native volunteer woody seedlings are abundant in both plots, and average density of planted plus native volunteer stems was 2104 stems per acre in 2015. Growth Invasive *Lespedeza cuneata* along the western edge of plot 2 and some adjacent enhancement areas appears similar in extent and density to 2014 conditions, but is not widespread in the project area.

Enhancement Areas Beyond CVS Plots: Based on visual assessment of the former pasture areas along Wells Creek outside of the CVS plots, planted woody stem survival and native volunteer recruitment appears to be good throughout the enhancement area, despite dense growth of tall grasses and herbaceous weeds. Visual assessment of the understory enhancement area along UT3 revealed fair survival and growth of the planted shrubs, likely due to dense forest canopy in this area. Some shrubs may have been buried or crushed under fallen trees during the 2013-14 winter storm, but canopy gaps created may increase future growth rates of the remaining shrubs (mainly buckeye, pawpaw, and spicebush). Invasive *Microstegium* grass is abundant throughout the UT3 enhancement area and along the nearby lower segment of Wells Creek, under forest canopy. Volunteer tree seedlings are also numerous in these areas, primarily green ash and sweetgum.

Preservation Areas: Portions of the Northern Reach along Wells Creek, including the forested segment north of Carl Noah Rd, have patches of multiflora rose (*Rosa multiflora*), Chinese privet (*Ligustrum sinense*), and Japanese honeysuckle (*Lonicera japonica*), despite herbicide treatments in 2010-2011. These weedy species are abundant along adjacent roadsides and powerlines beyond the conservation easement. The Southern Reach also has patches of invasive *Ligustrum* and *Rosa* both within and adjacent to the conservation easement, mainly at the upper and lower ends where these weeds are common along roadsides and pasture edges. They do not pose a threat to forest canopy trees. Invasive species patches are mapped in the CCPV figures, and are unchanged since last year.

2.3. Conservation Easement Conditions

Wells Creek Main Stem (Northern Reach): At the two cattle crossings on Wells Creek south of Carl Noah Rd, the fencing wire remains disengaged from the fence posts in some areas, as noted in previous years reports. However, the crossing ends are blocked with electric wires so that cattle do not have access to these crossings except under controlled conditions. Fence wires broken by falling trees or large limbs are an ongoing issue, but the landowner has kept up with repairs along segments where cattle might gain access. Farm manager Jan Nirri reported in Sep 2015 that she had removed stray calves on a few occasions from the Wells Creek main stem conservation easement. During the Apr and Sep 2015 monitoring visits we found no apparent livestock encroachment or damage to planted stems in the conservation area. The Wells Creek preservation segment north of Carl Noah Rd is not fenced, but no livestock are kept adjacent to this area.

Wells Creek UT3 (Northern Reach): Livestock exclusion fencing surrounding the UT-3 enhancement area was intact during the spring and fall 2015 monitoring visits, and we found no recent evidence of livestock encroachment or damage in this area.

Wells Creek UT1 & UT2 (Southern Reach): Livestock exclusion fencing along the northeast and southeast boundaries of the Southern Reach was intact during the spring and fall 2015 monitoring visits, and we found no recent evidence of livestock encroachment or damage in the preservation area. A gap under the fence is present where it crosses UT-2 (as reported in previous years), but the existing fence appears adequate to exclude cattle. Hogs are no longer kept on the property. There is no fence along the roadside (Longest Acres Rd) or along the southwest easement boundary, which is bordered by forest.

3.0. References

Griffith, G.E., Omernik, J.M., Comstock, J.A., Schafale, M.P., McNab, W.H., Lenat, D.R., and MacPherson, T.F. 2002. Ecoregions of North Carolina. U.S. Environmental Protection Agency, Corvallis, OR.

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 Division of Land Resources, 1985. Geologic map of North Carolina. North Carolina Geological Survey. Department of Natural Resources and Community Development, Raleigh, NC.

NC Division of Water Quality, 2005. Cape Fear River Basinwide Assessment Report, June 2005. North Carolina Division of Water Quality, N.C. Department of Environment and Natural Resources, Water Quality Planning Section, Raleigh, NC.

