

**Hargett Buffer Mitigation Site
Annual Vegetation Monitoring Report
2008 Growing Season**

Year 5 Monitoring Report



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September 2008

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1.0 SUMMARY

The Hargett / Tucker Farm is a 155-acre cattle operation located at the border of Lenoir and Jones Counties, North Carolina. The Hargett Buffer Mitigation Site involved the restoration of 16 acres of riparian buffer at the 155-acre tract. The Hargett Mitigation Site is located along a tributary to the Trent River, which is one of the major tributaries to the Neuse River.

Construction was completed in March 2004, and monitoring of the site has taken place during the five growing seasons subsequent to construction completion. This Annual Report summarizes the vegetative monitoring activities performed at the site during 2008.

The monitoring results for 2008 documented an average of 417 surviving stems per acre, with a range of 290 to 540 stems per acre. The site has achieved the vegetative success criteria of 260 stems per acre at the end of Year 5.

2.0 INTRODUCTION

A total of 16 acres of buffer were restored on the Hargett Mitigation Site. The primary objectives of the buffer restoration, as specified in the Restoration Plan was follows: “permanently remove beef cattle from direct access to the riparian areas in question and to re-vegetate the riparian buffer with woody vegetation.” The Restoration Plan called for buffering 3,680 linear feet along Tuckahoe Swamp and providing a buffer on both sides of 1,000 linear feet of a farm ditch that drains to Tuckahoe Swamp; buffer widths were to be between 50 and 200 feet.

The target natural community type for the restored buffer is a “coastal plain small stream swamp” (Schafale and Weakley, 1990). Coastal plain small stream swamp communities exist as the floodplain of small blackwater streams. The design at the Hargett buffer site was to restore a small stream swamp community adjacent to the Tuckahoe Swamp and the farm ditch that bisects the property. The species composition planted on site was selected based on the vegetation description for the “coastal plain small stream swamp (blackwater subtype)”. In addition to planting the buffer area, permanent fencing was installed to keep the cattle out of the buffer area.

To monitor the vegetation on the Hargett buffer site, approximately 2% or 0.3 acres of the site was sampled over five growing seasons. Three vegetation-monitoring plots of 1/10th of an acre in size were established on the site. The plots were randomly located to represent the range of conditions that exist on the site.

After construction of the Hargett mitigation site in March 2004, the following tree species were planted. The species were selected based on the natural communities types discussed above.

Table 1. Tree Species Planted in 2004

ID	Scientific Name	Common Name	FAC Status
1	<i>Platanus occidentalis</i>	Sycamore	FACW-
2	<i>Nyssa biflora</i>	Swamp Tupelo	OBL
3	<i>Nyssa aquatica</i>	Water Tupelo	OBL
4	<i>Quercus laurifolia</i>	Laurel Oak	FACW
5	<i>Quercus lyrata</i>	Overcup Oak	OBL
6	<i>Quercus michauxii</i>	Swamp Chestnut Oak	FACW-
7	<i>Quercus nigra</i>	Water Oak	FAC
8	<i>Quercus pagoda</i>	Cherrybark Oak	FAC+
9	<i>Quercus phellos</i>	Coastal Willow Oak	FACW-
10	<i>Quercus alba</i>	White Oak	FACU
11	<i>Taxodium distichum</i>	Bald Cypress	OBL

3.0 VEGETATION MONITORING

3.1 Success Criteria

The interim measure of vegetative success for the Hargett Buffer Plan was survival of at least 320 3-year old planted trees per acre at the end of Year 3 of the monitoring period. The interim success criteria was achieved in 2006. The final vegetative success criteria is the survival of 260 5-year old planted trees per acre at the end of Year 5 of the monitoring period.

Up to 20% of the site species composition may be comprised of invaders. Remedial action may be required should these (i.e. loblolly pine, red maple, sweetgum, etc.) present a problem and exceed 20% composition.

3.2 Description of Species and Monitoring Protocol

All of the planted stems inside the plot were flagged with orange flagging to mark them as the planted stems (vs. any colonizers) and to help in locating them during the five year monitoring period. Each stem was then tagged with a permanent numbered aluminum tag.

3.3 Results of Vegetation Monitoring

The following tables present stem counts for each of the monitoring plots. Each planted tree species is identified across the top row, and each plot is identified down the left column. The numbers on the top row correlate to the ID column of the previous table. Trees are flagged in the field on a quarterly basis before the flags degrade. Flags are utilized because they will not interfere with the growth of the tree. Volunteers are also flagged during this process.

Table 2. 2008 Vegetation Monitoring Plot Species Composition

Plot	1	2	3	4	5	6	7	8	9	10	11	Total	Stems per acre
H1	8	1	0	1	0	12	1	0	8	7	4	42	420
H2	0	0	3	0	1	0	1	0	0	0	24	29	290
H3	0	45	0	0	6	1	0	0	0	0	2	54	540

Average Stems/Acre: 417

Range of Stems/Acre: 290-540

Volunteer species were monitored throughout the five-year monitoring period. Below is a table of the most commonly found woody volunteer species.

Table 3. Volunteers in the Buffer Area

ID	Species	Common Name	FAC Status
A	<i>Liquidambar styraciflua</i>	Sweetgum	FAC+
B	<i>Acer rubrum</i>	Red Maple	FAC
C	<i>Diospyros virginiana</i>	Persimmon	FAC

Volunteer woody species were observed in most all of the vegetation plots, but are not exceeding 20% of the total composition. Red Maple (*Acer rubrum*) is the most common volunteer, though sweetgum (*Liquidambar styraciflua*) was also observed.

3.4 Vegetation Observations

The planted stems were planted in what used to be cattle pasture. Existing vegetation was being grazed before cattle exclusion, so some pasture grasses could still exist on-site. Hydrophytic herbaceous vegetation, including rush (*Juncus effusus*), spike-rush (*Eleocharis obtusa*), tearthumb (*Polygonum sagittatum*), climbing hempweed (*Mikania scandens*), and sedge (*Carex sp.*), are frequently observed across the site, particularly in areas of inundation. The presence of these herbaceous wetland plants helps to confirm the presence of wetland hydrology on the site.

There is little notable change in the zones of kudzu occurring along the perimeter of the site. The kudzu does not seem to be posing any problems. There are some climbing hempweed vines that are growing amongst the planted stems that sometimes contort the smaller trees, bending them around, but it seems to have little effect on the survivability of the five year old trees. No other weedy species seem to be posing any problems for the woody or herbaceous hydrophytic vegetation. The majority of the weedy species are annuals and seem to pose very little threat to survivability on site. Commonly seen weedy vegetation includes ragweed (*Ambrosia artemisiifolia*), dogfennel (*Eupatorium capillifolium*), and morning glory (*Ipomoea sp.*).

3.5 Conclusions

The 2008 vegetation monitoring (Year 5) documented an average tree density of 417 stems per acre, with a range of 290 to 540 stems per acre. This site has achieved the final success criteria of 260 trees per acre by the end of Year 5.

Table 4. Vegetation Monitoring Summary

Plot	Planted	2004	2005	2006	2007	2008	Percent Survival
H1	590	610	490	460	420	420	71%
H2	560	560	350	320	310	290	52%
H3	630	630	580	560	550	540	86%

Appendix A. Site Photos



Hargett Vegetation Plot 1



Hargett Vegetation Plot 2



Hargett Vegetation Plot 3