WELLS CREEK #2
NCEEP Project #92688
2011 MONITORING REPORT – YEAR 1

CONDUCTED FOR THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

Submitted on September 29, 2011 to:

North Carolina Department of
Environment and Natural Resources
Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699-1652

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APPENDICES

1.0 Executive Summary

Wells Creek #2 is a North Carolina Ecosystem Enhancement Program (EEP) stream mitigation project located near Snow Camp in southern Alamance County, North Carolina. The Project Site is located within the Cape Fear River Basin Cataloging Unit 0303002 and the 03030002050050 local watershed unit (14-digit HUC). EEP identified this HUC as a Targeted Local Watershed in the 2009 Cape Fear River Basin Restoration Priority report. The Project Site consists of two separate reaches located on two separate parcels: a Preservation Reach with two unnamed tributaries to Wells Creek (UT1 and UT2) and an Enhancement Reach with Wells Creek and an unnamed tributary (UT3). The Project Site is located immediately upstream of an existing EEP stream restoration site, Wells Creek (EEP # 414) (Figure 1.0).

The goals of the Wells Creek #2 are to improve water quality and restore 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 vegetated riparian buffer;
- Preserve existing natural, well-established riparian plant communities.

Two vegetation monitoring plots were established on April 27, 2011 and resampled on September 15, 2011. The Monitoring Year 1 live planted woody stem density is 586 stems per acre. Based on visual assessment, stem survival appears to be good throughout the restoration, despite the dry summer. Invasive species treatment in 2010 and early 2011 appears to have effectively reduced the presence of tree of heaven, multiflora rose, and other exotic species along both the enhancement and preservation reaches.

Based on the permanent photopoints and a visual assessment, there are no new areas of channel instability in the project area. Smaller hogs are able to access UT3 by going under the easement fence. Hog wallows and paths were noted in the upper portion of the reach during the September 15, 2011 visit. The presence of hogs does not appear to have affected the survival of the planted woody vegetation. The wallows are located in the same area as those that existed prior to the restoration.

Summary information/data related to the occurrence of items such as beaver or encroachment and statistics related to performance of various project and monitoring elements can be found in the tables and figures in the report appendices. Narrative background and supporting information formerly found in these reports can be found in the mitigation and restoration plan documents available on EEP's website. All raw data supporting the tables and figures in the appendices is available from EEP upon request.

2.0 Methodology

Monitoring methodologies follow the current EEP-provided templates and guidelines (Lee *et al* 2006). Photographs were taken digitally. A Trimble Geo XT handheld mapping-grade unit was used to collect vegetation corner, photopoint, and problem area locations. All problem areas identified on the spring 2011 versions of the CCPV were re-evaluated.

2.1. Stream Methodology

As outlined in the 2010 Existing Conditions Report, the Preservation Reach consists of two unnamed tributaries to Wells Creek. UT1 is a perennial stream with a rocky substrate. Channel width ranges from eight to 12 feet; overall channel morphology is stable. UT2 is a five-foot wide intermittent stream that is slightly incised. At the Enhancement Site, Wells Creek is an eight to 15 foot-wide perennial stream with a rocky substrate and some areas of channel instability. UT3 is an intermittent to a perennial stream with eroding banks due to hog access to the site. Photos in the Existing Conditions Report and Figures 3.0-3.7 in this report document typical channel morphology.

Since no changes were made to any stream channels, geomorphic data will not be collected as part of the annual monitoring for this site. Success of enhancement level II reaches will rely on using set photopoints to evaluate stream stability and the absence of further channel degradation. Photos taken during data collection for the Existing Conditions Report will serve as baseline photos. Based on available data, no new areas of channel instability were identified during the March or September 2011 site visits.

2.2. Vegetation Methodology

Two representative vegetation survey plots were selected and installed along Wells Creek in April 2011. Both plots measure 100 square meters in area and are five meters by 20 meters. Pursuant to the guidelines, the four corners of each plot (0,0; 0,20; 5,0; and 5,20.) are marked with metal pipe.

Level 1 (planted woody stems) and Level 2 (volunteer woody stems) data collection was performed in all plots, pursuant to the most recent CVS/EEP protocol (Lee *et al* 2006). Within each plot, each planted woody stem location (x and y) was recorded, and height and live stem diameter were recorded for each stem location. All planted stems were identified with pink flagging. Vegetation was identified using Weakley (Weakley 2007). Photos were taken of each vegetation plot from the 0,0 corner.

3.0 References

Lee, Michael T., Peet, Robert K., Roberts, Steven D., Wentworth, Thomas R. (2006). *CVS-EEP Protocol for Recording Vegetation Version 4.0*. Retrieved October 30, 2006, from: http://www.nceep.net/business/monitoring/veg/datasheets.htm.

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.

Weakley, Alan (2007). *Flora of the Carolinas, Virginia, Georgia, and Surrounding Areas*. Retrieved March 27, 2007 from: http://www.herbarium.unc.edu/flora.htm.

