SECOND ANNUAL MONITORING REPORT – 2007 GROWING SEASON

Moccasin Creek Riparian Buffer Restoration (EEP Contract: 005015)

December 2007

Submitted to:

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Introduction and Background

On 27 June 2005 the NC Ecosystem Enhancement Program awarded Greene Environmental Services a contract to restore 20.2 acres of riparian buffer along un-named tributaries to Moccasin Creek in southeastern Johnston County, NC (Figure 1). The project area is approximately 2.75 miles south of Princeton along Moccasin Creek's western bank. The buffer surrounds an unnamed tributary of Moccasin Creek that joins Moccasin Creek immediately to the southeast of the restoration site. Approximately 7.5 stream miles downstream, Moccasin Creek empties into the Neuse River. The entire project lies on the Danny Kornegay Farm in USGS Hydrologic Unit 03020201160010. Hay fields and cattle pastures adjacent to the buffers receive liquid hog waste from the farm and typically have 65 cow/calf pairs rotating between fields.

The Moccasin Creek Riparian Buffer Restoration Plan was implemented in February 2006 with site preparation and the planting of approximately 9,700 bare root hardwood saplings of 6 species and 2,000 bald cypress saplings.

Vegetation monitoring was conducted during November 2007 inside 17 quadrats using EEP's August 2006 Level 1 and Level 2 methodologies. The monitoring results, management activities to date, identified problem areas, and planned management activities are presented below. Because the project had been planted prior to the EEP vegetation methodology, the *total planted* numbers presented below are the sum of total live stems observed and total dead stems observed.

Results

During the November 2007 monitoring, 232 planted woody stems were recorded within the 17 quadrats (four in tracts A, B, and D, and five in Tract C; Figure 2). Planted stem density for all plots averaged 552 stems per acre (173 percent of the required 320 stems per acre). Volunteer woody stems (all native species) from those same 17 monitoring plots totaled 238, which results in an average density of all stems (planted +volunteer) of 1,074 stems per acre (335 percent of the required density). Planted woody stem success averaged 73 percent (Table 1).

When averaged separately, planted woody stem density per tract also exceeded the required 320 stems per acre (Tract A, 9.5 average = 384/acre (120%); Tract B, 15 average = 607/acre (190%); Tract C, 13.4 average = 542/acre (169%); Tract D, 16.75 average = 678/acre (212%)).

The second annual monitoring data indicate that *Fraxinus pennsylvanica* replaced *Liriodendron tulipifera* as the most abundant planted tree species (35 percent relative density among planted species). *Taxodium distichum* is second (28 percent relative density among planted species) and *Liriodendron tulipifera* is third most abundant *(*23 percent relative density among planted species). *Liquidambar styraciflua* is the dominant species, when all species (planted and volunteers) are considered in all monitoring plots (40.6 percent relative density).

Maintenance (completed and planned) and Qualitative Observations

The quantitative data demonstrate that overall planted woody stem success was high during the second growing season.

In January 2007, approximately 1000 bare root water tolerant seedlings (*T. distichum* and *Nyssa sylvatica)* were planted in wet areas where mortality was observed in 2006. Approximately 500 bare root seedlings of *F. pennsylvanica* were planted in the mesic areas that experienced significant mortality in 2006. These remedial plantings of more appropriate species has successfully eliminated all of the problems areas identified in 2006.

For the 2007 growing season, a small planted woody stem mortality problem area was identified near Quadrat A1 (Figure 2). Remedial plantings of bare root *F. pennsylvanica* seedlings will occur in winter of 2008 within this small problem area. Similar to 2006, *L. tulipifera* mortatlity represents the majority of the total planted woody stem mortality (31 individuals in 2006 and 18 in 2007), either from being planted in areas that were too wet or exposed to the drought conditions in the upland portions.

No herbicide application or other invasive management technique was used in the Moccasin Creek project following initial site preparation and planting or during the second growing season. Although areas of dense rhizomatous grasses, and volunteer annuals and short-lived perennials (e.g. *Conyza Canadensis, Eupatorium capillofolium),* have colonized several locations throughout the site they do not appear to be reducing planted stem vigor. These areas will be monitored to determine if trimming or herbicide application is necessary to promote seedling survival. No remedial action to control herbaceous volunteers is recommended at this time.

Table 1. 2007 Summary Data - Vegetation Monitoring Year 2 - Moccasin Creek Riparian Buffer Restoration - Johnston County, NC

Species	Relative Density (planted)	Relative Density (planted + volunteer)	Total Live Stems	Total Dead	Total Planted	Survival (%)	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	C5	D1	D2	D3	D4	AVERAGE (all plots)
Planted Stems																								
Fraxinus pennsylvanica	35	17.2	81	6	87	93		7	2		4	9	6	11	6	8	1	9	4	9	1	3	1	
Liriodendron tulipifera	23	11.3	53	49	102	52	6			7		2			9	1			4	6	8	10		
Nyssa sylvatica	3	1.3	6	6	12	50												6						
Platanus occidentalis	12	5.7	27	9	36	75				5	10				3					2	4	3		
Taxodium distichum	28	13.8	65	14	79	82		3	8			2	11	5		1	10		5		6	1	13	
Total Planted Stems			**232**	**84**	**316**	**73**	**6**	**10**	**10**	**12**	**14**	**13**	**17**	**16**	**18**	**10**	**11**	**15**	**13**	**17**	**19**	**17**	**14**	**14**
Planted Stems/acre							**243**	**405**	**405**	**486**	**567**	**526**	**688**	**648**	**728**	**405**	**445**	**607**	**526**	**688**	**769**	**688**	**567**	**552**
Volunteer Stems																								
Acer rubrum		4.0	19					3		1								1	3	8	2		1	
Baccharis halimifolia		4.7	22									2	2			2		1			12		3	
Carya sp.		0.2	1							1														
Diosporus virginiana		0.4	2											2										
Liquidambar styraciflua		40.6	191					5		1	5	2				1	2	1	13	10	142	8	1	
Morella cerifera		0.4	2																		2			
Prunus serotina		0.2	1									1												
Total volunteers			**238**				**0**	**8**	**0**	**3**	**5**	**5**	**2**	**2**	**0**	**3**	**2**	**3**	**16**	**18**	**158**	**8**	**5**	
Volunteers/acre/plot								**324**		**121**	**202**	**202**	**81**	**81**		**121**	**81**	**121**	**648**	**728**	**6,394**	**324**	**202**	**525**
All stems (planted + volunteer)			**470**																					
All Stems/Acre (planted + volunteer)							**243**	**728**	**405**	**607**	**769**	**728**	**769**	**728**	**728**	**526**	**526**	**728**	**1,174**	**1,416**	**7,163**	**1,012**	**769**	**1,074**

