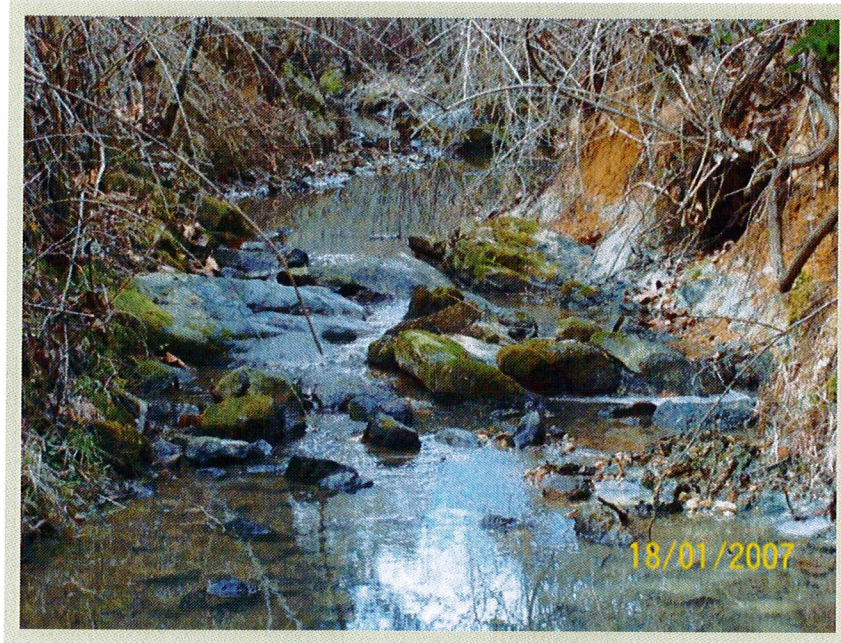


**FINAL  
ANNUAL MONITORING REPORT  
UT TO HAW (GWYNN) SITE  
ALAMANCE COUNTY, NORTH CAROLINA  
(EEP Project No. 92753)**

Monitoring Year 1 of 5 (2010)



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



November 2010

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NOV 18 2010

NC ECOSYSTEM  
ENHANCEMENT PROGRAM

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Monitoring Year 1 of 5 (2010)



Submitted to:  
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Raleigh, North Carolina

Prepared by:  
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November 2010



## 1.0 EXECUTIVE SUMMARY

The North Carolina Ecosystem Enhancement Program (NCEEP) has completed enhancement and preservation of streams and wetlands at the UT to Haw (Gwynn) Site (hereafter referred to as the "Site") to assist in fulfilling stream and wetland mitigation goals in the area. The Site is located approximately 9 miles north of Burlington, in Alamance County within United States Geological Survey (USGS) Hydrologic Unit 03030002030010 (North Carolina Division of Water Quality Subbasin 03-06-02) of the Cape Fear River Basin and will service USGS 8-digit Cataloging Unit (CU) 03030002 (Figure 1, Appendix A). The Site is located within a NCEEP Targeted Local Watershed; in addition, this Site was identified for preservation and enhancement as Site 26 (Travis & Tickle 15.4) in the 2008 NCEEP *Little Alamance, Travis, and Tickle Creek Local Watershed Plan* (PTCG 2008). The removal of invasive species and subsequent planting with native riparian vegetation at the Site resulted in 2428 linear feet of stream enhancement, 2.0 acres of riparian riverine wetland enhancement, and 0.3 acres of riparian riverine wetland preservation. Site activities provided 971 Stream Mitigation Units and 1.1 riparian riverine Wetland Mitigation Units. This report (compiled based on NCEEP's *Revised Table of Contents for 2009 Monitoring Report Submissions* Version 1.2.1 dated 6/1/09) summarizes data for year 1 (2010) monitoring.

Prior to construction the Site was characterized by pasture land utilized for livestock grazing, a drained pond, and disturbed forest. Land use practices including the maintenance and removal of riparian vegetation and hoof shear from livestock had resulted in degraded water quality, unstable channel characteristics (stream entrenchment, erosion, and bank collapse), and reduced storage capacity and floodwater attenuation. In addition, hydric soils were disturbed due to regular plowing, vegetation maintenance, and hoof shear from livestock.

The goals and objectives of this project focused on improving local water quality, enhancing flood attenuation, and restoring aquatic and riparian habitat. These goals were accomplished by the following.

