

ANNUAL REPORT FOR 2006



**Crescent Road Mitigation Site
Lenoir County
TIP No. R-2719BA**



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SUMMARY

The following report summarizes the monitoring activities that have occurred in 2006 at the Crescent Road Mitigation Site. The 2006-year concludes the fourth 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. Two of the three groundwater gauges met the jurisdictional criteria for wetland hydrology (>12.5% of the growing season), while one groundwater gauge met for 10.2% of the growing season. All three surface water gauges showed periods of inundation during the 2006 monitoring year.

Three vegetation plots were established to monitor the trees planted in the 3.35-acre site. The 2006 vegetation monitoring of the site revealed an average tree density of 442 trees per acre. This average 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 adjacent to C.F. Harvey Road (Crescent Road) both to the north and south, in the western portion of Lenoir County (Figure 1). It is approximately 2 miles (3.2 kilometers) northwest of Kinston. The U.S. Army Corps of Engineers permit for R-2719BA dated June 12, 2001 states the onsite mitigation for Crescent Road needs to provide 0.58-acre of riverine restoration and 1,706 linear feet of stream restoration to offset unavoidable impacts. According to the as-built drawings of the site, the site actually restored 3.71-acres of riverine wetlands, 2,291 linear feet of stream restoration, and 7.6 acres of Neuse River riparian buffer. These additional credits may be used to offset future mitigation needs.

