"McCotter/Raines Farm"
Buffer Restoration Project

Jones County, NC
Neuse River Basin
(Cataloging Unit #03020204)

2007 Annual Monitoring Report (Year 5 of 5)
(Task 6)

Contract No. AW03011-3

Prepared For:

North Carolina Department of Environment and Natural Resources
Ecosystem Enhancement Program
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EXECUTIVE SUMMARY

The following report summarizes riparian buffer site conditions through Year 5 of the "McCotter/Raines Farm" Buffer Restoration Project. Under contract with the NC Ecosystem Enhancement Program (EEP), Land Management Group, Inc. (LMG) initiated the restoration of 24.4 acres of riparian buffer habitat in February 2003.

The 24.4-acre riparian buffer restoration area represents a portion of a larger 211-acre tract ("McCotter/Raines Farm") actively farmed for the production of soybean and cotton. Prior to restoration activities, land use practices (including herbicide, pesticide, and fertilizer application) served as potential contributors to decreased water quality of adjacent surface waters within the project area. Application of nitrogen-rich fertilizer represented the most significant non-point source of nitrogen. Woody vegetation adjacent to ditches was either absent or sparse (less than 100 stems per acre that are > 5 inches diameter at breast height). As a result, surface waters were subject to direct run-off from adjacent agricultural fields with little or no nutrient filtration/transformation. The project site is located approximately 5.5 miles northwest of Trenton (refer to Figure 1) in Jones County, NC. The site is bordered to the north by State Route (SR) 1317 and to the south by Beaver Creek (Figure 2). Beaver Creek is a second-order tributary of the Trent River located within sub-basin NEU-11 of the lower Neuse River Basin (USGS Cataloging Unit 03020204).

Based upon Year 5 monitoring results, the buffer restoration area is progressing well toward an established vegetative community of characteristic tree and shrub species. Given recruitment of various volunteer species and the continued growth of planted species, the average stem density across the site is 1,313 stems/acre (this density excludes red maple, sweet gum, and privet stems). Of the total stems enumerated within the monitoring plots, 1,576 stems were counted toward the success criteria. By comparison, a total of 1,835 stems (excluding red maple, sweet gum, and privet) were identified during Year 4 monitoring (corresponding to 1,529 stems/acre).

The following report summarizes the restoration project and includes more specific information related to site progress through Year 5 monitoring. The report also summarizes all of the previous data in preparation for final project approval from the NC EEP.

I. PROJECT SUMMARY

1. Location and Setting

The following report summarizes riparian buffer site conditions through Year 5 of the "McCotter/Raines Farm" buffer restoration project. Under contract with the NC Ecosystem Enhancement Program (EEP), Land Management Group, Inc. (LMG) initiated the restoration of 24.4 acres of riparian buffer habitat in February 2003.

The project site is located approximately 5.5 miles northwest of Trenton (refer to Figure 1) in Jones County, NC. The site is bordered to the north by State Route (SR) 1317 and to the south by Beaver Creek (Figure 2). Beaver Creek is a second-order tributary of the Trent River located within sub-basin NEU-11 of the lower Neuse River Basin (USGS Cataloging Unit 03020204).

2. Mitigation Type and Objectives

The restoration project is intended to provide suitable, high-quality riparian buffer restoration as compensatory mitigation for riparian buffer impacts authorized through the North Carolina Division of Water Quality (NC DWQ). 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 restoration project has resulted in the removal of agricultural fields adjacent to Beaver Creek and surface-water ditches contiguous with the creek. In doing so, the restoration project helps to reduce non-point source loading of nitrogen (N) into surface waters while increasing the nutrient removal capacity of the adjacent land. The following monitoring report summarizes conditions related to restoration site development through Year 5.

3. Project History and Background

Please refer to Table 1 for identification of the reporting and milestone history for the McCotter/Raines Farm riparian buffer restoration project.

4. Monitoring Plan View

Locations of vegetation monitoring plots for the McCotter/Raines Farm riparian buffer restoration project are depicted in Figure 3.

II. PROJECT CONDITIONS

A. Vegetation Assessment

1. Pre-Construction Conditions

The 24.4-acre riparian buffer restoration area represents a portion of a larger 211-acre tract ("McCotter/Raines Farm") actively farmed for the production of soybean and cotton. Prior to restoration activities, land use practices (including herbicide, pesticide, and fertilizer application) served as potential contributors to decreased water quality of adjacent surface waters within the project area. Application of nitrogen-rich fertilizer represented the most significant non-point source of nitrogen. Woody vegetation adjacent to ditches was either absent or sparse (less than 100 stems per acre that are > 5 inches diameter at breast height). As a result, surface waters were subject to direct run-off from adjacent agricultural fields with little or no nutrient filtration/transformation.

2. Soils

Drainage features of the site are typically located within slightly lower topographic areas mapped as Muckalee loam (refer to Figure 4). Muckalee loam is a nearly level, poorly drained soil exhibiting moderate permeability and slow surface runoff. Areas adjacent to these drainage features are mapped as Norfolk loamy sand and Autryville loamy fine sand. The Norfolk series consists of well-drained soils occurring near major drainageways of the county. Norfolk soils exhibit moderate permeability with a seasonal high water table occurring at a depth of 4 to 6 feet. Surface runoff is medium. The Autryville series consists of well-drained soils with moderately rapid permeability and slow surface runoff. The high water table typically occurs at a depth of 4 to 6 feet.

3. Restoration Activities

Restoration activities included minor grading and planting within the 24.4-acre project area (refer to Figure 3 for a plan view of restoration activities completed at the site). Areas of higher topographic relief and incised ditch banks were graded to 3:1 slopes to provide more stable areas for planting. Much of the field area was plowed and disked prior to planting to reduce compaction and to enhance microtopography. Removal of drain tiles and installation of check

dams help to promote diffuse flow conditions. Restoration activities have reduced peak discharge rates to promote enhanced nutrient uptake and exchange.

The riparian buffer was planted with characteristic tree species including river birch (*Betula nigra*), American sycamore (*Platanus occidentalis*), southern red oak (*Quercus falcata*), and green ash (*Fraxinus pennsylvanica*). Bare-root seedlings were planted at a density of 600 trees per acre. The outer 50 feet of the proposed buffer areas were planted with characteristic shrub species including wax myrtle (*Myrica cerifera*), American beautyberry (*Callicarpa americana*), elderberry (*Sambucus canadensis*), and winged sumac (*Rhus copallinum*). Shrubs were planted at a density of 1200 plants per acre. The planted species list for the riparian buffer restoration area is detailed in Table 2.

Species were selectively planted in areas corresponding to changes in micro-elevation and soil texture. For instance, white oak (adapted for relatively low moisture requirements) was planted in slightly higher topographic areas. Conversely, river birch and green ash were planted in lower landscape positions and finer soils – conditions suitable for these species' relatively high moisture requirements. These same considerations were used to plant shrub species in appropriate locations within the shrub planting zone. 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 WRP's "Guidelines for Riparian Buffer Restoration" as appropriate species for use in riparian buffer restoration projects.

III. LAND ACQUISITION AND PROTECTION

LMG arranged for the execution of the conservation easement deed to ensure the protection of the riparian buffer restoration area in perpetuity. The easement prohibits any activities (e.g. timbering, farming, building, etc.) that would alter the environmental state of the restoration project. Post-restoration management will be consistent with allowable activities as identified in the Neuse Buffer Rule (15A NCAC 02B.0233). The conservation easement deed was conveyed to the North Carolina Cooperative Extension Service Foundation (NCCESF) on February 28th, 2003.

In addition to the 24.4-acre project area, 10.6 acres of wooded land adjacent to Beaver Creek (located immediately adjacent to the project area) was donated to NCCESF. This additional land was incorporated into the conservation easement and will be protected under the terms and conditions conveyed with the deed. Two 20-ft access easements were also conveyed by the property owner to allow for suitable access to the project site.

IV. METHODOLOGY & SUCCESS CRITERIA

Based upon standard mitigation site monitoring requirements, annual monitoring is conducted at the end of each growing season over a period of five years. Twelve (12) 0.10-acre permanent plots corresponding to a total of 1.2 acres (equivalent to 5% of the restoration area) were established subsequent to site planting. The locations of the monitoring plots are depicted in Figure 3. Monitoring includes the identification and enumeration of individuals (including shrubs and trees, planted or volunteer) occurring within each plot. All tree and shrub species within the plots are identified, flagged, and recorded on field data sheets during each monitoring event. Site planting is to be deemed successful if survivorship of plantings and volunteers of desirable species meets or exceeds a target stem density of 320 trees/shrub per acre at the end of five years. For the purpose of calculating stem density, red maple (*Acer rubrum*) and sweet gum (*Liquidambar styraciflua*) are excluded from the recorded plot density.

Monitoring reports are submitted annually to the NC EEP by December 1 of each year (immediately following the fall monitoring event). These reports include results of vegetative monitoring and photographic documentation of site conditions.

