

**FINAL**  
**MONITORING BASELINE DOCUMENT**  
**UT TO HAW BECKOM RESTORTION SITE**  
**ALAMANCE COUNTY, NORTH CAROLINA**  
**(EEP Project No. 92694)**



Submitted to:  
North Carolina Department of Environment and Natural Resources  
Ecosystem Enhancement Program  
Raleigh, North Carolina



March 2011

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Prepared by:  
Axiom Environmental, Inc.  
218 Snow Ave.  
Raleigh, North Carolina 27603

Design Firm:  
Axiom Environmental, Inc.  
218 Snow Ave.  
Raleigh, North Carolina 27603



March 2011

## EXECUTIVE SUMMARY

The North Carolina Ecosystem Enhancement Program (NCEEP) has completed stream and wetland enhancement and preservation at the UT to Haw Beckom Restoration Site (hereafter referred to as the “Site”) to assist in fulfilling stream and wetland mitigation goals in the area. The Site is located approximately 4 miles north of Burlington, in Alamance County, North Carolina. This portion of Alamance County is located within Cape Fear River Basin Hydrologic Unit and Targeted Local Watershed 03030002030010.

Site drainage features provide water quality function to an approximately 385-acre (0.6-square mile) watershed. The Site is located within a NCEEP Targeted Local Watershed; in addition, this Site was identified for preservation as part of Site 15 (Travis & Tickle 15.2) in the 2008 NCEEP *Little Alamance and Travis and Tickle Creek Local Watershed Plan* (pages 72-73). Site streams drain to a section of the Haw River, which is currently on North Carolina’s 2010 final 303(d) list for impaired ecological/biological integrity of benthic communities.

Prior to construction, Site land use consisted of cleared pasture for livestock grazing and disturbed forest. Site streams were characterized by eroding stream banks and a riparian buffer dominated by active livestock pasture and disturbed forest.

The primary goals of this mitigation project were obtained through removal of livestock from streams, buffers, and wetlands; reforestation of pasture land with native species; and installation of forded crossings to safely move animals and equipment across the Site. The goals of this project focused on improving water quality, enhancing flood attenuation, and restoring aquatic and riparian habitat and include the following.

- Reducing nonpoint sources of pollution by 1) fencing livestock from stream channels, buffers, and wetlands; 2) ceasing the application of agricultural herbicides, pesticides, and fertilizers; and 3) providing a vegetative buffer adjacent to streams and wetlands to treat surface runoff prior to entering Site streams and ultimately the Haw River.
- Reducing sedimentation/siltation within onsite and downstream receiving waters by a) reducing bank erosion associated with livestock hoof shear on Site streams, b) filtering surface runoff and reducing particulate matter deposition into tributaries, and c) providing a forested vegetative buffer adjacent to Site streams and wetlands.
- Promoting floodwater attenuation and improving stream stability by revegetating Site floodplains to reduce floodwater velocities through increased frictional resistance on floodwaters crossing Site floodplains.
- Providing increased habitat for aquatic wildlife by 1) increasing organic matter, carbon export, and woody debris in the stream corridor and 2) restoring shade to Site open waters.
- Providing wildlife habitat including a minimum of a 50-foot forested riparian corridor from the top of each stream bank within a region of the state increasingly dissected by residential/agricultural land use.
- Protecting a Site identified in the 2008 Piedmont Triad Council of Government *Little Alamance, Travis, and Tickle Creek Watersheds Restoration Plan* (PTCG 2008) for preservation due to its location within a remote, rural area with increasing development pressure and appeal to developers.

This project was constructed between December 23, 2010 and January 6, 2011. All stream channels have a minimum of a 50-foot wide riparian buffer from the top of each stream bank, which was verified in the field on January 22, 2011. The project consisted of enhancement (level II) of 2200 linear feet of stream and enhancement of 1.75 acres of riparian wetlands by removing livestock and reforesting with native species. The project includes preservation of 1465 linear feet of perennial stream and 0.05 acre of riparian wetlands.

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CVS Output Tables

## 1.0 INTRODUCTION

### 1.1 Location and Setting

The North Carolina Ecosystem Enhancement Program (NCEEP) has completed stream and wetland enhancement and preservation at the UT to Haw Beckom Restoration Site (hereafter referred to as the “Site”) to assist in fulfilling stream and wetland mitigation goals in the area. The Site is located approximately 4 miles north of Burlington, in Alamance County, North Carolina (Figure 1, Appendix A). This portion of Alamance County is located within Cape Fear River Basin Hydrologic Unit and Targeted Local Watershed 03030002030010.

Directions to the Site from Burlington, North Carolina:

- Take NC Highway 62 North for approximately 2.5 miles
- Turn left on Union Ridge Road (at the Shell station; Five Points Grocery and Grill)
- Take the first left on Greenwood Drive.
- After 2.0 miles, turn right on Mansfield Road
- Site is on left
- Latitude 36.1503°N, Longitude 79.4644°W (NAD83/WGS84)

### 1.2 Project Goals and Objectives

The goals of this project focus on improving water quality, enhancing flood attenuation, and restoring aquatic and riparian habitat. The project approach was designed to provide restoration-oriented improvements to maximize environmental benefits while working within Site constraints, technical guidelines, and availability of funds. These goals were accomplished by the following.

