

# ANNUAL REPORT FOR 2015



**Banks School Road Wetland Mitigation Site**  
**Lenoir County**  
**TIP No. R-2719A**  
**COE Action ID: 200511238**  
**DWR: 20050787**



Prepared By:  
Natural Environment Section & Roadside Environmental Unit  
North Carolina Department of Transportation  
January 2016

# TABLE OF CONTENTS

SUMMARY .....	1
1.0 INTRODUCTION .....	2
1.1 Project Description.....	2
1.2 Purpose .....	2
1.3 Project History .....	2
1.4 Debit Ledger .....	3
2.0 HYDROLOGY.....	5
2.1 Success Criteria.....	5
2.2 Hydrologic Description.....	5
2.3 Results of Hydrologic Monitoring .....	5
2.3.1 Site Data .....	5
2.3.2 Climatic Data.....	7
2.4 Conclusions .....	7
3.0 VEGETATION .....	10
3.1 Success Criteria.....	10
3.2 Description of Species .....	10
3.3 Results of Vegetation Monitoring .....	11
3.4 Conclusions .....	11
4.0 OVERALL CONCLUSIONS/RECOMMENDATIONS.....	12

## LIST OF FIGURES

Figure 1.	Site Location Map .....	4
Figure 2.	Monitoring Gauge Location Map.....	6
Figure 3.	2015 Hydrologic Monitoring Results .....	8
Figure 4.	30-70 Percentile Graph 2015.....	9

## LIST OF TABLES

Table 1.	2015 Hydrologic Monitoring Results .....	7
Table 2	2012-2016 Hydrologic Monitoring Results .....	7
Table 3	Vegetation Monitoring Statistics.....	11

## APPENDICES

APPENDIX A	GROUNDWATER GAUGE DATA
APPENDIX B	SITE PHOTOS, PHOTO STATIONS, AND PLOT LOCATIONS MAP

## **SUMMARY**

The following report summarizes the wetland monitoring activities conducted during 2015 at the Banks School Road Mitigation Site. This site, situated adjacent to the new US 70 Bypass near Kinston, was designed and constructed during 2012 by the North Carolina Department of Transportation (NCDOT) in order to provide mitigation for wetland impacts associated with the construction of Transportation Improvement Program (TIP) number R-2719A. This report provides the monitoring results for the fourth formal year of monitoring (Year 2015). The site must demonstrate hydrologic and vegetation success for a minimum of five years or until the site is deemed successful.

The site hydrology is monitored with three groundwater gauges including two gauges in the restoration area and one gauge in the enhancement area. All three of the groundwater gauges met the jurisdictional criteria for wetland hydrology (>12.5% of the growing season) in 2015.

There were two vegetation monitoring plots established throughout the wetland restoration area. The 2015 vegetation monitoring of the site revealed an average tree density of 625 trees per acre. This average is well above the minimum success criteria of 290 trees per acre for the third year of monitoring.

NCDOT will continue hydrologic and vegetation monitoring at the Banks School Road Mitigation Site in 2016.

## 1.0 INTRODUCTION

### 1.1 Project Description

The following report summarizes the wetland monitoring activities that have occurred during 2015 at the Banks School Road Mitigation Site. The site is located adjacent to new US 70 Bypass near Kinston (Figure 1). The site was constructed to provide mitigation for wetland impacts associated with (TIP number) R-2719A in Lenoir County. The 21.28 acre site provides the following types of mitigation: 0.68 acre of non-riverine wetland restoration, 2.1 acres of riparian buffer, 2.07 acres of wetland enhancement, 3.92 acres of jurisdictional wetland preservation and preservation of 13.01 acres of non-jurisdictional uplands.

### 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. Criteria for hydrologic conditions and vegetation survival are included in these documents. The following report details the results of hydrologic and vegetation monitoring during the 2015-growing season at the Banks School Road Mitigation Site.

