Annual Monitoring Report

FINAL

Project Name: East Fork Pigeon River Wetland

Monitoring Year 1

EEP Contract No.: 006035

EEP Project No.: 94203

Haywood County, North Carolina

Data Collected: 08/27/2014-10/28/2014

Date Submitted: 11/24/2014

Submitted to:

Ecosystem Enhancement PROGRAM

NCDENR-EEP, 1652 Mail Service Center Raleigh NC 27699-1652

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1.0 PROJECT SUMMARY

1.1. Project History and Background

The East Fork Pigeon River Wetlands Project Site (project site) is located in the French Broad River Basin (HUC8- 06010106) near Cruso in Haywood County, NC. The site is situated between the right-descending bank of the East Fork of the Pigeon River and Old Micheal Road, off of Highway 276.

On November 3, 2010, the USACE approved a wetland Jurisdictional Determination on the project site. The mitigation plan for the project was completed by Mactec Engineering and Consulting, Inc (Currently AMEC Environment and Infrastructure, Inc.) in March 2011.

The established mitigation goals for the Site were to enhance and protect existing wetlands and wildlife habitat along the East Fork Pigeon River. Specifically, the target goal was the vegetative enhancement of the existing wetland community on the site. The project objectives included:

- Enhance existing wetlands by removing identified invasive plant species through manual and/or chemical methods and by planting native species within the site.
- Protecting the wetlands on the site with a permanent Conservation Easement.

The project did not require Clean Water Act Section 404 / Section 401 permits as no ground disturbing activities within jurisdictional wetlands were anticipated or completed on the site. Additionally, the project was instituted prior to July 28, 2010 and did not require a mandatory IRT mitigation plan review.

The control of nuisance plant species within the bottomland hardwood forest and shrub/groundstory open areas on the Site entailed the treatment of the seven invasive nuisance plant species: Bamboo (Phyllostachys sp.), common cattail (Typha latifolia), multiflora rose (Rosa multiflora), Japanese knotweed (Reynoutria japonica), Japanese honeysuckle (Lonicera japonica), kudzu (Pueraria montana), and Chinese privet (Ligustrum sinense).

A majority of the invasive species were mapped in the 2011 mitigation plan; however Chinese privet and multiflora rose were essentially scattered throughout the entire bottomland hardwood forest. The control methods entailed the treatment of small-sized plants with foliar spray and larger stems by hack and squirt. The chemical 'aquatic glyphosate' was used for the herbicide applications. The cut bamboo was placed in a slash pile and burned on the site. New shoots of bamboo, which developed after the initial treatment, were treated with aquatic glyphosate. All invasive control treatments and planting efforts were conducted by Habitat Assessment & Restoration Professionals (HARP) (Charlotte, NC). The nuisance plant species were treated for two growing seasons prior to the planting of the site. EEP postponed the planting of the site to allow for an additional growing season of nuisance species control prior to planting. Additionally, EEP will be completing follow up invasive treatments through the 5 year monitoring term.

The 2011 mitigation plan estimated an approximately 5.64 acre wetland planting area. Based on 2013 site conditions and the implemented invasive plant treatment areas, approximately 2.26 acres of the total area of USACE jurisdictional wetlands on the site (13.95 acres) were planted in December 2013. The wetland areas that were excluded from the planting operation encompassed: (1) a deepwater wetland drainageway which occurred along the southern shoulder of Old Michael Road and was determined to be an historic channel of the East Fork Pigeon River; (2) the stream banks of East Fork Pigeon River (bankfull bench and spoil areas); and (3) the heavily forested portions of the bottomland hardwood forest. Therefore, the planting operation primarily encompassed the areas of the bottomland hardwood forest that were open and lacking an overstory of trees or a dense shrub component. The planting of trees (seedlings) within these open areas will essentially restore the hardwood overstory of the wetlands.

The 2011 Mitigation plan and project implementation did not include any enhancement activities for the East Fork Pigeon River or the unnamed perennial stream that occurs within the western portion of the Site. These surface waters are essentially unimpaired and provide suitable habitat for fish and benthic macro-invertebrates. The proposed stream preservation assets have a minimum 30-foot buffer from edge of bank on each side of the channel.

