

# ANNUAL REPORT FOR 2010



**UT Forney Creek Wetland Mitigation Site  
Lincoln County  
TIP No. R-2206B**



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December 2010

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## **SUMMARY**

The following report summarizes the monitoring activities that have occurred in the past year at the UT Forney Creek Wetland Mitigation Site. The mitigation site is approximately 0.48 acre and construction was completed in June 2007. Monitoring activities in 2010 represent the third 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.

The mitigation site was previously maintained as a pond until a natural channel design was proposed at the site. The pond was drained and undercut with new soil material replacing the existing. However, due to existing springs in the area, the new material became too saturated for natural channel design. As an alternative, NCDOT restored a 0.48 acre wetland with the anticipation that stream flow will create its own path through the wetland. The channel that forms through the wetland will be evaluated periodically to determine if any in-stream grade control structures are needed.

The site is monitored with two groundwater gauges, one rain gauge, and visual vegetation monitoring.

The daily rainfall data depicted on the monitoring gauge graphs was recorded from an onsite rain gauge. An offsite rain gauge, maintained by the NC State Climate Office in Lincolnton, contributed to the daily rainfall data and historical rainfall data used for the 30<sup>th</sup> – 70<sup>th</sup> percentile analysis to determine if 2010 was a normal climatic year.

Hydrologic success criteria are based on the approved mitigation plan and require that the site demonstrate saturation or inundation within 12 inches of the soil surface for a consecutive 12.5% of the growing season during years of normal rainfall.

The 2010-year represents the third year for hydrology monitoring. Both groundwater gauges located in the wetland restoration area exceeded the success criteria with saturation within 12" of the soil surface for 100% of the growing season.

The third year of visual monitoring of the site revealed the planted species are not surviving in the planted areas. Due to the excessive amount of water that has been present on the site throughout the growing season, it is expected that none of the planted species have survived. The restoration area has been inundated throughout the past year due to a combination of beaver activity and off-site activity by the adjacent property owner. A site visit will be scheduled at this year's annual monitoring meeting to review the site and determine a course of action.

NCDOT will continue to monitor the UT Forney Creek Wetland Mitigation Site for hydrology and vegetation in 2011.

## 1.0 INTRODUCTION

### 1.1 Project Description

The UT Forney Creek Wetland Mitigation Site serves as mitigation for TIP No. R-2206B, the NC 16 Bypass from north of NC 73 to north of SR 1386 (St. James Church road) in Lincoln County (Figure 1). The 0.48 acre site is located approximately 19 miles east of the Lincoln County seat.

### 1.2 Purpose

In order to demonstrate successful wetland mitigation, hydrologic and vegetation monitoring must be conducted for a minimum of five years or until the site is deemed successful. Hydrologic success criteria are based on the approved mitigation plan, which requires that the site demonstrate saturation or inundation within 12 inches of the soil surface for a consecutive 12.5% of the growing season during years of normal rainfall. Vegetation success will require reference photos, plant survival (noting missing, stressed, damaged or dead plantings), estimated causes and proposed/required remedial action) and visual inspection of channel stability. A monitoring report will be submitted within sixty days after completing the monitoring.

