

BURNETTS CHAPEL BUFFER MITIGATION SITE

Guilford County, NC

DENR Contract 003996

NCEEP Project Number 95009

Monitoring Year 1 Annual Report **FINAL**

Data Collection Period: September-October 2012

Submission Date: December 28, 2012



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BURNETTS CHAPEL BUFFER MITIGATION SITE

Monitoring Year 1 Annual Report

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1.0 Executive Summary

The Burnetts Chapel Buffer Mitigation Site, hereafter referred to as the Site, is located within the Randleman Regional Reservoir watershed (North Carolina Division of Water Quality (NCDWQ) Subbasin 03-06-08) of the Cape Fear River Basin (USGS Hydrologic Unit Code 03030003010050). The Site is located in the Carolina Slate Belt of the Piedmont Physiographic Province (USGS, 1998) approximately three miles west of the Town of Pleasant Garden and four miles south of the City of Greensboro in Guilford County, NC. The Site has historically been forested or used for agricultural purposes. The current property owner has confirmed that the Site has been farmed for more than 100 years and has included activities such as crop production, livestock pastures, and timber. The project is surrounded by fields that are alternately used for cattle and crop production.

The Deep River is the primary river in this HUC which flows into the Randleman Reservoir. The project site streams are direct tributaries to the Randleman Regional Reservoir. The newly created reservoir is a regional water supply and stream buffer protection rules are in place throughout the watershed (<http://portal.ncdenr.org/web/wq/swp/ws/401/riparianbuffers/rules>). The Site is comprised of two areas on one parcel of land along three (3) perennial streams (Reaches A, B₁ and B₂) and four intermittent streams (Reaches B₂, B₃, B₄, and B₅) that drain to the Randleman Reservoir. At the downstream limits of the project, the drainage area is 366 acres (0.6 square mile).

The North Carolina Division of Water Quality (NCDWQ) assigns best usage classifications to State Waters that reflect water quality conditions and potential resource usage. Deep River is classified as Class WS-IV; Critical Area (CA) waters. Class WS-IV waters are used as sources of water supply for drinking or food processing purposes where a more restrictive WS-I, WS-II, or WS-III classification is not feasible. These waters are also protected for Class C uses such as secondary recreation, fishing, wildlife, fish and aquatic life propagation and survival, and agriculture. WS-IV waters are generally in moderately to highly-developed watersheds or Protected Areas. This portion flowing into the Randleman Regional Reservoir is located within the Critical Area or area within ½ mile of a water supply.

A conservation easement has been recorded to protect the 12.0 acres of riparian corridor resources in perpetuity. Directions and a map of the Site are provided in Figure 1.

1.1 Project Goals and Objectives

Prior to construction activities, the primary watershed stressor was the lack of a vegetated buffer and subsequent moderate stream incision from agricultural maintenance activities. Some reaches (A and B₁) exhibited only moderate incision with stable bedform and stream banks throughout, while other reaches (B₂) exhibited stable geomorphic conditions with no active bed incision or bank erosion. The riparian zones within these areas were maintained in the past and mowed on an annual basis resulting in varying buffer widths. The smaller intermittent channels with small upstream ephemeral channels are located entirely within existing open pasture. These reaches (B₃, B₄, and B₅) entirely lacked suitable woody riparian

species and were dominated by various grass and sedge species. As a result of the aforementioned land activities, the Site had poor water quality due to sediment and nutrient pollution and poor in-stream habitat due to lack of riparian vegetation and lack of in-stream bed diversity.

Tables 1-4 in Appendix 1 presents the pre-restoration conditions in detail for the Site.

The primary objectives of the project were to remove harmful nutrients from creek flow, reduce pollution of creek by excess sediment, restore the terrestrial habitat, and improve aesthetics. These goals were achieved by restoring 9.2 acres and preserving 1.5 acres of riparian buffer.

The project restoration activities completed provides 9.2 buffer mitigation units (BMUs) in the Cape Fear River Basin (Table 1, Appendix 1). As part of the parcel preparation, two small surface water impoundments, located on Reaches B₄ and B₅, were removed in order to allow for stable stream channels to be constructed and for these areas to qualify for buffer restoration credit. Riparian stream buffers were planted and restored to the dominant natural plant community that exists within the project watershed. This natural community within and adjacent to the project easement is classified as Piedmont Bottomland Forest and was determined based on existing canopy and herbaceous species (Schafale and Weakley, 1990). Plant and seed materials were installed on stream banks out to the project easement limits. These areas were planted with bare root trees and a seed mixture of permanent herbaceous vegetation ground cover.

The goals of the Site address water quality improvements identified in the Cape Fear River Basin Restoration Priorities Report and include the following:

- Remove harmful nutrients from creek flow;
- Reduce pollution of creek by excess sediment;
- Restore terrestrial habitat; and
- Improve aesthetics.

The following project objectives were established to meet these goals:

- Riparian areas will be fenced off from adjacent agricultural activities and runoff will be filtered through buffer zones. Flood flows will be filtered through restored riparian areas, where flood flow will spread through native vegetation. Vegetation will be planted to uptake excess nutrients.
- Streambanks will be further stabilized by increased woody root mass in the banks. Storm flow containing grit and fine sediment will be filtered through restored riparian buffer areas, where flow will spread through native vegetation.
- The establishment and maintenance of riparian buffers will create long-term shading of the channel bed, reducing thermal heating and improving aquatic habitat.

- Adjacent buffer and riparian habitats will be restored with native vegetation and invasive species will be treated as part of the project. Native vegetation will provide cover and food for terrestrial creatures.

1.2 *Monitoring Year 1 Data Assessment*

The final mitigation plan was submitted and accepted by the North Carolina Ecosystem Enhancement Program (NCEEP) in February 2012. Grading activities were completed by the landowner in December 2011. Planting activities were completed by Bruton Natural Systems, Inc. in March 2012. The baseline monitoring and as-built survey were completed in April 2012. There were no significant deviations reported in the project elements in comparison to the design plans. Appendix 1 provides more detailed project activity, history, contact information, and watershed/site background information for this project.

The buffer restoration success criteria for the Site follows the approved success criteria presented in the NCEEP Mitigation Plan Guidance (Version 2.0, 10/01/2010). Annual monitoring and monthly site visits were conducted to assess the condition of the finished project between July and November 2012.