### 1.3 Project History

December 2011	Herbicide Application on Privet
May 2011	Site Constructed
June 2011	Gauges Installed
March 2012	Wetland Restoration Area Planted
March-November 2012	Hydrologic Monitoring (Year 1)
July 2012	Vegetation Monitoring (Year 1)
March-November 2013	Hydrologic Monitoring (Year 2)
July 2013	Vegetation Monitoring (Year 2)
March-November 2014	Hydrologic Monitoring (Year 3)
June 2014	Vegetation Monitoring (Year 3)
January 2015	Supplemental Planting
March-November 2015	Hydrologic Monitoring (Year 4)
June 2015	Vegetation Monitoring (Year 4)
September 2015	Herbicide Application on Privet

#### **1.4 Debit Ledger**

The entire Banks School Road mitigation site was used for the R-2719A project to compensate for unavoidable wetland impacts.



## **2.0 HYDROLOGY**

### **2.1 Success Criteria**

In accordance with the mitigation plan and permit for wetland mitigation, the success criteria for hydrology 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 hydrologic monitoring shall persist for a total of five years with monitoring reports submitted annually. After the five year monitoring period, if the monitoring requirements are not met, the site may still be deemed successful at the discretion of and written approval of the Division of Water Quality (401 permit conditions).

The growing season in Lenoir County begins March 17 and ends November 15. These dates correspond to a 50% probability that temperatures will remain above 28° F or higher after March 17 and before November 15. The growing season is 244 days; therefore hydrology for 12.5% of the growing season is at least 31 consecutive days. Local climate must represent average conditions for the area in order for the hydrologic data to be valid.

### **2.2 Hydrologic Description**

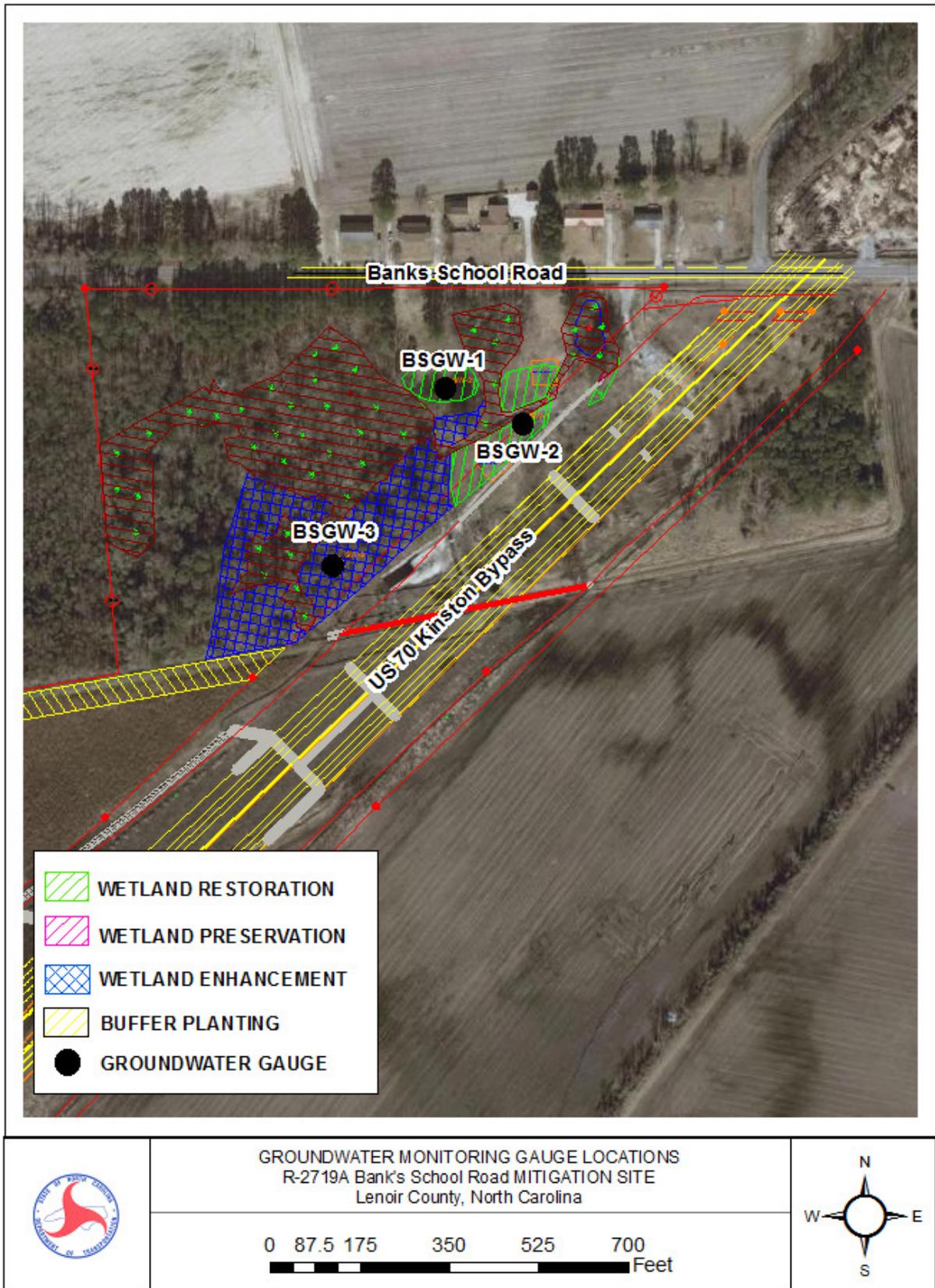
Three groundwater monitoring gauges are used to record site hydrologic data including two in the restoration area and one gauge in the enhancement area. The groundwater gauges are set to record daily water levels. The hydrologic response (groundwater) to rainfall events is evaluated using data provided by the North Carolina State Climate Office.

