ANNUAL REPORT FOR 2008

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

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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 hydrology is monitored through the use of two groundwater gauges, two surface water gauges, and one rain gauge. The site vegetation is monitored using one vegetation 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 was not planted due to the high water conditions on-site.

The 2008-year represents the fourth 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 2008 showed that both GS-GW1 and GS-GW2 met the jurisdictional success criteria for growing season. GS-GW1 was at 12.7%, and GS-GW2 was at 21.1% saturation of the growing season. The surface gauges showed a consistent presence of surface water during the growing season.

There was only one vegetation monitoring plot established within the 1.17 acre planting area. The 2008 vegetation monitoring of the site revealed a tree density of 373 trees per acre. This density is well above the minimum success criteria of 260 trees per acre.

NCDOT recommends that monitoring continue at the Greene Street Bridge Mitigation Site for 2009.

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 2008-growing season at the Greene Street Bridge Mitigation Site.

1.3 Project History

March 2004	Site Construction
March 2004	Site Planted
March-November 2005	Hydrologic Monitoring (Year 1)
June 2005	Vegetation Monitoring (Year 1)
March-November 2006	Hydrologic Monitoring (Year 2)
August 2006	Vegetation Monitoring (Year 2)
March -November 2007	Hydrologic Monitoring (Year 3)
June 2007	Vegetation Monitoring (Year 3)
July 2008	Vegetation Monitoring (Year 4)
March -November 2008	Hydrologic Monitoring (Year 4)

