



EEP Project Closeout Summary

Project ID & Status

Project Name/Number: Mallard Creek
EEP ID: 239
County: Mecklenberg
Project Type: Wetland Restoration/Creation
Current Status: 5 Years of Monitoring complete

Project Setting

Basin: Catawba
 Physiographic Region: Piedmont
 Ecoregion: Southern Piedmont
 USGS Hydro Unit: 03050103

Project Performers

DOT Project Transfer in 2005

Project Timeline

Milestone	Date
Construction Completed	2000
Monitoring Year-1	June 2001
Monitoring Year 2	March 2002
Monitoring Year-3	June 2003
Monitoring Year-4	June 2001
Monitoring Year 5	March 2002
Monitoring Year-6	June 2003
Monitoring Year-7	June 2004
Monitoring Year-8	June 2005
Monitoring Year-9	June 2006

Project Restoration Components and Mitigation Assets

Wetland	Restoration Component	Asset Data				Wetland Type
		Level	Ratio	Acres	WMU	
	Bottomland Hardwood	R	1.00	2.80	2.80	RIP
	Bottomland Hardwood	C	0.33	6.60	2.38	RIP

Asset Summary

Level	Multip	Acres	WMU
R	1.00	2.80	2.80
E	0.50	0.00	0.00
C	0.33	6.60	2.20
P	0.20	0.0	0.00
		9.40	5.00

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

The Mallard Creek Mitigation Site is a DOT project built in 1994 that underwent remediation in 1997.

The site consists of 2 areas separated by Mallard Creek Church Road. The project consists of restoring 2.8 acres and creating 7.20 acres of bottomland hardwood forest.

Remediation in 1997 consisted of grading the site down to an elevation that would create wetland hydrology. The area was replanted and monitoring continued until 2005.

The last several years showed a steady success in hydrology as well as vegetation. The creation of bottomland hardwood forest resulted in 6.6 acres being accepted by the commenting agencies during the close-out process.

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

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

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

Mallard Creek 2000 (3)

Table 1. Hydrologic Monitoring: Mallard Creek Mitigation Site.

Monitoring Gauge	< 5%	5% - 8%	8% - 12.5%	> 12.5%	Actual %	Success Dates
Site 1						
MW-1				✓	22.9	Sep. 19 - Nov. 11
MW-2				✓	100	Mar. 22 - Nov. 11
MW-3				✓	47.2	Jul. 24 - Nov. 11
Site 2						
MW-4	✓				3.4	Apr. 14 - Apr. 21
MW-5		✓			6.0	Apr. 9 - Apr. 22
MW-6				✓	19.6	Mar. 22 - May 6
MW-7				✓	14.0	Mar. 22 - Apr. 23
MW-8		✓			5.5	Apr. 25 - May 7
MW-9				✓	19.5	Mar. 22 - May 6

Figure 3 is a graphical representation of the hydrologic monitoring results.

Site 1 hydrologic data indicates that the site meets the hydrologic success criteria established by the USACE permit. The site was saturated or inundated for more than 26 days of the growing season. The surface gauge located on Site 1 also showed consistent inundation throughout the growing season. A 12" water main leak adjacent to his site has effected the hydrology at this location. The extent of the effect is unknown at this time.

Site 2 hydrologic data indicates that only three of six gauges met the hydrologic success criteria established for the site. Only gauges 6, 7, and 9 showed saturation or inundation greater than 26 days of the growing season. Gauges 4, 5, and 8 failed to meet the hydrologic success criteria. The data for Site 2, as in 1999, still indicates that the groundwater levels drop quickly after rainfall.

MW 1: Data was lost due to battery failure from March 22 to May 3, 2000.

MW 5: Data was lost due to battery failure from June 19 to August3, 2000.

MW 6: Data was lost due to battery failure from September 11 to October 3, 2000.

Monitoring Year 2001 (4)

Table 2. Hydrologic Monitoring: Mallard Creek Mitigation Site-10" Success Criteria

Monitoring Gauge	Meets Success Criteria?		Success Dates
	No—< 26 days	Yes— 26 days	
Site 1			
MW-1		✓	Mar 22 – Apr 20
MW-2		✓	Mar 22 – May 8
MW-3		✓	Mar 22 – Apr 23
Site 2			
MW-4	✓		Mar 22 – Apr 11
MW-5		✓	Mar 22 – Apr 16
MW-6		✓	Mar 22 – Apr 19
MW-7		✓	Mar 22 – Apr 17
MW-8	✓		Mar 22 – Apr 10
MW-9		✓	Mar 22 – Apr 18
MW-12	✓		Sept 25 – Sept 30

Monitoring Year 2001 (4)

Table 3. Hydrologic Monitoring: Mallard Creek Mitigation Site-12" Success Criteria

Monitoring Gauge	<5%	5-8%	8-12.5%	>12.5%	Actual %	Success Dates
Site 1						
MW-1				✓	12.8	Mar 22 – Apr 20
MW-2				✓	20.8	Mar 22 – May 8
MW-3				✓	16.6	Mar 22 – Apr 23
Site 2						
MW-4			✓		9.4	Mar 22 – Apr 11
MW-5			✓		11.1	Mar 22 – Apr 16
MW-6			✓		12.3	Mar 22 – Apr 19
MW-7			✓		11.5	Mar 22 – Apr 17
MW-8			✓		8.5	Mar 22 – Apr 9
MW-9			✓		11.9	Mar 22 – Apr 18
MW-12	✓				2.1	Sept 25 – Sept 30

Site 1 hydrologic data indicates that the site meets the hydrologic success criteria established by the USACE permit and the Federal guidelines. The site was saturated or inundated for more than 26 consecutive days within 10" of the ground and 12.5% of the growing season within 12" of the ground. All three gauges showed saturation multiple times throughout the growing season. The surface gauge located on Site 1 showed consistent inundation throughout the growing season. A leak in a 12" water main adjacent to this site affected the hydrology at this location prior to 2001; however, the leak was repaired 4 months prior to the growing season.