1. 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.
2. Reducing sedimentation/siltation within on-Site and downstream receiving waters by a) eliminating 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.
3. Promoting floodwater attenuation and improving stream stability by revegetating Site floodplains to reduce floodwater velocities through increased frictional resistance on floodwaters crossing Site floodplains.
4. 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.
5. Providing wildlife habitat including a forested riparian corridor within a region of the state increasingly dissected by residential/agricultural land use.
6. 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 along the heavily used Boone Road resulting in increasing development pressure and appeal to developers.

Success criteria for stream enhancement will include 1) success of riparian vegetation and 2) documentation of two bankfull channel events. Three bankfull events were documented to occur in 2010 with one occurring in February during planting and the remaining two occurring in May and September.

Success criteria dictate that an average density of 320 stems per acre of Characteristic Tree Species must be surviving in the first three monitoring years. Subsequently, 260 Characteristic Tree Species per acre must be surviving in year 5. Based on the number of stems counted, average densities were measured at 1174 planted stems per acre surviving in year 1 (2010). The dominant species identified at the Site were planted stems of swamp chestnut oak (*Quercus michauxii*), cherrybark oak (*Quercus pagoda*), persimmon (*Diospyros virginiana*), and green ash (*Fraxinus pennsylvanica*). All individual plots met success criteria when counting planted stems alone. Survival of planted stems was slightly low within the wetland enhancement area as the result of drought during the summer, overtopping of seedlings by grasses, or as the result of flooding from a beaver dam observed on June 29, 2010 and removed by Aphis in early August 2010. However, all individual plots met success criteria and there is abundant seed source adjacent to the Site. Plants within the wetland enhancement area should be monitored closely throughout subsequent monitoring years.

In summary, the Site achieved success criteria for vegetation and stream attributes in the First Monitoring Year (2010). Summary information and 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 tables and figures within this report's appendices. Narrative background and supporting information formerly found in these reports can be found in the mitigation and restoration plan documents available on EEPs website. All raw data supporting the tables and figures in the appendices is available from EEP upon request.



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## **2.0 METHODOLOGY**

### **2.1 Stream**

Annual stream monitoring will include vegetation survival (Section 2.2 Vegetation) and a photographic record of preconstruction and postconstruction conditions. Preconstruction photographs are included in Appendix B. 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.

### **2.2 Vegetation**

After planting was completed, an initial evaluation was performed to verify planting methods were successful and to determine initial species composition and density. Five sample vegetation 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). In each sample plot, vegetation parameters to be monitored include species composition and species density. Visual observations of the percent cover of shrub and herbaceous species will also be documented by photograph.



### 3.0 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.
- Piedmont Triad Council of Government (PTCG). 2008. Little Alamance, Travis, & Tickle Creek Watersheds Restoration Plan. Available: <http://www.ptcog.org/eep/LATTPHaseIII.pdf> [November 2008]. Piedmont Triad Council of Government, Greensboro, North Carolina.
- Schafale, M.P. and A.S. Weakley. 1990. Classification of the Natural Communities of North Carolina: Third Approximation. North Carolina Natural Heritage Program, Division of Parks and Recreation, North Carolina Department of Environment, Health, and Natural Resources. Raleigh, North Carolina.
- 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 Geological Survey (USGS). 1974. Hydrologic Unit Map - 1974. State of North Carolina.