Appendix A contains a plot of the water depth for each of the groundwater monitoring gauges for 2015. Precipitation events, provided by the State Climate Office, are included on each groundwater graph as bars.

### **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 2015. Table 2 presents the hydrologic results at the site since construction was completed. Figure 3 is a graphical representation of the hydrologic monitoring results for 2015.



**Figure 2.** Monitoring Gauge Location Map

**Table 1.** 2015 Hydrologic Monitoring Results

Monitoring Gauge	< 5%	5 – 12.5%	> 12.5%	Actual %	Dates of Success
BSGW-1			X	38.9	April 13 - July 16; Aug. 3 - Oct. 20
BSGW-2			X	47.1	March 17 - July 9, Aug. 7 - Nov. 15
BSGW-3			X	21.3	March 17 - May 7

\*BSGW-3 is located in the enhancement area.

\*Appendix A contains plots of surface and groundwater data during 2015.

**Table 2.** 2012-2016 Hydrologic Monitoring Results

Monitoring Gauge	2012 Results	2013 Results	2014 Results	2015 Results	2016 Results
BSGW-1	52.0	44.3	61.1	38.9	
BSGW-2	52.5	29.1	99.6	47.1	
BSGW-3	14.8	12.7	15.6	21.3	
Climate Conditions	Ave./Above Average Rainfall	Ave./Above Average Rainfall	Ave./Above Average Rainfall	Ave./Above Average Rainfall	