V. MONITORING RESULTS

A total of 2,240 stems (planted and volunteer shrubs/trees) were observed within the twelve 0.10-acre plots. Of the total observed, 1,569 stems (excluding red maple, sweet gum, and privet stems) were counted toward the success criteria (corresponding to 1,308 stems/acre). In Year 4, a total of 1,835 stems (excluding red maple and sweet gum) were identified. Of the species planted,

American sycamore (*Platanus occidentalis*) was the most abundant tree observed within the twelve monitoring plots. It should be noted that while red maple and sweet gum were numerically high, most of these stems were relatively young and did not have a competitive advantage over taller planted species. Refer to Table 3 for a summary of results related to species abundance and target stem densities. Appendix A contains photos of the site taken during the Year 5 monitoring event. In addition, individual plot data sheets are provided in Appendix B.

VI. YEAR 5 PROJECT MONITORING SUMMARY

The results provided in the previous section of this document represent the totals for the final year of monitoring required for this project. Results from Year 1 monitoring demonstrated strong survivorship within 9 of the 12 plots sampled. Although average survivorship (across the entire site) well exceeded 75%, a supplemental planting was conducted in a six (6) acre portion of the project area (Figure 3) that demonstrated exhibited lower density. Approximately 2,400 stems were planted in February 2004 as part of the effort to improve stem densities within this area. The supplemental plantings included a mixture of wax myrtle (*Myrica cerifera*), water oak (*Quercus nigra*), white oak (*Quercus alba*), and sycamore (*Platanus occidentalis*).

Year 2 monitoring identified 1,297 stems of planted and desirable volunteer species (corresponding to an average density of 1,080 stems/acre) throughout the project. Stem counts in Year 3 improved significantly in part due to increases in volunteer recruitment and the supplemental planting. A total of 2,217 stems were counted, of which 1,226 were applied to the overall success criteria. It should be noted that high numerical abundances of red maple and sweet gum did not appear to affect the growth and survivorship of plantings. Given the opportunistic nature of these species, it is common to have high numerical abundances in the early stages of habitat restoration. Planted species continue to maintain a competitive height advantage over the young red maple and sweet gum saplings. Excluding red maple and sweet gum, the observed density in Year 3 across the entire site was 1,022 stems/acre. Year 4 monitoring calculated 1,835 seedlings throughout the twelve (12) plots, corresponding to an average density of 1,529 stems/acre.

At the end of Year 4, a majority of the desirable species such as green ash, tulip poplar, and river birch had grown to heights exceeding 15’ and had begun to develop significant leaf litter which improves soil moisture content and encourages future seedling germination. Leaf litter also

functions as valuable habitat for small reptiles and bird populations. Further development of these conditions was documented during the Year 5 monitoring event.

Although annual plot data totals were bolstered by the recruitment of acceptable volunteers such as black willow and loblolly pine, planted species densities are sufficient to meet the existing success criteria. Totals for all planted species (tulip poplar, green ash, and southern red oak, etc,) averaged 100 stems per plot during Year 5 monitoring.

At the end of the 5-year monitoring period, each of the twelve (12) monitoring plots has exceeded the minimum success criteria of 320 stems/acre. Totals ranged from an average of 790 stems/acre in Plot 8 to 2,210 stems/acre in Plot 5. Given the density of desirable species and robust growth through five years of development, it is anticipated that this area will continue to develop toward a mature riparian buffer community.

VI. CONCLUSION

Restoration activities have demonstrated to be successful at the 24.4-acre project site through the final year of annual monitoring. Stem densities within all twelve monitoring plots well exceed the 320 stem/acre target density for restored buffer habitats. Density of planted and acceptable volunteer species indicates that the site is progressing well toward the target maturity density.

It should be noted that red maple and sweet gum demonstrate relatively high abundances in many of the plots monitored. Stem densities of planted species and desirable volunteer species remain high and are not compromised by the presence of volunteer red maple and sweet gum. Most of the volunteer red maple and sweet gum stems are less than 3 feet in height. As a result, planted trees continue to have a competitive height advantage over the opportunistic species. Also documented during the 2007 monitoring were a small number (6 plants or 0.2% of total tree count) of Chinese privet (*Ligustrum sinense*). No other non-native, invasive species were observed.

Based upon documented densities of planted and acceptable volunteer species, the buffer restoration area has been successfully re-established and, under the protection of the perpetual conservation easement, will continue to develop into a mature riparian buffer community.

Reversion of agricultural land to wooded riparian buffer will continue to decrease non-point source nutrient loading and concurrently increase nutrient filtration/uptake. Establishment of tree and shrub vegetative cover also promotes diffuse flow and increases the N removal capacity of the restored buffer area. By doing so, the proposed project effectively mitigates for authorized loss of riparian buffers within the Neuse River Basin.

TABLES

TABLE 1: REPORTING AND MILESTONE HISTORY

TASK	STATUS	COMMENTS
TASK 1		
Identification of project location	Complete	
Identification of non-point source N	Complete	
Site assessment	Complete	
Site preparation	Complete	
Selection of plant species	Complete	
TASK 2		
Delineation of project mapping	Complete	
Description of existing conditions	Complete	
Identification of sources of N loading	Complete	
TASK 3		
Permanent protection of buffer area	Complete	Recorded in Jones County Courthouse on February 28, 2003
Description of provisions made for long-term protection and management	Complete	Conservation easement deed conveyed to NCCESF
TASK 4		
Development of comprehensive restoration plan	Complete	Approved by NC EEP
Implementation of plan	January 2003	
TASK 5		
Development of monitoring plan	Complete and submitted January 2003	
Implementation of monitoring plan	February 2003	Site planted February 2003
Supplemental planting	February 2004	Supplemental planting on 6 acres
Year 1 Monitoring Report	Submitted December 2003	Approved with supplemental planting contingency
Year 2 Monitoring Report	Submitted December 2004	Approved
Year 3 Monitoring Report	Submitted December 2005	Approved
Year 4 Monitoring Report	December 2006	Approved
Year 5 Monitoring Report	December 2007	

TABLE 2: PLANTED SPECIES[1] – NEUSE RIVER RIPARIAN BUFFER PROJECT, McCOTTER/RAINES FARM

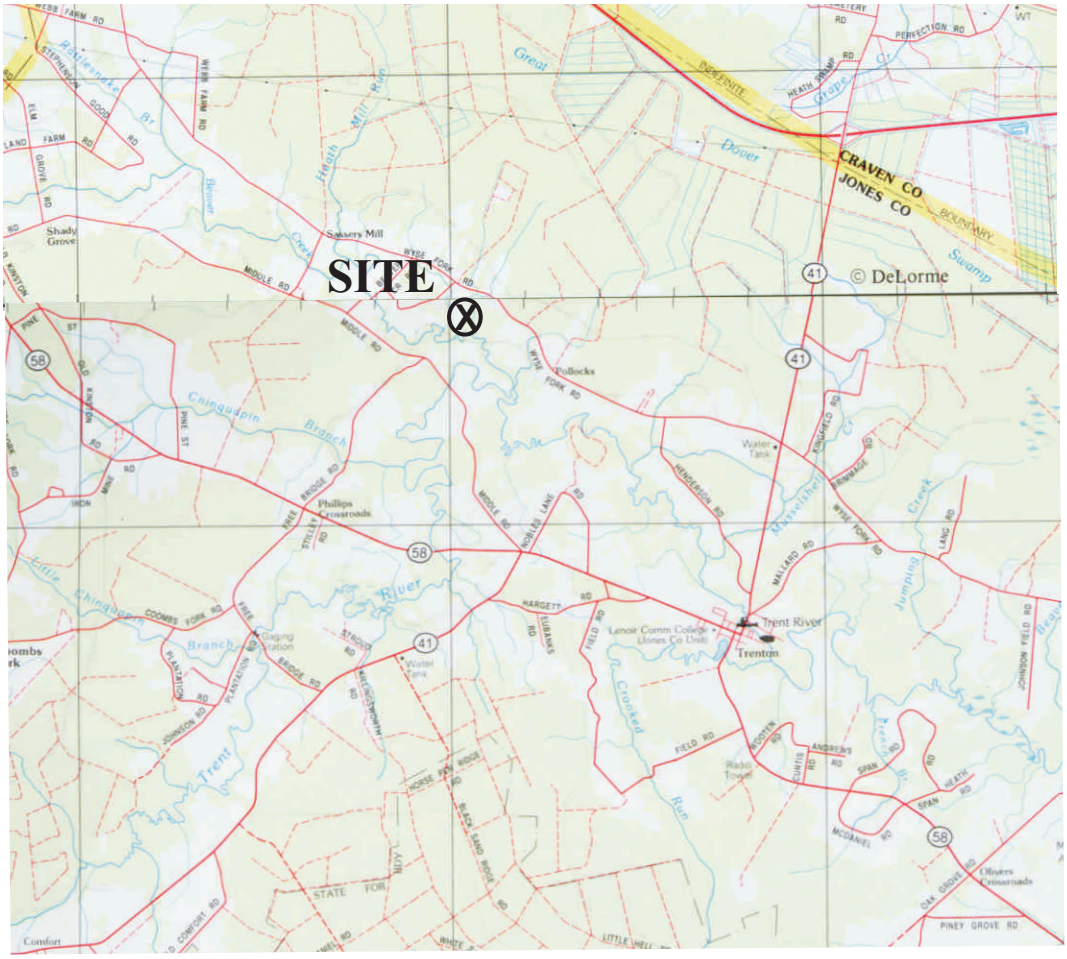
Buffer Zone	Zone 1 –Trees	Zone 2 - Shrubs	TOTAL
Stem Density: Area (acres):	600/acre (18.3)	1200/acre (6.1)	 (24.4)
SPECIES	# planted (% of total)	# planted (% of total)	#planted
River Birch *(*Betula nigra*)*	2800 (25)		2,800
Sycamore (*Platanus occidentalis*)	1,100 (10)		1,100
Southern Red Oak (*Quercus falcata*)	1,500 (13)		3,500
White Oak (*Quercus alba*)	2,500 (23)		2,500
Cherrybark Oak (*Quercus falcata*)	1,500 (13)		1,100
Persimmon (*Diospyros virginiana)*	500 (4)		500
Tulip Poplar (*Liriodendron tulipifera*)	200 (2)		200
Green Ash (*Fraxinus pennsylvanica*)	1,100 (10)		1,100
Wax Myrtle (*Myrica cerifera*)		3,000 (41)	3,000
American Beautyberry *(*Callicarpa Americana*)*		2,424 (33)	2,424
Elderberry (*Sambucus canadensis*)		1,062 (14)	1,062
Winged Sumac (*Rhus copallina*)		850 (12)	850
Possumhaw (*Viburnum nudum*)		14 (0.2)	14
TOTAL TREES/SHRUBS	11,200	7,350	18,550

