# EAST FORK PIGEON RIVER WETLANDS PROJECT

**SCO ID 10-07350-01**

**HAYWOOD COUNTY, NORTH CAROLINA**

**Prepared for:**

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**ECOSYSTEM ENHANCEMENT PROGRAM**
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# FINAL WETLAND MITIGATION REPORT

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## 1.0 BACKGROUND

The East Fork Pigeon River project site (Site) is a 15.73-acre parcel of land that is located to the south of the Town of Canton, in Haywood County, North Carolina (Figure 1, in Appendix A). Figure 1 includes directions to the Site. The Site is bordered on the west, north, and east sides by Old Michael Road, while the southern boundary of the Site abuts forested wetlands (Figure 2, in Appendix A). The Site presently consists of a bottomland hardwood forest, numerous shrub and groundstory openings, and a small upland stand of eastern white pine (*Pinus strobus*). Surface waters include a perennial stream channel, which occurs near the western project boundary, and the East Fork (of the) Pigeon River, which includes braided channels and overlaps the southern project boundary at multiple locations. The Site is owned by Ms. Helen Coleman. The North Carolina Ecosystem Enhancement Program (EEP) has obtained a Conservation Easement for the Site. The Conservation Easement is held by the State of North Carolina and has been recorded at the Haywood County Courthouse.

The Wetland Mitigation Plan for the Site proposed wetland enhancement of a bottomland hardwood forest which encompassed the floodplain of the East Fork Pigeon River. Nuisance plant species have become established over time within the bottomland hardwood forest (jurisdictional wetlands) on site. The Wetland Mitigation Plan presented methods for the control of six (6) nuisance plant species. The Wetland Mitigation Plan also included a conceptual planting program to install desirable wetland plant species within the jurisdictional wetland area. The elements of the nuisance species control program and the planting plan were approved by the EEP prior to implementation. The wetland enhancement for the Site was not proposed to off-set or mitigate for any particular project; however, the proposed enhancement would provide a quantified amount of EEP wetland mitigation credit for various permitted projects which occur within the same U.S. Geological Survey (USGS) 8-digit Hydrologic Unit Code (HUC). The Site is located in the French Broad River Basin HUC 06010106 (DWQ 2010; USGS 2010). This HUC is identified as a Targeted Local Watershed (TLW) in EEP's 2009 French Broad River Basin Restoration Priority (RBRP).

AMEC Environment & Infrastructure, Inc. (AMEC) has prepared this Final Wetland Mitigation Report for EEP to facilitate the monitoring program that shall be implemented for the Site, as principally including the assessment of survivorship, growth, and/or vitality of the installed plant material within the jurisdictional wetlands and the extent, vitality, and/or recruitment of nuisance plant species.

## 2.0 BASELINE WETLAND CONDITIONS

### 2.1 Jurisdictional Wetlands

The 15.73-acre Site is comprised of 13.95 acres of U.S. Army Corps of Engineers (USACE) jurisdictional wetlands, 0.82 acre of jurisdictional surface waters, and 0.96 acre of non-jurisdictional uplands (Figure 2). The jurisdictional wetlands include a bottomland hardwood forest with shrub and groundstory openings. The non-jurisdictional uplands include an eastern white pine community, which occurs near the western boundary of the Site, and linear areas of the shoulder (berm) of Old Michael Road, which extend along the western, northern, and eastern boundaries of the Site. Jurisdictional surface waters include 1,411 linear feet (0.77 acre) of the East Fork Pigeon River and 664 linear feet (0.05 acre) of a perennial, unnamed tributary to the East Fork Pigeon River. The 0.05-acre perennial stream channel occurs near the western project boundary and flows to the south to a point of confluence with the East Fork Pigeon River near the southwest corner of the Site. The East Fork Pigeon River enters the Site as a braided channel system at a point along the southern project boundary and leaves the Site near the southwest corner of the Site as a single thread channel system.

AMEC professional wetland scientists delineated the landward limits of jurisdictional waters of the U.S, including streams and wetlands on the Site in April 2010 pursuant to the methods defined in the 1987 USACE Wetlands Delineation Manual (Environmental Laboratory 1987). Mr. Tyler Crumbley of the USACE - Asheville Regulatory Field Office conducted a site inspection of the delineated wetlands on October 6, 2010, with AMEC professional wetland scientists in attendance. The inspected wetland limits were then surveyed by Mr. David Alley of Cavanaugh (NC Professional Land Surveyor). The signed and sealed, specific purpose survey of the landward limits of USACE regulatory jurisdiction for the Site was subsequently submitted to Mr. Crumbley for approval and signature. The USACE Notification of Jurisdictional Determination for the Site was issued on November 3, 2010, under Action Id No. 2010-01783 (expiration date of November 3, 2015).

### 2.2 Hydrologic Characterization

The Site is located within the French Broad River Basin (USGS 8-digit HUC 06010106). This HUC is identified as a Targeted Local Watershed (TLW) in EEP's 2009 French Broad River Basin Restoration Priority (RBRP): In addition, the Site is situated within the Federal Emergency Management Agency (FEMA) 100-year flood zone (Zone A7) according to Flood Insurance Rate Map (FIRM) Panel No. 370120 0190B (FEMA 2010). The proposed activities for this project did not require a FEMA development permit. Furthermore, the project did not require a Clean Water Act Section 404 / Section

401 permit as no ground disturbing activities within jurisdictional wetlands were anticipated or completed on the Site.

Drainage on the Site is generally to the south and west through the wetlands, the East Fork Pigeon River, and an unnamed perennial tributary to the East Fork Pigeon River. The East Fork Pigeon River is classified in the North Carolina Division of Water Quality, Basinwide Information Management System as a Water Supply III (WS-III) waterbody and Trout Waters (Tr). Areas of the bottomland hardwood forest are shallowly inundated or saturated. Based on personal communication with the previous landowner, the majority of the Site was farmed in the past, with cessation of farming activities occurring a few decades ago. The farming activities included the establishment of small ditches to facilitate drainage of the farm land. These drainage ditches do not appear to significantly affect the current hydrology of the Site. Some hydrologic enhancement has occurred on the project site for an unknown period of time due to the activities of beaver (*Castor canadensis*); i.e., a small number of beaver dams historically contributed to the impoundment of surface water within the eastern portion of the bottomland hardwood forest. Beavers do not appear to be active on the Site at the present time, however. The various hydrologic changes through time have led to wetter site conditions since farming activities were abandoned and these wetter site conditions have facilitated the establishment of hydrophytes on the Site.

Finally, other sources of hydrology for the Site include three culvert features which occur along Old Michael Road. Stream flow is conveyed onto the Site by these culverts. The westernmost culvert conveys stream flow from an off-site, potentially jurisdictional, stream feature into the perennial stream channel that occurs near the western Site boundary. The central culvert conveys stream flow from another off-site, potentially jurisdictional, stream feature into the wetland drainageway that extends along the northern Site boundary and Old Michael Road. The easternmost culvert (cross culvert) discharges stormwater into the aforementioned wetland drainageway.