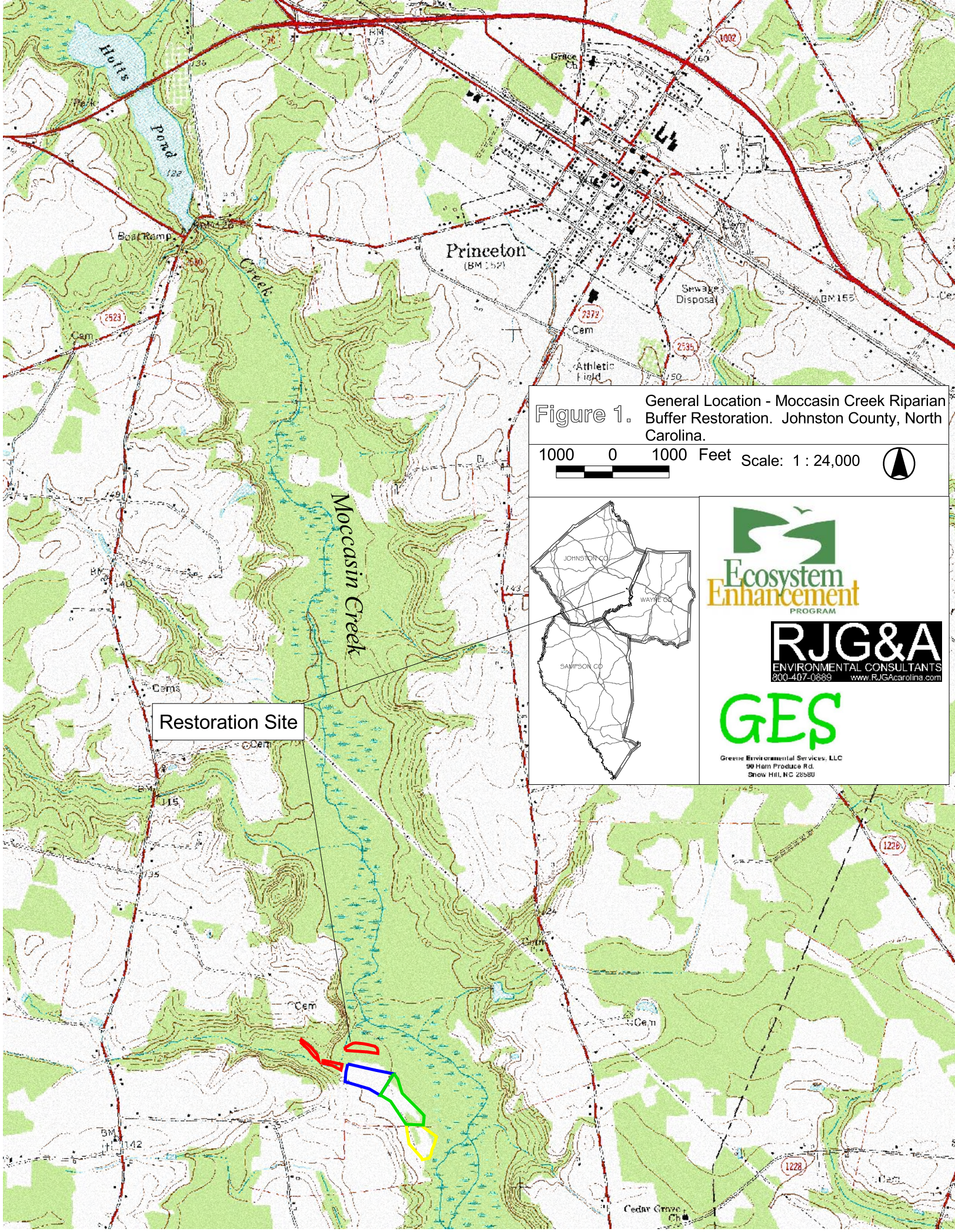

Figure 1. General Location - Moccasin Creek Riparian Buffer Restoration. Johnston County, North Carolina.

