

**“Howard Farm Property”
Buffer Restoration Project**

**Greene County, NC
Neuse River Basin
(Cataloging Unit #03020203)**

**2009 Annual Monitoring Report (Year 4 of 5)
(Task T10)**

NC EEP Contract #D05020-1



Prepared For:

**North Carolina Department of Environment and Natural Resources
Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699-1652**



November 2009

Prepared By:

Land Management Group, Inc.
PO Box 2522
Wilmington, NC 28403



Phone. 910-452-0001

Fax. 910-452-0060

Project Manager:

Christian A. Preziosi

Office. 910-452-0001

Cell. 910-471-0515

Email. cpreziosi@lmgroup.net

TABLE OF CONTENTS

EXECUTIVE SUMMARY1

I. PROJECT BACKGROUND2

 1. Location and Setting2

 2. Mitigation Type and Objectives.....2

 3. Project History and Background.....2

 4. Monitoring Plan View.....2

II. PROJECT CONDITIONS3

 1. Pre-Construction Conditions.....3

 2. Soils.....3

 3. Restoration Activities.....3

 4. Adaptive Management4

III. METHODOLOGY AND SUCCESS CRITERIA.....4

IV. MONITORING.....5

V. CONCLUSION6

TABLES

- 1. REPORTING AND MILESTONE HISTORY
- 2. PLANTED SPECIES LIST
- 3. ANNUAL MONITORING DATA (YEAR 4) – CUMULATIVE SPREADSHEET

FIGURES

- 1. SITE LOCATION MAP
- 2. USGS TOPOGRAPHIC QUADRANGLE
- 3. NRCS SOIL SURVEY
- 4. BUFFER PLANTING OVERVIEW

APPENDICES

- A. SITE PHOTOGRAPHS
- B. VEGETATION SURVEY DATA BY PLOT
- C. SURVEY WITH MONITORING PLOT LOCATIONS

EXECUTIVE SUMMARY

Prior to project implementation, the Howard Farm Property was farmed for soybean and cotton production. The site consisted entirely of open agricultural fields with no existing riparian buffer (i.e. trees and shrubs are absent within 200 ft of existing surface waters). Under contract with the North Carolina Ecosystem Enhancement Program (EEP), Land Management Group, Inc. (LMG) implemented the restoration of 26.3 acres of riparian buffer habitat along Mussel Run (a tributary of Contentnea Creek) and contiguous surface-waters (i.e. field ditches) in Greene County, NC.

The entire 26.3-ac project area has been planted with characteristic tree and shrub species on an average density of 900 stems/ac. Planting was completed in February 2006. Thirteen (13) permanent 0.10-ac monitoring plots (equivalent to 5% of the restoration area) were established subsequent to planting. Annual monitoring will be conducted near the end of each growing season for a period of five years beginning in October 2006. Vegetative planting will be deemed successful if survivorship of plantings and volunteers of desirable species meets or exceeds a target stem density of 320 stems/acre.

A total of 2,260 stems (planted and volunteer shrubs/trees) were observed within the thirteen 0.10-acre plots during Year 4 monitoring. Of the total observed, 1,401 stems (total excluding red maple and sweet gum) were counted toward the success criteria (corresponding to an average of 1,078 stems/acre). Given the average stem density observed, the site is progressing well toward the targeted stem density.

Monitoring reports are being submitted annually to the EEP (by January 1 of each year). These reports include results of vegetative monitoring and photographic documentation of site conditions. Monitoring reports also identify any contingency measures that may need to be employed to remedy any site deficiencies.

The following monitoring report summarizes the restoration project and includes more specific information related to project implementation, 'as-built' conditions, and site progress through Year 4.

I. PROJECT BACKGROUND

1. Location and Setting

As approved by the EEP, LMG implemented the restoration of 26.3 acres of farmland located adjacent to Mussel Run (a tributary of the Neuse River) and a series of contiguous surface waters (i.e. field ditches). The project area is part of the “Howard Farm”, located approximately 2.5 miles northeast of Hookerton in Greene County, NC (refer to Figure 1). The project includes the establishment of characteristic tree and shrub species adjacent to open field ditches on the east and west side of Churchill Road (SR #1404) as well as Mussel Run (refer to Figure 2). The property is situated within NEU-7 of the lower Neuse River Basin (USGS Cataloging Unit 03020203) and within sub-basin 03-04-07.

2. Mitigation Type and Objectives

The proposed restoration project is intended to provide suitable, high-quality riparian buffer restoration as compensatory mitigation for riparian buffer impacts authorized through the EEP. The objective of the project is to restore riparian buffer vegetation and diffuse flow conditions to help reduce non-point source discharge of contaminants into adjacent water bodies. The primary function of the riparian buffer project detailed in this document is to restore the nitrogen (N) removal capacity of those areas situated adjacent to surface waters. In addition, the project will provide ancillary benefits to aquatic and wildlife habitat via enhanced niche habitat, microclimate modification and shade, and increased food-web support.

3. Project History and Background

Table 1 provides information regarding the reporting and milestone history for the Howard Farm Buffer Restoration project.

4. Monitoring Plan View

Locations of vegetation monitoring plots for the Howard Farm Buffer Restoration are depicted in Appendix C.

II. PROJECT CONDITIONS

1. Pre-Construction Conditions

The 26.3-acre riparian buffer restoration area represents a portion of a larger 145-acre tract (“Howard Farm”) formerly farmed for the production of soybean and cotton. Land use practices (including herbicide, pesticide, and fertilizer application) served as potential contributors to decreased water quality of adjacent surface waters (i.e. ditches and ‘blue-line’ streams).

Application of nitrogen-rich fertilizer represented the most significant non-point source of nitrogen within the immediate project area. Woody vegetation along ditches was either absent or sparse (less than 100 stems per acre that are > 5 inches diameter at breast height). As a result, nutrient-laden runoff was discharged from agricultural fields directly into surface waters with little or no nutrient filtration/transformation.

2. Soils

The site consists predominantly of Johns sandy loam (refer to Figure 4) – a somewhat poorly drained to moderately well drained soil occurring along stream terraces. Infiltration is moderate and surface runoff is slow in these areas. The seasonal high water table occurs between 1.5 ft and 3.0 ft below the soil surface. The remaining portion of the buffer area consists of Lumbee sandy loam – a poorly drained soil characteristic of broader flats of stream terraces. Lumbee soils exhibit moderate infiltration with a seasonal high water table occurring at or near the soil surface.

3. Restoration Activities

The restoration project included the planting of characteristic tree and shrub seedlings adjacent to open ditches and blue-line streams on the 26.3-ac restoration site (refer to Figure 3). No federal or state permits were necessary to conduct the restoration activities. The riparian buffer was planted with various species including river birch (*Betula nigra*), sycamore (*Platanus occidentalis*), green ash (*Fraxinus pennsylvanica*), water oak (*Quercus nigra*), willow oak (*Quercus phellos*), and red bay (*Persea borbonia*). The outer 50 feet of the buffer area was planted with characteristic shrub species including wax myrtle (*Myrica cerifera*), American beautyberry (*Callicarpa americana*), elderberry (*Sambucus canadensis*), and sweet pepperbush (*Clethra alnifolia*). All species selected for the restoration project naturally occur on the site within undisturbed riparian buffer areas. These species are considered to be well suited for site-specific conditions (including soil characteristics and moisture regimes). In addition, each of

these species is listed within NCDENR's "Guidelines for Riparian Buffer Restoration" as appropriate species for use in riparian buffer restoration projects. Approximately 20,000 trees and shrubs were planted throughout the project footprint. Bare-root seedlings were planted at a density of 600 trees per acre. Shrubs were planted at densities of 1,000 to 1,200 plants per acre. On-site planting was completed in February 2006.

Refer to Table 2 for a list of species planted (with corresponding quantities) within the buffer restoration area.

4. Adaptive Management

Infestation of common morning glory (*Ipomoea purpurea*) was prevalent during the early stages of site development. Physical removal of the vines was conducted prior to Year 1 and Year 2 monitoring events. In addition to the removal activities a supplemental planting was conducted in February 2007. A total of 12,000 river birch, green ash, and wax myrtle were planted in areas that experienced reduced survivorship and/or suppressed growth. In addition, the herbicide Oust™ was applied in select areas of the tract to selectively target areas of morning glory infestation.

LMG identified the continued prevalence of morning glory during site inspections conducted in February 2008. As a result, an additional application of Oust™ (at a rate of 1,500 liters per hectare) was performed. This work was coordinated through, and conducted by a licensed applicator. Physical removal of vines was also conducted during Year 3 and Year 4 of monitoring. Though morning glory is still present within the buffer area, survivorship of planted trees and shrubs remained high during Year 4 monitoring. It appears as though most plantings now have a competitive height advantage over the morning glory vines, and as a result, no future remedial actions are planned at this time.

III. METHODOLOGY & SUCCESS CRITERIA

Annual monitoring is being conducted near the end of each growing season for a period of five years. Vegetative monitoring has included the establishment of thirteen (13) 0.10-acre permanent plots corresponding to a total of 1.3 acres (equivalent to 5% of the restoration area). The

locations of the monitoring plots are depicted in Appendix C. Vegetative planting will be deemed successful if survivorship of plantings and volunteers of desirable species¹ meets or exceeds a target stem density of 320 stems/acre.

Monitoring reports are being submitted annually to the EEP (by January 1 of each year). These reports include results of vegetative monitoring and photographic documentation of site conditions. Monitoring reports will also identify any contingency measures that may need to be employed to remedy any site deficiencies. For instance, deer browse tubes and fencing may need to be used if evidence of significant herbivory or deer browse is observed. In addition, supplemental planting may be necessary in areas of reduced survivorship. Remedial actions are not anticipated based on survivorship of planted and volunteer species at Year 4.

IV. MONITORING

A total of 2,260 stems (planted and volunteer shrubs/trees) were observed within the thirteen 0.10-acre plots during the Year 4 monitoring event. Of the total observed, 1,401 stems (total excluding red maple and sweet gum) were counted toward the success criteria (corresponding to an average of 1,078 stems/acre). Of the species planted, wax myrtle (*Myrica cerifera*) and American beautyberry (*Callicarpa americana*) were the most abundant shrubs observed within the thirteen monitoring plots. The most abundant of the planted tree species were American sycamore (*Platanus occidentalis*) and river birch (*Betula nigra*). In addition to the abundance, exceptional growth rates have also been observed for these species with a majority of the individuals exceeding twelve (12) feet in height. Please refer to Appendix A for site photographs of Year 4 conditions.

