

**Year 1 Monitoring Report**

**Bucky's Branch Mitigation Project**

**DMS Project #: 100109 | Contract #: 7861 | DWR # 2019-1404 | RFP: 16-007703**

Randolph County, North Carolina  
Cape Fear River Basin  
Randleman Lake Watershed  
HUC 03030003



**Prepared By:**



Resource Environmental Solutions, LLC  
For Environmental Banc and Exchange, LLC

**Prepared For:**

NC Department of Environmental Quality  
Division of Mitigation Services

**January 2021**



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January 6, 2021

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RE: Bucky's Branch Mitigation Site: Year 1 Draft Monitoring Report (NCDMS ID 100109)

Listed below are comments provided by DMS on January 5, 2021 regarding the Bucky's Branch Mitigation Site Draft Year 1 Monitoring Report and RES' responses.

1. Section 1.3 – The first sentence states: "This Project generates approximately 183,312.294 ft<sup>2</sup> (4.21 acres) of riparian buffer mitigation credits..." Please remove the word approximately, and the reference to ft<sup>2</sup> and acres so it reads "This Project generates 183,312.294 riparian buffer mitigation credits..." Alternatively, you can state "This project consists of 253,562 ft<sup>2</sup> (5.82 acres) of buffer restoration and enhancement via cattle exclusion which generates 183,312.294 riparian buffer mitigation credits..."

[Done.](#)

2. The CVS database that was submitted is generating an error that says "The Microsoft Access database engine could not find the object MSysDb." and it cannot be opened. Please address this error and resubmit.

[This error has been addressed.](#)

3. Please submit monitoring photos as JPEGs.

[Done.](#)

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# **1 Project Summary**

## ***1.1 Project Location and Description***

The Bucky's Branch Project is within the Randleman Lake Watershed of the Cape Fear River Basin within the 8-digit Hydrologic Unit Code (HUC) 03030003, 14-digit HUC 03030003010060 and DWR Subbasin Number 03-06-08.

The Project is located in Randolph County approximately 3 miles southeast of Glenola, North Carolina (**Figure 1**). To access the Project head east on Banner Whitehead Road from I-74 and turn left on Farlowe Davis Drive; the Project is approximately 0.25 miles north on the left. The coordinates are 35.859 °N and -79.881 °W.

Environmental Banc & Exchange, LLC (EBX), a wholly owned subsidiary of Resource Environmental Solutions (RES), is pleased to provide this Monitoring Report for the Bucky's Branch Riparian Buffer Mitigation Project (Project) as a full-delivery buffer mitigation project for the Division of Mitigation Services (DMS) (DMS #100109). This Project provides riparian buffer mitigation credits for unavoidable impacts due to development within the Randleman Lake Watershed of the Cape Fear River Basin, United States Geological Survey (USGS) 8-digit Hydrologic Unit Code (HUC – 03030003) (**Figure 1**). The Project is in accordance with the Consolidated Buffer Mitigation Rule 15A NCAC 02B .0295 and the Randleman Lake Water Supply Watershed Buffer Rule 15A NCAC 02B .0250.

The conservation easement of the Bucky's Branch Project totals approximately 6.17 acres and includes one unnamed tributary that drains into Randleman Lake approximately 0.75 miles downstream of the Project. Land use within the Project is primarily non-forested pasture and grazed riparian forest. The Project area has been used extensively for agricultural purposes for over 70 years. The lack of forested riparian buffer, long-term presence of livestock, and past land management actions are all contributing water quality stressors and have led to the loss of bank stabilizing vegetation.