1.2.1 *Vegetative Assessment*

A total of 22 vegetation plots were established within the project easement area using standard 10 meter by 10 meter vegetation monitoring plots. Plots were randomly established within planted portions of the riparian buffer areas to capture the heterogeneity of the designed vegetative communities. The plot corners have been marked and are recoverable either through field identification or with the use of a GPS unit. Reference photographs at the origin looking diagonally across the plot to the opposite corner were taken. The final vegetative success criteria will be the survival of 320 planted stems per acre in the buffer corridor at the end of year five (5) of the monitoring period. The extent of invasive species coverage will also be monitored and controlled as necessary.

The monitoring year 1 (MY-1 of 5) vegetative survey was completed in September 2012. The 2012 annual vegetation monitoring resulted in an average survivability of 607 stems per acre, which is 22% less than the baseline density recorded (775 stems/acre) in April 2012. There was an average of 15 stems per plot compared to 19 stems per plot in MY-0. All 22 plots met the success criteria required for MY-1. Please refer to Appendix 3 for vegetation summary tables and raw data tables and Appendix 2 for vegetation plot photographs and the vegetation condition assessment table.

1.3 *Monitoring Summary*

Overall, the Site has met the required mitigation success criteria for MY-1. All the vegetation plots within the site met MY-1 success criteria as seen in the CCPV. At this time no maintenance beyond mowing is proposed.

Summary information/data and statistics related to performance of various project and monitoring elements can be found in the tables and figures in the report appendices. Narrative background and supporting information formerly found in these reports can be found in the Mitigation Plan documents available on NCEEP's website. All raw data supporting the tables and figures in the appendices is available from NCEEP upon request.

2.0 Methodology

Vegetation monitoring protocols followed the Carolina Vegetation Survey-NCEEP Level 2 Protocol (Lee et al., 2006).

3.0 References

Lee, Michael T., Peet, Robert K., Steven D., Wentworth, Thomas R. 2006. CVS-EEP Protocol for Recording Vegetation Version 4.0. Retrieved from <http://www.nceep.net/business/>

Schafale, M.P. and A.S. Weakley. 1990. Classification of the Natural Communities of North Carolina, 3rd approx. North Carolina Natural Heritage Program, Raleigh, North Carolina.

United States Department of Agriculture (USDA), 2009. Natural Resources Conservation Service, Soil Survey Geographic (SSURGO) database for Guilford County, North Carolina. <http://SoilDataMart.nrcs.usda.gov>

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Weakley, A.S. 2008. *Flora of the Carolinas, Virginia, Georgia, Northern Florida, and Surrounding Areas* (Draft April 2008). University of North Carolina at Chapel Hill: Chapel Hill, NC.

Wildlands Engineering, Inc. 2012. Burnetts Chapel Buffer Mitigation Site Mitigation Plan. NCEEP, Raleigh, NC.

Wildlands Engineering, Inc. 2012. Burnetts Chapel Buffer Mitigation Site Baseline Monitoring Document and As-Built Baseline Report. NCEEP, Raleigh, NC.

APPENDIX 1

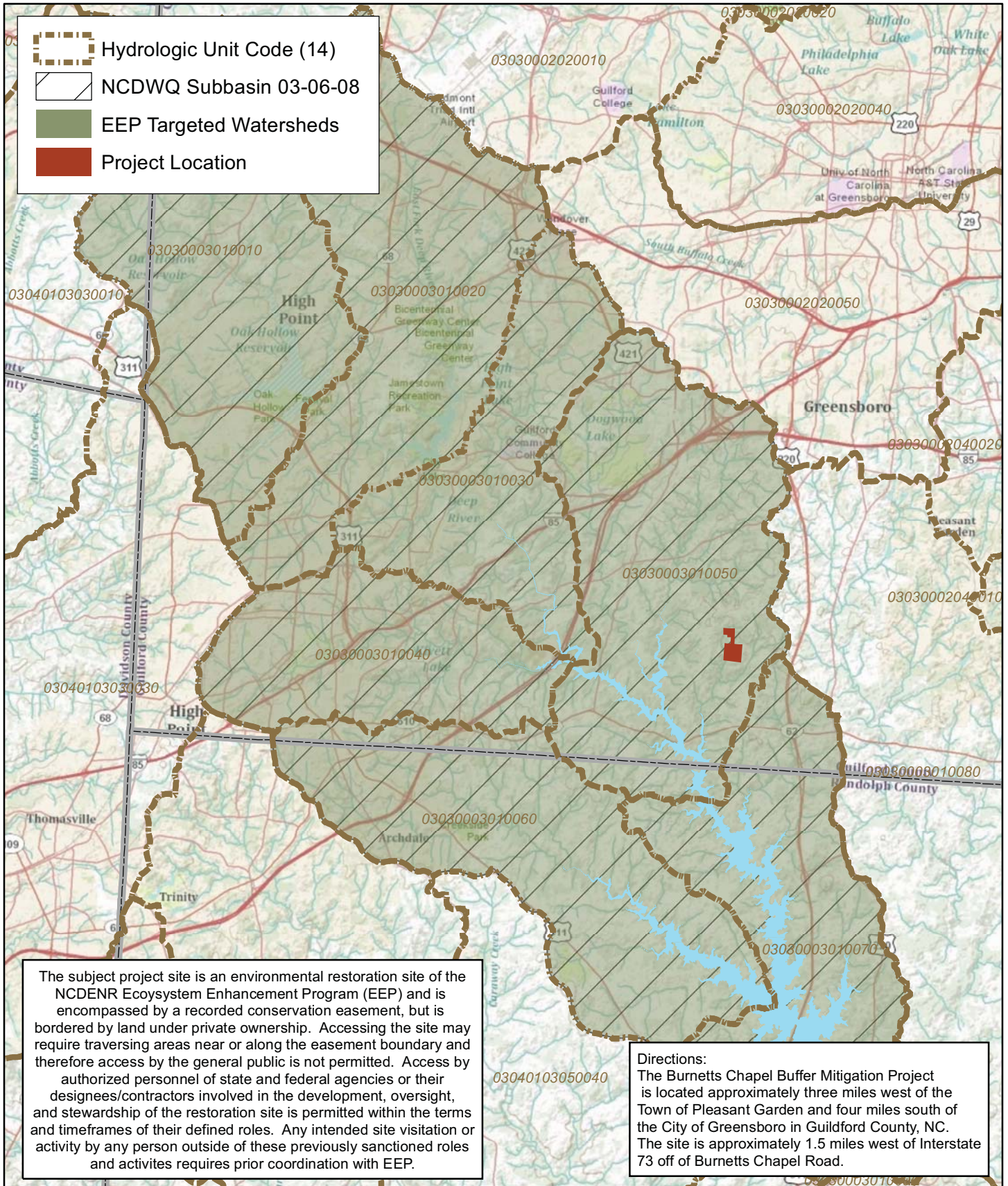


Figure 1 Project Vicinity Map
 Burnetts Chapel Buffer Mitigation Site
 NCEEP Project Number 95009
 Monitoring Year 1 of 5