Appendix A. Project Vicinity Map and Background Tables

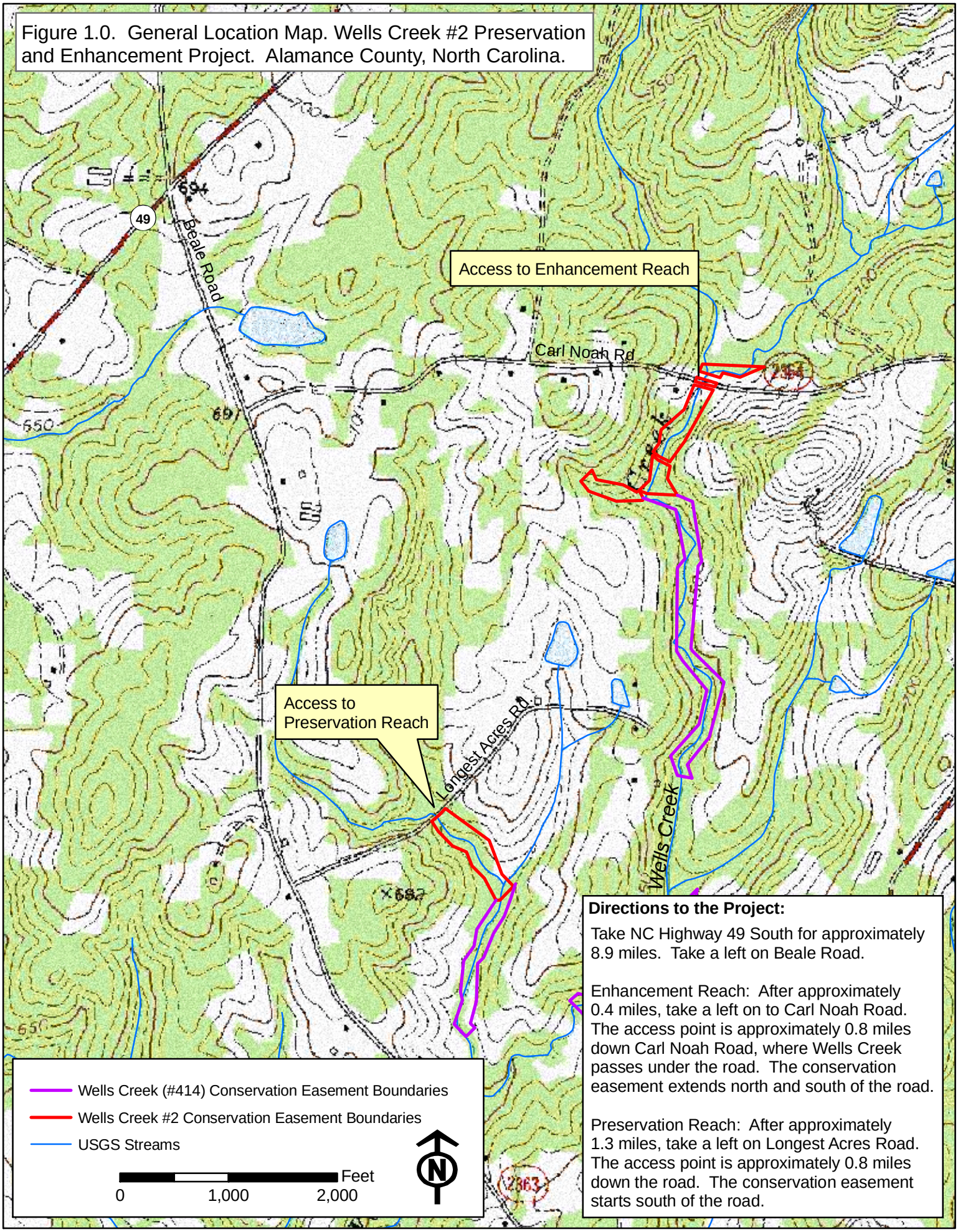
Figure 1.0. General Location Map. Wells Creek #2 Preservation and Enhancement Project. Alamance County, North Carolina.
49
Beale Road
Access to Enhancement Reach
Carl Noah Rd
Access to Preservation Reach
Longest Acres Rd
Wells Creek
Directions to the Project:
Take NC Highway 49 South for approximately 8.9 miles. Take a left on Beale Road.
Enhancement Reach: After approximately 0.4 miles, take a left on to Carl Noah Road. The access point is approximately 0.8 miles down Carl Noah Road, where Wells Creek passes under the road. The conservation easement extends north and south of the road.
Preservation Reach: After approximately 1.3 miles, take a left on Longest Acres Road. The access point is approximately 0.8 miles down the road. The conservation easement starts south of the road.
Wells Creek (#414) Conservation Easement Boundaries
Wells Creek #2 Conservation Easement Boundaries
USGS Streams
Feet
0
1,000
2,000
N

Table 1.0 Project Components
Wells Creek #2 (EEP #92688)

Project Component or Reach ID	Existing Length (ft)	Restoration Level	Approach	Mitigation Length (ft)	Stationing[+]	Mitigation Ratio	Stream Mitigation Units	BMP Elements[1]	Comment
Wells Creek - Preservation	438	P	n/a	438	00+00 to 04+38	5:1	87		
Wells Creek - Enhancement	1321	E2	n/a	1253*	04+98 to 18+19	2.5:1	501	Cattle fencing, watering system	Invasive vegetation treatment, riparian buffer plantings
UT 3	644	E2	n/a	644	00+00 to 06+44	2.5:1	258	Cattle fencing, watering system	Invasive vegetation treatment, riparian buffer plantings
UT1 - Preservation	1130	P	n/a	1130	00+00 to 11+30	5:1	226	Cattle fencing	Invasive vegetation treatment
UT2 - Preservation	48	P	n/a	48	00+00 to 00+48	5:1	10	Cattle fencing	Invasive vegetation treatment

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

[+] Stationing is estimated based on stream length measurements in ArcGIS. Measured upstream to downstream for each reach.

* Wells Creek enhancement reach mitigation length does not include two cattle crossings or road crossing at Carl Noah Road.

