

# ANNUAL REPORT FOR 2004



**Bridge Maintenance Mitigation Site**

**New Hanover County**

**Project No. 8.2250109**

**TIP No. U-92 WM**



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## **SUMMARY**

The following report summarizes the monitoring activities that have occurred in 2004 at the Bridge Maintenance Mitigation Site, representing the fifth year of monitoring on the Phase One section.

This site will be constructed in two phases. Phase One, which will encompass the majority of the site (5.76 acres), involved grading and planting up to the right-of-way limits for the proposed Section A of the Smith Creek Parkway. Phase Two will involve the remainder of the site (0.63 acre) inside of the right-of-way boundary, up to ten feet outside of the fill slope. It will be completed during construction of Section A of the Smith Creek Parkway.

The site was equipped with one surface water gauge that was installed in July 2000. Since the site is a tide-driven system, groundwater and rain gauges were not installed. An onsite agency meeting was held in July 2004. It was agreed that the Bridge Maintenance Site had 4 years of successful gauge data (tidal); therefore the surface gauge was removed in July 2004 and no hydrologic data has been presented in this report.

The 2004 vegetation monitoring of the bald cypress area revealed an average tree density of 100 trees per acre. This average is above the minimum success criteria of 50 trees per acre.

Based on a visual evaluation of the site, it was estimated that there is approximately 70% coverage of cattails, 25% coverage of sawgrass, and 5% coverage of other marsh grass species. A small area of phragmites was noted in the marsh grass area. This area was treated in June 2004.

NCDOT has discontinued hydrology monitoring and proposes to discontinue vegetation monitoring at the Bridge Maintenance Mitigation Site.

## 1.0 INTRODUCTION

### 1.1 Project Description

The Bridge Maintenance Mitigation Site is located in New Hanover County, adjacent to Smith Creek and the U-92A project in Wilmington (Figure 1). Totalling 6.4 acres in size, the site provides compensatory mitigation for a portion of the wetland impacts associated with U-92C. Phase One of the site (5.76 acres) has been constructed and planted and Phase Two will be constructed concurrent with construction of U-92A. The site consists of tidal Cypress-Gum Swamp Forest restoration and contains a system of swales to facilitate drainage as the tide goes out and to help prevent ponding.

### 1.2 Purpose

In order to demonstrate successful mitigation, the Bridge Maintenance Site is monitored for both hydrology and vegetation. The following report describes the results of both hydrologic and vegetation monitoring for the 2004-year (the fifth year of monitoring).

### 1.3 Project History

March- May 2000	Site Constructed – Phase 1
May 2000	Site Planted – Phase 1
July 2000	Surface Water Gauge Installed
July- December 2000	Hydrologic Monitoring (Year 1)
August 2000	Vegetation Monitoring (Year 1)
February – November 2001	Hydrologic Monitoring (Year 2)
September 2001	Vegetation Monitoring (Year 2)
February-November 2002	Hydrologic Monitoring (Year 3)
October 2002	Vegetation Monitoring (Year 3)
February 2003	Site Supplemental Planting (3 gal. Baldcypress)
February-November 2003	Hydrologic Monitoring (Year 4)
August 2003	Vegetation Monitoring (Year 4)
February-November 2004	Hydrologic Monitoring (Year 5)
June 2004	Phragmites Treated
September 2004	Vegetation Monitoring (Year 5)