1.2. Project Goals and Objectives

The established mitigation goals for the Site were to enhance and protect existing wetlands and wildlife habitat along the East Fork Pigeon River. Specifically, the target goal was the vegetative enhancement of the existing wetland community on the Site. The project objectives included:

- Enhance existing wetlands by removing identified invasive plant species through manual and/or chemical methods and by planting native species within the Site.
- Protecting the wetlands on the Site with a permanent Conservation Easement.

1.3. Project Success Criteria

The project success criteria are as follows:

- Vegetation success within the wetland areas that were planted and proposed for Wetland Enhancement (2.26-acres) will be based on the criteria established in the USACE Stream Mitigation Guidelines (2003). This document states that vegetation monitoring results indicate the following planted stem density minimums in the corresponding monitoring years: 320 stems/acre through year three, 288 stems/acre in year four, and 260 stems/acre in year five.
- Vegetation monitoring will not be conducted in the wetland preservation areas; however, the entire site will be monitored via yearly photo points. Invasive plant species and beaver colonization will be suppressed on the entire site until project closeout; however, there will be no success criteria linked to treatment of the invasive plant species or beaver removal.

1.4. Annual Monitoring Results

MY1 vegetation monitoring consisted of establishing three vegetation plots in three of the four newly planted areas and collecting initial vegetation data. Results from vegetation monitoring indicate that all plots are currently meeting the interim success criteria of 320 planted stems per acre (Table 6). Planted stem density averaged 796 stems per acre across all plots. Stem density ranged from 526 stems per acre to 1,133 stems per acre. A total of six woody species were documented in the vegetation plots.

Visual assessment, performed on 10/28/2014, focused on planted stems outside of the permanent vegetation plots and the status of invasive exotic vegetation. Although no quantifiable data related to planted stems were collected during the visual assessment, observations suggest that the planted stems are surviving throughout the easement. Dead stems were noted; however, these were limited to isolated stems and not large areas. Several small areas of dense dodder vine (*Cuscuta pentagona*) growth within the bamboo treatment area were noted and could potentially affect planted stems.

In addition to planted stems, an inventory of invasive exotic vegetation was performed as well as an assessment of previous treatment efficacy. Japanese honeysuckle (*Lonicera japonica*), Oriental bittersweet (*Celastrus orbiculatus*), and Chinese privet (*Ligustrum sinense*) were documented throughout drier, upland areas of the easement and scattered in low densities throughout the easement (Figure 2). Previous treatments have greatly reduced densities of these species; however, regrowth is occurring throughout the easement. The main bamboo area has shown good efficacy, but re-sprouting is beginning to occur throughout the treatment area. One small patch of Kudzu persists along Old Michael Road at the edge of the easement. Treatment of Japanese Knotweed (*Fallopia japonica*) appears to have been successful; no evidence of populations were observed during the visual assessment. Although not an

invasive-exotic, cattails (*Typha latifolia*) can be aggressive and create a monoculture in some wetlands. Initial treatment efforts appear to have greatly reduced the density of cattails within the easement; however, stems still persist in very low densities in some areas (Figure 2).

Summary information/data related to the occurrence of items such as beaver or easement encroachment and statistics related to performance of various project and monitoring elements can be found in the tables and figures in the report appendices. Narrative background and supporting information formerly found in these reports can be found in the restoration plan on EEP's website (NCEEP 2014). All raw data supporting tables and figures in the appendices are available from EEP upon request.

2.0 METHODOLOGY

Vegetation plot monitoring data were collected following the standard CVS-EEP Protocol for Recording Vegetation, Level II, Version 4.2 (Lee et al. 2008). A total of three plots were monitored for this project.

3.0 REFERENCES

Lee, Michael T., R.K. Peet, S.D. Roberts, and T.R. Wentworth. 2008. CVS-EEP Protocol for Recording Vegetation, Version 4.2 (http://cvs.bio.unc.edu/methods.htm)

NCEEP (North Carolina Ecosystem Enhancement Program). 2014. Final Wetland Mitigation Report-East Fork Pigeon River Wetlands Project. Haywood County, North Carolina. Raleigh.

