

# ANNUAL REPORT FOR 2004



**Crescent Road Mitigation Site**

**Lenoir County**

**Project No. 8.2200101**

**TIP No. R-2719BA**



Prepared By:  
Office of Natural Environment & Roadside Environmental Unit  
North Carolina Department of Transportation  
December 2004

# 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. Hydrologic Monitoring Results.....	7
Figure 4. Crescent Road 30-70 Percentile Graph .....	8

## LIST OF TABLES

Table 1. 2004 Hydrologic Monitoring Results.....	6
Table 2. Vegetation Monitoring Statistics.....	9

## APPENDICES

APPENDIX A GAUGE DATA GRAPHS

APPENDIX B SITE PHOTOS & VEGETATION PLANTING PLAN

## **SUMMARY**

The following report summarizes the monitoring activities that have occurred in 2004 at the Crescent Road Mitigation Site. The 2004-year concludes the second year of hydrology and vegetation monitoring following construction of the site. The site must be monitored for five consecutive years or until the site is deemed successful.

Site hydrology is monitored with three groundwater gauges, three surface water gauges, and one onsite rain gauge. Three vegetation-monitoring plots were established to monitor the 3.35 acres planted in trees on the site.

Initial results for hydrologic monitoring indicate that the site has experienced varying saturation levels during the second year of monitoring. Two of the three groundwater-monitoring gauges met the jurisdictional criteria for more than 12.5% of the growing season. The third gauge reported saturation for 9.8% of the growing season. All three surface water gauges showed periods of inundation during the 2004 monitoring year. All of the groundwater and surface gauges were not downloaded after September 30, 2004; therefore no hydrologic data is available.

The three vegetation plots revealed an average tree density of 495 trees per acre, which is well above the minimum success criteria of 320 trees per acre.

NCDOT will continue to monitor the hydrology and vegetation at the Crescent Road Mitigation Site.

# 1.0 INTRODUCTION

## 1.1 Project Description

The Crescent Road Mitigation Site is situated immediately south and adjacent to C.F. Harvey Road (Crescent Road) in the western portion of Lenoir County (Figure 1). It is approximately 2 miles (3.2 kilometers) northeast of Kinston. The site restoration consists of approximately 0.58-acre of riverine wetland.