The goal of the Project is to restore and enhance ecological function to the existing stream and riparian area by establishing appropriate plant communities while minimizing temporal and land disturbing impacts. Restoration of a native hardwood forest to the riparian buffer and surrounding areas and the removal of livestock aid in filtering runoff from agricultural fields, thereby reducing nutrient and sediment loads to Project channels and the overall watershed. Restoration and enhancement of the Randleman Lake riparian buffer and surrounding area (as defined in 15A NCAC 02B .0250) results in a reduction of the water quality stressors that affected the Project: livestock access and a lack of vegetated riparian buffer. Immediate water quality benefits and pollutant removal within the vicinity of the Project include the exclusion of livestock access to streams and reduction in nutrient loads from agricultural land-uses. This Project is consistent with the management strategy for maintaining and protecting riparian areas in the Randleman Lake watershed. Project attributes are summarized in **Table 1**.

## ***1.2 Monitoring Protocol and Project Success Criteria***

Annual vegetation monitoring and visual assessments will be conducted. Riparian vegetation monitoring is based on the "Carolina Vegetation Survey-Ecosystem Enhancement Program Protocol for Recording Vegetation: Level 2 Plot Sampling Only Version 4.2". Monitoring plots were installed a minimum of 100 meters squared in size and cover at least two percent of the planted mitigation area. These plots were randomly placed throughout the planted riparian buffer mitigation area (4.83 acres) and are representative of the riparian restoration and enhancement areas where applicable (i.e. when enhancement credit is being

generated from supplemental planting under 15A NCAC 02B .0295 (n)). The following data is recorded for all trees in the plots: species, height, planting date (or volunteer), and grid location. All stems in plots are flagged with flagging tape. Data is processed using the CVS data entry tool. In the field, the four corners of each plot were permanently marked with PVC at the origin and metal conduit at the other corners. Photos of each plot are to be taken from the origin each monitoring year. There are four fixed vegetation monitoring plots (**Figure 2**).

Photos are to be taken at all vegetation plot origins each monitoring year and be provided in the annual reports. Visual inspections and photos will be taken to ensure that enhancement areas are being maintained and compliant. The measures of vegetative success for the Project are the survival of at least four native hardwood tree species, where no one species is greater than 50 percent of stems, at a density of at least 260 stems per acre at the end of Year 5. Native volunteer species may be included to meet the performance standards as determined by NC Division of Water Resources (DWR).

A visual assessment of the conservation easement is also performed each year to confirm:

- Fencing is in good condition throughout the site;
- No livestock access within the conservation easement area;
- No encroachment has occurred;
- No invasive species in areas where invasive species were treated,
- Diffuse flow is being maintained in the conservation easement areas; and
- There has not been any cutting, clearing, filling, grading, or similar activities that would negatively affect the functioning of the buffer.

| Component/<br>Feature            | Monitoring                   | Maintenance through project close-out  |
|----------------------------------|------------------------------|--|
| Vegetation                       | Annual vegetation monitoring | Vegetation shall be maintained to ensure the health and vigor of the targeted plant community. Routine vegetation maintenance and repair activities may include supplemental planting, pruning, mulching, and fertilizing. Exotic invasive plant species shall be treated by mechanical and/or chemical methods. Any vegetation requiring herbicide application will be performed in accordance with NC Department of Agriculture (NCDA) rules and regulations. Vegetation maintenance activities will be documented and reported in annual monitoring reports. Vegetation maintenance will continue through the monitoring period.  |
| Invasive and Nuisance Vegetation | Visual Assessment            | Invasive and noxious species will be monitored and treated so that none become dominant or alter the desired community structure of the Project. Locations of invasive and nuisance vegetation will be mapped.   |
| Project Boundary                 | Visual Assessment            | Project boundaries were identified in the field to ensure clear distinction between the mitigation project and adjacent properties. Boundaries shall be marked with signs identifying the property as a mitigation project and will include the name of the long-term steward and a contact number. Boundaries may be identified by fence, marker, bollard, post, tree-blazing, or other means as allowed by Project conditions and/or conservation easement. Boundary markers disturbed, damaged, or destroyed will be repaired and/or replaced on an as-needed basis. Easement monitoring and staking/signage maintenance will continue in perpetuity as a stewardship activity. |
| Livestock Fencing                | Visual Assessment            | Livestock fencing was placed outside the easement limits. Maintenance of fencing is the responsibility of the landowner.   |

