

**Casey-King Wetland Mitigation Project  
Lenoir County, North Carolina**

Final  
2/11/2008

**Year 6 Monitoring Report**



**Prepared by:**

Environmental Banc and Exchange, LLC  
909 Capability Drive, Suite 3100  
Raleigh, NC 27606

**Monitoring Field Work by:**

Ecosystem & Land Trust Monitoring  
115 Attwood Street, Suite 408  
Sparta, NC 28675

**November 2007**

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ENHANCEMENT PROGRAM**

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## **1.0 SUMMARY**

Construction was completed in March 2002 for the restoration of a wetland ecosystem at the Casey-King Mitigation Site. The targeted wetland system for the restored site was a "non-riverine, wet hardwood forest" with a small component of "Coastal Plain, small stream swamp", as described by Schafale and Weakley, 1990. Monitoring of this restoration project has taken place during the five growing seasons subsequent to completion. Prior Annual Reports for Monitoring Years 1 through 5 have demonstrated that the hydrologic success criteria for 37.3 acres of restored wetland was achieved. However, since a portion of the site received supplemental planting at the conclusion of the first growing season, an additional year of vegetative monitoring has been required. This Annual Report summarizes the vegetation monitoring activities performed on the Casey-King Wetland Mitigation Site during the sixth year following construction completion. All data included in this Report correspond to results obtained from monitoring during the year 2007 growing season. All success criteria required to demonstrate the restoration of 37.3 wetland acres have now been achieved, and no further monitoring is required.

## **2.0 INTRODUCTION**

This Annual Report documents vegetation survivability, during the fifth growing season since completion of supplemental planting, based on five vegetation-monitoring plots. Five monitoring plots 1/10th of an acre in size were used to predict survivability of the woody vegetation planted on the 37.3-acre mitigation site. The Casey-King site is overall in its sixth growing season, but based on correspondence dated September 13, 2005 from the Army Corps of Engineers, the site is considered to be in the fifth and final growing season.

The vegetation monitoring, for the fifth growing season, indicated a range of survivability between 320 and 590 stems per acre, which means that the site has achieved the final vegetation survival criteria of 260 stems per acre surviving after the fifth growing season 2007.

### **2.1 Project Description**

Located in Lenoir County, North Carolina, the Casey-King Wetland Mitigation Site encompasses a total restored area of 37.3 acres. It is situated off of British Road (State Road 1803) several miles east of Kinston (Figures 1 and 2). It was constructed between December 2001 and February 2002, with 37.3 acres of planting completed on March 19, 2002.

### **2.2 Purpose**

This project provides compensatory mitigation for wetland impacts associated with North Carolina Department of Transportation (NCDOT) projects within the resident hydrologic unit. The Casey-King Site was designed to restore a non-riverine, wet hardwood forest ecosystem and a Coastal Plain, small stream swamp ecosystem. Monitoring of the Casey-King Site is required to demonstrate successful mitigation based on the criteria described in both the Site Specific Mitigation Plan and the Neu-Con Umbrella Stream and Wetland Mitigation Bank Instrument, as well as through comparison to conditions at

a selected reference site. Both hydrologic and vegetation monitoring must be conducted throughout each growing season. Success criteria must be met for five consecutive years. This Annual Report details the results of the vegetation monitoring for 2007 at the Casey-King Wetland Mitigation Site. Table 1 details the project history and schedule.

**Table 1 Project History and Schedule**

May 2000	Pre-restoration Monitoring Gauges Installed
Fall 2001	Approved Mitigation Plan
December 17, 2001	Construction Began
March 7, 2002	Construction Completed
March 19, 2002	Planting Completed
March 19, 2002	Post Construction Monitoring Gauges Installed
April 2002	As-Built Report Submitted
October / November 2002	Supplemental Vegetative Monitoring
November 30, 2002	1 <sup>st</sup> Annual Monitoring Report
November 2003	2 <sup>nd</sup> Annual Monitoring Report
November 2004	3 <sup>rd</sup> Annual Monitoring Report
November 2005	4 <sup>th</sup> Annual Monitoring Report
November 2006	5 <sup>th</sup> Annual Monitoring Report
November 2007	6 <sup>th</sup> Annual Monitoring Report