Ecosystem Enhancement Program

RJG&A ENVIRONMENTAL CONSULTANTS 800-407-0889 www.RJGAcarolina.com

GES Greene Environmental Services, LLC 99 Ham Produce Rd. Snow Hill, NC 28580

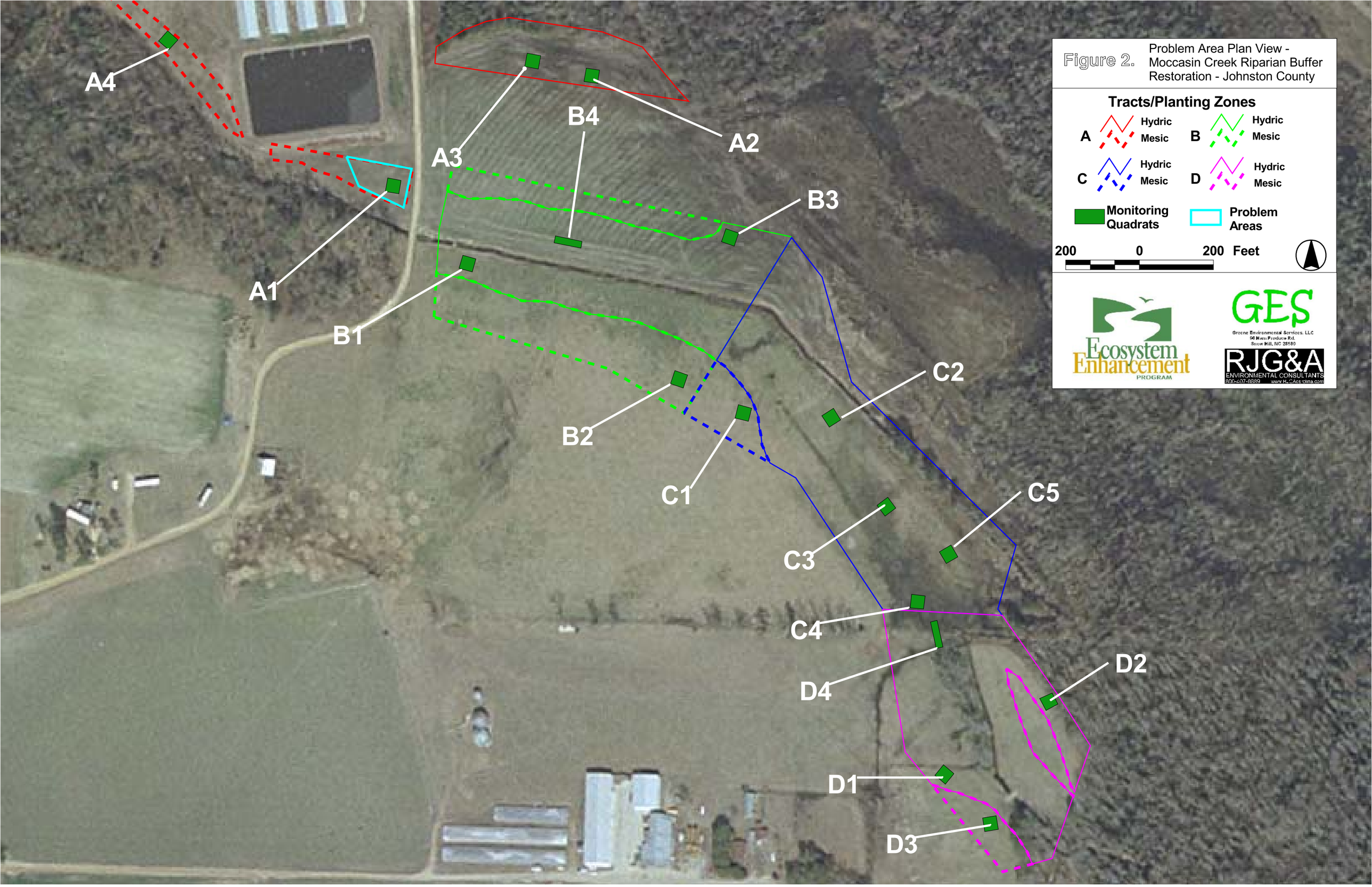

Figure 2. Problem Area Plan View - Moccasin Creek Riparian Buffer Restoration - Johnston County

Tracts/Planting Zones

A — Hydric / Mesic

B — Hydric / Mesic

C — Hydric / Mesic

D — Hydric / Mesic

Monitoring Quadrats

Problem Areas

200 0 200 Feet

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RJG&A
ENVIRONMENTAL CONSULTANTS

2007 Vegetation Monitoring Plot Photographs - Monitoring Year 2 - Moccasin Creek Riparian Buffer Restoration

Plot A-1

Plot A-2

Plot A-3

Plot A-4

2007 Vegetation Monitoring Plot Photographs - Monitoring Year 2 - Moccasin Creek Riparian Buffer Restoration

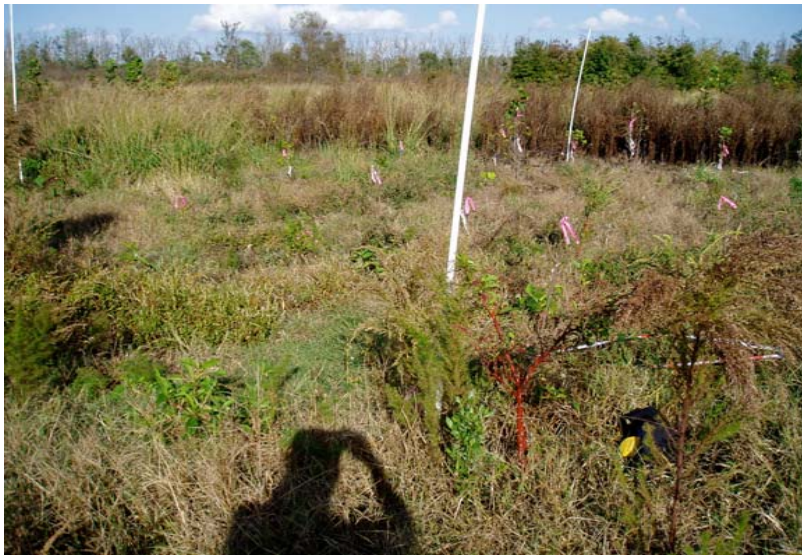
Plot B-1

Plot B-2

Plot B-3

Plot B-4

2007 Vegetation Monitoring Plot Photographs - Monitoring Year 2 - Moccasin Creek Riparian Buffer Restoration



Plot C-1

Plot C-2

Plot C-3

Plot C-4

2007 Vegetation Monitoring Plot Photographs - Monitoring Year 2 - Moccasin Creek Riparian Buffer Restoration

Plot C-5

Plot D-1

Plot D-2

Plot D-3

2007 Vegetation Monitoring Plot Photographs - Monitoring Year 2 - Moccasin Creek Riparian Buffer Restoration

Plot D-4

Raw Data - Planted Woody Stems - All Plots - Moccasin Creek Riparian Buffer Restoration - Monitoring Year 2 (2007)

