

ANNUAL REPORT FOR 2006



**Southwest Creek Mitigation Site
Lenoir County
TIP No. R-2001B**



Prepared By:
Natural Environment Unit & Roadside Environmental Unit
North Carolina Department of Transportation
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TABLE OF CONTENTS

SUMMARY	1
1.0 INTRODUCTION	2
1.1 Project Description.....	2
1.2 Purpose	2
1.3 Project History	2
2.0 HYDROLOGY.....	4
2.1 Success Criteria.....	4
2.2 Hydrologic Description	4
2.3 Results of Hydrologic Monitoring	6
2.3.1 Site Data	6
2.3.2 Climatic Data.....	6
2.4 Conclusions	6
3.0 VEGETATION	9
3.1 Success Criteria.....	9
3.2 Description of Species	9
3.3 Results of Vegetation Monitoring	9
3.4 Conclusions	10
4.0 OVERALL CONCLUSIONS/RECOMMENDATIONS.....	10

LIST OF FIGURES

Figure 1. Site Location Map	3
Figure 2. Gauge Location Map	5
Figure 3. 2006 Hydrologic Monitoring Gauge Results	7
Figure 4. 30-70 Percentile Graph	8

LIST OF TABLES

Table 1. Hydrologic Monitoring Results	6
Table 2. Vegetation Monitoring Statistics	9

APPENDICES

APPENDIX A GAUGE DATA GRAPHS

APPENDIX B SITE PHOTOGRAPHS, PHOTO & PLOT LOCATIONS

SUMMARY

The following report summarizes the monitoring activities that have occurred in the past year for the Southwest Creek Mitigation Site. Monitoring activities in 2006 represent the fourth year of monitoring for the site. The site must demonstrate both hydrologic and vegetation success for a minimum of five years or until the site is deemed successful.

On May 15, 2003, two groundwater gauges, two surface water gauges, and one rain gauge were installed to monitor the site for hydrologic success. The fourth year of monitoring indicated hydrologic success with both of the groundwater gauges in the forested wetland area meeting the success criteria (within 12" of the surface for 12.5% of the growing season). The groundwater gauges revealed saturation levels of 46.3% and 31.1% of the growing season. In accordance with the mitigation plan, the restored marsh gauge (SG-1) was comparable with the flooding patterns and inundation periods of the reference marsh gauge (SG-2).

There were two vegetation monitoring plots established throughout the 2.9 acre planting area. The 2006 vegetation monitoring of the site revealed an average tree density of 671 trees per acre. This average is well above the minimum success criteria of 320 trees per acre.

NCDOT will continue to monitor the Southwest Creek Mitigation Site for hydrology and vegetation.

1.0 INTRODUCTION

1.1 Project Description

The Southwest Creek Mitigation Site consists of two areas that serve as onsite mitigation for the NC 11 Deep Run Bypass (Figure 1). The Southwest Creek Site includes approximately 43.1 acres of wetland preservation and approximately 3.61 acres of wetland restoration. The site consists of the former NC 11 road bed that has been graded to meet the elevations of surrounding wetlands.

1.2 Purpose

In order to demonstrate successful mitigation, the site must be monitored for a minimum of five years or until success criteria are achieved. Success criteria are based on federal guidelines for wetland mitigation and are stipulated in the approved mitigation plan and in relevant environmental permits. Criteria for both hydrologic conditions and vegetation survival are included in these documents. Included in this report are analyses of both hydrologic and vegetative monitoring results, as well as local climate conditions throughout the growing season.