- Reducing nonpoint sources of pollution by 1) fencing livestock from stream channels, buffers, and wetlands; 2) ceasing the application of agricultural herbicides, pesticides, and fertilizers; and 3) providing a vegetative buffer adjacent to streams and wetlands to treat surface runoff prior to entering Site streams and ultimately the Haw River.
- Reducing sedimentation/siltation within onsite and downstream receiving waters by a) reducing bank erosion associated with livestock hoof shear on Site streams, b) filtering surface runoff and reducing particulate matter deposition into tributaries, and c) providing a forested vegetative buffer adjacent to Site streams and wetlands.
- Promoting floodwater attenuation and improving stream stability by revegetating Site floodplains to reduce floodwater velocities through increased frictional resistance on floodwaters crossing Site floodplains.
- Providing increased habitat for aquatic wildlife by 1) increasing organic matter, carbon export, and woody debris in the stream corridor and 2) restoring shade to Site open waters.
- Providing wildlife habitat including a minimum of a 50-foot forested riparian corridor from the top of each stream bank within a region of the state increasingly dissected by residential/agricultural land use.
- Protecting a Site identified in the 2008 Piedmont Triad Council of Government *Little Alamance, Travis, and Tickle Creek Watersheds Restoration Plan* (PTCG 2008) for preservation due to its location within a remote, rural area with increasing development pressure and appeal to developers.

### 1.3 Project Structure, Restoration Type, and Approach

Prior to construction, the Site was used extensively for agriculture including row crop and livestock production. Site streams drain to a section of the Haw River characterized by impaired ecological/biological integrity of benthic communities (NCDWQ 2010). This designation of impaired waters has most likely arisen as the result of historical land uses.

As constructed, Site activities enhanced (level II) 2200 linear feet of stream and preserved 1465 linear feet of stream. Site activities also enhanced 1.75 acres and preserved 0.05 acres of riparian wetlands (NCWAM- Bottomland Hardwood Forest). Site stream and wetland enhancement and preservation activities will result in 1173 Stream Mitigation Units and 0.89 Riparian Wetland Mitigation Units (Table 1 and Figure 2, Appendix A). Planting occurred within 5.1 acres of the approximately 10-acre conservation easement including stream banks, floodplain, and wetlands. Target natural communities consisted of Piedmont/Mountain Swamp Forest within wetlands and Piedmont/Mountain Bottomland Forest within the floodplain (Schafale and Weakley 1990). Table 5 (Appendix C) outlines woody species planted within the Site. Completed project activities, reporting history, completion dates, project contacts, and background information are summarized in Tables 2-4 (Appendix A).

## **2.0 MONITORING PLAN**

Monitoring will be performed for stream and vegetation components of the Site until success criteria are fulfilled. Hydrology will not be monitored since existing Site wetlands are jurisdictional. The establishment, collection, and summarization of monitoring data shall be conducted in accordance with the most current version of the EEP document entitled *Procedural Guidance and Content Requirements for EEP Monitoring Reports* (version 1.3).

### **2.1 Stream**

Annual stream monitoring will include vegetation survival (Section 2.2 Vegetation Monitoring) and a photographic record of post-construction conditions. Photographs of the enhancement (level II) reach will be taken for each year of the monitoring period. In addition, visual assessments of the stream will be conducted by walking the length of stream and bankfull flow events will be documented during the monitoring period.

### **2.2 Vegetation**

After planting was completed, an initial evaluation was performed to verify planting methods and to determine initial species composition and density. Five sample plots (10-meter by 10-meter) were installed within the Site as per guidelines established in *CVS-EEP Protocol for Recording Vegetation, Version 4.0* (Lee et al. 2006); locations are depicted on Figure 3 (Appendix A).

In each sample plot, vegetation parameters to be monitored include species composition and species density. Visual observations of shrub and herbaceous species will also be recorded by photograph.

Baseline measurements indicate that there is an average of 874 living planted stems per acre with an average of 6 species represented per plot (CVS Output Tables, Appendix C).

## **3.0 SUCCESS CRITERIA**

### **3.1 Stream Success Criteria**

Success criteria for stream enhancement will include 1) success of riparian vegetation, 2) bank stability, and 3) documentation of two bankfull channel events. In the event that less than two bankfull events occur during the first five years, monitoring will continue until the second event is documented. In addition, bankfull events must occur during separate monitoring years.

### **3.2 Vegetation Success Criteria**

Characteristic Tree Species include woody tree and shrub species planted at the Site (Table 5, Appendix C), observed within the reference forest, or outlined for the appropriate plant community in Schafale and Weakley (1990). An average density of 320 stems per acre of Characteristic Tree Species must be surviving in the first three monitoring years. Subsequently, 260 stems per acre must be surviving in year 5.

### **3.3 Wetland Success Criteria**

Success criteria for wetland enhancement will include success of riparian vegetation. Wetland enhancement areas are jurisdictional; therefore, hydrology will not be monitored.

### **4.0 MAINTENANCE AND CONTINGENCY**

In the event that success criteria are not fulfilled, a mechanism for contingency will be implemented.

#### **Stream**

In the event that stream success criteria are not fulfilled, a mechanism for contingency will be implemented. The method of contingency is expected to be dependent upon stream variables that are not in compliance with success criteria. Primary concerns, which may jeopardize stream success, include 1) riparian vegetation and/or 2) documentation of bankfull events.

#### **Vegetation**

If vegetation success criteria are not achieved based on average density calculations from combined plots over the entire restoration area, supplemental planting may be performed with tree species approved by regulatory agencies. Supplemental planting will be performed as needed until achievement of vegetation success criteria.