### 2.3.2 Climatic Data

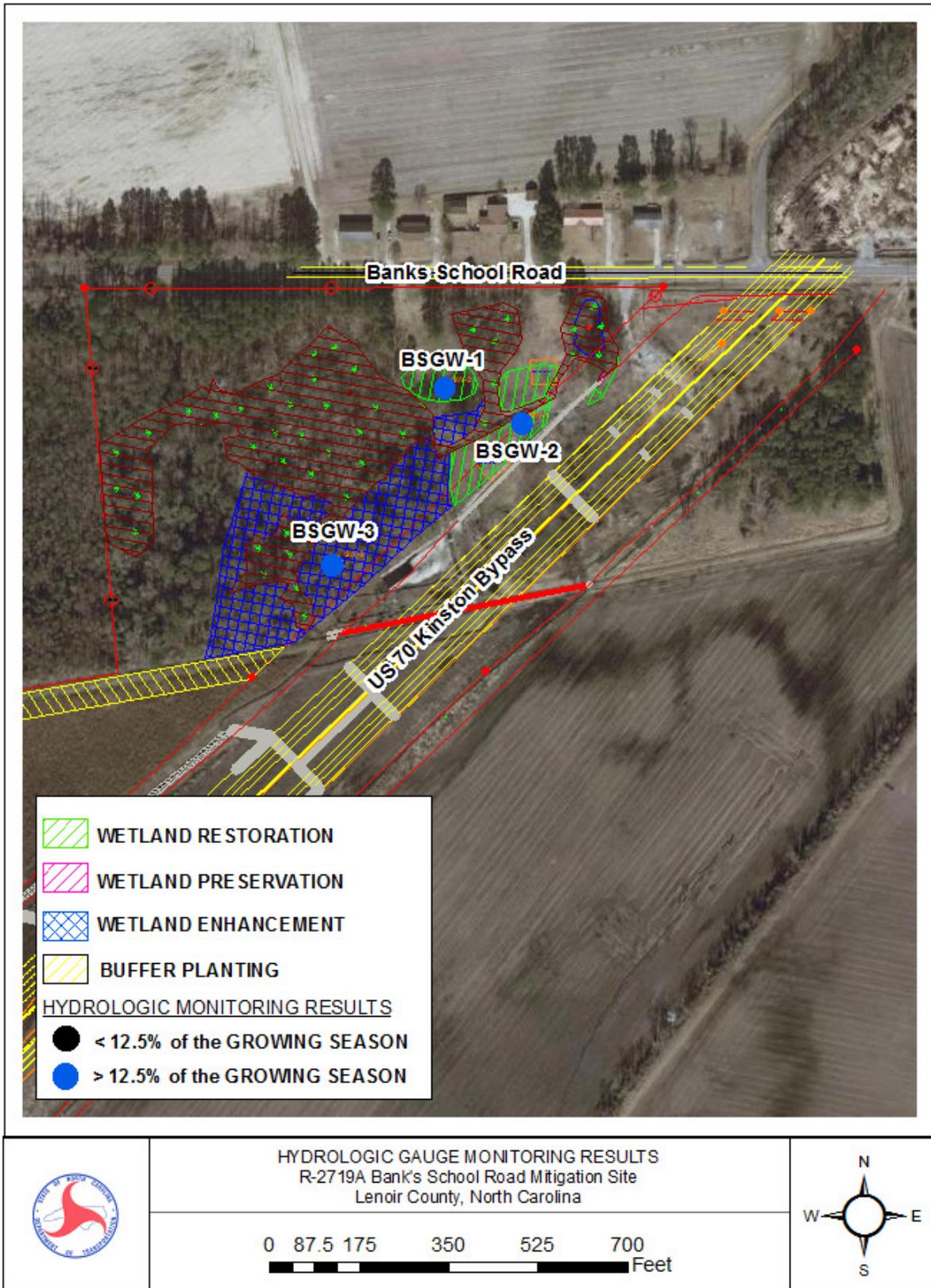
Figure 4 is a comparison of monthly rainfall for the period of January 2015 through November 2015 to historical precipitation (collected between 1984 and 2013) for the Kinston Agriculture Research Station in Lenoir County. This comparison gives an indication of how 2015 relates to historical data in terms of climate conditions. The NC State Climate Office provided all local rainfall information.

For the 2015-year, March, April, June, and September experienced average rainfall. August recorded below average rainfall while January, February, May July, October, and November recorded above average rainfall. Overall 2015 experienced an average to above average rainfall year.