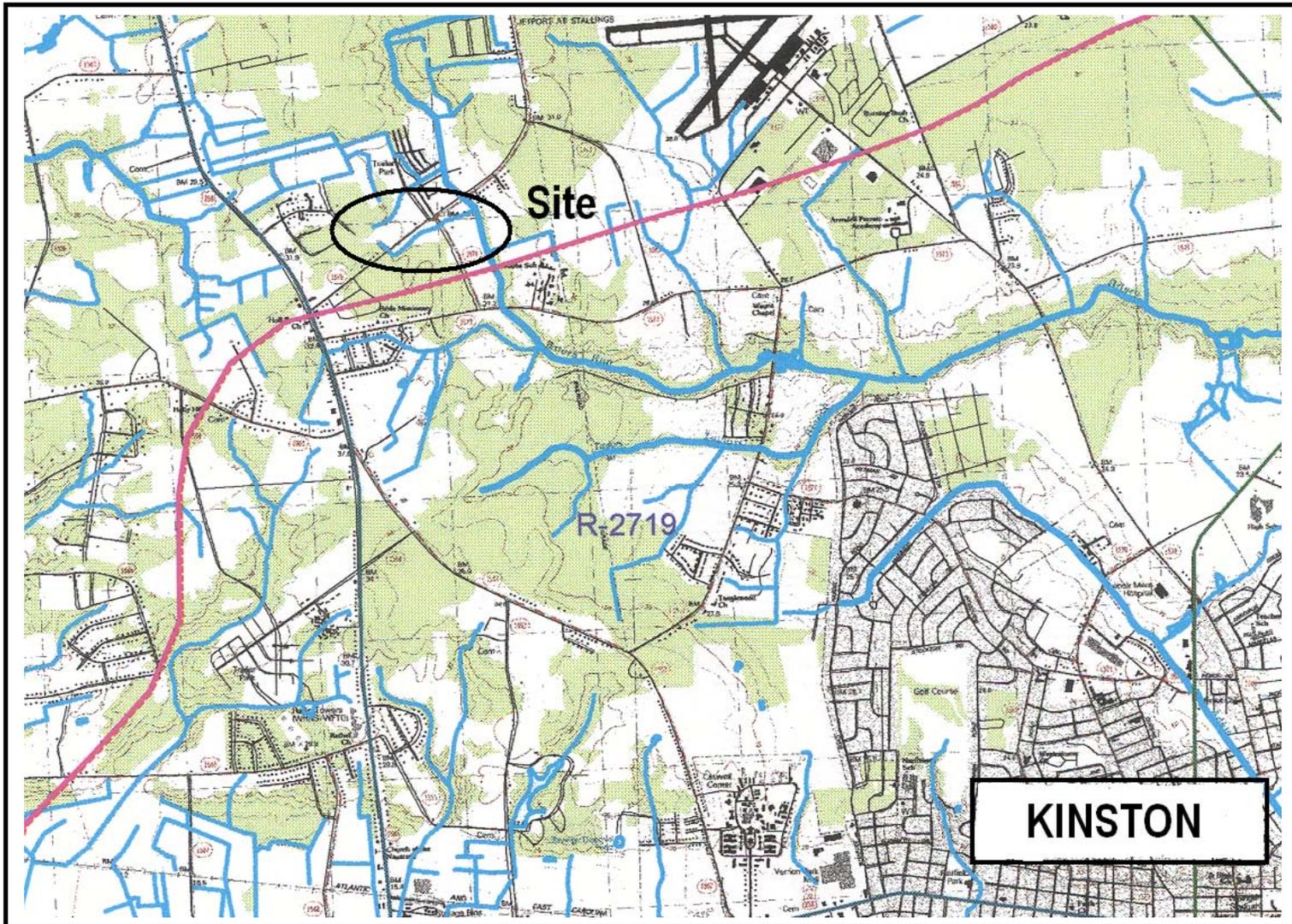
## 1.2 Purpose

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. Criteria for hydrologic conditions and vegetation survival are included in these documents. The following report describes the results of the hydrologic and vegetation monitoring during the 2004-growing season at the Crescent Road Mitigation Site.

## 1.3 Project History

Spring 2002	Site Construction
May 2002	Hydrologic Monitoring Gauges Installed
March 2002	Site Planted
May- November 2002	Hydrologic Monitoring (Incomplete Year)
March- November 2003	Hydrologic Monitoring (Year 1)
June 2003	Vegetation Monitoring (Year 1)
March- November 2004	Hydrologic Monitoring (Year 2)
August 2004	Vegetation Monitoring (2 yr.)