## 5.0 REFERENCES

- Lee, M.T., R.K. Peet, S.D. Roberts, and T.R. Wentworth. 2006. CVS-EEP Protocol for Recording Vegetation. Version 4.0. North Carolina Department of Environment and Natural Resources, Ecosystem Enhancement Program. Raleigh, North Carolina.
- North Carolina Ecosystem Enhancement Program (NCEEP). 2009. Cape Fear River Basin Restoration Priorities (online). Available: [http://www.nceep.net/services/lwps/cape\\_fear/RBRP%20Cape%20Fear%202008.pdf](http://www.nceep.net/services/lwps/cape_fear/RBRP%20Cape%20Fear%202008.pdf) [June 2010]. North Carolina Department of Environment and Natural Resources, Raleigh, North Carolina.
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- United States Army Corps of Engineers, United States Environmental Protection Agency, North Carolina Wildlife Resources Commission, North Carolina Division of Water Quality (USACE et al.). 2003. Stream Mitigation Guidelines.
- United States Environmental Protection Agency (USEPA). 1990. Mitigation Site Type Classification (MiST). USEPA Workshop, August 13-15, 1989. EPA Region IV and Hardwood Research Cooperative, NCSU, Raleigh, North Carolina.
- United States Geological Survey (USGS). 1974. Hydrologic Unit Map - 1974. State of North Carolina.

**Appendix A.  
General Tables and Figures**

**Table 1. Project Components and Mitigation Credits**

**Table 2. Project Activity and Reporting History**

**Table 3. Project Contacts Table**

**Table 4. Project Attributes Table**

**Figure 1. Site Location Map**

**Figure 2. Mitigation Units**

**Figure 3. Monitoring Plan View**

**Table 1. Project Components and Mitigation Credits  
UT to Haw (Beckom) Site, EEP Project No. 92964**

Mitigation Credits								
Type	Stream		Riparian Wetland		Non-Riparian Wetland	Buffer	Nitrogen Offset	Phosphorus Nutrient Offset
	R	RE	R	RE				
<b>Totals</b>		1173 SMUs		0.89 WMUs				
Project Components								
Project Component/ Reach ID	Station/Location	Existing Footage	Approach	Restoration or Restoration Equivalent	Restoration Footage/ Acreage	Mitigation Ratio		
Main Channel	--	1550	--	Enhancement (Level II)/	1550	2.5:1		
	--	635	--	Preservation	635	5:1		
UT1	--	15	--	Enhancement (Level II)	15	2.5:1		
	--	665	--	Preservation	665	5:1		
UT2	--	635	--	Enhancement (Level II)	635	2.5:1		
UT3	--	165	--	Preservation	165	5:1		
Wetland 1	--	1.15	--	Enhancement	1.15	2:1		
Wetland 2	--	0.25	--	Enhancement	0.25	2:1		
Wetland 3	--	0.05	--	Enhancement	0.05	2:1		
Wetland 4	--	0.15	--	Enhancement	0.15	2:1		
Wetland 5	--	0.05	--	Enhancement	0.05	2:1		
Wetland 6	--	0.10	--	Enhancement	0.10	2:1		
Wetland 7	--	0.01	--	Preservation	0.01	5:1		
Wetland 8	--	0.04	--	Preservation	0.04	5:1		
Component Summation								
Restoration Level	Stream (linear footage)	Riverine Riparian Wetland (acreage)	Planted Riparian Buffer (acreage)					
Enhancement (Level II)	2200	--	--					
Enhancement	--	1.75	--					
Preservation	1465	0.05	--					
<b>Totals</b>	<b>3665</b>	<b>1.8</b>	<b>5.1</b>					
<b>Mitigation Units</b>	<b>1173 SMUs</b>	<b>0.89 WMUs</b>	--					

**Table 2. Project Activity and Reporting History  
UT to Haw (Beckom) Site, EEP Project No. 92964**

Activity or Report	Data Collection Complete	Completion or Delivery
Mitigation Plan	March 2010	March 2010
Soil Amendments	January 2011	January 2011
Site Planting	January 2011	January 2011
Baseline Monitoring Document	January 2011	January 2011

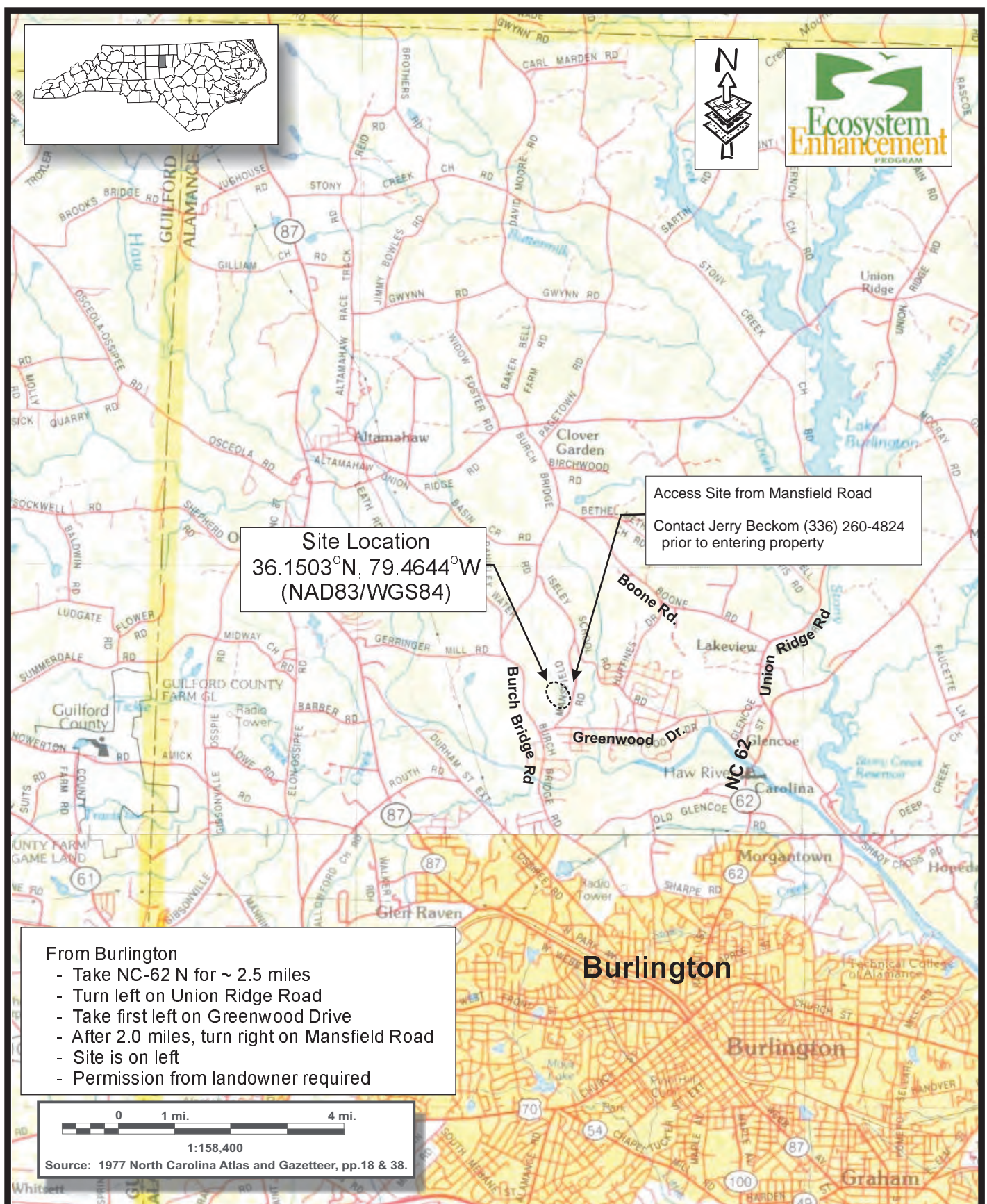
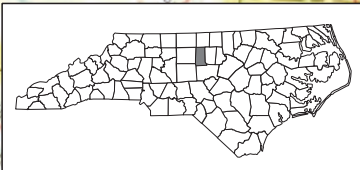
**Table 3. Project Contacts Table  
UT to Haw (Beckom) Site, EEP Project No. 92964**

