ANNUAL REPORT FOR 2005

Greene Street Bridge Mitigation Site
Pitt County
Project No. 8.2220601
TIP No. B-2225WM

Natural Environment Unit & Roadside Environmental Unit
North Carolina Department of Transportation
December 2005

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SUMMARY

The following report summarizes the monitoring activities that have occurred in the past year at the Green Street Bridge Mitigation Site. This site was constructed to serve as a wetland mitigation site for the replacement of the existing Greene Street Bridge, as well as the construction of a new bridge to extend Pitt Street over the Tar River in Pitt County.

The site is monitored for hydrology through the use of two groundwater-monitoring gauges, two surface water gauges, and one rain gauge. The site is monitored for vegetation using one plot, which is representative of the 1.17 acre planting area. The mitigation plan called for two plots, one in the tree area and one in the shrub area. The shrub area will not be planted due to the high water conditions on-site.

The 2005-year represents the first year of hydrology and vegetation monitoring following construction. The site must demonstrate hydrologic and vegetation success for a minimum of five years or until the project is deemed successful.

The hydrologic data for 2005 showed that both groundwater gauges met jurisdictional success with GS-GW1 meeting success for 18.2% of the growing season and GS-GW2 meeting success for 29.6% of the growing season. The surface gauges showed a consistent presence of surface water throughout the growing season.

There was only one vegetation monitoring plot established within the 1.17 acre planting area. The 2005 vegetation monitoring of the site revealed an average tree density of 640 trees per acre. This average is well above the minimum success criteria of 260 trees per acre.

NCDOT recommends that monitoring continue at the Greene Street Bridge Mitigation Site.

1.0 INTRODUCTION

1.1 Project Description

The Greene Street Bridge Mitigation Site consists of approximately 3.1 acres of onsite restoration, enhancement, and preservation of upland levee forest and adjacent bottomlands. The site mitigates for impacts associated with B-2225, which consists of the replacement of the existing Greene Street Bridge, as well as the construction of a new bridge to extend Pitt Street over the Tar River. The purpose of the site is to provide a contiguous bottomland hardwood and cypress swamp system in previously impacted areas.

