

# ANNUAL REPORT FOR 2004



**Southwest Creek Mitigation Site  
Lenoir County  
Project No. 6.201014  
TIP No. R-2001B**



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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. Monitoring Gauge Locations .....	5
Figure 3. Hydrologic Monitoring Results.....	7
Figure 4. 30-70 Percentile Graph .....	8

## LIST OF TABLES

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

## APPENDICES

APPENDIX A GAUGE DATA GRAPHS

APPENDIX B SITE PHOTOGRAPHS & 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 2004 represent the second 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 on the site to monitor the site for hydrologic success. The second 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 38.9% and 35.6% 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).

The site is being monitored for vegetation using two representative plots. For the second year of monitoring, the site exceeded the success requirements with an average density of 599 trees per acre.

In October 2004, NCDOT was notified that utility construction was occurring in the mitigation site. Upon investigation, it was discovered that the Wooten Company had a USACE permit to trench a utility line through the site. The permit was issued without knowledge of the mitigation site. The Wooten Company voluntarily ceased construction until this issue could be resolved. USACE and NCDOT agreed to leave what pipe had already been installed (approximately 100 feet within the site). The remainder of the utility line will be installed using dissectional bore equipment. The Wooten Company will reestablish the disturbed portion of the mitigation site.

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 was the former NC 11 road bed that was 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)

**Figure1.** Site Location Map



## **2.0 HYDROLOGY**

### **2.1 Success Criteria**

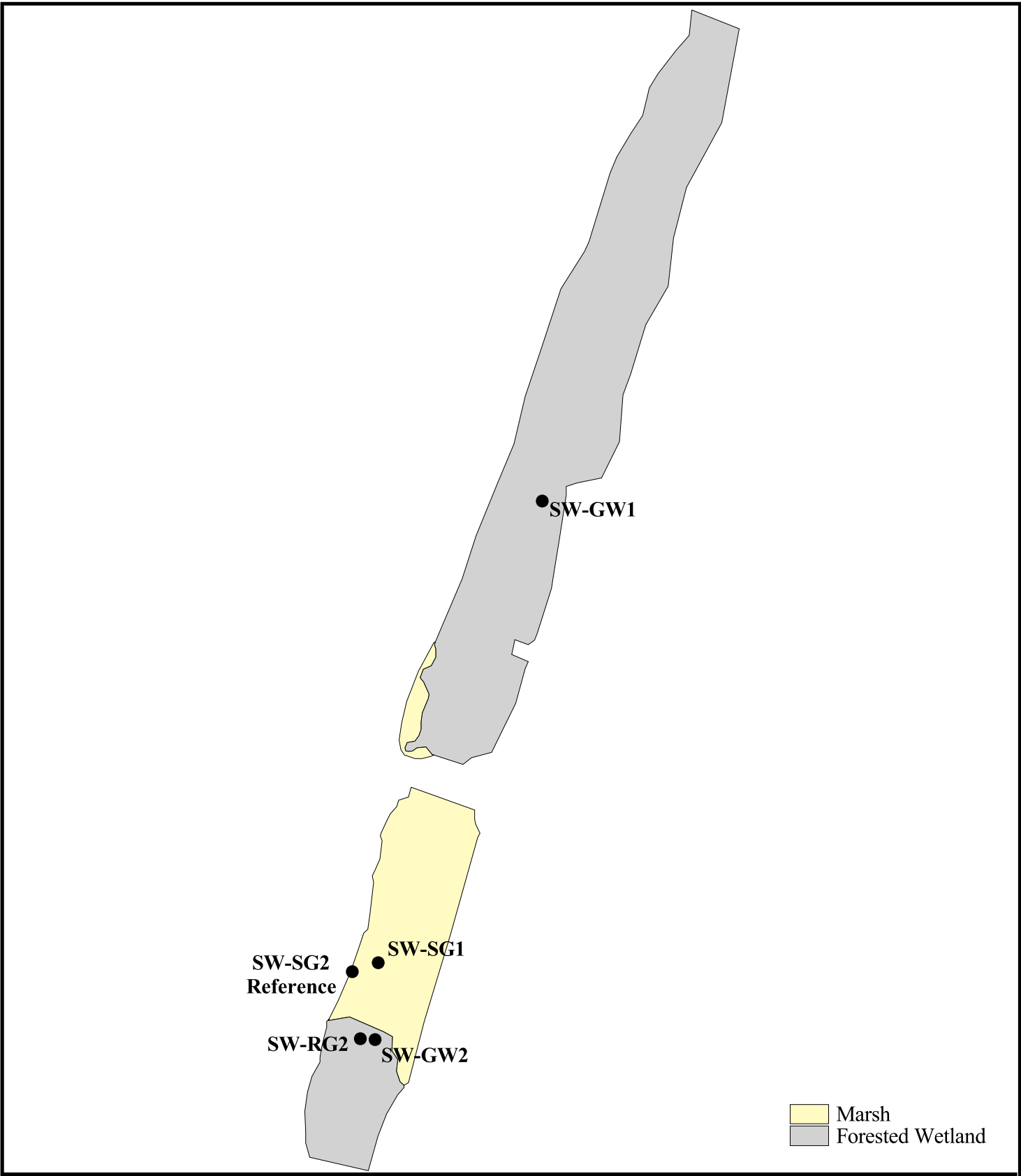
The Southwest Creek Site has different success criteria to account for both marsh and swamp areas. In accordance with federal guidelines for wetland mitigation, the success criteria for hydrology state that the area must be inundated or saturated (within 12 inches of the surface) by surface or groundwater 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. A consecutive 12.5% of the growing season for Southwest Creek would equal 31 days. 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 closest official weather station.