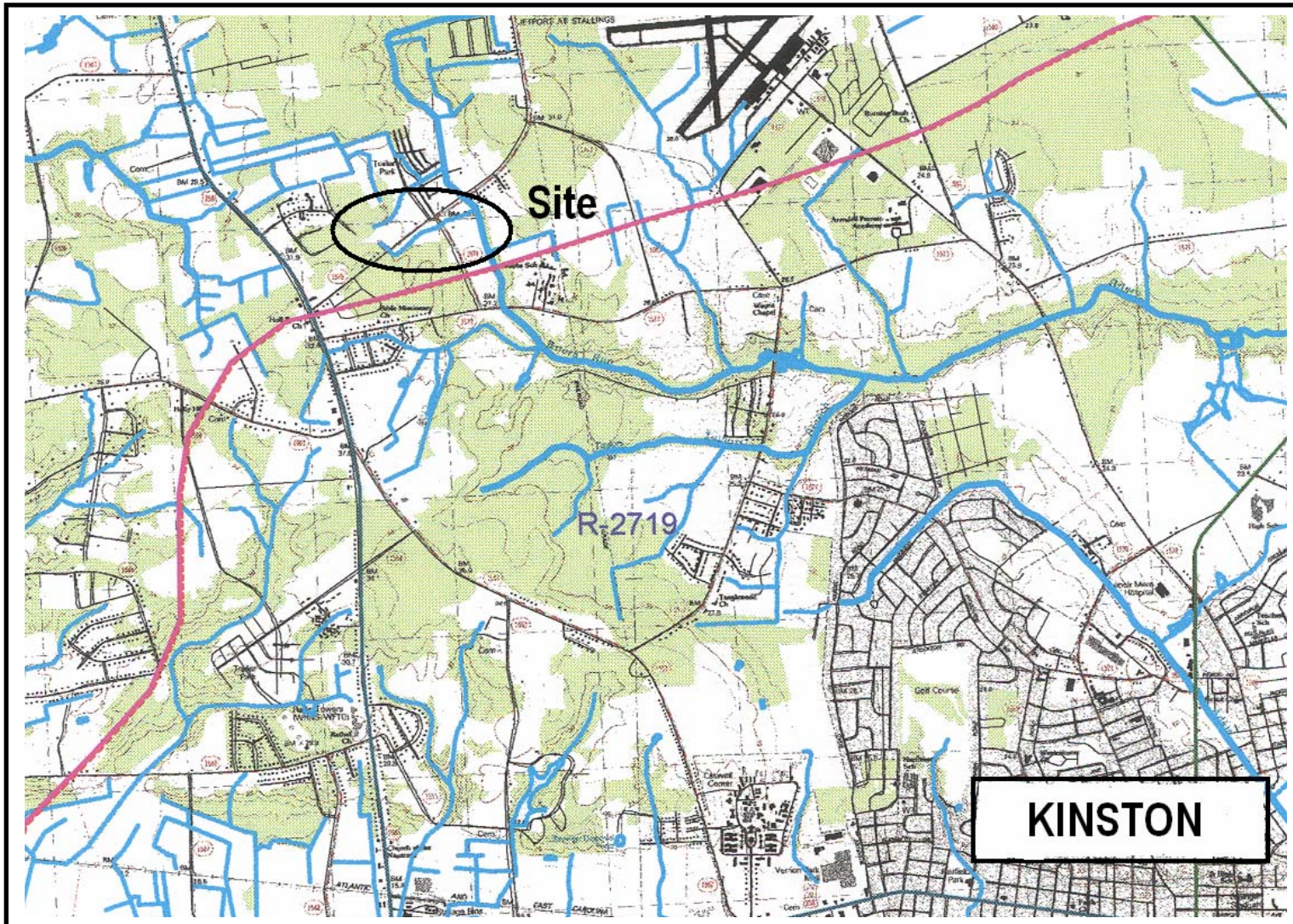
1.2 Purpose

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 2006-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 (Year 2)
March - November 2005	Hydrologic Monitoring (Year 3)
August 2005	Vegetation Monitoring (Year 3)
March - November 2006	Hydrologic Monitoring (Year 4)
June 2006	Vegetation Monitoring (Year 4)

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 2006. Precipitation events, measured by the onsite rain gauge, are included on each groundwater graph as bars.

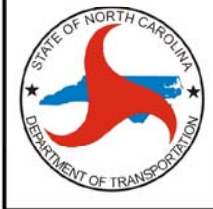
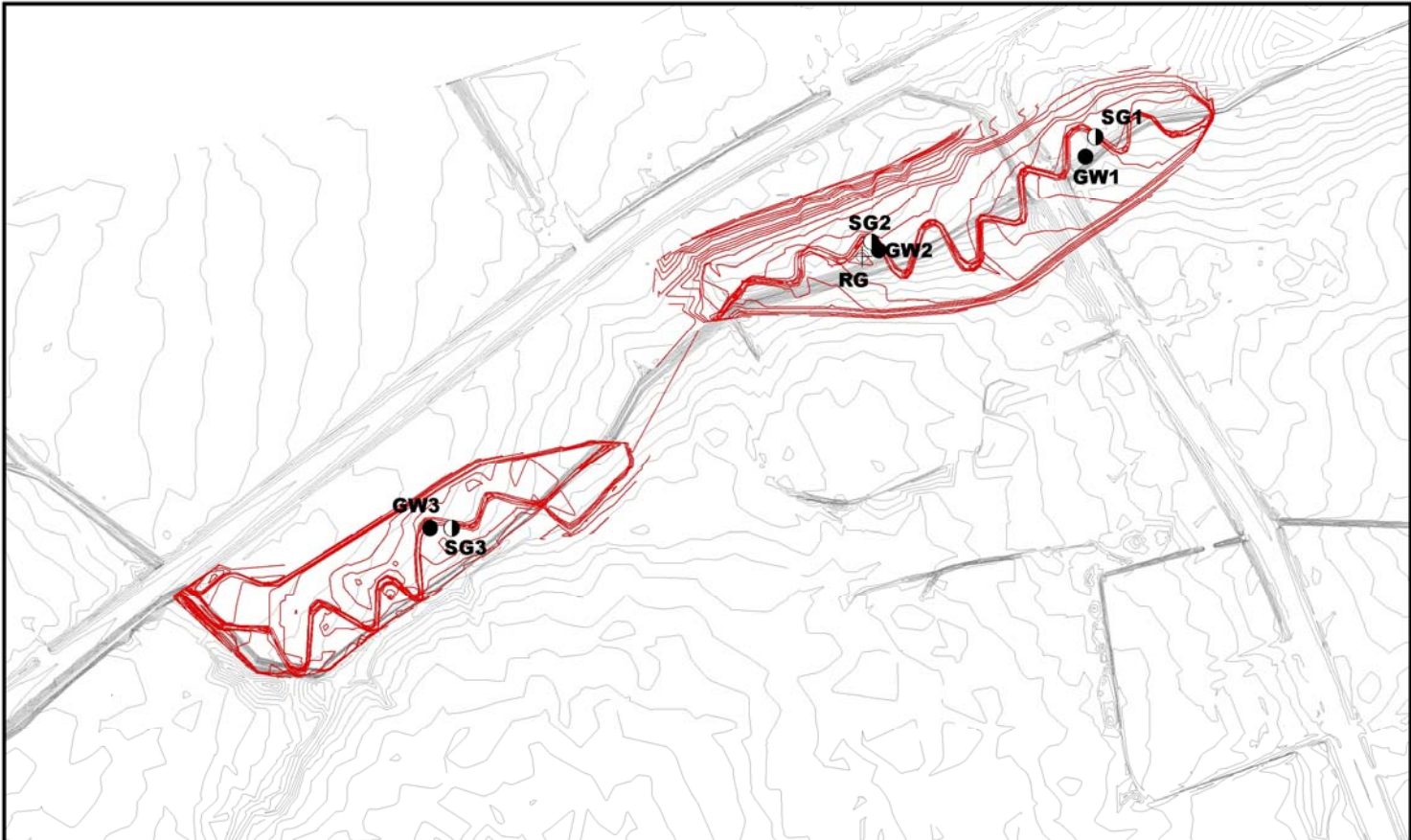
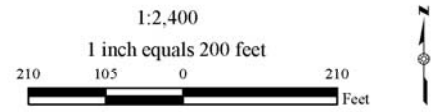