A total of 859 sweet gum and red maple saplings were observed throughout the thirteen plots. It appears as though the presence and growth of sweet gum and red maple is not adversely affecting the growth of target species. This is substantiated through a comparison of the stem heights within each of the plots. For example, the sweet gum and red maple seedlings observed in Plot #7 range in height from 3' to 10' while the planted species range from 3' to 16'. This increase in height provides a competitive advantage for the planted species that will likely result

¹Desirable species are considered as noninvasive species characteristic of riparian habitats of the Coastal Plain.
Howard Farm Buffer Restoration
Annual Monitoring Report (Year 4 of 5)
Land Management Group, Inc.
November 2009
Contract No. D05020-1

in an overall decline in densities of sweet gum and red maple. The numerical abundance of these species is a reflection of their opportunistic strategy in early successional stages of forest development. Given the competitive height advantage of planted species, it appears as though sweet gum and red maple will not adversely affect the survivorship of planted species.

Refer to Table 3 for a summary of results related to species abundance and target stem densities. In addition, individual plot data sheets are provided in Appendix B.

V. CONCLUSION

LMG has completed the fourth year monitoring for the 26.3 acres of riparian buffer restoration located in NEU-7 of the lower Neuse Basin. Stem densities within all thirteen plots well exceed the 320 stems/acre target density for restored buffer habitats. The total observed density (1,078 stems/acre) indicates that the site is progressing well toward the target maturity density. The presence of morning glory will be monitored during the early growing season for the remaining scheduled monitoring event. However, it is anticipated that the planted seedlings have achieved a sufficient height advantage and that growth and success of these trees and shrubs will not be inhibited by the presence of any morning glory vines.

Reversion of agricultural land to wooded riparian buffer will decrease source nutrient loading and concurrently increase nutrient removal capacity. In addition, the project will provide ancillary benefits to aquatic and wildlife habitat via enhanced niche habitat, microclimate modification and shade, and increased food-web support. By doing so, the proposed project will help to effectively mitigate for authorized loss of riparian buffers within the Neuse Basin.

TABLES

Table 1. Reporting and Milestone History

	Project Milestone	Completion Date	COMMENTS
1	Feasibility Study, CE Document, and Public Meeting	September, 2005	Complete
2	Record a Conservation Easement on the Site	January 2006	Conveyed to SPO
3	Restoration Plan Approved by EEP		
4	Mitigation Site Earthwork Completed	January 2006	
5	Mitigation Site Planting and Installation of Monitoring Devices	February 15, 2006	Complete
6	Submittal of Mitigation Plan (including as-built drawings)	June 2006	Complete
7	Submittal of Monitoring Report #1 to EEP	December 31, 2006	Approved by NCEEP
8	Submittal of Monitoring Report #2 to EEP	December 31, 2007	Approved by NCEEP
9	Submittal of Monitoring Report #3 to EEP	December 31, 2008	Approved by NCEEP
10	Submittal of Monitoring Report #4 to EEP	December 31, 2009	
11	Submittal of Monitoring Report #5 to EEP	December 31, 2010	

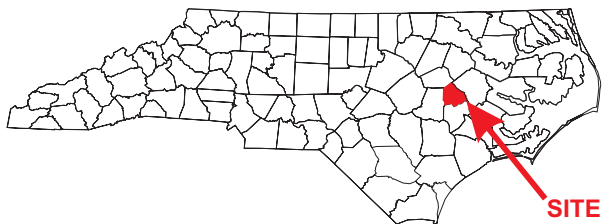
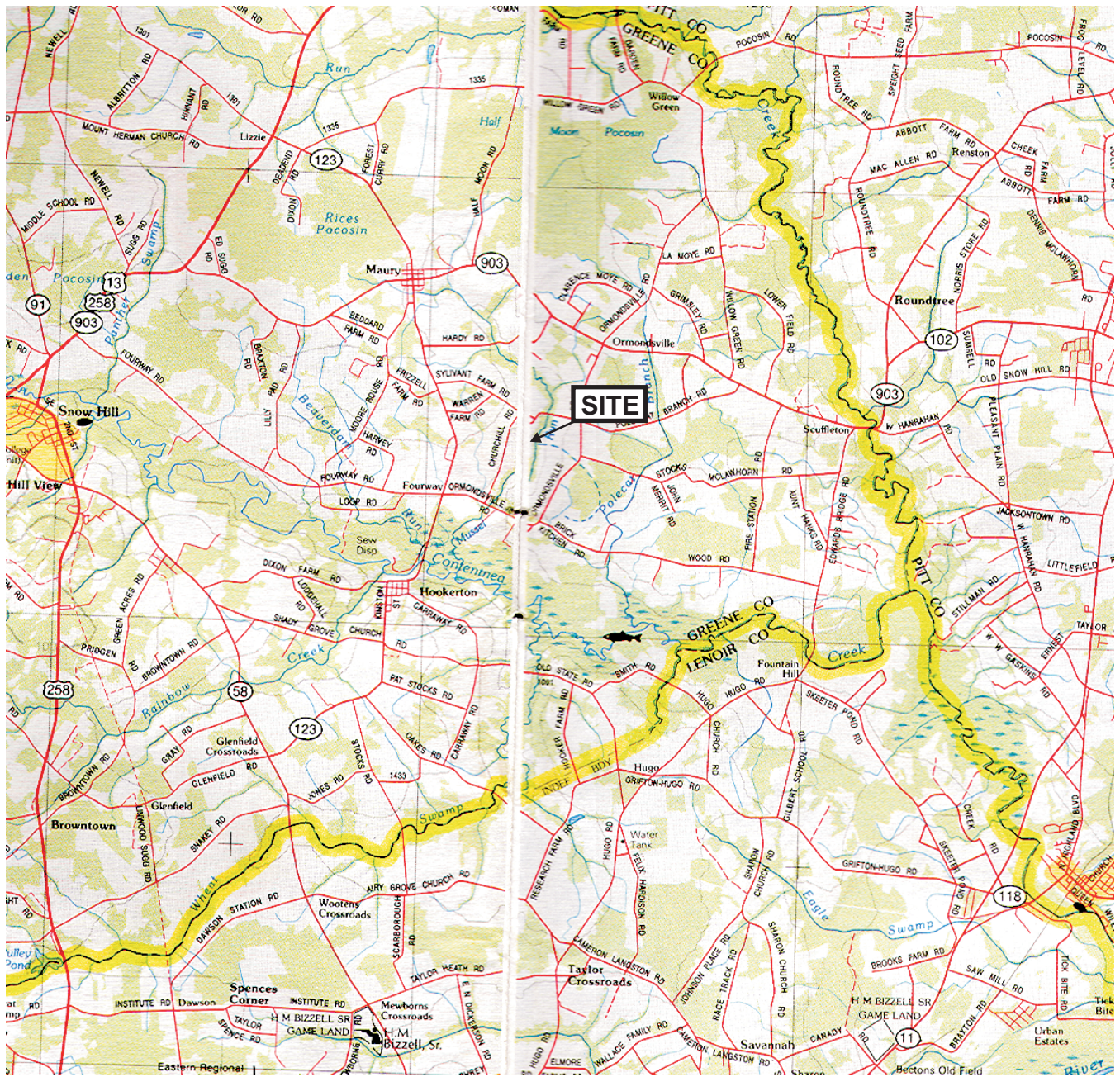
Table 2. Howard Farm Plant List

Species (trees)	Quantity
River Birch (<i>Betula nigra</i>)	2,000
Sycamore (<i>Platanus occidentalis</i>)	2,000
Green Ash (<i>Fraxinus pennsylvanica</i>)	1,000
Willow Oak (<i>Quercus phellos</i>)	1,000
Overcup Oak (<i>Quercus lyrata</i>)	1,000
Water Oak (<i>Quercus nigra</i>)	2,000
Black Gum (<i>Nyssa sylvatica</i>)	1,000
Red Bay (<i>Persea borbonia</i>)	2,000
Species (shrubs)	
Wax Myrtle (<i>Myrica cerifera</i>)	2,000
Sweet pepperbush (<i>Clethra alnifolia</i>)	2,000
Elderberry (<i>Sambucus canadensis</i>)	2,000
American Beautyberry (<i>Callicarpa americana</i>)	1,000
Possumhaw (<i>Viburnum nudum</i>)	1,000
Supplemental Planting (February 2007)	
Green Ash (<i>Fraxinus pennsylvanica</i>)	4,000
River Birch (<i>Betula nigra</i>)	4,000
Wax Myrtle (<i>Myrica cerifera</i>)	4,000
TOTAL	32,000

**TABLE 3. ANNUAL MONITORING DATA SHEET (YEAR 4) - VEGETATION PLOTS
HOWARD FARM RIPARIAN BUFFER SITE**

SPECIES	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5	PLOT 6	PLOT 7	PLOT 8	PLOT 9	PLOT 10	PLOT 11	PLOT 12	PLOT 13	TOTAL
Sycamore	8			1	8			27	51		58	3	27	183
Red Maple	3	82	1	5		40	60	5			2	3	2	203
Sweet Gum		200	65	22		80	150	21	41	55	10	9	3	656
Loblolly Pine	7	16	27	6	13	7		4	3	14	3	14	4	118
Baccharis	3	5	8	13	31	9	4	13	1	21	2	13	1	124
Green Ash	15	12	7	5	14	13	30	8	5	6		9	8	132
Wax Myrtle	19		7	21	14	24	32	8		35		44	9	213
River Birch	1	5	8	19	17	9	8	5	12	6	28		37	155
Blackgum								2						2
Amer. Beautyberry	15	19	15			9	17		5	19		16		115
Persimmon	1	7	6					3	19	17	11		6	70
Elderberry		1	18		2	12	9	8	9	23	2	14	3	101
Water Oak														0
Overcup Oak	2		7	7	15	6								37
Willow Oak			1	8	6	7				1		1		24
Black Willow								15	9	23		1		48
Possumhaw		1												1
Highbush Blueberry														0
Sweet Pepperbush						1	1					1		3
Red Cedar	2	1				8	7					12		30
Tulip Poplar						1	3		1					5
Black Cherry	2		4									1		7
Sweetbay		1	4	9										14
Red Bay			4		11							4		19
TOTAL	78	350	182	116	131	226	321	119	156	220	116	145	100	2260
Total Counted toward Success	75	68	116	89	131	106	111	93	115	165	104	133	95	1401
Stem Density (per ac)	750	680	1160	890	1310	1060	1110	930	1150	1650	1040	1330	950	1078