SCIENTIFIC_NAME	plot	stemSource	stemX	stemY	dgh	Height	DBH	stemHealth	stemComment
Plot A1									
Liriodendron tulipifera	A1	R	0.8	6.89				Missing	
Liriodendron tulipifera	A1	R	0.87	0.11	25.5	119		4	
Liriodendron tulipifera	A1	R	1.01	7.86				0	
Liriodendron tulipifera	A1	R	1.03	5	10.1	70		4	
Liriodendron tulipifera	A1	R	1.14	2.08				Missing	
Liriodendron tulipifera	A1	R	1.22	9.26				Missing	
Liriodendron tulipifera	A1	R	3.38	0.57				Missing	
Liriodendron tulipifera	A1	R	3.5	7.04				Missing	
Liriodendron tulipifera	A1	R	3.66	8.43				Missing	
Liriodendron tulipifera	A1	R	3.67	2.74	6.3	43		4	
Liriodendron tulipifera	A1	R	3.7	8.6				Missing	
Liriodendron tulipifera	A1	R	3.98	5				0	
Liriodendron tulipifera	A1	R	6.78	3.43				0	
Liriodendron tulipifera	A1	R	6.88	0.98				Missing	
Liriodendron tulipifera	A1	R	7.06	5.78				Missing	
Liriodendron tulipifera	A1	R	7.07	8.33				0	
Liriodendron tulipifera	A1	R	9.76	2.93	14.7	81		4	
Liriodendron tulipifera	A1	R	9.8	0.46	6.4	43		4	
Liriodendron tulipifera	A1	R	9.8	5.1	2.7	20		4	
Liriodendron tulipifera	A1	R	9.85	7.38				Missing	
Liriodendron tulipifera	A1	R	9.9	9.8				0	
Plot A2									
Fraxinus pennsylvanica	A2	R	0.65	0.3	9.6	65		1	
Fraxinus pennsylvanica	A2	R	2.65	0.25	10.6	85		3	
Fraxinus pennsylvanica	A2	R	4.7	5.95	18	104		3	
Fraxinus pennsylvanica	A2	R	4.8	0.3	11.2	88		3	
Fraxinus pennsylvanica	A2	R	6.65	0.5	5.7	61		3	
Fraxinus pennsylvanica	A2	R	7.4	6.2	14.5	107		4	
Fraxinus pennsylvanica	A2	R	8.9	0.3	8.7	73		3	
Taxodium distichum	A2	R	0.41	3.1	15.1	101		2	
Taxodium distichum	A2	R	2.1	9				Missing	
Taxodium distichum	A2	R	2.17	6.1				0	Cut
Taxodium distichum	A2	R	2.9	3.2				0	
Taxodium distichum	A2	R	4.6	8.7				Missing	
Taxodium distichum	A2	R	5.4	3	8.7	62		1	
Taxodium distichum	A2	R	7.6	9.2				Missing	
Taxodium distichum	A2	R	8.35	3.1	14	102		4	

Raw Data - Planted Woody Stems - All Plots - Moccasin Creek Riparian Buffer Restoration - Monitoring Year 2 (2007)

SCIENTIFIC_NAME	plot	stemSource	stemX	stemY	dgh	Height	DBH	stemHealth	stemComment
Plot A3									
Fraxinus pennsylvanica	A3	R	8.4	3.9	8.8	66		2	
Fraxinus pennsylvanica	A3	R	8.7	7.3	12.5	107		3	
Liriodendron tulipifera	A3		1.5	5.2				0	
Taxodium distichum	A3	R	0.55	7.3	22.8	128		1	
Taxodium distichum	A3	R	1.5	1.2				Missing	
Taxodium distichum	A3	R	3.3	4.4	11.2	89		3	
Taxodium distichum	A3	R	3.6	7.07	15.8	86		3	
Taxodium distichum	A3	R	4.12	1.08	16	100		1	Unknown
Taxodium distichum	A3	R	5.6	4.4	17.3	109		3	
Taxodium distichum	A3	R	6.4	7.4	19.9	108		3	
Taxodium distichum	A3		6.5	5.4				0	
Taxodium distichum	A3	R	6.72	1.1	17.9	116		3	Drought
Taxodium distichum	A3	R	9.63	1.33	24.2	133		3	Drought
Plot A4									
Fraxinus pennsylvanica	A4		8.33	3.58				Missing	
Liriodendron tulipifera	A4		0.5	2.1	12.2	62		4	
Liriodendron tulipifera	A4		0.52	4.8	13.8	73		4	
Liriodendron tulipifera	A4		0.53	7.31	4.1	30		4	
Liriodendron tulipifera	A4		3.8	3.6	15.6	116		4	
Liriodendron tulipifera	A4		6.63	0.63	32.8	215	1.3	4	
Liriodendron tulipifera	A4		9.3	9.44	22.8	150	0.6	4	
Liriodendron tulipifera	A4		9.4	9.94				Missing	
Liriodendron tulipifera	A4		9.4	6.8	10	62		4	
Platanus occidentalis	A4		0.48	4.7				Missing	
Platanus occidentalis	A4		0.7	9.7	18.5	138	0.3	4	
Platanus occidentalis	A4		1.4	7.82				Missing	
Platanus occidentalis	A4		3.55	5.94				Missing	
Platanus occidentalis	A4		3.7	7.8				Missing	
Platanus occidentalis	A4		3.9	0.69	12.2	118		4	
Platanus occidentalis	A4		6	8.41				Missing	
Platanus occidentalis	A4		6.23	6.17	22.8	171	0.7	4	
Platanus occidentalis	A4		6.4	3.44	17.6	111		4	
Platanus occidentalis	A4		8.9	4.49	15.2	152	0.6	4	
Platanus occidentalis	A4		9.25	2.35				Missing	
Plot B1									
Fraxinus pennsylvanica	B1	R	0.97	6.67	28	147	0.7	4	
Fraxinus pennsylvanica	B1	R	2.86	1.42	29	160	0.8	4	
Fraxinus pennsylvanica	B1	R	5.04	7.21	13	105		4	

Raw Data - Planted Woody Stems - All Plots - Moccasin Creek Riparian Buffer Restoration - Monitoring Year 2 (2007)