### ***1.3 Project Components***

This Project generates 183,312.294 riparian buffer mitigation credits within a 6.17-acre conservation easement. These are derived from buffer restoration and buffer enhancement. The riparian buffer mitigation credits generated service Randleman Lake buffer impacts within the Randleman Lake Watershed. The total

mitigation credits that the Bucky’s Branch Mitigation Project generate are summarized below and a more detailed table is in **Appendix A**.

| <b>Mitigation Totals</b>         | <b>Used Area Square Feet</b> | <b>Credits</b>     |
|----------------------------------|------------------------------|--------------------|
| Restoration                      | 210,571                      | 161,815.794        |
| Enhancement via Cattle Exclusion | 42,993                       | 21,496.500         |
| <b>Total Riparian Buffer</b>     | <b>253,564</b>               | <b>183,312.294</b> |

### ***1.4 Riparian Mitigation Approach***

Restoration activities included planting a composition of native bare-root tree species based on reference reach data and excluding livestock from the stream and buffer area. The restoration of plant communities within the Project not only provide stabilization and improve water quality within the easement limits but also provide ecological benefits to the entire watershed.

Enhancement occurred in forested areas within the Project, along BY1, where grazing occurred adjacent to the stream in accordance with the Consolidated Buffer Mitigation Rule 15A NCAC 02B .0295 (o)(6) (**Figure 2**). All livestock was removed from the easement and the fence was installed to exclude access to riparian areas and their associated streams.

### ***1.5 Construction and As-Built Conditions***

Revegetation of the Site included treating invasive species and planting native hardwood bare root trees. Prior to planting, RES prepped the site by spraying and ripping the easement. Piedmont Alluvial Forest is the target community type for the riparian restoration areas. The community is defined by Schafale (2012). The planting of bare root trees occurred in May 2020. Deviations from the initial planting plan were due to bare root availability. A list of the planted species can be found in **Table 2**. Additionally, a temporary and permanent seed mixture was applied in areas where cattle caused bare areas. The mixture included black-eyed susan (*Rudbeckia hirta*) which is a perennial, pollinator species.

### ***1.6 Year 1 Monitoring Performance***

Monitoring of the four permanent vegetation plots was completed on November 4, 2020. Vegetation tables are in **Appendix B** and associated photos are in **Appendix C**. Year 1 monitoring data indicates that all plots are exceeding the success criteria of 260 planted stems per acre. Planted stem densities ranged from 405 to 728 planted stems per acre with a mean of 546 planted stems per acre across all plots. A total of 12 native species were documented within the plots. Volunteer species were noted at Year 1 monitoring and are expected to increase in upcoming years. The average tree height observed was 1.6 feet.

Visual assessment of vegetation outside of the monitoring plots indicates that the herbaceous vegetation is becoming well established throughout the project and no invasive species were observed. The fence has been installed, is in good condition, and is maintaining cattle exclusion. Additionally, there were no signs of encroachment or concentrated flow in the easement area.

## 2 **Reference**

Lee Michael T., Peet Robert K., Roberts Steven D., and Wentworth Thomas R., 2008. *CVS-EEP Protocol for Recording Vegetation Level*. Version 4.2

NC Environmental Management Commission. 2010. Rule 15A NCAC 02B .0250 - Randleman Lake Water Supply Watershed: Protection and Maintenance of Existing Riparian Buffers.

NC Environmental Management Commission. 2014. Rule 15A NCAC 02B.0295 - Mitigation Program Requirements for the Protection and Maintenance of Riparian Buffers.

Resource Environmental Solutions, LLC (2020). Bucky's Branch Mitigation Project – Final Mitigation Plan.

Schafale, M.P. 2012. Classification of the Natural Communities of North Carolina, Fourth Approximation. North Carolina Natural Heritage Program, Division of Parks and Recreation, NCDENR, Raleigh, NC.