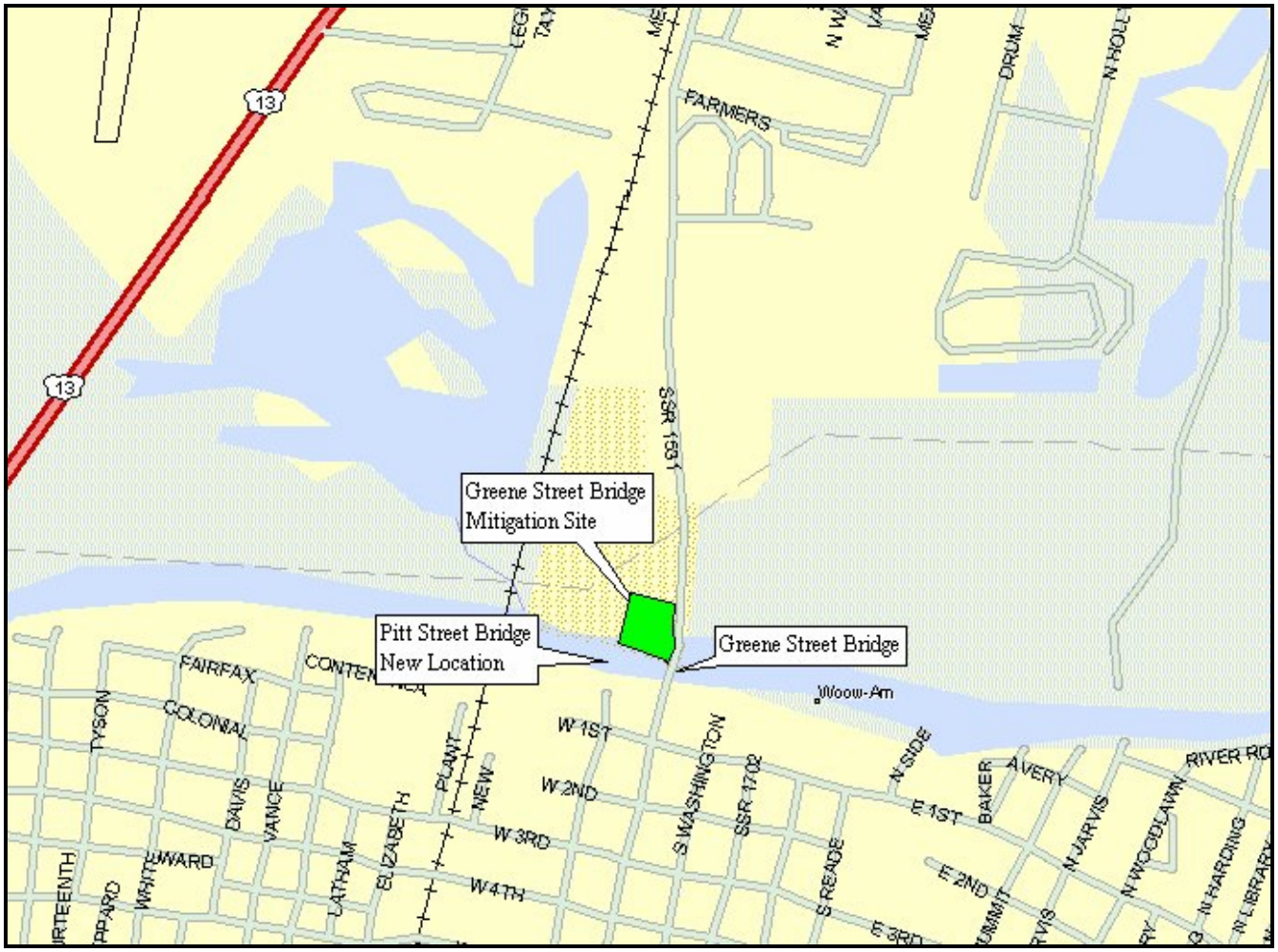
1.2 Purpose

In order to demonstrate successful mitigation, hydrologic and vegetative monitoring must be conducted for a minimum of five years or until success criteria are satisfied. Success criteria are based on federal guidelines for wetland mitigation and are stipulated in the approved August 1999 Mitigation Plan. The following report details the results of hydrologic and vegetative monitoring during the 2005-growing season at the Greene Street Bridge Mitigation Site.

1.3 Project History

March 2004	Site Planted
March- November 2005	Hydrologic Monitoring (Year 1)
June 2005	Vegetation Monitoring (Year 1)

Figure 1. Site Location Map



2.0 HYDROLOGY

2.1 Success Criteria

In accordance with federal guidelines for wetland mitigation, hydrologic success criteria states that the area must be inundated or saturated (within 12" of the surface) by surface or ground water for at least a consecutive 12.5% of the growing season.

The growing season in Pitt County begins March 15 and ends November 16. These dates correspond to a 50% probability that temperatures will remain above 28^{o} F or higher after March 15 and before November 16.[1] The growing season is 247 days; therefore, the optimum duration for wetland hydrology is 31 days. Local climate must represent average conditions for the area; this will be examined using local monthly rainfall totals recorded at the nearest possible official weather station.

2.2 Hydrologic Description

The site is monitored for hydrology using two groundwater-monitoring gauges, two surface water gauges, and one rain gauge. The initial set of gauges (surface gauge 1, groundwater gauge 1, and a rain gauge) were installed following site construction in 2003. Before the growing season began in 2005 another set of gauges (groundwater gauge 2 and surface gauge 2) were installed. Figure 2 is a map of the monitoring gauge locations. The groundwater-monitoring gauge records daily readings of the groundwater depth and the surface gauge records surface water elevations every three hours.

2.3 Results of Hydrologic Monitoring

2.3.1 Site Data

The maximum number of consecutive days that the groundwater was within twelve inches of the surface was determined for the groundwater-monitoring gauge. This number was converted into a percentage of the 247-day growing season (March 15 – November 16).

Table 1 shows the hydrologic results for 2005; Figure 3 is a graphical representation of these results.