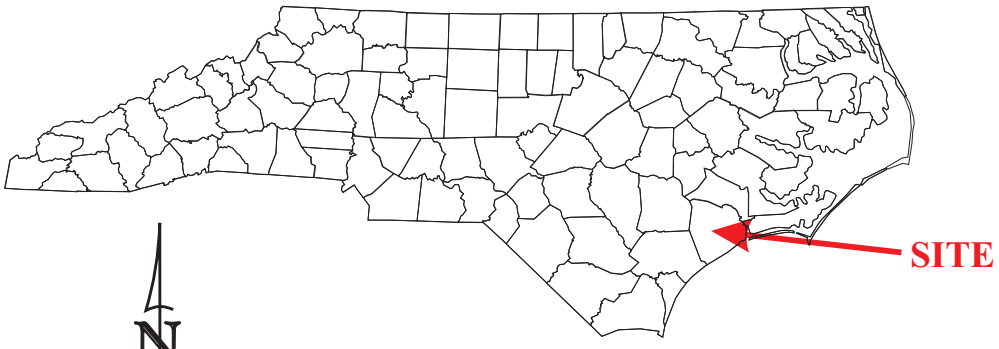
[1]Seedlings planted February 2003.

TABLE 3. ANNUAL MONITORING DATA SHEET (YEAR 5) - VEGETATION PLOTS
NEUSE RIVER RIPARIAN BUFFER SITE (McCOTTER/RAINES FARM)

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	TOTAL
Sycamore	1	29	12	33	94	39	20	29	14	33	11	25	340
Red Maple	29	56		1			57	8		10	2	1	164
Sweet Gum	18	123	154	28	28	75	18		3	2	12	46	507
Southern Red Oak	22	39	11	4		45					6	23	150
Green Ash			31	59	36								126
Wax Myrtle		4	2	4		10	40		21	4	17	45	147
Tulip Poplar		7					29	15		9			60
River Birch	10		11		16	11	16		38	4		2	108
Amer. Beautyberry	15	3						9		17	13	2	59
Persimmon	12	1	21		1	23	9	25		8	8		108
Elderberry													0
Water Oak													0
White Oak										1	27		28
Willow Oak	6			2					5		16		29
Black Willow	30	39						1		5			75
Winged Sumac	4	4								1		17	26
Cherry Bark Oak	5				16	0							21
Chokeberry													0
Baccharis	7		3	8	11						2		31
Loblolly Pine	33	25	11	32	47	42	21		13	11	16	10	261
Possumhaw													0
Chinese Privet													0
American Elm													0
Sweet Pepperbush													0
Eastern Cottonwood													0
Eastern False Willow													0
TOTAL	192	330	256	171	249	245	210	87	94	105	130	171	2240
Total Counted toward Success	145	151	102	142	221	170	135	79	91	93	116	124	1569
Stem Density (per ac)	1450	1510	1020	1420	2210	1700	1350	790	910	930	1160	1240	1308 (avg.)

FIGURES





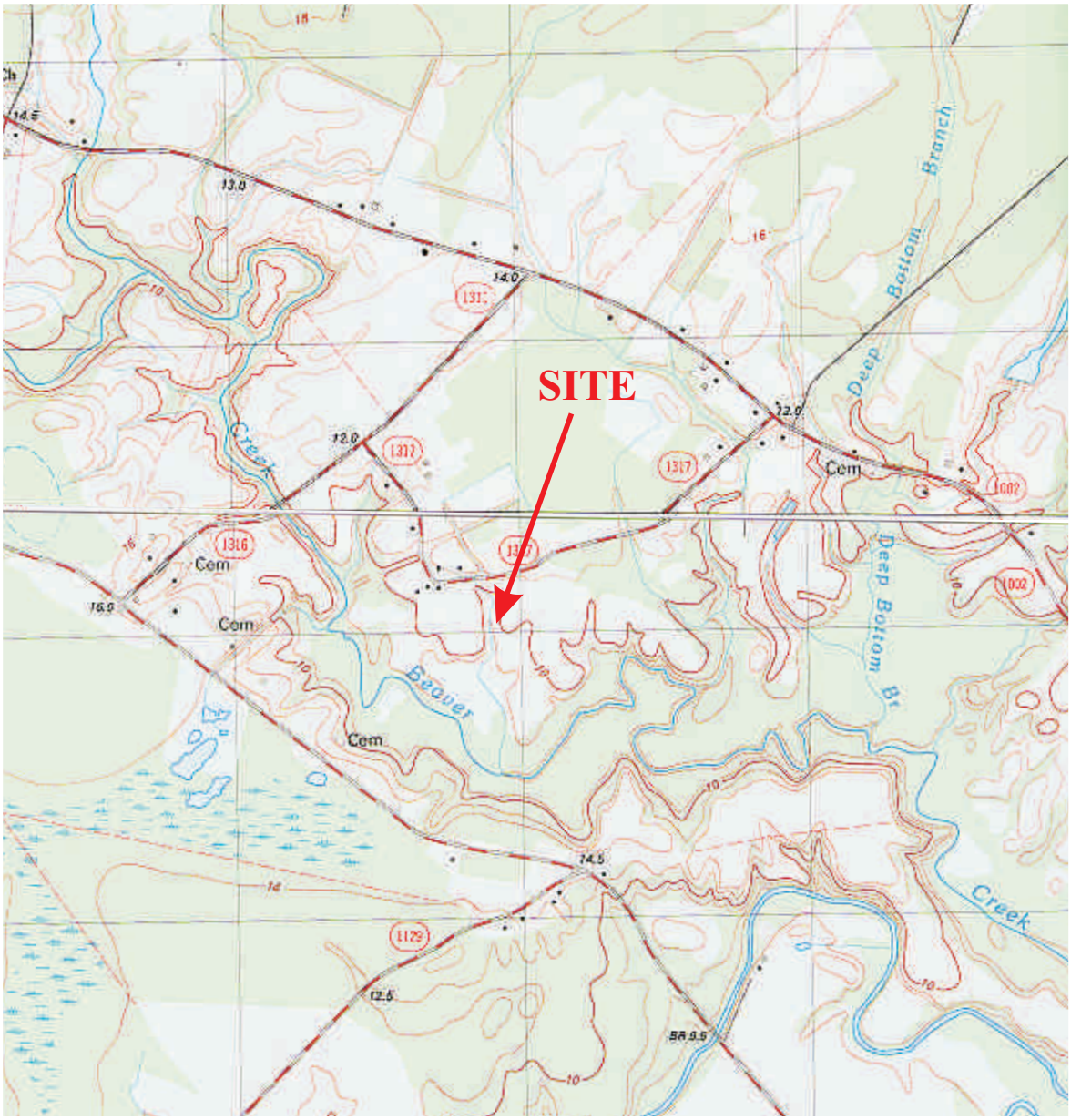
N

SCALE 1″ = 2.4 miles

McCotter/Raines Farm
Neuse River Riparian Buffer
Restoration Project
Jones County, NC

LMG
LAND MANAGEMENT GROUP INC.
Environmental Consultants

Figure 1.
Vicinity Map



N

SCALE 1" = 2000'

McCotter/Raines Farm
Neuse River Riparian Buffer
Restoration Project
Jones County, NC