1.3 Project History

April 2003	Site Planted
May 2003	Monitoring Gauges Installed
May-November 2003	Hydrologic Monitoring (Year 1)
July 2003	Vegetation Monitoring (Year 1)
May-November 2004	Hydrologic Monitoring (Year 2)
September 2004	Vegetation Monitoring (Year 2)
March-November 2005	Hydrologic Monitoring (Year 3)
September 2005	Vegetation Monitoring (Year 3)
March-November 2006	Hydrologic Monitoring (Year 4)
August 2006	Vegetation Monitoring (Year 4)

Figure1. Site Location Map



2.0 HYDROLOGY

2.1 Success Criteria

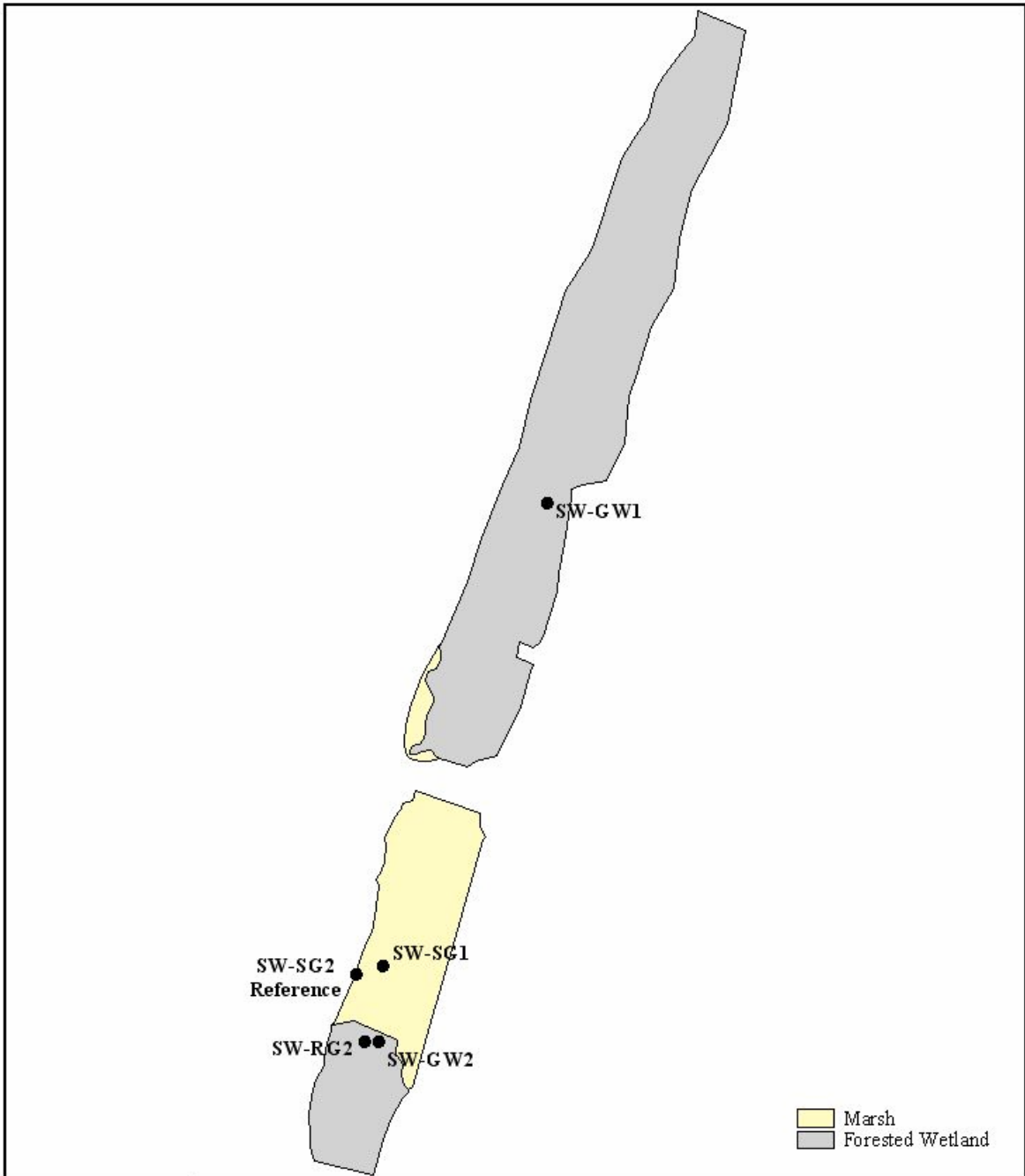
The Southwest Creek Site has different success criteria to account for both marsh and swamp areas. In accordance with federal guidelines for wetland mitigation, the success criteria for hydrology state that the area must be inundated or saturated (within 12 inches of the surface) by surface or groundwater for at least a consecutive 12.5% of the growing season during years of normal rainfall. Hydrologic success criteria for the swamp area are consistent with federal guidelines. As was stated in the March 2000 mitigation plan, the success of the restored marsh will be determined by comparing the hydrologic data (by demonstrating patterns of flooding or inundation) to that recorded within the reference marsh system adjacent to the site.