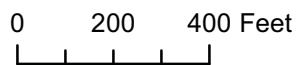
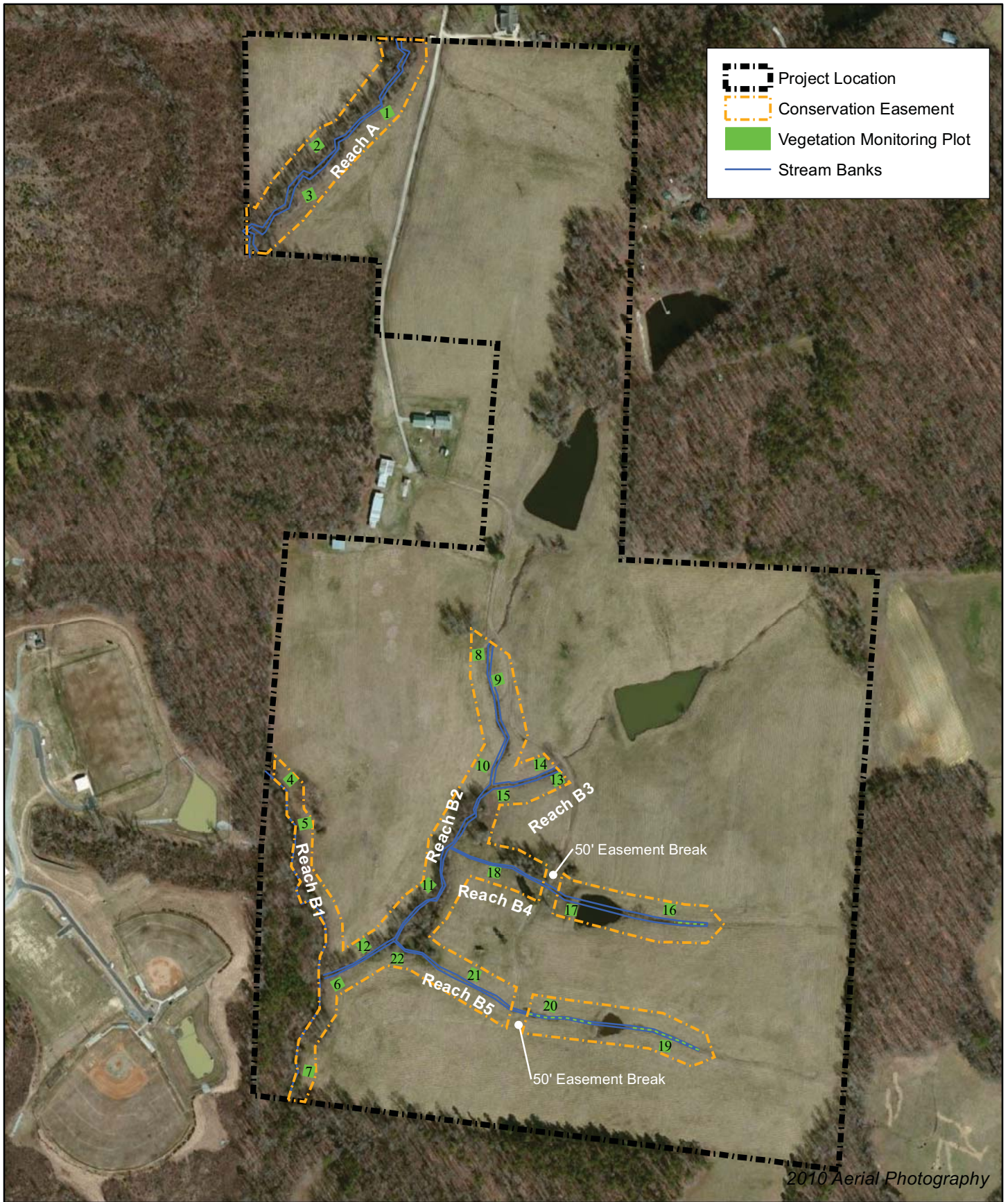


Figure 2 Project Component/Asset Map
 Burnetts Chapel Buffer Mitigation Site
 NCEP Project Number 95009
 Monitoring Year 1 of 5

Appendix 1. General Tables and Figures

**Table 1. Project Components and Mitigation Credits
Burnetts Chapel Buffer Mitigation Site (NCEEP Project No.95009)
Monitoring Year 1**

| Mitigation Credits | | | | | | | | | |
|---------------------------|----------------------------|-----------------------------|---------------------------------|--|----------------------|------------------|--------|-----------------------------|--------------------------------|
| | Stream | | Riparian Wetland | | Non-Riparian Wetland | | Buffer | Nitrogen Nutrient Offset | Phosphorous Nutrient Offset |
| Type | R | RE | R | RE | R | RE | | | |
| Totals | N/A | N/A | N/A | N/A | N/A | N/A | 9.2 | N/A | N/A |
| Project Components | | | | | | | | | |
| Reach ID | Stationing/ Location | Existing Footage (LF) | Approach | Restoration or Restoration Equivalent | Area (acres) | Mitigation Ratio | | | |
| Reach A | Area A | | N/A | Restoration | 1.5 | 1:1 | | | |
| Reach B1 | Area B | | N/A | Restoration | 0.7 | 1:1 | | | |
| Reach B2 | Area B | | N/A | Restoration | 2.7 | 1:1 | | | |
| Reach B3 | Area B | | N/A | Restoration | 0.4 | 1:1 | | | |
| Reach B4 | Area B | | N/A | Restoration | 1.7 | 1:1 | | | |
| Reach B5 | Area B | | N/A | Restoration | 2.2 | 1:1 | | | |
| Component Summation | | | | | | | | | |
| Restoration Level | Stream (linear feet) | Riparian Wetland (acres) | Non-Riparian Wetland (acres) | Buffer (square feet) | Upland (acres) | | | | |
| | | Riverine | Non-Riverine | | | | | | |
| Restoration | | | | 400,752 | | | | | |
| Enhancement | | | | | | | | | |
| Enhancement I | | | | | | | | | |
| Enhancement II | | | | | | | | | |
| Creation | | | | | | | | | |
| Preservation | | | | | | | | | |
| High Quality Preservation | | | | | | | | | |
| BMP Elements | | | | | | | | | |
| Elements | Location | Purpose/Function | Notes | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