Figure 1. Site Location Map



## **2.0 HYDROLOGY**

### **2.1 Success Criteria**

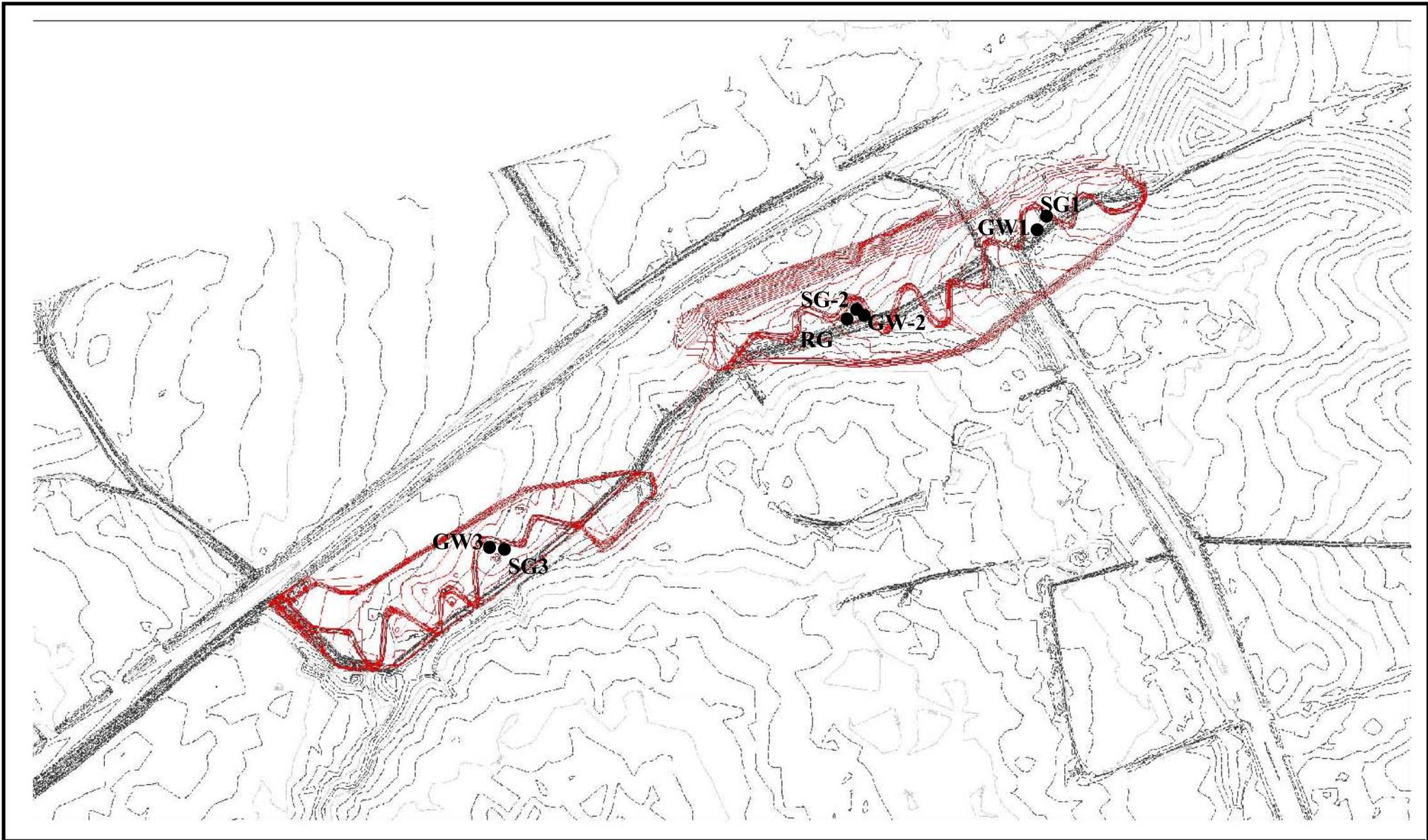
In accordance with federal guidelines for wetland mitigation, the success criteria for hydrology state that the area must be inundated or saturated (within 12 inches of the surface) by surface or groundwater for at least a consecutive 12.5% of the growing season. Areas inundated less than 5% of the growing season are always classified as non-wetlands. Areas inundated between 5% and 12.5% of the growing season can be classified as wetlands depending upon factors such as the presence of hydrophytic vegetation and hydric soils.

According to the Soil Conservation Service, the growing season in Lenoir County extends from March 17-November 15 (approximately 244 days). A consecutive 12.5% of the growing season for Crescent Road would equal 31 days; a consecutive 8% would be equivalent to 20 days. Local climate must represent average conditions for the area in order for the hydrologic data to be valid.

### **2.2 Hydrologic Description**

Three groundwater and three surface water-monitoring gauges are used to record site hydrologic data. The groundwater gauges are set to record daily water levels, while the surface water gauges are set to record at 3-hour intervals. A rain gauge is also located on the site in order to get accurate site rainfall measurements. The hydrologic response (groundwater) to rainfall events is evaluated using this data.