According to the Soil Conservation Service, the growing season in Lenoir County extends from March 17 to November 15, approximately 244 days. Thirty-one consecutive days would equal 12.5% of the growing season for Southwest Creek. Local climate must represent average conditions for the area in order for the hydrologic data to be valid. Average conditions are determined through an analysis of monthly rainfall totals recorded at the nearest official weather station.


2.2 Hydrologic Description

Two groundwater gauges are being used to measure groundwater levels within the forested wetland portions. Two additional surface gauges are located within the marsh area. One surface gauge is in the restored area and another gauge serves as a reference within the existing marsh (reference marsh) adjacent to the site. The data from the two surface gauges are compared to determine the success of the marsh portion. A rain gauge is also located within the swamp area in order to obtain accurate site rainfall measurements. The site rainfall data is used to analyze the site's (specifically, the swamp portion) response to rainfall events. Figure 2 is a map showing the location of all of the site gauges.

Appendix A contains a plot of the water depth for each of the groundwater and surface water monitoring gauges. Precipitation events, measured by the onsite rain gauge, are included on each groundwater gauge graph as bars.



 **Figure 2. Gauge Location Map**


 Not to Scale

2.3 Results of Hydrologic Monitoring

2.3.1 Site Data

The total number of consecutive days that the groundwater was within twelve inches of the surface was determined at each groundwater monitoring gauge location. This number was converted into a percentage of the total growing season. Table 1 presents the hydrologic results for 2006. Figure 3 is a graphical representation of the hydrologic monitoring results for 2006.

Table 1. Hydrologic Monitoring Results

Monitoring Gauge	< 5%	5-8%	8-12.5%	>12.5%	Actual %	Dates of Success
SW-GW1+				×	46.3	March 17-May 29 July 26-Nov 15
SW-GW2+				×	31.1	March 23-June 21 Sept 1-Nov 15

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

2.3.2 Climatic Data

Figure 4 is a comparison of monthly rainfall for the period of January through November 2006 to historical precipitation (collected between 1975 and 2006) for Kinston, North Carolina. This comparison gives an indication of how 2006 relates to historical data in terms of climate conditions. The NC State Climate Office provided all local rainfall information.

For the 2006-year, the months of April, September, and November experienced above average rainfall. The months of February, March, July, and August recorded below average rainfall for the site. January, May, June, and October experienced average rainfall. Overall, 2006 experienced a normal rainfall year.

2.4 Conclusions

The 2006-year represents the fourth full growing season for which the hydrologic data has been examined. Both groundwater gauges in the forested wetland met the requirement for jurisdictional wetland hydrology (12.5% of the growing season). Gauge GW-1 recorded hydrology for 46.3%, while GW-2 recorded hydrology for 31.1% of the growing season. The restored marsh gauge (SG-1) was comparable with the flooding patterns and inundation periods from the reference marsh gauge (SG-2). Hydrologic monitoring has indicated that the site has met the success criteria for 2006.