FIGURES



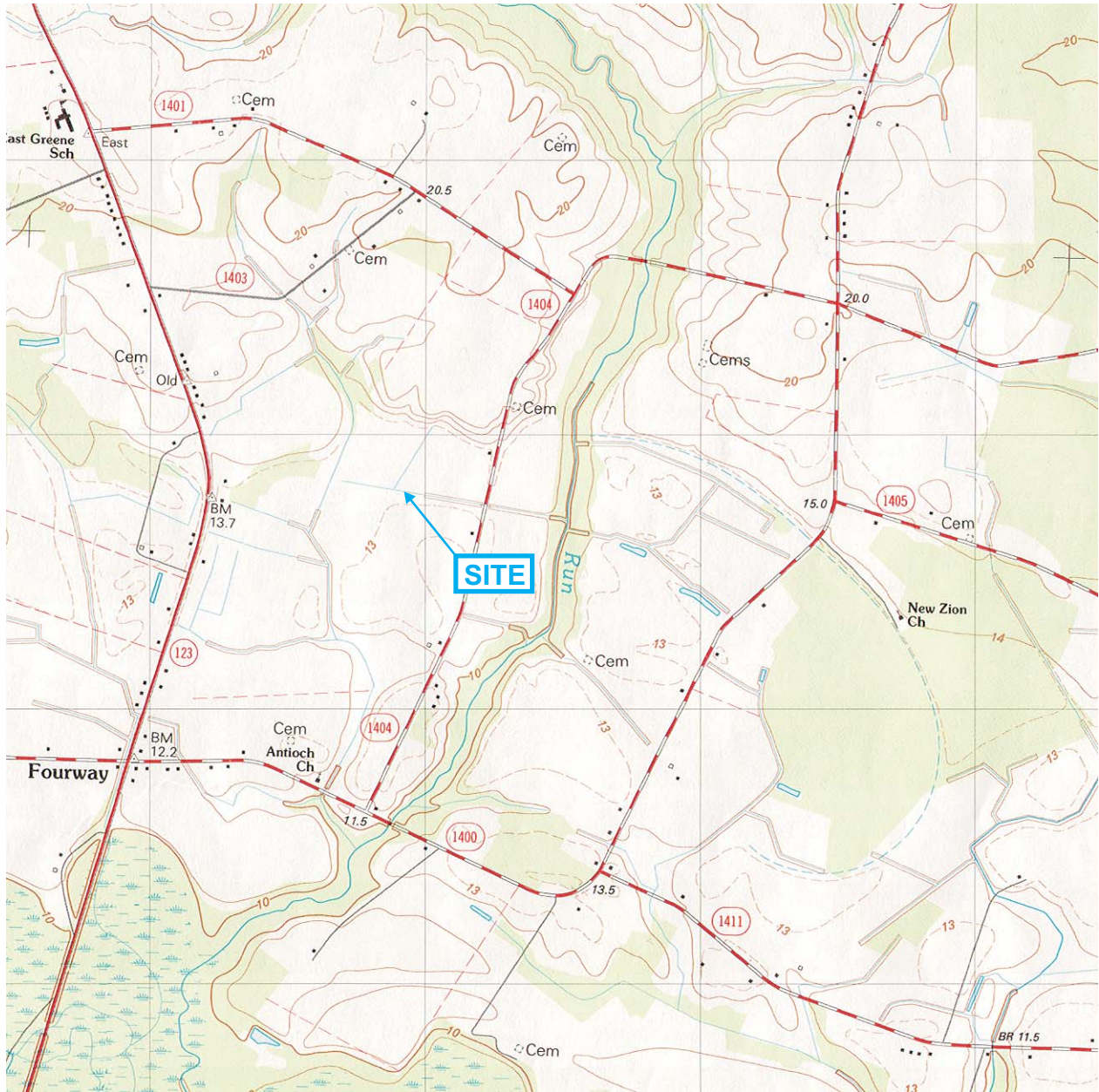
SCALE 1" = 2.0 miles

Map Source: DeLorme: North Carolina Atlas and Gazetteer., 1997 p. 46.

NC EEP
 Howard Farm
 Buffer Restoration Project
 Greene County



Figure 1.
 Site Location Map



Boundaries are approximate
and not meant to be absolute.



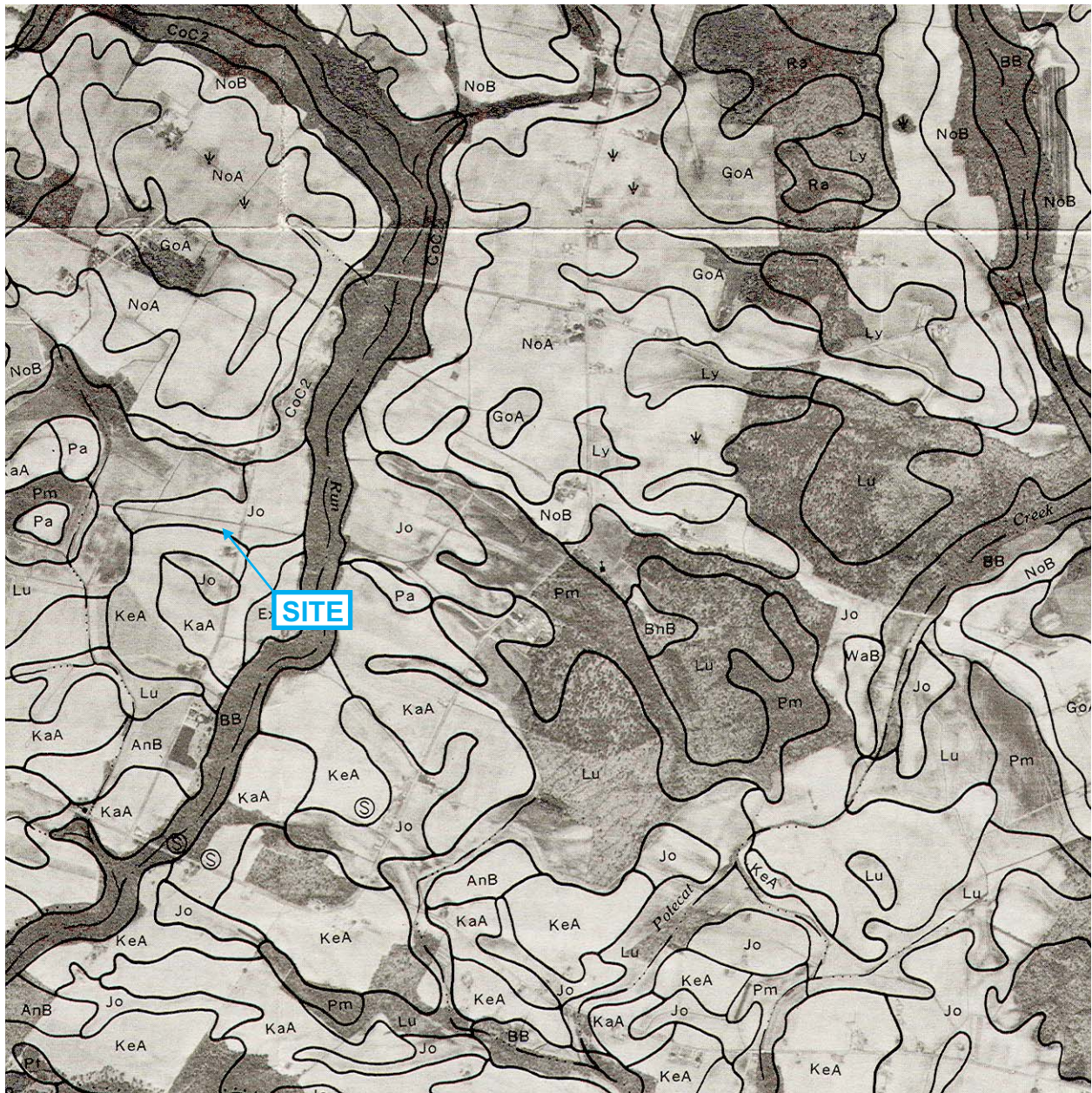
SCALE 1" = 2000'

Map Source: 1982, USGS 7.5' Topographic Quadrangle. Hookerton Quadrangle

NC EEP
Howard Farm
Buffer Restoration Project
Greene County



Figure 2.
1982 Topographic Quad



Boundaries are approximate and not meant to be absolute.

Map Source: Soil Survey of Greene County, 1977.