[1] Soil Conservation Service, Soil Survey of Pitt County, North Carolina, p.71.

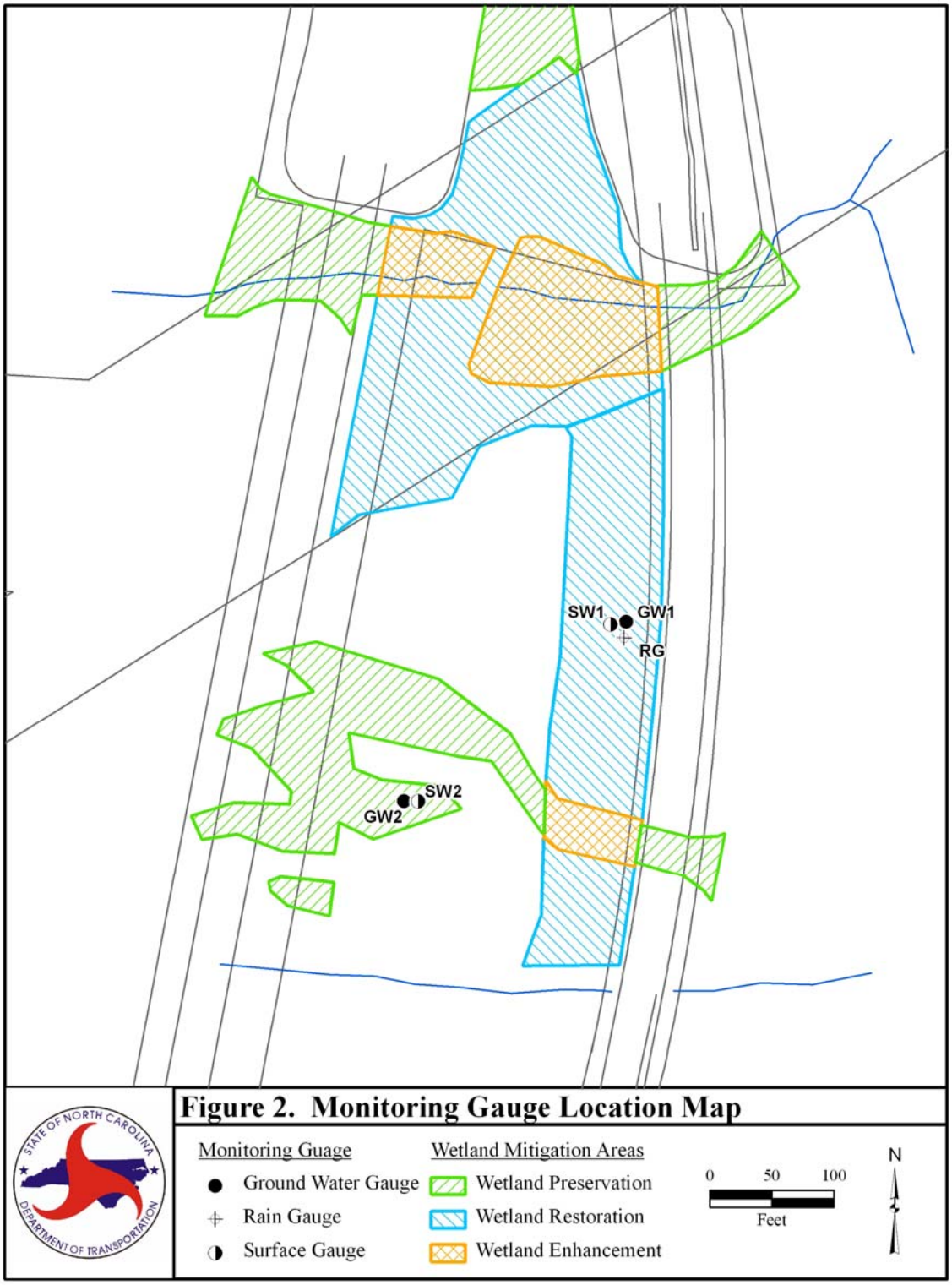

SW1
GW1
RG
SW2
GW2
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
Figure 2. Monitoring Gauge Location Map
Monitoring Guage
Ground Water Gauge
Rain Gauge
Surface Gauge
Wetland Mitigation Areas
Wetland Preservation
Wetland Restoration
Wetland Enhancement
0
50
100
Feet
N

Table 1. 2005 Hydrologic Monitoring Results

Monitoring Gauge	< 5%	5 – 8%	8 – 12%	> 12.5%	Actual %	Success Dates
GS-GW1				**X**	18.2	March 15-April 28
GS-GW2				**X**	29.6	March 15-May 26

Appendix A contains plots of surface and groundwater data at the gauge location during 2005.