### 2.3 Soil Characterization

According to the Natural Resources Conservation Service (NRCS), the Site is underlain by the Dellwood cobbly sandy loam, 0 to 3 percent slopes, occasionally flooded (DeA) map unit, which encompasses depressions and floodplains (landforms) (NRCS 2010). The NRCS considers this map unit to include hydric soil inclusions; i.e., small areas of Cullowhee or Nikwasi soils in depressions. The hydric criteria for this map unit is listed by the NRCS as ‘2B3’; i.e., soils that are poorly drained or very poorly drained and have a water table at a depth of 1.0 foot or less during the growing season if permeability is less than

6.0 inches per hour in any layer within a depth of 20 inches. An AMEC Licensed Soil Scientist confirmed, through on-site soil probing, that the wetland areas within the Site were underlain by hydric soils. The hydric soils observed in the field consisted generally of loam textures. Redoximorphic features (mottles) were observed within one foot of the existing ground surface.

### 2.4 Topographic Characterization

According to the USGS topographic quadrangle (*Asheville, North Carolina*), no distinct variation in topography is apparent across the Site. An elevation (contour interval) of 2,760 feet mean sea level is depicted on the quadrangle along the north side of Old Michael Road and to the south of the southern Site boundary. No contour interval was depicted on the quadrangle for the interior of the Site. More detailed topographic data for the project site were provided through a specific purpose topographic survey of ground elevations conducted by Cavanaugh in November 2010. The Cavanaugh field survey entailed the collection of ground elevation data at 100-foot grid intersections. Based on the results of this topographic survey, the ground elevations ranged from approximately 2,760 feet at Old Michael Road at the southeastern corner of the Site to approximately 2,735 feet at the southwestern corner of the Site near the confluence of the East Fork Pigeon River and the unnamed perennial stream. Low contour intervals (low surveyed ground elevations), ranging from approximately 2,737 to 2,739 feet, occurred within the east-central portion of the Site where shallow pooling was observed during field reconnaissance. Another area of low contour intervals and shallow pooling occurred within the west-central portion of the Site, where the ground elevations ranged from 2,738 to 2,739 feet. The surveyed 2,740-foot contour interval generally extended through the western half of the Site.

### 2.5 Plant Community Characterization

The distribution, structure, and species composition of the plant communities that occur on the Site partly reflect historic agricultural land use practices. The jurisdictional wetlands encompass a bottomland hardwood forest with scattered shrub and groundstory openings (Figure 2). The wetlands are areas of poorly-drained, seasonally saturated soils in lowlands abutting the East Fork Pigeon River. Areas of shallow seasonal pooling (i.e., generally less than 6 inches) are also present within on-site depressions. The U.S. Fish & Wildlife Service (USFWS) National Wetlands Inventory (NWI) online *Wetlands Mapper* (USFWS 2010) identifies the majority of the wetlands area on the Site as Code PSS1A, or Palustrine, Scrub/Shrub, Broad-leaved Deciduous, Temporary Flooded (Cowardin et al. 1979). Based on the natural community classification scheme for North Carolina by Schafale and Weakley (1990), the wetlands area on the Site would be classified as Piedmont/Mountain Bottomland Forest.

Within the portions of the on-site bottomland hardwood forest that contain dominant or co-dominant overstory vegetation, the canopy stratum is comprised of sycamore (*Platanus occidentalis*), black willow (*Salix nigra*), and red maple (*Acer rubrum*). Areas comprised of shrubs and areas dominated by groundstory plants are interspersed throughout the Site. These areas occur as openings within the bottomland hardwood forest. The shrub vegetation primarily includes black willow (saplings) and multiflora rose (*Rosa multiflora*). The groundstory is comprised of sedges, rushes, and herbaceous plants, such as swamp aster (*Aster puniceus*), soft rush (*Juncus effusus*), orange jewelweed (*Impatiens capensis*), false-nettle (*Boehmeria cylindrica*), sedges (*Carex* spp.), panic grass (*Panicum* sp.), blackberry (*Rubus* sp.), multiflora rose, seedbox (*Ludwigia* sp.), and duck-potato (*Sagittaria latifolia*).

## 2.6 Nuisance Plant Species Characterization

In the baseline condition (pre-enhancement), nuisance (invasive) plant species that occurred within the bottomland hardwood forest on the Site, or in upland areas adjacent to the Site, included bamboo (*Phyllostachys* sp.), common cattail (*Typha latifolia*), multiflora rose, Japanese knotweed (*Reynoutria japonica*), Japanese honeysuckle (*Lonicera japonica*), and/or kudzu (*Pueraria montana*). The North Carolina Native Plant Society (NCNPS) lists multiflora rose, Japanese knotweed, kudzu, and Japanese honeysuckle as each having a 'severe' threat (Rank 1 category) to native plant communities in North Carolina (NCNPS 2010). The NCNPS lists bamboo as having a 'significant' threat (Rank 2 category) to native plant communities in North Carolina. No ranking of threat to native plant communities is assigned for cattail by the NCNPS.

Figure 3a (Appendix A) presents the general locations (areal cover) of the aforementioned six nuisance plant species. Three stands of bamboo were found in or adjacent to the Site. The largest stand of bamboo (Bamboo Area 1; 0.88 acre) was present within the eastern portion of the Site, along the northern bank of the East Fork Pigeon River. The two, smaller, stands of bamboo were present along the southern shoulder of Old Michael Road (Bamboo Area 2; 0.09 acre) and the northern side of the road (Bamboo Area 3; 0.12 acre). While both of these latter two stands of bamboo occurred outside of the Site boundary, they were considered to be a potential seed source for this nuisance species. A cattail area (Cattail Area 1; 0.61 acre) was present within the north-central portion of the Site, within a shallow inundated shrub/groundstory opening of the bottomland hardwood forest. Two smaller areas of cattail were also present on the Site: Cattail Area 2 (0.06 acre) occurred within the western portion of the Site and Cattail Area 3 (0.002 acre) existed near the southeast corner of the Site. Kudzu occurred on or

adjacent to the Site at three locations. Kudzu Area 1 (0.24 acre) abutted the northwest boundary of the Site along the southern shoulder of Old Michael Road, while Kudzu Area 2 (0.11 acre) and a Japanese Knotweed/Kudzu Area (0.02 acre) occurred within the southeastern portion of the Site in the bottomland hardwood forest. Japanese knotweed was sparsely scattered within the southeastern portion of the Site. The two observed locations of Japanese knotweed include Japanese Knotweed Area 1 (0.06 acre) and the Japanese Knotweed/Kudzu Area (0.02 acre). Multiflora rose was scattered throughout the bottomland hardwood forest, under the forest canopy and within the shrub openings. With regard to density and areal coverage, multiflora rose was the most common of the six nuisance plant species observed on the Site. Japanese honeysuckle was sparsely scattered throughout the bottomland hardwood forest. The boundaries (areal cover) of the aforementioned areas of nuisance plant species occurrence were obtained through global positioning system (GPS) technology, via October 2010 field reconnaissance conducted by AMEC.