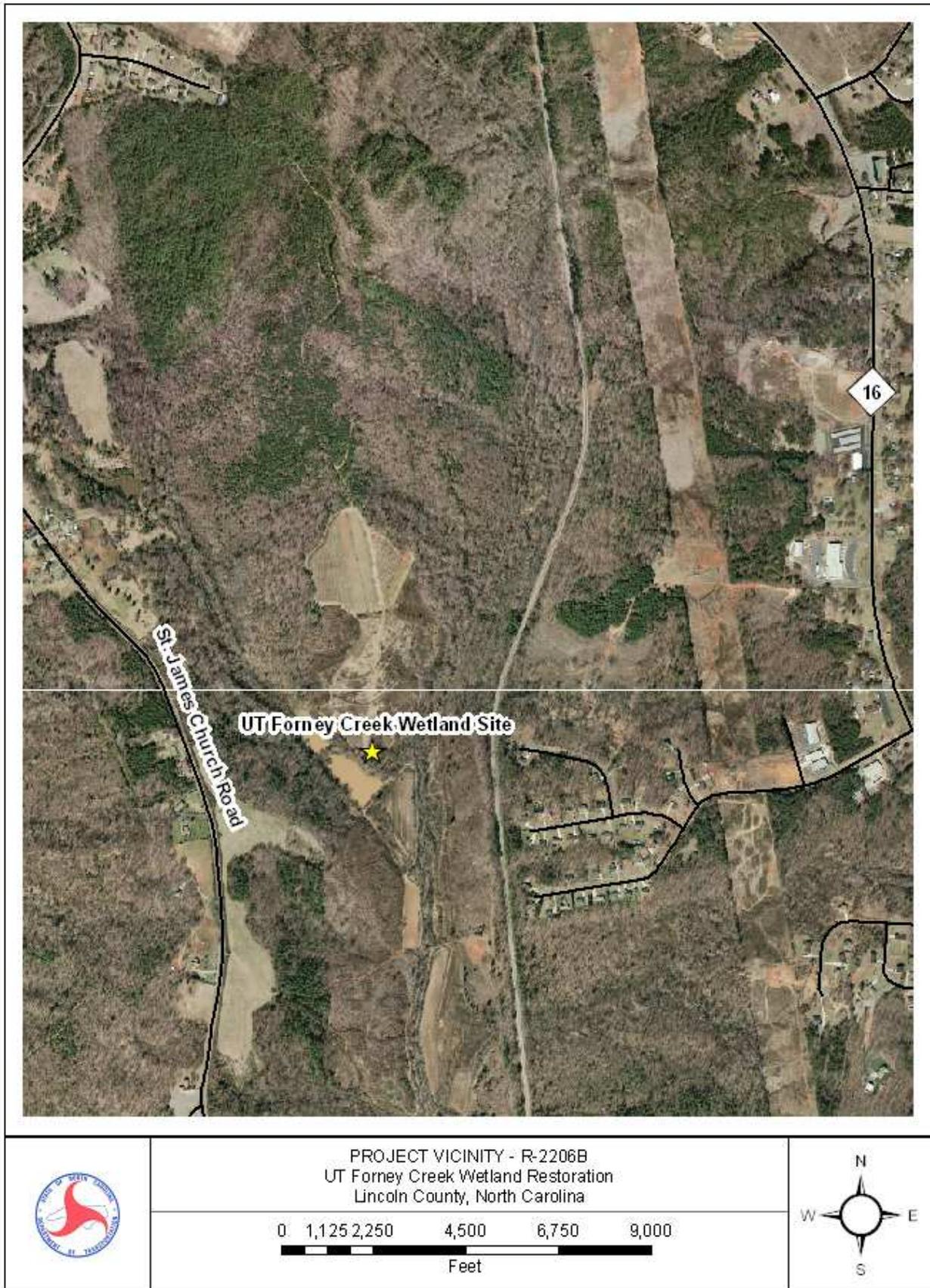
This report includes analyses of hydrologic and vegetation monitoring results, discussions of local climatic conditions throughout the growing season, and site photographs.

### 1.3 Project History

March 2008	Site Planted
September 2008	Visual Vegetation Monitoring (Year 1)
March-November 2008	Hydrologic Monitoring (Year 1)
August 2009	Visual Vegetation Monitoring (Year 2)
March-November 2009	Hydrologic Monitoring (Year 2)
August 2010	Visual Vegetation Monitoring (Year 3)
March-November 2010	Hydrologic Monitoring (Year 3)

### 1.4 Project History

The entire UT Forney Creek wetland mitigation site was upfront wetland restoration mitigation. This site will be used, with regulatory approval, to offset future impacts in the Catawba River basin.



**Figure 1. Site Location Map**

## **2.0 HYDROLOGY**

### **2.1 Success Criteria**

The hydrologic success criteria established for UT Forney Creek Wetland Mitigation Site, as stipulated in the approved mitigation plan and subsequent revisions, require that the site demonstrate saturation or inundation within 12 inches of the soil surface for a consecutive 12.5% of the growing season during years of normal rainfall.

The growing season in Lincoln County begins on March 28 and ends November 4. These dates correspond to a 50% probability that temperatures will drop to 28°F or lower after March 28 or before November 4<sup>1</sup>. The growing season is 222 days; therefore, hydrologic success requires 12.5% continuous saturation during this period, or at least 22 consecutive days.