# **Appendix A**

## **Project Background Tables and Site Maps**



**Table 1. Buffer Project Areas and Assets**

| <b>Credit Type</b> | <b>Location</b> | <b>Subject?</b> | <b>Feature Type</b> | <b>Mitigation Activity</b>       | <b>Min-Max Buffer Width (ft)</b> | <b>Feature Name</b> | <b>Total Area (sf)</b> | <b>Creditable Area (sf)</b> | <b>Initial Credit Ratio (x:1)</b> | <b>% Full Credit</b> | <b>Final Credit Ratio (x:1)</b> | <b>Riparian Buffer Credits</b> |
|--------------------|-----------------|-----------------|---------------------|----------------------------------|----------------------------------|---------------------|------------------------|-----------------------------|-----------------------------------|----------------------|---------------------------------|--------------------------------|
| Buffer             | Rural           | Yes             | I / P               | Restoration                      | 0-100                            | BY1                 | 137,802                | 137,802                     | 1                                 | 100%                 | 1                               | 137,802.000                    |
| Buffer             | Rural           | Yes             | I / P               | Enhancement via Cattle Exclusion | 0-100                            | BY1                 | 42,993                 | 42,993                      | 2                                 | 100%                 | 2                               | 21,496.500                     |
| Buffer             | Rural           | Yes             | I / P               | Restoration                      | 101-200                          | BY1                 | 72,769                 | 72,769                      | 1                                 | 33%                  | 3.0303                          | 24,013.794                     |
| <b>Total</b>       |                 |                 |                     |                                  |                                  |                     | <b>253,564</b>         |                             |                                   |                      |                                 | <b>183,312.294</b>             |

**Table 2. Project Activity and Reporting History  
Bucky's Branch Site**

**Elapsed Time Since planting complete: 7 months**  
**Number of reporting Years<sup>1</sup>: 1**

| <b>Activity or Deliverable</b>          | <b>Data Collection Complete</b> | <b>Completion or Delivery</b> |
|---|---------------------------------|-------------------------------|
| Restoration Plan                        | NA                              | Jan-20                        |
| Final Design – Construction Plans       | NA                              | NA                            |
| Stream Construction                     | NA                              | NA                            |
| Site Planting                           | NA                              | May-20                        |
| As-built (Year 0 Monitoring – baseline) | May-20                          | May-20                        |
| Year 1 Monitoring                       | Nov-20                          | Dec-20                        |
| Year 2 Monitoring                       |                                 |                               |
| Year 3 Monitoring                       |                                 |                               |
| Year 4 Monitoring                       |                                 |                               |
| Year 5 Monitoring                       |                                 |                               |