Table 1.1. Component Summations

Wells Creek #2 (EEP #92688)

Restoration Level	Stream (lf)	Riparian Wetland (Ac)		**Mitigation Length (ft)** (Ac)	**Stationing**[+] (Ac)	Buffer (Ac)	BMP
		Riverine	Non-Riverine				
Restoration							
Enhancement							
Enhancement I							
Enhancement II	1897						
Creation							
Preservation	1616						
HQ Preservation							
	3513						
MU Totals	**1082**						

Non-Applicable

Table 2. Project Activity and Reporting History
Wells Creek #2 (#92688) - Monitoring Year 1 (2011)

Elapsed Time Since Grading Complete: n/a
Elapsed Time Since Planting Complete: 10 months
Number of Reporting Years[1]: 1

Activity or Deliverable	Data Collection Complete	Completion or Delivery
Conservation Easement Option Signed	n/a	May 12, 2008
Conservation Easement Survey Plat Recorded	n/a	October 8, 2008
Permanent Conservation Easement Executed & Recorded	n/a	December 31, 2008
Cattle Exclusion Fencing & Livestock Watering System	n/a	December 2009
Existing Conditions Report	January 2010	March 2010
Final Design – Construction Plans	January 2010	April 2010
Containerized plant installations*	n/a	November 2010
Invasive Exotic Vegetation Treatments	January 2010	December 2010
Baseline Monitoring/As-built Baseline Report (Year 0 - baseline)	May 2011	June 2011
Monitoring Year 1 Report	September 2011	September 2011

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

Table 3. Project Contacts

Wells Creek #2 (#92688) - Monitoring Year 1 (2011)

Designer	Robert J. Goldstein & Associates
	1221 Corporation Parkway, Ste. 100
	Raleigh, NC 27610
Design POC -	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, 4th 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, Ste. 100
	Raleigh, NC 27610
Monitoring POC -	Gerald Pottern, (919) 872-1174

Table 4. Project Attributes Wells Creek #2 (#92688) - Monitoring Year 1 (2011)		
Project County	Alamance	
Physiographic Region	Piedmont	
Ecoregion	Carolina Slate Belt	
Project River Basin	Cape Fear	
USGS HUC for Project (14 digit)	3030002050050	
NCDWQ Sub-basin for Project	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	2.99 (including areas with existing overstory)
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 2.0.-2.2	Current Conditions Plan View
Table 5.0	Vegetation Condition Assessment Table
Figure 3.0-3.7	Permanent Photopoints
Figures 4.0	Vegetation Monitoring Plot Photos

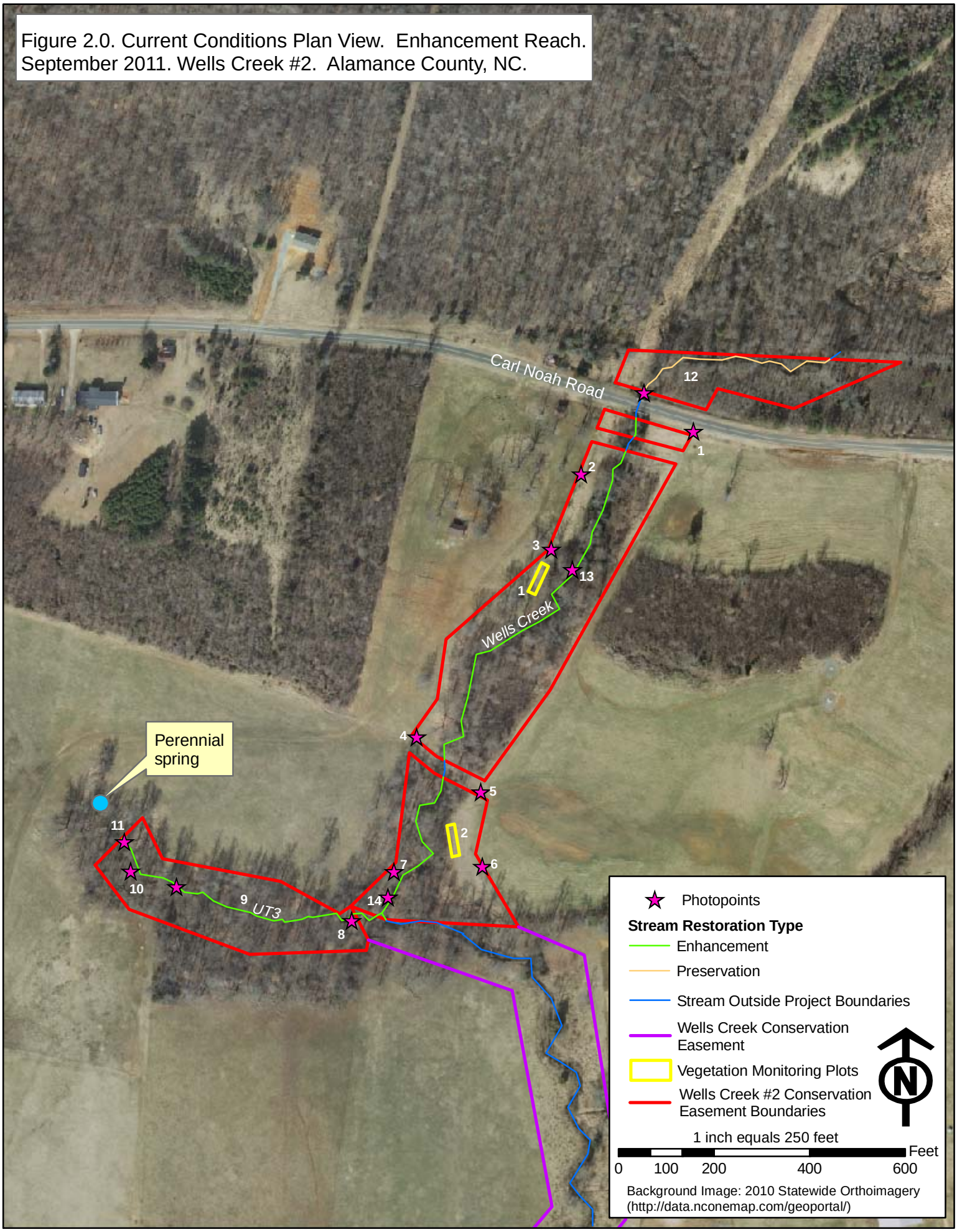
Figure 2.0. Current Conditions Plan View. Enhancement Reach.
September 2011. Wells Creek #2. Alamance County, NC.
Carl Noah Road
Wells Creek
UT3
Perennial spring
Photopoints
Stream Restoration Type
Enhancement
Preservation
Stream Outside Project Boundaries
Wells Creek Conservation Easement
Vegetation Monitoring Plots
Wells Creek #2 Conservation Easement Boundaries
N
1 inch equals 250 feet
0 100 200 400 600 Feet
Background Image: 2010 Statewide Orthoimagery
(http://data.nconemap.com/geoportal/)