Appendix A contains a plot of the water depth for each of the groundwater and surface water monitoring gauges for 2004. 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 for each groundwater-monitoring gauge. This number was converted into a percentage of the growing season. Table 1 presents the hydrologic results for 2004. Figure 3 is a graphical representation of the hydrologic monitoring results for 2004.

**Table 1. 2004 Hydrologic Monitoring Results**

Monitoring Gauge	< 5%	5-8%	8-12.5%	>12.5%	Actual %	Dates of Saturation
CRGW-1			X		9.8	Aug 30-Sept 22
CRGW-2+				X	20.1	Aug 13-Sept 30
CRGW-3+				X	28.7	July 23-Sept 30

+ Gauge met success criterion during an average rainfall month (April, May, July, September, and October).

All of the groundwater and surface gauges were not downloaded after September 30, 2004; therefore no hydrologic data is available.

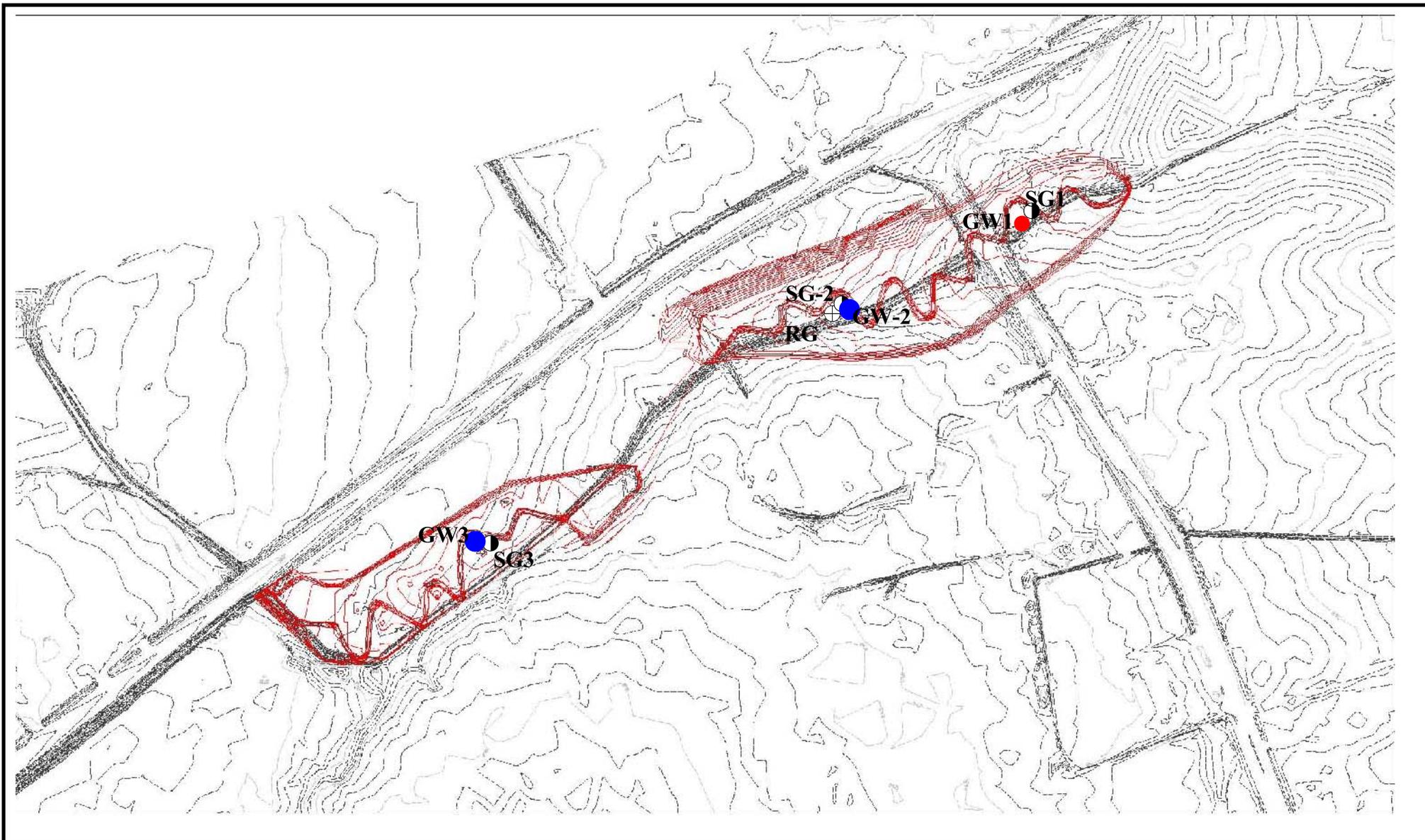
### 2.3.2 Climatic Data

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 of the local rainfall information.

For the 2004-year, December (03'), February, June, August, and November experienced above average rainfall. The months of January and March recorded below average rainfall for the site. 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 that hydrologic data has been collected on the Crescent Road Mitigation Site. Two of the three groundwater-monitoring gauges met the jurisdictional criteria for wetland hydrology (>12.5% of the growing season). The third gauge reported saturation for 9.8% of the growing season. All three surface water gauges showed periods of inundation during the 2004 monitoring year. All of the groundwater and surface gauges were not downloaded after September 30, 2004; therefore no hydrologic data is available.