LMG
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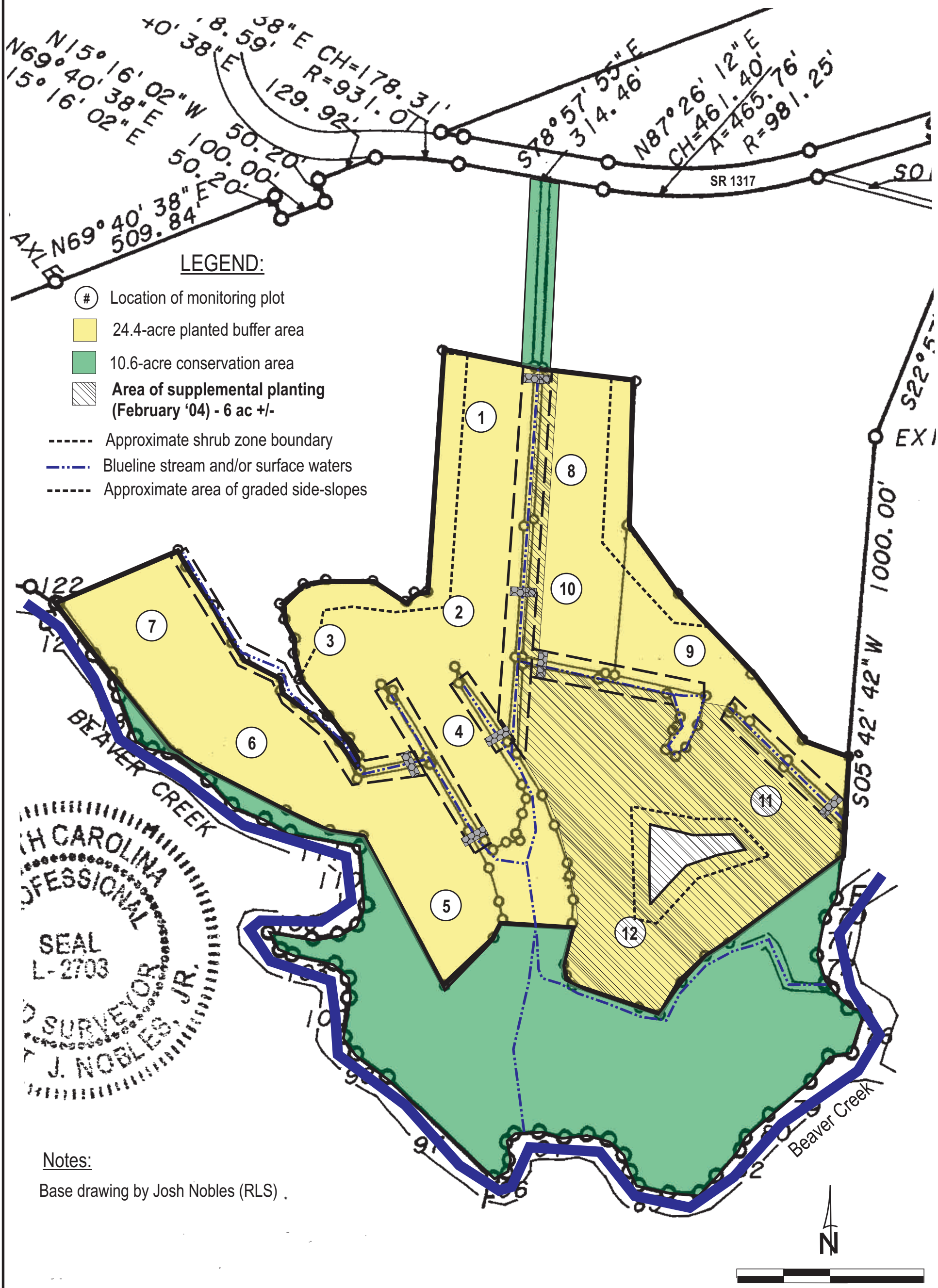
Figure 2.
USGS Topographic Map
Phillips Crossroads Quadrangle

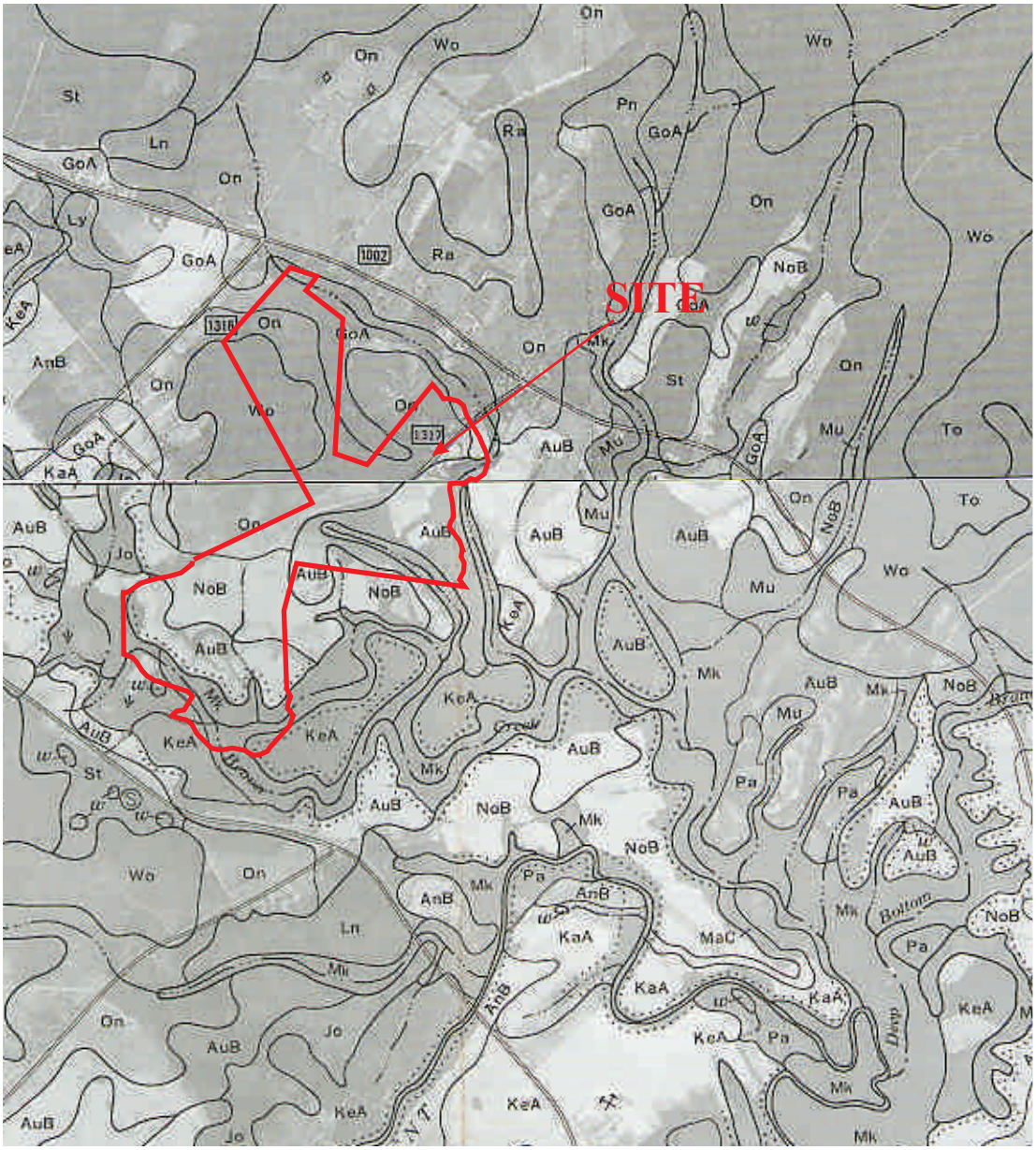


Notes:

Base drawing by Josh Nobles (RLS) .

SCALE 1" = 300'

Neuse River Riparian Buffer Restoration Project Jones County, NC (Contract Number AW03011-3)	LMG LAND MANAGEMENT GROUP INC. Environmental Consultants	Figure 3. Site Plan View & Area of Supplemental Planting McCotter/Raines Farm



Property Boundary

N

SCALE 1" = 2000'

McCotter/Raines Farm
Neuse River Riparian Buffer
Restoration Project
Jones County, NC

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Figure 4.
NRCS Soil Survey
Jones County

APPENDIX A.
Site Photographs - Year 5 Monitoring
September 2007

(1) View of community composition at Plot #2

(2) View of wax myrtle and tulip poplars in southwestern portion of project area

(3) View of river birch saplings at Plot #9

(4) View of large American sycamore at Plot #11

(5) View of buffer vegetation near western boundary (with planted cornfield in background)

(6) View of Plot #3

APPENDIX B.
Plot Data Sheets - Year 5 Monitoring
September 2007

NEUSE RIVER RIPARIAN BUFFER SITE
ANNUAL MONITORING DATA SHEET - VEGETATION PLOTS

PLOT#: 1

SPECIES	STRATUM	Number of Individuals	HEIGHT	Planted vs. Volunteer Species	Number of Individuals Counted toward Success Criteria
Winged Sumac	SH	2	2ft.	Planted	2
Winged Sumac	SH	1	4ft.	Planted	1
Winged Sumac	SH	1	6ft.	Planted	1
Beautyberry	SH	11	2ft.	Planted	11
Beautyberry	SH	3	4ft.	Planted	3
Beautyberry	SH	1	6ft.	Planted	1
Southern Red Oak	SA	10	2ft	Planted	10
Southern Red Oak	SA	9	4ft.	Planted	9
Southern Red Oak	SA	3	6ft	Planted	3
River Birch	SA	8	2ft.	Planted	8
River Birch	SA	2	4ft.	Planted	2
Willow Oak	SA	1	2ft.	Planted	1
Willow Oak	SA	1	4ft.	Planted	1
Willow Oak	SA	2	6ft.	Planted	2
Willow Oak	SA	2	8ft.	Planted	2
Cherry Bark Oak	SA	2	3ft	Planted	2
Cherry Bark Oak	SA	1	4ft.	Planted	1
Cherry Bark Oak	SA	2	5ft.	Planted	2
American Sycamore	SA	1	4ft	Planted	1
Persimmon	SA	3	2ft.	Planted	3
Persimmon	SA	9	4ft.	Planted	9
Baccharis	SH	3	4ft.	Volunteer	3
Baccharis	SH	1	6ft.	Volunteer	1
Baccharis	SH	2	8ft.	Volunteer	2
Baccharis	SH	1	10ft.	Volunteer	1
Loblolly Pine	SA	4	2ft	Volunteer	4
Loblolly Pine	SA	11	4ft	Volunteer	11
Loblolly Pine	SA	14	6ft	Volunteer	14
Loblolly Pine	SA	4	8ft	Volunteer	4
Black Willow	SA	1	2ft.	Volunteer	1