Figure 2. Gauge Location Map

- Groundwater Gauge
- Surface Gauge
- ⊕ Rain Gauge



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 2006. Figure 3 is a graphical representation of the hydrologic monitoring results for 2006.

Table 1. Hydrologic Monitoring Results

Monitoring Gauge	< 5%	5-12.5%	>12.5%	Actual %	Dates of Success
CRGW-1		X		10.2	
CRGW-2			X	52.0	March 17-July 22 July 24-Nov 15
CRGW-3			X	20.1	Sept 28-Nov 15

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 of the 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 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), while one groundwater gauge met for 10.2% of the growing season. All three surface water gauges showed periods of inundation during the 2006 monitoring year.

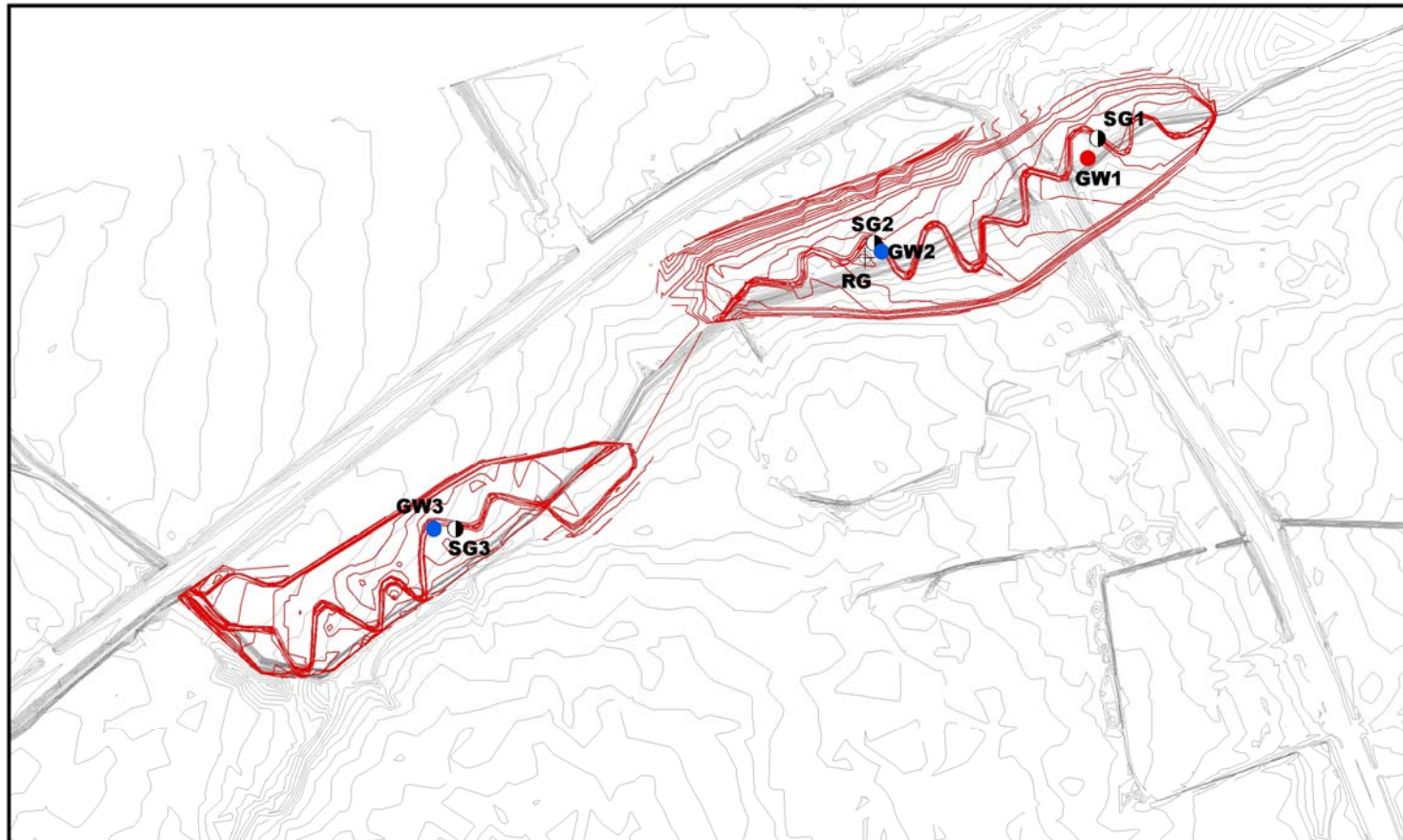


Figure 3. 2006 Monitoring Gauge Results



- | | |
|-------------|-----------------|
| ● 0 - < 5% | ○ Surface Gauge |
| ● 5 - 8% | ⊕ Rain Gauge |
| ● 8 - 12.5% | |
| ● > 12.5% | |

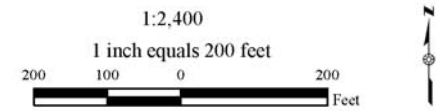
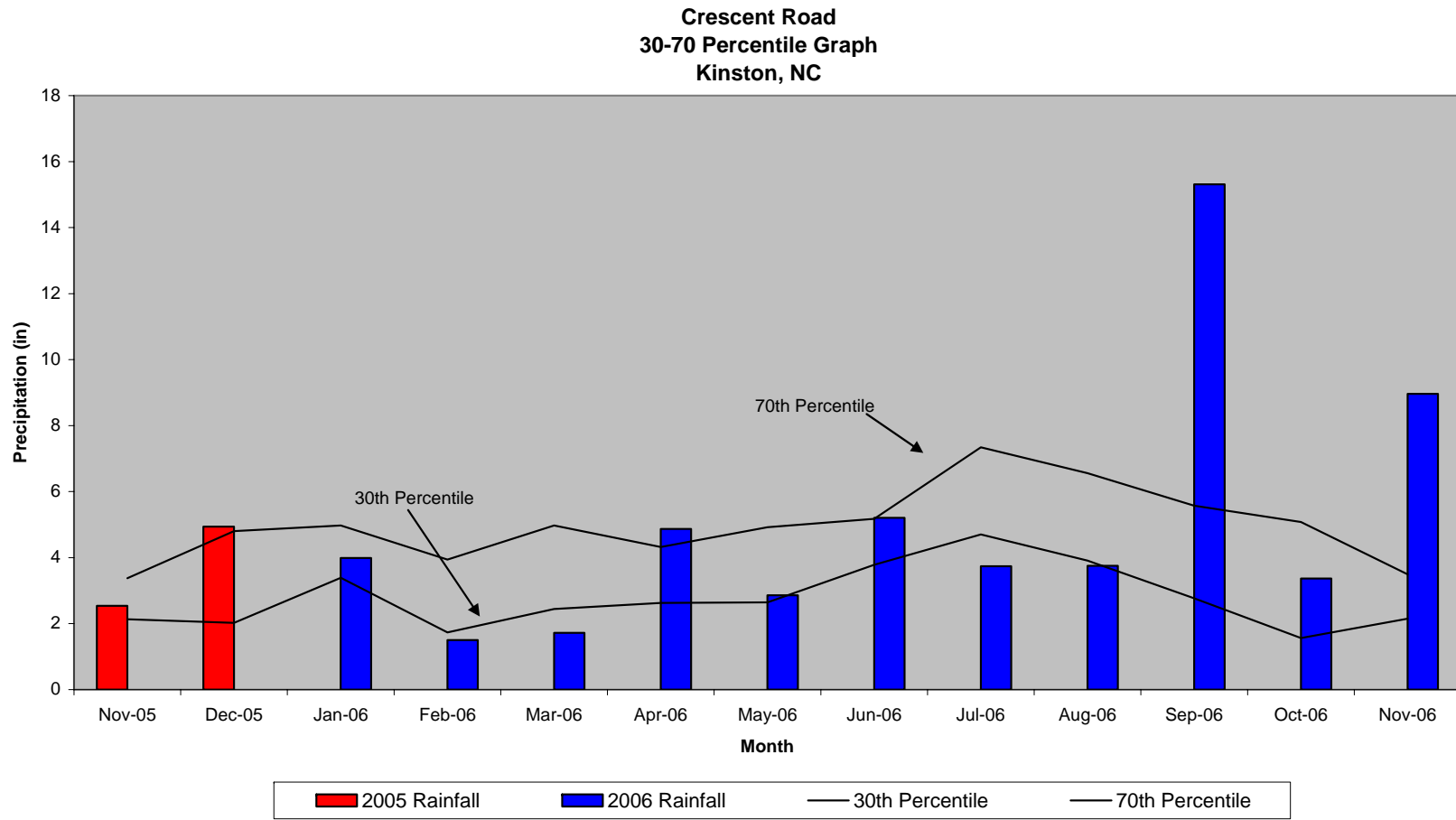