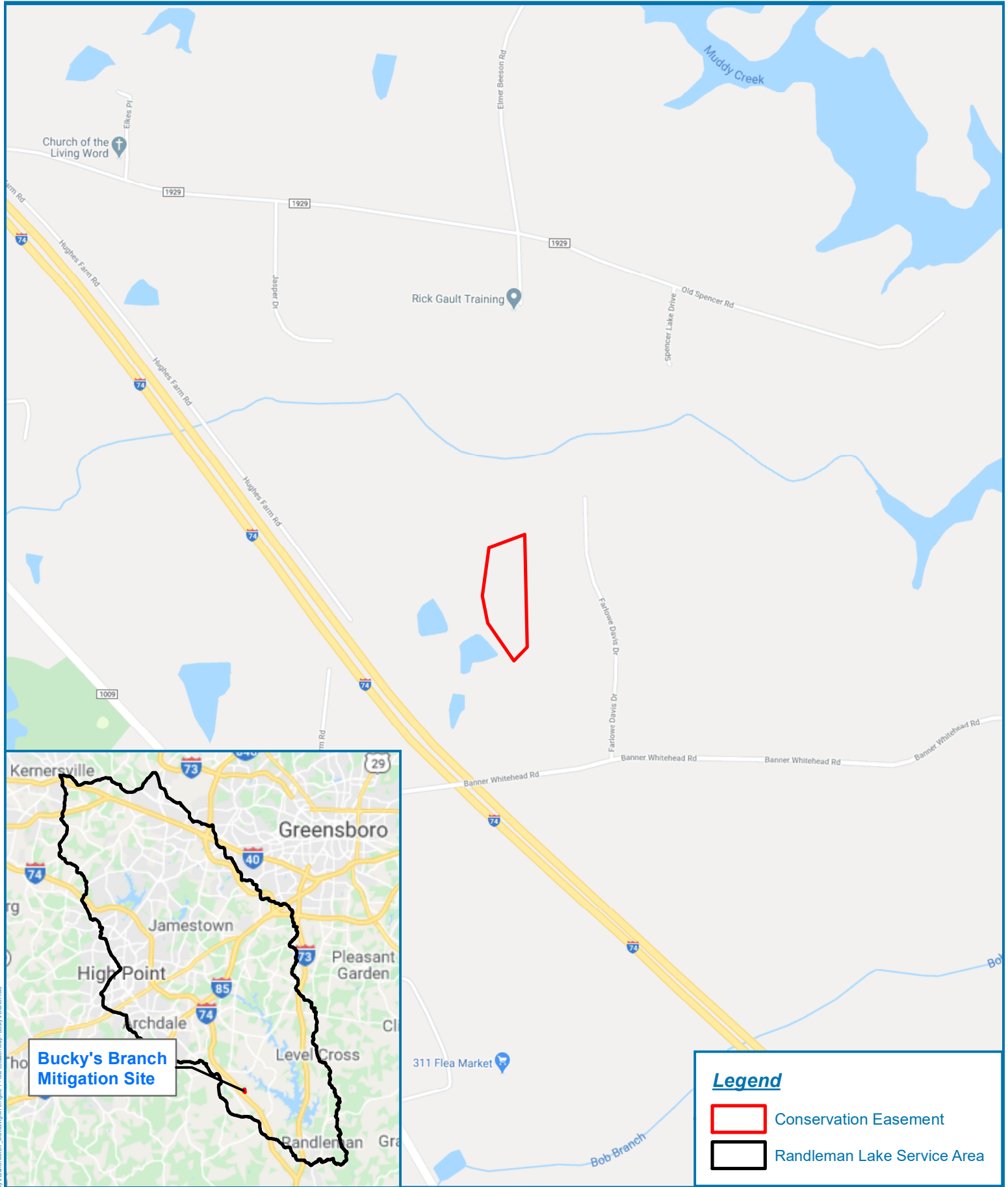
<sup>1</sup> = The number of reports or data points produced excluding the baseline

**Table 3. Project Contacts Table  
Bucky's Branch Site**

|                                |   |
|--------------------------------|---|
| <b>Planting Contractor</b>     | H&J Forestry  |
| Planting contractor POC        | Matt Hitch  |
| <b>Nursery Stock Suppliers</b> | Arborgen  |
| <b>Monitoring Performers</b>   | RES / 3600 Glenwood Ave, Suite 100, Raleigh, NC 27612 |
| Monitoring POC                 | Ryan Medric (919) 741-6268                            |

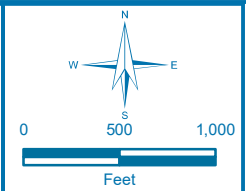
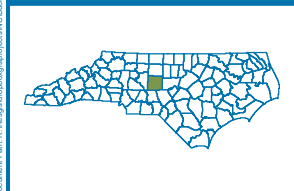
**Table 4. Project Background Information**

|   |   |                                      |                |
|---|---|--------------------------------------|----------------|
| <b>Project Name</b>                                   | Bucky's Branch                          |                                      |                |
| <b>County</b>   | Randolph                                |                                      |                |
| <b>Project Area (acres)</b>                           | 6.17                                    |                                      |                |
| <b>Project Coordinates (latitude and longitude)</b>   | Latitude: 35.859 N Longitude: -79.881 W |                                      |                |
| <b>Planted Acreage (Acres of Woody Stems Planted)</b> | 4.83                                    |                                      |                |
| <b>Project Watershed Summary Information</b>          |   |                                      |                |
| <b>Physiographic Province</b>                         | Southern Outer Piedmont                 |                                      |                |
| <b>River Basin</b>                                    | Cape Fear                               |                                      |                |
| <b>USGS Hydrologic Unit 8-digit</b>                   | 03030003                                | <b>USGS Hydrologic Unit 14-digit</b> | 03030003010060 |
| <b>DWR Sub-basin</b>                                  | 03-06-08                                |                                      |                |