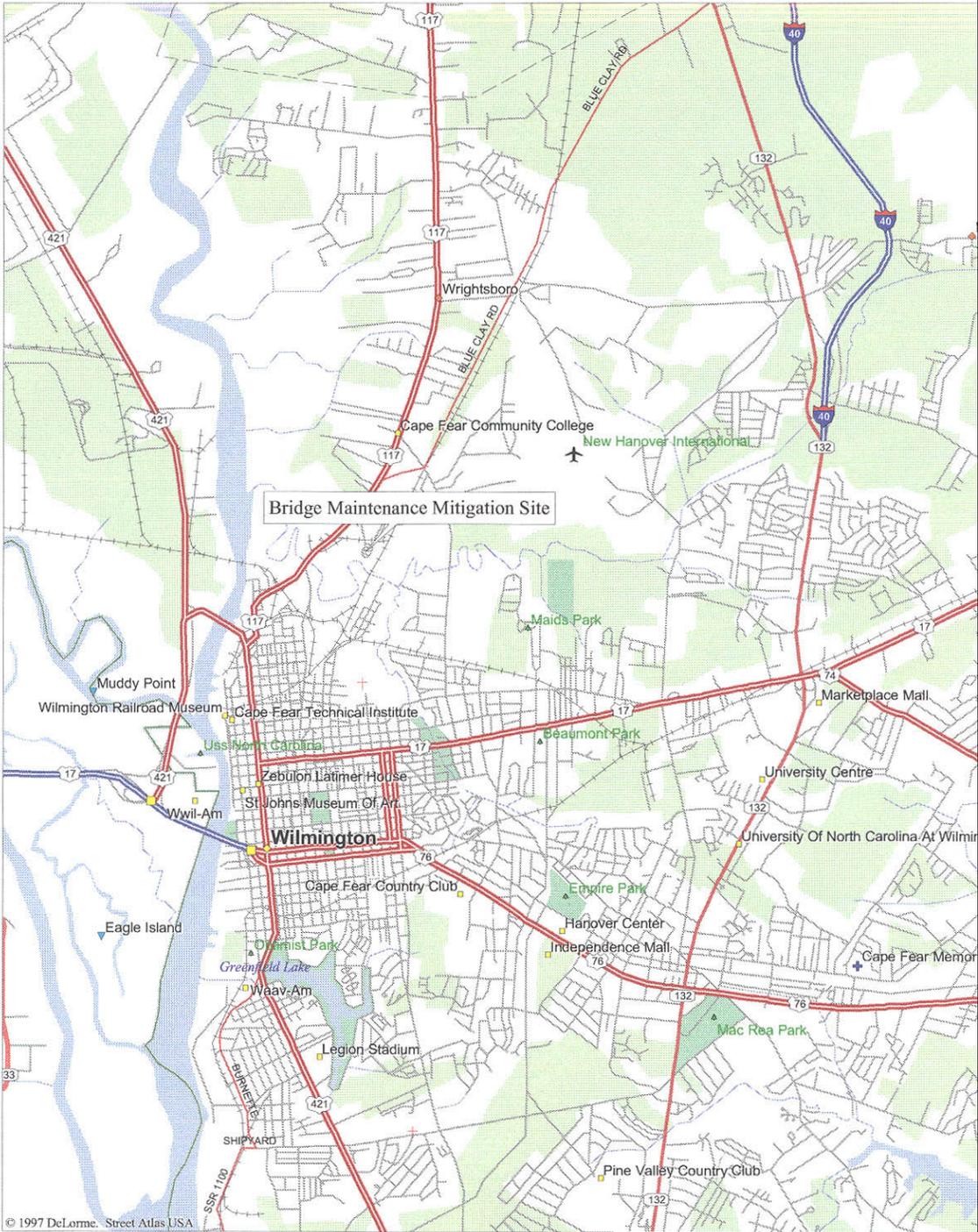


FIGURE 1. Site Location Map

## **2.0 HYDROLOGY**

### **2.1 Success Criteria**

Groundwater monitoring is not required at this site because it is a tidal system. Instead, data from an onsite tide gauge (collected 10-10-96 through 11-21-97) was used as a baseline to estimate the percentage of time that the site should remain flooded, at specific elevations. A target elevation of 2.5 feet above mean sea level was selected based on elevations of desired vegetation communities at the adjacent proposed Smith Creek Mitigation Site. Using the baseline data, this would result in the site being inundated for 37% of the growing season.

Subsequently, but prior to construction, it was decided that an elevation of 2.5 feet was too high, based on the elevation of the adjacent wetland to the east. An onsite meeting was held with the Corps of Engineers in January 2000 to discuss this issue. They agreed that lowering the proposed grade to an elevation of approximately 1.0 foot above mean sea level at the edge of the creek (match to the existing mudflat) and then gradually sloping up to an elevation of approximately 1.8 feet above mean sea level at the upper edge of the site would be acceptable.

Revised calculations of the inundation time, based on the baseline data, yielded an inundation result of 56% for the proposed average elevation of the site (1.4 feet). Therefore, the site will be considered hydrologically successful if it is inundated for 56% of the growing season, from February 27 to November 26 (271 days).

### **2.2 Hydrologic Description**

The site was equipped with one surface water gauge that was installed in July 2000. Since the site is a tide-driven system, groundwater and rain gauges were not installed. An onsite agency meeting was held in July 2004. It was agreed that the Bridge Maintenance Site had 4 years of successful gauge data (tidal); therefore the surface gauge was removed in July 2004 and no hydrologic data has been presented in this report.

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

Hydrology monitoring has been discontinued at the Bridge Maintenance Site.

### **2.4 Conclusions**

An onsite agency meeting was held in July 2004. It was agreed that the Bridge Maintenance Site had 4 years of successful gauge data (tidal); therefore the surface gauge was removed in July 2004 and no hydrologic data has been presented in this report.

NCDOT has discontinued hydrology monitoring at the Bridge Maintenance Site.