NC Ecosystem Enhancement Program, 2009. Cape Fear River Basin Restoration Priorities 2009. N.C. DENR-EEP, Raleigh, NC.

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.

Schafale, M.P., and A.S. Weakley. 1990. Classification of the natural communities of North Carolina, third approximation. N.C. Natural Heritage Program, Raleigh, NC.

Weakley, Alan (2011). *Flora of the Carolinas, Virginia, Georgia, and Surrounding Areas*. downloaded December 2011 from: <http://www.herbarium.unc.edu/flora.htm>.

USDA Natural Resources Conservation Service, 2007. Web Soil Survey—Alamance County. Available at: <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>.

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

Appendix A. Project Vicinity Map and Background Tables

Figure 1.0.	Project Vicinity Map and Directions
Table 1.A.	Project Restoration Components
Table 1.B.	Project Component Summations
Table 2.0	Project Activity and Reporting History
Table 3.0	Project Contacts Table
Table 4.0	Project Attributes Table

Figure 1. Project Vicinity Map: Wells Creek #2 Stream Preservation and Enhancement, Alamance County NC

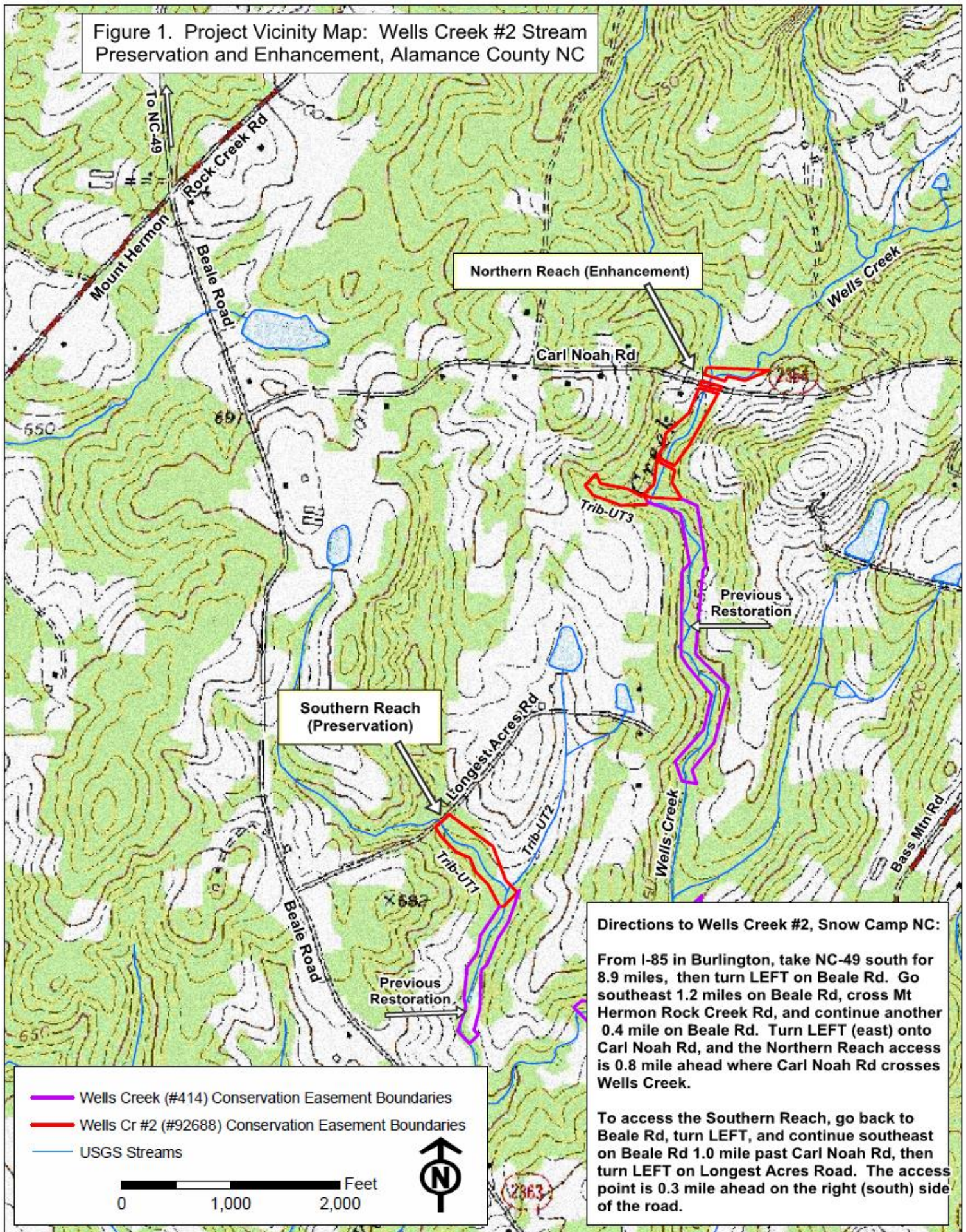


Table 1A. Project Components: Wells Creek #2 (EEP #92688)								
Project Reach ID	Existing Length (ft)	Approach Level	Mitigation Length (ft)	Stationing ⁺	Mitigat Ratio	Stream Mitigat Units	BMP Elements ¹	Comment
Wells Creek - Preservation	438	P	438	00+00 to 04+38	5:1	87	CF, WS	Invasive vegetation treatment,
Wells Creek - Enhancement	1321	E2	1253*	04+98 to 18+19	2.5:1	501	CF, WS	Invasive vegetation treatment,
UT 3 - Enhancement	644	E2	644	00+00 to 06+44	2.5:1	258	CF, WS	Invasive vegetation treatment,
UT1 - Preservation	1130	P	1130	00+00 to 11+30	5:1	226	CF	Invasive vegetation treatment
UT2 - Preservation	48	P	48	00+00 to 00+48	5:1	10	CF	Invasive vegetation treatment