Figure 4. 30-70 Percentile Graph



3.0 VEGETATION: CRESCENT ROAD MITIGATION SITE (Year 4 Monitoring)

3.1 Success Criteria

Success Criteria states 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 (4 year)	Total (at planting)	Density (Trees/Acre)
1	14	9		10	33	47	477
2	14	11		4	29	42	470
3	9	7		3	19	34	380
Average Density (Trees/Acre)							442

Site Notes:

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

3.4 Conclusions

There were three vegetation monitoring plots established throughout the 3.35-acre planting area. The 2006 vegetation monitoring of the site revealed an average tree density of 442 trees per acre. This average is well above the minimum success criteria of 320 trees per acre.

NCDOT will continue vegetation monitoring at the Crescent Road Mitigation Site.

4.0 OVERALL CONCLUSIONS/RECOMMENDATIONS

The 2006-year represents the fourth full growing season that hydrologic and vegetation data has been collected on the Crescent Road Mitigation Site. Two of the three groundwater gauges met the jurisdictional criteria for wetland hydrology (>12.5% of the growing season), while one groundwater gauge met for 10.2% of the growing season. All three surface water gauges showed periods of inundation during the 2006 monitoring year.

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APPENDIX A
GAUGE DATA GRAPHS

APPENDIX B

SITE PHOTOS AND

PHOTO AND PLOT LOCATIONS MAP

Crescent Road



Photo Point #1 (Upstream)



Photo Point #1 (Downstream)



Photo Point #2 (Upstream)



Photo Point #2 (Downstream)



Photo Point #3 (Upstream)



Photo Point #3 (Downstream)



Overview of the Upper Reach (Upstream)



Facing Upstream from Culvert at end of Upper Reach



Photo Point #4 (Upstream)



Photo Point #4 (Downstream)



Photo Point #5 (Upstream)



Photo Point #5 (Downstream)



Photo Point #6 (Upstream)



Photo Point #6 (Downstream)