Site 2 hydrologic data indicates that four of six gauges met the hydrologic success criteria established by the permit for the site and none of the gauges met the Federal guidelines for success. Gauges 5, 6, 7, and 9 showed saturation or inundation greater than 8% of the growing season within 12" of the ground. Gauges 4 and 8 showed saturation for between 5 and 8% of the growing season within 12" of the ground.

Gauge 12 showed saturation for less than 5% of the growing season. The data for Site 2 still indicates that the groundwater levels drop quickly after rainfall.

Monitoring Year 2002 (5)

Table 2. Hydrologic Monitoring: Mallard Creek Mitigation Site-12" Success Criteria

Monitoring Gauge	<5%	5-8%	8-12.5%	>12.5%	Actual %	Success Dates
Site 1						
MW-1*				✓	13.6	10/11-11/11
MW-2				✓	24.7	9/15-11/11
MW-3*				✓	13.6	(3/22-4/20) (10/11- 11/11)
Site 2						
MW-4			✓		9.8	10/12-11/3
MW-5			✓		10.6	3/22-4/15
MW-6*			✓		12.3	(3/22-4/19) (10/14-11/11)
MW-7*			✓		13.6	10/11-11/11
MW-8		✓			6.4	
MW-9*				✓	13.6	10/11-11/11
MW-12*				✓	13.2	10/12-11/11

* Gauges met the criteria success during an above average rainfall for the month of October.

Site 1 hydrologic data indicates that the site meets the hydrologic success criteria established by the Federal guidelines. The site was saturated or inundated for more than 12.5% of the growing season within 12" of the ground. All three gauges showed saturation multiple times throughout the growing season. The surface gauge located on Site 1 showed consistent inundation throughout the growing season.

Site 2 hydrologic data indicates that only 2 of the gauges met the Federal guidelines for success. Gauges 9 and 12 showed saturation or inundation greater than 12.5% of the growing season within 12" of the ground. Gauges 4,5,6, and 7 showed saturation for between 8 and 12.5% of the growing season within 12" of the ground. Gauge 8 showed saturation for between 5 and 8% of the growing season. The data for Site 2 still indicates that the groundwater levels drop quickly after rainfall.

For Site 1, all three gauges showed saturation for more than 12.5% of the growing season. Site 2 did not recover from Charlotte's dry early season.

Monitoring Year 6

Table 2. 2003 Hydrologic Monitoring Results

Monitoring Gauge	<5%	5-8%	8-12.5%	>12.5%	Actual %	Success Dates
Site 1						
MC-1	✘				4.7	
MC -2				✘	42.6	March 22-June 29
MC -3				✘	44.7	April 2-July 15
Site 2						
MC -4				✘	39.6	March 22-June 22
MC -5				✘	68.5	March 22-Aug 29
MC -6				✘	44.3	March 22-Sept. 2
MC -7				✘	37.4	March 22-June 17
MC -8				✘	17.4	April 3-May 1 May 22-June 23
MC -9				✘	17.9	April 2-May 13 July 13-August 22
MC -12				✘	70.2	March 22-Sept 2

Specific Gauge Problems:

- Gauge (MC-1) experienced malfunctions such as battery failure and gauge replacement during the growing season (April 2 - October 1).
- Gauges (MC-2, MC-3, MC-7, MC-8, and MC-9) all experienced battery failure and gauge malfunctions during the growing season.

Monitoring Year 7

Table 1. 2004 Hydrologic Monitoring Results

Monitoring Gauge	<5%	5-8%	8-12.5%	>12.5%	Actual %	Success Dates
Site 1						
MC-1				✘	17.9	June 15-July 15 Sept 15-Oct 26
MC -2+				✘	26.8	March 21-May 22 Oct 7-Nov 10
MC -3+				✘	35.3	June 15-Sept 5 Sept 7-Nov 10
Site 2						
MC -4+				✘	41.7	June 15-July 16 July 18-Oct 23
MC -5+				✘	63.4	June 15-Nov 10
MC -6+				✘	63.4	March 21-April 19 June 15-Nov 10
MC -7+				✘	63.4	June 15-Nov 10
MC -8	✘				4.7	
MC -9			✘		10.2	
MC -12+				✘	63.4	March 21-April 22 June 15-Nov 10

+ Gauge met the success criterion during an average rainfall month (February, May, and November).

Monitoring Year 2005 (8)

2. Wetland Criteria Attainment

**Table XIII: Wetland Criteria Attainment
Mallard Creek Wetland Mitigation Site (EEP Project # 00060)**

Well ID	Well Hydrology Threshold Met?	Vegetation Plot ID	Vegetation Survival Threshold Met?
MC-1	Yes	Plot 1	Y
MC-2	Yes	Plot 2	Y
MC-3	Yes	Plot 3	Y
MC-4	Yes	Plot 4	Y
MC-5	N/A	Plot 5	Y
MC-6	Yes	Plot 6	Y
MC-7	Yes		
MC-8	N/A		
MC-9	Yes		
MC-10	Yes		

Stem Counts per Acre by Plot

MY	CY	Ave	Plots					
			1	2	3	4	5	6
Y1	1998	501	307	680	389	680	573	378
Y2	1999	469	417	655	427	658	376	283
Y3	2000	492	439	529	525	636	447	378
Y4	2001	517	417	579	563	680	465	397
Y5	2002	539	461	630	563	680	483	416
Y6	2003	508	439	655	544	548	465	397
Y7	2004	490	439	630	505	505	465	397
Y8	2005	413	439	630	480	263	357	378