¹ = BR = Bioretention Cell; SF = Sand Filter; SW = Stormwater Wetland; WDP = Wet Detention Pond; O = Other; DDP = Dry Detention Pond; FS = Filter Strip; Grassed Swale = S; LS = Level Spreader; NI = Natural Infiltration Area, CF = Cattle Fencing; WS = Watering System; CH = Livestock Housing

⁺ Stationing is based on stream length measurements in ArcGIS, upstream to downstream for each reach.

* Wells Creek enhancement reach mitigation excludes two cattle crossings and Carl Noah Road crossing.

Table 1B. Component Summations: Wells Creek #2 (EEP #92688)							
Restoration Level	Stream Length (ft)	Riparian Wetland (ac)		Mitigation Length (ft)	Station ⁺	Buffer (acres)	BMP's
		Riverine	Non-Riverine				
Restoration							
Enhancement							
Enhancement I							
Enhancement II	1897						
Creation							
Preservation	1616						
HQ Preservat							
	3513						
MU Totals	1082						

Table 2. Project Activity and Reporting History
Wells Creek #2 (#92688) - Monitoring Year 5 (2015)

Elapsed Time Since Grading Complete: n/a
Elapsed Time Since Planting Complete: 5 years, 2 mo
Number of Reporting Years¹: 5

Activity or Deliverable	Data Collection Complete	Completion or Delivery
Permanent Conservation Easement Executed & Recorded	n/a	December 31, 2008
Cattle Exclusion Fencing & Livestock Watering System	n/a	December 2009
Final Design – Construction Plans	January 2010	April 2010
Planting	n/a	November 2010
Invasive Exotic Vegetation Treatments	n/a	Nov 2010, May 2011
MY0 As-built Survey & Baseline Report	May 2011	June 2011
Monitoring Year 1 Report	September 2011	September 2011
Monitoring Year 2 Report	September 2012	March 2013
Monitoring Year 3 Report	October 2013	November 2013
Monitoring Year 4 Report	October 2014	March 2015
Monitoring Year 5 Report	September 2015	November 2015
Final Closeout Report		

* *Saururus cernuus* and *Lobelia cardinalis* planted within UT3 wetland seep in May 2011.