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Appendix A
General Tables and Figures

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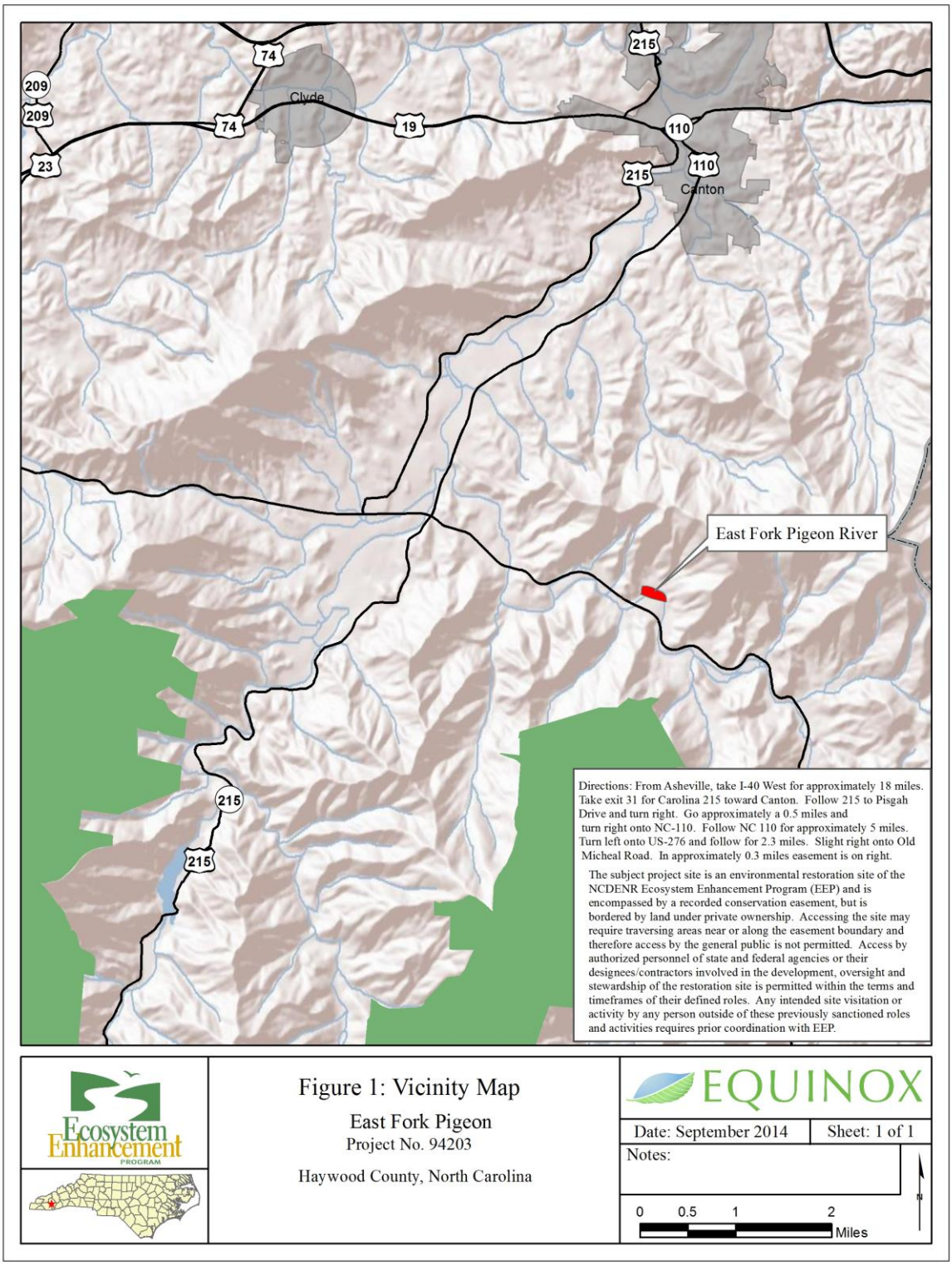
Appendix A