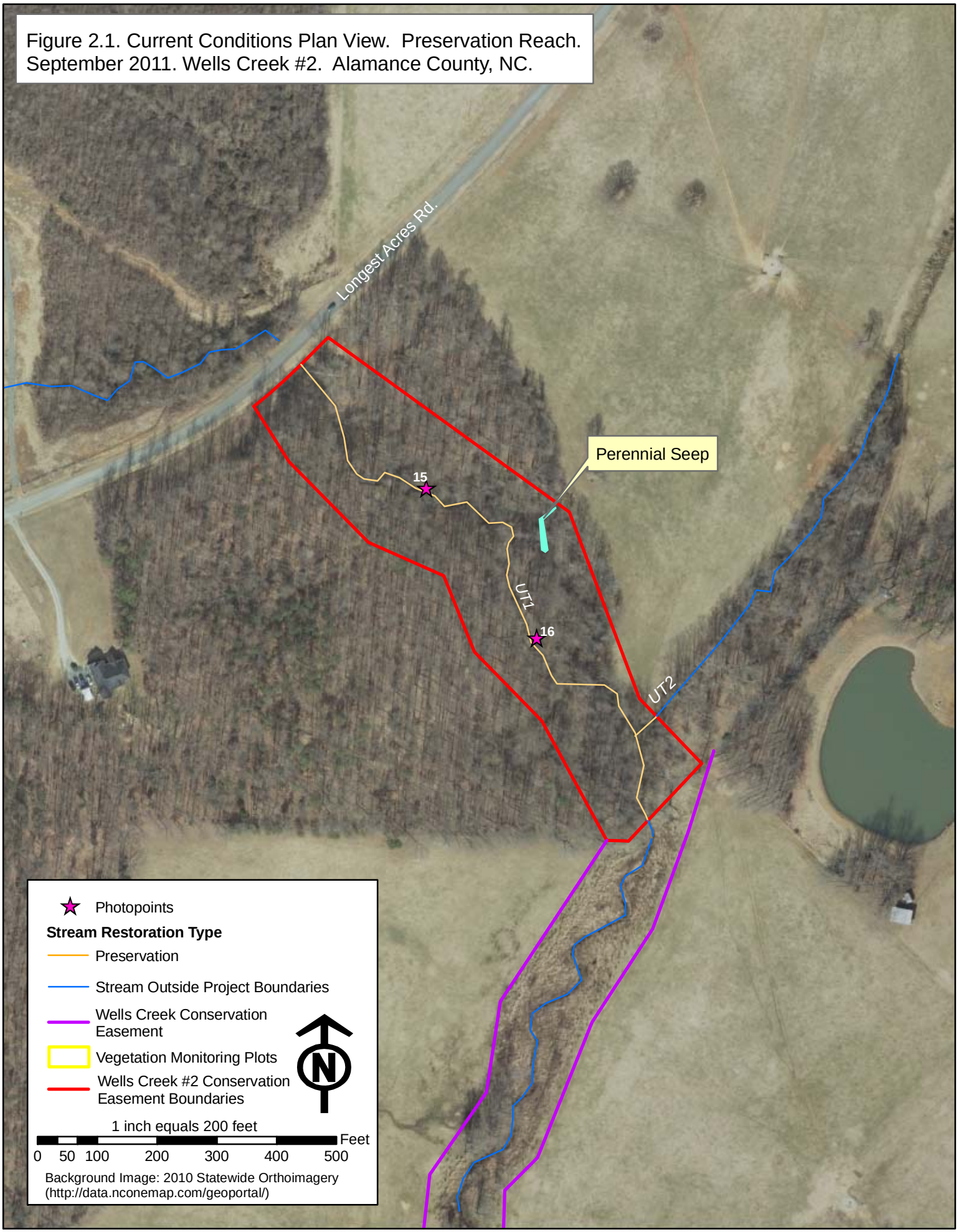
Figure 2.1. Current Conditions Plan View. Preservation Reach.
September 2011. Wells Creek #2. Alamance County, NC.
Longest Acres Rd.
Perennial Seep
15
16
UT1
UT2
Photopoints
Stream Restoration Type
Preservation
Stream Outside Project Boundaries
Wells Creek Conservation Easement
Vegetation Monitoring Plots
Wells Creek #2 Conservation Easement Boundaries
N
1 inch equals 200 feet
0 50 100 200 300 400 500
Feet
Background Image: 2010 Statewide Orthoimagery
(http://data.nconemap.com/geoportal/)

Table 5. Vegetation Assessment - Wells Creek #2 (#92688) - Monitoring Year 1 (2011)

Planted Acreage[1] **3.04**

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).	1000 SF	Pattern and Color	0	0.00	0.0%
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%

1 = Enter the planted acreage within the easement. This number is calculated as the easement acreage minus any existing mature tree stands that were not subject to supplemental planting of the understory, the channel acreage, crossings or any other elements not directly planted as part of the project effort.