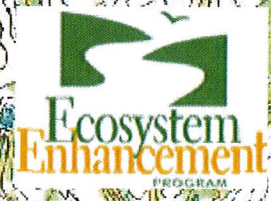
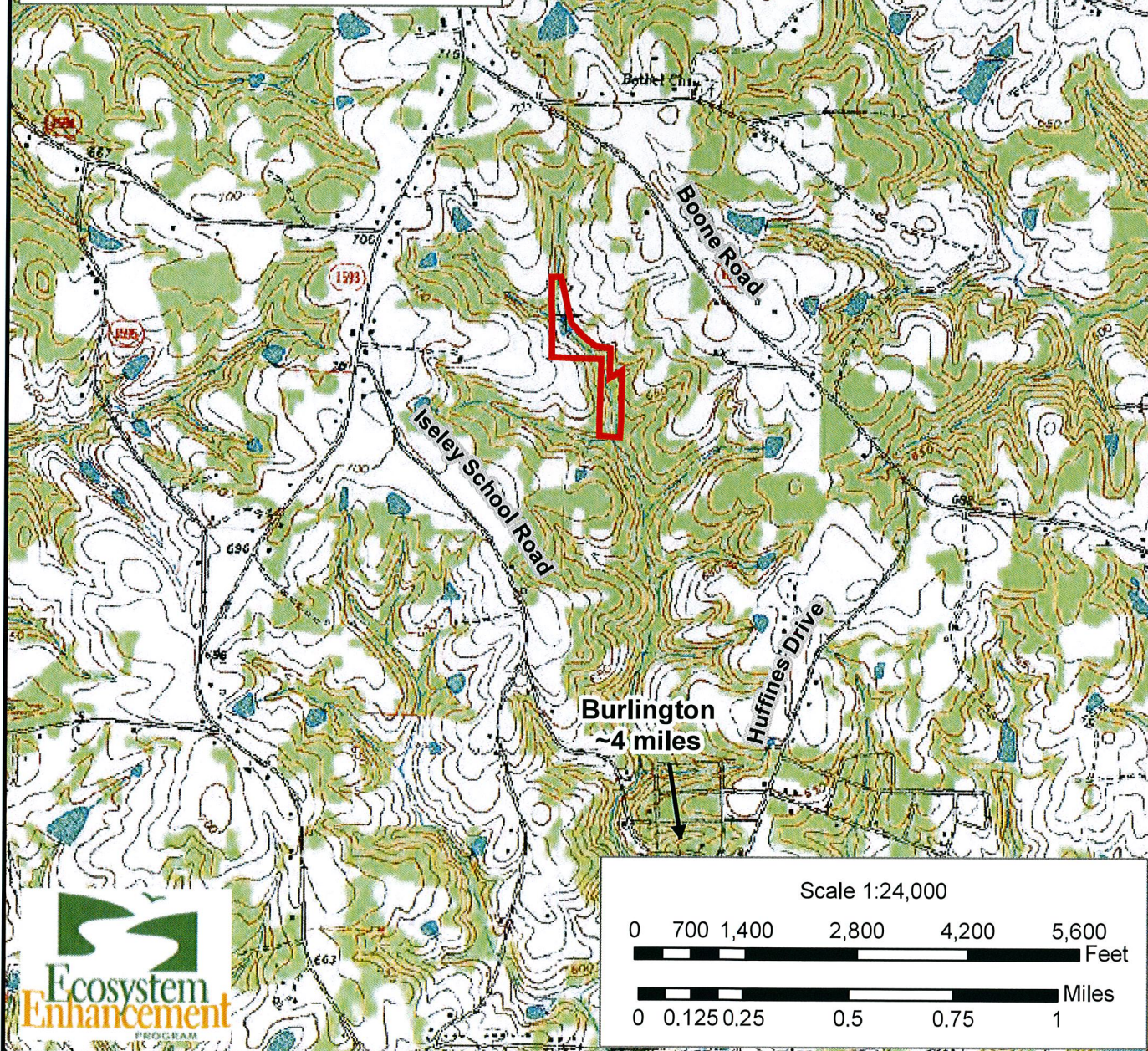
**Appendix A.**  
**Figures**

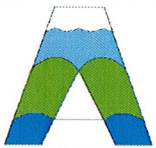
- Figure 1. Site Location Map  
Figure 2. Monitoring Plan View



Directions to the Site  
from Burlington:

- > Take NC-62 North for ~ 2.5 miles
- > Turn left on Union Ridge Road (at the Shell station; Five Points Grocery and Grill)
- > Take 3rd left on Boone Road
- > The Site entrance is ~ 2.5 miles ahead on the left/southwest side of Boone Road between 1048 and 1130 Boone Road; the Site entrance is gated and permission is required from the landowner for entrance.
- > Coordinates in the center of the Site:  
Latitude 36.1631, Longitude -79.4556 (NAD83/WGS84)



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

**SITE LOCATION**  
**UT TO HAW (GWYNN) SITE**  
 Alamance County, North Carolina

Dwn. by:  
 CLF  
 Date:  
 Oct 2010  
 Project:  
 08-027

FIGURE  
1





Comment	Latitude	Longitude
Veg Plot 1 Origin	36.167540	-79.458165
Veg Plot 1	36.167472	-79.458245
Veg Plot 1	36.167537	-79.458327
Veg Plot 1	36.167607	-79.458250
Veg Plot 2 Origin	36.166402	-79.458224
Veg Plot 2	36.166492	-79.458270
Veg Plot 2	36.166522	-79.458167
Veg Plot 2	36.166441	-79.458123
Veg Plot 3 Origin	36.165784	-79.456866
Veg Plot 3	36.165717	-79.456936
Veg Plot 3	36.165773	-79.457031
Veg Plot 3	36.165835	-79.456969
Veg Plot 4 Origin	36.164799	-79.456071
Veg Plot 4	36.164793	-79.456180
Veg Plot 4	36.164874	-79.456184
Veg Plot 4	36.164880	-79.456068
Veg Plot 5 Origin	36.163508	-79.455586
Veg Plot 5	36.163506	-79.455700
Veg Plot 5	36.163560	-79.455678
Veg Plot 5	36.163601	-79.455592