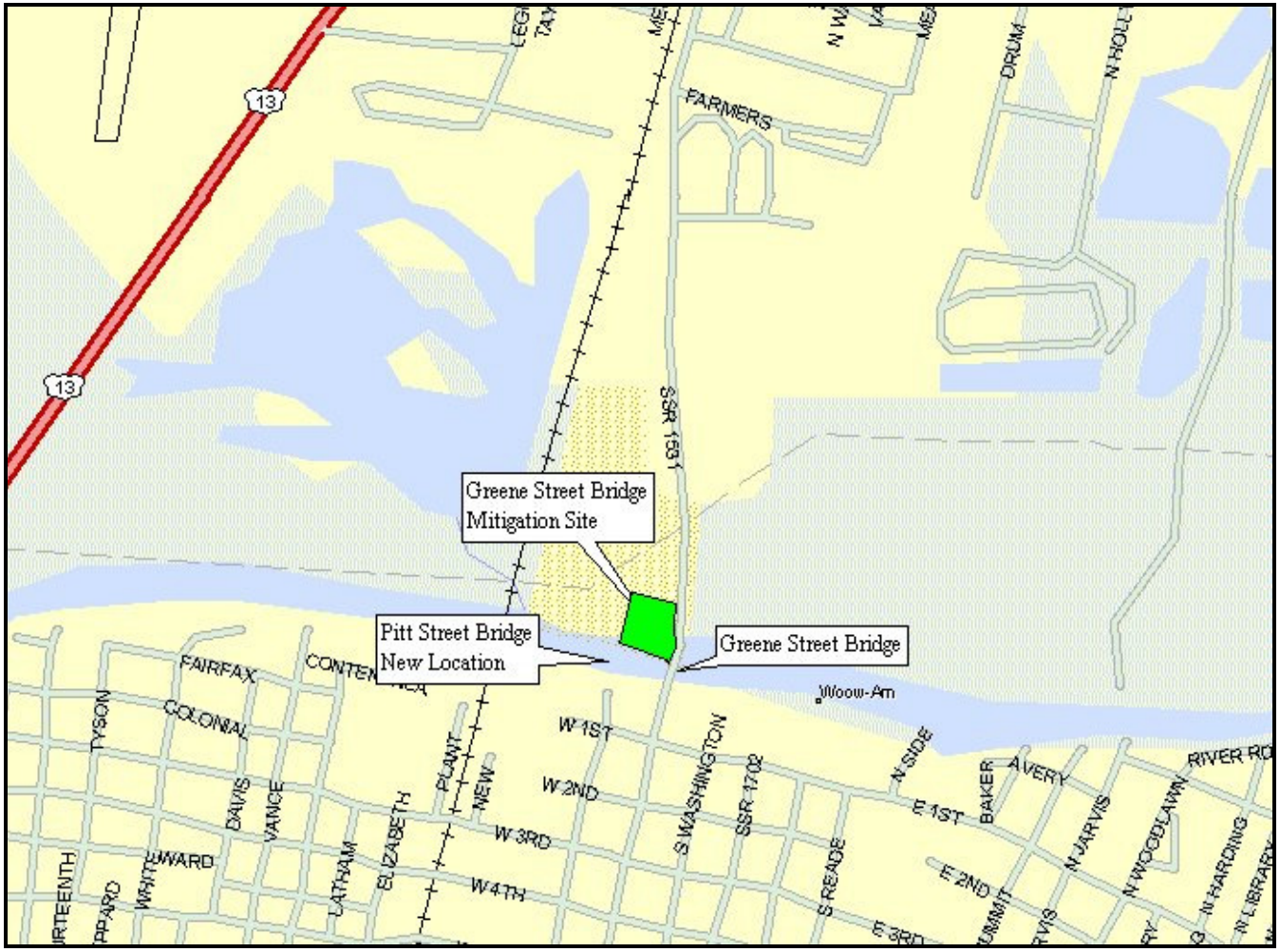


Figure 1. Site Location Map

2.0 HYDROLOGY

2.1 Success Criteria

In accordance with federal guidelines for wetland mitigation, hydrologic success criteria state 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° 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 hydrology is monitored using two groundwater 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 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 gauges. This number was converted into a percentage of the 247-day growing season (March 15 – November 16).

Table 1 shows the hydrologic results for 2008; Figure 3 is a graphical representation of these results.