Designer	Axiom Environmental 218 Snow Ave Raleigh, NC 27603 Grant Lewis (919-215-1693)
Planting and Soil Amendment Contractor	Riverworks Inc. PO Box 31768 Raleigh NC 27622 George Morris (919-459-9043)

**Table 4. Project Baseline Information and Attributes  
UT to Haw (Beckom) Site, EEP Project No. 92964**

Project Information									
Project name			UT to Haw Beckom						
County			Alamance						
Project Area			10 acres						
Project Coordinates			36.1503°N, -79.4644°W						
Project Watershed Summary Information									
Physiographic Province			Southern Outer Piedmont						
River Basin			Cape Fear						
USGS Hydrologic Unit 8-digit		03030002		USGS Hydrologic Unit 14-digit		03030002030010			
DWQ Sub-Basin			03-06-02						
Project Drainage Area			385 acres						
Project Drainage Area Percentage Impervious Surface			<5						
CGIA Land Use Classification			Managed Herbaceous Cover, Hardwood Swamps						
Reach Summary Information									
Parameters		Main Channel		UT 1		UT 2		UT 3	
Length of reach (linear feet)		2185		680		635		165	
Valley classification		VIII		VIII		VIII		VIII	
Drainage area (acres)		150		75		50		30	
NCDWQ stream identification score		42		51		60		68	
NCDWQ Water Quality Classification		WS-V							
Morphological Description (stream type)		-		-		-		-	
Evolutionary trend		-		-		-		-	
Underlying mapped soils		Local Alluvial Land							
Drainage class		Poorly drained							
Soil Hydric status		Hydric							
Slope		.009 feet		.005 feet		.025 feet		.024 feet	
FEMA classification		-		-		-		-	
Percent composition of exotic invasive vegetation		<5		<5		<5		<5	
Wetland Summary Information									
Parameters		Wetland 1	Wetland 2	Wetland 3	Wetland 4	Wetland 5	Wetland 6	Wetland 7	Wetland 8
Size of Wetland (acres)		1.15 acres	0.25 acres	0.05 acres	0.15 acres	0.05 acres	0.10 acres	0.01 acres	0.04 acres
Wetland Type		Riparian							
Drainage class		Poorly Drained							
Soil Hydric Status		Hydric							
Source of Hydrology		Overbank and over-land flow							
Native Vegetation Community		Piedmont/Mountain Swamp Forest						P/M BHF*	P/M BHF*
Percent composition of exotic invasive vegetation		0	0	0	0	0	0	0	0
Regulatory Considerations									
Regulation			Applicable			Resolved?		Supporting Document	
Waters of the United States – Section 404			No						
Waters of the United States – Section 401			No						
Endangered Species Act			No						
Historic Preservation Act			No						
Coastal Management Zone Act (CZMA)/ Coastal Area Management Act (CAMA)			No						
FEMA Floodplain Compliance			No						
Essential Fisheries Habitat			No						

\*Piedmont/Mountain Bottomland Hardwood Forest (Schafale and Weakley)

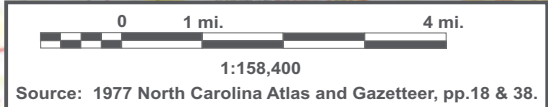


Site Location  
 $36.1503^{\circ}\text{N}, 79.4644^{\circ}\text{W}$   
 (NAD83/WGS84)

Access Site from Mansfield Road  
 Contact Jerry Beckom (336) 260-4824  
 prior to entering property