2 = The acreage within the easement boundaries.

3 = Encroachment may occur within or outside of planted areas and will therefore be calculated against the overall easement acreage. In the event a polygon is cataloged into items 1, 2 or 3 in the table and is the result of encroachment, the associated acreage should be tallied in the relevant item (i.e., item 1,2 or 3) as well as a parallel tally in item 5.

4 = Invasives may occur in or out of planted areas, but still within the easement and will therefore be calculated against the overall easement acreage. Invasives of concern/interest are listed below. The list of high concern spcies are those with the potential to directly outcompete native, young, woody stems in the short-term (e.g. monitoring period or shortly thereafter) or affect the community structure for existing, more established tree/shrub stands over timeframes that are slightly longer (e.g. 1-2 decades). The low/moderate concern group are those species that generally do not have this capacity over the timeframes discussed and therefore are not expected to be mapped with regularity, but can be mapped, if in the judgement of the observer their coverage, density or distribution is suppressing the viability, density, or growth of planted woody stems. Decisions as to whether remediation will be needed are based on the integration of risk factors by EEP such as species present, their coverage, distribution relative to native biomass, and the practicality of treatment. For example, even modest amounts of Kudzu or Japanese Knotweed early in the projects history will warrant control, but potentially large coverages of Microstegium in the herb layer will not likley trigger control because of the limited capacities to impact tree/shrub layers within the timeframes discussed and the potential impacts of treating extensive amounts of ground cover. Those species with the "watch list" designator in gray shade are of interest as well, but have yet to be observed across the state with any frequency. Those in *red italics* are of particular interest given their extreme risk/threat level for mapping as points where isolated specimens are found, particularly ealry in a projects monitoring history. However, areas of discreet, dense patches will of course be mapped as polygons. The symbology scheme below was one that was found to be helpful for symbolzing invasives polygons, particulalry for situations where the conditon for an area is somewhere between isolated specimens and dense, discreet patches. In any case, the point or polygon/area feature can be symbolized to describe things like high or low concern and species can be listed as a map inset, in legend items if the number of species are limited or in the narrative section of the executive summary.

Figure 3.0. Stream Photo Station Photo - Wells Creek #2 - Monitoring Year 1 (2011) - Project #92688

PP #1 – Looking Downstream from Easement Boundary (09/16/09)

PP #1 – Looking Downstream from Easement Boundary (09/15/11)

PP #2 – Looking Downstream (09/16/09)

PP #2 – Looking Downstream (09/15/11)

Figure 3.1. Stream Photo Station Photo - Wells Creek #2 - Monitoring Year 1 (2011) - Project #92688

PP #3 – Looking Downstream (09/16/09)

PP #3 – Looking Downstream (09/15/11)

PP #4 – Looking Down Slope toward Channel (09/16/09)

PP #4 – Looking Down Slope toward Channel (09/15/11)

Figure 3.2. Stream Photo Station Photo - Wells Creek #2 - Monitoring Year 1 (2011) - Project #92688

PP #5 – Looking Downstream (09/16/09)

PP #5 – Looking Downstream (09/15/11)

PP #6 – Looking South toward Channel (09/16/09)

PP #6 – Looking South toward Channel (09/15/11)

Figure 3.3. Stream Photo Station Photo - Wells Creek #2 - Monitoring Year 1 (2011) - Project #92688

PP #7 – Looking South beside Channel (09/16/09)

PP #7 – Looking South beside Channel (09/15/11)

PP #8 – Looking up UT from Fence Post (09/16/09)

PP #8 – Looking up UT from Fence Post (09/15/11)

Figure 3.4. Stream Photo Station Photo - Wells Creek #2 - Monitoring Year 1 (2011) - Project #92688

PP #9 – Looking Downstream (09/16/09)

PP #9 – Looking Downstream (09/15/11)

PP #10 – Looking across Trampled Banks of UT3 (09/16/09)

PP #10 – Looking across Trampled Banks of UT3 (09/15/11)

Figure 3.5. Stream Photo Station Photo - Wells Creek #2 - Monitoring Year 1 (2011) - Project #92688

PP #11 – Looking Downstream at Headwaters (09/16/09)

PP #11 – Looking Downstream at Headwaters (09/15/11)

PP #12 – Wells Creek North of Carl Noah Road (05/26/11)

PP #12 – Wells Creek North of Carl Noah Road (09/15/11)

Figure 3.6. Stream Photo Station Photo - Wells Creek #2 - Monitoring Year 1 (2011) - Project #92688

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

PP #13 – Wells Creek South of Carl Noah Road (09/15/11)

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

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

Figure 3.7. Stream Photo Station Photo - Wells Creek #2 - Monitoring Year 1 (2011) - Project #92688

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

PP #15 – UT#1 Preservation Reach (09/15/11)

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

PP #16 – UT1 Preservation Reach (09/15/11)

Figure 4.0. Vegetation Plot Photos - Wells Creek #2 - Monitoring Year 1 (2011) - Project #92688

VP 1 (April 27, 2011)

VP 1 (September 15, 2011)

VP 2 (April 27, 2011)

VP 2 (September 15, 2011)

Appendix C. Vegetation Plot Data

Table 6.0	Vegetation Plot Mitigation Success Summary Table
Table 7.0	Vegetation Metadata
Table 8.0	Stem Count Total and Planted by Plot and Species
e-Tables	Raw CVS vegetation data sheets

Table 6. Vegetation Plot Criteria Attainment Wells Creek #2 - EEP Project #92688 MY1 (2011)			
Tract	Vegetation Plot ID	Vegetation Survival Threshold Met	Tract Mean
Wells Creek	1	Y	100%
	2	Y	