### **2.2 Hydrologic Description**

Two groundwater gauges are used to measure groundwater levels within the forested wetland portions of the site. An additional two surface gauges are located within the marsh area (one gauge in the restored area, 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 get 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 2004. Figure 3 is a graphical representation of the hydrologic monitoring results for 2004.

The restored marsh gauge (SG-1) was comparable with the flooding patterns and inundation periods from the reference marsh gauge (SG-2).

**Table 1.** 2004 Hydrologic Monitoring Results

Monitoring Gauge	< 5%	5-8%	8-12.5%	>12.5%	Actual %	Dates of Saturation
SW-GW1				×	38.9	March 17-May 11 Aug 13-Nov 15
SW-GW2				×	35.6	March 17-May 20 May 24-July 16 July 23-Oct 17

### 2.3.2 Climatic Data

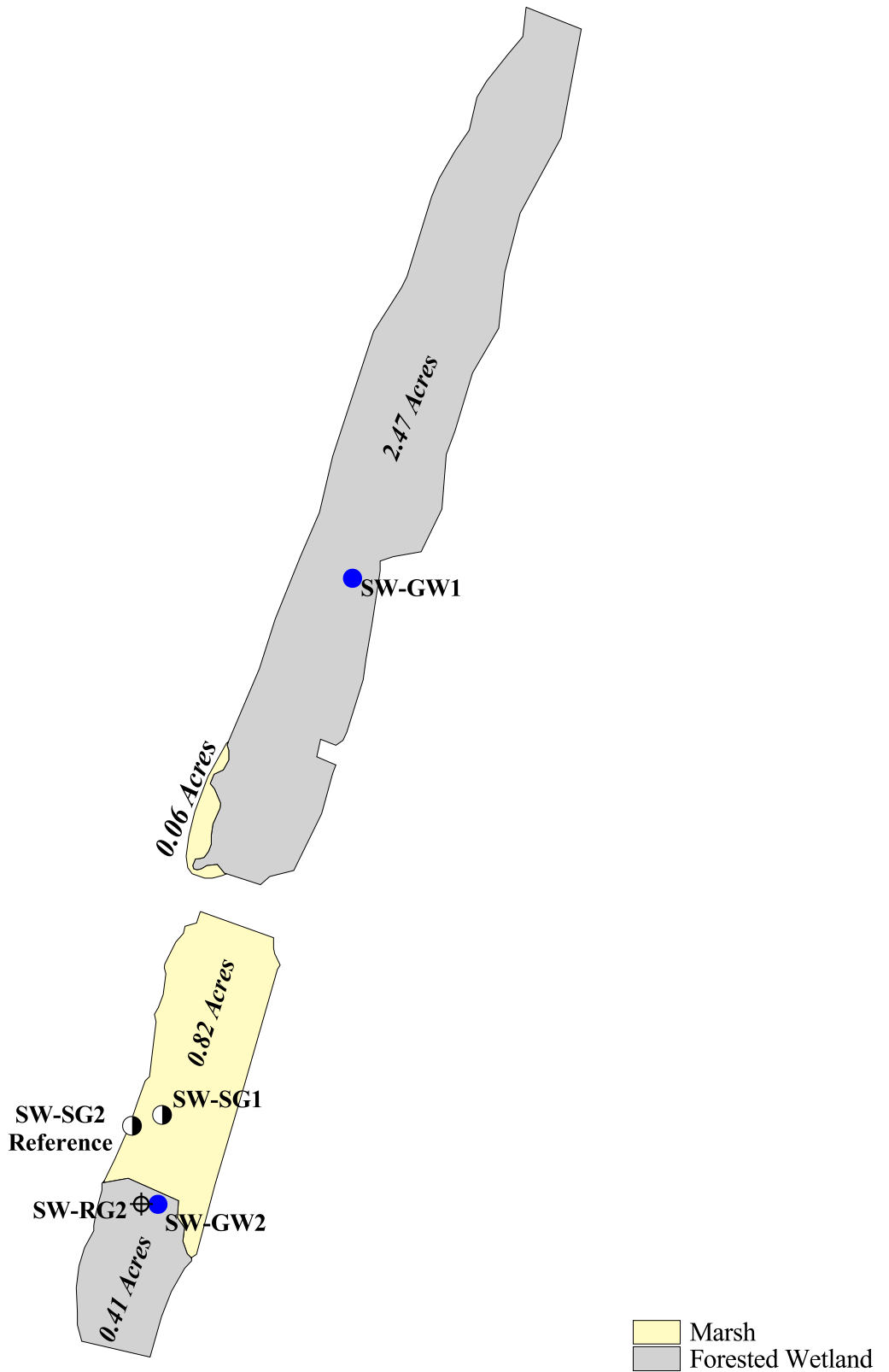
Figure 4 is a comparison of monthly rainfall for the period of November 2003 through November 2004 to historical precipitation (collected between 1973 and 2004) for Kinston, North Carolina. This comparison gives an indication of how 2004 relates to historical data in terms of climate conditions. The NC State Climate Office provided all local rainfall information.

For the 2004-year, December (03') February, June, August, and November experienced above average rainfall. The months of January and February recorded below average rainfall and November (03'), April, May, July, September, and October experienced average rainfall. Overall, 2004 experienced an average to above average rainfall year.

## 2.4 Conclusions

The 2004-year represents the second 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). 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 the 2004-year.