From Burlington

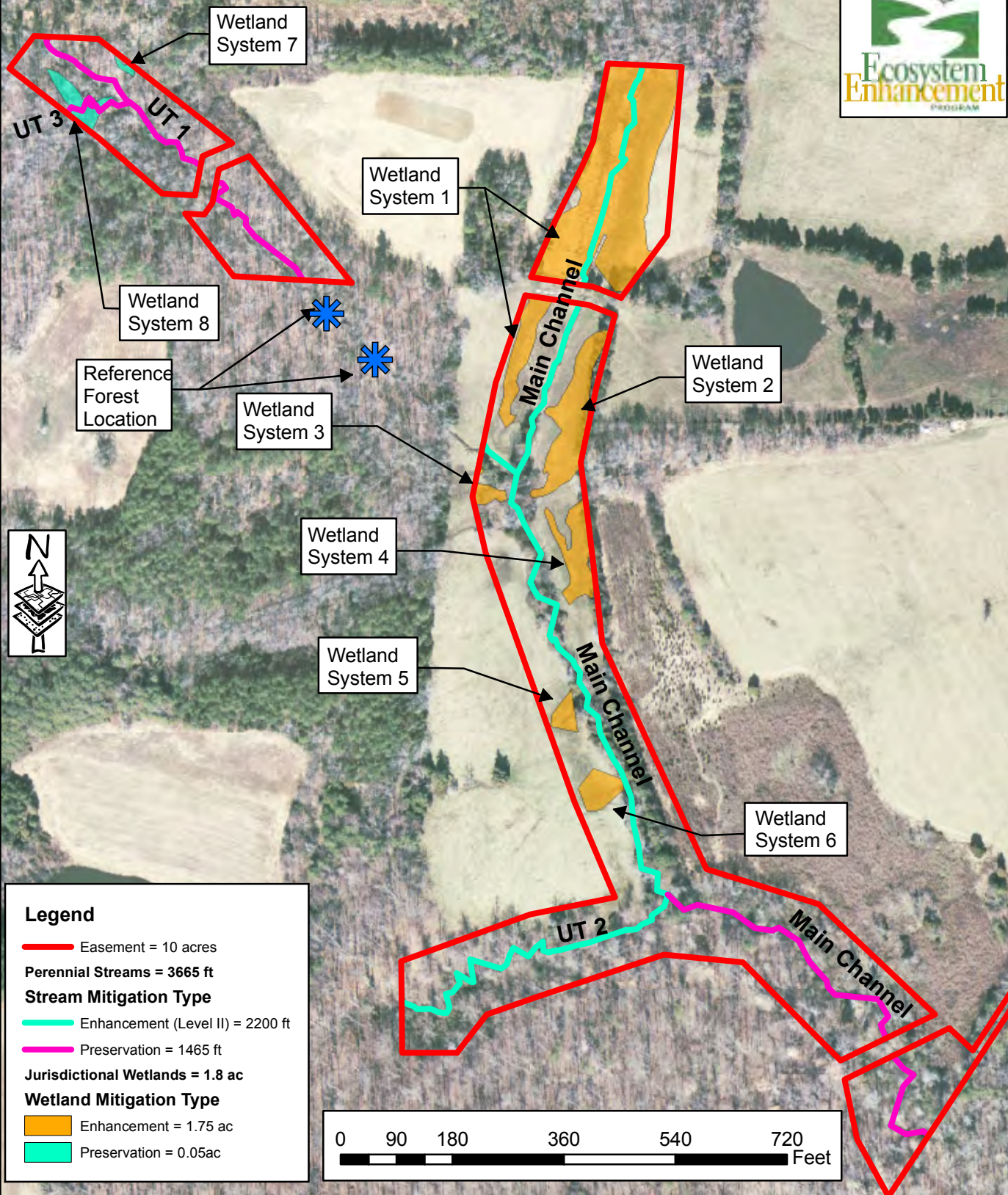
- Take NC-62 N for ~ 2.5 miles
- Turn left on Union Ridge Road
- Take first left on Greenwood Drive
- After 2.0 miles, turn right on Mansfield Road
- Site is on left
- Permission from landowner required



**SITE LOCATION**  
 UT TO HAW (BECKOM) SITE (EEP #92694)  
 Alamance County, North Carolina

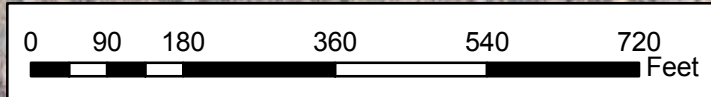
Dwn. by:	WGL
Ckd by:	CLF
Date:	January 2009
Project:	09-025

FIGURE  
**1**



**Legend**

- Easement = 10 acres
- Perennial Streams = 3665 ft**
- Stream Mitigation Type**
- Enhancement (Level II) = 2200 ft
- Preservation = 1465 ft
- Jurisdictional Wetlands = 1.8 ac**
- Wetland Mitigation Type**
- Enhancement = 1.75 ac
- Preservation = 0.05ac

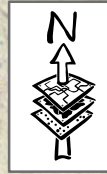


Axiom Environmental, Inc.  
 20 Enterprise Street, Suite 7  
 Raleigh, NC 27607  
 (919) 215-1693