Figure 1. Vicinity Map of the East Fork of the Pigeon River Wetland Site



Appendix A

Table 1. Project Components and Summation East Fork of Pigeon Wetland / Project No. 94203				
Feature	**Mitigation Approach**	**Quantity (Linear Footage/Acreage)**	**Ratio**	**Mitigation Units (SMU/WMU)**
Stream				
Perennial Stream	P	664	5:1	133
East Fork of the Pigeon River	P	1,411	5:1	282
	Total:	**2,075**	**Total:**	**415**
Wetland				
Bottomland Hardwood Forest	E	2.26	2:1	1.13
Bottomland Hardwood Forest	P	11.69	5:1	2.34
	Total	**13.95**	**Total**	**3.47**

Table 2. Project Activity & Reporting History East Fork of Pigeon Wetland / Project No. 94203		
Activity or Report	**Data Collection Complete**	**Actual Completion or Delivery**
Land Acquisition	-	Dec 2010
Environmental Resource Technical Report	N/A	N/A
Restoration Plan	N/A	N/A
Permit Date	N/A	N/A
Initial Wetland Delineation	-	Oct 2010
Initial Invasive Exotic Reconnaissance	-	Oct 2010
Topographic Survey	-	Nov 2010
Initial Mitigation Plan / As-built	-	March 2011
Invasive Exotic Treatment	-	June 2012
Invasive Exotic Treatment	-	Nov 2012
Invasive Exotic Treatment	-	July 2013
Invasive Exotic Treatment	-	Nov 2013
Invasive Exotic Treatment	-	Dec 2013
Wetland Planting	-	Dec 2013
Final Mitigation Plan (Year 0 Monitoring - Baseline)	-	March 2014
Year 1 Monitoring	Oct 2014	Nov-14
Year 2 Monitoring		
Year 3 Monitoring		
Year 4 Monitoring		
Year 5 Monitoring		

N/A - Item does not apply.

- Information Unavailable

Table 3. Project Contacts East Fork of the Pigeon Wetland / Project No. 94203	
Designer	AMEC Environment and Infrastructure, INC. 4021 Stirrup Creek Drive, Suite 100 Durham, North Carolina 27701
Primary Project Design POC	Richard Harmon (919) 381-9909
Construction Contractor	N/A
	N/A
	N/A
Construction Contractor POC	N/A
Planting Contractor	Habitat Assessment and Restoration Professionals 301 McCullough Drive, 4th Floor Charlotte, North Carolina 28262
Planting Contractor POC	(704) 841-2841
Seeding Contractor	Habitat Assessment and Restoration Professionals 301 McCullough Drive, 4th Floor Charlotte, North Carolina 28262
Seeding Contractor POC	(704) 841-2841
Seed Mix Sources	-
	-
Nursery Stock Suppliers	-
	-
Monitoring Performers (Y0) - 2013	AMEC Environment and Infrastructure, INC. 4021 Stirrup Creek Drive, Suite 100 Durham, North Carolina 27701
Monitoring POC	Richard Harmon (919) 381-9909
Monitoring Performers (Y1) - 2014	Equinox 37 Haywood Street, Suite 100 Asheville, North Carolina 28801
Monitoring POC	Hunter Terrell (828) 253-6856

N/A - Item does not apply.

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Appendix B
Visual Assessment Data