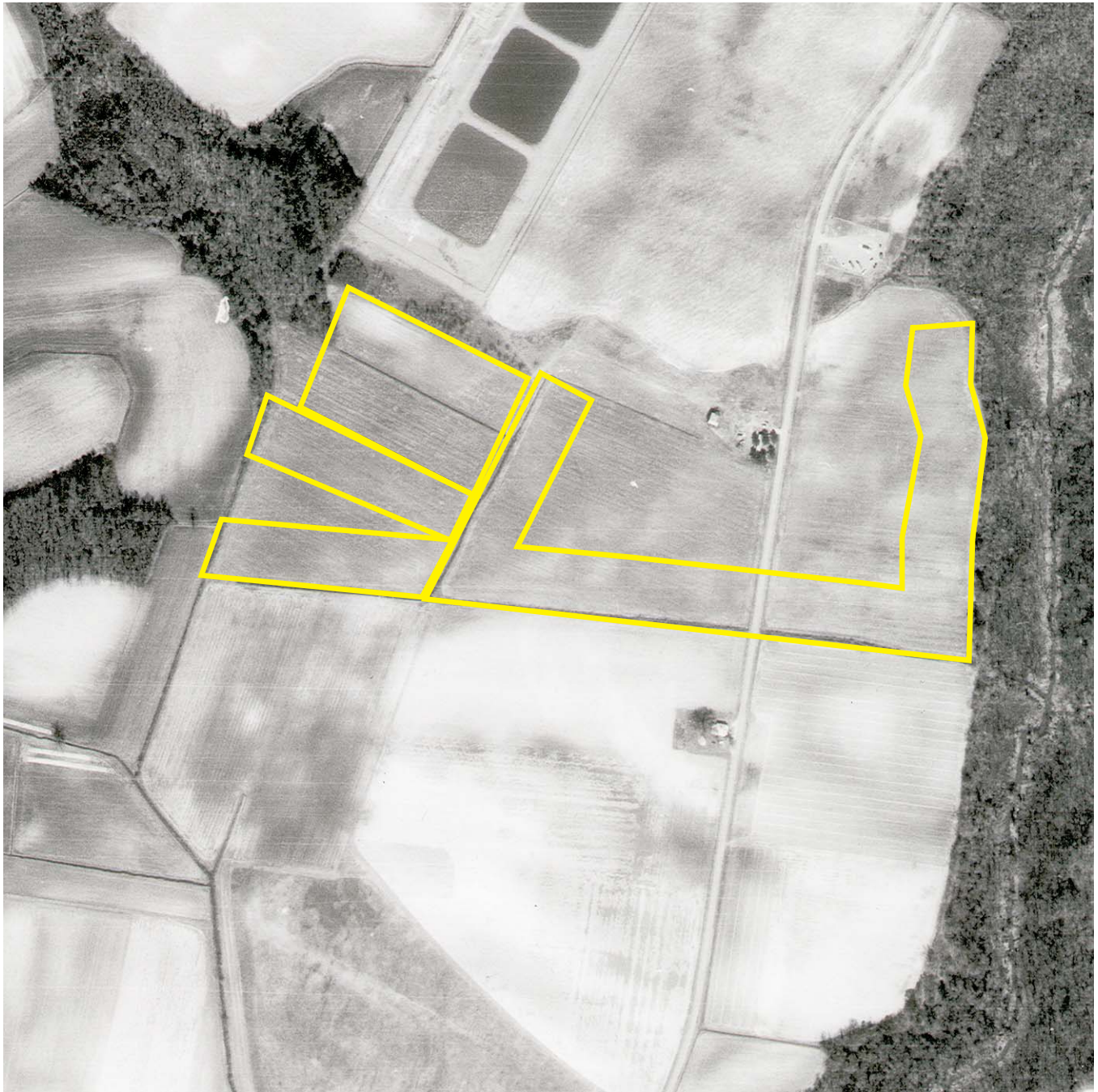


SCALE 1" = 2000'

NC EEP
Howard Farm
Buffer Restoration Project
Greene County



Figure 3.
Generalized Soil Map
Greene County, NC



 200' Buffer Planting Area (26.3 acres)

Boundaries are approximate
and not meant to be absolute.

Map Source: Soil Survey of Greene County , 1977.



SCALE 1" = 500'

NC EEP
Howard Farm
Buffer Restoration Project
Greene County



Figure 4.
Buffer Planting Overview

APPENDIX A. SITE PHOTOGRAPHS (SEPTEMBER 2009)



1) View of maturing American beautyberry in Plot 1.



2) View of planted and volunteer individuals in Plot 3.



3) View of maturing red cedar at Plot 6.



4) View of maturing sycamore at Plot 9.



5) View of river birch in Plot 8.



6) A stand of planted and volunteer species.

APPENDIX B. INDIVIDUAL PLOT DATA SHEETS

**HOWARD FARM RIPARIAN BUFFER SITE
ANNUAL MONITORING DATA SHEET - VEGETATION PLOTS**

PLOT NUMBER 1

SPECIES	STRATUM	Number of Individuals	HEIGHT	Planted vs. Volunteer Species	Number of Individuals Counted toward Success Criteria
	(T, SA, or SH)				
American Beautyberry	SH	1	2 ft	Planted	1
American Beautyberry	SH	4	3 ft	Planted	4
American Beautyberry	SH	3	4 ft	Planted	3
American Beautyberry	SH	7	5 ft	Planted	7
Persimmon	SA	1	1 ft	Planted	1
River Birch	SA	1	5 ft	Planted	1
American Sycamore	SA	1	4 ft	Planted	1
American Sycamore	SA	1	11 ft	Planted	1
American Sycamore	SA	3	12 ft	Planted	3
American Sycamore	SA	1	14 ft	Planted	1
American Sycamore	SA	2	15 ft	Planted	2
Green Ash	SA	3	2 ft	Volunteer	3
Green Ash	SA	5	3 ft	Volunteer	5
Green Ash	SA	3	4 ft	Planted	3
Green Ash	SA	3	6 ft	Planted	3
Green Ash	SA	1	7 ft	Planted	1
Overcup Oak	SA	1	5 ft	Planted	1
Overcup Oak	SA	1	7 ft	Planted	1
Wax Myrtle	SH	1	1 ft	Planted	1
Wax Myrtle	SH	7	2 ft	Planted	7
Wax Myrtle	SH	6	3 ft	Planted	6
Wax Myrtle	SH	5	4 ft	Planted	5
Loblolly Pine	SA	2	3 ft	Volunteer	2
Loblolly Pine	SA	2	4 ft	Volunteer	2

Loblolly Pine	SA	2	5 ft	Volunteer	2
Loblolly Pine	SA	1	6 ft	Volunteer	1
Black Cherry	SA	2	7 ft	Volunteer	2
Red Maple	SA	2	2 ft	Volunteer	0
Red Maple	SA	1	3 ft	Volunteer	0
Red Cedar	SA	1	4 ft	Volunteer	1
Red Cedar	SA	1	6 ft	Volunteer	1
Baccharis	SH	1	6 ft	Volunteer	1
Baccharis	SH	2	7 ft	Volunteer	2
	TOTAL SHRUBS	37		OBSERVED DENSITY (PER PLOT)	75
	TOTAL TREES OF PLANTED SPECIES	19		OBSERVED DENSITY (PER ACRE)	750
	TOTAL TREES OF VOLUNTEER SPECIES	22			
	TOTAL INDIVIDUALS	78			

**HOWARD FARM RIPARIAN BUFFER SITE
ANNUAL MONITORING DATA SHEET - VEGETATION PLOTS**

PLOT NUMBER

2

SPECIES	STRATUM	Number of Individuals	HEIGHT	Planted vs. Volunteer Species	Number of Individuals Counted toward Success Criteria
	(T, SA, or SH)				
Amer. Beautyberry	SH	1	2 ft	Planted	1
Amer. Beautyberry	SH	1	3 ft	Planted	1
Amer. Beautyberry	SH	1	4 ft	Planted	1
Amer. Beautyberry	SH	6	5 ft	Planted	6
Amer. Beautyberry	SH	7	6 ft	Planted	7
Amer. Beautyberry	SH	1	8 ft	Planted	1
Amer. Beautyberry	SH	1	10 ft	Planted	1
Amer. Beautyberry	SH	1	12 ft	Planted	1
Possumhaw	SH	1	3 ft	Planted	1
Elderberry	SH	1	5 ft	Planted	1
River Birch	SA	1	3 ft	Volunteer	1
River Birch	SA	1	10 ft	Planted	1
River Birch	SA	1	12 ft	Planted	1
River Birch	SA	1	15 ft	Planted	1
River Birch	SA	1	20 ft	Planted	1
Persimmon	SA	3	2 ft	Planted	3
Persimmon	SA	3	3 ft	Planted	3
Persimmon	SA	1	20 ft	Planted	1
Green Ash	SA	1	1 ft	Volunteer	1
Green Ash	SA	3	4 ft	Planted	3
Green Ash	SA	1	5 ft	Planted	1
Green Ash	SA	4	6 ft	Planted	4
Green Ash	SA	1	7 ft	Planted	1
Green Ash	SA	2	10 ft	Planted	2
Baccharis	SH	1	5 ft	Volunteer	1
Baccharis	SH	1	6 ft	Volunteer	1
Baccharis	SH	1	8 ft	Volunteer	1
Baccharis	SH	2	10 ft	Volunteer	2
Red Cedar	SA	1	1 ft	Volunteer	1
Sweet Bay	SA	1	2 ft	Volunteer	1
Red Maple	SA	82	3 ft - 20 ft	Volunteer	0
Sweet Gum	SA	400	10 ft - 15 ft	Volunteer	0
Loblolly Pine	SA	16	4 ft - 12 ft	Volunteer	16

	TOTAL SHRUBS	46		OBSERVED DENSITY (PER PLOT)	68
	TOTAL TREES OF PLANTED SPECIES	22		OBSERVED DENSITY (PER ACRE)	680
	TOTAL TREES OF VOLUNTEER SPECIES	502			
	TOTAL INDIVIDUALS	570			

**HOWARD FARM RIPARIAN BUFFER SITE
ANNUAL MONITORING DATA SHEET - VEGETATION PLOTS**

PLOT NUMBER

3

SPECIES	STRATUM	Number of Individuals	HEIGHT	Planted vs. Volunteer Species	Number of Individuals Counted toward Success Criteria
	(T, SA, or SH)				
Amer. Beautyberry	SH	1	1 ft	Planted	1
Amer. Beautyberry	SH	1	2 ft	Planted	1
Amer. Beautyberry	SH	3	3 ft	Planted	3
Amer. Beautyberry	SH	8	4 ft	Planted	8
Amer. Beautyberry	SH	2	5 ft	Planted	2
Elderberry	SH	1	2 ft	Planted	1
Elderberry	SH	1	3 ft	Planted	1
Elderberry	SH	3	4 ft	Planted	3
Elderberry	SH	5	5 ft	Planted	5
Elderberry	SH	5	6 ft	Planted	5
Elderberry	SH	2	7 ft	Planted	2
Elderberry	SH	1	8 ft	Planted	1
Wax Myrtle	SH	3	2 ft	Planted	3
Wax Myrtle	SH	2	4 ft	Planted	2
Wax Myrtle	SH	1	1 ft	Planted	1
Wax Myrtle	SH	1	1 ft	Planted	1
Willow Oak	SA	1	7 ft	Planted	1
Green Ash	SA	2	2 ft	Volunteer	2
Green Ash	SA	3	3 ft	Volunteer	3
Green Ash	SA	1	4 ft	Planted	1
Green Ash	SA	1	7 ft	Planted	1
Red Bay	SA	2	1 ft	Planted	2
Red Bay	SA	1	2 ft	Planted	1
Red Bay	SA	1	3 ft	Planted	1
Overcup Oak	SA	1	5 ft	Planted	1
Overcup Oak	SA	1	6 ft	Planted	1
Overcup Oak	SA	2	7 ft	Planted	2
Overcup Oak	SA	3	8 ft	Planted	3
Persimmon	SA	1	1 ft	Planted	1