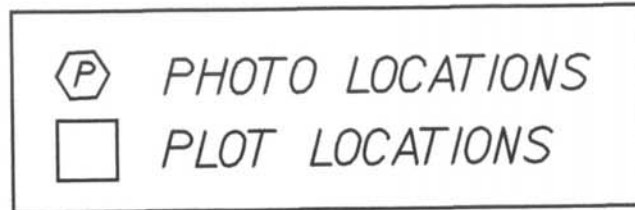
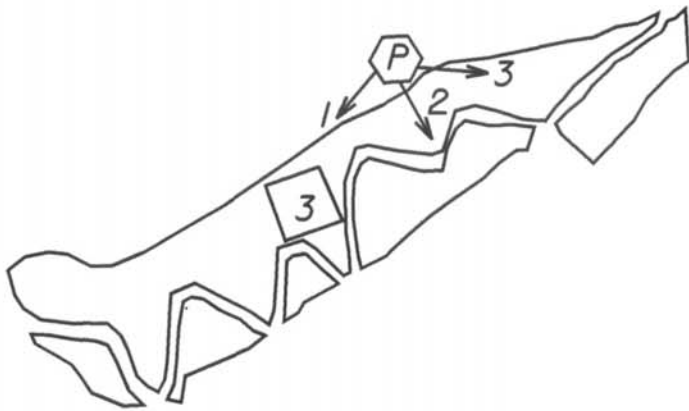
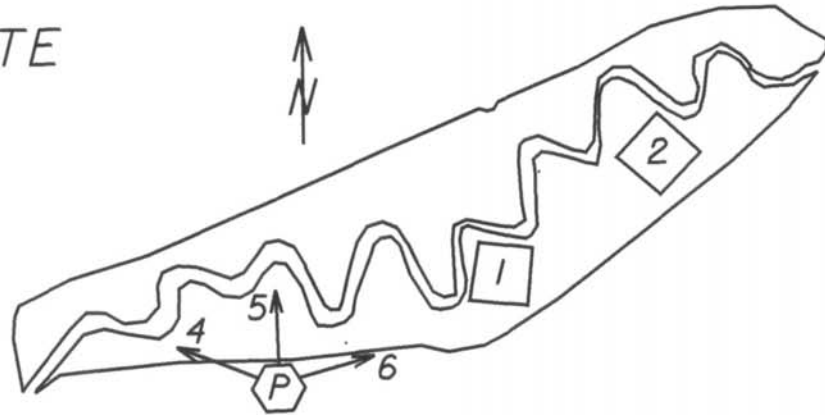


Overview of Lower Reach (Upstream)

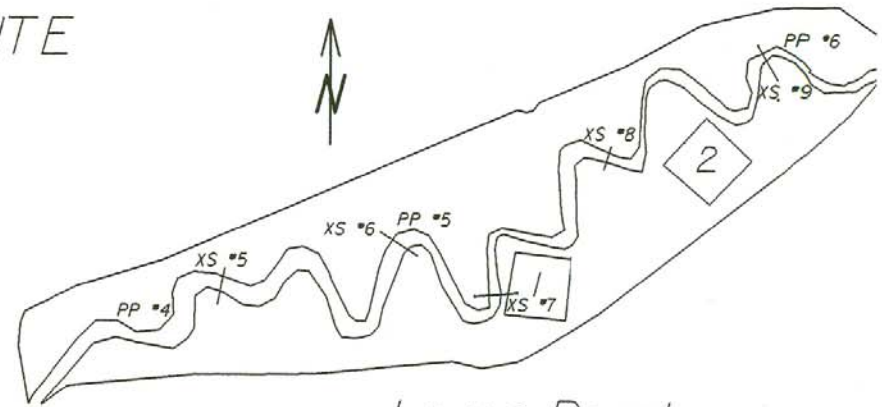


Overview of Lower Reach (Downstream)

CRESCENT ROAD MITIGATION SITE



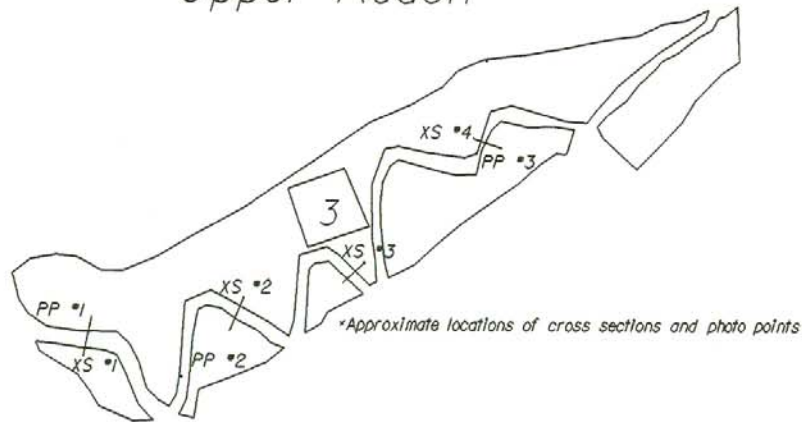
CRESCENT ROAD MITIGATION SITE



*Approximate locations of cross sections and photo points

Lower Reach

Upper Reach



*Approximate locations of cross sections and photo points