Wetland 1

Wetland 2

Wetland 3

Wetland 4

Main Channel

UT1

UT2

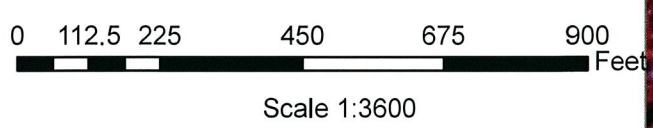
UT3

UT4

UT5

**Legend**

- Easement
- Stream Enhancement (Level II)
- Existing Perennial Streams
- Existing Intermittent Streams
- Vegetation Plots
- Vegetation Plot Origins
- Wetland Enhancement = 2.0 acres
- Wetland Preservation = 0.3 acres
- Crest Gage Location
- Photo Point Locations



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MONITORING PLAN VIEW  
UT TO HAW (GWYNN) SITE  
Alamance County, North Carolina

Dwn. by: CLF  
Date: Oct 2010  
Project: 08-027

FIGURE  
**2**



**Appendix B.**  
**General Tables**

Table 1. Site Restoration Structures and Objectives

Table 2. Project Activity and Reporting History

Table 3. Project Contacts Table

Table 4. Project Attributes Table

**Table 1. Site Restoration Structures and Objectives**

Restoration Segment/ Reach ID	Station Range	Mitigation Type	Priority Approach	Linear Footage/ Acreage	Comment
Main Channel	--	Enhancement (Level II)	--	1987	Invasive species removal, planting with native forest vegetation, and exclusion of livestock.
UT1	--	Enhancement (Level II)	--	93	
UT2	--	Enhancement (Level II)	--	96	
UT3	--	Enhancement (Level II)	--	98	
UT4	--	Enhancement (Level II)	--	121	
UT5	--	Enhancement (Level II)	--	33	
Wetland 1	--	Enhancement	--	1.8	Invasive species removal, planting with native forest vegetation, and exclusion of livestock.
Wetland 2	--	Preservation	--	0.2	Exclusion of livestock.
Wetland 3	--	Preservation	--	0.1	
Wetland 4	--	Enhancement	--	0.2	Invasive species removal, planting with native forest vegetation, and exclusion of livestock.
Component Summation					
Restoration Level	Stream (linear footage)	Riverine Riparian Wetland (acreage)		Planted Riparian Buffer (acreage)	
Enhancement (Level II)	2428	--		--	
Enhancement	--	2.0		--	
Preservation	--	0.3		--	
<b>Totals</b>	<b>2428</b>	<b>2.3</b>		<b>8.3</b>	
<b>Mitigation Units</b>	<b>971 SMUs</b>	<b>1.1 WMUs</b>		<b>--</b>	

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

Activity or Report	Data Collection Complete	Completion or Delivery
Restoration Plan	--	June 2009
Invasive Species Control	--	February 2010
Soil Amendments	--	February 2010
Site Planting	--	January 2010
Mitigation Plan	February 2010	February 2010
Monitoring Year 1 (2010)	October 2010	November 2010

**Table 3. Project Contacts Table**

<b>Designer and Monitoring Performer</b>	Axiom Environmental, Inc. 20 Enterprise Street, Suite 7 Raleigh, North Carolina 27607 Grant Lewis (919) 215-1693
<b>Planting, Soil Amendment, and Invasive Species Removal Contractor</b>	Carolina Silvics 908 Indian Trail Road Edenton, North Carolina 27932 Dwight McKinney (252) 482-8491



**Table 4. Project Attribute Table**

Project County	Alamance County, North Carolina
Physiographic Region	Piedmont
Ecoregion	Southern Outer Piedmont
Project River Basin	Cape Fear
USGS 14-digit HUC	03030002030010
NCDWQ Subbasin	03-06-02
Within EEP Watershed Plan Extent?	Yes-Targeted Local Watershed
WRC Class	Warm
% of project easement fenced	70 %
Beaver activity observed during design phase	No

**Appendix C.**  
**Vegetation Data**

Table 5. Vegetation Plot Mitigation Success Summary  
Vegetation Monitoring Plot Photos  
CVS Summary Data Tables