### 2.4 Conclusions

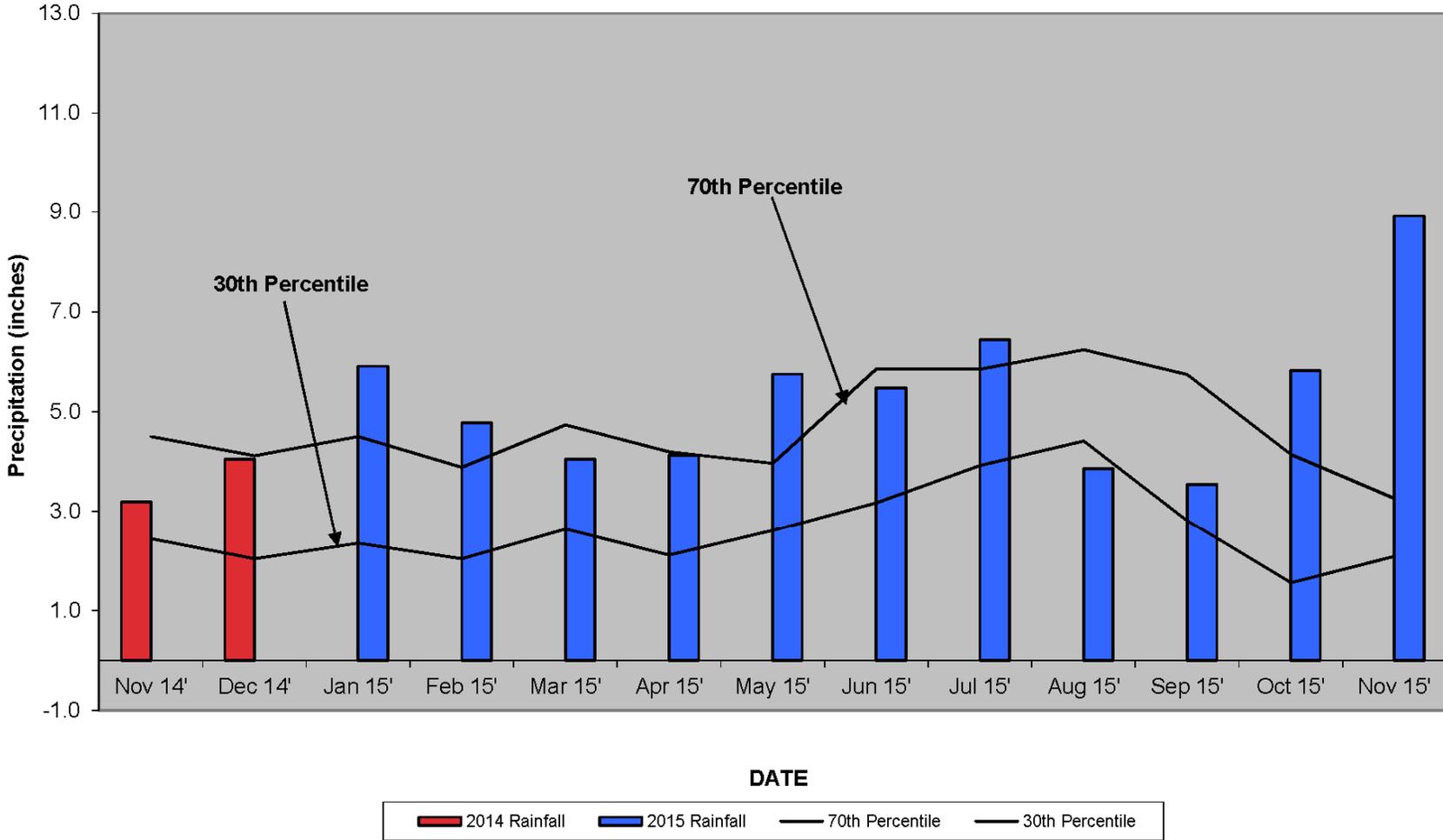
The 2015 year represents the fourth year of hydrologic monitoring at the Banks School Road Mitigation Site. All three groundwater monitoring gauges met the jurisdictional criteria wetland hydrology (>12.5% of the growing season) during the 2015 growing season.

NCDOT will continue to monitor the hydrology at the Banks School Road Mitigation Site in 2016.