Table 3. Project Contacts: Wells Creek #2 (#92688)

Designer	Robert J. Goldstein & Associates 1221 Corporation Parkway, suite 100 Raleigh, NC 27610 Design POC - Gerald Pottern, Sean Doig, (919) 872-1174
Farm BMPs Design	Alamance County SWCD Burlington NC POC - Phil Ross, (336) 228-1753
Planting / Invasives Contractor	Habitat Assessment and Restoration Program 301 McCullough Drive, 4 th Floor Charlotte, NC 28262 POC - Karri Blackmon, (704) 841-2841
Nursery Stock Suppliers	Cure Nursery, 919-542-6186 Parks Seed, 800-845-3369 Coastal Plain Conservation Nursery, 252-482-5707 Habitat And Restoration Plants (HARP), 704-841-2841
Monitoring Firm	Robert J. Goldstein & Associates 1221 Corporation Parkway, suite 100 Raleigh, NC 27610 Monitoring POC - Gerald Pottern, (919) 872-1174

Table 4. Project Attributes Wells Creek #2 -- EEP#92688		
Project County	Alamance	
Physiographic Region	Piedmont	
Ecoregion	Carolina Slate Belt	
Project River Basin	Cape Fear	
USGS HUC for Project (14 digit)	3030002-050050	
NCDWQ Sub-basin for Project	Cape Fear 03-06-04	
Within extent of EEP Watershed Plan?	2009 Cape Fear River Basin Restoration Priority Report	
WRC Hab Class (Warm, Cool, Cold)	Warm	
% of project easement fenced or demarcated	100%	
Beaver activity observed during design phase?	No	
Restoration Component Attribute Table		
	Preservation	Enhancement
Drainage area	377 acres	958 acres
Stream order	1	1
Restored length (feet)	n/a	n/a
Perennial or Intermittent	Perennial	Intermittent/Perennial
Watershed type (Rural, Urban, Developing etc.)	Rural	Rural
Watershed LULC Distribution (e.g.)		
Residential	4	4
Ag-Row Crop	2	0
Ag-Livestock	57	21
Forested	28	73
Etc.	9	2
Watershed impervious cover (%)	2	2
NCDWQ AU/Index number	16-28-1	16-28-1
NCDWQ classification	C-NSW	C-NSW
303d listed?	No	No
Upstream of a 303d listed segment?	No	No
Reasons for 303d listing or stressor	n/a	n/a
Total acreage of easement	4.62	7.52
Total vegetated acreage within the easement	4.62	6.07
Total planted acreage as part of the restoration	0	3.14 ac (includes shrub planting beneath canopy)
Rosgen classification of pre-existing	n/a	n/a
Rosgen classification of As-built	n/a	n/a
Valley type	n/a	n/a
Valley slope	n/a	n/a
Valley side slope range (e.g. 2-3.%)	n/a	n/a
Valley toe slope range (e.g. 2-3.%)	n/a	n/a
Cowardin classification	n/a	n/a
Trout waters designation	n/a	n/a
Species of concern, endangered etc.? (Y/N)	N	N
Dominant soil series and characteristics		
Series	Colfax	Colfax
Depth	65	65
Clay%	19	19
K	0.17	0.17
T	4	4

Use N/A for items that may not apply. Use "--" for items that are unavailable and "U" for items that are unknown

Appendix B. Visual Assessment Data

Figure 2.1.-2.2	Current Conditions Plan View
Table 5.	Vegetation Condition Assessment
Figure 3.1-3.8	Permanent Stream Photopoints
Figure 4.	Vegetation Monitoring Plot Photos

Figure 2.1. Current Conditions Plan View, Sep 2015 (MY5): Northern Reach (Enhancement): Wells Creek#2, DMS#92688, Alamance Co.

