

ANNUAL REPORT FOR 2014



Daniel's Street Extension Wetland Mitigation Site
Edgecombe County
TIP No. U-3826
COE Action ID: SAW 2009-00101
DWQ: 20090134



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SUMMARY

The following report summarizes the wetland monitoring activities conducted during 2014 at the Daniel's Street Extension mitigation site. This site, located adjacent to the SR 1537 Daniel's Street Extension from Baker Street (SR 1518) to US 258 near Tarboro, was designed and constructed during 2011 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 U-3826. This report provides the monitoring results for the third formal year of monitoring (Year 2014). The site must demonstrate hydrologic and vegetation success for a minimum of seven 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 reference gauge in the adjacent wetland area. All three of the groundwater gauges met the jurisdictional criteria for wetland hydrology (>12.5% of the growing season) in 2014.

One vegetation plot was established to monitor the trees planted in the 0.864 acre restoration site. The 2014 vegetation monitoring revealed an average density of 591 trees per acre, which is well above the minimum success criteria of 320 trees per acre.

NCDOT will continue hydrologic and vegetation monitoring at the Daniel's Street Extension mitigation site in 2015.

1.0 INTRODUCTION

1.1 Project Description

The following report summarizes the wetland monitoring activities that have occurred during 2014 at the Daniel's Street Extension mitigation site. The site is located adjacent to the SR 1537 Daniel's Street Extension from Baker Street (SR 1518) to US 258 near Tarboro (Figure 1). The site was constructed to provide mitigation for wetland impacts associated with U-3826 in Edgecombe County. This site provides 0.864 acre of riverine wetland restoration.

1.2 Purpose

In order to demonstrate successful mitigation, hydrologic and vegetative monitoring must be conducted for a minimum of seven years or until success criteria are satisfied. Success criteria are based on guidelines for wetland mitigation as stated in the mitigation plan. 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 2014-growing season at the Daniel's Street Extension mitigation site.

1.3 Project History

June 2011	Site Constructed
February 2012	Gauges Installed
February 2012	Site Planted
March-November 2012	Hydrologic Monitoring (Year 1)
August 2012	Vegetation Monitoring (Year 1)
March-November 2013	Hydrologic Monitoring (Year 2)
June 2013	Vegetation Monitoring (Year 2)
March-November 2014	Hydrologic Monitoring (Year 3)
August 2014	Vegetation Monitoring (Year 3)

1.4 Debit Ledger

The entire Daniel's Street Extension mitigation site was used for the U-3826 project to compensate for unavoidable wetland impacts.



Figure 1. Site Location Map

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. Areas inundated less than 5% of the growing season are classified as non-wetlands. Areas inundated between 5% and 12.5% of the growing season can be classified as wetland depending upon factors such as the presence of hydrophytic vegetation and hydric soils.

The growing season in Edgecombe County begins March 21 and ends November 10. These dates correspond to a 50% probability that temperatures will remain above 28° F or higher after March 21 and before November 10. The growing season is 233 days; therefore hydrology for 12.5% of the growing season is at least 29 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 reference gauge in the adjacent wetland 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 2014. 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 2014. Figure 2 is a graphical representation of the hydrologic monitoring results for 2014.

Table 1. 2014 Hydrologic Monitoring Results

Monitoring Gauge	< 5%	5 – 12.5%	> 12.5%	Actual %	Dates of Success
DSGW-1			X	18.0	March 21 - May 1
DSGW-2			X	73.0	March 21 – Sept. 6; Sept. 8 - Oct. 27
DSREF-1			X	18.0	March 21 - May 1

*DSREF-1 is the reference gauge located in the adjacent wetland area.

*Appendix A contains plots of surface and groundwater data during 2014.

Table 2. 2012-2016 Hydrologic Monitoring Results

Monitoring Gauge	2012 Results	2013 Results	2014 Results	2015 Results	2016 Results
DSGW-1	3.9	7.7	18.0		
DSGW-2	44.2	45.9	73.0		
DSREF-1	3.9	8.2	18.0		
Climate Conditions	Average Rainfall	Average Rainfall	Average Rainfall		

2.3.2 Climatic Data

Figure 4 is a comparison of monthly rainfall for the period of January 2014 through November 2014 to historical precipitation (collected between 1984 and 2013) for the Upper Coastal Plain Research Station in Edgecombe County. This comparison gives an indication of how 2014 relates to historical data in terms of climate conditions. The NC State Climate Office provided all local rainfall information.