SCIENTIFIC_NAME	plot	stemSource	stemX	stemY	dgh	Height	DBH	stemHealth	stemComment
Fraxinus pennsylvanica	B1	R	8.5	7.25	21	93		4	
Platanus occidentalis	B1	R	0.1	4.29	26	180	1	4	
Platanus occidentalis	B1	R	0.6	0.31		270	2.1	4	
Platanus occidentalis	B1	R	2.68	3.53				Missing	
Platanus occidentalis	B1		3.9	9.8	9	83		4	
Platanus occidentalis	B1	R	4.7	3.61	41	240	1.7	4	
Platanus occidentalis	B1	R	5.07	1.31		260	2.1	4	
Platanus occidentalis	B1	R	5.81	9.96	15	150	0.4	3	
Platanus occidentalis	B1	R	6.56	3.87	34	245	1.5	4	
Platanus occidentalis	B1	R	7.22	1.74	21	171	0.8	4	
Platanus occidentalis	B1	R	8.27	3.99	31	187	1.1	4	
Platanus occidentalis	B1	R	8.7	9.98				0	
Platanus occidentalis	B1	R	9.3	9	28	190	1.1	4	
Taxodium distichum	B1	R	3.26	6.93				0	
Taxodium distichum	B1	R	6.97	7.11				0	
Plot B2									
Fraxinus pennsylvanica	B2		1.4	5.2	18	75		4	
Fraxinus pennsylvanica	B2		1.6	7.7	20	95		4	
Fraxinus pennsylvanica	B2		2.85	9.9	16	85		4	
Fraxinus pennsylvanica	B2		3.26	4.79	13	78		4	
Fraxinus pennsylvanica	B2		4.45	7.53	22	106		4	
Fraxinus pennsylvanica	B2		4.88	4.26	11	68		4	
Fraxinus pennsylvanica	B2		5.93	9.97	7	25		4	
Fraxinus pennsylvanica	B2		7.41	7.04	14	60		4	
Fraxinus pennsylvanica	B2		9.18	6.68	22	95		4	
Liriodendron tulipifera	B2	R	1.36	5.22				0	
Liriodendron tulipifera	B2	R	1.405	1.42				Missing	
Liriodendron tulipifera	B2	R	3.26	4.79				0	
Liriodendron tulipifera	B2	R	3.72	1.08				0	
Liriodendron tulipifera	B2	R	4.45	7.53				Missing	
Liriodendron tulipifera	B2	R	4.88	4.26				Missing	
Liriodendron tulipifera	B2	R	5.67	0.89				0	
Liriodendron tulipifera	B2	R	5.93	9.97				Missing	
Liriodendron tulipifera	B2	R	6.59	3.93	14	100		4	
Liriodendron tulipifera	B2	R	7	0.61	13	70		4	
Liriodendron tulipifera	B2	R	7.41	7.04				Missing	
Liriodendron tulipifera	B2	R	8.07	4.02				Missing	
Liriodendron tulipifera	B2	R	9.18	6.68				Missing	
Liriodendron tulipifera	B2	R	9.83	0.36				Missing	

Raw Data - Planted Woody Stems - All Plots - Moccasin Creek Riparian Buffer Restoration - Monitoring Year 2 (2007)

SCIENTIFIC_NAME	plot	stemSource	stemX	stemY	dgh	Height	DBH	stemHealth	stemComment
Taxodium distichum	B2		1.41	1.42	11	45		2	
Taxodium distichum	B2		9.83	0.36	10	80		4	
Plot B3									
Fraxinus pennsylvanica	B3	R	0.15	0.05	17	110		2	
Fraxinus pennsylvanica	B3	R	1.2	3.4	9	89		4	Insects
Fraxinus pennsylvanica	B3	R	2.3	9.4	12	80		4	
Fraxinus pennsylvanica	B3	R	3.7	4	18	79		4	
Fraxinus pennsylvanica	B3	R	5.2	9.6	7	70		3	
Fraxinus pennsylvanica	B3	R	8.8	3.9	8	75		3	
Taxodium distichum	B3	R	0.4	7	18	125		4	
Taxodium distichum	B3	R	2.8	0.2	16	122		4	
Taxodium distichum	B3	R	3.2	6.6	24	137	0.2	4	
Taxodium distichum	B3	R	5.8	6.6	13	107		4	
Taxodium distichum	B3	R	6.2	3.6	23	140	0.3	4	
Taxodium distichum	B3	R	7.3	9.8	20	127		4	
Taxodium distichum	B3	R	7.7	0.5	20	132		4	
Taxodium distichum	B3	R	8	6.5	21	132		4	
Taxodium distichum	B3	R	8.2	0.8	22	134		4	
Taxodium distichum	B3	R	9.6	9.3	23	156	0.3	4	
Taxodium distichum	B3	R	9.8	0.9	20	142	0.3	4	
Plot B4									
Fraxinus pennsylvanica	B4	R	0.1	3.3	13	97		4	
Fraxinus pennsylvanica	B4	R	2.6	2.4	12	77		2	
Fraxinus pennsylvanica	B4	R	3	0.2	11	77		2	
Fraxinus pennsylvanica	B4	R	5.6	3.2	17	83		4	
Fraxinus pennsylvanica	B4	R	7.5	3.3	11	90		4	
Fraxinus pennsylvanica	B4	R	10.1	3.5	11	93		4	
Fraxinus pennsylvanica	B4	R	13.2	3.5	10	65		2	
Fraxinus pennsylvanica	B4	R	14.9	0.3	8	66		2	
Fraxinus pennsylvanica	B4	R	15.5	3.3	14	108		4	
Fraxinus pennsylvanica	B4	R	17	0.2	14	117		4	
Fraxinus pennsylvanica	B4	R	17.75	3.5	8	76		4	
Taxodium distichum	B4	R	0.4	0.3	15	122		4	
Taxodium distichum	B4	R	5.2	0.3	18	127		4	
Taxodium distichum	B4	R	7.5	1	20	160	0.7	4	
Taxodium distichum	B4		10	0.8	16	118		4	
Taxodium distichum	B4	R	19.4	0.1	13	113		4	
Plot C1									
Fraxinus pennsylvanica	C1		0.94	3.96	10	51		4	

Raw Data - Planted Woody Stems - All Plots - Moccasin Creek Riparian Buffer Restoration - Monitoring Year 2 (2007)