Table 6. Vegetation Metadata Table

Table 7. Total and Planted Stems by Plot and Species

**Table 5. Vegetation Plot Mitigation Success Summary Table**

Vegetation Plot ID	Vegetation Survival Threshold Met?	Tract Mean
1	Yes	100%
2	Yes	
3	Yes	
4	Yes	
5	Yes	

**UT to Haw (Gwynn) Restoration Site  
Year 1 (2010) Annual Monitoring  
Vegetation Plot Photos (taken October 2010)**





**Table 6. Vegetation Metadata Table**

<b>Report Prepared By</b>	Corri Faquin
<b>Date Prepared</b>	11/3/2010 15:17
<b>database name</b>	Axiom-EEP-2010-A.mdb
<b>database location</b>	C:\Axiom\Business\CVS Database\2010
<b>computer name</b>	CORRI
<b>file size</b>	40230912
<b>DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT-----</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>ALL 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>PROJECT SUMMARY-----</b>	
<b>Project Code</b>	92753
<b>project Name</b>	UT to Haw (Gwynn)
<b>Description</b>	Stream/wetland enhancement site
<b>River Basin</b>	Cape Fear
<b>length(ft)</b>	
<b>stream-to-edge width</b>	
<b>area (sq m)</b>	
<b>Required Plots</b>	
<b>Sampled Plots</b>	5





**APPENDIX D**  
**STREAM ASSESSMENT DATA**

Table 8. Verification of Bankfull Events  
Stream Fixed Station Photographs



**Table 8. Verification of Bankfull Events**

Date of Data Collection	Date of Occurrence	Method	Photo (if available)
February 17, 2010	February 5, 2010	Visual observations of overbank event including wrack lines and sediment deposition resulting from a 1.36 inch* rainfall event on February 5, 2010 that occurred after numerous rainfall events, within the 3 weeks prior, that totaled 3.52 inches.	1-2
June 16, 2010	May 17, 2010	Visual observations of overbank event including wrack lines and sediment deposition resulting from a 4.1 inch* rainfall event on May 16-17, 2010.	--
October 5, 2010	September 30, 2010	A 4.43-inch* rainfall event occurring between September 26-October 2, 2010.	--

\* Reported at KBUY Weather Station in Burlington.





UT to Haw (Gwynn) Site  
Fixed Station Photo Points  
Taken October 2010

Photo Point 1



Photo Point 2



Photo Point 3



Photo Point 4

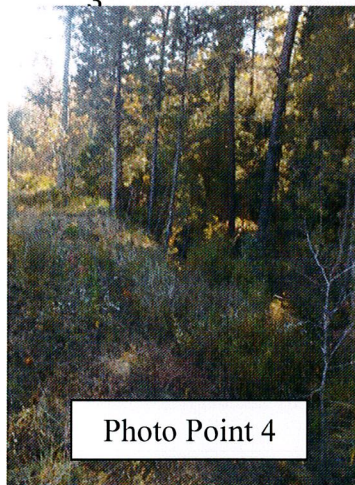


Photo Point 5

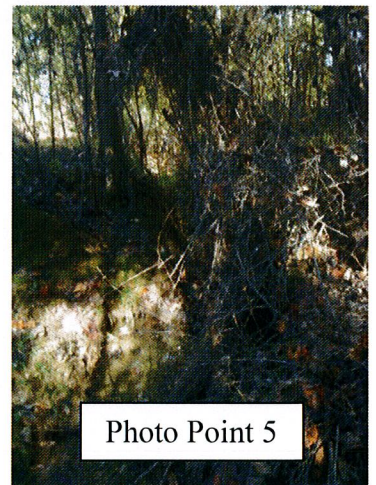


Photo Point 6

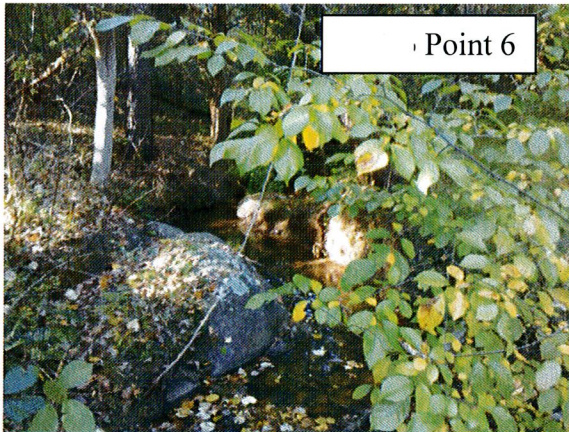


Photo Point 7