### **3.0 VEGETATION: U-92 BRIDGE MAINTENANCE SITE (YEAR 5 MONITORING)**

#### **3.1A Success Criteria (Baldcypress Area)**

Two 100' x 100' plots have been set and will be counted as part of the vegetation monitoring for the site.

The revised mitigation plan for the Bridge Maintenance Site dated November 30, 1999 states:

The site will be considered a success for the baldcypress if there are 50 five-year old trees per acre after the end of the fifth growing season....changes in the hydrology of Smith Creek have caused the decline in natural baldcypress populations, and it is uncertain if the planted baldcypress trees will survive. If the baldcypress survivorship declines to below the success criteria, then the Department of Transportation will consult with the Corps of Engineers to determine appropriate action.

The plan also states:

Establishment of cypress trees over the restoration area of the Bridge Maintenance Site is proposed, although there is evidence that they may not survive because of increases in salinity, tidal amplitude, and sea level (Hackney and Yelverton, 1990). Consequently, if cypress mortality occurs and the area develops into an emergent marsh community, the vegetation success criteria will be based on emergent marsh vegetation.

#### **3.1B Success Criteria (Marsh Grass Area)**

The vegetative marsh success of the wetland site will be determined in accordance with NMFS Guidelines. Monitoring plots found to be located within the open water channel will not be evaluated, and will not count in the final count of plots. The vegetation component of the wetland site will be deemed successful if the following criteria are met.

1. At year five, the average of all plots should have a scale value of 5 (75% vegetative cover) consisting of wetland herbaceous species, not including any invasive species.
2. A minimum of 70% of the plots shall contain the target (planted) species.

### 3.2A & B Description of Planted Areas

The following plant species were planted throughout the Bridge Maintenance Site:

*Spartina cynosuroides*, Big Cordgrass

*Spartina alterniflora*, Smooth Cordgrass

*Cladium jamaicense*, Sawgrass

*Taxodium distichum*, Baldcypress

### 3.3A Results of Vegetation Monitoring (Baldcypress Area)

Plot #	Baldcypress (5 year)	Total (at planting)	Density (trees/acre)
1	29	30	104
2	25	28	96
AVG. DENSITY			100

**Site Notes:** Three-gallon baldcypress trees were supplemental planted at the Bridge Maintenance Site in February 2003.

### 3.3B Results of Vegetation Monitoring (Marsh Grass Area)

Based on a visual evaluation of the site, it was estimated that there is approximately 70% coverage of cattails, 25% coverage of sawgrass, and 5% coverage of other marsh grass species.

### 3.4A Conclusions (Baldcypress Area)

Baldcypress trees were planted on 20' centers throughout the approximately 5.7-acre site. Two 100' x 100' plots were established in the planting area. The 2004 vegetation monitoring of the site revealed an average tree density of 100 trees per acre. This average is well above the minimum success criteria of 50 trees per acre.

NCDOT proposes to discontinue vegetation monitoring of the baldcypress area at the U-92 Bridge Maintenance Mitigation Site.

### **3.4B Conclusions (Marsh Grass Area)**

Due to the significant coverage of cattails at the site, there were no random GPS points calculated. Based on visual observations at the site, it was estimated that there is approximately 70% coverage of cattails, 25% coverage of sawgrass, and 5% coverage of other marsh grass species. A small area of phragmites was noted in the marsh grass area. This area was treated in June 2004.

NCDOT proposes to discontinue visual vegetation monitoring of the marsh grass area at the U-92 Bridge Maintenance Mitigation Site.

## **4.0 OVERALL CONCLUSIONS/ RECOMMENDATIONS**

During the fifth year of monitoring, an onsite agency meeting was held in July 2004 to discuss the hydrologic success of the Bridge Maintenance Site. At the meeting, it was agreed that the Bridge Maintenance Site had 4 years of successful gauge data (tidal); therefore the surface gauge was removed in July 2004.

The 2004 vegetation monitoring of the bald cypress area revealed an average tree density of 100 trees per acre. This average is above the minimum success criteria of 50 trees per acre. Due to the significant coverage by cattails, a visual evaluation was performed in the marsh grass area. It was estimated that there is approximately 70% coverage by cattails, 25% coverage by sawgrass, and 5% coverage by other marsh grass species. A small area of phragmites was also noted in the marsh grass area. This area was treated in June 2004.

NCDOT has discontinued hydrology monitoring and proposes to discontinue vegetation monitoring at the Bridge Maintenance Mitigation Site.

**APPENDIX A**

**SITE PHOTOS**

**&**

**PLOT AND PHOTO LOCATIONS MAP**

## Bridge Maintenance



Photo 1



Photo 2



Photo 3