SCIENTIFIC_NAME	plot	stemSource	stemX	stemY	dgh	Height	DBH	stemHealth	stemComment
Fraxinus pennsylvanica	C1		0.99	0.79	16	100		4	
Fraxinus pennsylvanica	C1		2.4	6.55	7	40		4	
Fraxinus pennsylvanica	C1		3.32	0.98	17	97		4	
Fraxinus pennsylvanica	C1		8.3	3.55	16	65		4	
Fraxinus pennsylvanica	C1		9.2	0.67	11	65		4	
Liriodendron tulipifera	C1	R	0.36	9.49	5	45		4	
Liriodendron tulipifera	C1	R	0.94	3.96				0	
Liriodendron tulipifera	C1	R	0.99	0.79				Missing	
Liriodendron tulipifera	C1	R	2.03	9.41				0	
Liriodendron tulipifera	C1	R	2.89	3.89	10	80		4	
Liriodendron tulipifera	C1	R	3.32	0.98				Missing	
Liriodendron tulipifera	C1	R	3.83	5.1				Missing	
Liriodendron tulipifera	C1	R	3.98	9.41	11	62		4	
Liriodendron tulipifera	C1	R	5.24	0.92				0	
Liriodendron tulipifera	C1	R	5.98	9.47	16	85		4	
Liriodendron tulipifera	C1	R	6.59	3.52	6	34		4	
Liriodendron tulipifera	C1	R	7.35	0.9	4	27		4	
Liriodendron tulipifera	C1	R	7.44	9.38	14	85		4	
Liriodendron tulipifera	C1	R	8.3	3.55				Missing	
Liriodendron tulipifera	C1	R	9.2	0.67				0	
Liriodendron tulipifera	C1	R	9.53	9.57	10	75		4	
Liriodendron tulipifera	C1	R	9.8	6.19	11	93		4	
Platanus occidentalis	C1	R	2.4	6.55				0	
Platanus occidentalis	C1	R	4.1	6.82	7	64		4	
Platanus occidentalis	C1	R	6	6.82	15	148	0.7	4	
Platanus occidentalis	C1	R	8.51	6.43	17	140	0.3	4	
Plot C2									
Fraxinus pennsylvanica	C2		0.8	2.7	26.8	168	0.8	4	
Fraxinus pennsylvanica	C2	R	1.13	8.98				Missing	
Fraxinus pennsylvanica	C2		1.2	6.7	22.7	128		4	
Fraxinus pennsylvanica	C2		1.6	6.8	15.3	142	0.5	4	
Fraxinus pennsylvanica	C2		3.6	3.8	16.6	132		4	
Fraxinus pennsylvanica	C2		3.8	7.2	25.4	153	0.9	4	
Fraxinus pennsylvanica	C2	R	4.26	4.38	11.7	80		4	
Fraxinus pennsylvanica	C2		5.8	4.3				0	
Fraxinus pennsylvanica	C2		6.8	7.7	18.6	116		4	
Fraxinus pennsylvanica	C2		9.91	4.15	15.8	105		4	
Liriodendron tulipifera	C2	R	1.73	4.04				Missing	
Liriodendron tulipifera	C2	R	2.23	0.24				Missing	

Raw Data - Planted Woody Stems - All Plots - Moccasin Creek Riparian Buffer Restoration - Monitoring Year 2 (2007)

SCIENTIFIC_NAME	plot	stemSource	stemX	stemY	dgh	Height	DBH	stemHealth	stemComment
Liriodendron tulipifera	C2	R	3.78	7.18				Missing	
Liriodendron tulipifera	C2	R	4.52	0.45				Missing	
Liriodendron tulipifera	C2	R	6.8	7.65				0	
Liriodendron tulipifera	C2	R	7.05	0.81				Missing	
Liriodendron tulipifera	C2	R	7.46	4.42	8.5	65		2	
Liriodendron tulipifera	C2	R	9.63	0.74				Missing	
Liriodendron tulipifera	C2	R	9.91	4.15				0	
Taxodium distichum	C2	R	9.25	7.67	29.1	140	0.3	4	
Plot C3									
Fraxinus pennsylvanica	C3	R	6.3	0.43				Missing	
Fraxinus pennsylvanica	C3	R	7.02	4.28				Missing	
Fraxinus pennsylvanica	C3	R	9.09	3.85	13.4	83		2	
Taxodium distichum	C3	R	0.48	6.45	33.7	150	0.3	4	
Taxodium distichum	C3	R	0.99	9.47				Missing	
Taxodium distichum	C3	R	1.07	0.45	37.6	142	0.2	4	
Taxodium distichum	C3	R	2.12	3.62	24.8	121		4	
Taxodium distichum	C3	R	3.03	6.32	14.4	110		3	
Taxodium distichum	C3	R	3.82	9.83	26.9	115		4	
Taxodium distichum	C3	R	4.6	3.75	34.6	144	0.4	4	
Taxodium distichum	C3	R	5.64	6.52	23	125		4	
Taxodium distichum	C3	R	6.86	9.77	19.7	115		3	
Taxodium distichum	C3	R	9.06	9.81	37	172	0.8	4	
Taxodium distichum	C3	R	9.77	6.65	27.7	132		4	
Plot C4									
Fraxinus pennsylvanica	C4		3.6	7.3	10.5	93		4	
Fraxinus pennsylvanica	C4		4.8	10	15.1	95		4	
Fraxinus pennsylvanica	C4		5.8	0.2	16.2	129		4	
Fraxinus pennsylvanica	C4		6.7	2.4	22.7	139	0.5	4	
Fraxinus pennsylvanica	C4		7.4	9.3	20.9	95		4	
Fraxinus pennsylvanica	C4		8.9	3.5	20.2	129		4	
Fraxinus pennsylvanica	C4		9	3.7	19.1	158	0.6	4	
Fraxinus pennsylvanica	C4		9.8	9.9	12.7	100		4	
Fraxinus pennsylvanica	C4		9.8	5.4	15.4	108		4	
Nyssa sylvatica	C4	R	0.4	9.3				0	
Nyssa sylvatica	C4	R	0.7	2.4				Missing	
Nyssa sylvatica	C4	R	0.8	6.4				0	
Nyssa sylvatica	C4	R	0.9	2.34				Missing	
Nyssa sylvatica	C4	R	1.2	0.9	3.2	43		3	
Nyssa sylvatica	C4	R	2.4	4.73	13.1	82		4	