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

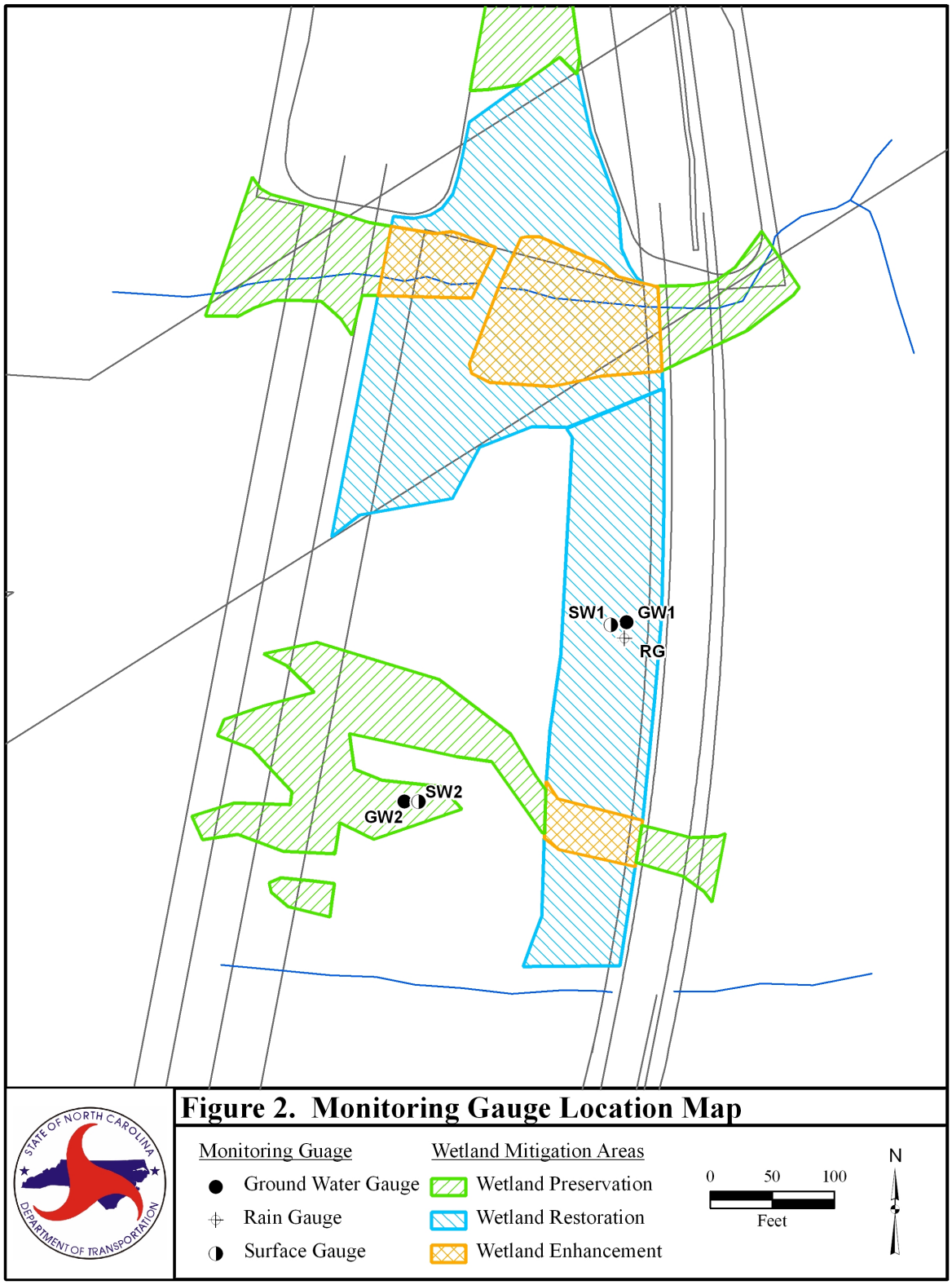


Figure 2. Monitoring Gauge Location Map

Table 1. Hydrologic Monitoring Results

Monitoring Gauge	< 5%	5 – 8%	8 – 12%	> 12.5%	Actual %	Dates of Success
GS-GW1				**X**	12.7	March 15-May 15
GS-GW2				**X**	21.1	March 15-May 21

Appendix A contains plots of surface and groundwater data during 2008.

2.3.2 Climatic Data

Figure 4 is a comparison of monthly rainfall for the period of November 2005 through November 2008 to historical precipitation (collected between 1975 and 2008) for Pitt County, Greenville Airport. This comparison gives an indication of how 2008 relates to historical data in terms of climate conditions. The NC State Climate Office provided all local rainfall information.

For the 2008-year, January, March, April, May, June, August, September, and October experienced below average rainfall. The month of July recorded average rainfall for the site while February and November recorded above average rainfall. Overall 2008 experienced a below average rainfall year.

2.4 Conclusions

The hydrologic data for 2008 showed that both GS-GW1 and GS-GW2 met the jurisdictional success criteria for growing season. GS-GW1 was at 12.7% and GS-GW2 was at 21.1% saturation of the growing season. The surface gauges showed a consistent presence of surface water during the growing season.