For the 2014-year, May, September, October and November experienced average rainfall. January, February and March recorded below average rainfall while April, June, July and August recorded above average rainfall. Overall 2014 experienced an average rainfall year.

2.4 Conclusions

The 2014 year represents the first full growing season that hydrologic data has been collected on the Daniel’s Street Extension mitigation site. All three of the groundwater monitoring gauges met the jurisdictional criteria for wetland hydrology (>12.5% of the growing season) for the 2014 monitoring year.

NCDOT will continue to monitor the hydrology at the Daniel’s Street Extension mitigation site in 2015.

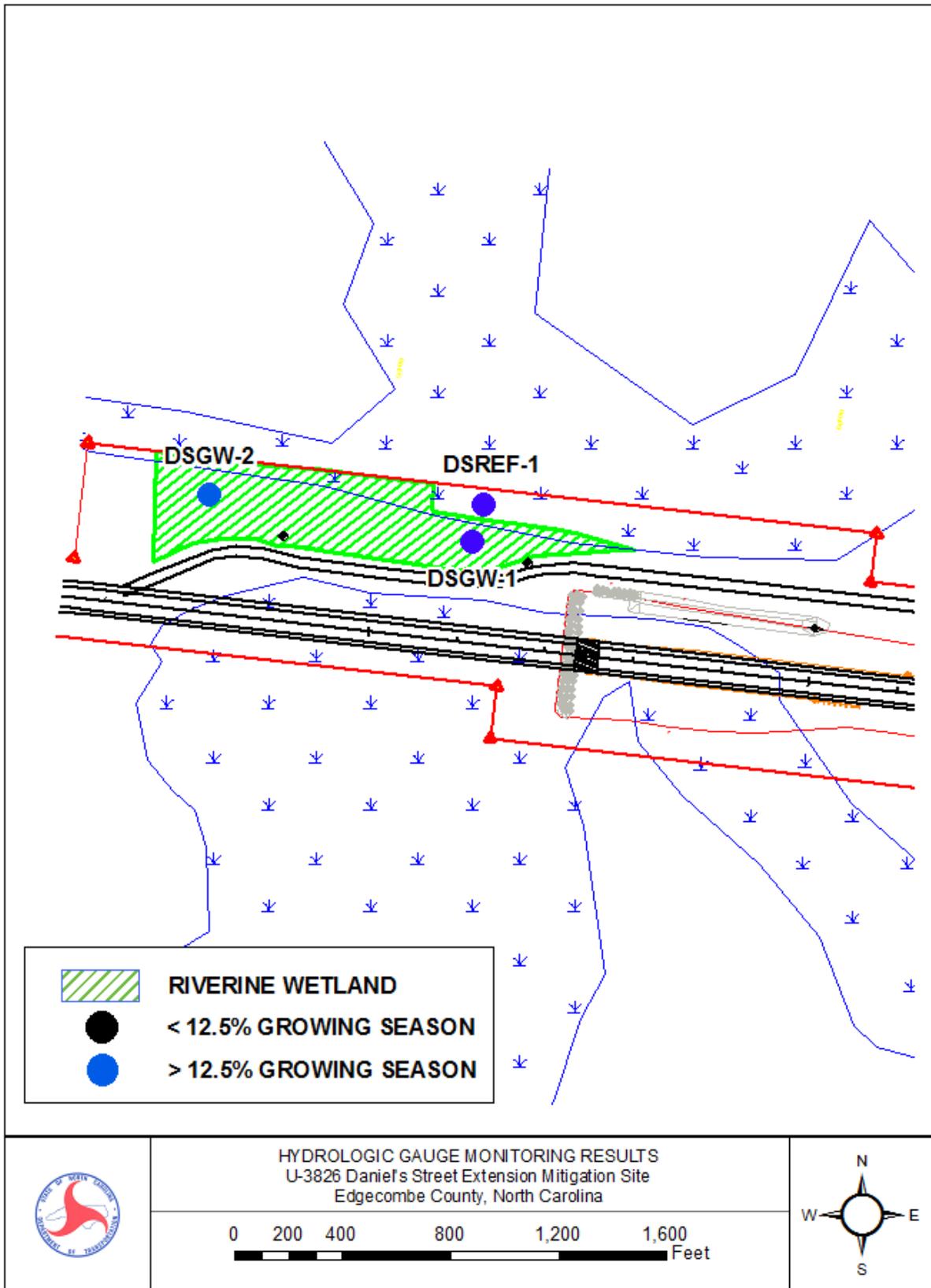


Figure 2. 2014 Hydrologic Monitoring Results

**Daniel's Street 30-70 Graph
Tarboro, NC Monthly Precipitation**

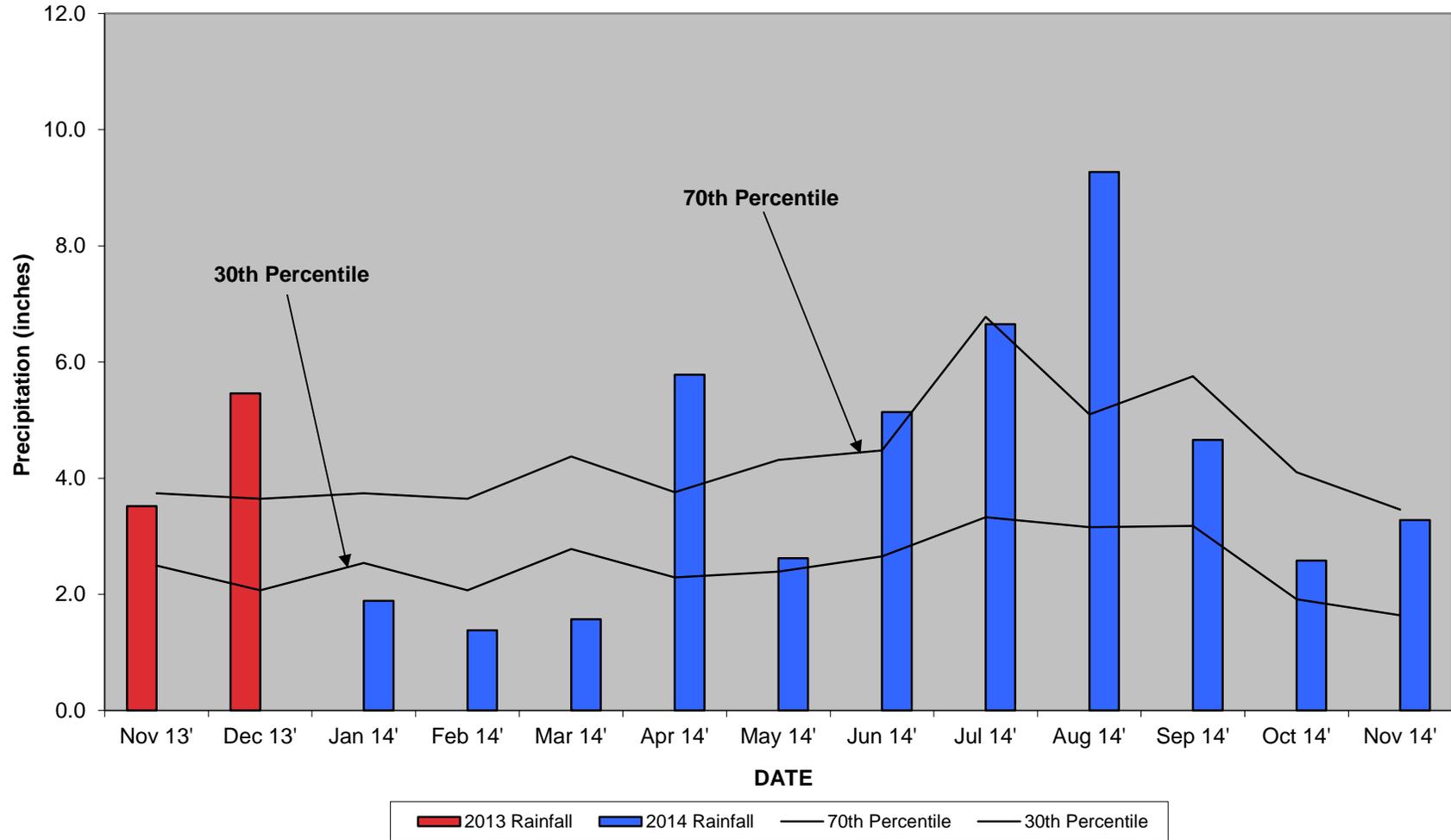


Figure 3. 30-70 Percentile Graph 2014

3.0 VEGETATION: DANIEL'S STREET EXTENSION MITIGATION SITE (YEAR 3 MONITORING)

3.1 Success Criteria

ACOE success criteria states that tree species composition shall be based on reference wetlands adjacent to the project site. Vegetation success shall be measured by survivability over a 7-year period. Survivability shall be based on 260 planted stems/acre after seven years.