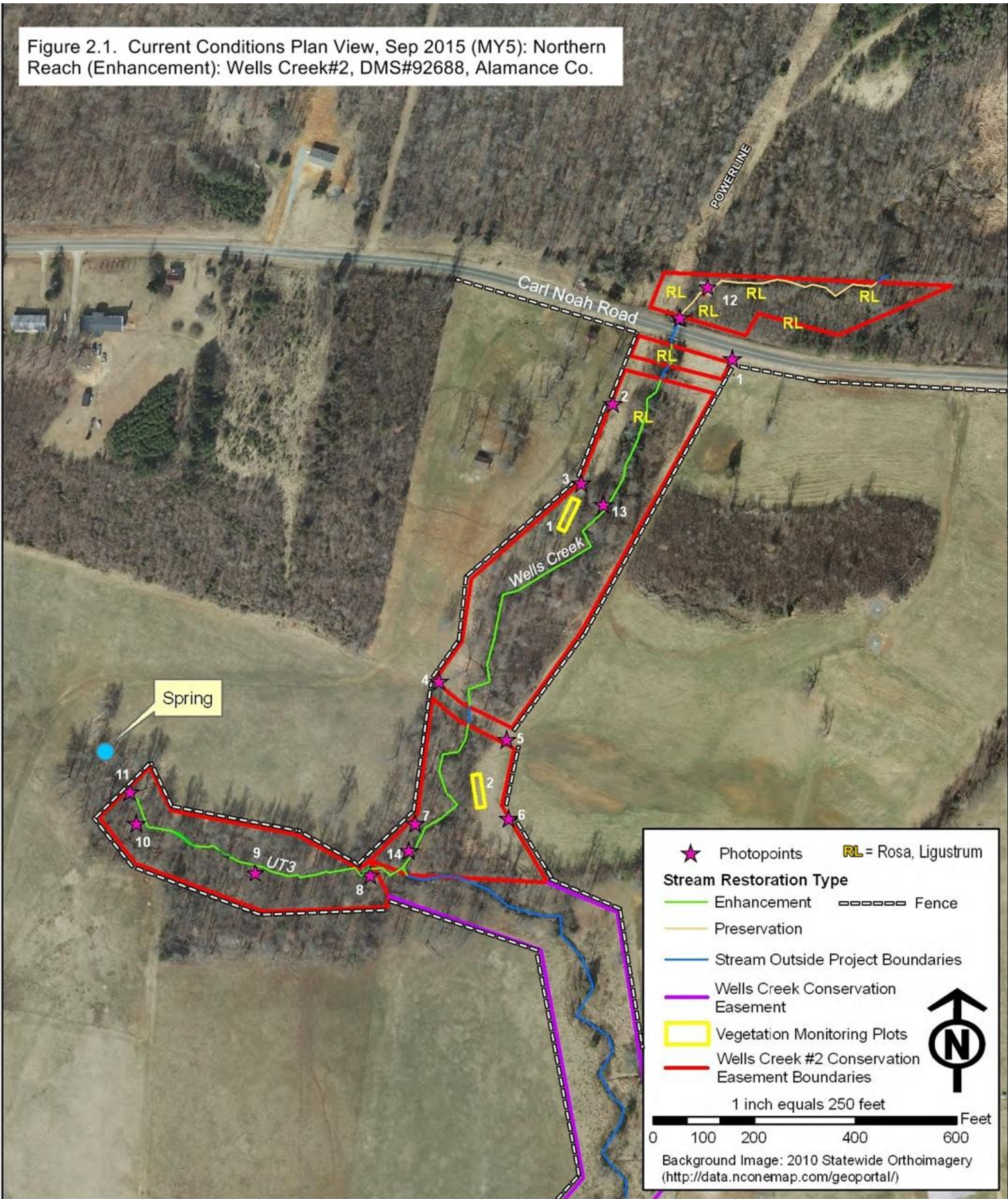


Figure 2.2. Current Conditions Plan View, Sep 2015 (MY5): Southern Reach (Preservation): Wells Creek#2, DMS#92688, Alamance Co.