Raw Data - Planted Woody Stems - All Plots - Moccasin Creek Riparian Buffer Restoration - Monitoring Year 2 (2007)

SCIENTIFIC_NAME	plot	stemSource	stemX	stemY	dgh	Height	DBH	stemHealth	stemComment
Nyssa sylvatica	C4	R	2.9	9.9				Missing	
Nyssa sylvatica	C4	R	3.9	6.22	23	105		4	
Nyssa sylvatica	C4	R	4.7	2.4	12.2	83		4	
Nyssa sylvatica	C4	R	6.3	5.13	23.1	169	0.3	4	
Nyssa sylvatica	C4	R	7.4	0.1				Missing	
Nyssa sylvatica	C4	R	7.8	6.63	13.2	124		4	
Taxodium distichum	C4	R	2	0.3				Missing	
Plot C5									
Fraxinus pennsylvanica	C5	R	0.7	8.6	12	97		3	
Fraxinus pennsylvanica	C5	R	2.74	9.6	7	65		4	
Fraxinus pennsylvanica	C5	R	5.6	1.1	14	89		4	
Fraxinus pennsylvanica	C5	R	8.3	2.25	9	81		3	
Liriodendron tulipifera	C5	R	2.85	0.1	12	83		4	
Liriodendron tulipifera	C5	R	3.91	4.2	15	99		4	
Liriodendron tulipifera	C5	R	6.5	4.46	9	78		4	
Liriodendron tulipifera	C5	R	9.05	5.7	9	72		4	
Taxodium distichum	C5	R	0.99	3	29	168	0.8	4	
Taxodium distichum	C5	R	1.64	6	23	112		4	
Taxodium distichum	C5	R	3.58	7	13	96		4	
Taxodium distichum	C5	R	6.43	7.8	23	157	0.3	4	
Taxodium distichum	C5	R	9.25	8.85	15	102		3	Rodents
Plot D1									
Fraxinus pennsylvanica	D1	R	1.4	3.75	13.9	82		4	
Fraxinus pennsylvanica	D1	R	3.3	3.5	9.1	81		1	Other
Fraxinus pennsylvanica	D1	R	4.3	1	10.6	80		4	
Fraxinus pennsylvanica	D1		5	1	7.6	47		4	
Fraxinus pennsylvanica	D1	R	5.2	5.2	12	96		4	
Fraxinus pennsylvanica	D1	R	5.4	3.2	12.2	96		4	
Fraxinus pennsylvanica	D1	R	6.8	5.7	13.1	99		4	
Fraxinus pennsylvanica	D1	R	7.4	3	13.1	95		2	
Fraxinus pennsylvanica	D1	R	9.3	2.5				Missing	
Fraxinus pennsylvanica	D1	R	9.4	5.8	16.4	100		4	
Liriodendron tulipifera	D1	R	1	6.7	12.3	72		4	
Liriodendron tulipifera	D1	R	1.9	1	8.6	51		4	
Liriodendron tulipifera	D1	R	2	8.8	13.1	76		4	
Liriodendron tulipifera	D1	R	3.1	6.1				0	
Liriodendron tulipifera	D1	R	6.3	0.5				0	
Liriodendron tulipifera	D1	R	7.7	0.6	16.1	93		4	
Liriodendron tulipifera	D1	R	8.2	8.2	18.4	135		4	

Raw Data - Planted Woody Stems - All Plots - Moccasin Creek Riparian Buffer Restoration - Monitoring Year 2 (2007)

SCIENTIFIC_NAME	plot	stemSource	stemX	stemY	dgh	Height	DBH	stemHealth	stemComment
Liriodendron tulipifera	D1	R	9.65	0.5	17.7	100		4	
Platanus occidentalis	D1	R	4	8.6	13.5	70		3	Cut
Platanus occidentalis	D1	R	6.2	8.4	26.4	180	1	4	
Plot D2									
Fraxinus pennsylvanica	D2	R	5.9	2	6	33		2	
Liriodendron tulipifera	D2	R	1.7	5.6	6	49		3	
Liriodendron tulipifera	D2	R	3.4	5.2	8	56		4	
Liriodendron tulipifera	D2	R	5.4	4.9	9	69		4	
Liriodendron tulipifera	D2	R	7.3	1.88	8	45		3	
Liriodendron tulipifera	D2	R	7.55	9.5	12	85		4	
Liriodendron tulipifera	D2	R	7.7	4.9	5	33		2	
Liriodendron tulipifera	D2	R	9	1.4	7	62		4	
Liriodendron tulipifera	D2	R	9.4	4.2	9	76		4	
Platanus occidentalis	D2	R	0.9	2.8	13	115		4	
Platanus occidentalis	D2	R	2.6	2.4	11	110		4	
Platanus occidentalis	D2	R	4.2	2.2	14	128		4	
Platanus occidentalis	D2	R	5.3	9.95	16	143	0.3	4	
Taxodium distichum	D2	R	1.6	8.6	8	54		3	
Taxodium distichum	D2	R	2.15	0.2	7	61		4	
Taxodium distichum	D2	R	3.4	7.7	12	65		4	
Taxodium distichum	D2	R	5.6	7.6	10	70		4	
Taxodium distichum	D2	R	7.8	7.1	8	65		4	
Taxodium distichum	D2	R	9.6	9.1	10	101		4	
Plot D3									
Fraxinus pennsylvanica	D3	R	0.9	0.4	12.4	102		4	
Fraxinus pennsylvanica	D3		5.5	8.5	12	77		3	
Fraxinus pennsylvanica	D3		6.7	8	19.3	107		4	
Liriodendron tulipifera	D3	R	1.2	9.7	19.7	150	0.4	4	
Liriodendron tulipifera	D3	R	1.37	4.4	4.7	20		4	
Liriodendron tulipifera	D3	R	1.81	6.85	23.3	148	0.7	4	
Liriodendron tulipifera	D3	R	3.33	5.3	29.3	200	1.2	4	
Liriodendron tulipifera	D3	R	3.4	8	25.7	176	0.7	4	
Liriodendron tulipifera	D3		4	0.2				0	
Liriodendron tulipifera	D3	R	5.04	6.7	14.3	113		4	
Liriodendron tulipifera	D3	R	6.2	1.45	17.8	108		4	
Liriodendron tulipifera	D3	R	6.92	9.9				Missing	
Liriodendron tulipifera	D3	R	7.75	1.8	12	77		4	
Liriodendron tulipifera	D3	R	9	8.7	22.3	148	0.5	4	
Liriodendron tulipifera	D3	R	9.1	2.9	17.6	103		4	