**Figure 3. 2004 Hydrologic Monitoring Gauge Results**

Hydrology Results

- < 5%
- 5 - 8%
- 8 - 12.5%
- > 12.5%
- ⊕ Rain Gauge
- Surface Gauge

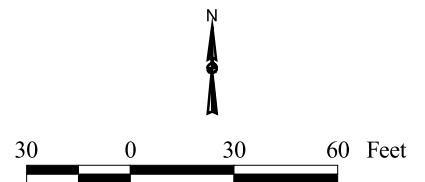
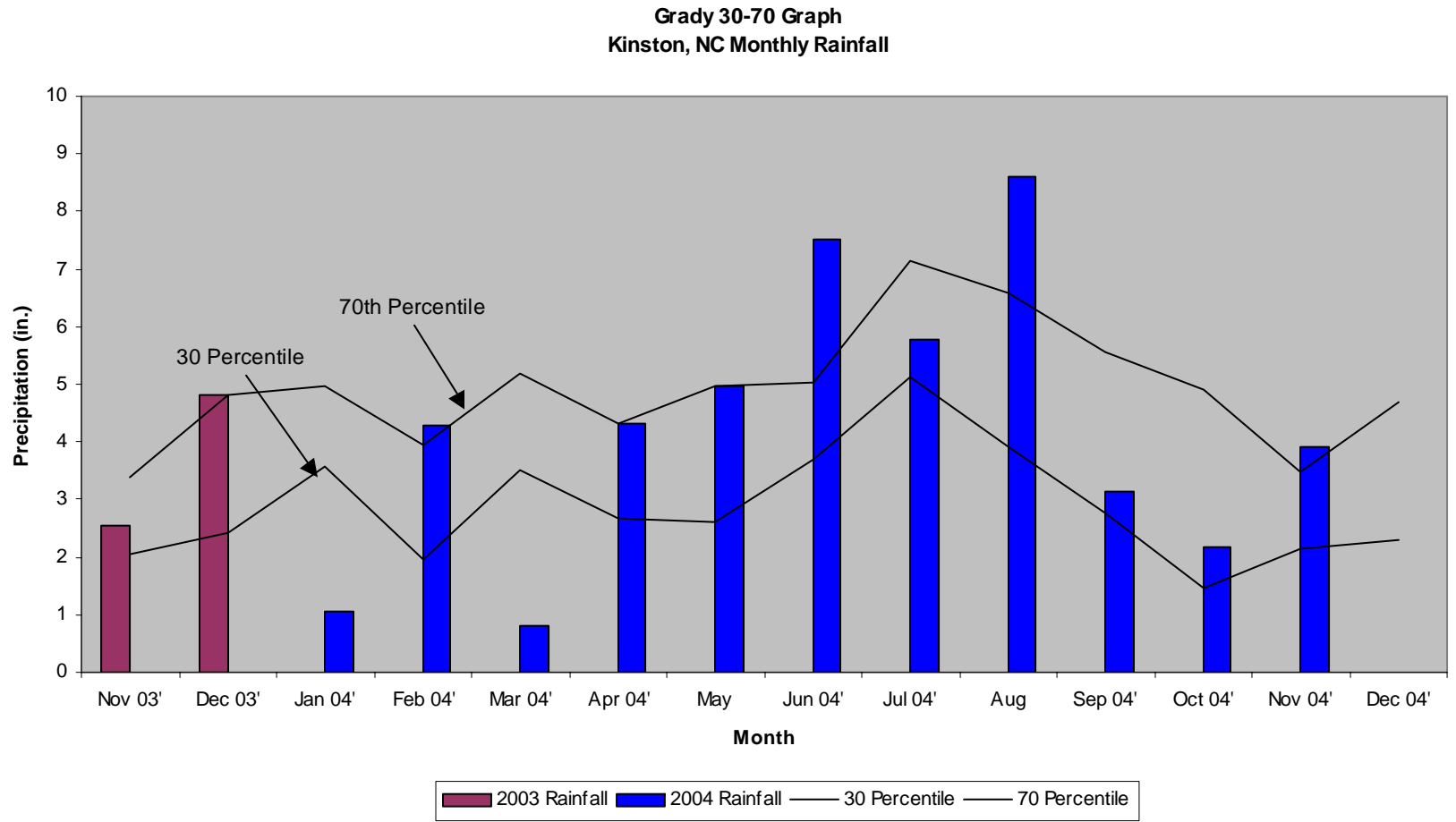