Table 7. CVS Vegetation Metadata Table - Wells Creek #2 (#92688) - Monitoring Year 1(2011)

Report Prepared By	Sean Doig
Date Prepared	9/16/2011 12:50
database name	WellsCreek2_2011.mdb
database location	D:\Sean\EEP\Wells Creek\2011
computer name	JESSIO
file size	35262464
DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT----------	
Metadata	Description of database file, the report worksheets, and a summary of project(s) and project data.
Proj, planted	Each project is listed with its PLANTED stems per acre, for each year. This excludes live stakes.
Proj, total stems	Each project is listed with its TOTAL stems per acre, for each year. This includes live stakes, all planted stems, and all natural/volunteer stems.
Plots	List of plots surveyed with location and summary data (live stems, dead stems, missing, etc.).
Vigor	Frequency distribution of vigor classes for stems for all plots.
Vigor by Spp	Frequency distribution of vigor classes listed by species.
Damage	List of most frequent damage classes with number of occurrences and percent of total stems impacted by each.
Damage by Spp	Damage values tallied by type for each species.
Damage by Plot	Damage values tallied by type for each plot.
Planted Stems by Plot and Spp	A matrix of the count of PLANTED living stems of each species for each plot; dead and missing stems are excluded.
ALL Stems by Plot and spp	A matrix of the count of total living stems of each species (planted and natural volunteers combined) for each plot; dead and missing stems are excluded.
PROJECT SUMMARY----------	
Project Code	92688
project Name	Wells Creek #2
Description	Stream enhancement project in Alamance County
River Basin	Cape Fear
length(ft)	2,026 (Wells Creek and UT3)
stream-to-edge width (ft)	65'-95'
area (sq m)	12,302 sq. meters, 6,677 sq. meters only planted understory
Required Plots (calculated)	3 (per CVS-EEP Access database)
Sampled Plots	2

Table 8. Planted and Total Stem Counts (Species by Plot with Annual Means) - Wells Creek #2 (#92688) - Monitoring Year 1 (2011)

			Current Data (MY1 2011)				Annual Means			
	Common		92688-SD-0001		92688-SD-0002		MY1 (2011)		Baseline (2011)	
	Name	Type	P	T	P	T	P	T	P	T
Acer rubrum	red maple	T								1
Alnus serrulata	hazel alder	T	3	3			3	3	3	3
Baccharis halimifolia	eastern baccharis	S				1		1		1
Carpinus caroliniana	American hornbeam	T								7
Carya cordiformis	bitternut hickory	T				5		5		6
Celtis laevigata	sugarberry	T	1	1			1	1	1	1
Diospyros virginiana	common persimmon	T			1	1	1	1	1	1
Fraxinus	ash	T				2		2		2
Fraxinus pennsylvanica	green ash	T				1		1	2	2
Juglans nigra	black walnut	T		3				3		1
Lindera benzoin	northern spicebush	S	2	2	4	5	6	7	6	6
Liquidambar styraciflua	sweetgum	T				4		4		2
Liriodendron tulipifera	tuliptree	T		6	3	9	3	15	3	3
Nyssa sylvatica	blackgum	T	3	3	1	1	4	4	3	3
Platanus occidentalis	American sycamore	T	1	1			1	1	1	1
Prunus serotina	black cherry	T								1
Quercus michauxii	swamp chestnut oak	T	3	3	2	2	5	5	5	5
Quercus rubra	northern red oak	T			1	1	1	1	3	3
Quercus stellata	post oak	T			1	1	1	1		
Viburnum dentatum	southern arrowwood	S	3	3			3	3	3	3
	Stem count		16	25	13	33	29	58	31	52
	Size (ares)		1		1		2		2	
	Size (acres)		0.0247		0.0247		0.0494		0.0494	
	Species count		7	9	7	12	11	17	11	19
	Stems per ACRE		648	1012	526	1336	587	1174	627.53	1052.63

Type = Tree, Shrub, Livestake
P = Planted
T = Total

Plot (continued): 92688-SD-0001

ID	Species	map char	source	X (m)	Y (m)	Apr 2011 Data ddh (mm)	Apr 2011 Data Height (cm)	Apr 2011 Data DBH (cm)	Notes*	THIS YEAR'S DATA ddh (mm)	THIS YEAR'S DATA Height (cm)	THIS YEAR'S DATA DBH (cm)	THIS YEAR'S DATA Re-sprout	THIS YEAR'S DATA Vigor*	THIS YEAR'S DATA Damage*	THIS YEAR'S DATA Notes

Plot 92688-SD-0001

Please fill in any missing data and fix incorrect data. **Vegetation Monitoring Data (VMD) Datasheet**

VMD Year (1-5): 1 Date: 9/15/11 - 9/15/11

Party: SD Role: PL

Notes on plot:

Taxonomic Standard: Wentzel 2007

Taxonomic Standard DATE:

Latitude or UTM-N: (dec.deg. or m) 791407.026 Datum: NAD83/W

Longitude or UTM-E: 1867889.853 UTM Zone: 17

Coordinate Accuracy (m): 1 X-Axis bearing (deg): 30

Plot Dimensions: X: 20 Y: 5 ☐ Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Apr 2011 Data ddh 1 mm	Apr 2011 Data Height 1cm*	Apr 2011 Data DBH 1 cm	Notes*	THIS YEAR'S DATA ddh 1mm	THIS YEAR'S DATA Height 1cm*	THIS YEAR'S DATA DBH 1 cm	THIS YEAR'S DATA Re-sprout	THIS YEAR'S DATA Vigor*	THIS YEAR'S DATA Damage*	THIS YEAR'S DATA Notes
1	Viburnum dentatum	a	P	1.4	4.0	6	42.0		☐	6	43		☐	2	munched	
2	Alnus serrulata	j	P	4.1	3.3	7	66.0		☐	8	64		☐	2	munched	
3	Quercus michauxii	k	P	3.4	0.1	8	53.0		☐	9	52		☐	2	top broken off	
4	Nyssa sylvatica	m	P	7.1	1.9	8	99.0		☐	8	103		☐	3		
5	Nyssa sylvatica	n	P	7.9	0.2	8	80.0		☐	10	84		☐	3		
6	Platanus occidentalis	o	P	9.8	1.1	6	63.0		☐	10	92		☐	4		
7	Viburnum dentatum	p	P	9.9	4.3	4	43.0		☐	5	45		☐	2		
8	Lindera benzoin	b	P	12.0	2.0	3	58.0		☐	6	66		☐	3		
9	Alnus serrulata	c	P	12.8	4.3	8	101.0	DBH?	☐	10	97		☐	3	top gone	
10	Quercus michauxii	d	P	14.4	2.0	11	131.0	DBH?	☐	12	133		☐	3		
11	Lindera benzoin	f	P	15.6	0.5	3	59.0		☐	4	64		☐	3		
12	Quercus michauxii	e	P	15.3	4.2	8	111.0	DBH?	☐	11	115		☐	3		
13	Alnus serrulata	g	P	17.1	4.0	7	110.0	DBH?	☐	6	115		☐	3		
14	Nyssa sylvatica	h	P	18.0	0.2	10	100.0		☐	11	100		☐	3		
15	Viburnum dentatum	j	P	18.9	2.8	4	43.0		☐	5	42		☐	2	top broken	
16	Celtis laevigata	i	P	18.7	4.8	4	61.0		☐	6	78		☐	3		

 # stems: 16

New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	ddh 1 mm	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSects, GAME, LIVESTock, Other/Unknown ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRicane, DISeased, VINE Strangulation, UNKNown, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

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Plot (continued): 92688-SD-0001

ID	Species	map char	source	X (m)	Y (m)	Apr 2011 Data: ddh (mm)	Height (cm)	DBH (cm)	Notes*	THIS YEAR'S DATA: ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes

Natural Woody Stems - tallied by species

Explanation of cut-off & subsampling**:

Height Cut-Off (All stems shorter than this are ignored. If >10cm, explain why to the right.): ☐ 10cm ☐ 50cm ☐ 100cm ☐ 137cm

Species Name	☑ c	SEEDLINGS — HEIGHT CLASSES: Sub-Seed	10 cm-50 cm	50 cm-100 cm	100 cm-137 cm	SAPLINGS — DBH: Sub-Sapl	0-1 cm	1-2.5	TREES — DBH: 2.5-	5-	=10 (write DBH)
Juglans nigra			1								
Lirio			1								

**Required if cut-off >10cm or subsample ? 100%.

1 2 3 4 5 6 7 8 9 10

Form WS2, ver 9.1

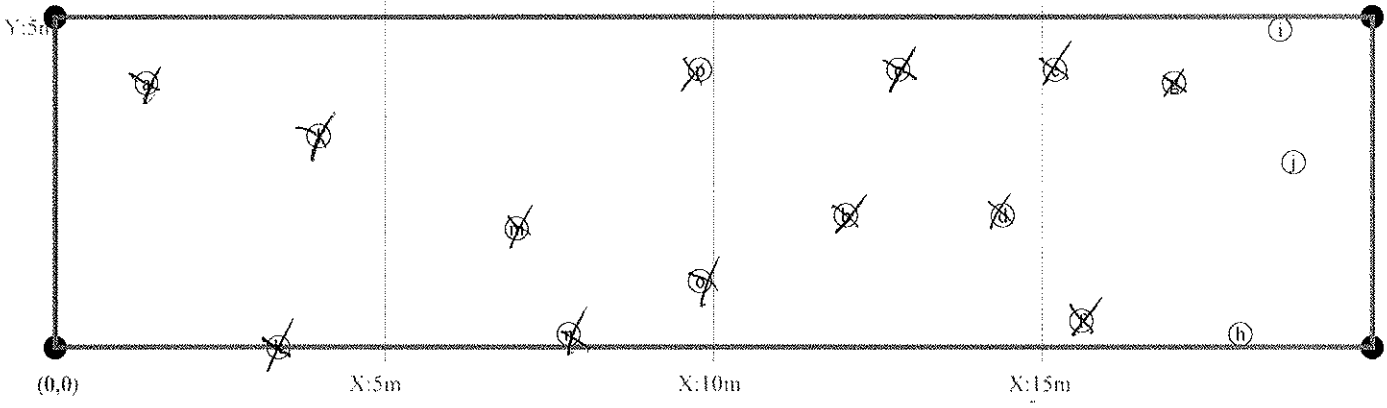
Map of stems on plot 92688-SD-0001

X-axis: 30°

N

 # stems: 16

map size: LARGE



*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSects, GAME, LIVESTock, Other/Unknown ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRicane, DISeased, VINE Strangulation, UNKNown, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

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Plot 92688-SD-0002 — **Please fill in any missing data and fix incorrect data.** — **Vegetation Monitori… Data (VMD) Datash…**

VMD Year (1-5): 1 Date: 9/15/1 - 9/15/1 Party: SD Role:

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N: (dec.deg. or m) 790858.058 Datum: NAD83/W…

Longitude or UTM-E: 1867733.181 UTM Zone: 17

Coordinate Accuracy (m): 1 X-Axis bearing (deg): 345

Plot Dimensions: X: 20 Y: 5 ☐ Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X

Notes on plot:

→ blackgum, not persimmon?