**Figure 3. 2004 Monitoring Gauge Results**



Hydrology Results

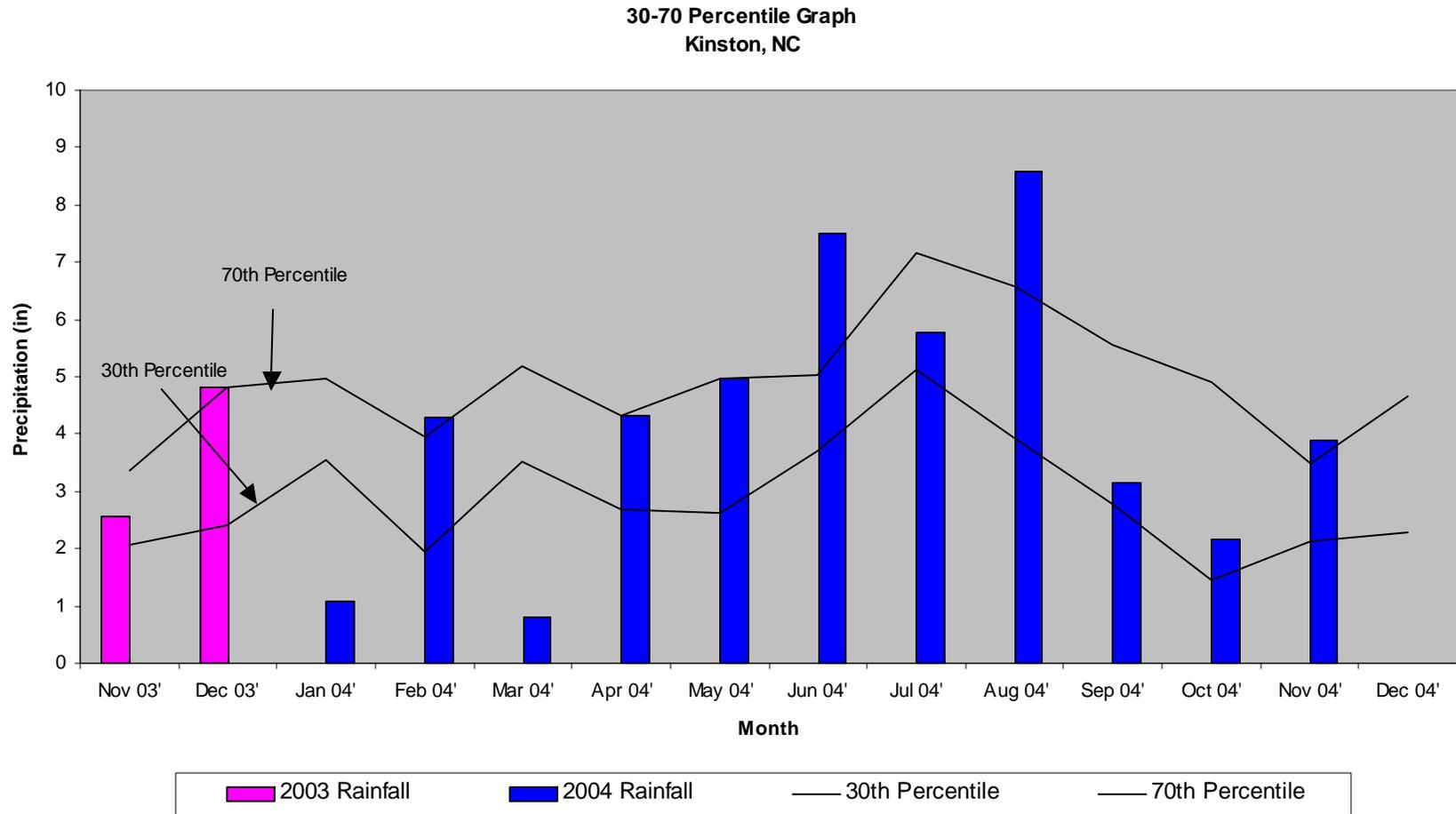
- > 5%
- 5 - 8%
- 8 - 12.5%
- > 12.5%

- ⊕ Rain Gauge
- Surface Gauge



Not to Scale

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



### 3.0 VEGETATION: CRESCENT ROAD 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 260 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

*Betula nigra*, River Birch

*Nyssa sylvatica* var. *biflora*, Swamp Blackgum

*Quercus phellos*, Willow Oak

#### 3.3 Results of Vegetation Monitoring

Table 2. Vegetation Monitoring Statistics

Plot #	Green Ash	River Birch	Swamp Blackgum	Willow Oak	Total (2 year)	Total (at planting)	Density (Trees/Acre)
1	15	10	1	9	35	47	506
2	14	12		6	32	42	518
3	10	8		5	23	34	460
Average Density (Trees/Acre)							495

#### Site Notes:

Other species noted: woolgrass, *Juncus* sp., broomsedge, fennel, black willow, tag alder, cattails, silky dogwood, nutsedge, wax myrtle, lespedeza, and goldenrod.

### **3.4 Conclusions**

There were three vegetation-monitoring plots established throughout the 3.35-acre planting area. The 2004 vegetation monitoring of the site revealed an average tree density of 495 trees per acre. This average is above the minimum success criteria of 320 trees per acre.

## **4.0 OVERALL CONCLUSIONS/RECOMMENDATIONS**

The 2004-year represents the second full growing season that hydrologic data has been collected on the Crescent Road Mitigation Site. Two of the three groundwater-monitoring gauges met the jurisdictional criteria for more than 12.5% of the growing season. The third gauge reported saturation for 9.8% of the growing season. All three surface water gauges showed periods of inundation during the 2004 monitoring year. All of the groundwater and surface gauges were not downloaded after September 30, 2004; therefore no hydrologic data is available.

The three vegetation plots revealed an average density of 495 trees per acre, which is above the minimum success criteria of 320 trees per acre.

NCDOT will continue to monitor hydrology and vegetation at the Crescent Road Mitigation Site.

**APPENDIX A**

**GAUGE DATA GRAPHS**

**APPENDIX B**

**SITE PHOTOS**

**&**

**VEGETATION PLANTING PLAN**

# CRESCENT ROAD



Photo 1



Photo 2



Photo 3



Photo 4



Photo 5



Photo 6

CRESCENT ROAD MITIGATION SITE