**Figure 3. 2015 Hydrologic Monitoring Results**

**Banks School Road 30-70 Graph  
Kinston, NC Monthly Precipitation**



**Figure 4. 30-70 Percentile Graph 2015**

### **3.0 VEGETATION: BANKS SCHOOL ROAD MITIGATION SITE (YEAR 3 MONITORING)**

#### **3.1 Success Criteria**

Wetland Success Criteria states that vegetation success shall be measured by survivability over a 5-year period. Survivability will be based on 320 planted stems/acre after three years and 260 planted stems/acre after 5 years. A survey of vegetation during the growing season shall be conducted annually over the five-year monitoring period and submitted to the NCDWQ. Monitoring should include tree density counts, photo documentation, and plots sufficient enough to demonstrate survival and diversity of tree species. If the surviving vegetation densities are below the required thresholds after the five-year monitoring period, the site may still be declared successful at the discretion of and with written approval from NCDWQ.

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

The following tree species were planted in the Wetland Restoration Area:

*Betula nigra*, River Birch

*Fraxinus pennsylvanica*, Green Ash

*Quercus lyrata*, Overcup Oak

*Quercus michauxii*, Swamp Chestnut Oak

*Platanus occidentalis*, American Sycamore

*Taxodium distichum*, Baldcypress

Enhancement Area: There was no planting done within the Enhancement Area. The Enhancement Area is composed of existing timber. This area was enhanced by installing the ditch plugs to enhance the hydrology of the site.

### 3.3 Results of Vegetation Monitoring

**Table 3.** Vegetation Monitoring Statistics

Plot #	River Birch	Green Ash	Overcup Oak	Swamp Chestnut Oak	Sycamore	Baldcypress	Total (Year 4)	Total (at planting)	Density (Trees/Acre)
1	7	18	3	3			31	37	570
2	0	14	6	2	10	8	40	40	680
<b>Year 4 Average Density (Tree/Acre)</b>									<b>625</b>
Year 3 Average Density (Tree/Acre)									428
Year 2 Average Density (Tree/Acre)									473
Year 1 Average Density (Tree/Acre)									537

Site Notes: The wetland restoration area that includes Vegetation Plot #2 was supplementally planted in January 2015. In September 2015, an herbicide application was sprayed on the privet noted onsite mainly around Photo Point #2. Other species noted onsite included briars, pine, sweetgum, poison ivy, red maple, cattail, black willow, blackberry, *Scirpus* sp., *Sagittaria* sp., *Juncus* sp., tulip poplar, tear-thumb, wax myrtle, privet and various grasses. There was no planting done within the Enhancement Area. The Enhancement Area is composed of existing timber. This area was enhanced by installing the ditch plugs to enhance the hydrology of the site.

### 3.4 Conclusions

There are a total of 2 vegetation monitoring plots established throughout the wetland restoration area. The 2015 vegetation monitoring of the site revealed an average tree density of 625 trees per acre. This average is well above the minimum success criteria of 290 trees per acre for Year 4. NCDOT proposes to continue monitoring vegetation at the Banks School Road Wetland Mitigation Site.

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

The 2015 year represents the fourth full growing season that hydrologic data has been collected on the Banks School Road Mitigation Site. All three groundwater monitoring gauges met the jurisdictional criteria for wetland hydrology (>12.5% of the growing season), during the 2015 growing season.

There were two vegetation monitoring plots established throughout the wetland restoration area. The 2015 vegetation monitoring revealed an average density of 625 trees per acre, which is well above the minimum success criteria of 290 trees per acre.

NCDOT will continue hydrologic and vegetation monitoring at the Banks School Road Mitigation Site in 2016.