BR = Bioretention Cell; S F= Sand Filter; SW = Stormwater Wetland; WDP = Wet Detention Pond; DDP = Dry Detention Pond; FS = Filter Strip; S = Grassed Swale; LS = Level Spreader; NI = Natural Infiltration Area; FB = Forested Buffer

Appendix 1. General Tables and Figures
Table 2. Project Activity and Reporting History
Burnetts Chapel Buffer Mitigation Site (NCEEP Project No.95009)
Monitoring Year 1

| Activity or Report | Date Collection Complete | Completion or Delivery |
|---|---------------------------------|-------------------------------|
| Mitigation Plan | December 2011 | February 2012 |
| Final Design - Construction Plans | December 2011 | February 2012 |
| Construction* | January 2012 | January 2012 |
| Temporary S&E mix applied to entire project area** | January 2012 | January 2012 |
| Permanent seed mix applied to reach/segments | January 2012 | January 2012 |
| Containerized and B&B plantings for reach/segments | March 2012 | March 2012 |
| Baseline Monitoring Document (Year 0 Monitoring - baseline) | April 2012 | June 2012 |
| Year 1 Monitoring | September 2012 | December 2012 |
| Year 2 Monitoring | 2013 | December 2013 |
| Year 3 Monitoring | 2014 | December 2014 |
| Year 4 Monitoring | 2015 | December 2015 |
| Year 5 Monitoring | 2016 | December 2016 |

*Grading of existing ponds was completed in January

**Seed and mulch is added as each section of construction is completed.

Appendix 1. General Tables and Figures

Table 3. Project Contacts Table

Burnetts Chapel Buffer Mitigation Site (NCEEP Project No.95009)

Monitoring Year 1

| | |
|--------------------------------|---|
| Designer | Wildlands Engineering, Inc. 5605 Chapel Hill Road, Suite 122 Raleigh, NC 27604 919.851.9986 |
| Daniel Taylor | |
| Construction Contractor | Landowner 1323 Burnetts Chapel Road Greensboro, NC 27403 |
| Richard L. Ingram | |
| Planting Contractor | Bruton Natural Systems, Inc. PO Box 1197 Freemont, NC 27830 919.242.6555 |
| Charlie Bruton | |
| Seeding Contractor | Bruton Natural Systems, Inc. PO Box 1197 Freemont, NC 27830 919.242.6555 |
| Charlie Bruton | |
| Seed Mix Sources | Mellow Marsh Farm |
| Nursery Stock Suppliers | Arborgen Dykes and Son Nursery NCForestry Service, Claridge Nursery |
| Monitoring Performers | Wildlands Engineering, Inc. Kirsten Y. Gimbert 704.332.7754, ext. 110 |
| Vegetation Monitoring, POC | |

Appendix 1. General Tables and Figures

**Table 4. Project Baseline Information and Attributes
Burnetts Chapel Buffer Mitigation Site (NCEEP Project No.95009)
Monitoring Year 1**

| Project Information | | | | | | |
|---|--|-------------------|--|--------------|-------------------|--------------|
| Project Name | Burnetts Chapel Buffer Mitigation Site | | | | | |
| County | Guilford | | | | | |
| Project Area (acres) | 12 | | | | | |
| Project Coordinates (latitude and longitude) | 35° 56' 46.0"N, 79° 50' 44.2"W | | | | | |
| Project Watershed Summary Information | | | | | | |
| Physiographic Province | Carolina Slate Belt of the Piedmont | | | | | |
| River Basin | Cape Fear | | | | | |
| USGS Hydrologic Unit 8-digit | 03030003 | | | | | |
| USGS Hydrologic Unit 14-digit | 03030003010050 | | | | | |
| DWQ Sub-basin | 03-06-08 | | | | | |
| Project Drainage Area (acres) | 366 | | | | | |
| Project Drainage Area Percentage of Impervious Area | 3% | | | | | |
| CGIA Land Use Classification | 52% Forest Land, 41% Cultivated Land, 7% Institutional | | | | | |
| Reach Summary Information | | | | | | |
| Parameters | Reach A | Reach B1 | Reach B2 | Reach B3 | Reach B4 | Reach B5 |
| Length of reach (linear feet) - Post-Restoration | 699 | 1,025 | 1,653 | 768 | 475 | 800 |
| Drainage area (acres) | 94 | 366 | 99 | 33 | 12 | 10 |
| NCDWQ stream identification score | 31 | 41 | 24.25/ | 23.25 | 19.75 | 22.75 |
| NCDWQ Water Quality Classification | WS-IV; CA, C | | | | | |
| Morphological Description (stream type) | Perennial | Perennial | Int./Per. | Intermittent | Int./ Ephem. | Int./ Ephem. |
| Evolutionary trend (Simon's Model) - Pre- Restoration | N/A | N/A | N/A | N/A | N/A | N/A |
| Underlying mapped soils | Ch | HeC | HeC | VaD | HeC | EnB |
| Drainage class | Poorly-drained | Mod. well-drained | Mod. well-drained | Well-drained | Mod. well-drained | Well-drained |
| Soil Hydric status | Yes | No | No | No | No | Yes |
| Slope | 0-2% | 6-10% | 6-10% | 10-15% | 6-10% | 2-6% |
| FEMA classification | no regulated floodplain | | | | | |
| Native vegetation community | Bottom-land forest | | | | | |
| Percent composition of exotic invasive vegetation - Post-Restoration | 0% | | | | | |
| Regulatory Considerations | | | | | | |
| Regulation | Applicable? | Resolved? | Supporting Documentation | | | |
| Waters of the United States - Section 404 | X | X | Burnetts Chapel Buffer Mitigation Plan; USACE | | | |
| Waters of the United States - Section 401 | X | X | Nationwide Permit No.27 and DWQ 401 Water Quality | | | |
| Division of Land Quality (Dam Safety) | N/A | N/A | N/A | | | |
| Endangered Species Act | X | X | Burnetts Chapel Buffer Mitigation Plan; studies found "no effect" (letter from USFWS) | | | |
| Historic Preservation Act | X | X | Burnetts Chapel Buffer Mitigation Plan; No historic resources were found to be impacted (letter from SHPO) | | | |
| Coastal Zone Management Act (CZMA)/Coastal Area Management Act (CAMA) | N/A | N/A | N/A | | | |
| FEMA Floodplain Compliance | N/A | N/A | N/A | | | |
| Essential Fisheries Habitat | N/A | N/A | N/A | | | |