**MITIGATION UNITS**  
**UT TO HAW (BECKOM) SITE (EEP# 92694)**  
 Alamance County, North Carolina

Dwn. By: WGL  
 Date: 1-8-11  
 Project: 09-025

**FIGURE**  
**2**

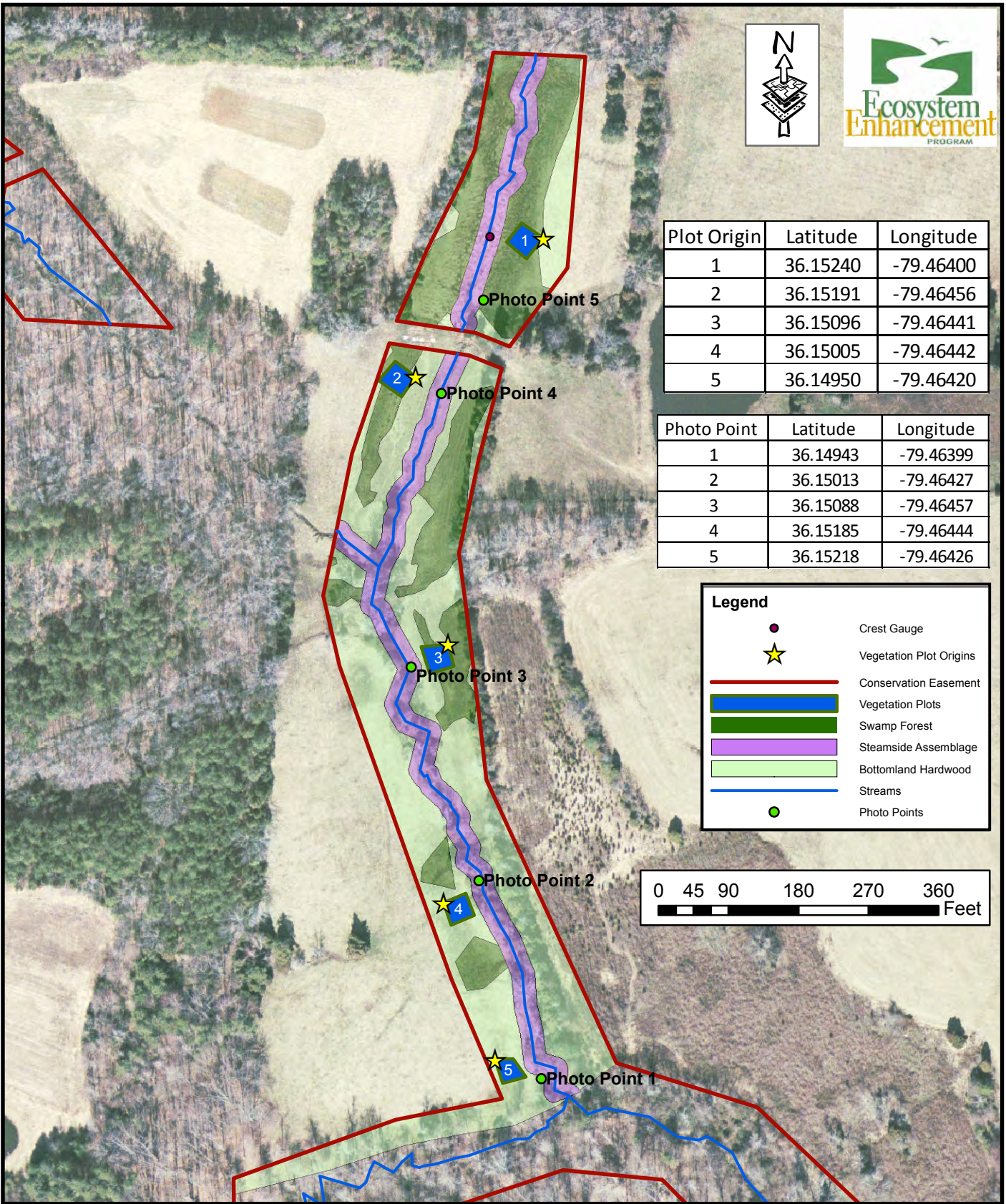
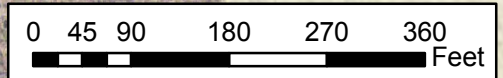


Plot Origin	Latitude	Longitude
1	36.15240	-79.46400
2	36.15191	-79.46456
3	36.15096	-79.46441
4	36.15005	-79.46442
5	36.14950	-79.46420

Photo Point	Latitude	Longitude
1	36.14943	-79.46399
2	36.15013	-79.46427
3	36.15088	-79.46457
4	36.15185	-79.46444
5	36.15218	-79.46426

**Legend**

- Crest Gauge
- Vegetation Plot Origins
- Conservation Easement
- Vegetation Plots
- Swamp Forest
- Steamside Assemblage
- Bottomland Hardwood
- Streams
- Photo Points




Axiom Environmental  
218 Snow Ave.  
Raleigh, NC 27603  
(919) 215-1693

**MONITORING PLAN VEIW  
UT TO HAW BECKOM SITE**  
Alamance County, North Carolina

Dwn. by: ND  
Date: JAN 2011  
Project: 09-025

FIGURE  
**3**

**Appendix B.**  
**Post Construction Photographs**



**UT to Haw (Beckom) Site (92694)  
Post Construction Photographs  
January 3, 2011**



Photo Point 1



Photo Point 2



Photo Point 3



Photo Point 4



Photo Point 5

**Appendix C.  
Vegetation Data**

**Table 5. Planted Woody Species**

**Table 6. Planted and Total Stem Counts (Species by Plot with Annual Means)**

**CVS Vegetation Plot Photographs**

**CVS Output Tables**

**Table 5. Planted Woody Vegetation  
UT to Haw (Beckom) Site, EEP Project No. 92964**

Vegetation Association	Piedmont/Mountain Bottomland Forest*		Piedmont/Mountain Swamp Forest*		Stream-side Assemblage**		TOTAL
Area (acres)	2.5		1.5		1.1		5.1
Species	Number planted	% of total	Number planted	% of total	Number planted	% of total	Number planted
Swamp chestnut oak ( <i>Quercus michauxii</i> )	400	20	200	20	--	--	600
Cherrybark oak ( <i>Quercus pagoda</i> )	400	20	200	20	--	--	600
Sycamore ( <i>Platanus occidentalis</i> )	400	20	100	10	--	--	500
American elm ( <i>Ulmus americana</i> )	300	15	--	--	--	--	300
Green ash ( <i>Fraxinus pennsylvanica</i> )	400	20	100	10	--	--	500
Willow oak ( <i>Quercus phellos</i> )	--	--	200	20	--	--	200
Overcup oak ( <i>Quercus lyrata</i> )	--	--	200	20	--	--	200
Silky dogwood ( <i>Cornus amomum</i> )	100	5	--	--	900	30	1000
Black willow ( <i>Salix nigra</i> )	--	--	--	--	900	30	900
Buttonbush ( <i>Cephalanthus occidentalis</i> )	--	--	--	--	600	20	600
Elderberry ( <i>Sambucus canadensis</i> )	--	--	--	--	600	20	600
<b>TOTAL</b>	<b>2000</b>	<b>100</b>	<b>1000</b>	<b>100</b>	<b>3000</b>	<b>100</b>	<b>6000</b>

\* Plant communities (Bottomland Forest and Swamp Forest) were planted at a density of 680 stems/acre.