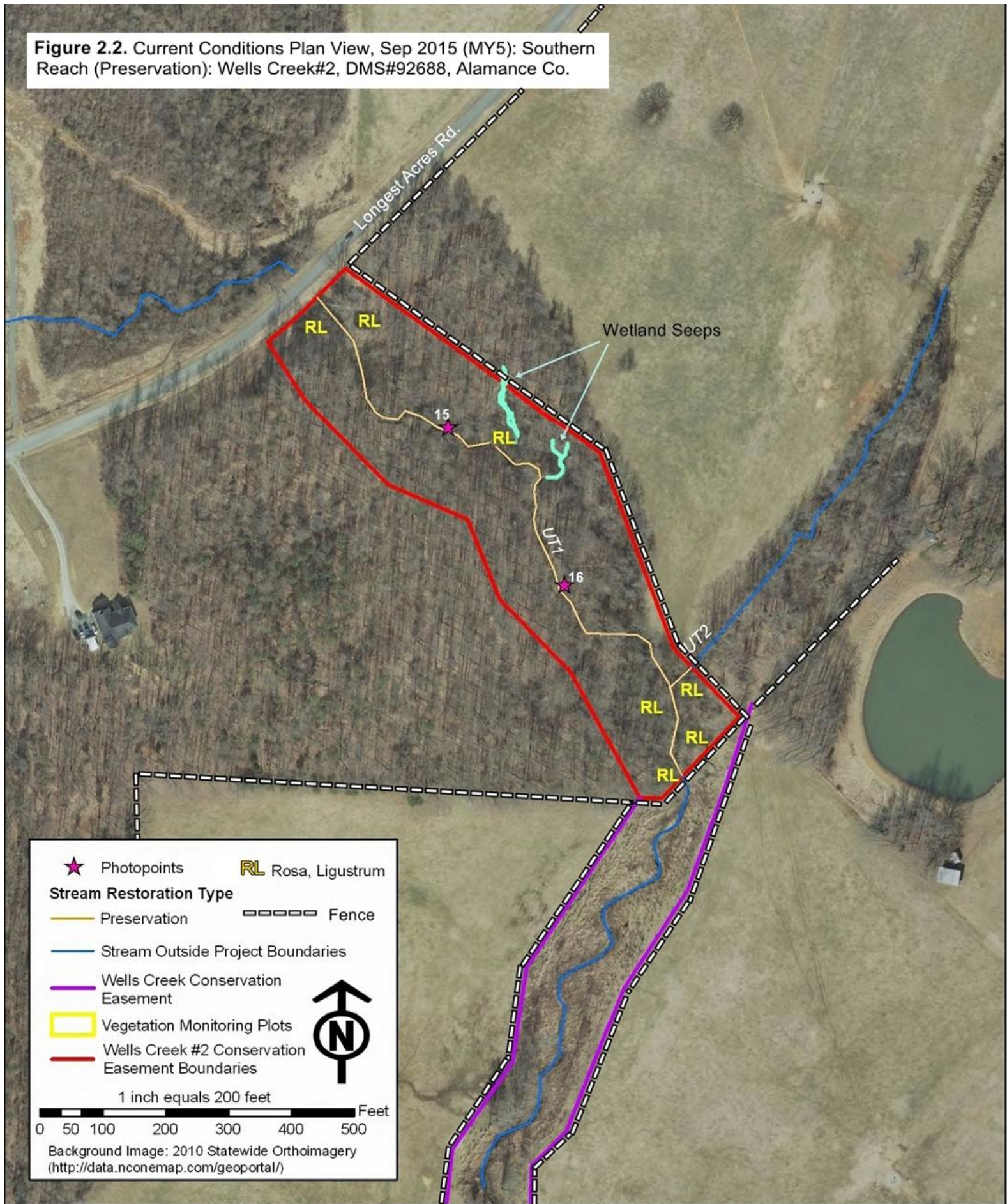


Table 5. Vegetation Visual Assessment - Wells Creek #2 (#92688) - Monitoring Year 5 (2015)