NCDWQ success criteria states that vegetation success shall be measured by survivability over a 3-year monitoring period. Survivability will be based on 320 stems/acre after three (3) years. A survey of vegetation during the growing season shall be conducted annually over the three-year monitoring period and submitted to the NC Division of Water Quality. If the surviving vegetation densities are below the required thresholds after three-year monitoring period, the site may still be declared successful at the discretion of and with written approval from the NC Division of Water Quality.

3.2 Description of Species

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

Taxodium distichum, Baldcypress

Betula nigra, River Birch

Nyssa aquatica, Water Tupelo

Quercus nigra, Water Oak

3.3 Results of Vegetation Monitoring

Table 3. Vegetation Monitoring Statistics

Plot #	Baldcypress	Water Tupelo	Water Oak	River Birch	Total (Year 3)	Total (at planting)	Density (Trees/Acre)
1	15	9	4	8	36	39	628
2	19	9		12	40	49	555
Year 3 Average Density							591
Year 2 Average Density							637
Year 1 Average Density							666

Site Notes: Vegetation Plot #2 had standing water at the time of monitoring. Other species noted onsite included woolgrass, broomsedge, sycamore, sweetgum, fennel, pine, willow oak, lespedeza, baccharis, *Juncus* sp. and various grasses.

3.4 Conclusions