\*\* Stream-side assemblage was planted at a density of 2720 stems/acre.

**Table 6. Planted and Total Stems (Species by Plot with Annual Means)  
UT to Haw (Beckom) Site, EEP Project No. 92964**

Scientific Name	Common Name	Species Type	Current Plot Data (MYO 2011)															Annual Means		
			92694-AXE-0001			92694-AXE-0002			92694-AXE-0003			92694-AXE-0004			92694-AXE-0005			MYO (2011)		
			P-LS	P-all	T	P-LS	P-all	T	P-LS	P-all	T	P-LS	P-all	T	P-LS	P-all	T	P-LS	P-all	T
Cephalanthus occidentalis	common buttonbush	Shrub Tree		2	2														2	2
Cornus amomum	silky dogwood	Shrub		1	1				1	1			1	1					3	3
Fraxinus pennsylvanica	green ash	Tree		5	5				3	3			3	3					11	11
Platanus occidentalis	American sycamore	Tree				3	3		5	5					4	4			12	12
Quercus	oak	Shrub Tree		1	1		7	7		2	2		4	4		6	6		20	20
Quercus michauxii	swamp chestnut oak	Tree				4	4		2	2		1	1		4	4			11	11
Quercus pagoda	cherrybark oak	Tree		9	9	3	3		3	3		5	5		3	3			23	23
Quercus phellos	willow oak	Tree		6	6	4	4												10	10
Ulmus americana	American elm	Tree				1	1		1	1		7	7		7	7			16	16
<b>Stem count</b>			0	24	24	0	22	22	0	17	17	0	21	21	0	24	24	0	108	108
<b>size (ares)</b>			1			1			1			1			1			5		
<b>size (ACRES)</b>			0.02			0.02			0.02			0.02			0.02			0.12		
<b>Species count</b>			0	6	6	0	6	6	0	7	7	0	6	6	0	5	5	0	9	9
<b>Stems per ACRE</b>			0	971.2	971.2	0	890.3	890.3	0	688	688	0	849.8	849.8	0	971.2	971.2	0	874.1	874.1

**UT to Haw Beckom  
CVS Vegetation Plot Photographs  
January 3, 2011**



CVS Vegetation Plot 1



CVS Vegetation Plot 2



CVS Vegetation Plot 3



CVS Vegetation Plot 4



CVS Vegetation Plot 5

**Metadata UT to Haw (Beckom) Site (92694)**

<b>Report Prepared By</b>	Corri Faquin	
<b>Date Prepared</b>	1/4/2011 15:04	
<b>database name</b>	Axiom-EEP-2011-A.mdb	
<b>database location</b>	C:\Axiom\Business\CVS Database\2011	
<b>computer name</b>	CORRI	
<b>file size</b>	40288256	
<b>DESCRIPTION OF WORKSHEETS</b>		
<b>Metadata</b>	Description of database file, the report worksheets, and a summary of project(s) and project data.	
<b>Proj, planted</b>	Each project is listed with its PLANTED stems per acre, for each year. This excludes live stakes.	
<b>Proj, total stems</b>	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.	
<b>Plots</b>	List of plots surveyed with location and summary data (live stems, dead stems, missing, etc.).	
<b>Vigor</b>	Frequency distribution of vigor classes for stems for all plots.	
<b>Vigor by Spp</b>	Frequency distribution of vigor classes listed by species.	
<b>Damage</b>	List of most frequent damage classes with number of occurrences and percent of total stems impacted by each.	
<b>Damage by Spp</b>	Damage values tallied by type for each species.	
<b>Damage by Plot</b>	Damage values tallied by type for each plot.	
<b>Planted Stems by Plot and Spp</b>	A matrix of the count of PLANTED living stems of each species for each plot; dead and missing stems are excluded.	
<b>ALL Stems by Plot and spp</b>	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.	
<b>PROJECT SUMMARY-----</b>		
<b>Project Code</b>	92694	
<b>project Name</b>	UT Haw (Beckom)	
<b>Description</b>	buffer and wetland mitigation	
<b>River Basin</b>		
<b>length(ft)</b>		
<b>stream-to-edge width (ft)</b>		
<b>area (sq m)</b>		
<b>Required Plots (calculated)</b>		
<b>Sampled Plots</b>	5	

**Planted Stems by Plots and Species UT to Haw (Beckom) Site (92694)**

<b>Species</b>	<b>CommonName</b>	<b>Total Planted Stems</b>	<b># plots</b>	<b>avg# stems</b>	<b>Plot 1</b>	<b>Plot 2</b>	<b>Plot 3</b>	<b>Plot 4</b>	<b>Plot 5</b>
Cephalanthus occidentalis	common buttonbush	2	1	2	2				
Cornus amomum	silky dogwood	3	3	1	1		1	1	
Fraxinus pennsylvanica	green ash	11	3	3.67	5		3	3	
Platanus occidentalis	American sycamore	12	3	4		3	5		4
Quercus	oak	20	5	4	1	7	2	4	6
Quercus michauxii	swamp chestnut oak	11	4	2.75		4	2	1	4
Quercus pagoda	cherrybark oak	24	5	4.8	9	4	3	5	3
Quercus phellos	willow oak	9	2	4.5	6	3			
Ulmus americana	American elm	16	4	4		1	1	7	7
<b>9</b>	<b>9</b>	<b>108</b>	<b>9</b>		<b>24</b>	<b>22</b>	<b>17</b>	<b>21</b>	<b>24</b>