### **2.2 Hydrologic Description**

Two groundwater monitoring gauges were installed on the site (Figure 2) in February 2008 in the wetland restoration area. The groundwater gauges record water levels on a daily basis. A rain gauge is also located on the site to assist in comparison of the rainfall data from an official weather station in Lincolnton (supplied by the NC State Climate Office). Monitoring data for 2010 represents the third year of hydrologic monitoring for the site.

### **2.3 Results of Hydrologic Monitoring**

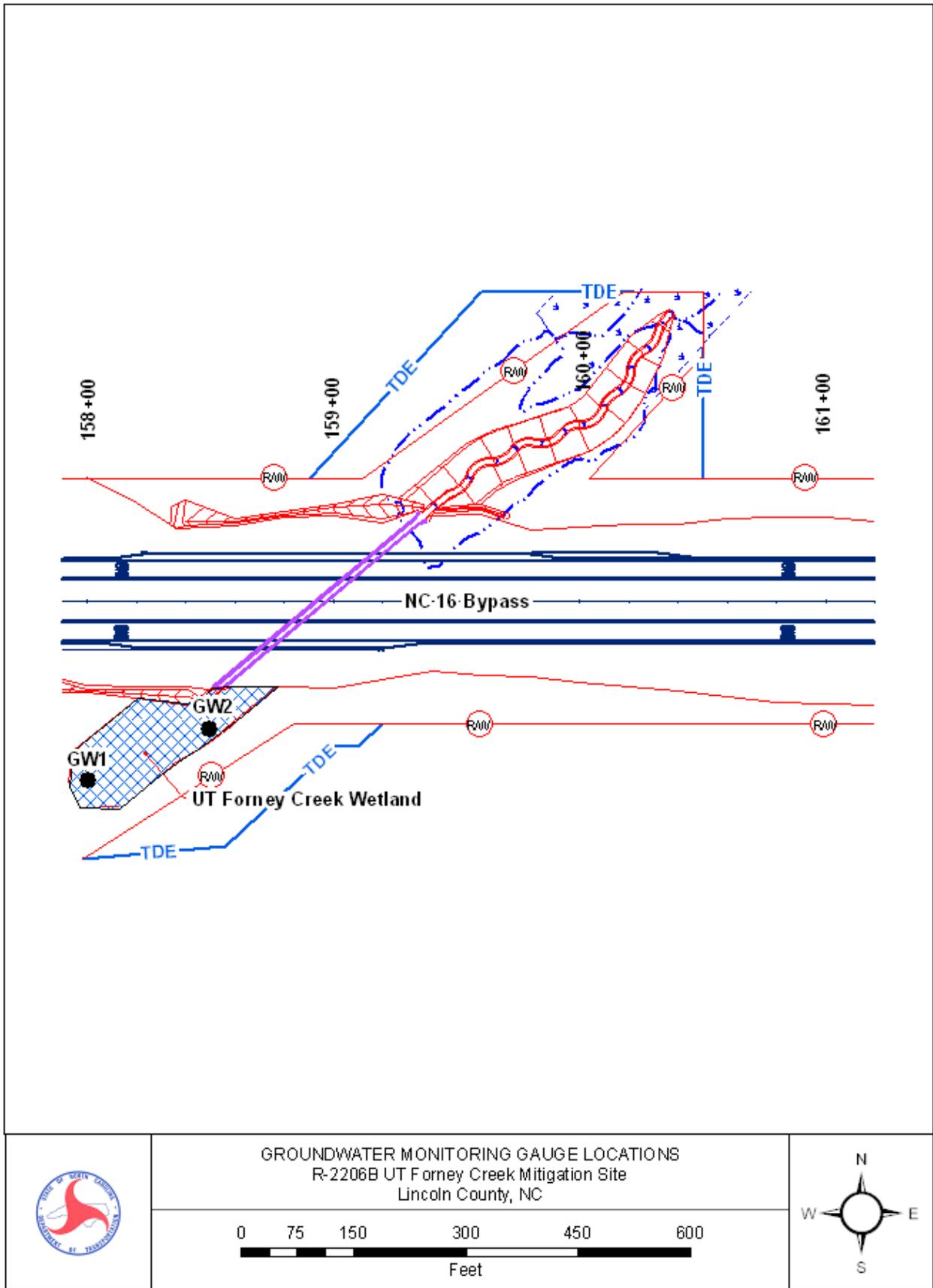
#### **2.3.1 Site Data**

The maximum number of consecutive days that the groundwater was within twelve inches of the surface was determined for each gauge. This number was converted into a percentage of the 222-day growing season. The results are presented in Table 1. Figure 3 also provides a graphical representation of the hydrologic results. Gauges highlighted in blue indicate wetland hydrology for more than 12.5% of the growing season. Those gauges highlighted in black indicate no wetland hydrology (< 5% of the growing season) while gauges highlighted in green indicate hydrology between 5% and 12.5%.

