EEP Project Closeout Summary

Project ID & Status

Project Name/Number:	Sandy Creek
EEP ID	321
County:	Randolph
Project Type:	Wetland Restoration, Preservation
Current Status:	5 Years of Monitoring complete

Project Setting

Basin:	Cape Fear
Physiographic Region:	Piedmont
Ecoregion:	Central Piedmont
USGS Hydro Unit:	03030003

Project Performers

DOT Project Transfer in 2005

Project Timeline

Milestone	Date
Construction Completed	2000
Monitoring Year-1	June 2001
Replanting	2002
Monitoring Year-2	2002
Monitoring Year-3	2003
Monitoring Year-4	2004
Monitoring Year-5	2005

The Sandy Creek Mitigation Site in the Cape Fear River Basin was constructed by DOT in 2000 and is 12.9 acres in size: 10 acres are restored riverine bottomland hardwood wetland and 2.9 acres are preserved riverine bottomland hardwood.

This entire tract is within the floodplain of Sandy Creek and was formerly used for hay production. Restoration of the site included filling ditches and leveling the bedding done to drain local areas.

Project Restoration Components and Mitigation Assets

Wetland		Asset Data				
	Restoration Component		Ratio			Wetland
		Level	Multip	Acres	WMU	Type
	Bottomland Hardwood	R	1.00	10.00	10.00	RIP
	Bottomland Hardwoods	P	0.20	2.90	0.58	RIP

Asset Summary

Level	Multip	Acres	WMU
R	1.00	10.00	10.00
		0.0	0.0
		0.0	0.0
P	0.20	2.90	0.58
		12.90	**10.58**

Standard Ratios

	Level	Ratio	Multiplier
Wetland	**R**	1	1.000
Wetland	**E**	2	0.500
Wetland	**C**	3	0.333
Wetland	**P**	5	0.200

P1 = Priority I Restoration
P2 = Priority II Restoration
P3 = Priority III Restoration

R = Restoration
E = Wetland Enhancement
EI = Stream Enhancement I
EII = Stream Enhancemnt II
C = Wetland Creation
P = Preservation

SMU =Stream Mitigation Units
WMU = Wetland Mitigation Units
P/I/E = Perennial, Intermittent, Ephemeral