→ post oak see photo

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Apr 2011 Data ddh 1 mm	Apr 2011 Data Height 1cm*	Apr 2011 Data DBH 1 cm	Notes*	THIS YEAR'S DATA ddh 1mm	Height 1cm*	DBH 1 cm	Re-sprout	Vigor*	Damage*	Notes
18	Quercus michauxii	a	P	0.2	1.5	11	160.0	0.2	☐	13	181	0.6	☐	3		
19	Diospyros virginiana ?	k	P	4.6	3.3	8	20.0		☐	—	—	—	☐	dead		—
20	Quercus rubra	~~m~~	P	7.2	4.2	8	74.0		☑	11	99		☐	3		
21	Lindera benzoin	~~x~~	P	7.2	2.4	3	56.0		☑	4	59		☐	2		
22	Quercus michauxii	~~w~~	P	9.5	1.4	9	105.0	*DBH?*	☐	9	103		☐	2	top dead	
23	Liriodendron tulipifera	~~x~~	P	2.5	1.1	4	48.0		☐	6	53		☐	3		
24	Lindera benzoin	~~w~~	P	11.9	1.5	3	62.0		☑	4	61		☐	2		
25	Liriodendron tulipifera	~~a~~	P	13.4	1.9	4	47.0		☐	6	80		☐	3		
26	Liriodendron tulipifera	~~w~~	P	17.0	1.0	5	51.0		☐	8	98		☐	4		
27	Quercus rubra – p50	~~x~~	P	18.6	1.9	21	125.0	*DBH?*	☐	27	162	.5	☐	4		
28	Lindera benzoin	~~x~~	P	16.7	2.3	4	61.0		☑	5	78		☐	2	too much lean	
29	Fraxinus pennsylvanica	~~x~~	P	16.9	4.7	8	55.0		☐	9	63		☐	3		
30	~~Fraxinus pennsylvanica~~ lindera	~~x~~	P	10.8	4.5	3	56.0		☐	5	67		☐	3		
31	Lindera benzoin	b	P	1.9	3.8	3	57.0		☐	—	—	—	☐	—	—	—

 # stems: 14

New Stems, not included last year, but are obviously planted. If more space needed, use blank PNS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	ddh 1 mm	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes

***Notes by ID:**
20-confirm species may be vol?
21-confirm
24-confirm
28-confirm

ok

dead

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSects, GAME, LIVESTock, Other/Unknown ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRicane, DISeased, VINE Strangulation, UNKNown, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

Plot (continued): 92688-SD-0002

ID	Species	map char	source	X (m)	Y (m)	Apr 2011 Data: ddh (mm)	Height (cm)	DBH (cm)	Notes*	THIS YEAR'S DATA: ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes

Natural Woody Stems - tallied by species

Explanation of cut-off & subsampling**:

Height Cut-Off (All stems shorter than this are ignored. If >10cm, explain why to the right.): ☐ 10cm ☐ 50cm ☐ 100cm ☐ 137cm

Species Name	☑ c	SEEDLINGS — HEIGHT CLASSES: Sub-Seed	10 cm-50 cm	50 cm-100 cm	100 cm-137 cm	SAPLINGS — DBH: Sub-Sapl	0-1 cm	1-2.5	TREES — DBH: 2.5-	5-	=10 (write DBH)
Winged sumac		___	1			___					
Frax		___	2			___					
Hickory cord.		___	2	1		___					
Sweetgum		___	2	1		___					
U/mun		___	1			___					
Lirio		___	3			___					
Bacgharis		___				___	1				

**Required if cut-off >10cm or subsample ? 100%.

●1 ●2 ●3 ●4 ●5 ●6 ●7 ●8 ●9 ●10

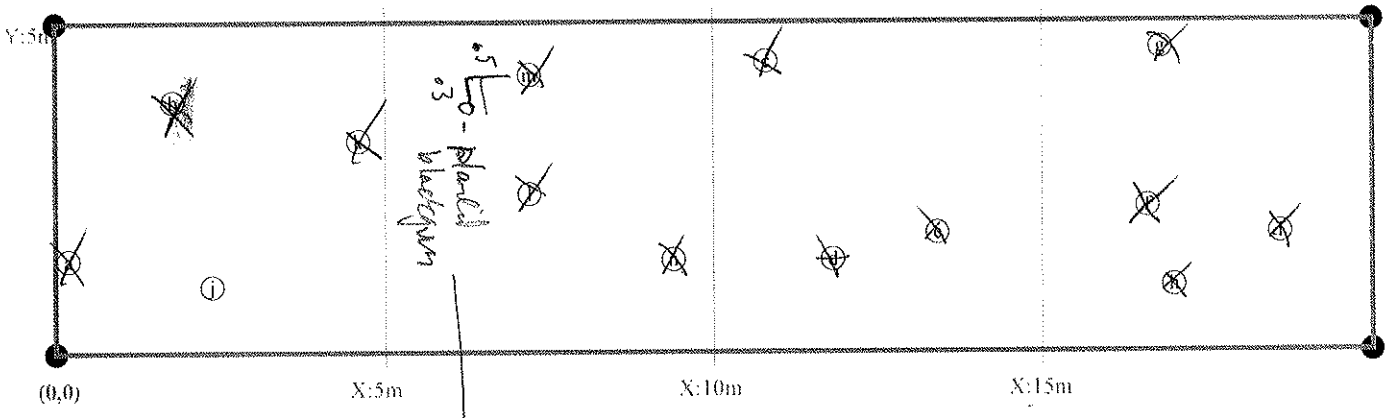
Form WS2, ver 9.1

Map of stems on plot 92688-SD-0002

X-axis: 345°

 # stems: 14
map size: LARGE

N



H = 51
ddh = 6
vig = 3

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSects, GAME, LIVESTock, Other/Unknown ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRicane, DISeased, VINE Strangulation, UNKNown, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

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