# 3.0 IMPLEMENTATION OF MITIGATION PLAN

## 3.1 Mitigation Plan 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.

## 3.2 Nuisance Plant Species Control

The control of nuisance plant species within the bottomland hardwood forest and shrub/groundstory open areas on the Site entailed the treatment of the aforementioned six nuisance plant species (Figure 3a). 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 in Bamboo Area 1 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 control treatments were conducted by HARP. The treatment periods included: June 5, 2012 through November 2, 2012 (all week days except if raining) and April 17, 2013 through June 2, 2013 (all week days except if raining). AMEC inspected the treated areas of the Site on July 13, 2013 and November 6, 2013 The nuisance plant species were treated for two growing seasons prior to the planting of the Site. Note: EEP postponed the planting of the Site to allow for an additional growing season of nuisance species control prior to planting.

A control treatment was conducted for Chinese privet (*Ligustrum sinense*) in December 2013 by HARP. Chinese privet was scattered throughout the bottomland hardwood forest, as was multiflora rose.

Two upland areas that were infested with bamboo were included in the nuisance plant species control effort. The two areas were located outside of the Conservation Easement, along the south side (Bamboo Area 2) and the north side (Bamboo Area 3) of Old Michael Road (Figure 3a).

Figure 3b (Appendix A) presents the locations (areal cover) of two areas of living stems of multiflora rose which were observed during a January 2014 field reconnaissance conducted by AMEC, after the plant installation effort was completed. The boundaries of these two areas were obtained through GPS technology. Both areas will be treated by an EEP nuisance plant species control contractor in the 2014

growing season. Follow up treatments for the control of all nuisance plant species within the bottomland hardwood forest and shrub/groundstory open areas on the Site will be conducted through the wetland monitoring term as necessary.

### 3.3 Wetland Planting Plan

In addition to the control of nuisance plant species, the Wetland Mitigation Plan entailed the installation of wetland plant species within the Site. Subsequent to nuisance species control, a portion of the jurisdictional wetlands were planted in December of 2013 with wetland tree and shrub species. The planting periods included December 19 through 23 and December 26 through 29, 2013. Tree and shrub species were selected that were native to Haywood County and/or common to the bottomland hardwood forested community along the East Fork Pigeon River. The planting operation was conducted by Habitat Assessment & Restoration Professionals (HARP) (Charlotte, NC). Prior to plant installation, discussions were completed among staff from HARP, AMEC, and EEP to finalize the planting palette. Figure 4 (Appendix A) presents the boundaries of the four wetland areas within the bottomland hardwood forest / shrub and groundstory openings of the Site that were planted in December 2013. Figure 5 (Appendix A) presents these four wetland planting areas and the approved jurisdictional wetlands boundary. Table 1 presents information on the December 2013 planting plan specifications: plant species (common name and scientific name); quantity installed; and USACE wetness tolerance. The size of

**Table 1. Installed Plant Material (December 2013) for the East Fork Pigeon River Wetlands Project, Wetland Mitigation Plan, Haywood County, North Carolina.**

| Common Name | Scientific Name[1] | Number of Tree/Shrub Seedlings to Plant | Wetness Tolerance[2] |
|---|---|---|---|
| Wetland Area 1 (0.29 acre) | | | |
| Black gum | *Nyssa sylvatica* | 100 | FAC |
| Tulip tree | *Liriodendron tulipifera* | 100 | FAC |
| Sycamore | *Platanus occidentalis* | 100 | FACW- |
| Subtotal | | 300 | |
| Wetland Area 2 (1.05 acre) | | | |
| Black gum | *Nyssa sylvatica* | 100 | FAC |
| Sycamore | *Platanus occidentalis* | 200 | FACW- |
| Green ash | *Fraxinus pennsylvanica* | 200 | FACW |
| Silky dogwood | *Cornus amomum* | 300 | FACW+ |
| Subtotal | | 800 | |
| Wetland Area 3 (0.19 acre) | | | |
| Sycamore | *Platanus occidentalis* | 100 | FACW- |
| Green ash | *Fraxinus pennsylvanica* | 100 | FACW |
| Tulip tree | *Liriodendron tulipifera* | 100 | FAC |
| Subtotal | | 300 | |

| | | | |
|---|---|---|---|
| Wetland Area 4 (0.73 acre) | | | |
| Black gum | *Nyssa sylvatica* | 300 | FAC |
| Tulip tree | *Liriodendron tulipifera* | 300 | FAC |
| Sycamore | *Platanus occidentalis* | 200 | FACW- |
| Green ash | *Fraxinus pennsylvanica* | 300 | FACW |
| Shumard oak | *Quercus shumardii* | 10 | FACW- |
| Silky dogwood | *Cornus amomum* | 300 | FACW+ |
| Elderberry | *Sambucus canadensis* | 50 | FACW- |
| Subtotal | | 1460 | |
| **Total (2.26 acres)** | | **2860** | |
| Treated Upland Bamboo Areas (0.21 acre) | | | |
| Black locust | *Robinia pseudoacacia* | 30 | UPL |
| Red mulberry | *Morus rubra* | 30 | FAC |
| Coralberry | *Symphoricarpos orbiculatus* | 25 | FAC- |
| **Total** | | 85 | |

[1] Taxonomic nomenclature based on Alan S. Weakley in *Flora of the Southern and Mid-Atlantic States*, March 8, 2010 Working Draft, University of North Carolina Herbarium.
[2] Wetness Tolerance based on Plant Indicator Status in *National List of Plant Species That Occur in Wetlands (Region 2 - Southeast)*, Resource Management Group, Inc., 1999. Abbreviations: FACW = Facultative Wetland; FAC = Facultative; UPL = Upland.

wetland planting Areas 1, 2, 3, and 4 were 0.29, 1.05, 0.19, and 0.73 acres, respectively. The total wetland planting area on the Site was 2.26 acres. The boundaries (and acreage values) of the four planting areas were obtained through GPS technology, via January 2014 field reconnaissance conducted by AMEC. The wetland plant material was comprised of five species of wetland trees and two wetland shrub species. The tree species included: black gum (*Nyssa sylvatica*); green ash (*Fraxinus pennsylvanica*); sycamore (*Platanus occidentalis*); tulip tree (*Liriodendron tulipifera*); and shumard oak (*Quercus shumardii*). The shrub species included silky dogwood (*Cornus amomum*) and elderberry (*Sambucus canadensis*)]. Bareroot seedlings were installed in planting Areas 1, 2, and 3. A combination of one-gallon stock and bareroot seedlings was installed in planting Area 4. Tree shelters ("Blue-X" brand) were installed over the planted seedlings in all four planting areas. The tree shelters were to provide protection from wildlife depredation and wind. Minor field adjustments during the planting operation were made; i.e., moving the planting location of tree or shrub seedlings when obstacles were encountered, such as logs or stump holes. 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 would essentially restore the hardwood overstory of the wetlands. Finally, the control of nuisance plant species prior to the planting effort was necessary to facilitate the growth of the plant material; i.e., competition for nutrients with nuisance plant species would be significantly reduced.