Persimmon	SA	4	2 ft	Planted	4
Persimmon	SA	1	3 ft	Planted	1
River Birtch	SA	6	4 ft	Planted	6
River Birtch	SA	2	5 ft	Planted	2
Black Cherry	SA	2	5 ft	Volunteer	2
Black Cherry	SA	1	7 ft	Volunteer	1
Black Cherry	SA	1	8 ft	Volunteer	1
Loblolly Pine	SA	27	1 ft - 8 ft	Volunteer	27
Sweetbay	SA	4	1 ft	Volunteer	4
Red Maple	SA	1	5 ft	Volunteer	0
Sweetgum	SA	65	4 ft - 8 ft	Volunteer	0
Baccharis	SH	2	4 ft	Volunteer	2
Baccharis	SH	3	3 ft	Volunteer	3
Baccharis	SH	1	1 ft	Volunteer	1
Baccharis	SH	2	2 ft	Volunteer	2
	TOTAL SHRUBS	48		OBSERVED DENSITY (PER PLOT)	116
	TOTAL TREES OF PLANTED SPECIES	28		OBSERVED DENSITY (PER ACRE)	1160
	TOTAL TREES OF VOLUNTEER SPECIES	106			
	TOTAL INDIVIDUALS	182			

**HOWARD FARM RIPARIAN BUFFER SITE
ANNUAL MONITORING DATA SHEET - VEGETATION PLOTS**

PLOT NUMBER 4

SPECIES	STRATUM	Number of Individuals	HEIGHT	Planted vs. Volunteer Species	Number of Individuals Counted toward Success Criteria
Willow Oak	SA	2	5 ft	Planted	2
Willow Oak	SA	3	6 ft	Planted	3
Willow Oak	SA	1	7 ft	Planted	1
Willow Oak	SA	1	8 ft	Planted	1
Willow Oak	SA	1	14 ft	Planted	1
River Birch	SA	1	3 ft	Volunteer	1
River Birch	SA	1	4 ft	Planted	1
River Birch	SA	2	5 ft	Planted	2
River Birch	SA	5	6 ft	Planted	5
River Birch	SA	2	7 ft	Planted	2
River Birch	SA	5	8 ft	Planted	5
River Birch	SA	1	9 ft	Planted	1
River Birch	SA	1	10 ft	Planted	1
River Birch	SA	1	12 ft	Planted	1
Overcup Oak	SA	2	7 ft	Planted	2
Overcup Oak	SA	3	8 ft	Planted	3
Overcup Oak	SA	2	10 ft	Planted	2
American Sycamore	SA	1	14 ft	Planted	1
Green Ash	SA	1	2 ft	Volunteer	1
Green Ash	SA	2	3 ft	Volunteer	2
Green Ash	SA	1	4 ft	Planted	1
Green Ash	SA	1	5 ft	Planted	1
Wax Myrtle	SH	1	2 ft	Planted	1
Wax Myrtle	SH	8	3 ft	Planted	8
Wax Myrtle	SH	5	4 ft	Planted	5
Wax Myrtle	SH	5	5 ft	Planted	5
Wax Myrtle	SH	1	6 ft	Planted	1
Wax Myrtle	SH	1	8 ft	Planted	1
Baccharis	SH	1	4 ft	Volunteer	1
Baccharis	SH	1	5 ft	Volunteer	1
Baccharis	SH	5	6 ft	Volunteer	5

Baccharis	SH	4	7 ft	Volunteer	4
Baccharis	SH	2	8 ft	Volunteer	2
Sweetbay	SA	9	3 ft	Volunteer	9
Sweet Gum	SA	22	1 ft - 7 ft	Volunteer	0
Loblolly Pine	SA	6	5 ft	Volunteer	6
Red Maple	SA	5	3 ft	Volunteer	0
	TOTAL SHRUBS	30		OBSERVED DENSITY (PER PLOT)	89
	TOTAL TREES OF PLANTED SPECIES	36		OBSERVED DENSITY (PER ACRE)	890
	TOTAL TREES OF VOLUNTEER SPECIES	46			
	TOTAL INDIVIDUALS	112			

**HOWARD FARM RIPARIAN BUFFER SITE
ANNUAL MONITORING DATA SHEET - VEGETATION PLOTS**

PLOT NUMBER

5

SPECIES	STRATUM	Number of Individuals	HEIGHT	Planted vs. Volunteer Species	Number of Individuals Counted toward Success Criteria
	(T, SA, or SH)				
Elderberry	SH	1	2 ft	Planted	1
Elderberry	SH	1	4 ft	Planted	1
River Birch	SA	2	3 ft	Volunteer	2
River Birch	SA	4	5 ft	Planted	4
River Birch	SA	1	6 ft	Planted	1
River Birch	SA	3	7 ft	Planted	3
River Birch	SA	3	8 ft	Planted	3
River Birch	SA	1	9 ft	Planted	1
River Birch	SA	2	12 ft	Planted	2
River Birch	SA	1	14 ft	Planted	1
Overcup Oak	SA	2	3 ft	Planted	2
Overcup Oak	SA	2	4 ft	Planted	2
Overcup Oak	SA	5	6 ft	Planted	5
Overcup Oak	SA	4	7 ft	Planted	4
Overcup Oak	SA	1	9 ft	Planted	1
Overcup Oak	SA	1	10 ft	Planted	1
Green Ash	SA	3	2 ft	Volunteer	3
Green Ash	SA	3	3 ft	Volunteer	3
Green Ash	SA	3	5 ft	Planted	3
Green Ash	SA	1	6 ft	Planted	1
Green Ash	SA	1	7 ft	Planted	1
Green Ash	SA	2	8 ft	Planted	2
Green Ash	SA	1	9 ft	Planted	1
Willow Oak	SA	1	3 ft	Planted	1
Willow Oak	SA	1	4 ft	Planted	1
Willow Oak	SA	1	5 ft	Planted	1
Willow Oak	SA	1	6 ft	Planted	1
Willow Oak	SA	1	7 ft	Planted	1
Willow Oak	SA	1	10 ft	Planted	1
American Sycamore	SA	8	15 ft	Planted	8
Wax Myrtle	SH	7	3 ft	Planted	7

Wax Myrtle	SH	3	4 ft	Planted	3
Wax Myrtle	SH	2	5 ft	Planted	2
Wax Myrtle	SH	1	6 ft	Planted	1
Wax Myrtle	SH	1	7 ft	Planted	1
Red Bay	SA	3	1 ft	Volunteer	3
Red Bay	SA	3	2 ft	Volunteer	3
Red Bay	SA	3	4 ft	Volunteer	3
Red Bay	SA	1	5 ft	Volunteer	1
Red Bay	SA	1	6 ft	Volunteer	1
Loblolly Pine	SA	13	5 ft	Volunteer	13
Baccharis	SH	2	4 ft	Volunteer	2
Baccharis	SH	7	5 ft	Volunteer	7
Baccharis	SH	14	6 ft	Volunteer	14
Baccharis	SH	7	7 ft	Volunteer	7
Baccharis	SH	1	8 ft	Volunteer	1
	TOTAL SHRUBS	47		OBSERVED DENSITY (PER PLOT)	131
	TOTAL TREES OF PLANTED SPECIES	52		OBSERVED DENSITY (PER ACRE)	1310
	TOTAL TREES OF VOLUNTEER SPECIES	32			
	TOTAL INDIVIDUALS	131			

**HOWARD FARM RIPARIAN BUFFER SITE
ANNUAL MONITORING DATA SHEET - VEGETATION PLOTS**

PLOT NUMBER 6

SPECIES	STRATUM	Number of Individuals	HEIGHT	Planted vs. Volunteer Species	Number of Individuals Counted toward Success Criteria
	(T, SA, or SH)				
Amer. Beautyberry	SH	3	6 ft	Planted	3
Amer. Beautyberry	SH	5	7 ft	Planted	5
Amer. Beautyberry	SH	1	9 ft	Planted	1
Sweet Pepperbush	SH	1	3 ft	Planted	1
Elderberry	SH	1	4 ft	Planted	1
Elderberry	SH	5	5 ft	Planted	5
Elderberry	SH	3	6 ft	Planted	3
Elderberry	SH	2	8 ft	Planted	2
Elderberry	SH	1	9 ft	Planted	1
River Birch	SA	2	5 ft	Planted	2
River Birch	SA	2	6 ft	Planted	2
River Birch	SA	1	8 ft	Planted	1
River Birch	SA	1	10 ft	Planted	1
River Birch	SA	2	12 ft	Planted	2
River Birch	SA	1	14 ft	Planted	1
Green Ash	SA	2	3 ft	Volunteer	2
Green Ash	SA	2	5 ft	Planted	2
Green Ash	SA	3	6 ft	Planted	3
Green Ash	SA	2	7 ft	Planted	2
Green Ash	SA	1	8 ft	Planted	1
Green Ash	SA	2	10 ft	Planted	2
Green Ash	SA	1	12 ft	Planted	1
Willow Oak	SA	1	3 ft	Planted	1
Willow Oak	SA	1	5 ft	Planted	1
Willow Oak	SA	1	6 ft	Planted	1
Willow Oak	SA	2	7 ft	Planted	2
Willow Oak	SA	2	10 ft	Planted	2
Red Cedar	SA	1	5 ft	Planted	1
Red Cedar	SA	2	6 ft	Planted	2
Red Cedar	SA	4	7 ft	Planted	4
Red Cedar	SA	1	8 ft	Planted	1
Loblolly Pine	SA	1	3 ft	Planted	1
Loblolly Pine	SA	1	4 ft	Planted	1

Loblolly Pine	SA	2	5 ft	Planted	2
Loblolly Pine	SA	1	7 ft	Planted	1
Loblolly Pine	SA	2	8 ft	Planted	2
Overcup Oak	SA	1	7 ft	Planted	1
Overcup Oak	SA	1	8 ft	Planted	1
Overcup Oak	SA	1	10 ft	Planted	1
Overcup Oak	SA	2	13 ft	Planted	2
Overcup Oak	SA	1	15 ft	Planted	1
Wax Myrtle	SH	1	2 ft	Planted	1
Wax Myrtle	SH	4	3 ft	Planted	4
Wax Myrtle	SH	2	4 ft	Planted	2
Wax Myrtle	SH	7	5 ft	Planted	7
Wax Myrtle	SH	3	6 ft	Planted	3
Wax Myrtle	SH	2	7 ft	Planted	2
Wax Myrtle	SH	1	8 ft	Planted	1
Wax Myrtle	SH	1	9 ft	Planted	1
Wax Myrtle	SH	2	10 ft	Planted	2
Wax Myrtle	SH	1	12 ft	Planted	1
Baccharis	SH	1	5 ft	Volunteer	1
Baccharis	SH	1	7 ft	Volunteer	1
Baccharis	SH	5	8 ft	Volunteer	5
Baccharis	SH	1	10 ft	Volunteer	1
Baccharis	SH	1	12 ft	Volunteer	1
Tulip Poplar	SA	1	5 ft	Volunteer	1
Red Maple	SA	40	10 ft	Volunteer	0
Sweet Gum	SA	80	10 ft	Volunteer	0
	TOTAL SHRUBS	55		OBSERVED DENSITY (PER PLOT)	106
	TOTAL TREES OF PLANTED SPECIES	48		OBSERVED DENSITY (PER ACRE)	1060
	TOTAL TREES OF VOLUNTEER SPECIES	123			
	TOTAL INDIVIDUALS	226			