Figure 1 Vicinity Map

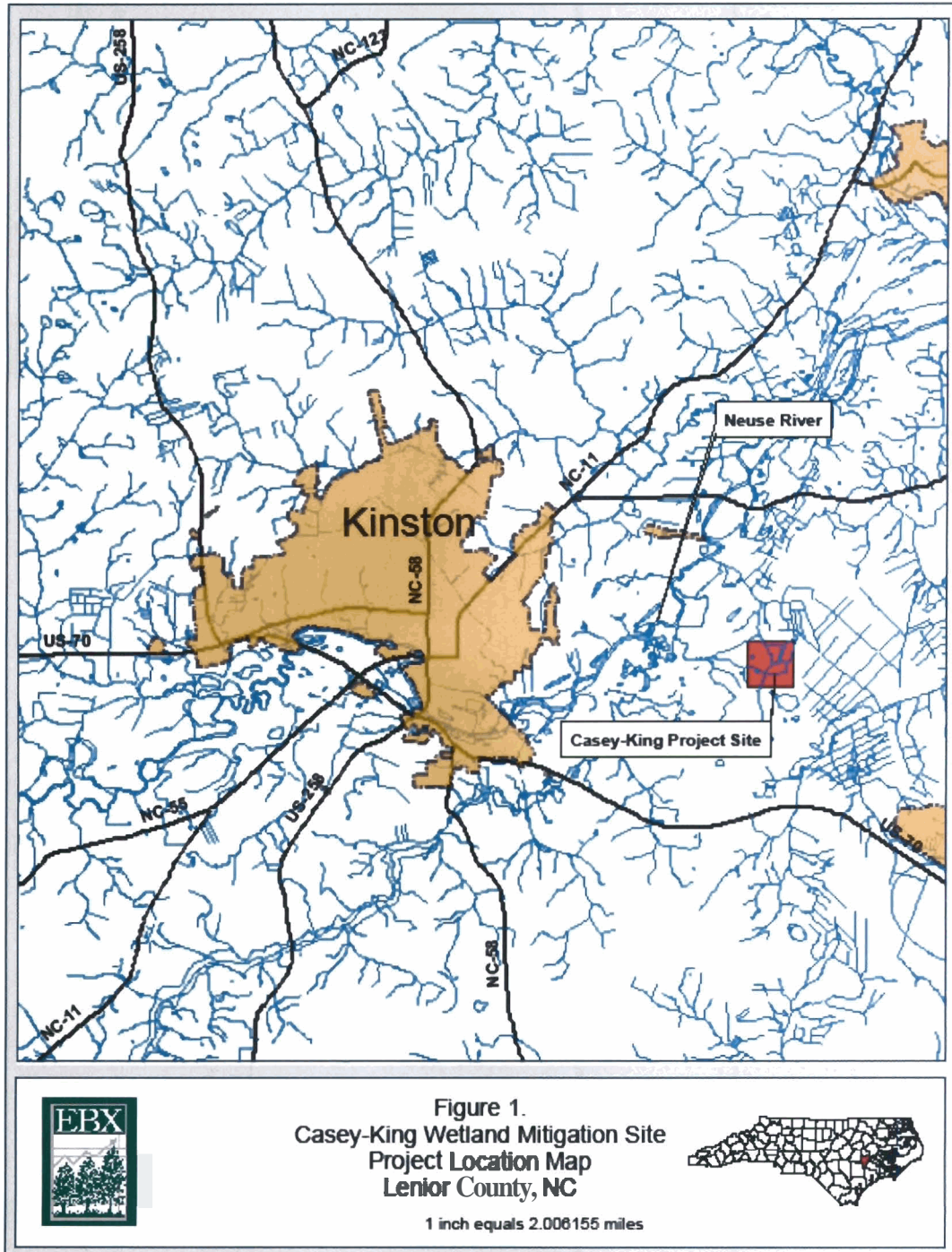
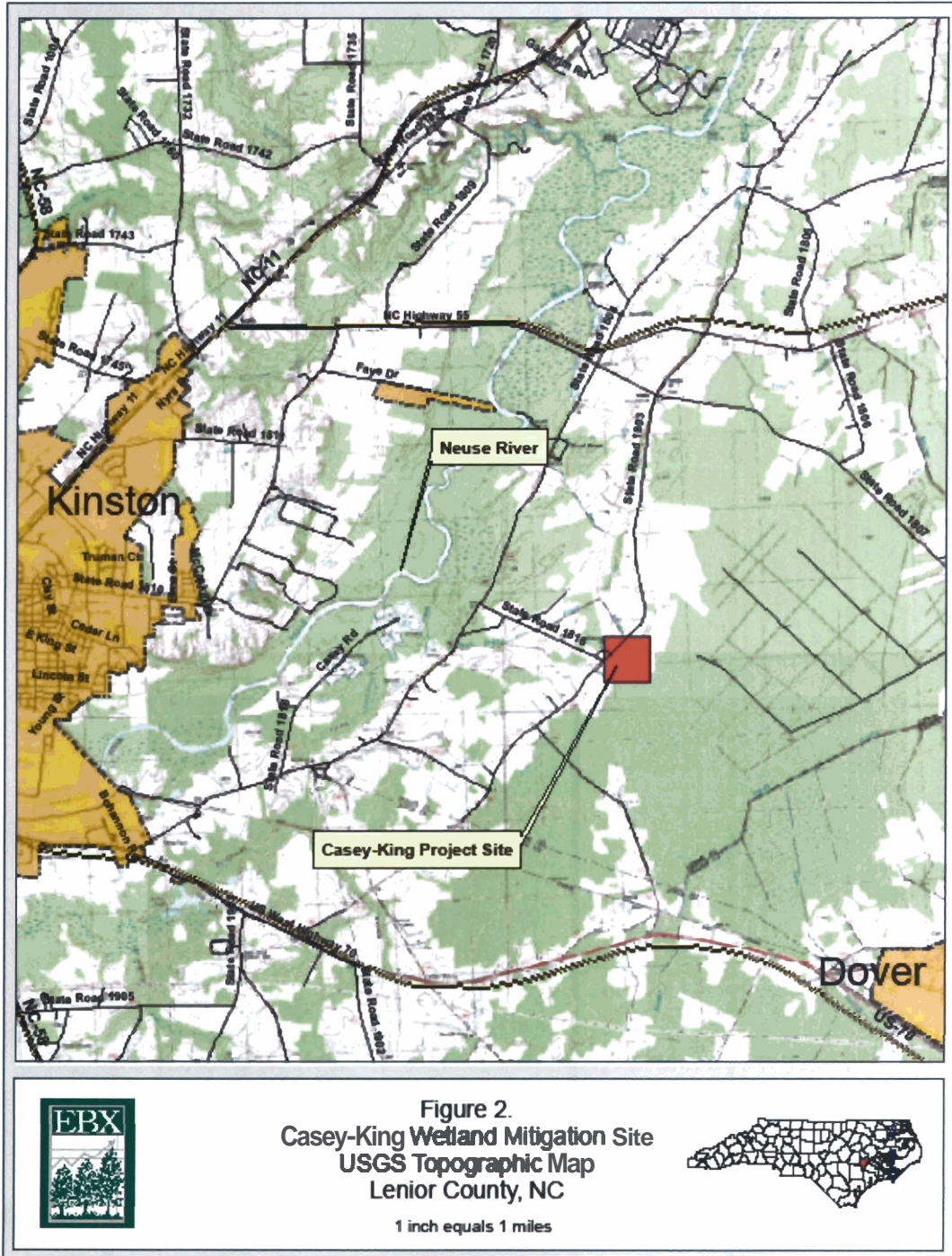