The Wetland Planting Plan 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 boundary of the wetland planting area on the Site was delineated in 2010 by AMEC. Based on GPS technology, the size of the original (proposed) planting area was 5.64 acres. The size of the final (actual) planting area, where the plant material was installed in December 2013, was 2.26 acres. This reduction in planting area (3.38 acres) was attributed to the exclusion of portions of the original planting area that were deemed to be unsuitable for the installation of plant material in December 2013; specifically, pockets (clusters) of shrub vegetation or scattered trees that were considered to be too dense to successfully plant seedlings.

Two upland areas that occurred along the south side and the north side of Old Michael Road were also planted in December 2013. These areas are identified as Bamboo Area 2 (0.09 acre) and Bamboo Area 3 (0.12 acre) on Figure 3a. The two areas were infested with mature bamboo. The bamboo was removed and the two areas were planted with one-gallon stock of black locust (*Robinia pseudoacacia*) and red mulberry (*Morus rubra*). Coralberry (*Symphoricarpos orbiculatus*), a deciduous shrub, was also planted. No tree shelters were used. Both areas were located outside of the Conservation Easement.

### 3.4 Ground Level Site Photography

Ground level photography of site conditions within wetland planting Areas 1, 2, 3, and 4 was acquired during the January 2014 field reconnaissance conducted by AMEC. The photographic log is included in Appendix B.

### 3.5 Project Components

The Mitigation Plan for the Site was implemented with the following results:

- A total reach of 1,411 linear feet of East Fork Pigeon River. Reach includes a 30-foot buffer from edge of bank on each side of the channel.

- A total reach of 664 linear feet of perennial stream (unnamed tributary of East Fork Pigeon River). Reach includes a 30-foot buffer from edge of bank on each side of the channel.
- The planting of 2.26 acres of bottomland hardwood forest wetland within the Conservation Easement (installation of woody tree and shrub seedlings).
- Non-planted area of 11.69 acres of bottomland hardwood forest wetland within the Conservation Easement.
-

Table 2 also presents the aforementioned project components.

**Table 2. Project Components for the East Fork Pigeon River Wetlands Project, Wetland Mitigation Plan, Haywood County, North Carolina.**

| Wetland/Stream Feature[1] | Quantity of On-Site Habitat[2] |
|---|---|
| East Fork Pigeon River | 1,411 linear feet |
| Perennial Stream | 664 linear feet |
| Bottomland Hardwood Forest – Planted | 2.26 acres |
| Bottomland Hardwood Forest – Not Planted | 11.69 acres |

[1] Four wetland areas were planted in December 2013, totaling 2.26 acres within the Conservation Easement. Chemical/hand treatments of nuisance plant species were conducted prior to the installation of tree and shrub seedlings within the wetland. A total of 11.69 acres of wetland with an existing midstory and overstory within the Conservation Easement was not planted.
[2] Stream reach includes a 30-foot buffer from edge of bank on each side of the channel.

## 4.0 MONITORING PLAN

Using the EEP Baseline Monitoring Plan template (version 2.0, October 14, 2010), a baseline monitoring document will be developed. Annual monitoring data will be reported using the EEP Monitoring Report template (version 1.5, June 8, 2012). The monitoring report shall provide a project data chronology that will facilitate an understanding of project status and trends, population of EEP databases for analysis, research purposes, and assist in decision making regarding project close-out. The monitoring period will extend at least five years beyond completion of project planting or until performance criteria have been met.

# 5.0 SITE PROTECTION AND ADAPTIVE MANAGEMENT STRATEGY

## 5.1 Legal Protection of Wetland Mitigation Area

The wetland mitigation area will be protected through the establishment of a Conservation Easement. The Conservation Easement is held by the State of North Carolina. The Conservation Easement was recorded at the Haywood County Courthouse on December 10, 2010 (Deed Book: RB 795; Deed Page: 450-459).

## 5.2 Long Term Management Plan

Upon approval for close-out by the Interagency Review Team (IRT) the site will be transferred to the NCDENR Division of Natural Resource Planning and Conservation's Stewardship Program. This party shall be responsible for periodic inspection of the site to ensure that restrictions required in the Conservation Easement or the deed restriction document(s) are upheld. Endowment funds required to uphold easement and deed restrictions shall be negotiated prior to site transfer to the responsible party. The NCDENR Division of Natural Resource Planning and Conservation's Stewardship Program currently houses EEP stewardship endowments within the non-reverting, interest-bearing Conservation Lands Stewardship Endowment Account. The use of funds from the Endowment Account is governed by North Carolina General Statute GS 113A-232(d)(3). Interest gained by the endowment fund may be used only for the purpose of stewardship, monitoring, stewardship administration, and land transaction costs, if applicable. The NCDENR Stewardship Program intends to manage the account as a non-wasting endowment. Only interest generated from the endowment funds will be used to steward the compensatory mitigation sites. Interest funds not used for those purposes will be re-invested in the Endowment Account to offset losses due to inflation.

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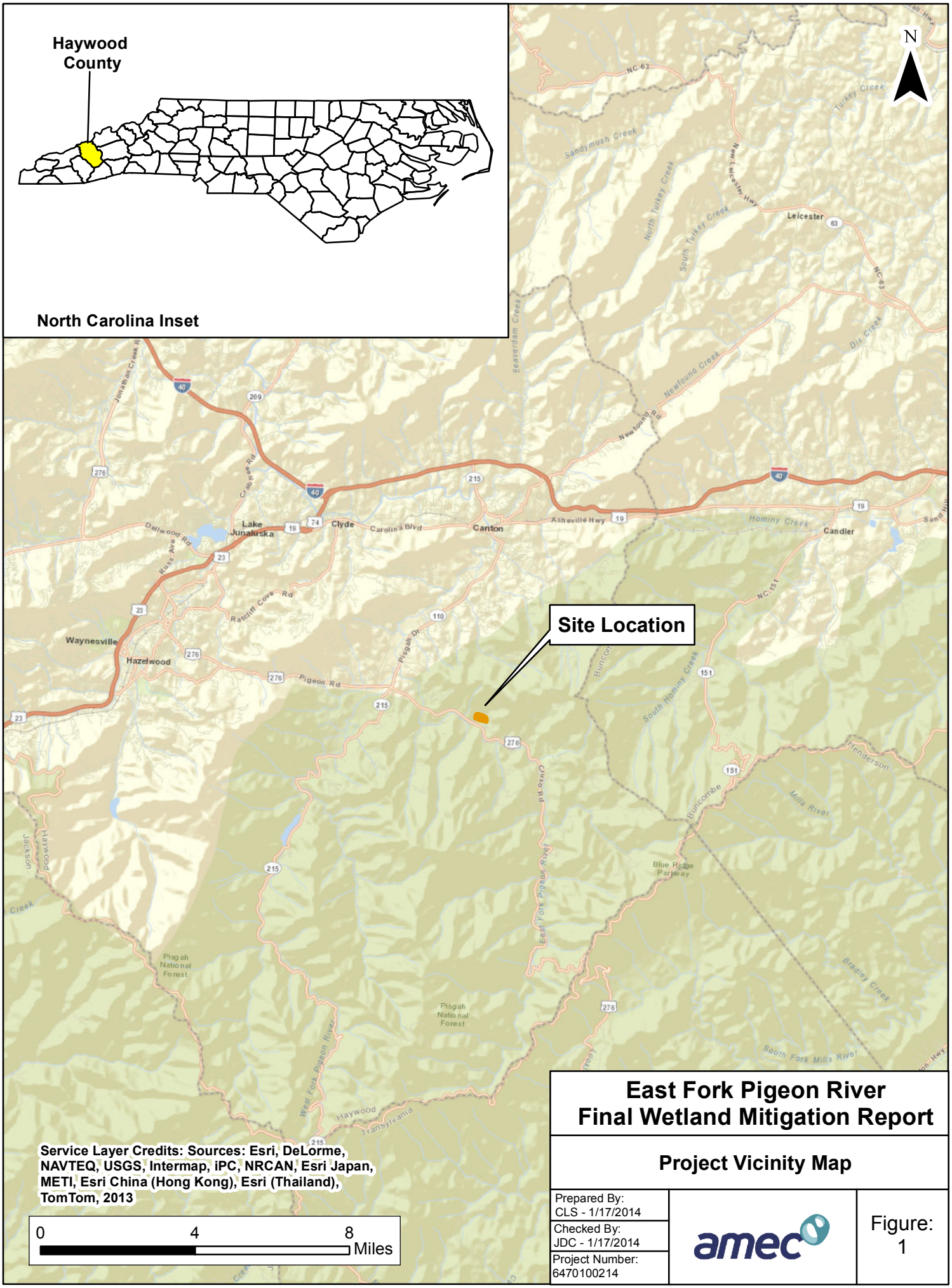
# APPENDIX A