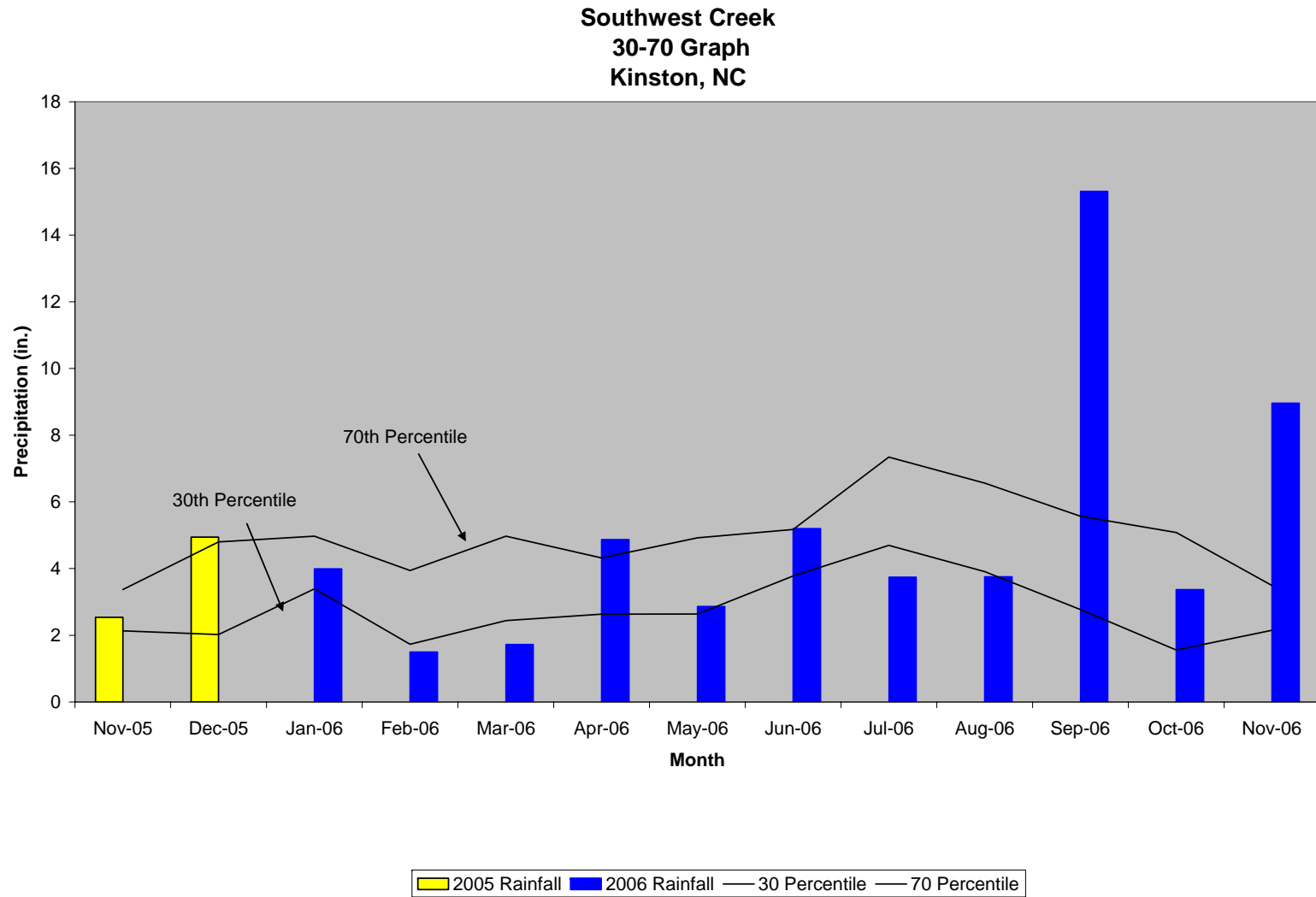


Figure 3. 2006 Hydrologic Monitoring Gauge Results

- | | |
|------------|--------------------|
| ● 0 - < 5% | ⊕ Rain Gauge |
| ● 5 - 8% | ◐ Surface Gauge |
| ● 8 - 12% | ■ Marsh |
| ● > 12.5% | ■ Forested Wetland |



Figure 4. 30-70 Percentile Graph



3.0 VEGETATION: SOUTHWEST CREEK MITIGATION SITE (YEAR 4 MONITORING)

3.1 Success Criteria

The success criteria state that at least 320 stems per acre must survive after the completion of the third growing season and 240 stems per acre after the fifth growing season. If desired vegetation has not been established, NCDOT will notify the appropriate agencies and will implement corrective measures.