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

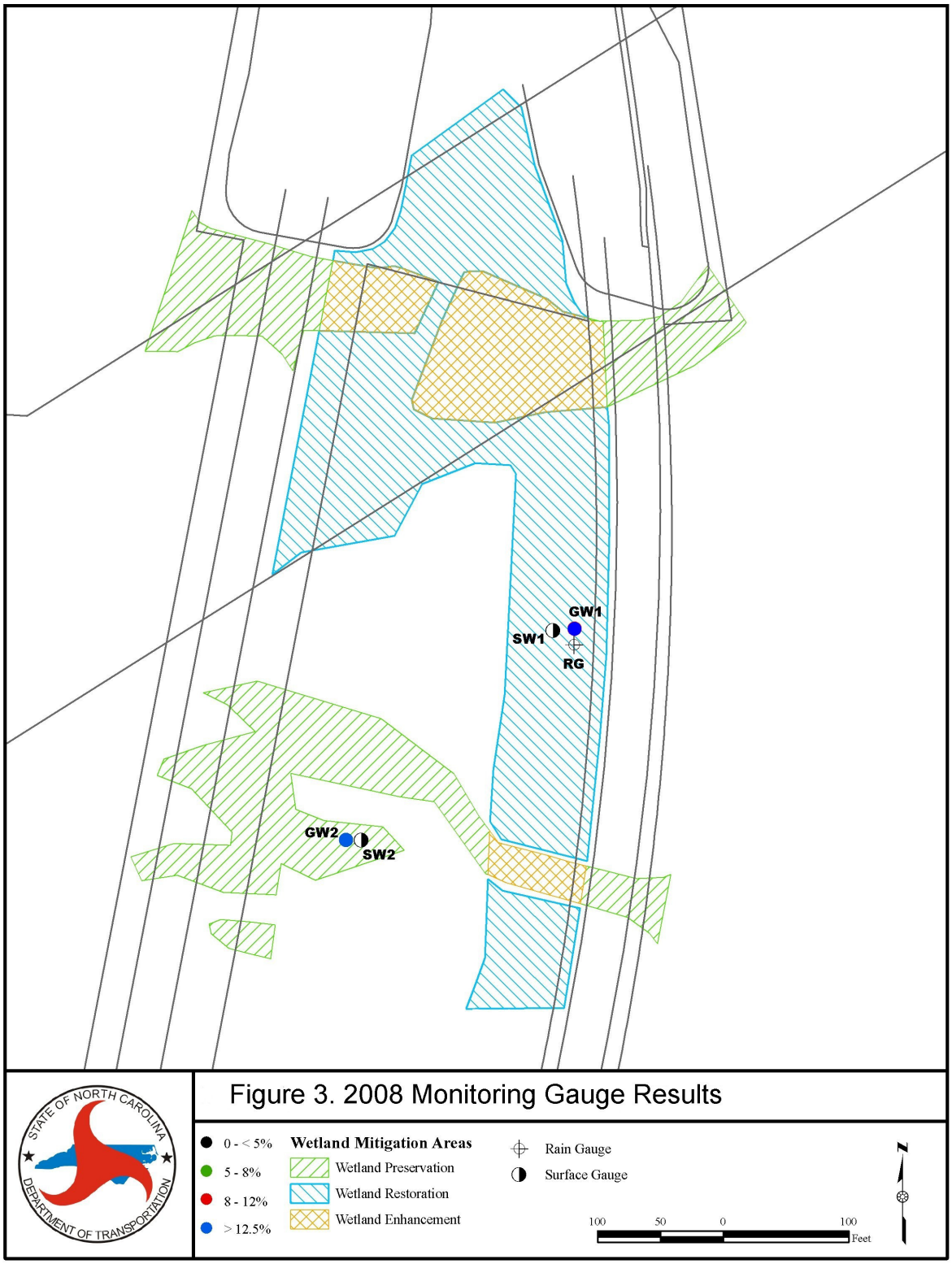


Figure 3. 2008 Hydrologic Monitoring Results

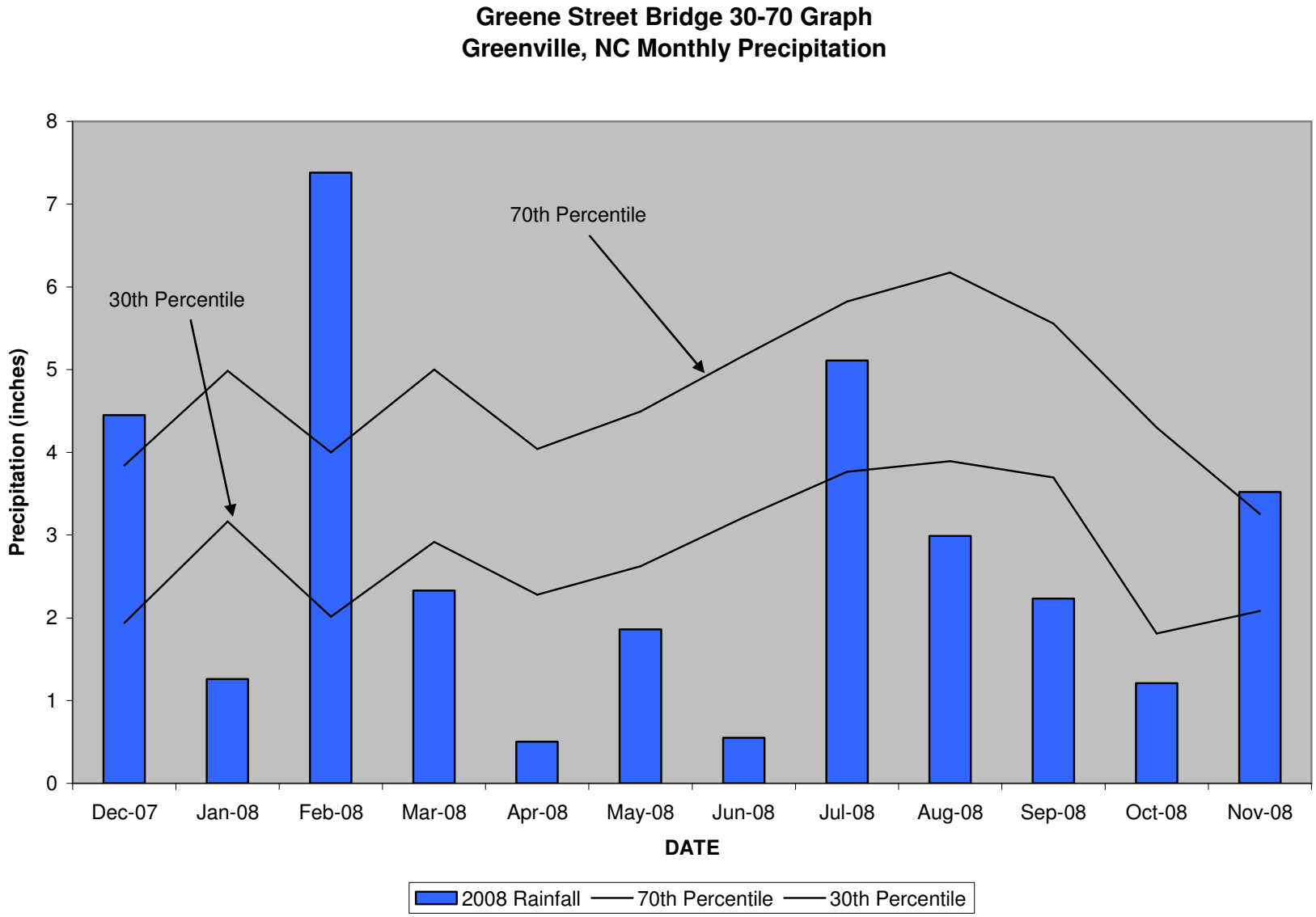


Figure 4. 30-70 Percentile Graph

3.0 VEGETATION: GREENE STREET BRIDGE MITIGATION SITE (YEAR 4 MONITORING)

3.1 Success Criteria

The success criteria state 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 #	Baldcypress	Swamp Blackgum	Sycamore	Willow Oak	River Birch	Swamp Chestnut Oak	Total (3 year)	Total (at planting)	Density (Trees/Acre)
1	12	6	4		4	2	28	51	373
Average Density (Trees/Acre)									373

Site Notes: Other vegetation noted: sedge, lespedeza, pluchea, green ash, sweetgum, black willow, *Sagittaria* sp., woolgrass, and various grasses. Willow Oak was noted outside of the plot location. There was some beaver activity noted on the site.

3.4 Conclusions

There was one vegetation monitoring plot established throughout the 1.17 acre planting area. The 2008 vegetation monitoring of the site revealed a tree density of 373 trees per acre. This density is well above the minimum success criteria of 260 trees per acre.