# FIGURES

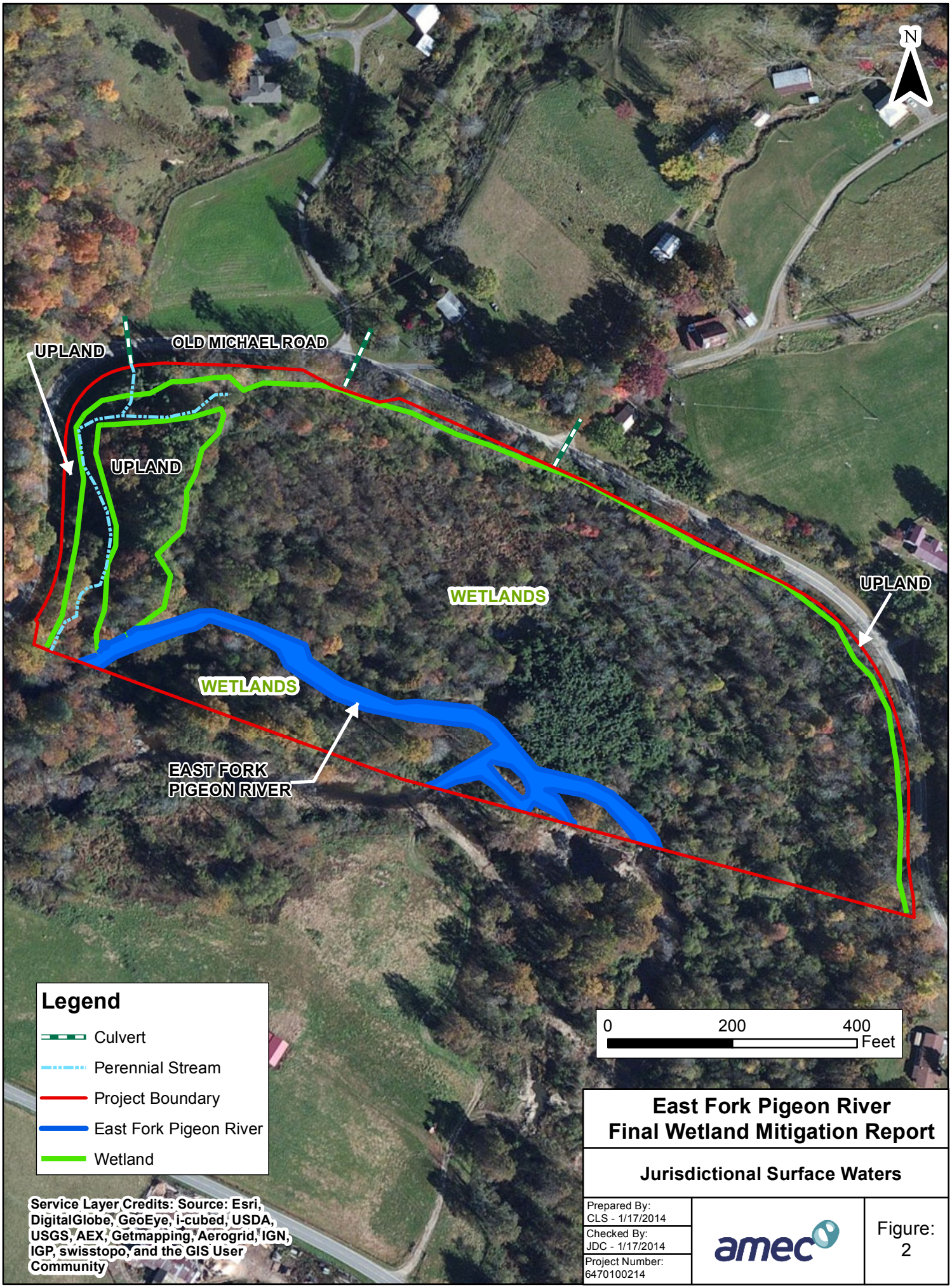



# East Fork Pigeon River Final Wetland Mitigation Report

## Project Vicinity Map

| | | |
|---|---|---|
| Prepared By: CLS - 1/17/2014 | amec | Figure: 1 |
| Checked By: JDC - 1/17/2014 | | |
| Project Number: 6470100214 | | |