Raw Data - Planted Woody Stems - All Plots - Moccasin Creek Riparian Buffer Restoration - Monitoring Year 2 (2007)

SCIENTIFIC_NAME	plot	stemSource	stemX	stemY	dgh	Height	DBH	stemHealth	stemComment
Platanus occidentalis	D3		0.5	4.8	6.7	76		3	
Platanus occidentalis	D3		7	9.9	10.8	57		4	
Platanus occidentalis	D3	R	8.4	5.3	17	131		4	
Taxodium distichum	D3	R	2.75	1.85	20.7	105		4	
Taxodium distichum	D3	R	6.25	4.1				Missing	
Plot D4									
Fraxinus pennsylvanica	D4		19.5	4.1	7.4	45		4	
Taxodium distichum	D4	R	0.8	0.5				0	
Taxodium distichum	D4	R	2.5	4.4	32.7	160	0.6	3	
Taxodium distichum	D4	R	3.5	0.6	32.4	155	0.4	4	
Taxodium distichum	D4	R	5.16	4.13	27	148	0.2	4	
Taxodium distichum	D4	R	6.4	0.84	41.9	157	0.7	4	
Taxodium distichum	D4	R	7.34	3.8	35.6	146	0.3	4	
Taxodium distichum	D4	R	9.1	1.6	21.6	135		4	
Taxodium distichum	D4	R	10.37	4.24	11.2	86		2	
Taxodium distichum	D4	R	11.68	1.12	23.1	140	0.2	1	
Taxodium distichum	D4	R	12.82	4.23	18.2	121		2	
Taxodium distichum	D4	R	14.18	1.8	22	17		1	
Taxodium distichum	D4	R	16.1	4.37	35.2	180	0.8	4	
Taxodium distichum	D4	R	16.79	0.91				0	
Taxodium distichum	D4	R	19.17	4.95	11.3	87		4	
Taxodium distichum	D4	R	19.47	0.9	38.9	198	1	4	

Raw Data - Volunteer Woody Stems - All Plots - Moccasin Creek Riparian Buffer Restoration - Monitoring Year 2

SCIENTIFIC_NAME	Plot	10-50	50-100	100-137	C0_1	C1_2	C2Plus	C5Plus	C10Plus	C15Plus	C20Plus	C25Plus	C30Plus	C35Plus	Total
Plot A1 - No Volunteers															
Plot A2															
Acer rubrum	A2	3	0	0	0	0	0	0	0	0	0	0	0	0	3
Liquidambar styraciflua	A2	5	0	0	0	0	0	0	0	0	0	0	0	0	5
Plot A3 - No Volunteers															
Plot A4															
Acer rubrum	A4	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Carya cordiformis	A4	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Liquidambar styraciflua	A4	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Plot B1															
Liquidambar styraciflua	B1	5	0	0	0	0	0	0	0	0	0	0	0	0	5
Plot B2															
Baccharis halimifolia	B2	2	0	0	0	0	0	0	0	0	0	0	0	0	2
Liquidambar styraciflua	B2	2	0	0	0	0	0	0	0	0	0	0	0	0	2
Prunus serotina	B2	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Plot B3															
Baccharis halimifolia	B3	0	1	1	0	0	0	0	0	0	0	0	0	0	2
Plot B4															
Diospyros virginiana	B4	0	0	0	1	1	0	0	0	0	0	0	0	0	2
Plot C1 - No Volunteers															
Plot C2															
Baccharis halimifolia	C2	2	0	0	0	0	0	0	0	0	0	0	0	0	2
Liquidambar styraciflua	C2	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Plot C3															
Liquidambar styraciflua	C3	2	0	0	0	0	0	0	0	0	0	0	0	0	2
Plot C4															
Acer rubrum	C4	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Baccharis halimifolia	C4	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Liquidambar styraciflua	C4	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Plot C5															
Acer rubrum	C5	2	1	0	0	0	0	0	0	0	0	0	0	0	3
Liquidambar styraciflua	C5	8	5	0	0	0	0	0	0	0	0	0	0	0	13
Plot D1															
Acer rubrum	D1	6	2	0	0	0	0	0	0	0	0	0	0	0	8
Liquidambar styraciflua	D1	10	0	0	0	0	0	0	0	0	0	0	0	0	10

Raw Data - Volunteer Woody Stems - All Plots - Moccasin Creek Riparian Buffer Restoration - Monitoring Year 2

SCIENTIFIC_NAME	Plot	10-50	50-100	100-137	C0_1	C1_2	C2Plus	C5Plus	C10Plus	C15Plus	C20Plus	C25Plus	C30Plus	C35Plus	Total
Plot D2															
Acer rubrum	D2	2	0	0	0	0	0	0	0	0	0	0	0	0	2
Baccharis halimifolia	D2	12	0	0	0	0	0	0	0	0	0	0	0	0	12
Liquidambar styraciflua	D2	142	0	0	0	0	0	0	0	0	0	0	0	0	142
Morella cerifera	D2	2	0	0	0	0	0	0	0	0	0	0	0	0	2
Plot D3															
Liquidambar styraciflua	D3	7	1	0	0	0	0	0	0	0	0	0	0	0	8
Plot D4															
Acer rubrum	D4	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Baccharis halimifolia	D4	0	1	2	0	0	0	0	0	0	0	0	0	0	3
Liquidambar styraciflua	D4	0	1	0	0	0	0	0	0	0	0	0	0	0	1