Planted Acreage ¹		3.14				
Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage
1. Bare Areas	Very limited cover of both woody and herbaceous material.	0.1 acres	Pattern and Color	0	0.00	0.0%
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.1 acres	Pattern and Color	0	0.00	0.0%
Total				0	0.00	0.0%
3. Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.	0.25 acres	Pattern and Color	0	0.00	0.0%
Cumulative Total				0	0.00	0.0%

Easement Acreage ²		12.14				
Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Easement Acreage
4. Invasive Areas of Concern ⁴	Areas or points (if too small to render as polygons at map scale). " RL " on ccpv	1000 SF	Pattern and Color	~30 clumps	0.02	0.2%
5. Easement Encroachment Areas ³	Areas or points (if too small to render as polygons at map scale).	none	Pattern and Color	0	0.00	0.0%

Figure 3.1. Permanent Photo Points - Wells Creek #2 - Monitoring Year 5 (2015) - Project #92688



PP #1 – Looking S from Carl Noah Rd, E of Wells Cr (09/16/09)



PP #1 – Looking S from Carl Noah Rd, E of Wells Cr (09/23/15)



PP #2 – Looking S along easement, W of Wells Cr (09/16/09)



PP #2 – Looking S along easement, W of Wells Cr (09/23/15)

Figure 3.2. Permanent Photo Points - Wells Creek #2 - Monitoring Year 5 (2015) - Project #92688



PP #3 – Looking SW along easement, W of Wells Cr (09/16/09)



PP #3 – Looking SW along easement, W of Wells Cr (09/23/15)



PP #4 – Looking East from easement toward Wells Cr (09/16/09)



PP #4 – Looking East from easement toward Wells Cr (09/23/15)

Figure 3.3. Permanent Photo Points - Wells Creek #2 - Monitoring Year 5 (2015) - Project #92688



PP #5 – Looking south along easement, E of Wells Cr (09/16/09)



PP #5 – Looking south along easement, E of Wells Cr (09/23/15)



PP #6 – Looking south from easement toward Wells Cr (09/16/09)



PP #6 – Looking south from easement toward Wells Cr (09/23/15)

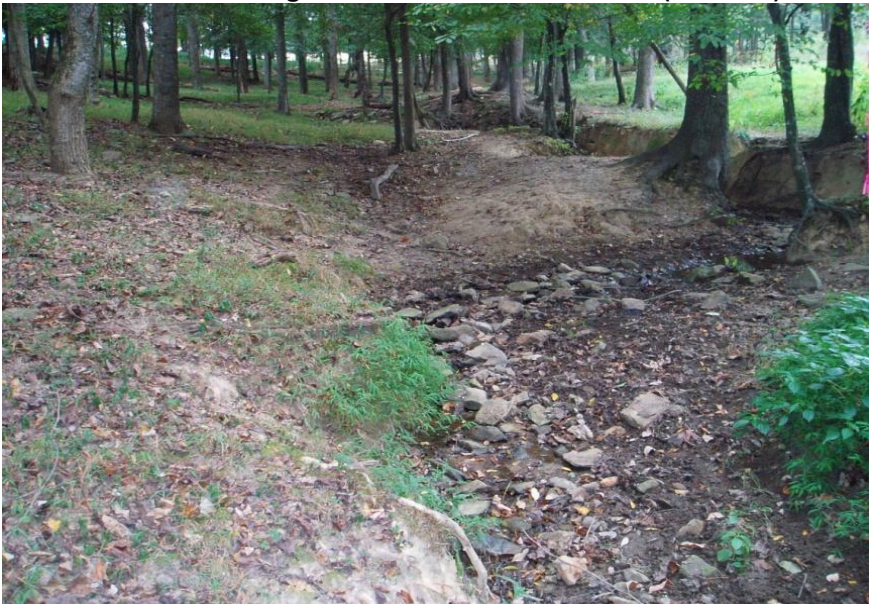
Figure 3.4. Permanent Photo Points - Wells Creek #2 - Monitoring Year 5 (2015) - Project #92688



PP #7 – Looking South beside RBK Wells Cr (09/16/09)