U= Unknown

APPENDIX 2

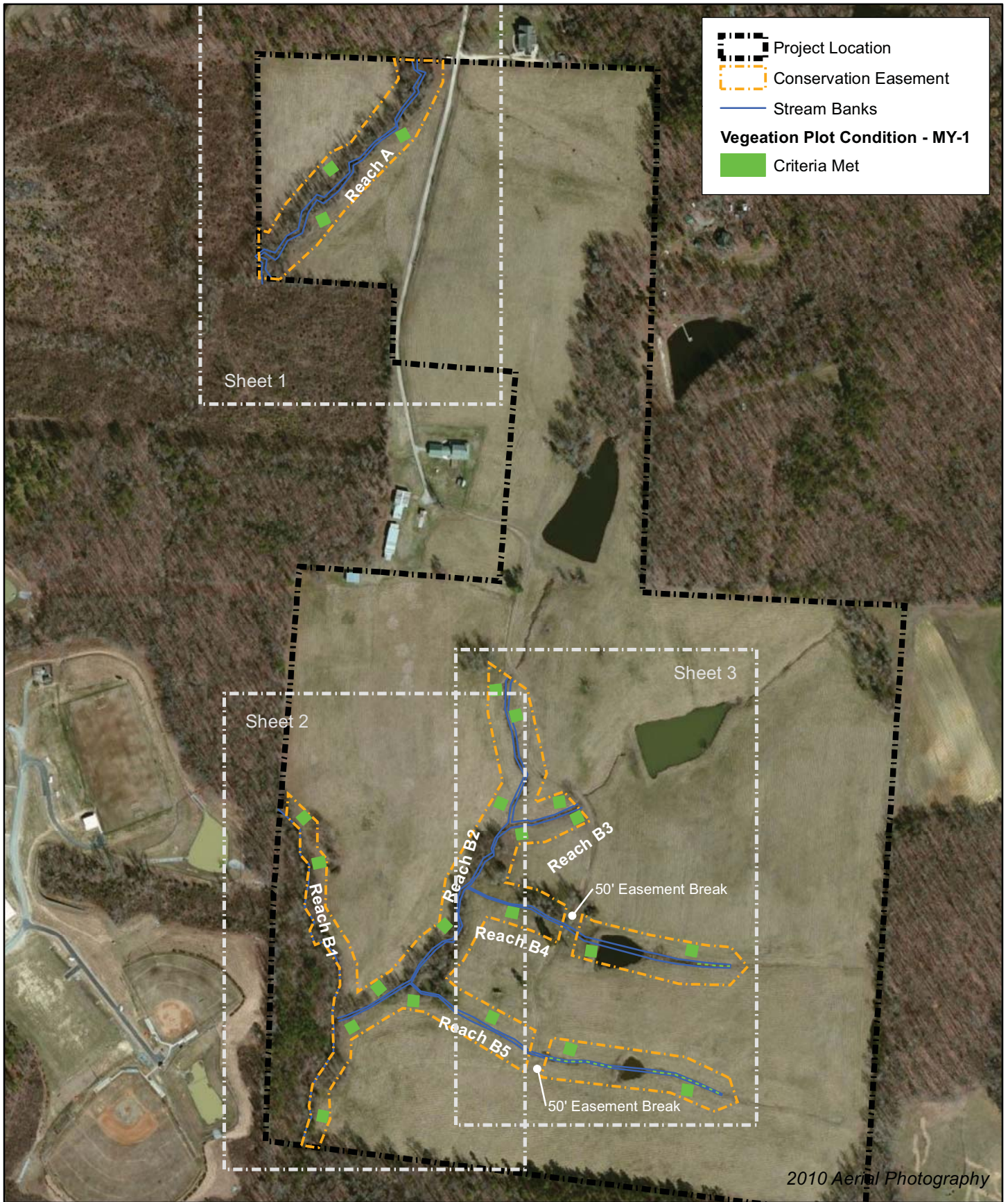


Figure 3 Integrated Current Condition Plan View
(Key)
Burnetts Chapel Buffer Mitigation Site
NCEP Project Number 95009
Monitoring Year 1 of 5
Guilford County, NC



WILDLANDS
ENGINEERING

0 200 400 Feet

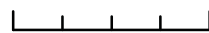




Figure 3.1. Integrated Current Condition Plan View
 (Sheet 1 of 3)
 Burnetts Chapel Buffer Mitigation Site
 NCEEP Project Number 95009
 Monitoring Year 1 of 5
 Guilford County, NC



WILDLANDS
ENGINEERING

0 75 150 Feet



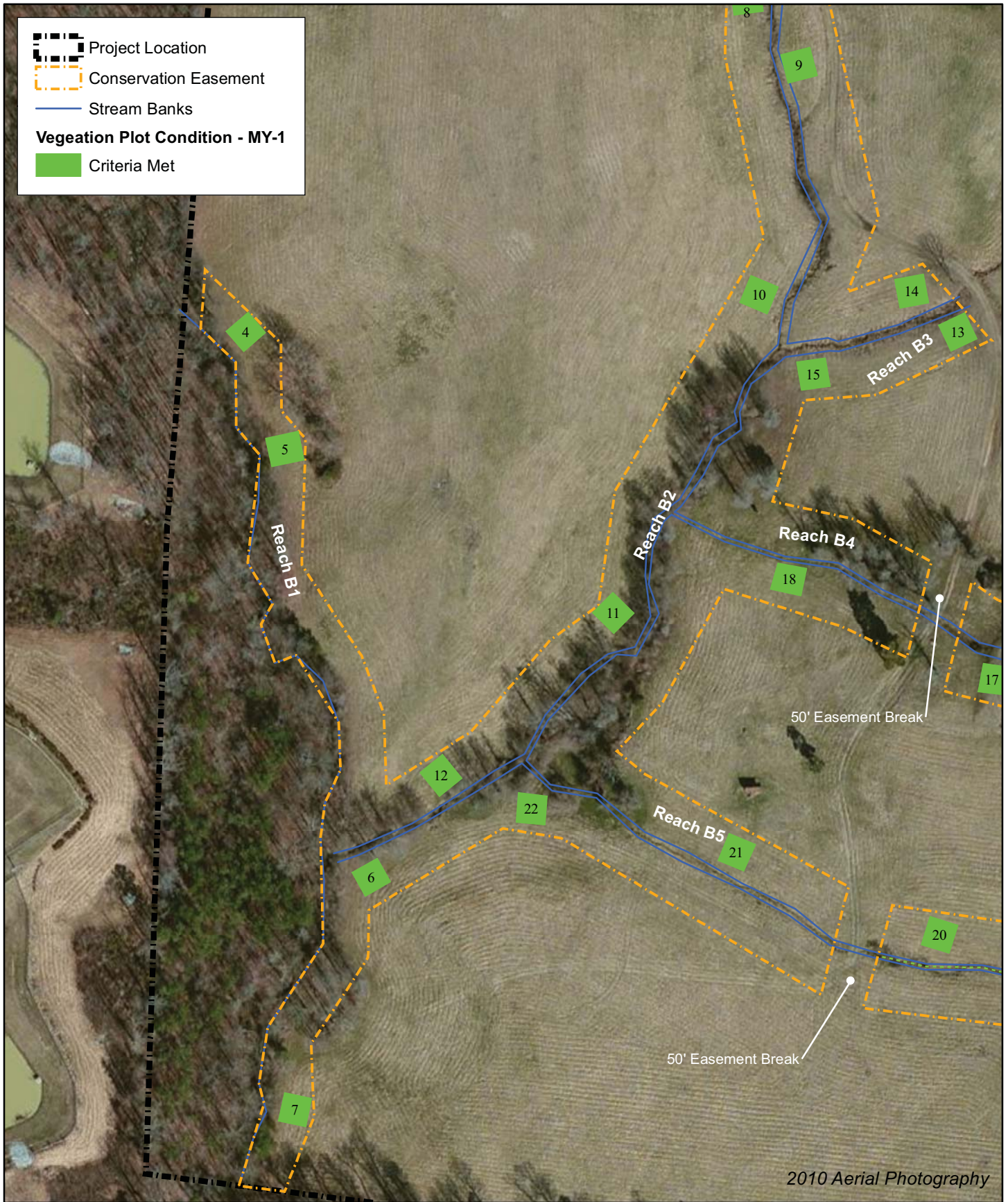
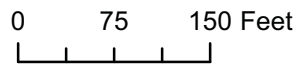