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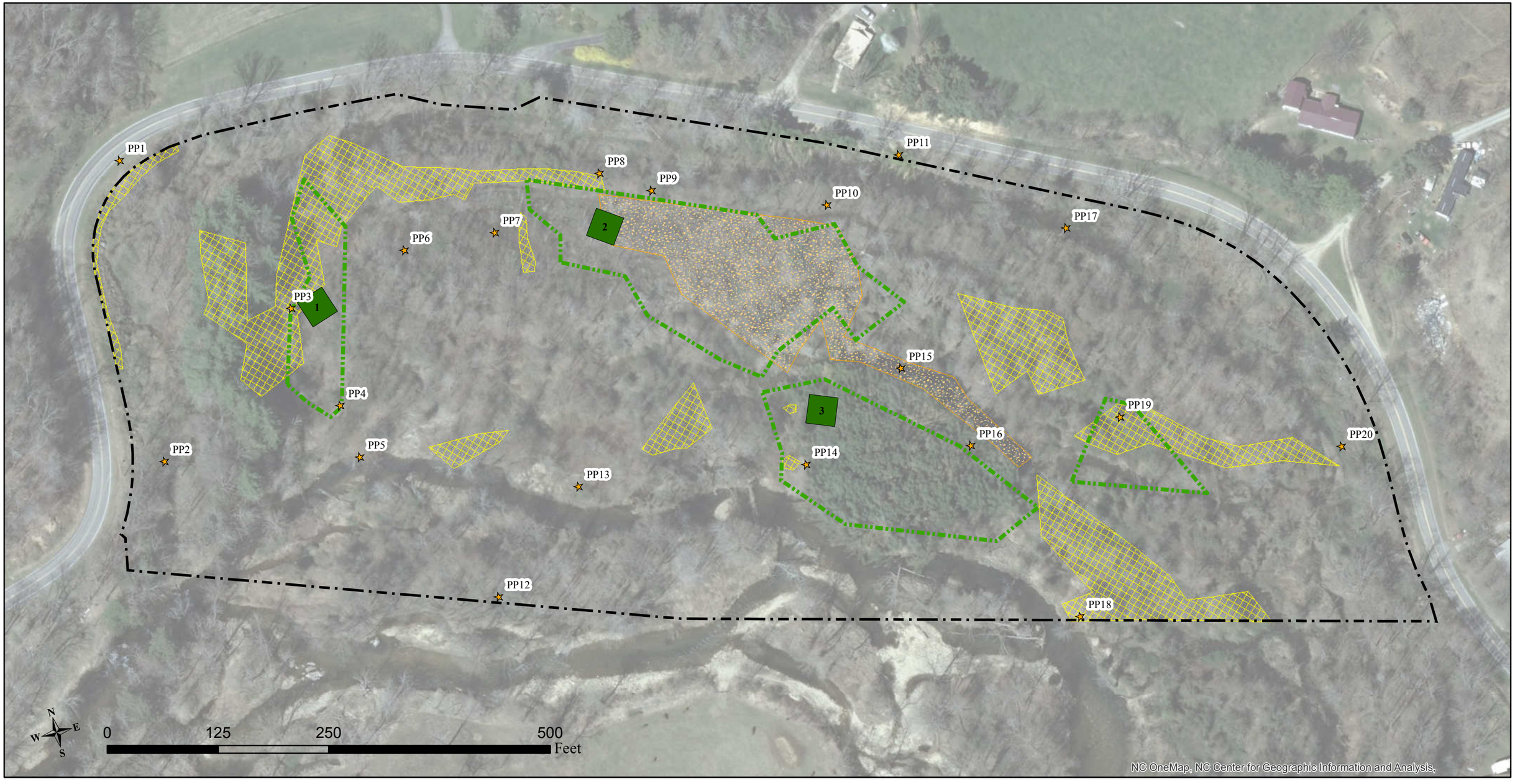

Prepared for:

Ecosystem Enhancement Program

Figure 2. Current Condition Plan View

East Fork Pigeon River Wetlands
Monitoring Year 1

NCEEP Project No. 94203

Haywood County, North Carolina

Photo Point

Easement

Planted Areas

Cattails (Typha latifolia)- Very Low Density

Vegetation Problem Areas

Dense

Present

Treated

Vegetation Plot Criteria

Criteria Met

Criteria Unmet

EQUINOX

Date: 10/28/2014

Sheet: 1 of 1

Notes:

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Table 4. Vegetation Condition Assessment East Fork of the Pigeon Wetland / Project No. 94203					
Planted Acreage:	**2.29**				
Vegetation Category	**Definitions**	**CCPV Depiction**	**Number of Polygons**	**Combined Acreage**	**% of Planted Acreage**
1. Bare Areas	Very limited cover of both woody and herbaceous material.	N/A	0	0.00	0%
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	Stipple Orange Dots White Background	0	0.00	0%
		Totals	0	0.00	0%
3. Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.	N/A	0	0.00	0%
		Cumulative Totals	0	0.00	0%
Easement Acreage:	**16.53**				
Vegetation Category	**Definitions**	**CCPV Depiction**	**Number of Polygons**	**Combined Acreage**	**% of Easement Acreage**
4. Invasive Areas of Concern	Areas or points (if too small to render as polygons at map scale).	Cross Hatch (Red - Dense/Yellow - Present)	9	1.60	10%
5. Easement Encroachment Areas	Areas or points (if too small to render as polygons at map scale).	Stipple Purple Dots White Background	0	0.00	0%

N/A - Item does not apply.