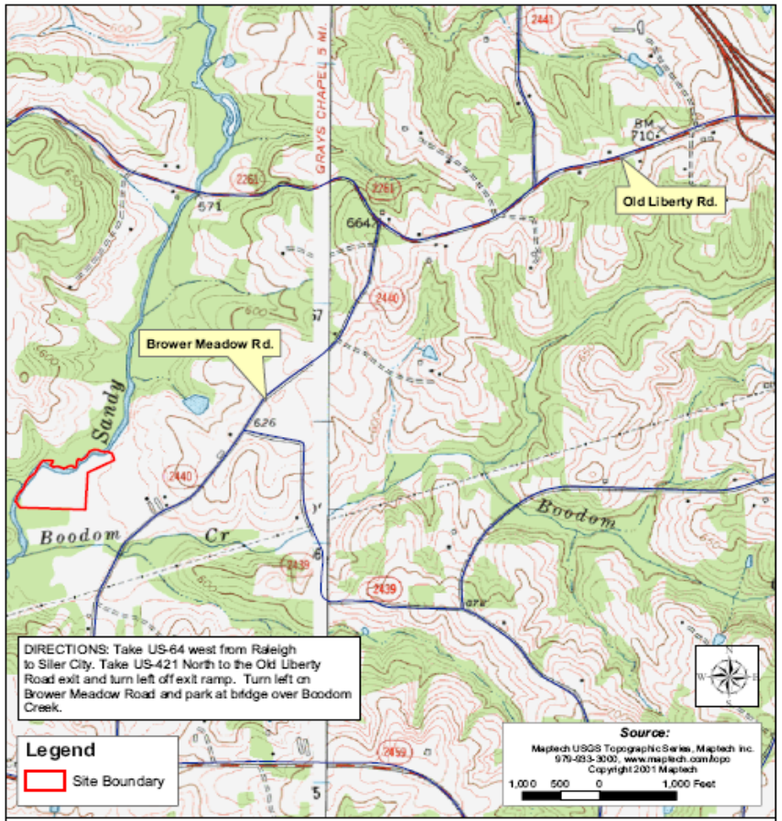

FIGURE 01
VICINITY MAP

Sandy's Creek Wetland Mitigation Site
Randolph County, North Carolina

Map Produced: January 2006

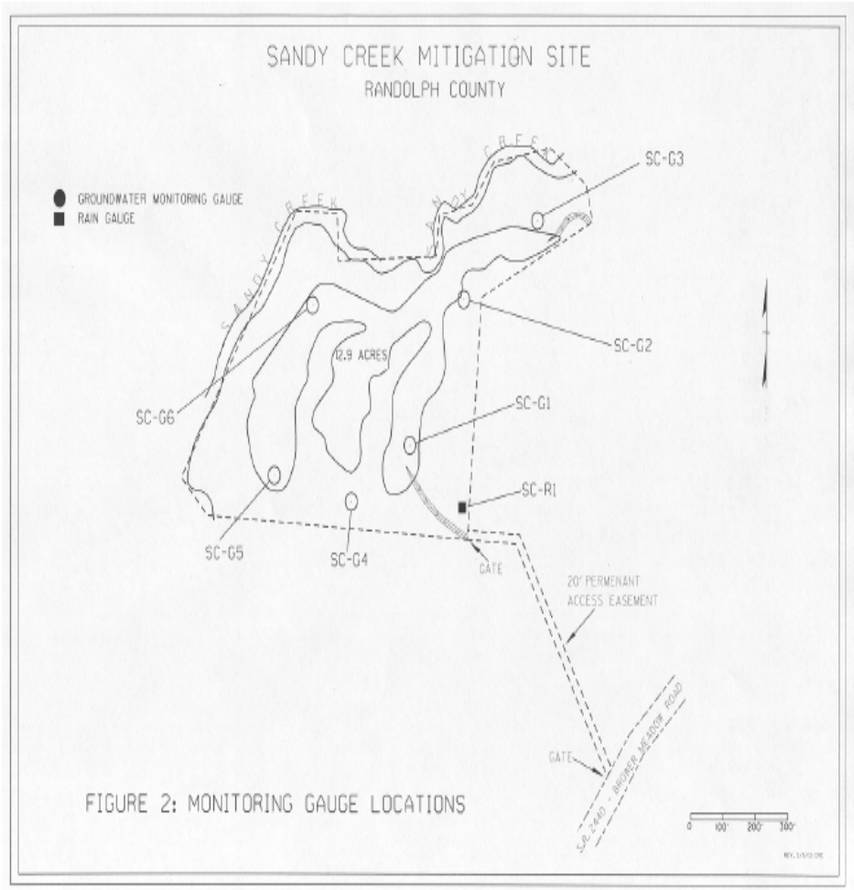

FIGURE 2: MONITORING GAUGE LOCATIONS

Table 2
2002 HYDROLOGIC MONITORING RESULTS

Monitoring Gauge	< 5%	5 - 8%	8 - 12.5%	> 12.5%	Actual %	Dates Meeting Success
SC-G1				✓	30.3	March 23-April 22 Aug 31-Nov 7
SC-G2				✓	34.7	March 23-June 9 June 28-August 9 Aug 26-Nov 7
SC-G3				✓	31.6	March 23-April 29 Aug 28-Nov 7
SC-G4				✓	23.4	Sept 15-Nov 7
SC-G5				✓	32.5	March 23-May 17 June 28-August 20 Aug 26-Nov 7
SC-G6				✓	18.9	May 2-June 10 June 28-August 9

Specific Gauge Problems

- **SC-G4:** The gauges battery was replaced and lost data from (February 27-April 9), which may have affected the gauge from meeting the success criteria.

All six gauges met jurisdictional hydrologic success of at least 12.5% during the growing season.

Table 2. 2003 HYDROLOGIC MONITORING RESULTS

Monitoring Gauge	< 5%	5 - 8%	8 - 12.5%	> 12.5%	Actual %	Dates Meeting Success
SC-G1				×	36.8	March 24-June 15
SC-G2				×	100	March 24-Nov 6
SC-G3				×	35.1	March 24-June 11
SC-G4				×	100	March 24-Nov 6
SC-G5				×	39.9	August 8-Nov 6
SC-G6				×	100	March 24-Nov 6

The 2003 year experienced an above average rainfall year.

Specific Gauge Problems:

- Gauges (G1) and (G3) could not be downloaded after June due to inundation at the gauge locations.

During the 2003-monitoring year, standing water was reported at the majority of the gauge locations. This increased the difficulty involved in downloading the gauges.

Table 1. 2004 HYDROLOGIC MONITORING RESULTS

Monitoring Gauge	< 5%	5 - 8%	8 - 12.5%	> 12.5%	Actual %	Dates Meeting Success
SC-G1+				X	18.0	Sept 28-Nov 7
SC-G2+				X	30.7	March 23-April 27 Aug 30-Nov 7
SC-G3+				X	30.7	March 23-April 25 Aug 30-Nov 7
SC-G4		X			6.6	March 23-April 6
SC-G5+				X	37.3	Aug 15-Nov 7
SC-G6+				X	14.9	Aug 30-Oct 10

+Gauge met during an average rainfall month (February, April, June, July, August, October, and November)

Specific Gauge Problems:

- Gauge 4 malfunctioned during the period from July 17 - October 10.