**HOWARD FARM RIPARIAN BUFFER SITE
ANNUAL MONITORING DATA SHEET - VEGETATION PLOTS**

PLOT NUMBER

7

SPECIES	STRATUM	Number of Individuals	HEIGHT	Planted vs. Volunteer Species	Number of Individuals Counted toward Success Criteria
	(T, SA, or SH)				
Amer. Beautyberry	SH	3	3 ft	Planted	3
Amer. Beautyberry	SH	3	4 ft	Planted	3
Amer. Beautyberry	SH	4	5 ft	Planted	4
Amer. Beautyberry	SH	5	6 ft	Planted	5
Amer. Beautyberry	SH	2	8 ft	Planted	2
Sweet Pepperbush	SH	1	3 ft	Planted	1
Elderberry	SH	1	5 ft	Planted	1
Elderberry	SH	8	6 ft	Planted	8
River Birch	SA	1	6 ft	Planted	1
River Birch	SA	1	8 ft	Planted	1
River Birch	SA	1	14 ft	Planted	1
River Birch	SA	5	16 ft	Planted	5
Green Ash	SA	1	1 ft	Volunteer	1
Green Ash	SA	1	2 ft	Volunteer	1
Green Ash	SA	3	3 ft	Volunteer	3
Green Ash	SA	8	4 ft	Planted	8
Green Ash	SA	4	5 ft	Planted	4
Green Ash	SA	3	6 ft	Planted	3
Green Ash	SA	5	7 ft	Planted	5
Green Ash	SA	2	8 ft	Planted	2
Green Ash	SA	2	10 ft	Planted	2
Green Ash	SA	1	12 ft	Planted	1
Red Cedar	SA	1	5 ft	Volunteer	1
Red Cedar	SA	5	6 ft	Volunteer	5
Red Cedar	SA	1	7 ft	Volunteer	1
Tulip Poplar	SA	1	3 ft	Volunteer	1
Tulip Poplar	SA	2	15 ft	Volunteer	2
Wax Myrtle	SH	1	3 ft	Planted	1
Wax Myrtle	SH	1	4 ft	Planted	1

Wax Myrtle	SH	4	5 ft	Planted	4
Wax Myrtle	SH	5	6 ft	Planted	5
Wax Myrtle	SH	2	7 ft	Planted	2
Wax Myrtle	SH	6	8 ft	Planted	6
Wax Myrtle	SH	6	10 ft	Planted	6
Wax Myrtle	SH	6	12 ft	Planted	6
Wax Myrtle	SH	1	14 ft	Planted	1
Baccharis	SH	1	10 ft	Volunteer	1
Baccharis	SH	3	12 ft	Volunteer	3
Sweet Gum	SA	150	10 ft	Volunteer	0
Red Maple	SA	40	3 ft	Volunteer	0
Red Maple	SA	20	8 ft	Volunteer	0
	TOTAL SHRUBS	63		OBSERVED DENSITY (PER PLOT)	111
	TOTAL TREES OF PLANTED SPECIES	33		OBSERVED DENSITY (PER ACRE)	1110
	TOTAL TREES OF VOLUNTEER SPECIES	224			
	TOTAL INDIVIDUALS	320			

**HOWARD FARM RIPARIAN BUFFER SITE
ANNUAL MONITORING DATA SHEET - VEGETATION PLOTS**

PLOT NUMBER 8

SPECIES	STRATUM	Number of Individuals	HEIGHT	Planted vs. Volunteer Species	Number of Individuals Counted toward Success Criteria
	(T, SA, or SH)				
Elderberry	SH	4	5 ft	Planted	4
Elderberry	SH	2	6 ft	Planted	2
Elderberry	SH	1	7 ft	Planted	1
Elderberry	SH	1	10 ft	Planted	1
Wax Myrtle	SH	3	2 ft	Planted	3
Wax Myrtle	SH	1	3 ft	Planted	1
Wax Myrtle	SH	1	4 ft	Planted	1
Wax Myrtle	SH	1	5 ft	Planted	1
Wax Myrtle	SH	1	6 ft	Planted	1
Wax Myrtle	SH	1	7 ft	Planted	1
Persimmon	SA	1	5 ft	Planted	1
Persimmon	SA	1	7 ft	Planted	1
Persimmon	SA	1	8 ft	Planted	1
Green Ash	SA	2	2 ft	Volunteer	2
Green Ash	SA	1	3 ft	Volunteer	1
Green Ash	SA	2	4 ft	Planted	2
Green Ash	SA	2	5 ft	Planted	2
Green Ash	SA	1	6 ft	Planted	1
Black Gum	SA	1	4 ft	Planted	1
Black Gum	SA	1	12 ft	Planted	1
River Birch	SA	1	4 ft	Planted	1
River Birch	SA	1	6 ft	Planted	1
River Birch	SA	1	8 ft	Planted	1
River Birch	SA	1	12 ft	Planted	1
River Birch	SA	1	16 ft	Planted	1
Black Willow	SA	2	1 ft	Volunteer	2
Black Willow	SA	1	3 ft	Volunteer	1
Black Willow	SA	2	4 ft	Planted	2
Black Willow	SA	1	5 ft	Planted	1
Black Willow	SA	1	6 ft	Planted	1
Black Willow	SA	1	7 ft	Planted	1
Black Willow	SA	3	8 ft	Planted	3
Black Willow	SA	1	9 ft	Planted	1

Black Willow	SA	1	12 ft	Planted	1
Black Willow	SA	2	15 ft	Planted	2
American Sycamore	SA	1	12 ft	Planted	1
American Sycamore	SA	1	14 ft	Planted	1
American Sycamore	SA	5	15 ft	Planted	5
American Sycamore	SA	8	16 ft	Planted	8
American Sycamore	SA	2	18 ft	Planted	2
American Sycamore	T	10	20+ ft	Planted	10
Baccharis	SH	1	2 ft	Volunteer	1
Baccharis	SH	2	5 ft	Volunteer	2
Baccharis	SH	4	6 ft	Volunteer	4
Baccharis	SH	2	7 ft	Volunteer	2
Baccharis	SH	2	8 ft	Volunteer	2
Baccharis	SH	2	9 ft	Volunteer	2
Loblolly Pine	SA	4	5 ft	Volunteer	4
Red Maple	SA	5	4 ft	Volunteer	0
Sweetgum	SA	21	10 ft	Volunteer	0
	TOTAL SHRUBS	29		OBSERVED DENSITY (PER PLOT)	93
	TOTAL TREES OF PLANTED SPECIES	54		OBSERVED DENSITY (PER ACRE)	930
	TOTAL TREES OF VOLUNTEER SPECIES	36			
	TOTAL INDIVIDUALS	119			

**HOWARD FARM RIPARIAN BUFFER SITE
ANNUAL MONITORING DATA SHEET - VEGETATION PLOTS**

PLOT NUMBER 9

SPECIES	STRATUM	Number of Individuals	HEIGHT	Planted vs. Volunteer Species	Number of Individuals Counted toward Success Criteria
	(T, SA, or SH)				
American Beautyberry	SH	1	1 ft	Planted	1
American Beautyberry	SH	1	2 ft	Planted	1
American Beautyberry	SH	1	3 ft	Planted	1
American Beautyberry	SH	2	4 ft	Planted	2
Elderberry	SH	6	6 ft	Planted	6
Elderberry	SH	2	8 ft	Planted	2
Elderberry	SH	1	10 ft	Planted	1
American Sycamore	SA	1	4 ft	Planted	1
American Sycamore	SA	1	12 ft	Planted	1
American Sycamore	SA	7	15 ft	Planted	7
American Sycamore	SA	1	18 ft	Planted	1
American Sycamore	T	41	20+ ft	Planted	41
Green Ash	SA	3	2 ft	Volunteer	3
Green Ash	SA	1	5 ft	Planted	1
Green Ash	SA	1	6 ft	Planted	1
Black willow	SA	1	6 ft	Planted	1
Black willow	SA	1	7 ft	Planted	1
Black willow	SA	4	8 ft	Planted	4
Black willow	SA	1	10 ft	Planted	1
Black willow	SA	1	12 ft	Planted	1
Black willow	SA	1	14 ft	Planted	1
River Birch	SA	1	6 ft	Planted	1
River Birch	SA	1	7 ft	Planted	1
River Birch	SA	1	12 ft	Planted	1
River Birch	SA	1	14 ft	Planted	1
River Birch	SA	4	15 ft	Planted	4
River Birch	T	4	20+ ft	Planted	4
Persimmon	SH	1	4 ft	Planted	1
Persimmon	SH	3	5 ft	Planted	3

Persimmon	SH	3	6 ft	Planted	3
Persimmon	SH	2	7 ft	Planted	2
Persimmon	SH	4	8 ft	Planted	4
Persimmon	SH	3	10 ft	Planted	3
Persimmon	SH	2	14 ft	Planted	2
Persimmon	SH	1	15 ft	Planted	1
Loblolly Pine	SA	3	6 ft	Volunteer	3
Tulip Poplar	SA	1	3 ft	Volunteer	1
Sweetgum	SA	41	5 ft - 8 ft	Volunteer	0
Baccharis	SH	1	7 ft	Volunteer	1
	TOTAL SHRUBS	79		OBSERVED DENSITY (PER PLOT)	115
	TOTAL TREES OF PLANTED SPECIES	74		OBSERVED DENSITY (PER ACRE)	1150
	TOTAL TREES OF VOLUNTEER SPECIES	48			
	TOTAL INDIVIDUALS	201			