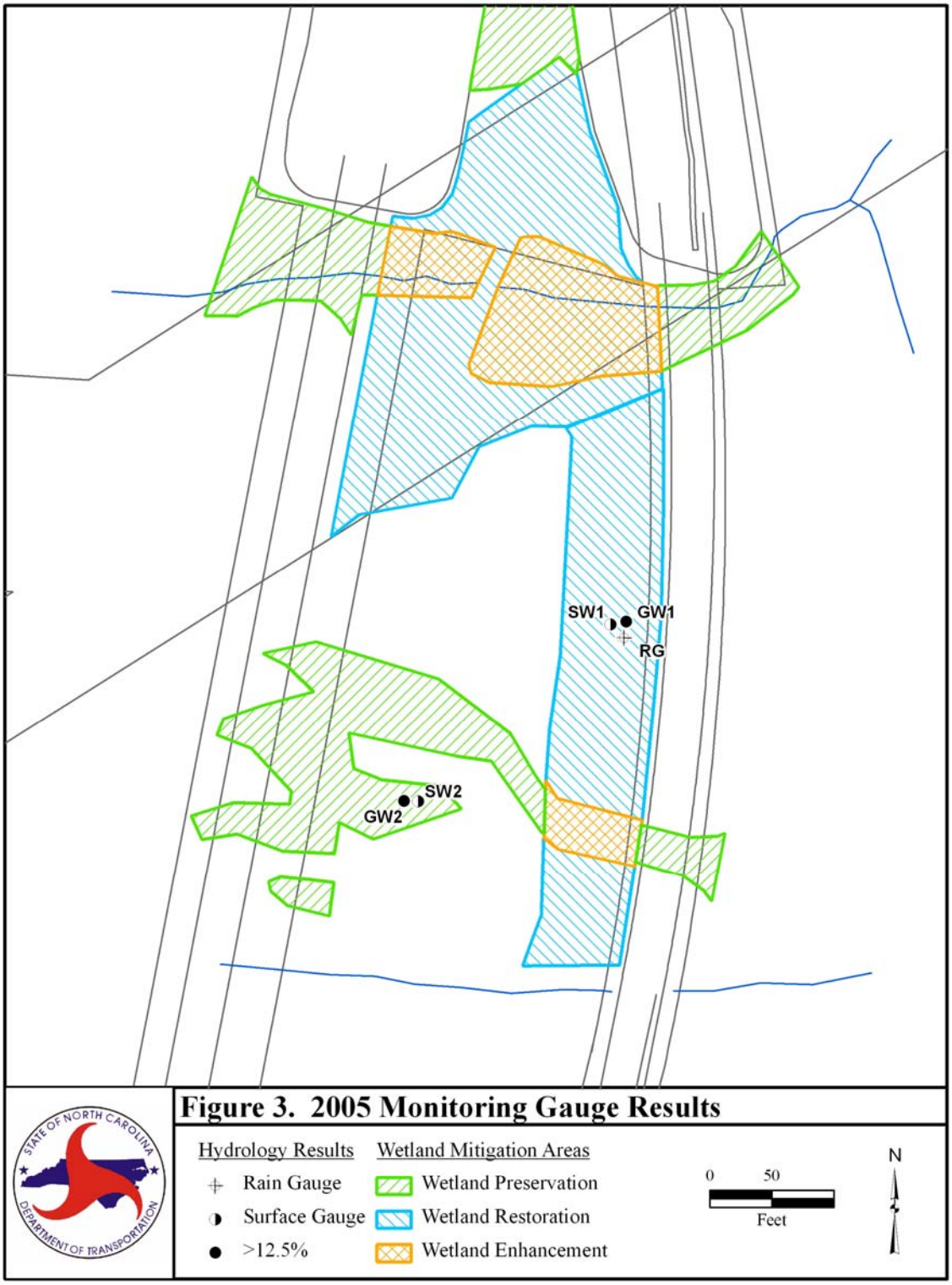
2.3.2 Climatic Data

The climate data and the on-site rainfall data are not reliable. The data from the on-site rain gauge consistently records more during each rainfall event and records a higher number of overall rainfall events than the Greenville Airport. For example, the on-site rain gauge records 4.46 inches of rainfall and the climate station only records 0.38 inches of rainfall in the month of May. There is no way to validate the rainfall data from either site. The rainfall data for 2005 cannot be used to determine normalcy of rainfall and is not included in this report.

2.4 Conclusions

The hydrologic data for 2005 showed that both groundwater gauges met jurisdictional success with GS-GW1 meeting success for 18.2% of the growing season and GS-GW2 meeting success for 29.6% of the growing season. The surface gauges showed a consistent presence of surface water throughout the growing season.

NCDOT will continue to monitor for hydrology at the Greene Street Bridge.


SW1
GW1
RG
SW2
GW2
Figure 3. 2005 Monitoring Gauge Results
Hydrology Results
Rain Gauge
Surface Gauge
>12.5%
Wetland Mitigation Areas
Wetland Preservation
Wetland Restoration
Wetland Enhancement
0
50
Feet
N
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

3.0 VEGETATION: GREENE STREET BRIDGE MITIGATION SITE (YEAR 1 MONITORING)

3.1 Success Criteria

Success Criteria states that successful plantings will be determined by obtaining at least 260 of the target trees per acre after five years. Also, no tree species should dominate more than 20% of the total density. 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:

Taxodium distichum, Bald cypress
Quercus phellos, Willow Oak
Nyssa sylvatica var. *biflora,* Swamp Blackgum
Platanus occidentalis, Sycamore
Betula nigra, River Birch
Quercus michauxii, Swamp Chestnut Oak