**APPENDIX A**

**DEPTH TO GROUNDWATER CHARTS**

## **APPENDIX B**

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

# Banks School Rd. Wetland Mitigation Site



Photo Point #1 looking at Veg. Plot 1

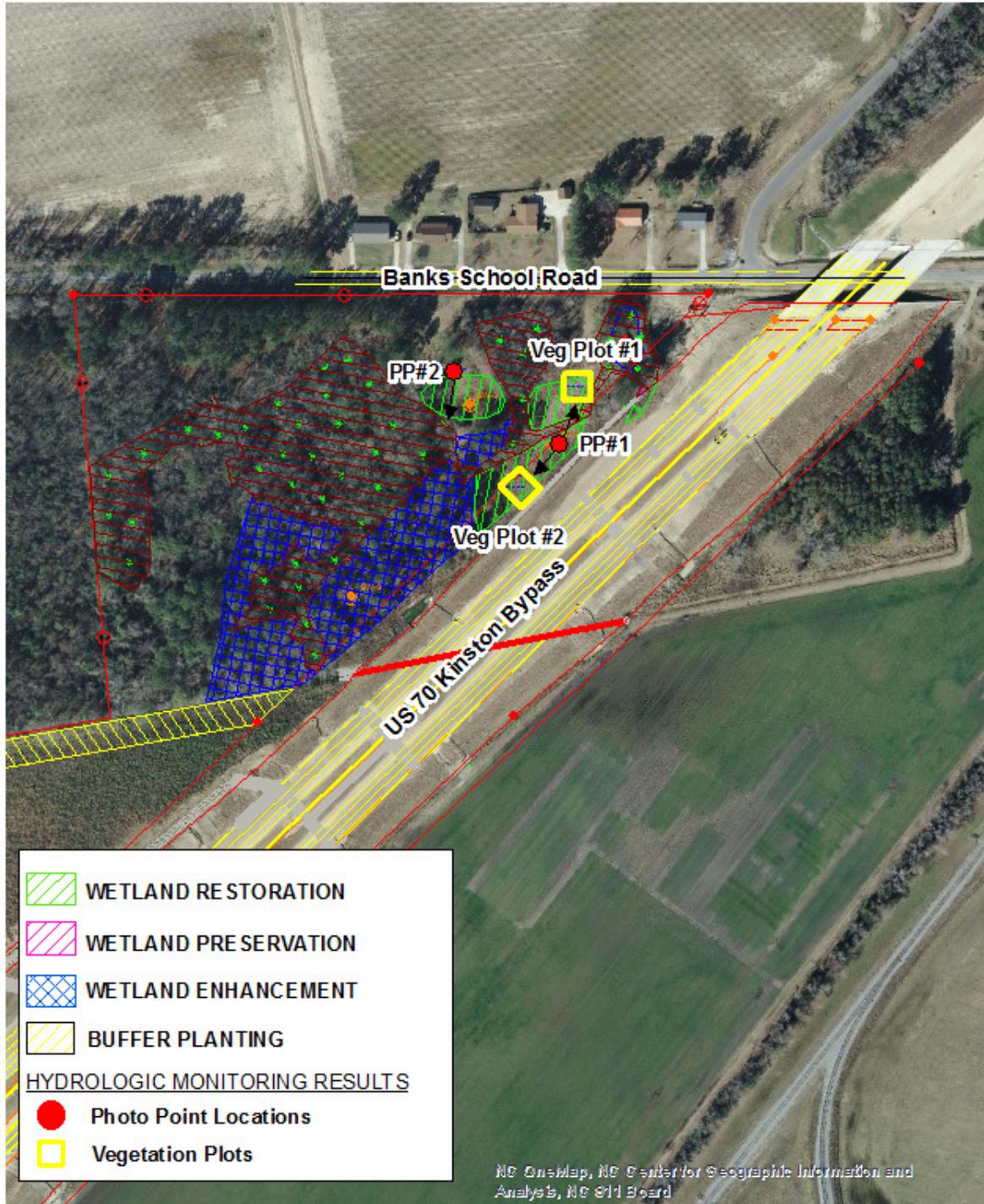


Photo Point #1 looking at Veg. Plot 2



Photo Point #2

June 2015



VEGETATION PLOT & PHOTO POINT LOCATIONS  
 R-2719A Bank's School Road Mitigation Site  
 Lenoir County, North Carolina