Appendix A contains a plot of the groundwater depth for each monitoring gauge. The maximum number of consecutive days is noted on each graph.

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<sup>1</sup> Soil Conservation Service, Soil Survey of Lincoln County, North Carolina.



**Figure 2. Monitoring Gauge Location Map**

**Table 1.** Hydrologic Monitoring Results

<b>Monitoring Gauge</b>	<b>&lt; 5%</b>	<b>5-8%</b>	<b>8-12%</b>	<b>&gt; 12.5%</b>	<b>Actual %</b>	<b>Success Dates</b>
GW-1+				<b>X</b>	100	March 28 - Nov 4
GW-2+				<b>X</b>	100	March 28 - Nov 4

+Gauge met success during average rainfall months.

### **2.3.2 Climatic Data**

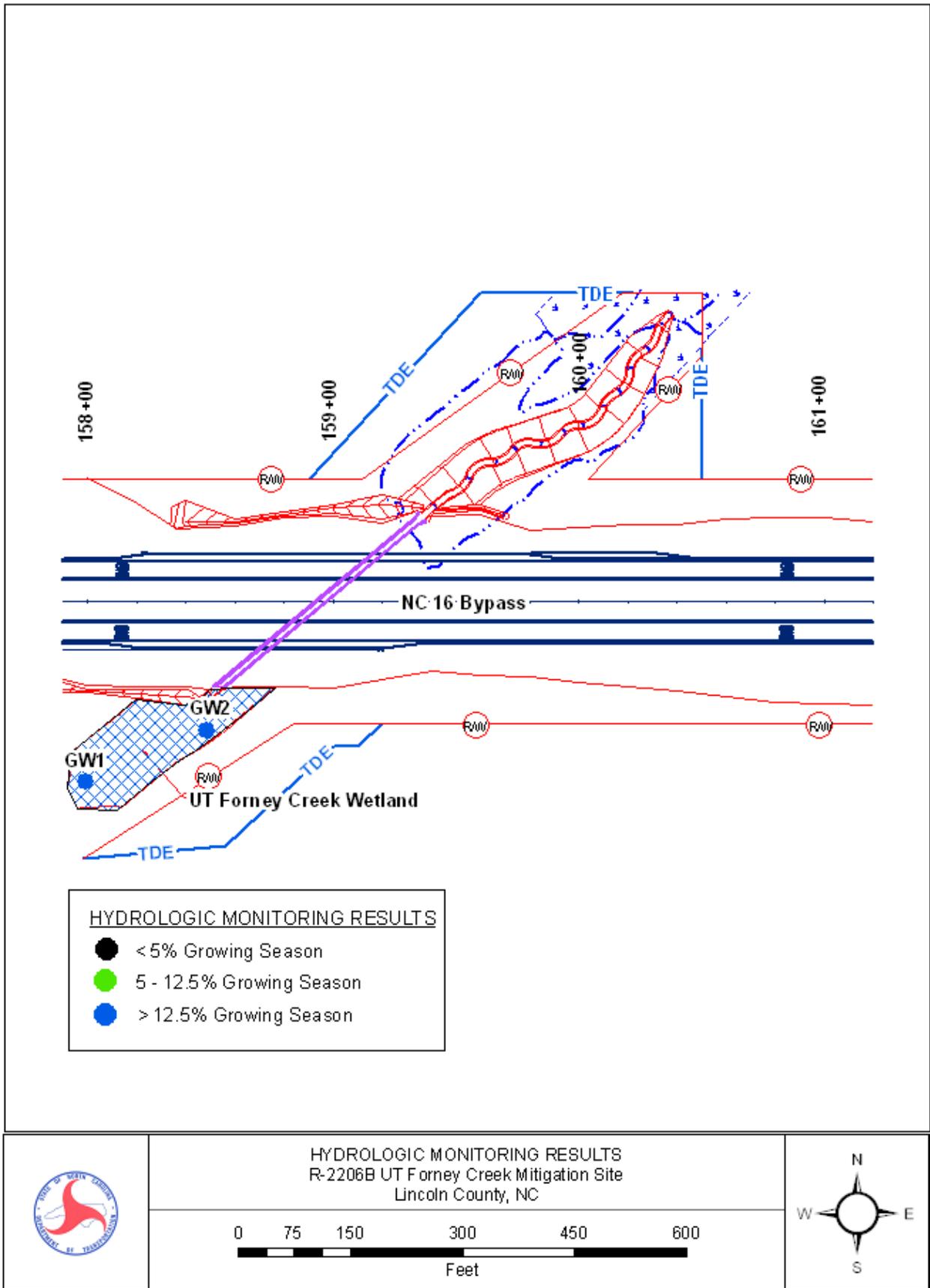
Figure 4 is a comparison of the 2010 monthly rainfall to the historical precipitation (collected between 1978 and 2009) for Lincolnton, North Carolina. This comparison gives an indication of how 2010 relates to historical data in terms of climate conditions. The NC State Climate Office provided all of the historical rainfall information.