Black Willow	SA	8	4ft.	Volunteer	8
Black Willow	SA	13	6ft	Volunteer	13
Black Willow	SA	8	8ft	Volunteer	8
Red Maple	SA	24	2ft.	Volunteer	0
Red Maple	SA	5	4ft.	Volunteer	0
Sweet Gum	SA	8	2ft.	Volunteer	0
Sweet Gum	SA	4	4ft.	Volunteer	0
Sweet Gum	SA	6	6ft	Volunteer	0
	TOTAL SHRUBS	26		OBSERVED DENSITY (PER PLOT)	145
	TOTAL TREES OF PLANTED SPECIES	56		OBSERVED DENSITY (PER ACRE)	1450
	TOTAL TREES OF VOLUNTEER SPECIES	110			
	TOTAL INDIVIDUALS	192			

NEUSE RIVER RIPARIAN BUFFER SITE
ANNUAL MONITORING DATA SHEET - VEGETATION PLOTS

PLOT#: 2

SPECIES	STRATUM (T, SA, or SH)	Number of Individuals	HEIGHT	Planted vs. Volunteer Species	Number of Individuals Counted toward Success Criteria
Black Willow	SA	1	1	Volunteer	1
Black Willow	SA	3	1.5	Volunteer	3
Black Willow	SA	2	2	Volunteer	2
Black Willow	SA	1	2.5	Volunteer	1
Black Willow	SA	2	1	Volunteer	2
Black Willow	SA	2	1.5	Volunteer	2
Black Willow	SA	4	2.5	Volunteer	4
Black Willow	SA	5	3	Volunteer	5
Black Willow	SA	3	3.5	Volunteer	3
Black Willow	SA	4	4	Volunteer	4
Black Willow	SA	1	4.5	Volunteer	1
Black Willow	SA	1	5	Volunteer	1
Black Willow	SA	3	5.5	Volunteer	3
Black Willow	SA	1	6	Volunteer	1
Black Willow	SA	1	8	Volunteer	1
Loblolly Pine	SA	2	1	Volunteer	2
Loblolly Pine	SA	1	1.5	Volunteer	1
Loblolly Pine	SA	4	2.5	Volunteer	4
Loblolly Pine	SA	5	3	Volunteer	5
Loblolly Pine	SA	2	3.5	Volunteer	2
Loblolly Pine	SA	4	4	Volunteer	4
Loblolly Pine	SA	1	4.5	Volunteer	1
Loblolly Pine	SA	1	5	Volunteer	1
Loblolly Pine	SA	2	5.5	Volunteer	2
Loblolly Pine	SA	1	6	Volunteer	1
Loblolly Pine	SA	1	6.5	Volunteer	1
Loblolly Pine	SA	1	8	Volunteer	1
Sycamore	SA	2	1	Planted	2
Sycamore	SA	2	1.5	Planted	2
Sycamore	SA	5	2	Planted	5

Sycamore	SA	2	2.5	Planted	2
Sycamore	SA	2	3	Planted	2
Sycamore	SA	4	3.5	Planted	4
Sycamore	SA	4	4	Planted	4
Sycamore	SA	1	4.5	Planted	1
Sycamore	SA	4	5	Planted	4
Sycamore	SA	1	6	Planted	1
Sycamore	SA	2	6.5	Planted	2
Red Maple	SA	13	1	Volunteer	0
Red Maple	SA	17	1.5	Volunteer	0
Red Maple	SA	18	2	Volunteer	0
Red Maple	SA	3	2.5	Volunteer	0
Red Maple	SA	5	3	Volunteer	0
Sweetgum	SA	31	1	Volunteer	0
Sweetgum	SA	6	1.5	Volunteer	0
Sweetgum	SA	30	2	Volunteer	0
Sweetgum	SA	15	2.5	Volunteer	0
Sweetgum	SA	13	3	Volunteer	0
Sweetgum	SA	8	3.5	Volunteer	0
Sweetgum	SA	6	4	Volunteer	0
Sweetgum	SA	6	4.5	Volunteer	0
Sweetgum	SA	4	5	Volunteer	0
Sweetgum	SA	1	5.6	Volunteer	0
Sweetgum	SA	3	6	Volunteer	0
Baccharis	SH	1	1	Volunteer	1
Baccharis	SH	1	2	Volunteer	1
Baccharis	SH	1	2.5	Volunteer	1
Baccharis	SH	1	4	Volunteer	1
Baccharis	SH	1	5	Volunteer	1
Beautyberry	SH	2	1	Planted	2
Beautyberry	SH	1	2	Planted	1
Southern Red Oak	SA	18	1	Planted	18
Southern Red Oak	SA	1	1.5	Planted	1
Southern Red Oak	SA	11	2	Planted	11
Southern Red Oak	SA	5	2.5	Planted	5
Southern Red Oak	SA	2	3	Planted	2
Southern Red Oak	SA	1	5.5	Planted	1
Southern Red Oak	SA	1	6	Planted	1

Tulip Poplar	SA	2	1	Planted	2
Tulip Poplar	SA	4	2	Planted	4
Tulip Poplar	SA	1	2.5	Planted	1
Wax Myrtle	SH	2	4	Planted	2
Wax Myrtle	SH	2	10	Planted	2
Persimmon	SA	1	1	Planted	1
Winged Sumac	SA	4	1	Volunteer	4
	TOTAL SHRUBS	16		OBSERVED DENSITY (PER PLOT)	151
	TOTAL TREES OF PLANTED SPECIES	76		OBSERVED DENSITY (PER ACRE)	1510
	TOTAL TREES OF VOLUNTEER SPECIES	238			
	TOTAL INDIVIDUALS	330			

NEUSE RIVER RIPARIAN BUFFER SITE
ANNUAL MONITORING DATA SHEET - VEGETATION PLOTS

PLOT#: 3

SPECIES	STRATUM (T, SA, or SH)	Number of Individuals	HEIGHT	Planted vs. Volunteer Species	Number of Individuals Counted toward Success Criteria
Loblolly Pine	SA	1	3	Volunteer	1
Loblolly Pine	SA	1	3.5	Volunteer	1
Loblolly Pine	SA	1	5.5	Volunteer	1
Loblolly Pine	SA	3	6	Volunteer	3
Loblolly Pine	SA	1	7	Volunteer	1
Loblolly Pine	SA	1	10	Volunteer	1
Loblolly Pine	SA	1	12	Volunteer	1
Loblolly Pine	SA	2	15	Volunteer	2
Green Ash	SA	3	1.5	Planted	3
Green Ash	SA	1	2	Planted	1
Green Ash	SA	1	4	Planted	1
Green Ash	SA	2	5	Planted	2
Green Ash	SA	2	5.5	Planted	2
Green Ash	SA	2	6	Planted	2
Green Ash	SA	3	7	Planted	3
Green Ash	SA	1	8	Planted	1
Green Ash	SA	2	10	Planted	2
Green Ash	SA	7	12	Planted	7
Green Ash	SA	3	13	Planted	3
Green Ash	SA	1	14	Planted	1
Green Ash	SA	2	15	Planted	2
Green Ash	SA	1	16	Planted	1
Sweetgum	SA	7	2	Volunteer	0
Sweetgum	SA	11	2.5	Volunteer	0
Sweetgum	SA	9	3	Volunteer	0
Sweetgum	SA	1	3.5	Volunteer	0
Sweetgum	SA	2	4	Volunteer	0
Sweetgum	SA	1	4.5	Volunteer	0
Sweetgum	SA	2	5	Volunteer	0
Sweetgum	SA	5	5.5	Volunteer	0

