

Fourth Annual Monitoring Report – 2009 Growing Season

Moccasin Creek Riparian Buffer Restoration (EEP Contract: 005015)



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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 unnamed tributary that the buffer surrounds confluences Moccasin Creek immediately to the southeast of the restoration site, approximately 7.5 stream miles north of its confluence with the Neuse River (Figure 1). 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 six species and 2,000 bald cypress saplings. Planted woody stem density, location, diameter, and height monitoring was conducted during October and November 2009 inside 17, 100 square meter (10m x 10m) quadrats, pursuant to the 2006 CVS-EEP protocol for monitoring vegetation. The monitoring results, management activities to date, identified problem areas, and planned management activities are presented below.

Results

During the 2009 monitoring, eight planted species with a total of 233 stems and six volunteer species with a total of 272 stems were recorded in the 17 monitoring plots (Table 1). Of the planted species, *Fraxinus pennsylvanica* was the most dominant, with a calculated Importance Value of 91.2 (Table 1). *Taxodium distichum* and *Liriodendron tulipifera* were the second and third most dominant planted species with Importance Values of 71.3 and 58.2, respectively. When calculating Importance Values inclusive of both planted and volunteer species, *Liquidambar styraciflua* superseded the above species with a value of 88.5 followed by *Fraxinus pennsylvanica* (53.3) *Taxodium distichum* (42.0) and *Liriodendron tulipifera* (34.4).

A total of 505 planted woody stems were recorded within the 17 plots, thus an average of 1203 stem per acre (Table 2). Tract D had the highest average planted stems per plot (15 \pm 1) or 607 \pm 57 planted stems per acre and Tract C had the lowest average planted stems per plot (11 \pm 2)

or 461 ± 68 planted stems per acre (Table 2). Inclusive of both planted and volunteer species, Tract D had the highest number of total stems per acre (2014 ± 1988) and Tract B had the lowest (648 ± 100 total stems per acre). The calculated stems per acre based on plot totals indicated that all 17 plots exceeded the required 320 stems per acre minimum; the highest plot value was Plot D-2 with 122 total stems per plot or 4939 total stems per acre while and the lowest five plots (B-2, C-2, C-3, C-4 and D-4) had the lowest with 13 total stems per plot or 526 total stems per acre (Tables 2 and 3).

A comparison of the 2008 to the 2009 annual monitoring data indicated no major changes in plots characteristics (Table 4). It should be noted, however that *Baccharis halimifolia*, a species comprising 8% of the woody stem total in the 2008 survey was not included in the 2009 data analysis because of its status as a shrub species. *Baccharis halimifolia* and *Morella cerifera*, both species of woody shrub, were recorded in the field data but not used in the data analysis (Table 5).

Maintenance (Completed and Planned) and Qualitative Observations

Table 1 provides a qualitative status assessment of individual stems; for all species, status averages good to intermediate. Grazing by deer and other herbivores was the most problematic concern; *Fraxinus pennsylvanica* seem the most prone to such grazing while *Platanus occidentalis* and *Liriodendron tulipifera* seemed less affected and subsequently had achieved the greatest overall height (Table 1). Volunteer species appear to be less susceptible to grazing.

As noted in the 2008 monitoring report, portions of Tract A, especially near Plots A-1 and A-4 were not achieving as much growth success; this area contains dense stands of pre-existing or invading pasture grasses, including coastal Bermuda grass (Figure 2). Consequently, in January 2009 remedial plantings of approximately 200 bareroot seedlings of *Platanus occidentalis*, *Liriodendron tulipifera* and *Taxodium distichum* were planted in under-performing portions of the tract. Additionally, approximately 300 bareroot seedlings of *Taxodium distichum* on the south side of main tributary bisecting the project between Plots B-1 and C-5 in an area altered by channel modification activities and washout during flooding. These remedial plantings will be included in the next annual monitoring report (Year 2010) and any areas underperforming will be address with additional planting and herbicide application if necessary.