**Legend**

- Conservation Easement
- Randleman Lake Service Area



**Figure 1 - Site Location Map**

**Bucky's Branch Mitigation Site**

**Randolph County, North Carolina**

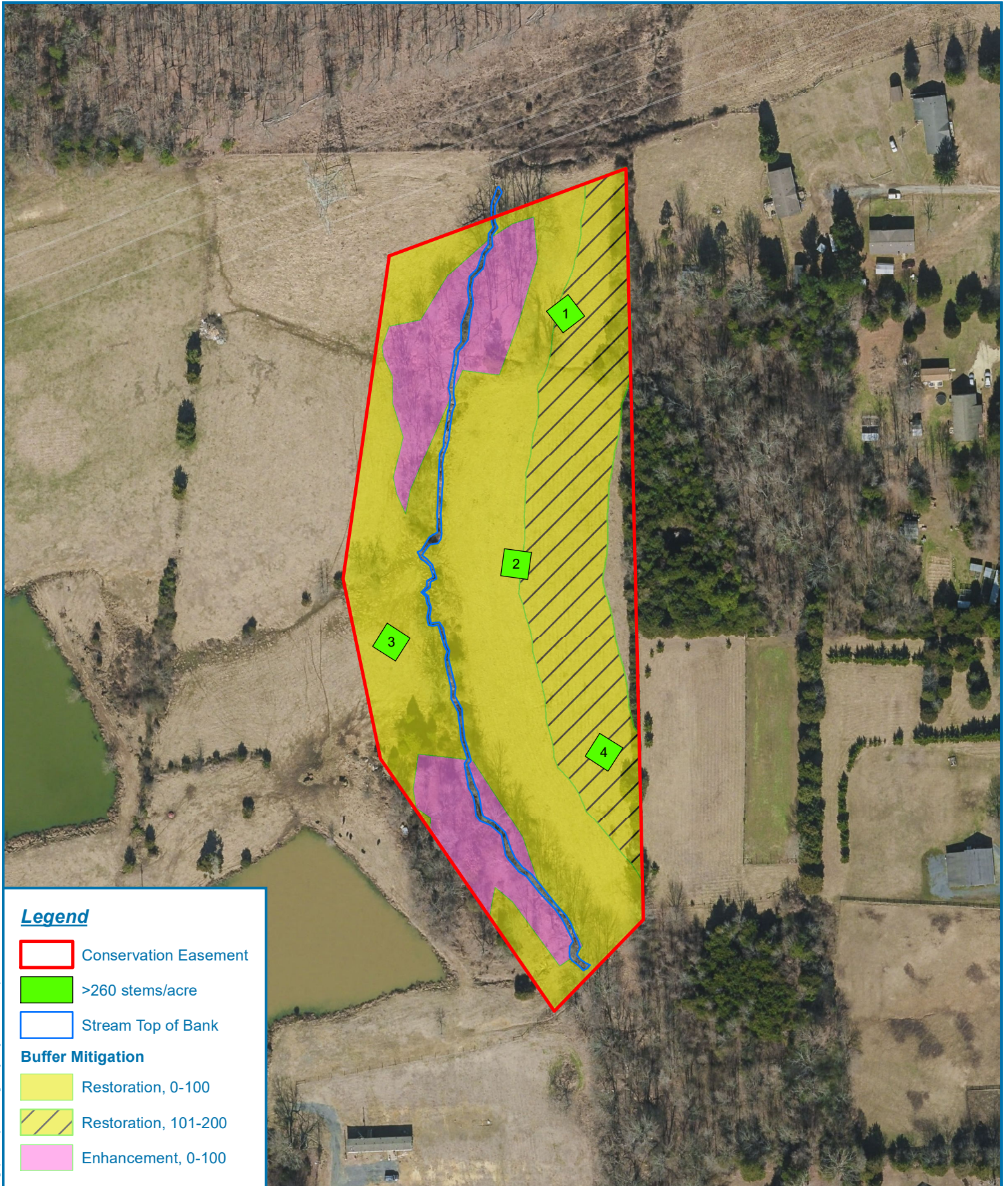
Date: 5/19/2020

Drawn by: EJU







Checked by: RTM

1 inch = 1,000 feet





**Legend**

-  Conservation Easement
-  >260 stems/acre
-  Stream Top of Bank
- Buffer Mitigation**
-  Restoration, 0-100
-  Restoration, 101-200
-  Enhancement, 0-100

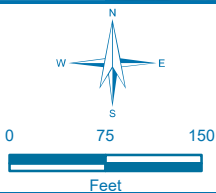
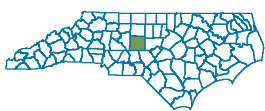


Figure 2 - Current Conditions Plan View

**Bucky's Branch Mitigation Site  
MY1 2020**

**Randolph County, North Carolina**

Date: 12/1/2020

Drawn by: EJU

Checked by: RTM

1 inch = 150 feet



# **Appendix B**

## **Vegetation Assessment Data**

**Table 5. Bucky's Branch Planted Species Summary**

| Common Name        | Scientific Name                | Total Stems Planted |
|--------------------|--------------------------------|---------------------|
| Sycamore           | <i>Platanus occidentalis</i>   | 1,000               |
| Tulip Poplar       | <i>Liriodendron tulipifera</i> | 900                 |
| Willow Oak         | <i>Quercus phellos</i>         | 900                 |
| Green Ash          | <i>Fraxinus pennsylvanica</i>  | 700                 |
| Northern Red Oak   | <i>Quercus rubra</i>           | 600                 |
| River Birch        | <i>Betula nigra</i>            | 500                 |
| White Oak          | <i>Quercus alba</i>            | 500                 |
| Water Oak          | <i>Quercus nigra</i>           | 500                 |