Based on the historical data, January, February, March, May, July, and September recorded average rainfall for the site in 2010. The months of April, June, October and November recorded below average rainfall while August recorded above average rainfall. Overall, the 2010 monitoring year was an average rainfall year.

### **2.4 Conclusions**

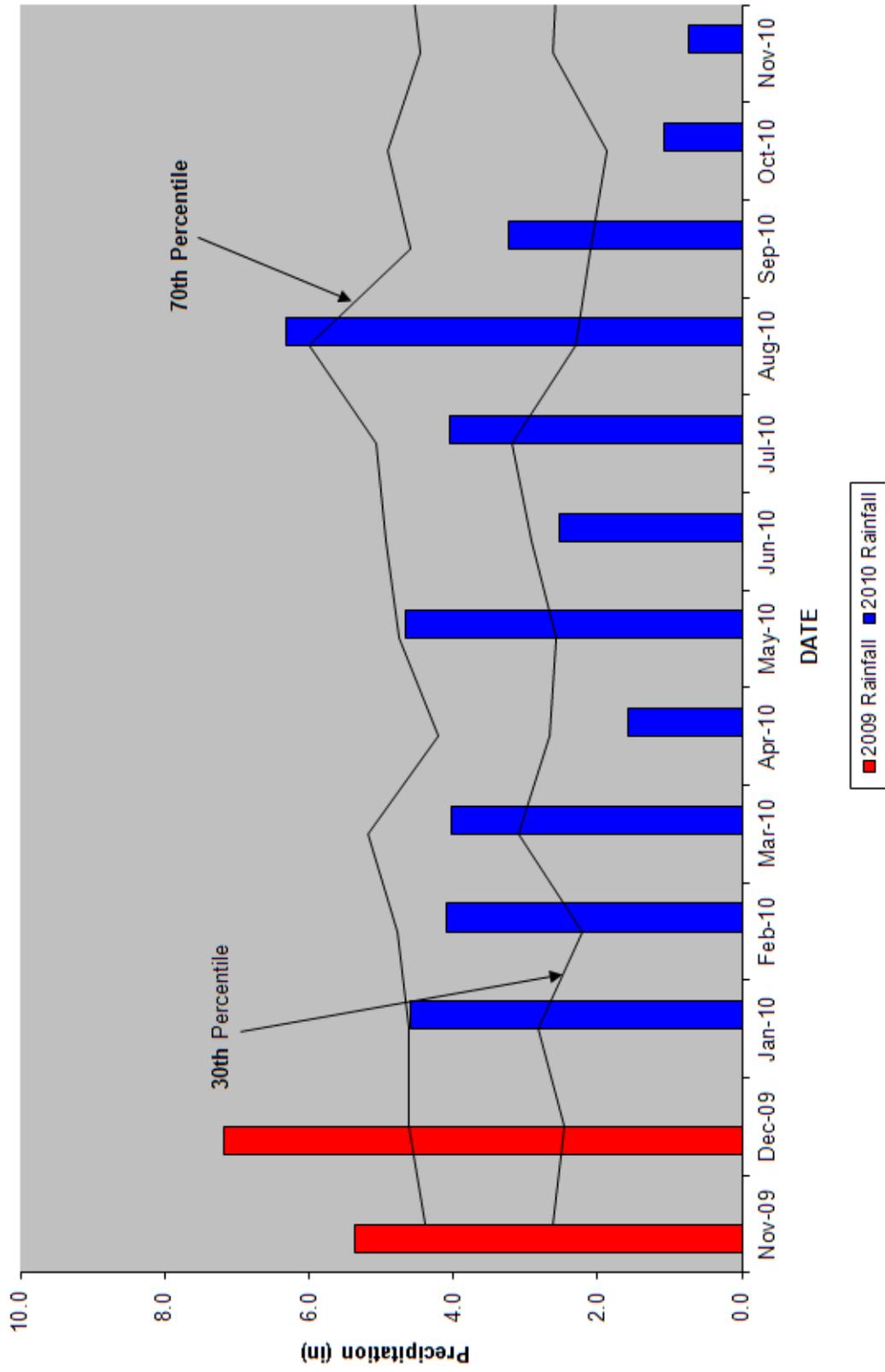
The 2010 monitoring year represents the third year of hydrologic monitoring for the R-2206B UT Forney Creek Wetland Mitigation Site. Both groundwater monitoring gauges recorded jurisdictional hydrology above the required 12.5% of the growing season. The restoration area has been inundated throughout the past year due to a combination of beaver activity and off-site activity by the adjacent property owner. A site visit will be scheduled at this year's annual monitoring meeting to review the site and determine a course of action.