Sweetgum	SA	20	6	Volunteer	0
Sweetgum	SA	1	6.5	Volunteer	0
Sweetgum	SA	14	7	Volunteer	0
Sweetgum	SA	1	7.5	Volunteer	0
Sweetgum	SA	20	8	Volunteer	0
Sweetgum	SA	19	9	Volunteer	0
Sweetgum	SA	8	10	Volunteer	0
Sweetgum	SA	1	11	Volunteer	0
Sweetgum	SA	6	12	Volunteer	0
Sweetgum	SA	20	13	Volunteer	0
Sweetgum	SA	2	14	Volunteer	0
Sweetgum	SA	4	15	Volunteer	0
Wax Myrtle	SH	1	13	Planted	1
Wax Myrtle	SH	1	15	Planted	1
Southern Red Oak	SA	1	2.5	Planted	1
Southern Red Oak	SA	2	6	Planted	2
Southern Red Oak	SA	1	7	Planted	1
Southern Red Oak	SA	1	8	Planted	1
Southern Red Oak	SA	2	10	Planted	2
Southern Red Oak	SA	1	13	Planted	1
Southern Red Oak	SA	3	15	Planted	3
River Birch	SA	4	1	Planted	4
River Birch	SA	1	2	Planted	1
River Birch	SA	2	3	Planted	2
River Birch	SA	1	6	Planted	1
River Birch	SA	1	12	Planted	1
River Birch	SA	2	15	Planted	2
Baccharis	SH	1	8	Volunteer	1
Baccharis	SH	1	10	Volunteer	1
Baccharis	SH	1	12	Volunteer	1
Persimmon	SA	1	1.5	Planted	1
Persimmon	SA	1	3	Planted	1
Persimmon	SA	1	4	Planted	1
Persimmon	SA	1	4.5	Planted	1
Persimmon	SA	9	5	Planted	9
Persimmon	SA	5	6	Planted	5
Persimmon	SA	2	7	Planted	2
Persimmon	SA	1	10	Planted	1

Sycamore	SA	2	2	Planted	2
Sycamore	SA	1	3	Planted	1
Sycamore	SA	2	4	Planted	2
Sycamore	SA	1	4.5	Planted	1
Sycamore	SA	2	5	Planted	2
Sycamore	SA	1	7	Planted	1
Sycamore	SA	1	8	Planted	1
Sycamore	SA	1	9	Planted	1
Sycamore	SA	1	12	Planted	1
	TOTAL SHRUBS	5		OBSERVED DENSITY (PER PLOT)	102
	TOTAL TREES OF PLANTED SPECIES	87		OBSERVED DENSITY (PER ACRE)	1020
	TOTAL TREES OF VOLUNTEER SPECIES	165			
	TOTAL INDIVIDUALS	256			

NEUSE RIVER RIPARIAN BUFFER SITE
ANNUAL MONITORING DATA SHEET - VEGETATION PLOTS

PLOT#: 4

SPECIES	STRATUM (T, SA, or SH)	Number of Individuals	HEIGHT	Planted vs. Volunteer Species	Number of Individuals Counted toward Success Criteria
Sycamore	SA	1	2	Planted	1
Sycamore	SA	16	4	Planted	16
Sycamore	SA	7	6	Planted	7
Sycamore	SA	4	8	Planted	4
Sycamore	SA	2	10	Planted	2
Sycamore	SA	3	12	Planted	3
Willow Oak	SA	1	6	Planted	1
Willow Oak	SA	1	10	Planted	1
Green Ash	SA	2	4	Planted	2
Green Ash	SA	4	6	Planted	4
Green Ash	SA	15	8	Planted	15
Green Ash	SA	11	10	Planted	11
Green Ash	SA	11	12	Planted	11
Green Ash	SA	16	14	Planted	16
Wax Myrtle	SH	1	6	Planted	1
Wax Myrtle	SH	1	8	Planted	1
Wax Myrtle	SH	1	12	Planted	1
Wax Myrtle	SH	1	14	Planted	1
So. Red Oak	SA	2	6	Planted	2
So. Red Oak	SA	1	8	Planted	1
So. Red Oak	SA	1	12	Planted	1
Loblolly Pine	SA	3	4	Volunteer	3
Loblolly Pine	SA	10	6	Volunteer	10
Loblolly Pine	SA	9	8	Volunteer	9
Loblolly Pine	SA	5	10	Volunteer	5
Loblolly Pine	SA	4	12	Volunteer	4
Loblolly Pine	SA	1	14	Volunteer	1
Sweet Gum	SA	6	4	Volunteer	0
Sweet Gum	SA	5	6	Volunteer	0
Sweet Gum	SA	11	8	Volunteer	0

Sweet Gum	SA	4	10	Volunteer	0
Sweet Gum	SA	1	12	Volunteer	0
Sweet Gum	SA	1	14	Volunteer	0
Baccharis	SH	1	4	Volunteer	1
Baccharis	SH	1	8	Volunteer	1
Baccharis	SH	3	10	Volunteer	3
Baccharis	SH	1	12	Volunteer	1
Baccharis	SH	2	14	Volunteer	2
Red Maple	SA	1	4	Volunteer	0
	TOTAL SHRUBS	11		OBSERVED DENSITY (PER PLOT)	142
	TOTAL TREES OF PLANTED SPECIES	98		OBSERVED DENSITY (PER ACRE)	1420
	TOTAL TREES OF VOLUNTEER SPECIES	61			
	TOTAL INDIVIDUALS	171			

NEUSE RIVER RIPARIAN BUFFER SITE
ANNUAL MONITORING DATA SHEET - VEGETATION PLOTS

PLOT#: 5

SPECIES	STRATUM (T, SA, or SH)	Number of Individuals	HEIGHT	Planted vs. Volunteer Species	Number of Individuals Counted toward Success Criteria
Cherry Oak	SA	4	4	Planted	4
Cherry Oak	SA	4	6	Planted	4
Cherry Oak	SA	7	8	Planted	7
Cherry Oak	SA	1	10	Planted	1
River Birch	SA	1	4	Planted	1
River Birch	SA	5	6	Planted	5
River Birch	SA	5	8	Planted	5
River Birch	SA	5	10	Planted	5
Green Ash	SA	5	4	Planted	5
Green Ash	SA	5	6	Planted	5
Green Ash	SA	9	8	Planted	9
Green Ash	SA	3	10	Planted	3
Green Ash	SA	14	12	Planted	14
Sycamore	SA	30	2	Planted	30
Sycamore	SA	10	4	Planted	10
Sycamore	SA	47	6	Planted	47
Sycamore	SA	3	8	Planted	3
Sycamore	SA	2	10	Planted	2
Sycamore	SA	1	12	Planted	1
Sycamore	SA	1	14	Planted	1
Sweet Gum	SA	5	2	Volunteer	0
Sweet Gum	SA	5	4	Volunteer	0
Sweet Gum	SA	8	6	Volunteer	0
Sweet Gum	SA	7	8	Volunteer	0
Sweet Gum	SA	3	10	Volunteer	0
Loblolly Pine	SA	2	4	Volunteer	2
Loblolly Pine	SA	1	6	Volunteer	1
Loblolly Pine	SA	17	8	Volunteer	17
Loblolly Pine	SA	27	10	Volunteer	27

Persimmon	SA	1	2	Planted	1
Baccharis	SH	5	4	Volunteer	5
Baccharis	SH	3	6	Volunteer	3
Baccharis	SH	2	8	Volunteer	2
Baccharis	SH	1	10	Volunteer	1
	TOTAL SHRUBS	11		OBSERVED DENSITY (PER PLOT)	221
	TOTAL TREES OF PLANTED SPECIES	163		OBSERVED DENSITY (PER ACRE)	2210
	TOTAL TREES OF VOLUNTEER SPECIES	75			
	TOTAL INDIVIDUALS	249			

NEUSE RIVER RIPARIAN BUFFER SITE
ANNUAL MONITORING DATA SHEET - VEGETATION PLOTS

PLOT#: 6

SPECIES	STRATUM (T, SA, or SH)	Number of Individuals	HEIGHT (ft)	Planted vs. Volunteer Species	Number of Individuals Counted toward Success Criteria
Wax Myrtle	SH	1	4	Planted	1
Wax Myrtle	SH	1	6	Planted	1
Wax Myrtle	SH	8	10	Planted	8
Sycamore	SA	10	2	Planted	10
Sycamore	SA	12	4	Planted	12
Sycamore	SA	11	6	Planted	11
Sycamore	SA	6	8	Planted	6
Persimmon	SA	12	2	Planted	12
Persimmon	SA	11	4	Planted	11
So. Red Oak	SA	9	2	Planted	9
So. Red Oak	SA	21	4	Planted	21
So. Red Oak	SA	14	6	Planted	14
So. Red Oak	SA	1	8	Planted	1
River Birch	SA	1	2	Planted	1
River Birch	SA	1	4	Planted	1
River Birch	SA	1	8	Planted	1
River Birch	SA	1	10	Planted	1
River Birch	SA	7	12	Planted	7
Sweet Gum	SA	10	2	Volunteer	0
Sweet Gum	SA	6	4	Volunteer	0
Sweet Gum	SA	36	6	Volunteer	0
Sweet Gum	SA	20	8	Volunteer	0
Sweet Gum	SA	3	10	Volunteer	0
Loblolly Pine	SA	4	4	Volunteer	4
Loblolly Pine	SA	3	6	Volunteer	3
Loblolly Pine	SA	4	8	Volunteer	4
Loblolly Pine	SA	12	10	Volunteer	12
Loblolly Pine	SA	19	12	Volunteer	19

	TOTAL SHRUBS	10		OBSERVED DENSITY (PER PLOT)	170
	TOTAL TREES OF PLANTED SPECIES	118		OBSERVED DENSITY (PER ACRE)	1700
	TOTAL TREES OF VOLUNTEER SPECIES	117			
	TOTAL INDIVIDUALS	245			