Figure 3.2 Integrated Current Condition Plan View
 (Sheet 2 of 3)
 Burnetts Chapel Buffer Mitigation Site
 NCEEP Project Number 95009
 Monitoring Year 1 of 5
 Guilford County, NC



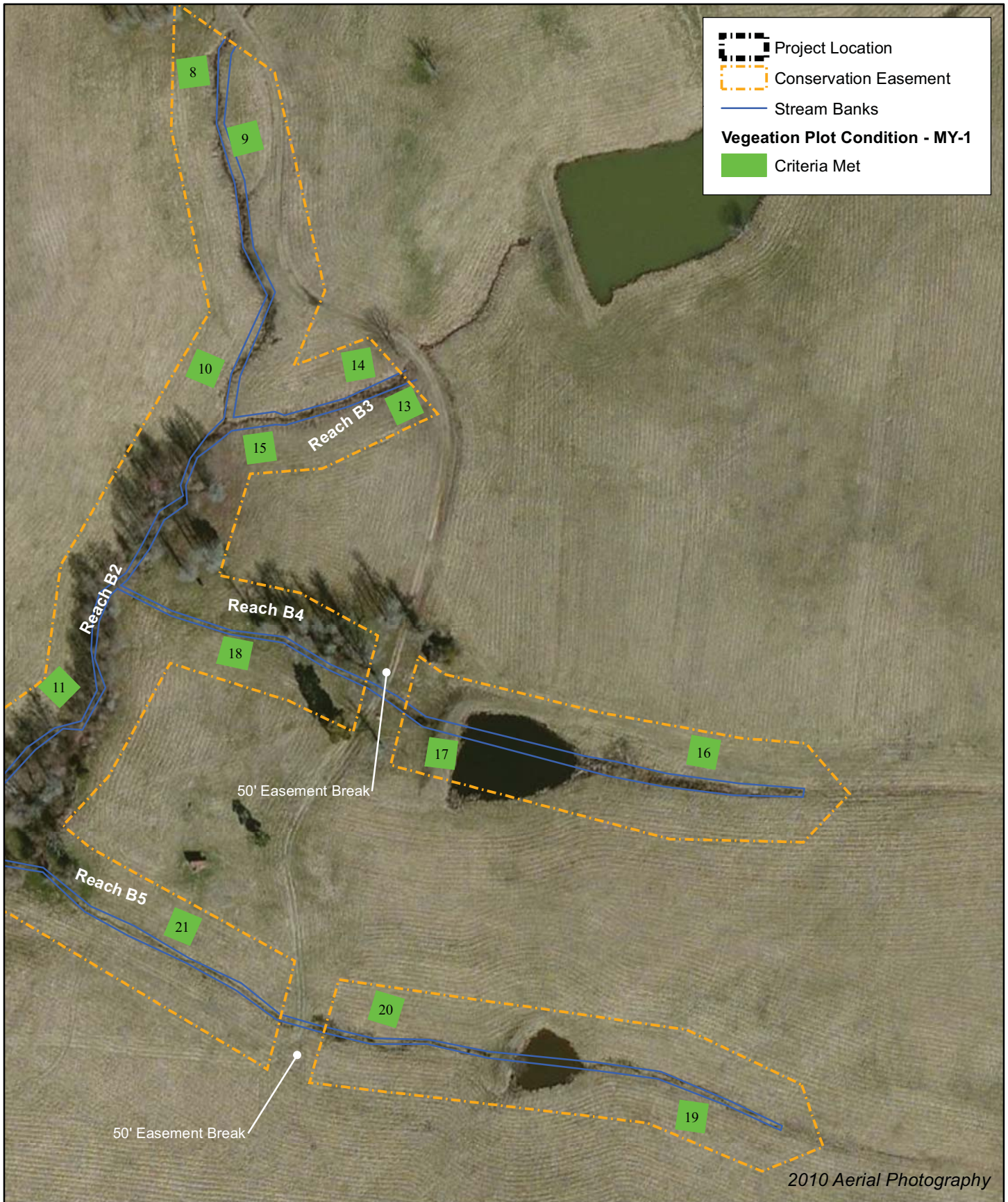
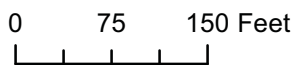


Figure 3.3 Integrated Current Condition Plan View
 (Sheet 3 of 3)
 Burnetts Chapel Buffer Mitigation Site
 NCEEP Project Number 95009
 Monitoring Year 1 of 5
 Guilford County, NC



WILDLANDS
ENGINEERING



Appendix 2. Visual Assessment Data
Table 5. Vegetation Condition Assessment Table
Burnett's Chapel Buffer Mitigation Site (NCEEP Project No. 95009)
Monitoring Year 1