Document Path: G:\East Fork Pigeon River\MXD\Site Location.mxd

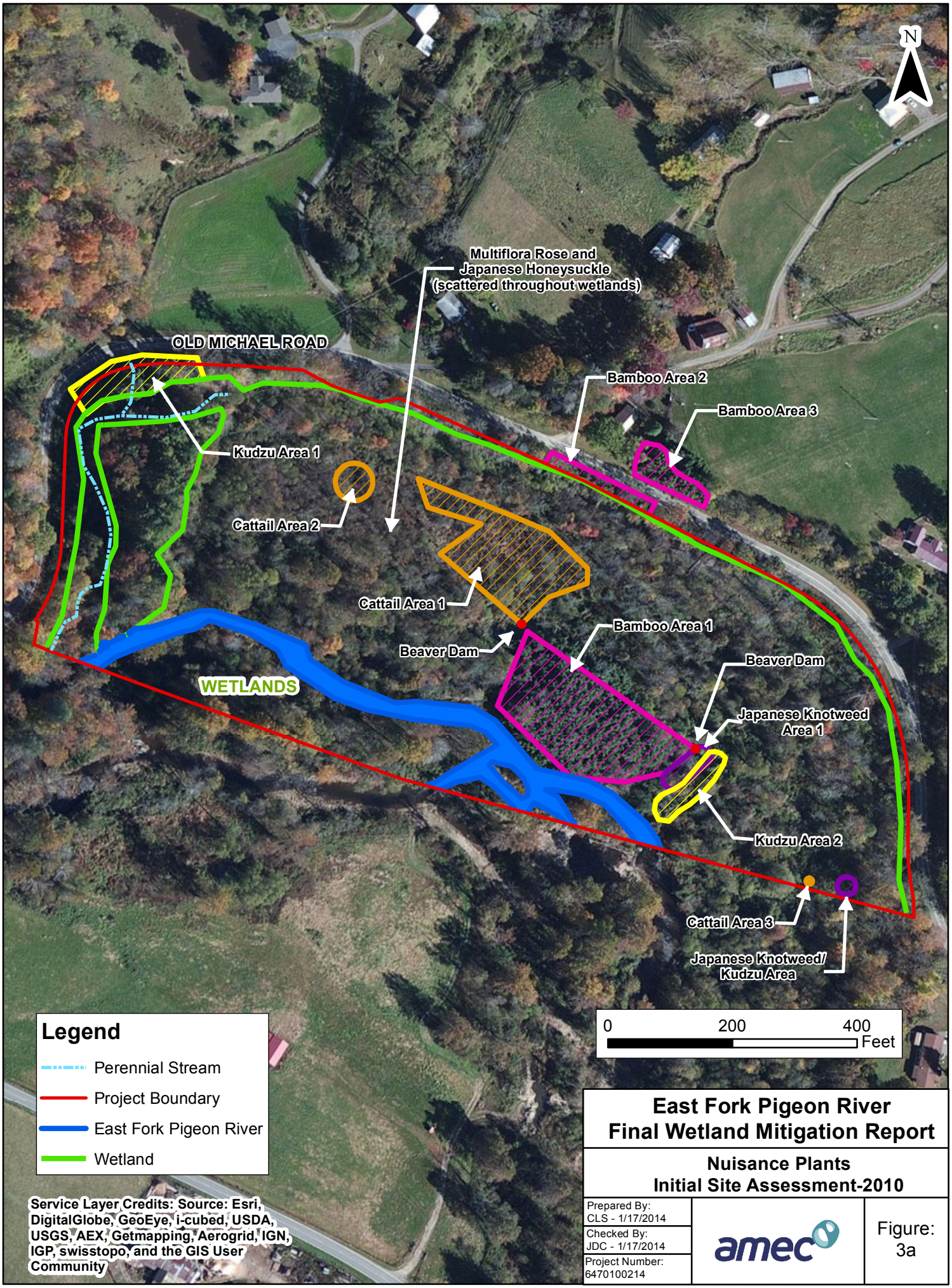



Document Path: G:\East Fork Pigeon River\MXD\JD Surface Water.mxd

**East Fork Pigeon River**
**Final Wetland Mitigation Report**

**Jurisdictional Surface Waters**

| | | |
|---|---|---|
| Prepared By: CLS - 1/17/2014 | amec | Figure: 2 |
| Checked By: JDC - 1/17/2014 | | |
| Project Number: 6470100214 | | |