Figure 2 USGS Map



### 3.0 VEGETATION MONITORING (Year 6)

#### 3.1 Success Criteria

The interim measure of vegetative success identified in the Casey/King Mitigation Plan was the survival of at least 320 3-year old trees per acre at the end of year 3 of the monitoring period. The final vegetative success criteria will be the survival of 260 5-year old trees per acre at the end of the monitoring period. In addition, for the five year monitoring period, the presence of volunteer facultative softwood species such as red maple, sweet gum, and loblolly pine will be limited to less than 10% each of the total number of trees utilized to determine success. These trees may contribute more than 10% of the total trees on the site, but they will not constitute more than 10% each of the 260 trees per acre.

#### 3.2 Description of Species

The following tree species 1-12 were planted and A-F volunteered in the Wetland Restoration Area:

**Table 2 Description of Tree Species in Wetland Restoration Area**

<b>ID</b>	<b>Scientific Name</b>	<b>Common Name</b>	<b>FAC Status</b>
<b>1</b>	<i>Celtis laevigata</i>	Sugarberry	FACW
<b>2</b>	<i>Nyssa biflora</i>	Swamp Tupelo	OBL
<b>3</b>	<i>Nyssa sylvatica</i>	Blackgum	FAC
<b>4</b>	<i>Platanus occidentalis</i>	Sycamore	FACW-
<b>5</b>	<i>Quercus laurifolia</i> (3)	Laurel Oak	FACW
<b>6</b>	<i>Quercus lyrata</i>	Overcup Oak	OBL
<b>7</b>	<i>Quercus michauxii</i>	Swamp Chestnut Oak	FACW-
<b>8</b>	<i>Quercus nigra</i>	Water Oak	FACW-
<b>9</b>	<i>Quercus pagoda</i>	Cherrybark Oak	FAC
<b>10</b>	<i>Quercus phellos</i>	Coastal Willow Oak	FACW-
<b>11</b>	<i>Quercus shumardii</i>	Shumard Oak	FACW-
<b>12</b>	<i>Taxodium distichum</i>	Bald Cypress	OBL
<b>A</b>	<i>Acer rubrum</i>	Red Maple	FAC
<b>B</b>	<i>Liquidambar styraciflua</i>	Sweetgum	FAC+
<b>C</b>	<i>Platanus occidentalis</i>	Sycamore	FACW-
<b>D</b>	<i>Salix nigra</i>	Black Willow	OBL
<b>E</b>	<i>Carya</i> sp. (1)	Hickory	(2)
<b>F</b>	<i>Fraxinus</i> sp. (1)	Ash	(2)

(1) Sapling; positive ID not possible

(2) Unknown

(3) Inadvertently omitted from original plan

(4) Bald Cypress and Blackgum were previously noted as a volunteer species but did not survive the 2005 growing season.