Planted Acreage 9.2

| Vegetation Category | Definitions | Mapping Threshold (acres) | Number of Polygons | Combined Acreage | % of Planted Acreage* |
|-------------------------------------|---|---------------------------|--------------------|------------------|-----------------------|
| Bare Areas | Very limited cover of both woody and herbaceous material | 0.1 | 0 | 0 | 0.00% |
| Low Stem Density Areas^ | Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria. | 0.1 | 0 | 0.0 | 0% |
| Total | | | 0 | 0.0 | 0% |
| Areas of Poor Growth Rates or Vigor | Areas with woody stems of a size class that are obviously small given the monitoring year. | 0.25 acres | 0 | 0 | 0% |
| Cumulative Total | | | 0 | 0.0 | 0% |

Easement Acreage 12

| Vegetation Category | Definitions | Mapping Threshold (SF) | Number of Polygons | Combined Acreage | % of Planted Acreage |
|-----------------------------|--|------------------------|--------------------|------------------|----------------------|
| Invasive Areas of Concern | Areas of points (if too small to render as polygons at map scale). | 1000 | 0 | 0 | 0% |
| Easement Encroachment Areas | Areas of points (if too small to render as polygons at map scale). | none | 0 | 0 | 0% |

Vegetation Photographs



Vegetation Plot 1 (09/08/2012)



Vegetation Plot 2 (09/08/2012)



Vegetation Plot 3 (09/08/2012)



Vegetation Plot 4 (09/08/2012)



Vegetation Plot 5 (09/08/2012)



Vegetation Plot 6 (09/08/2012)



Vegetation Plot 7 (09/08/2012)



Vegetation Plot 8 (09/08/2012)



Vegetation Plot 9 (09/08/2012)



Vegetation Plot 10 (09/08/2012)



Vegetation Plot 11 (09/08/2012)



Vegetation Plot 12 (09/08/2012)



Vegetation Plot 13 (09/08/2012)



Vegetation Plot 14 (09/08/2012)



Vegetation Plot 15 (09/08/2012)



Vegetation Plot 16 (09/08/2012)



Vegetation Plot 17 (09/08/2012)



Vegetation Plot 18 (09/08/2012)



Vegetation Plot 19 (09/08/2012)



Vegetation Plot 20 (09/08/2012)



Vegetation Plot 21 (09/08/2012)



Vegetation Plot 22 (09/08/2012)

APPENDIX 3

Appendix 3. Vegetation Plot Data

Table 6. Vegetation Plot Criteria Attainment

Burnett's Chapel Buffer Mitigation Site (NCEEP Project No. 95009)

Monitoring Year 1

| Plot | MY1 Success Criteria Met (Y/N) | Tract Mean |
|-------------|---------------------------------------|-------------------|
| 1 | Y | 100% |
| 2 | Y | |
| 3 | Y | |
| 4 | Y | |
| 5 | Y | |
| 6 | Y | |
| 7 | Y | |
| 8 | Y | |
| 9 | Y | |
| 10 | Y | |
| 11 | Y | |
| 12 | Y | |
| 13 | Y | |
| 14 | Y | |
| 15 | Y | |
| 16 | Y | |
| 17 | Y | |
| 18 | Y | |
| 19 | Y | |
| 20 | Y | |
| 21 | Y | |
| 22 | Y | |

Appendix 3. Vegetation Plot Data

Table 7. CVS Vegetation Plot Metadata

Burnett's Chapel Buffer Mitigation Site (NCEEP Project No. 95009)

Monitoring Year 1

| | |
|--|--|
| Report Prepared By | Ian Eckardt |
| Date Prepared | 10/1/2012 16:33:05 PM |
| | |
| database name | Bunetts Chapel-MY1.mdb |
| database location | Q:\ActiveProjects\005-02130 Burnettts Chapel Buffer Mitigation Site\Monitoring\Monitoring Year 1\Vegetation Assessment |
| | |
| DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT----- | |
| Metadata | <i>Description of database file, the report worksheets, and a summary of project(s) and project data.</i> |
| Plots | <i>Each project is listed with its PLANTED stems per acre, for each year. This excludes live stakes.</i> |
| Stem Count by Plot and Spp | <i>A matrix of the count of total living stems of each species (planted and natural volunteers combined) for each plot; dead and missing stems are excluded.</i> |
| | |
| PROJECT SUMMARY----- | |
| Project Code | 95009 |
| project Name | Burnetts Chapel Mitigation Site |
| Description | Buffer Mitigation |
| length (ft) | |
| stream-to-edge width (ft) | |
| area (sq m) | |
| Required Plots (calculated) | 22 |
| Sampled Plots | 22 |

Appendix 3. Vegetation Plot Data

Table 8a. Planted and Total Stem Counts (Species by Plot with Annual Means)

Burnett's Chapel Buffer Mitigation Site (NCEEP Project No. 95009)

Reach A and B1

Monitoring Year 1

| Species | Common Name | Type | Current Data (MY1-9/2012) | | | | | | | | | | | | | | Annual Means | |
|--------------------------------|--------------------|------|---------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--------------|------------|
| | | | Plot 1 | | Plot 2 | | Plot 3 | | Plot 4 | | Plot 5 | | Plot 6 | | Plot 7 | | Current Mean | |
| | | | P | T | P | T | P | T | P | T | P | T | P | T | P | T | P | T |
| <i>Betula nigra</i> | River Birch | Tree | 3 | 3 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 5 | 5 | 2 | 2 |
| <i>Carpinus caroliniana</i> | Ironwood | Tree | 2 | 2 | 1 | 1 | | | 3 | 3 | | | 3 | 3 | 2 | 2 | 2 | 2 |
| <i>Fraxinus pennsylvanica</i> | Green Ash | Tree | | | | | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 1 | 1 | 3 | 3 |
| <i>Liriodendron tulipifera</i> | Tulip Poplar | Tree | | | 9 | 9 | 6 | 6 | | | | | | | | | 4 | 4 |
| <i>Platanus occidentalis</i> | Sycamore | Tree | 7 | 7 | 4 | 4 | 5 | 5 | 11 | 11 | 7 | 7 | 3 | 3 | 4 | 4 | 5 | 5 |
| <i>Quercus michauxii</i> | Swamp Chestnut Oak | Tree | 1 | 1 | 1 | 1 | | | | | | | 1 | 1 | | | 3 | 3 |
| <i>Quercus phellos</i> | Willow Oak | Tree | | | | | 1 | 1 | 1 | 1 | | | 1 | 1 | 2 | 2 | 2 | 2 |
| <i>Quercus rubra</i> | Northern Red Oak | Tree | 1 | 1 | 1 | 1 | | | 1 | 1 | 2 | 2 | | | 1 | 1 | 3 | 3 |
| Plot Area (acres) | | | 0.0247 | | | | | | | | | | | | | | | |
| Species Count | | | 5 | 5 | 6 | 6 | 5 | 5 | 6 | 6 | 4 | 4 | 6 | 6 | 6 | 6 | 5 | 5 |
| Stem Count | | | 14 | 14 | 17 | 17 | 15 | 15 | 19 | 19 | 13 | 13 | 12 | 12 | 15 | 15 | 15 | 15 |
| Stems per Acre | | | 567 | 567 | 688 | 688 | 607 | 607 | 769 | 769 | 526 | 526 | 486 | 486 | 607 | 607 | 607 | 607 |