NCDOT will continue to monitor the UT Forney Creek Wetland Mitigation Site for hydrology in 2011.



**Figure 3. Hydrologic Monitoring Results Map**

**UT Forney Creek Wetland Mitigation Site  
Figure 4 (30-70 Percentile Graph)  
Lincolnton, NC**



**Figure 4. 30-70 Percentile Graph**

### **3.0 VEGETATION: UT FORNEY CREEK WETLAND MITIGATION SITE (YEAR 3 MONITORING)**

#### **3.1 Success Criteria**

Monitoring to support vegetation success will require reference photos, plant survival (noting missing, stressed, damaged or dead plantings), estimated causes and proposed/required remedial action) and visual inspection of channel stability. A monitoring report will be submitted within sixty days after completing the monitoring.

#### **3.2 Description of Species**

The following tree species were planted in the wetland restoration area:

*Quercus lyrata*, Overcup Oak

*Platanus occidentalis*, Sycamore

*Fraxinus pennsylvanica*, Green Ash

*Betula nigra*, River Birch

#### **3.3 Results of Vegetation Monitoring**

The third year of visual monitoring of the wetland restoration area shows that it is re-attaining wetland jurisdictional status but the planted species are not surviving in the planted areas. The site was supplementally planted in January 2009 with Baldcypress seedlings. Due to the excessive amount of water that has been present on the site throughout the growing season, it is expected that none of the planted species have survived. The restoration area has been inundated throughout the past year due to a combination of beaver activity and off-site activity by the adjacent property owner. A site visit will be scheduled at this year's annual monitoring meeting to review the site and determine a course of action.

**Site Notes:** Other vegetation noted: black willow, *Scirpus* sp., *Juncus* sp., alder, *Polygonum* sp., cattail, and various wetland grasses.

#### **3.4 Conclusions**

There were approximately 0.48 acres total of wetland restoration on site. There were no plots established on the site. The third year of visual monitoring of the wetland restoration area shows that it is re-attaining wetland jurisdictional status but the planted species are not surviving in the planted areas. NCDOT will continue to monitor the planted vegetation at the site in 2011.

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

The 2010 monitoring year represents the third year of hydrologic monitoring for the UT Forney Creek Wetland Mitigation Site. Both groundwater monitoring gauges recorded jurisdictional hydrology for 100% of the growing season. Visual vegetation monitoring of the site revealed the planted species are not surviving in the planted areas. Due to the excessive amount of water that has been present on the site throughout the growing season, it is expected that none of the planted species have survived. The restoration area has been inundated throughout the past year due to a combination of beaver activity and off-site activity by the adjacent property owner. A site visit will be scheduled at this year's annual monitoring meeting to review the site and determine a course of action.

NCDOT will continue to monitor the UT Forney Creek Wetland Mitigation Site for vegetation and hydrology in 2011.

## **APPENDIX A**

### **GAUGE DATA GRAPHS**

## **APPENDIX B**

### **SITE PHOTOS AND PHOTO PLOT LOCATIONS**

# UT Forney Creek Mitigation Site



Photo 1



Photo 2

September 2010