**HOWARD FARM RIPARIAN BUFFER SITE
ANNUAL MONITORING DATA SHEET - VEGETATION PLOTS**

PLOT NUMBER 10

SPECIES	STRATUM	Number of Individuals	HEIGHT	Planted vs. Volunteer Species	Number of Individuals Counted toward Success Criteria
	(T, SA, or SH)				
Elderberry	SH	4	4 ft	Planted	4
Elderberry	SH	6	5 ft	Planted	6
Elderberry	SH	10	6 ft	Planted	10
Elderberry	SH	2	7 ft	Planted	2
Elderberry	SH	1	8 ft	Planted	1
Wax Myrtle	SH	1	3 ft	Planted	1
Wax Myrtle	SH	7	4 ft	Planted	7
Wax Myrtle	SH	6	5 ft	Planted	6
Wax Myrtle	SH	12	6 ft	Planted	12
Wax Myrtle	SH	2	7 ft	Planted	2
Wax Myrtle	SH	1	8 ft	Planted	1
Wax Myrtle	SH	3	10 ft	Planted	3
Wax Myrtle	SH	3	12 ft	Planted	3
Amer. Beautyberry	SH	3	3 ft	Planted	3
Amer. Beautyberry	SH	10	4 ft	Planted	10
Amer. Beautyberry	SH	4	5 ft	Planted	4
Amer. Beautyberry	SH	2	6 ft	Planted	2
Persimmon	SA	1	7 ft	Planted	1
Persimmon	SA	7	8 ft	Planted	7
Persimmon	SA	5	10 ft	Planted	5
Persimmon	SA	4	12 ft	Planted	4
Green Ash	SA	1	3 ft	Volunteer	1
Green Ash	SA	2	5 ft	Planted	2
Green Ash	SA	1	7 ft	Planted	1
Green Ash	SA	1	8 ft	Planted	1
Green Ash	SA	1	10 ft	Planted	1
Willow Oak	SA	1	4 ft	Planted	1
River Birch	SA	2	8 ft	Planted	2
River Birch	SA	2	12 ft	Planted	2

River Birch	SA	2	14 ft	Planted	2
Black Willow	SA	5	5 ft	Planted	5
Black Willow	SA	1	6 ft	Planted	1
Black Willow	SA	1	7 ft	Planted	1
Black Willow	SA	10	8 ft	Planted	10
Black Willow	SA	6	10 ft	Planted	6
Loblolly Pine	SA	6	4 ft - 7 ft	Volunteer	6
Loblolly Pine	SA	8	8 ft - 12 ft	Volunteer	8
Baccharis	SH	1	2 ft	Volunteer	1
Baccharis	SH	1	5 ft	Volunteer	1
Baccharis	SH	3	6 ft	Volunteer	3
Baccharis	SH	7	7 ft	Volunteer	7
Baccharis	SH	7	8 ft	Volunteer	7
Baccharis	SH	1	10 ft	Volunteer	1
Baccharis	SH	1	12 ft	Volunteer	1
Sweetgum	SA	20	12 ft	Volunteer	0
Sweetgum	SA	35	6 ft - 8 ft	Volunteer	0
	TOTAL SHRUBS	98		OBSERVED DENSITY (PER PLOT)	165
	TOTAL TREES OF PLANTED SPECIES	52		OBSERVED DENSITY (PER ACRE)	1650
	TOTAL TREES OF VOLUNTEER SPECIES	70			
	TOTAL INDIVIDUALS	220			

**HOWARD FARM RIPARIAN BUFFER SITE
ANNUAL MONITORING DATA SHEET - VEGETATION PLOTS**

PLOT NUMBER 11

SPECIES	STRATUM	Number of Individuals	HEIGHT	Planted vs. Volunteer Species	Number of Individuals Counted toward Success Criteria
	(T, SA, or SH)				
Elderberry	SH	1	8 ft	Planted	1
Elderberry	SH	1	15 ft	Planted	1
Persimmon	SA	1	2 ft	Planted	1
Persimmon	SA	2	3 ft	Planted	2
Persimmon	SA	4	4 ft	Planted	4
Persimmon	SA	3	6 ft	Planted	3
Persimmon	SA	1	12 ft	Planted	1
River Birch	SA	2	8 ft	Planted	2
River Birch	SA	3	10 ft	Planted	3
River Birch	SA	6	12 ft	Planted	6
River Birch	SA	15	15 ft	Planted	15
River Birch	SA	2	18 ft	Planted	2
American Sycamore	SA	9	14 ft	Planted	9
American Sycamore	SA	9	16 ft	Planted	9
American Sycamore	SA	33	18 ft	Planted	33
American Sycamore	T	7	20+ ft	Planted	7
Baccharis	SH	2	6 ft	Volunteer	2
Loblolly Pine	SA	3	4 ft	Volunteer	3
Red Maple	SA	2	3 ft	Volunteer	0
Sweetgum	SA	10	11 ft	Volunteer	0
	TOTAL SHRUBS	4		OBSERVED DENSITY (PER PLOT)	104
	TOTAL TREES OF PLANTED SPECIES	97		OBSERVED DENSITY (PER ACRE)	1040
	TOTAL TREES OF VOLUNTEER SPECIES	15			

	TOTAL INDIVIDUALS	116			
--	-------------------	-----	--	--	--

**HOWARD FARM RIPARIAN BUFFER SITE
ANNUAL MONITORING DATA SHEET - VEGETATION PLOTS**

PLOT NUMBER

12

SPECIES	STRATUM	Number of Individuals	HEIGHT	Planted vs. Volunteer Species	Number of Individuals Counted toward Success Criteria
	(T, SA, or SH)				
Amer. Beautyberry	SH	1	1 ft	Planted	1
Amer. Beautyberry	SH	4	3 ft	Planted	4
Amer. Beautyberry	SH	6	4 ft	Planted	6
Amer. Beautyberry	SH	5	5 ft	Planted	5
Elderberry	SH	2	2 ft	Planted	2
Elderberry	SH	2	3 ft	Planted	2
Elderberry	SH	4	4 ft	Planted	4
Elderberry	SH	3	5 ft	Planted	3
Elderberry	SH	1	6 ft	Planted	1
Elderberry	SH	2	7 ft	Planted	2
Wax Myrtle	SH	3	2 ft	Planted	3
Wax Myrtle	SH	9	3 ft	Planted	9
Wax Myrtle	SH	10	4 ft	Planted	10
Wax Myrtle	SH	6	5 ft	Planted	6
Wax Myrtle	SH	9	6 ft	Planted	9
Wax Myrtle	SH	5	7 ft	Planted	5
Wax Myrtle	SH	1	8 ft	Planted	1
Wax Myrtle	SH	1	9 ft	Planted	1
Sweet Pepperbush	SH	1	1 ft	Planted	1
Black Willow	SA	1	8 ft	Planted	1
WillowOak	SA	1	6 ft	Planted	1
American Sycamore	SA	2	15 ft	Planted	2
American Sycamore	SA	1	18 ft	Planted	1
Green Ash	SA	1	2 ft	Volunteer	1
Green Ash	SA	3	3 ft	Volunteer	3
Green Ash	SA	3	4 ft	Planted	3
Green Ash	SA	2	6 ft	Planted	2
Red Cedar	SA	2	4 ft	Volunteer	2
Red Cedar	SA	1	5 ft	Volunteer	1

Red Cedar	SA	5	6 ft	Volunteer	5
Red Cedar	SA	4	7 ft	Volunteer	4
Red Bay	SA	4	6 ft	Volunteer	4
Black Cherry	SA	1	5 ft	Volunteer	1
Baccharis	SH	1	2 ft	Volunteer	1
Baccharis	SH	1	4 ft	Volunteer	1
Baccharis	SH	7	6 ft	Volunteer	7
Baccharis	SH	2	7 ft	Volunteer	2
Baccharis	SH	1	8 ft	Volunteer	1
Baccharis	SH	1	10 ft	Volunteer	1
Sweetgum	SA	9	7 ft	Volunteer	0
Red Maple	SA	3	4 ft	Volunteer	0
Loblolly Pine	SA	14	4 ft - 8 ft	Volunteer	14
	TOTAL SHRUBS	88		OBSERVED DENSITY (PER PLOT)	133
	TOTAL TREES OF PLANTED SPECIES	10		OBSERVED DENSITY (PER ACRE)	1330
	TOTAL TREES OF VOLUNTEER SPECIES	47			
	TOTAL INDIVIDUALS	145			

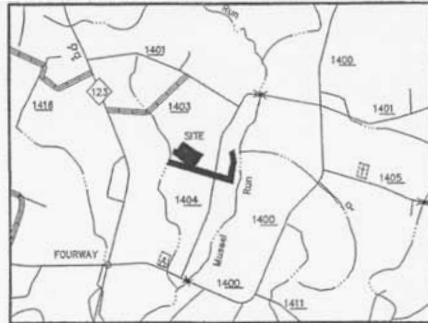
**HOWARD FARM RIPARIAN BUFFER SITE
ANNUAL MONITORING DATA SHEET - VEGETATION PLOTS**

PLOT NUMBER 13

SPECIES	STRATUM	Number of Individuals	HEIGHT	Planted vs. Volunteer Species	Number of Individuals Counted toward Success Criteria
	(T, SA, or SH)				
Wax Myrtle	SH	1	1 ft	Volunteer	1
Wax Myrtle	SH	1	2 ft	Volunteer	1
Wax Myrtle	SH	4	3 ft	Volunteer	4
Wax Myrtle	SH	3	4 ft	Volunteer	3
Elderberry	SH	1	3 ft	Planted	1
Elderberry	SH	2	6 ft	Planted	2
Persimmon	SA	1	3 ft	Planted	1
Persimmon	SA	2	4 ft	Planted	2
Persimmon	SA	2	5 ft	Planted	2
Persimmon	SA	1	6 ft	Planted	1
Green Ash	SA	2	3 ft	Volunteer	2
Green Ash	SA	4	4 ft	Planted	4
Green Ash	SA	2	5 ft	Planted	2
River Birch	SA	1	3 ft	Volunteer	1
River Birch	SA	3	4 ft	Planted	3
River Birch	SA	2	6 ft	Planted	2
River Birch	SA	7	7 ft	Planted	7
River Birch	SA	4	8 ft	Planted	4
River Birch	SA	8	10 ft	Planted	8
River Birch	SA	11	12 ft	Planted	11
River Birch	SA	1	15 ft	Planted	1
American Sycamore	SA	2	8 ft	Planted	2
American Sycamore	SA	4	11 ft	Planted	4
American Sycamore	SA	3	13 ft	Planted	3
American Sycamore	SA	7	15 ft	Planted	7
American Sycamore	SA	5	17 ft	Planted	5
American Sycamore	T	6	20+ ft	Planted	6
Baccharis	SH	1	8 ft	Volunteer	1
Red Maple	SA	2	3 ft	Volunteer	0