Document Path: G:\East Fork Pigeon River\MXD\Nuisance_Plants.mxd

**East Fork Pigeon River**
**Final Wetland Mitigation Report**

**Nuisance Plants**
**Initial Site Assessment-2010**

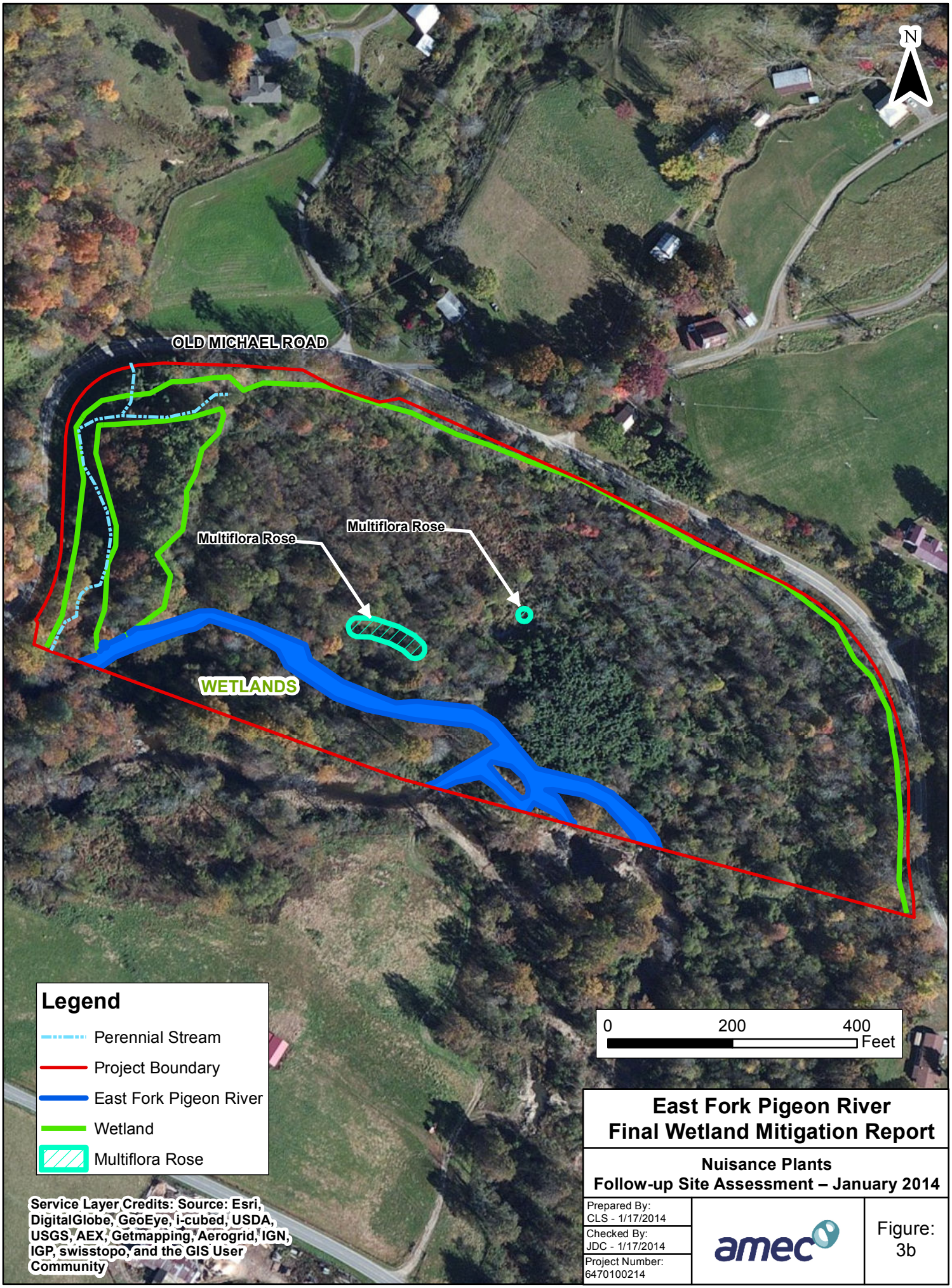
Prepared By:
CLS - 1/17/2014

Checked By:
JDC - 1/17/2014

Project Number:
6470100214

amec

Figure:
3a




Document Path: G:\East Fork Pigeon River\MXD\Nuisance_Plants_2014.mxd

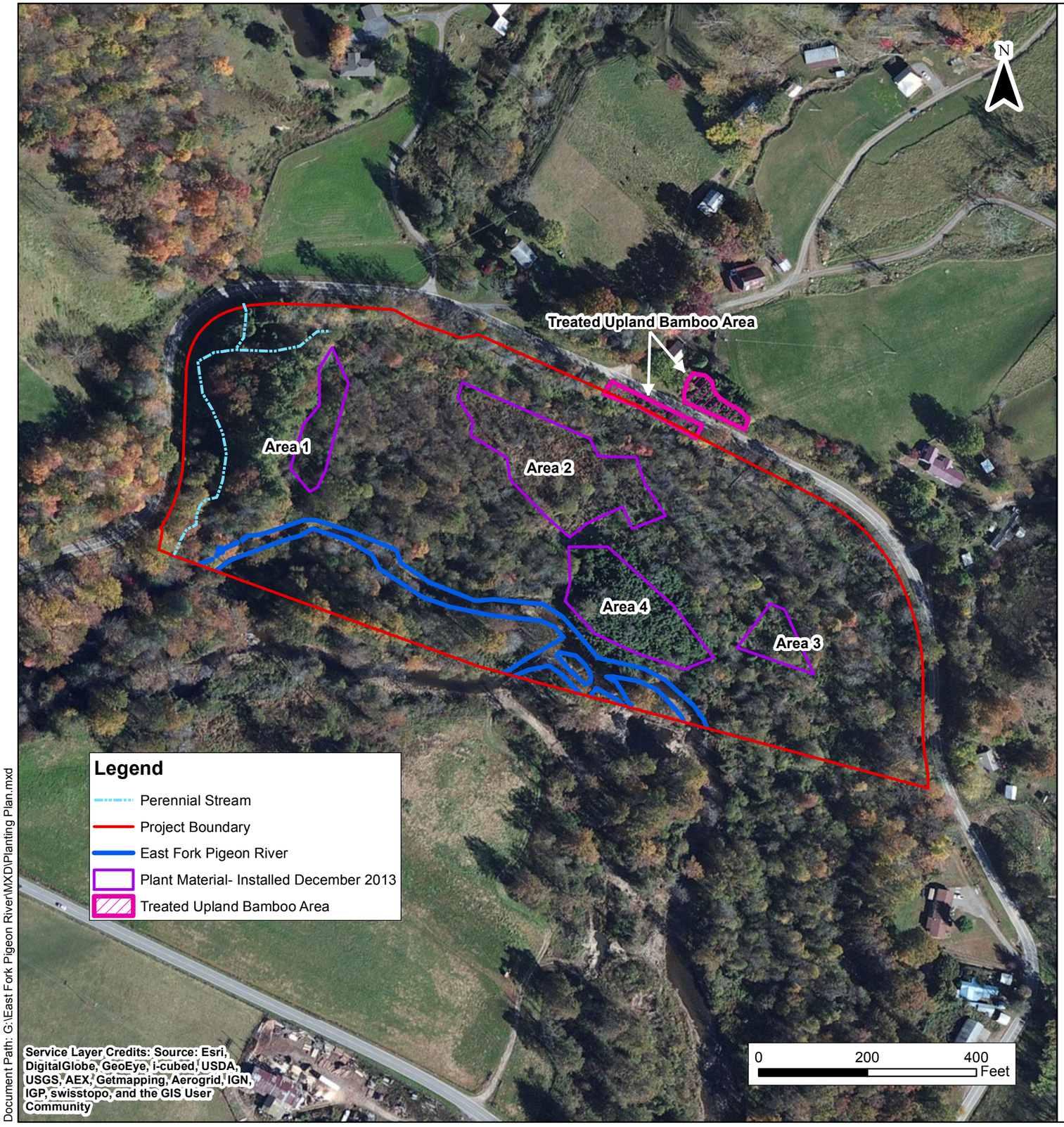
**East Fork Pigeon River**
**Final Wetland Mitigation Report**

**Nuisance Plants**
**Follow-up Site Assessment – January 2014**

Prepared By: CLS - 1/17/2014
Checked By: JDC - 1/17/2014
Project Number: 6470100214

amec

Figure: 3b




Document Path: G:\East Fork Pigeon River\MXD\Planting Plan.mxd

**Installed Plant Material (December 2013) for the East Fork Pigeon River Wetlands Project, Wetland Mitigation Plan, Haywood County, North Carolina.**

| Common Name | Scientific Name[1] | Number of Tree/Shrub Seedlings to Plant | Wetness Tolerance[2] |
|---|---|---|---|
| Wetland Area 1 (0.29 acre) | | | |
| Black gum | *Nyssa sylvatica* | 100 | FAC |
| Tulip tree | *Liriodendron tulipifera* | 100 | FAC |
| Sycamore | *Platanus occidentalis* | 100 | FACW- |
| Subtotal | | 300 | |
| Wetland Area 2 (1.05 acres) | | | |
| Black gum | *Nyssa sylvatica* | 100 | FAC |
| Sycamore | *Platanus occidentalis* | 200 | FACW- |
| Green ash | *Fraxinus pennsylvanica* | 200 | FACW |
| Silky dogwood | *Cornus amomum* | 300 | FACW+ |
| Subtotal | | 800 | |
| Wetland Area 3 (0.19 acre) | | | |
| Sycamore | *Platanus occidentalis* | 100 | FACW- |
| Green ash | *Fraxinus pennsylvanica* | 100 | FACW |
| Tulip tree | *Liriodendron tulipifera* | 100 | FAC |
| Subtotal | | 300 | |
| Wetland Area 4 (0.73 acre) | | | |
| Black gum | *Nyssa sylvatica* | 300 | FAC |
| Tulip tree | *Liriodendron tulipifera* | 300 | FAC |
| Sycamore | *Platanus occidentalis* | 200 | FACW- |
| Green ash | *Fraxinus pennsylvanica* | 300 | FACW |
| Shumard oak | *Quercus shumardii* | 10 | FACW- |
| Silky dogwood | *Cornus amomum* | 300 | FACW+ |
| Elderberry | *Sambucus canadensis* | 50 | FACW- |
| Subtotal | | 1460 | |
| **Total (2.26 acres)** | | **2860** | |
| Treated Upland Bamboo Area (0.21 acre) | | | |
| Black locust | *Robinia pseudoacacia* | 30 | UPL |
| Red mulberry | *Morus rubra* | 30 | FAC |
| Coralberry | *Symphoricarpos orbiculatus* | 25 | FAC- |
| **Total** | | 85 | |

[1] Taxonomic nomenclature based on Alan S. Weakley in *Flora of the Southern and Mid-Atlantic States*, March 8, 2010 Working Draft, University of North Carolina Herbarium.