Figure 4. 30-70 Percentile Graph, Kinston, NC



### 3.0 VEGETATION: SOUTHWEST CREEK MITIGATION SITE (YEAR 2 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 the 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*, Baldcypress  
*Quercus lyrata*, Overcup Oak  
*Nyssa aquatica*, Water Tupelo

#### 3.3 Results of Vegetation Monitoring

Table 2. 2004 Hydrologic Monitoring Results

Plot #	Green Ash	Baldcypress	Overcup Oak	Water Tupelo	Total (2 year)	Total (at planting)	Density (Trees/Acre)
1	12	17		1	30	37	551
2	13	21	3	1	38	40	646
Average Density (Trees/Acre)							599

**Site Notes:** Overcup oaks are living in drier areas outside of plots. Most water tupelo were noted outside of the plots. Other species noted: cattail, *Juncus* sp., *Scirpus* sp., black willow, woolgrass, fennel, goldenrod, indian grass, and various grasses.

### **3.4 Conclusions**

There were two vegetation-monitoring plots established within the 2.9-acre planting area. The 2004 vegetation monitoring of the site revealed an average tree density of 599 trees per acre. This average is well above the minimum success criteria of 320 trees per acre.

NCDOT will continue vegetation monitoring at the Southwest Creek Mitigation Site

### **4.0 OVERALL CONCLUSIONS/RECOMMENDATIONS**

The second year of hydrologic monitoring indicated that the site has met the success criteria for 2004. The groundwater gauges revealed saturation levels of 38.9% and 35.6% of the growing season, respectively. In accordance with the mitigation plan, the restored marsh gauge (SG-1) was comparable with the flooding patterns and inundation periods from the reference marsh gauge (SG-2).

The two vegetation-monitoring plots yielded an average density of 599 trees per acre, well above the minimum requirement (320) for the second year of monitoring.

In October 2004, NCDOT was notified that utility construction was occurring in the mitigation site. Upon investigation, it was discovered that the Wooten Company had a USACE permit to trench a utility line through the site. The permit was issued without knowledge of the mitigation site. The Wooten Company voluntarily ceased construction until this issue could be resolved. USACE and NCDOT agreed to leave what pipe had already been installed (approximately 100 feet within the site). The remainder of the utility line will be installed using dissectional bore equipment. The Wooten Company will reestablish the disturbed portion of the mitigation site.

NCDOT will continue to monitor the Southwest Creek Mitigation Site for hydrologic and vegetative success.

**APPENDIX A**  
**GAUGE DATA GRAPHS**

**APPENDIX B**

**SITE PHOTOGRAPHS &**

**PLOT LOCATIONS**

# SOUTHWEST CREEK

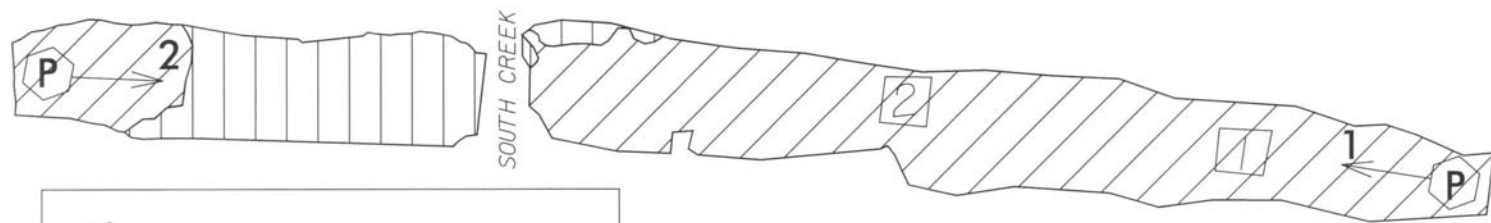




PHOTO 1





PHOTO 2

DEEP RUN MITIGATION SITE  
PHOTO AND PLOT LOCATIONS



	PHOTO LOCATIONS
	PLOT LOCATIONS

	HERBACEOUS MARSH AREA
	HARDWOOD AREA