| Eastern Redbud     | <i>Cercis canadensis</i>       | 400                 |
| Black Walnut       | <i>Juglans nigra</i>           | 400                 |
| Southern Crabapple | <i>Malus angustifolia</i>      | 400                 |
| Persimmon          | <i>Diospyros virginiana</i>    | 200                 |
| American Plum      | <i>Prunus americana</i>        | 100                 |
| Elderberry         | <i>Sambucus canadensis</i>     | 100                 |
| <b>Total</b>       |                                | <b>7,200</b>        |

**Table 6. Bucky's Branch Vegetation Plot Mitigation Success Summary**

| Plot #             | Planted Stems/Acre | Volunteer Stems/Acre | Total Stems/Acre | Success Criteria Met? | Average Planted Stem Height (ft) |
|--------------------|--------------------|----------------------|------------------|-----------------------|----------------------------------|
| 1                  | 486                | 162                  | 647              | Yes                   | 1.6                              |
| 2                  | 405                | 40                   | 445              | Yes                   | 1.5                              |
| 3                  | 728                | 0                    | 728              | Yes                   | 1.5                              |
| 4                  | 567                | 0                    | 567              | Yes                   | 1.7                              |
| <b>Project Avg</b> | <b>546</b>         | <b>51</b>            | <b>597</b>       | <b>Yes</b>            | <b>1.6</b>                       |