Loblolly Pine	SA	4	6 ft	Volunteer	4
Sweetgum	SA	3	5 ft	Volunteer	0
	TOTAL SHRUBS	13		OBSERVED DENSITY (PER PLOT)	95
	TOTAL TREES OF PLANTED SPECIES	75		OBSERVED DENSITY (PER ACRE)	950
	TOTAL TREES OF VOLUNTEER SPECIES	12			
	TOTAL INDIVIDUALS	100			

APPENDIX C. CONSERVATION EASEMENT PLAT
(INCLUDING MONITORING PLOTS)



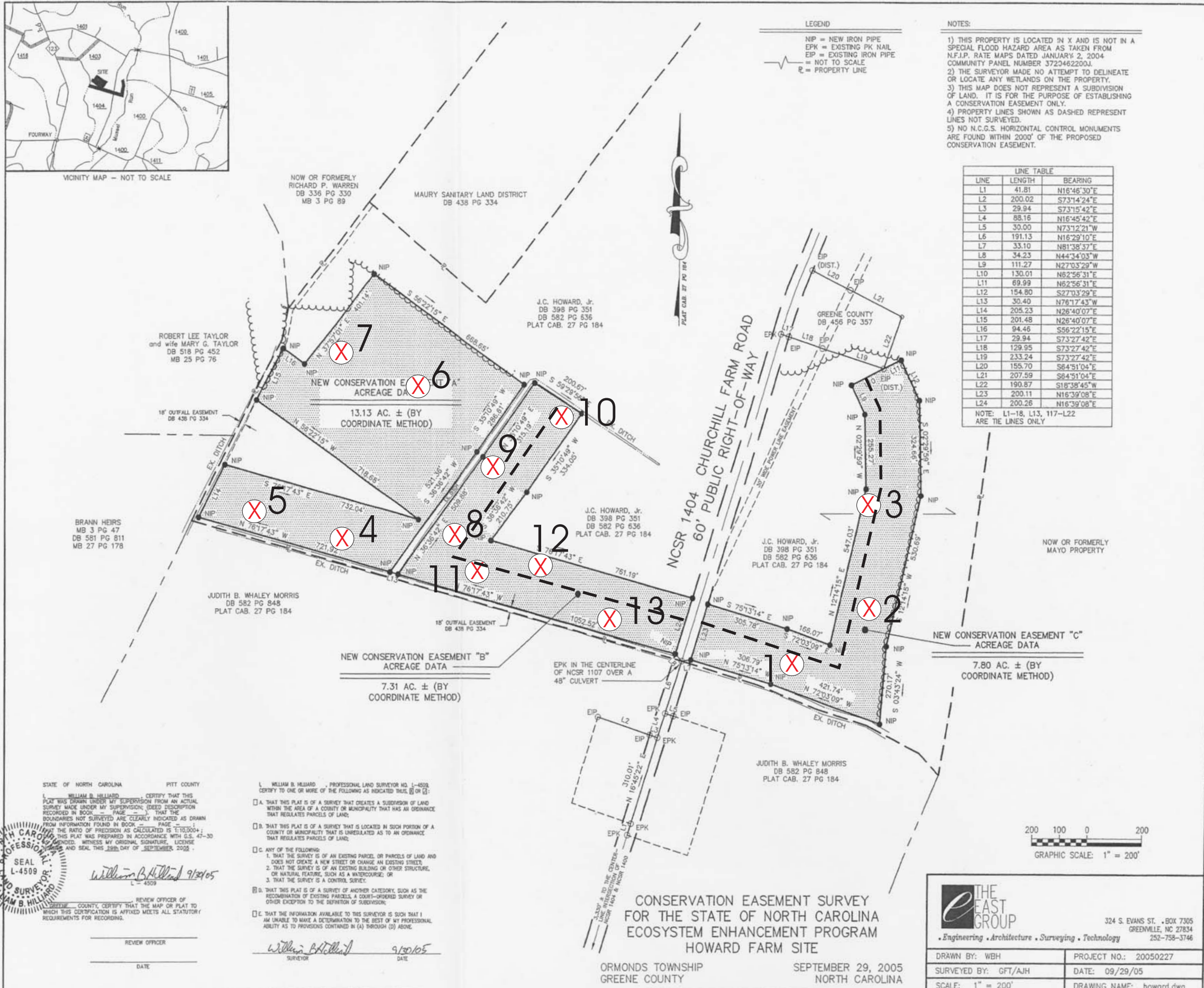
VICINITY MAP - NOT TO SCALE

- LEGEND**
- NIP = NEW IRON PIPE
 - EPK = EXISTING PK NAIL
 - EIP = EXISTING IRON PIPE
 - - - = NOT TO SCALE
 - P = PROPERTY LINE

- NOTES:**
- 1) THIS PROPERTY IS LOCATED IN X AND IS NOT IN A SPECIAL FLOOD HAZARD AREA AS TAKEN FROM N.F.P. RATE MAPS DATED JANUARY 2, 2004 COMMUNITY PANEL NUMBER 3720462200J.
 - 2) THE SURVEYOR MADE NO ATTEMPT TO DELINEATE OR LOCATE ANY WETLANDS ON THE PROPERTY.
 - 3) THIS MAP DOES NOT REPRESENT A SUBDIVISION OF LAND. IT IS FOR THE PURPOSE OF ESTABLISHING A CONSERVATION EASEMENT ONLY.
 - 4) PROPERTY LINES SHOWN AS DASHED REPRESENT LINES NOT SURVEYED.
 - 5) NO N.C.G.S. HORIZONTAL CONTROL MONUMENTS ARE FOUND WITHIN 2000' OF THE PROPOSED CONSERVATION EASEMENT.

LINE	LENGTH	BEARING
L1	41.81	N16°46'30"E
L2	200.02	S73°14'24"E
L3	29.94	S73°15'42"E
L4	88.16	N16°45'42"E
L5	30.00	N73°12'21"W
L6	191.13	N16°29'10"E
L7	33.10	N81°38'57"E
L8	34.23	N44°34'03"W
L9	111.27	N27°03'29"W
L10	130.01	N62°56'31"E
L11	69.99	N62°56'31"E
L12	154.80	S27°03'29"E
L13	30.40	N78°17'43"W
L14	205.23	N26°40'07"E
L15	201.48	N26°40'07"E
L16	94.46	S56°22'15"E
L17	29.94	S73°27'42"E
L18	129.95	S73°27'42"E
L19	233.24	S73°27'42"E
L20	155.70	S64°51'04"E
L21	207.59	S64°51'04"E
L22	190.87	S18°38'45"W
L23	200.11	N16°39'08"E
L24	200.26	N16°39'08"E

NOTE: L1-16, L13, 117-L22 ARE THE LINES ONLY



⊗ Permanent Monitoring Plot			
Plot #	UTM Coordinates	Plot #	UTM Coordinates
1	740025.940563 189523.165945	7	739480.818314 189764.335203
2	740098.689967 189567.014901	8	739637.279362 189603.887887
3	740086.731161 189628.802066	9	739664.309005597 189677.942642213
4	739538.61921 189587.942812	10	739720.991005 189734.438188
5	739586.454435 189726.46565	11	739681.128318 189564.025199
6	739586.454435 189726.46565	12	739645.251899 189634.781469
		13	739820.647723 189570.004602

STATE OF NORTH CAROLINA PITT COUNTY

WILLIAM B. HILLIARD, PROFESSIONAL LAND SURVEYOR NO. 1-4509, CERTIFY TO ONE OR MORE OF THE FOLLOWING AS INDICATED BY (X) OR ():
 A. THAT THIS PLAT IS OF A SURVEY THAT CREATES A SUBDIVISION OF LAND WITHIN THE AREA OF A COUNTY OR MUNICIPALITY THAT HAS AN ORDINANCE THAT REGULATES PARCELS OF LAND;
 B. THAT THIS PLAT IS OF A SURVEY THAT IS LOCATED IN SUCH PORTION OF A COUNTY OR MUNICIPALITY THAT IS UNREGULATED AS TO AN ORDINANCE THAT REGULATES PARCELS OF LAND;
 C. ANY OF THE FOLLOWING:
 1. THAT THE SURVEY IS OF AN EXISTING PARCEL, OR PARCELS OF LAND AND DOES NOT CREATE A NEW STREET OR CHANGE AN EXISTING STREET;
 2. THAT THE SURVEY IS OF AN EXISTING BUILDING OR OTHER STRUCTURE, OR NATURAL FEATURES, SUCH AS A WATERCOURSE; OR
 3. THAT THE SURVEY IS A CONTROL SURVEY;
 D. THAT THIS PLAT IS OF A SURVEY OF ANOTHER CATEGORY, SUCH AS THE RECOMBINATION OF EXISTING PARCELS, A COURT-ORDERED SURVEY OR OTHER EXCEPTION TO THE DEFINITION OF SUBDIVISION;
 E. THAT THE INFORMATION AVAILABLE TO THIS SURVEYOR IS SUCH THAT I AM UNABLE TO MAKE A DETERMINATION TO THE BEST OF MY PROFESSIONAL ABILITY AS TO PROVISIONS CONTAINED IN (A) THROUGH (D) ABOVE.

WILLIAM B. HILLIARD, PROFESSIONAL LAND SURVEYOR, LICENSE NO. 1-4509, SEAL, DATE 9/29/05

REVIEW OFFICER: _____ DATE: _____

CONSERVATION EASEMENT SURVEY
 FOR THE STATE OF NORTH CAROLINA
 ECOSYSTEM ENHANCEMENT PROGRAM
 HOWARD FARM SITE
 ORMONDS TOWNSHIP
 GREENE COUNTY
 SEPTEMBER 29, 2005
 NORTH CAROLINA

THE EAST GROUP
 Engineering • Architecture • Surveying • Technology
 324 S. EVANS ST., BOX 7305
 GREENVILLE, NC 27834
 252-758-3746

DRAWN BY: WBH PROJECT NO.: 20050227
 SURVEYED BY: GFT/AJH DATE: 09/29/05
 SCALE: 1" = 200' DRAWING NAME: howard.dwg