Table XIV. Wetland Criteria Attainment
(March 24 - November 13, 2005)
Sandy Creek Wetland Mitigation Site/ Project No. 321

Tract	Monitoring Gauge ID	Hydrology Threshold Met?	Tract Mean	Vegetation Plot ID	Vegetation Survival Threshold Met?	Tract Mean
	SC-G1	N	83%	01	Y	100%
	SC-G2	Y		02	Y	
	SC-G3	Y		03	Y	
	SC-G4	Y				
	SC-G5	Y				
	SC-G6	Y				

Stem Counts Per Acre By Plot					
MY	CY	Ave	Plots		
			1	2	3
Y1	2001	**361**	372	189	521
Y2	2002	**570**	595	495	621
Y3	2003	**522**	571	457	539
Y4	2004	**284**	291	210	352
Y5	2005	**6993**	2631	3293	15054
Y6	2006	**314**	261	192	488

Table V. Hydrologic Monitoring Results for 2006 (Year 5)

Gauge	<5 percent	5-8 percent	8-12 percent	>12.5 percent	Cumulative percent	Dates Meeting Success
SC-1	X				5.7	
SC-2				X*		*
SC-3				X	81.1	Mar 23-12-Jul
SC-4				X	68.8	Aug 30-4-Oct
SC-5				X	60	Mar 23-29-May
SC-6				X	46.9	Mar 23-20-May

Notes:

Percentage indicates percent of the growing season water table is less 12 inches below ground surface.

*Gauge SC-2 malfunctioned during the period. Success is based on monthly observations of inundation and saturation

MEMORANDUM

Date: July 17, 2006

To: Greg Melia, Stream Monitoring Specialist, EEP

From: Ron Johnson

Reference: Vegetation Monitoring for EEP Project # 321, Sandy Creek Wetland Mitigation Site, Randolph County, North Carolina

This memo is to follow up on our conversation regarding the vegetation monitoring and the stem counts of the Sandy Creek Wetland Mitigation Site in Randolph County, North Carolina. On June 1, 2006 we met on-site to reach an agreement as to how to count stems given the large number of green ash recruitment that is occurring on the site.

It was agreed that Earth Tech would attempt to identify and count as many planted stems as possible. A planted stem would be a stem that appeared to have flagging from a previous year, or if flagging could be found at the base of the stem and the stem (sapling/tree) appeared to be the appropriate size and age it would be counted.

The results of the revised count are presented in the attached table. Based upon the above methodology the stem density within the three plots is 354 stems per acre. This density is based upon a plot size of 50 X 50 feet. All three plots were measured in the field and were determined to be within 1 foot of this size. This density is within the success criteria of 240 stems per acre although the required six species is not present.

Additional tree species occurring in the plots (as volunteers) included American sycamore, sweet gum, and box elder. Outside the plots, black willow was observed in several locations. Dense stands of green ash occur throughout the site.

Across the site, survival of planted trees is mixed, with lower survival in areas that appear to have standing water during the wetter time periods. With natural recruitment occurring, over time, the site will be similar to adjacent bottomland areas that also have a high density of green ash. A dense stand of herbaceous cover is present and few if any bare spots were observed. The majority of the herbaceous vegetation observed are wetland species.

Beaver are currently active in adjacent Sandy Creek and over the 5-year monitoring period beaver activity has adversely affected stem counts. Numerous cut stems were observed. Some existing saplings are regenerating from cut stumps that are several years old.

Although the required six species of planted trees is not present across the site, Earth Tech does not recommend that any additional plantings be performed. Additional plantings would likely be unsuccessful given the established herbaceous vegetation, developing stands of green ash, and likely beaver activity. Given time there will be plenty of diversity and natural recruitment on the site from adjacent bottomland forest areas as well as seeds brought in by periodic flooding from Sandy Creek.

If you have any questions regarding information or need additional information please contact me at (919) 854-6210.

EarthTech
A Tyco International Ltd. Company

Species	Exhibit Table VIII. Stem Counts for each species arranged by plot							Initial Totals	Year 1 Totals	Year 2 Totals	Year 3 Totals	Year 4 Totals	Year 5 Totals	Survival %
		Plots												
Common Name	*Scientific Name*	**1**	**2**	**3**	**Total Stems**	**% of total**								
Shrubs														
	No shrub planted													
	Total Shrubs	*0*	*0*	*0*	*0*									
Trees														
Black gum	*Nyssa sylvatica*				*0*	*0.0*			14	9	7	0	0	0
Green ash	*Fraxinus pennsylvanicum*	8	27	12	*47*	*77.0*			12	47	47	47	47	100
Willow oak	*Quercus phellos*	2	4		*6*	*9.8*			20	32	25	6	6	30
River birch	*Betula nigra*	2	4	2	*8*	*13.1*			21	28	34	14	8	38
Cherrybark oak	*Quercus pagodifolia*				*0*	*0.0*			12	13	10	2	0	0
Water oak	*Quercus nigra*				*0*	*0.0*			0	9	7	2	0	0
Southern red oak	*Quercus falcata*				*0*	*0.0*			1	1	0	0	0	0
	Total Trees	*12*	*35*	*14*	*61*				*80*	*139*	*130*	*71*	*61*	
	TABLE SUMMARY				**AVERAGE**									
Total Stems of planted Woody vegetaion.		12	35	14	*20*									
% Shrubs		0%	0%	0%	*0%*									
% Trees		100%	100%	100%	*100%*									
Current Density														
Stems per acre		209	610	244	354				465	807	755	412	354	
Stems per hectare		517	1,507	603	875				1,148	1,995	1,866	1,019	875	