**All Stems by Plot and Species UT to Haw (Beckom) Site (92694)**

<b>Species</b>	<b>Common Name</b>	<b>Total Stems</b>	<b># plots</b>	<b>avg# stems</b>	<b>Plot 1</b>	<b>Plot 2</b>	<b>Plot 3</b>	<b>Plot 4</b>	<b>Plot 5</b>
Cephalanthus occidentalis	common buttonbush	2	1	2	2				
Cornus amomum	silky dogwood	3	3	1	1		1	1	
Fraxinus pennsylvanica	green ash	11	3	3.67	5		3	3	
Platanus occidentalis	American sycamore	12	3	4		3	5		4
Quercus	oak	20	5	4	1	7	2	4	6
Quercus michauxii	swamp chestnut oak	11	4	2.75		4	2	1	4
Quercus pagoda	cherrybark oak	24	5	4.8	9	4	3	5	3
Quercus phellos	willow oak	9	2	4.5	6	3			
Ulmus americana	American elm	16	4	4		1	1	7	7
<b>9</b>	<b>9</b>	<b>108</b>	<b>9</b>		<b>24</b>	<b>22</b>	<b>17</b>	<b>21</b>	<b>24</b>



### Project Planted Stems

Living planted stems, excluding live stakes, per acre: Negative (red) numbers indicate the project failed to reach requirements in a particular year.			
Project Code	Project Name	River Basin	Year 0 (baseline)
92694	UT Haw (Beckom)	Haw	874.12

### Project Total Stems

Total stems, including planted stems of all kinds (including live stakes) and natural/volunteer stems:			
Project Code	Project Name	River Basin	Year 0 (baseline)
92694	UT Haw (Beckom)		874.1209889

### Vigor UT to Haw (Beckom) Site (92694)

vigor	Count	Percent
2	1	0.9
3	44	40.7
4	63	58.3

### Damage UT to Haw (Beckom) Site (92694)

Damage	Count	Percent Of Stems
(no damage)	108	100

**Vigor By Species UT to Haw (Beckom) Site (92694)**

	Species	CommonName	4	3	2	1	0	Missing	Unknown
	Cephalanthus occidentalis	common buttonbush	1	1					
	Cornus amomum	silky dogwood	2	1					
	Fraxinus pennsylvanica	green ash	5	6					
	Quercus michauxii	swamp chestnut oak	6	5					
	Quercus pagoda	cherrybark oak	21	3					
	Quercus phellos	willow oak	5	4					
	Quercus	oak	10	9	1				
	Platanus occidentalis	American sycamore	11	1					
	Ulmus americana	American elm	2	14					
<b>TOT:</b>	<b>9</b>	<b>9</b>	<b>63</b>	<b>44</b>	<b>1</b>				

**Damage By Species UT to Haw (Beckom) Site (92694)**

	Species	CommonName	Count of Damage Categories	(no damage)
	Cephalanthus occidentalis	common buttonbush	0	2
	Cornus amomum	silky dogwood	0	3
	Fraxinus pennsylvanica	green ash	0	11
	Platanus occidentalis	American sycamore	0	12
	Quercus	oak	0	20
	Quercus michauxii	swamp chestnut oak	0	11
	Quercus pagoda	cherrybark oak	0	24
	Quercus phellos	willow oak	0	9
	Ulmus americana	American elm	0	16
<b>TOT:</b>	<b>9</b>	<b>9</b>	<b>0</b>	<b>108</b>

**Damage By Plot UT to Haw (Beckom) Site (92694)**

	plot	Count of Damage Categories	(no damage)
	1	0	24
	2	0	22
	3	0	17
	4	0	21
	5	0	24
<b>TOT:</b>	<b>5</b>	<b>0</b>	<b>108</b>

**Plots UT to Haw (Beckom) Site (92694)**

plot	Plot Level	Year	Latitude/Northing	Longitude/Easting	Datum	Date Sampled	Planted Living Stems	Planted Living Stems EXCLUDING Live Stakes	Dead/Missing Stems	Natural (Volunteer) Stems	Total Living Stems	Total Living Stems EXCLUDING Live Stakes	Planted Living Stems per ACRE	Planted Living Stems EXCLUDING Live Stakes PER ACRE	Natural (Volunteer) Stems PER ACRE	Total Living Stems PER ACRE	Total Living Stems EXCLUDING Live Stakes PER ACRE	# species
1	2	0	36.15240	- 79.46400	NAD83/WGS84	1/3/2011	24	24	0	0	24	24	971.245	971.24	0	971.245	971.245	6
2	2	0	36.15191	- 79.46456	NAD83/WGS84	1/3/2011	22	22	0	0	22	22	890.308	890.308	0	890.308	890.308	6
3	2	0	36.15096	- 79.46441	NAD83/WGS84	1/3/2011	17	17	0	0	17	17	687.965	687.965	0	687.965	687.965	7
4	2	0	36.15005	- 79.46442	NAD83/WGS84	1/3/2011	21	21	0	0	21	21	849.839	849.839	0	849.839	849.839	6
5	2	0	36.14950	- 79.46419	NAD83/WGS84	1/3/2011	24	24	0	0	24	24	971.245	971.245	0	971.245	971.245	5