Appendix B

East Fork Pigeon River-Permanent Photo Station 1
East/Southeast

East Fork Pigeon River-Permanent Photo Station 4
North

East Fork Pigeon River-Permanent Photo Station 2
West

East Fork Pigeon River-Permanent Photo Station 5
Upstream

East Fork Pigeon River-Permanent Photo Station 3
North

East Fork Pigeon River-Permanent Photo Station 6
Southwest

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East Fork Pigeon River-Permanent Photo Station 7
East

East Fork Pigeon River-Permanent Photo Station 10
South/Southwest

East Fork Pigeon River-Permanent Photo Station 8
South/Southeast

East Fork Pigeon River-Permanent Photo Station 11
Southeast

East Fork Pigeon River-Permanent Photo Station 9
Southwest

East Fork Pigeon River-Permanent Photo Station 12
Northwest

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East Fork Pigeon River-Permanent Photo Station 12 East

East Fork Pigeon River-Permanent Photo Station 14 East/Southeast

East Fork Pigeon River-Permanent Photo Station 13 Upstream

East Fork Pigeon River-Permanent Photo Station 15 North

East Fork Pigeon River-Permanent Photo Station 13 Downstream

East Fork Pigeon River-Permanent Photo Station 16 West

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East Fork Pigeon River-Permanent Photo Station 17
Northwest

East Fork Pigeon River-Permanent Photo Station 20
North

East Fork Pigeon River-Permanent Photo Station 18
North/Northeast

East Fork Pigeon River-Permanent Photo Station 19
South/Southwest

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Appendix C
Vegetation Data

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Table 5. Vegetation Plot Criteria Attainment East Fork Pigeon River Wetland / Project No. 94203		
Vegetation Plot ID	**Vegetation Survival Threshold Met?**	**Tract Mean**
1	Yes	100%
2	Yes	
3	Yes	

Table 6. Planted and Total Stem Counts (Species by Plot with Annual Means)
East Fork Pigeon River Wetland / Project No. 94203

			Current Plot Data (MY0 2014)									Annual Means		
			Plot 1			Plot 2			Plot 3			MY0 (2014)		
Scientific Name	**Common Name**	**Species Type**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**
Cornus amomum	Silky dogwood	Shrub				1	1	1	3	3	3	4	4	4
Fraxinus pennsylvanica	Green ash	Tree	3	3	3	6	6	6	3	3	3	12	12	12
Liriodendron tulipifera var. tulipifera	Tulip-tree, Yellow Poplar, Whitewood	Tree	6	6	6							6	6	6
Nyssa sylvatica	Blackgum	Tree	6	6	6				6	6	6	12	12	12
Platanus occidentalis var. occidentalis	Sycamore, Plane-tree	Tree	13	13	13	6	6	6	5	5	5	24	24	24
Sambucus canadensis	Common elderberry	Shrub							1	1	1	1	1	1
		Stem count	28	28	28	13	13	13	18	18	18	59	59	59
		size (ares)	1			1			1			3		
		size (ACRES)	0.02			0.02			0.02			0.07		
		Species count	4	4	4	3	3	3	5	5	5	6	6	6
		Stems per ACRE	1133	1133	1133	526.1	526.1	526.1	728.4	728.4	728.4	795.9	795.9	795.9

Appendix C

Vegetation Monitoring Plot 1

Monitoring Year 1 – August 27, 2014

Vegetation Monitoring Plot 2

Monitoring Year 1 – Aug 27, 2014

Appendix C

Vegetation Monitoring Plot 3

Monitoring Year 1 – Aug 27, 2014