NEUSE RIVER RIPARIAN BUFFER SITE
ANNUAL MONITORING DATA SHEET - VEGETATION PLOTS

PLOT#: 7

SPECIES	STRATUM (T, SA, or SH)	Number of Individuals	HEIGHT	Planted vs. Volunteer Species	Number of Individuals Counted toward Success Criteria
Wax Myrtle	SH	2	8	Planted	2
Wax Myrtle	SH	8	10	Planted	8
Wax Myrtle	SH	30	12	Planted	30
River Birch	SA	1	4	Planted	1
River Birch	SA	15	12	Planted	15
Persimmon	SA	1	4	Planted	1
Persimmon	SA	2	6	Planted	2
Persimmon	SA	6	8	Planted	6
Sycamore	SA	2	4	Planted	2
Sycamore	SA	2	6	Planted	2
Sycamore	SA	1	8	Planted	1
Sycamore	SA	2	10	Planted	2
Sycamore	SA	13	12	Planted	13
Tulip Poplar	SA	1	2	Planted	1
Tulip Poplar	SA	4	4	Planted	4
Tulip Poplar	SA	5	6	Planted	5
Tulip Poplar	SA	7	8	Planted	7
Tulip Poplar	SA	1	10	Planted	1
Tulip Poplar	SA	11	12	Planted	11
Loblolly Pine	SA	2	4	Volunteer	2
Loblolly Pine	SA	3	6	Volunteer	3
Loblolly Pine	SA	3	8	Volunteer	3
Loblolly Pine	SA	3	10	Volunteer	3
Loblolly Pine	SA	10	12	Volunteer	10
Sweet Gum	SA	2	4	Volunteer	0
Sweet Gum	SA	2	8	Volunteer	0
Sweet Gum	SA	2	10	Volunteer	0
Sweet Gum	SA	12	12	Volunteer	0
Red Maple	SA	50	2	Volunteer	0
Red Maple	SA	1	4	Volunteer	0

Red Maple	SA	2	6	Volunteer	0
Red Maple	SA	3	8	Volunteer	0
Red Maple	SA	1	10	Volunteer	0
	TOTAL SHRUBS	41		OBSERVED DENSITY (PER PLOT)	135
	TOTAL TREES OF PLANTED SPECIES	74		OBSERVED DENSITY (PER ACRE)	1350
	TOTAL TREES OF VOLUNTEER SPECIES	96			
	TOTAL INDIVIDUALS	210			

NEUSE RIVER RIPARIAN BUFFER SITE
ANNUAL MONITORING DATA SHEET - VEGETATION PLOTS

PLOT#: 8

SPECIES	STRATUM (T, SA, or SH)	Number of Individuals	HEIGHT in Ft.	Planted vs. Volunteer Species	Number of Individuals Counted toward Success Criteria
Beautyberry	SH	1	2.5	Planted	1
Beautyberry	SH	1	4	Planted	1
Beautyberry	SH	1	6	Planted	1
Beautyberry	SH	1	7	Planted	1
Beautyberry	SH	2	8	Planted	2
Beautyberry	SH	1	10	Planted	1
Beautyberry	SH	1	12	Planted	1
Beautyberry	SH	1	14	Planted	1
Black Willow	SA	1	1	Planted	1
Persimmon	SA	1	0.5	Planted	1
Persimmon	SA	14	1	Planted	14
Persimmon	SA	6	1.5	Planted	6
Persimmon	SA	4	2	Planted	4
Sycamore	SA	1	3	Planted	1
Sycamore	SA	2	6	Planted	2
Sycamore	SA	3	7	Planted	3
Sycamore	SA	2	8	Planted	2
Sycamore	SA	1	9	Planted	1
Sycamore	SA	2	10	Planted	2
Sycamore	SA	1	11	Planted	1
Sycamore	SA	8	12	Planted	8
Sycamore	SA	1	13	Planted	1
Sycamore	SA	3	14	Planted	3
Sycamore	SA	3	15	Planted	3
Sycamore	SA	1	16	Planted	1
Sycamore	SA	1	18	Planted	1
Tulip Poplar	SA	1	1.5	Planted	1
Tulip Poplar	SA	1	2.5	Planted	1
Tulip Poplar	SA	3	3	Planted	3
Tulip Poplar	SA	6	4	Planted	6

Tulip Poplar	SA	2	7	Planted	2
Tulip Poplar	SA	1	8	Planted	1
Tulip Poplar	SA	1	12	Planted	1
Red Maple	SA	5	1	Volunteer	0
Red Maple	SA	2	1.5	Volunteer	0
Red Maple	SA	1	2	Volunteer	0
	TOTAL SHRUBS	9		OBSERVED DENSITY (PER PLOT)	79
	TOTAL TREES OF PLANTED SPECIES	69		OBSERVED DENSITY (PER ACRE)	790
	TOTAL TREES OF VOLUNTEER SPECIES	9			
	TOTAL INDIVIDUALS	87			

NEUSE RIVER RIPARIAN BUFFER SITE
ANNUAL MONITORING DATA SHEET - VEGETATION PLOTS

PLOT#: 9

SPECIES	STRATUM	Number of Individuals	HEIGHT in Ft.	Planted vs. Volunteer Species	Number of Individuals Counted toward Success
Wax Myrtle	SH	3	8	Planted	3
Wax Myrtle	SH	1	9	Planted	1
Wax Myrtle	SH	8	10	Planted	8
Wax Myrtle	SH	1	11	Planted	1
Wax Myrtle	SH	3	12	Planted	3
Wax Myrtle	SH	1	13	Planted	1
Wax Myrtle	SH	2	14	Planted	2
Wax Myrtle	SH	2	15	Planted	2
River Birch	SA	2	2	Planted	2
River Birch	SA	2	3	Planted	2
River Birch	SA	3	4	Planted	3
River Birch	SA	1	4.5	Planted	1
River Birch	SA	3	5	Planted	3
River Birch	SA	2	5.5	Planted	2
River Birch	SA	2	7	Planted	2
River Birch	SA	4	8	Planted	4
River Birch	SA	3	9	Planted	3
River Birch	SA	5	10	Planted	5
River Birch	SA	1	12	Planted	1
River Birch	SA	3	13	Planted	3
River Birch	SA	1	14	Planted	1
River Birch	SA	2	15	Planted	2
River Birch	SA	1	16	Planted	1
River Birch	SA	1	18	Planted	1
River Birch	SA	2	20	Planted	2
Willow Oak	SA	1	1.5	Planted	1
Willow Oak	SA	1	2	Planted	1
Willow Oak	SA	2	6	Planted	2
Willow Oak	SA	1	8	Planted	1
Sycamore	SA	2	2	Planted	2
Sycamore	SA	3	3	Planted	3

Sycamore	SA	2	6	Planted	2
Sycamore	SA	1	8	Planted	1
Sycamore	SA	2	9	Planted	2
Sycamore	SA	2	10	Planted	2
Sycamore	SA	1	14	Planted	1
Sycamore	SA	1	16	Planted	1
Sweetgum	SA	1	1	Volunteer	0
Sweetgum	SA	1	4	Volunteer	0
Sweetgum	SA	1	5.5	Volunteer	0
Loblolly Pine	SA	2	4	Volunteer	2
Loblolly Pine	SA	2	4.5	Volunteer	2
Loblolly Pine	SA	4	5	Volunteer	4
Loblolly Pine	SA	1	6	Volunteer	1
Loblolly Pine	SA	1	7	Volunteer	1
Loblolly Pine	SA	2	8	Volunteer	2
Loblolly Pine	SA	1	15	Volunteer	1
	TOTAL SHRUBS	21		DENSITY (PER PLOT)	91
	TOTAL TREES OF PLANTED SPECIES	57		OBSERVED DENSITY (PER ACRE)	910
	TOTAL TREES OF VOLUNTEER SPECIES	16			
	TOTAL INDIVIDUALS	94			

NEUSE RIVER RIPARIAN BUFFER SITE
ANNUAL MONITORING DATA SHEET - VEGETATION PLOTS

PLOT#: 10

SPECIES	STRATUM	Number of Individuals	HEIGHT in Ft.	Planted vs. Volunteer Species	Number of Individuals Counted toward Success Criteria
Beautyberry	SH	3	1	Planted	3
Beautyberry	SH	2	1.5	Planted	2
Beautyberry	SH	6	2	Planted	6
Beautyberry	SH	1	2.5	Planted	1
Beautyberry	SH	3	3	Planted	3
Beautyberry	SH	1	4	Planted	1
Beautyberry	SH	1	4.5	Planted	1
Wax Myrtle	SH	1	3	Planted	1
Wax Myrtle	SH	1	6	Planted	1
Wax Myrtle	SH	1	8	Planted	1
Wax Myrtle	SH	1	10	Planted	1
Sycamore	SA	2	2	Planted	2
Sycamore	SA	5	3	Planted	5
Sycamore	SA	4	4	Planted	4
Sycamore	SA	4	5	Planted	4
Sycamore	SA	1	6	Planted	1
Sycamore	SA	4	7	Planted	4
Sycamore	SA	4	8	Planted	4
Sycamore	SA	2	9	Planted	2
Sycamore	SA	3	10	Planted	3
Sycamore	SA	2	11	Planted	2
Sycamore	SA	1	15	Planted	1
Sycamore	SA	1	18	Planted	1
Tulip Poplar	SA	2	1	Planted	2
Tulip Poplar	SA	3	1.5	Planted	3
Tulip Poplar	SA	2	2	Planted	2
Tulip Poplar	SA	1	2.5	Planted	1
Tulip Poplar	SA	1	3	Planted	1
Persimmon	SA	2	1	Planted	2
Persimmon	SA	1	1.5	Planted	1