Type=Shrub or Tree

P = Planted

T = Total

Appendix 3. Vegetation Plot Data

Table 8b. Planted and Total Stem Counts (Species by Plot with Annual Means)

Burnett's Chapel Buffer Mitigation Site (NCEEP Project No. 95009)

Reach B2 and B3

Monitoring Year 1

| Species | Common Name | Type | Current Data (MY1-9/2012) | | | | | | | | | | | | | | | | | | Annual Means | |
|--------------------------------|--------------------|------|---------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--------------|------------|--------------|--|
| | | | Plot 8 | | Plot 9 | | Plot 10 | | Plot 11 | | Plot 12 | | Plot 13 | | Plot 14 | | Plot 15 | | Current Mean | | | |
| | | | P | T | P | T | P | T | P | T | P | T | P | T | P | T | P | T | P | T | | |
| <i>Betula nigra</i> | River Birch | Tree | | | 1 | 1 | 4 | 4 | 3 | 3 | | | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | | |
| <i>Carpinus caroliniana</i> | Ironwood | Tree | | | 1 | 1 | | | 1 | 1 | | | | | 1 | 1 | 1 | 1 | 2 | 2 | | |
| <i>Fraxinus pennsylvanica</i> | Green Ash | Tree | 6 | 6 | | | 4 | 4 | 3 | 3 | 11 | 11 | | | | | | | 3 | 3 | | |
| <i>Liriodendron tulipifera</i> | Tulip Poplar | Tree | 11 | 11 | 1 | 1 | | | 1 | 1 | | | | | | | | | 4 | 4 | | |
| <i>Platanus occidentalis</i> | Sycamore | Tree | | | 4 | 4 | | | 9 | 9 | 1 | 1 | 4 | 4 | 6 | 6 | 2 | 2 | 5 | 5 | | |
| <i>Quercus michauxii</i> | Swamp Chestnut Oak | Tree | | | 2 | 2 | 2 | 2 | 1 | 1 | | | 4 | 4 | 7 | 7 | 9 | 9 | 3 | 3 | | |
| <i>Quercus phellos</i> | Willow Oak | Tree | | | 2 | 2 | 2 | 2 | 1 | 1 | | | 3 | 3 | 1 | 1 | 6 | 6 | 2 | 2 | | |
| <i>Quercus rubra</i> | Northern Red Oak | Tree | | | 7 | 7 | | | | | 6 | 6 | 2 | 2 | 1 | 1 | 3 | 3 | 3 | 3 | | |
| Plot Area (acres) | | | 0.0247 | | | | | | | | | | | | | | | | | | | |
| Species Count | | | 2 | 2 | 7 | 7 | 4 | 4 | 7 | 7 | 3 | 3 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 5 | | |
| Stem Count | | | 17 | 17 | 18 | 18 | 12 | 12 | 19 | 19 | 18 | 18 | 15 | 15 | 17 | 17 | 22 | 22 | 15 | 15 | | |
| Stems per Acre | | | 688 | 688 | 729 | 729 | 486 | 486 | 769 | 769 | 729 | 729 | 607 | 607 | 688 | 688 | 891 | 891 | 607 | 607 | | |

Type=Shrub or Tree

P = Planted

T = Total

Appendix 3. Vegetation Plot Data

Table 8c. Planted and Total Stem Counts (Species by Plot with Annual Means)

Burnett's Chapel Buffer Mitigation Site (NCEEP Project No. 95009)

Reach B4 and B5

Monitoring Year 1

| Species | Common Name | Type | Current Data (MY1-9/2012) | | | | | | | | | | | | | | Annual Means | |
|--------------------------------|--------------------|------|---------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--------------|------------|
| | | | Plot 16 | | Plot 17 | | Plot 18 | | Plot 19 | | Plot 20 | | Plot 21 | | Plot 22 | | Current Mean | |
| | | | P | T | P | T | P | T | P | T | P | T | P | T | P | T | P | T |
| <i>Betula nigra</i> | River Birch | Tree | | | | | 2 | 2 | | | 3 | 3 | | | 4 | 4 | 2 | 2 |
| <i>Carpinus caroliniana</i> | Ironwood | Tree | | | 2 | 2 | | | 7 | 7 | 4 | 4 | 2 | 2 | 1 | 1 | 2 | 2 |
| <i>Fraxinus pennsylvanica</i> | Green Ash | Tree | 4 | 4 | 2 | 2 | 5 | 5 | | | 2 | 2 | 5 | 5 | 2 | 2 | 3 | 3 |
| <i>Liriodendron tulipifera</i> | Tulip Poplar | Tree | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 4 | 4 | 6 | 6 | 1 | 1 | 4 | 4 |
| <i>Platanus occidentalis</i> | Sycamore | Tree | 8 | 8 | 6 | 6 | 3 | 3 | 3 | 3 | 2 | 2 | | | 9 | 9 | 5 | 5 |
| <i>Quercus michauxii</i> | Swamp Chestnut Oak | Tree | | | | | | | 1 | 1 | | | 1 | 1 | | | 3 | 3 |
| <i>Quercus phellos</i> | Willow Oak | Tree | 1 | 1 | | | 3 | 3 | 5 | 5 | 2 | 2 | 1 | 1 | | | 2 | 2 |
| <i>Quercus rubra</i> | Northern Red Oak | Tree | | | | | | | | | | | | | | | 3 | 3 |
| Plot Area (acres) | | | 0.0247 | | | | | | | | | | | | | | | |
| Species Count | | | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 6 | 6 | 5 | 5 | 5 | 5 | 5 | 5 |
| Stem Count | | | 14 | 14 | 12 | 12 | 14 | 14 | 17 | 17 | 17 | 17 | 15 | 15 | 17 | 17 | 15 | 15 |
| Stems per Acre | | | 567 | 567 | 486 | 486 | 567 | 567 | 688 | 688 | 688 | 688 | 607 | 607 | 688 | 688 | 607 | 607 |

Type=Shrub or Tree

P = Planted

T = Total