[2] Wetness Tolerance based on Plant Indicator Status in *National List of Plant Species That Occur in Wetlands (Region 2 - Southeast)*, Resource Management Group, Inc., 1999. Abbreviations: FACW = Facultative Wetland; FAC = Facultative; UPL = Upland.

**East Fork Pigeon River**
**Final Wetland Mitigation Report**

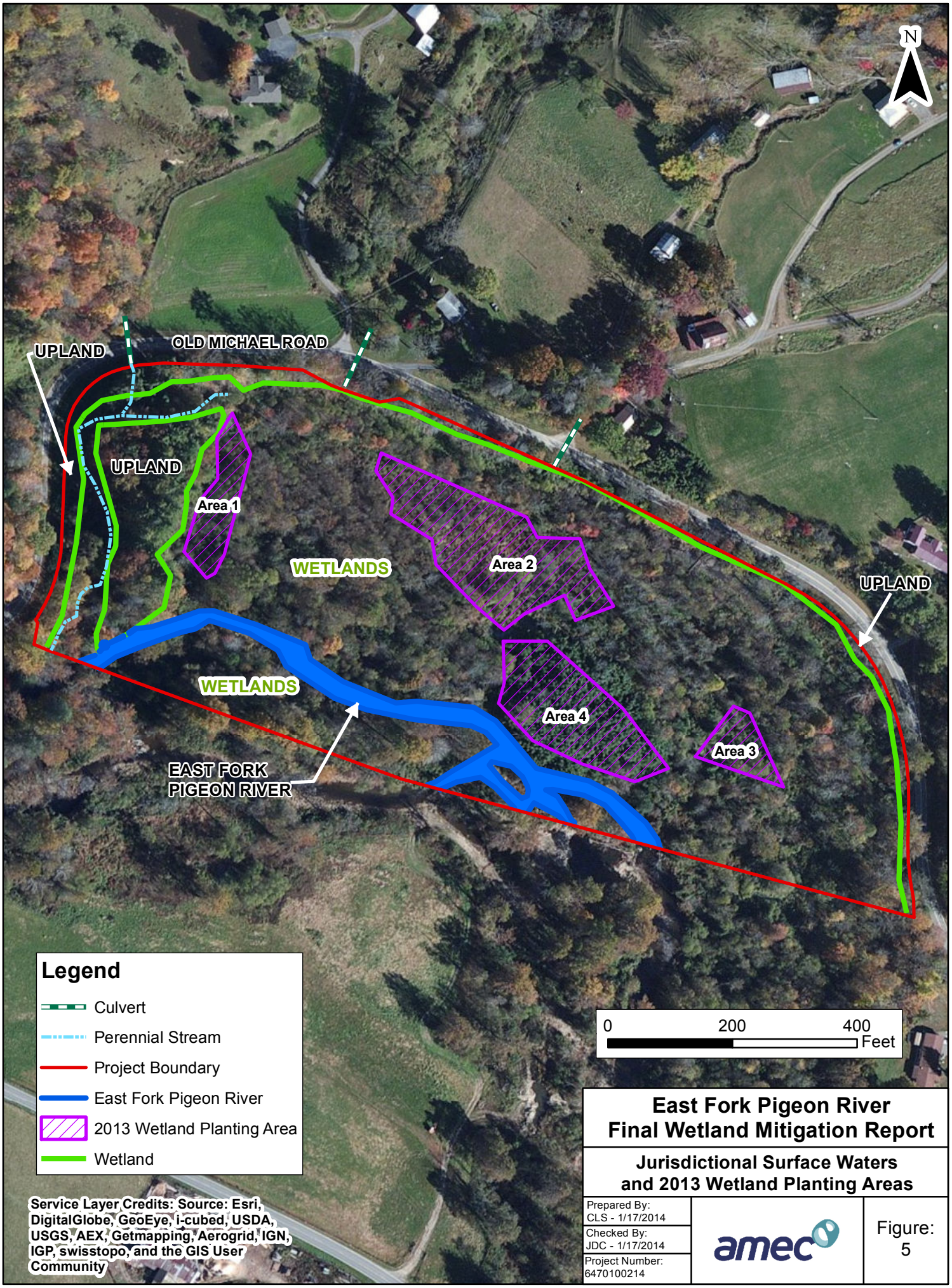
**Haywood County, North Carolina**

**Planting Plan and Species Composition**
**December 2013**

Prepared By: CLS - 1/17/2014
Checked By: JDC - 1/17/2014
Project Number: 6470100214

amec

Figure: 4

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**East Fork Pigeon River**
**Final Wetland Mitigation Report**

**Jurisdictional Surface Waters and 2013 Wetland Planting Areas**

Prepared By: CLS - 1/17/2014
Checked By: JDC - 1/17/2014
Project Number: 6470100214

amec

Figure: 5

# APPENDIX B

# GROUND LEVEL SITE PHOTOGRAPHY

**PHOTOGRAPHIC LOG -**
**EAST FORK PIGEON RIVER WETLANDS PROJECT**
**Haywood County, North Carolina**

Photograph #1: View to the south of wetland planting Area 1; photograph taken from the northern end of the planting area (January 13, 2014).

Photograph #2: View to the north of wetland planting Area 1; photograph taken from the southern end of the planting area (January 13, 2014).

Photograph #3: View to the north of wetland planting Area 2; photograph taken from the southern end of the planting area (January 13, 2014).

Photograph #4: View to the west of wetland planting Area 2; photograph taken from the eastern end of the planting area (January 13, 2014).

Photograph #5: View to the east of wetland planting Area 2; photograph taken from the western end of the planting area (January 13, 2014).

Photograph #6: View to the south of wetland planting Area 3; photograph taken from the northern end of the planting area (January 13, 2014).

Photograph #7: View to the northwest of wetland planting Area 3; photograph taken from the southern end of the planting area (January 13, 2014).

Photograph #8: View to the northwest of wetland planting Area 4; photograph taken from the southeastern corner of the planting area (January 13, 2014).

Photograph #9: View to the southeast of wetland planting Area 4; photograph taken from the northwestern corner of the planting area (January 13, 2014).

Photograph #10: View of a small pocket of live multiflora rose within the project wetlands; west-central portion of the project site (January 13, 2014).

Photograph #11: View of treated upland bamboo area on north side of Old Michael Road; bamboo removed and area replanted with upland hardwood seedlings (January 13, 2014).