PP #7 – Looking South beside RBK Wells Cr (09/23/15)



PP #8 – Looking up UT3 from lower end (09/16/09)



PP #8 – Looking up UT3 from lower end (09/23/15)

Figure 3.5. Permanent Photo Points - Wells Creek #2 - Monitoring Year 5 (2015) - Project #92688



PP #9 – Looking downstream (east) along UT3 (09/16/09)



PP #9 – Looking downstream (east) along UT3 (09/23/15)



PP #10 – Looking across trampled banks, upper UT3 (09/16/09)



PP #10 – Looking across trampled banks, upper UT3 (09/23/15)

Figure 3.6. Permanent Photo Points - Wells Creek #2 - Monitoring Year 5 (2015) - Project #92688



PP #11 – Looking downstream from UT3 Head (09/16/09)



PP #11 – Looking downstream from UT3 Head (09/23/15)



PP #12 – Wells Cr north of Carl Noah Rd, looking upstr (01/03/10)



PP #12 – Wells Cr north of Carl Noah Rd, looking upstr (09/23/15)

Figure 3.7. Permanent Photo Points - Wells Creek #2 - Monitoring Year 5 (2015) - Project #92688



PP #13 – Wells Creek South of Carl Noah Road (01/03/10)



PP #13 – Wells Creek South of Carl Noah Road (09/23/15)



PP #14 – Confluence of Wells Creek and UT3 (09/16/09)



PP #14 – Confluence of Wells Creek and UT3 (09/23/15)

Figure 3.8. Permanent Photo Points - Wells Creek #2 - Monitoring Year 5 (2015) - Project #92688



PP #15 – UT#1 Preservation Reach (01/03/10)



PP #15 – UT#1 Preservation Reach (09/23/15)



PP #16 – UT1 Preservation Reach (01/03/10)



PP #16 – UT1 Preservation Reach (09/23/15)

Figure 4.0. CVS Vegetation Plot Photos - Wells Creek #2 - Monitoring Year 5 (2015) - Project #92688



VegPlot-1 (27 April 2011)



VegPlot-1 (22 September 2015)



VegPlot-2 (27 April 2011)



VegPlot-2 (22 September 2015)

Appendix C. Vegetation Plot Data

Table 6.	CVS Vegetation Plot Mitigation Success Summary
Table 7.	CVS Stem Counts, Total and Planted by Species, Plot and Year
e-Tables	Raw CVS Vegetation Data Sheets

Table 6. CVS Vegetation Plot Mitigation Success Summary, Wells Cr #2 - MY5

Wells Creek #2 (#92688)

Vegetation Plot Summary Information: MY-5 (22-Sep-2015)

Plot #	Riparian Buffer Stems ¹	Stream/Wetland Stems ²	Live Stakes	Invasives	Volunteers ³	Total ⁴	Unknown Growth Form
0001	n/a	14	0	0	43	57	0
0002	n/a	10	0	0	37	47	0

Wetland/Stream Vegetation Totals (stems per acre)

Plot #	Stream/Wetland Stems ²	Volunteers ³	Total ⁴	Success Criteria Met?
0001	567	1740	2307	Yes
0002	405	1497	1902	Yes
Project Avg	486	1619	2104	Yes

Riparian Buffer Vegetation Totals (stems per acre)

Plot #	Riparian Buffer Stems ¹	Success Criteria Met?
0001	n/a	n/a
0002	n/a	n/a
Project Avg	n/a	n/a

Stem Class Characteristics

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

²Stream/ Wetland Stems: Native planted hardwood trees and shrubs. Does NOT include live stakes or vines.

³Volunteers: Native woody trees and shrubs NOT planted. No vines.

⁴Total: Planted + volunteer native woody trees and shrubs, including live stakes. Excludes exotics and vines.

Color for Density

Exceeds 260 trees/acre requirements by 10%

Exceeds 260 trees/acre requirements, but by less than 10%

Fails to meet 260 trees/acre requirements, by less than 10%

Fails to meet 260 trees/acre requirements by more than 10%