Persimmon	SA	3	2	Planted	3
Persimmon	SA	2	3	Planted	2
White Oak	SA	1	3	Planted	1
Black Willow	SA	1	6	Planted	1
Black Willow	SA	1	4	Planted	1
Black Willow	SA	1	7	Planted	1
Black Willow	SA	2	15	Planted	2
River Birch	SA	1	8	Planted	1
River Birch	SA	1	10	Planted	1
River Birch	SA	1	15	Planted	1
River Birch	SA	1	16	Volunteer	1
Winged Sumac	SA	1	1	Volunteer	1
Loblolly Pine	SA	1	1	Volunteer	1
Loblolly Pine	SA	1	2	Volunteer	1
Loblolly Pine	SA	4	3	Volunteer	4
Loblolly Pine	SA	2	4	Volunteer	2
Loblolly Pine	SA	1	5	Volunteer	1
Loblolly Pine	SA	2	6	Volunteer	2
Red Maple	SA	5	1	Volunteer	0
Red Maple	SA	3	2	Volunteer	0
Red Maple	SA	1	3	Volunteer	0
Red Maple	SA	1	4	Volunteer	0
Sweet Gum	SA	2	2	Volunteer	0
	TOTAL SHRUBS	**21**		**OBSERVED DENSITY (PER PLOT)**	**93**
	TOTAL TREES OF PLANTED SPECIES	**60**		**OBSERVED DENSITY (PER ACRE)**	**930**
	TOTAL TREES OF VOLUNTEER SPECIES	**24**			
	TOTAL INDIVIDUALS	**105**			

NEUSE RIVER RIPARIAN BUFFER SITE
ANNUAL MONITORING DATA SHEET - VEGETATION PLOTS

PLOT#: 11

SPECIES	STRATUM (T, SA, or SH)	Number of Individuals	HEIGHT	Planted vs. Volunteer Species	Number of Individuals Counted toward Success Criteria
Baccharis	SH	1	7	Volunteer	1
Baccharis	SH	1	9	Volunteer	1
Beautyberry	SH	4	1	Planted	4
Beautyberry	SH	2	1.5	Planted	2
Beautyberry	SH	1	2	Planted	1
Beautyberry	SH	3	3	Planted	3
Beautyberry	SH	1	3.5	Planted	1
Beautyberry	SH	2	4	Planted	2
Wax Myrtle	SH	1	4	Planted	1
Wax Myrtle	SH	4	6	Planted	4
Wax Myrtle	SH	3	7	Planted	3
Wax Myrtle	SH	6	8	Planted	6
Wax Myrtle	SH	2	9	Planted	2
Wax Myrtle	SH	1	10	Planted	1
White Oak	SA	3	1	Planted	3
White Oak	SA	5	2	Planted	5
White Oak	SA	1	2.5	Planted	1
White Oak	SA	13	3	Planted	13
White Oak	SA	1	3.5	Planted	1
White Oak	SA	1	5	Planted	1
White Oak	SA	1	6	Planted	1
White Oak	SA	2	7	Planted	2
Willow Oak	SA	1	1.5	Planted	1
Willow Oak	SA	2	2	Planted	2
Willow Oak	SA	1	2.5	Planted	1
Willow Oak	SA	2	3	Planted	2
Willow Oak	SA	1	3.5	Planted	1
Willow Oak	SA	4	4	Planted	4
Willow Oak	SA	2	6	Planted	2
Willow Oak	SA	1	6.5	Planted	1

Willow Oak	SA	2	7	Planted	2
Sycamore	SA	1	1	Planted	1
Sycamore	SA	2	3	Planted	2
Sycamore	SA	2	4.5	Planted	2
Sycamore	SA	1	5	Planted	1
Sycamore	SA	1	9	Planted	1
Sycamore	SA	2	12	Planted	2
Sycamore	SA	2	13	Planted	2
Southern Red Oak	SA	1	3	Planted	1
Southern Red Oak	SA	1	4.5	Planted	1
Southern Red Oak	SA	2	5	Planted	2
Southern Red Oak	SA	1	6	Planted	1
Southern Red Oak	SA	1	8	Planted	1
Loblolly Pine	SA	3	4	Volunteer	3
Loblolly Pine	SA	1	6	Volunteer	1
Loblolly Pine	SA	1	7	Volunteer	1
Loblolly Pine	SA	2	8	Volunteer	2
Loblolly Pine	SA	3	9	Volunteer	3
Loblolly Pine	SA	4	10	Volunteer	4
Loblolly Pine	SA	1	12	Volunteer	1
Loblolly Pine	SA	1	15	Volunteer	1
Red Maple	SA	1	2.5	Volunteer	0
Red Maple	SA	1	6	Volunteer	0
Sweetgum	SA	1	1	Volunteer	0
Sweetgum	SA	1	5	Volunteer	0
Sweetgum	SA	1	5.5	Volunteer	0
Sweetgum	SA	1	6	Volunteer	0
Sweetgum	SA	5	7	Volunteer	0
Sweetgum	SA	1	8	Volunteer	0
Sweetgum	SA	1	9	Volunteer	0
Sweetgum	SA	1	10	Volunteer	0
Persimmon	SA	1	1	Planted	1
Persimmon	SA	2	2	Planted	2
Persimmon	SA	2	3	Planted	2
Persimmon	SA	1	4.5	Planted	1
Persimmon	SA	2	5	Planted	2

	TOTAL SHRUBS	32		OBSERVED DENSITY (PER PLOT)	116
	TOTAL TREES OF PLANTED SPECIES	67		OBSERVED DENSITY (PER ACRE)	1160
	TOTAL TREES OF VOLUNTEER SPECIES	30			
	TOTAL INDIVIDUALS	130			

NEUSE RIVER RIPARIAN BUFFER SITE
ANNUAL MONITORING DATA SHEET - VEGETATION PLOTS

PLOT#: 12

SPECIES	STRATUM (T, SA, or SH)	Number of Individuals	HEIGHT	Planted vs. Volunteer Species	Number of Individuals Counted toward Success Criteria
Wax Myrtle	SH	2	6	Planted	2
Wax Myrtle	SH	5	8	Planted	5
Wax Myrtle	SH	11	10	Planted	11
Wax Myrtle	SH	14	12	Planted	14
Wax Myrtle	SH	5	14	Planted	5
Wax Myrtle	SH	8	16	Planted	8
Beautyberry	SH	2	4	Planted	2
So. Red Oak	SA	2	2	Planted	2
So. Red Oak	SA	5	4	Planted	5
So. Red Oak	SA	8	6	Planted	8
So. Red Oak	SA	5	8	Planted	5
So. Red Oak	SA	2	10	Planted	2
So. Red Oak	SA	1	12	Planted	1
River Birch	SA	2	4	Planted	2
Sycamore	SA	1	2	Planted	1
Sycamore	SA	4	4	Planted	4
Sycamore	SA	3	6	Planted	3
Sycamore	SA	7	8	Planted	7
Sycamore	SA	2	10	Planted	2
Sycamore	SA	3	12	Planted	3
Sycamore	SA	2	14	Planted	2
Sycamore	SA	3	16	Planted	3
Winged Sumac	SA	6	2	Planted	6
Winged Sumac	SA	8	4	Planted	8
Winged Sumac	SA	3	6	Planted	3
Sweet Gum	SA	1	4	Volunteer	0
Sweet Gum	SA	5	6	Volunteer	0
Sweet Gum	SA	16	8	Volunteer	0
Sweet Gum	SA	6	10	Volunteer	0
Sweet Gum	SA	5	12	Volunteer	0

Sweet Gum	SA	7	14	Volunteer	0
Sweet Gum	SA	6	16	Volunteer	0
Red Maple	SA	1	6	Volunteer	0
Loblolly Pine	SA	3	4	Volunteer	3
Loblolly Pine	SA	2	6	Volunteer	2
Loblolly Pine	SA	3	10	Volunteer	3
Loblolly Pine	SA	2	12	Volunteer	2
	TOTAL SHRUBS	47		OBSERVED DENSITY (PER PLOT)	124
	TOTAL TREES OF PLANTED SPECIES	67		OBSERVED DENSITY (PER ACRE)	1240
	TOTAL TREES OF VOLUNTEER SPECIES	57			
	TOTAL INDIVIDUALS	171			

APPENDIX C.
Summary of Supplemental Planting

Riparian Buffer Restoration – Neuse River Basin ("McCotter/Raines Farm")
Contract No. AW03011-3/Task #5 – Annual Monitoring (Year 1)

SUPPLEMENTAL PLANTING

Due to low percent survivorship of plantings calculated for three plots, supplemental planting has been conducted in an approximate six-acre area of the buffer site.

Supplemental planting was conducted as follows during February 2004:

- 200 wax myrtle installed on east side of primary ditch/water of the US and in select areas of southeast portion of site
- 1067 water oak planted in six-acre area
- 300 white oak planted in higher elevations of six-acre area
- 300 persimmon planted in six-acre area
- 387 willow oak planted in six-acre area
- 143 sycamore planted in six-acre area

2,397 total trees and shrubs planted