3.2 Description of Species

The following tree species were planted in the Wetland Restoration Area:

Fraxinus pennsylvanica, Green Ash

Taxodium distichum, Bald cypress

Quercus lyrata, Overcup Oak

Nyssa aquatica, Water Tupelo

3.3 Results of Vegetation Monitoring

Table 2. Vegetative Monitoring Statistics

Plot #	Green Ash	Baldcypress	Overcup Oak	Water Tupelo	Total (4 year)	Total (at planting)	Density (Trees/Acre)
1	14	20	1	1	36	37	662
2	15	21	3	1	40	40	680
Average Density (Trees/Acre)							671

Site Notes: Overcup oak and water tupelo were noted living outside of plots even though very few were noted in the stem counts. Other species noted: cattail, *Juncus* sp., *Scirpus* sp., black willow, woolgrass, fennel, goldenrod, trumpet creeper, sedge, water grass, smart weed, laurel oak, tulip poplar, *Baccharis* sp., indian grass, wax myrtle, red maple, sweetgum, and various grasses.

3.4 Conclusions

There were two vegetation monitoring plots established throughout the 2.9 acre planting area. The 2006 vegetation monitoring of the site revealed an average tree density of 671 trees per acre. This average is well above the minimum success criteria of 320 trees per acre.

4.0 OVERALL CONCLUSIONS/RECOMMENDATIONS

The following report summarizes the monitoring activities that have occurred in the past year for the Southwest Creek Mitigation Site. Monitoring activities in 2006 represent the fourth year of monitoring for the site. The site must demonstrate both hydrologic and vegetation success for a minimum of five years or until the site is deemed successful.

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NCDOT will continue to monitor the Southwest Creek Mitigation Site for hydrology and vegetation.

APPENDIX A
GAUGE DATA GRAPHS

APPENDIX B

SITE PHOTOGRAPHS, PHOTO & PLOT LOCATIONS

SOUTHWEST CREEK



Photo 1



Photo 2

DEEP RUN MITIGATION SITE PHOTO AND PLOT LOCATIONS

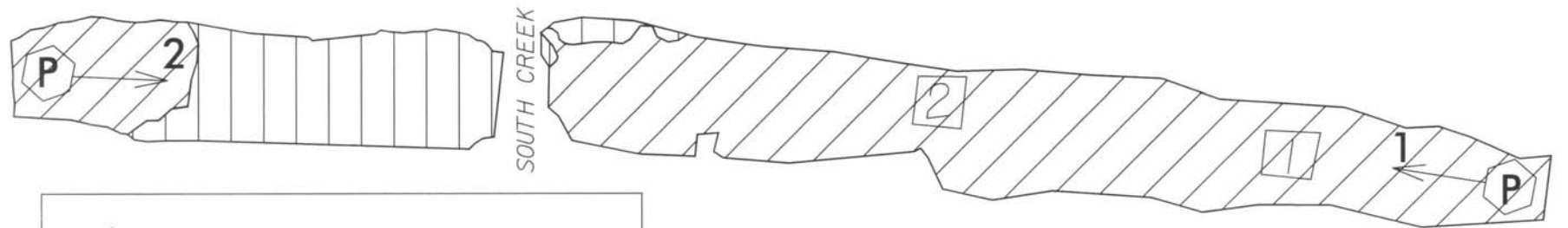


	PHOTO LOCATIONS
	PLOT LOCATIONS

	HERBACEOUS MARSH AREA
	HARDWOOD AREA