There were two vegetation monitoring plots established throughout the wetland restoration area. The 2014 vegetation monitoring of the site revealed an average tree density of 591 trees per acre. This average is well above the minimum success criteria of 320 trees per acre for year three.

NCDOT proposes to continue monitoring vegetation at the Daniel Street mitigation site.

4.0 OVERALL CONCLUSIONS/ RECOMMENDATIONS

The 2014 year represents the third year that hydrologic data has been collected on the Daniel's Street Extension mitigation site. All three of the groundwater monitoring gauges met the jurisdictional criteria for wetland hydrology (>12.5% of the growing season) during the 2014 growing season.

There were two vegetation monitoring plots established throughout the wetland restoration area. The 2014 vegetation monitoring revealed an average density of 591 trees per acre, which is well above the minimum success criteria of 320 trees per acre.

NCDOT will continue hydrologic and vegetation monitoring at the Daniel's Street Extension mitigation site in 2015.

APPENDIX A

DEPTH TO GROUNDWATER CHARTS

APPENDIX B

SITE PHOTOS, PHOTO LOCATIONS, AND PLOT LOCATIONS MAP

Daniel's Street Extension



Photo 1



Photo 2



Photo 3



Photo 4



Overview Photo



NC OneMap, NC Center for Geographic Information and Analysis,
 NC S11 Board

	<p>U-3826 Daniel Street Bridge Mitigation Site Site Map (Vegetation Plots and Photo Point Locations) Edgemcombe County, North Carolina</p>	
<p>0 75 150 300 Feet</p> 