### 3.3 Results of Vegetation Monitoring

The following tables present stem counts for each of the monitoring plots for 2007. Numbers identify planted tree species and letters identify volunteer tree species across the top row, and each plot is identified down the left column. The numbers and letters on the top row correlate to the ID column of the previous table. Trees are flagged in the field as needed before the flags marking them degrade. Flags are utilized because they will not interfere with the growth of the tree. Volunteers are also flagged during this process.

**Table 3 2007 Vegetation Monitoring Statistics, by plot**

<b>Plot</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>Stem/ac</b>
<b>CK1</b>	0	5	2	3	5	0	3	7	0	16	8	5	4	0	0	4	0	0	620
<b>CK2</b>	0	1	0	2	0	2	1	3	0	13	4	6	0	0	0	0	0	0	320
<b>CK3</b>	0	10	2	3	2	0	5	1	0	0	10	1	0	0	0	3	0	0	370
<b>CK4</b>	0	2	0	3	1	12	3	0	0	0	8	0	1	4	10	5	1	0	500
<b>CK5</b>	0	0	0	18	4	0	2	0	0	3	1	1	0	0	0	3	1	4	370

Range of Stems/Acre: 320-620

Variability in the past statistics resulted from an inability to locate trees from one year to the next, but the overwhelming factor is that tree counts are performed after planting or near leaf drop when identification of leafless sapling oaks and gums is near impossible. In order increase consistency, PVC stakes have been erected adjacent to trees within the plots since the lack of forest cover allows the flags to photo-degrade. Changes in data also results because some saplings appear dead in one year when they may in fact be dormant or have a dead terminal bud and will re-sprout in the following spring.

### 3.4 Conclusions

Approximately 37.3 acres of this site was planted in nonriverine hardwoods and coastal plain swamp species. There were five 1/10th acre vegetation monitoring plots established throughout the planting areas. The 2007 vegetation monitoring revealed the range of tree density to be between 320 and 620 stems per acre, well exceeding the final success criteria of 260 trees per acre at the end of Year 5.

### 4.0 OVERALL CONCLUSIONS AND RECOMMENDATIONS

Vegetation monitoring efforts have calculated the range of stems per acre on site to between 320 and 620. The site meets the vegetative success criteria of 260 stems per acre at the end of the five-year vegetative monitoring period. Prior Annual Reports for Monitoring Years 1 through 5 have demonstrated that the hydrologic success criteria have been achieved. Therefore, all success criteria required to demonstrate the restoration of 37.3 acres of wetlands have now been achieved and no further monitoring of the site is required.



## 5.0 VEGETATION OBSERVATIONS

Hydrophytic herbaceous vegetation including rush (*Juncus effusus*), spike-rush (*Eleocharis obtusa*), Boxseed (*Ludwigia* sp.), and sedge (*Carex* sp.) are frequently observed across the site, particularly in areas of inundation. Cat-tail (*Typha latifolia*) and knotweed (*Polygonum persicaria*) are also found on site. The presence of these herbaceous wetland plants helps to confirm the presence of wetland hydrology on the site.

Weedy vegetation is also present on the site in some localized areas. The majority of the weedy species are annuals and are believed to pose very little threat to survivability in site. There is a confined population of lespedeza. The lespedeza does not seem to be affecting the overall success of the planted tree survival. We believe that planted hardwood species tree heights are tall enough to out compete the existing lespedeza. Therefore, no remedial action is required. Thickets of partridge pea (*Cassia fasciculata*) are no longer present on the site and the fennel (*Foeniculum vulgare*) has become even more localized; these don't seem to be affecting the survivability of the planted vegetation. Other weedy vegetation including ragweed (*Ambrosia artemisiifolia*) is present on site. The patches of Johnson grass (*Sorghum halepense*), which were previously noted in scattered portions of the site, are noted only along the entrance road to the site. The herbaceous layer of the site will continue to change as the planted stems develop into a mature forest canopy.

Appendix A. Site Photos



Casey-King Vegetation Plot 1



Casey-King Vegetation Plot 2



Casey-King Vegetation Plot 3



Casey-King Vegetation Plot 4



Casey-King Vegetation Plot 5