4.0 OVERALL CONCLUSIONS/ RECOMMENDATIONS

The hydrologic data for 2008 showed that both GS-GW1 and GS-GW2 met the jurisdictional success criteria for growing season. GS-GW1 was at 12.7%, and GS-GW2 was at 21.1% saturation of the growing season. The surface gauges showed a consistent presence of surface water during the growing season.

There was one vegetation monitoring plot established throughout the 1.17 acre planting area. The 2008 vegetation monitoring of the site revealed a tree density of 373 trees per acre. This density is well above the minimum success criteria of 260 trees per acre.

NCDOT will continue hydrologic and vegetation monitoring at the Greene Street Bridge Mitigation Site for 2009.

APPENDIX A

DEPTH TO GROUNDWATER CHARTS

APPENDIX B

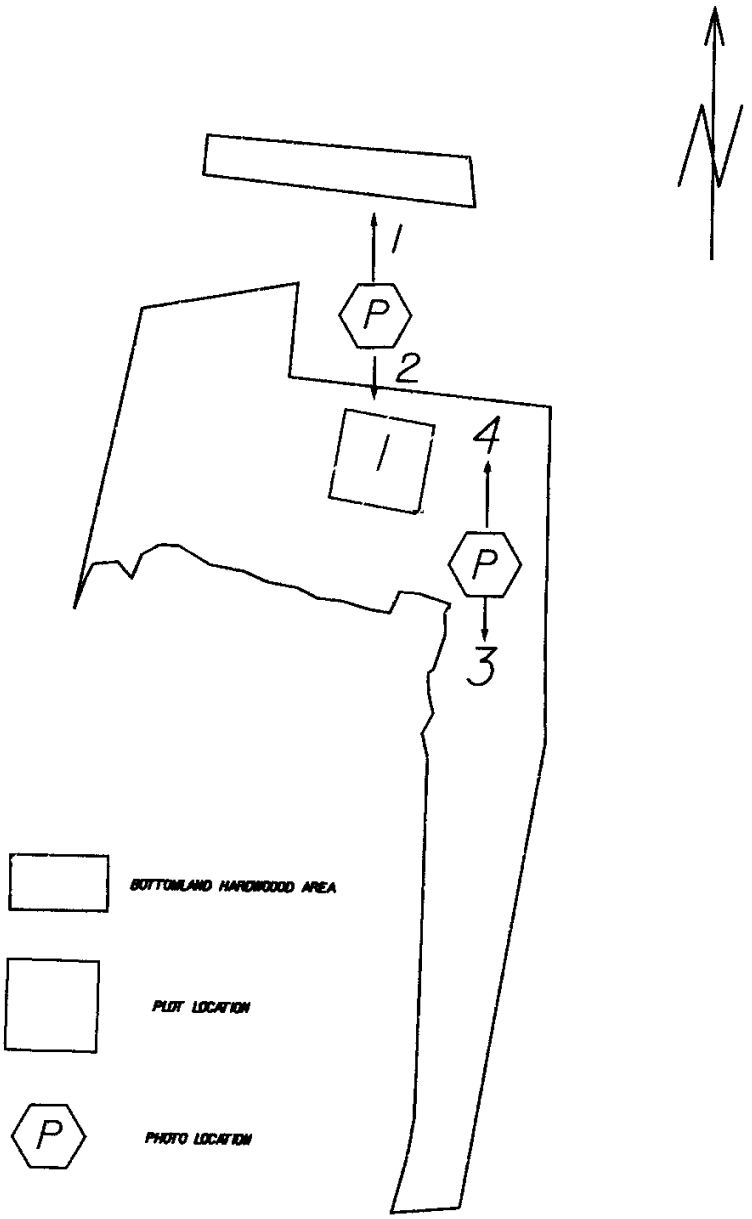
SITE PHOTOS, PHOTO LOCATIONS, AND PLOT LOCATIONS MAP

Greene Street Bridge

Photo 1

Photo 2

Photo 3 (additional photo outside of plot)

Photo 4 (additional photo outside of plot)

GREENE STREET BRIDGE