3.3 Results of Vegetation Monitoring

Table 2. Vegetation Monitoring Statistics

Plot #	Bald cypress	Swamp Blackgum	Sycamore	Willow Oak	River Birch	Swamp Chestnut Oak	Total (1 year)	Total (at planting)	Density (Trees/Acre)
1	12	14	15	1	3	3	48	51	640
Average Density (Trees/Acre)									640

Site Notes: Other vegetation noted: sedge, lespedeza, green ash, sweetgum, black willow, arrowhead, and various grasses.

3.4 Conclusions

There was one vegetation monitoring plot established throughout the 1.17 acre planting area. The 2005 vegetation monitoring of the site revealed an average tree density of 640 trees per acre. This average is well above the minimum success criteria of 260 trees per acre.

4.0 OVERALL CONCLUSIONS/ RECOMMENDATIONS

Before the growing season began in 2005 another set of gauges (groundwater gauge 2 and surface gauge 2) were installed. The hydrologic data for 2005 showed that both groundwater gauges met jurisdictional success with GS-GW1 meeting success for 18.2% of the growing season and GS-GW2 meeting success for 29.6% of the growing season. The surface gauge showed a consistent presence of surface water throughout the growing season.

There was one vegetation monitoring plot established throughout the 1.17 acre planting area. The 2005 vegetation monitoring of the site revealed an average tree density of 640 trees per acre. This average is well above the minimum success criteria of 260 trees per acre.

The climate data and the on-site rainfall data are not reliable. The rainfall data for 2005 cannot be used to determine normalcy of rainfall and is not included in this report.

NCDOT will continue hydrologic and vegetation monitoring at the Greene Street Bridge Mitigation Site.

APPENDIX A

DEPTH TO GROUNDWATER CHARTS

APPENDIX B

SITE PHOTOS, PHOTO LOCATIONS, AND PLOT LOCATIONS MAP

Green Street Bridge

Photo1

Photo 2

June 2005

GREENE STREET BRIDGE