Table 7. Bucky's Branch Stem Count Total and Planted by Plot Species

| Bucky's Branch                 |                    |              | Current Plot Data (MY1 2020) |       |     |                |       |     |                |       |     |                |       |     | Annual Means |       |     |            |       |      |
|--------------------------------|--------------------|--------------|------------------------------|-------|-----|----------------|-------|-----|----------------|-------|-----|----------------|-------|-----|--------------|-------|-----|------------|-------|------|
| Scientific Name                | Common Name        | Species Type | 100109-01-0001               |       |     | 100109-01-0002 |       |     | 100109-01-0003 |       |     | 100109-01-0004 |       |     | MY1 (2020)   |       |     | MY0 (2020) |       |      |
|                                |                    |              | PnoLS                        | P-all | T   | PnoLS          | P-all | T   | PnoLS          | P-all | T   | PnoLS          | P-all | T   | PnoLS        | P-all | T   | PnoLS      | P-all | T    |
| <i>Betula nigra</i>            | river birch        | Tree         | 3                            | 3     | 3   |                |       |     |                |       |     | 1              | 1     | 1   | 4            | 4     | 4   | 13         | 13    | 13   |
| <i>Celtis laevigata</i>        | sugarberry         | Tree         |                              |       |     |                |       |     |                |       |     | 6              | 6     | 6   | 6            | 6     | 6   |            |       |      |
| <i>Cercis canadensis</i>       | eastern redbud     | Tree         |                              |       |     | 4              | 4     | 4   |                |       |     |                |       |     | 4            | 4     | 4   | 5          | 5     | 5    |
| <i>Diospyros virginiana</i>    | common persimmon   | Tree         |                              |       |     |                |       |     | 2              | 2     | 2   | 1              | 1     | 1   | 3            | 3     | 3   | 7          | 7     | 7    |
| <i>Fraxinus pennsylvanica</i>  | green ash          | Tree         | 1                            | 1     | 5   |                |       | 1   |                |       |     |                |       |     | 1            | 1     | 6   | 1          | 1     | 1    |
| <i>Juglans nigra</i>           | black walnut       | Tree         |                              |       |     |                |       |     | 1              | 1     | 1   |                |       |     | 1            | 1     | 1   | 3          | 3     | 3    |
| <i>Liriodendron tulipifera</i> | tuliptree          | Tree         | 1                            | 1     | 1   | 1              | 1     | 1   |                |       |     | 1              | 1     | 1   | 3            | 3     | 3   | 5          | 5     | 5    |
| <i>Malus angustifolia</i>      | southern crabapple | Tree         | 2                            | 2     | 2   | 3              | 3     | 3   |                |       |     |                |       |     | 5            | 5     | 5   | 11         | 11    | 11   |
| <i>Platanus occidentalis</i>   | American sycamore  | Tree         |                              |       |     |                |       |     | 5              | 5     | 5   | 2              | 2     | 2   | 7            | 7     | 7   | 6          | 6     | 6    |
| <i>Prunus americana</i>        | American plum      | Tree         |                              |       |     |                |       |     |                |       |     |                |       |     |              |       |     | 7          | 7     | 7    |
| <i>Quercus alba</i>            | white oak          | Tree         | 1                            | 1     | 1   | 1              | 1     | 1   | 1              | 1     | 1   |                |       |     | 3            | 3     | 3   | 4          | 4     | 4    |
| <i>Quercus nigra</i>           | water oak          | Tree         |                              |       |     |                |       |     |                |       |     |                |       |     |              |       |     | 7          | 7     | 7    |
| <i>Quercus phellos</i>         | willow oak         | Tree         | 3                            | 3     | 3   |                |       |     | 7              | 7     | 7   | 2              | 2     | 2   | 12           | 12    | 12  | 30         | 30    | 30   |
| <i>Quercus rubra</i>           | northern red oak   | Tree         | 1                            | 1     | 1   | 1              | 1     | 1   | 2              | 2     | 2   | 1              | 1     | 1   | 5            | 5     | 5   | 5          | 5     | 5    |
| <i>Sambucus canadensis</i>     | Common Elderberry  | Shrub        |                              |       |     |                |       |     |                |       |     |                |       |     |              |       |     | 3          | 3     | 3    |
| <b>Stem count</b>              |                    |              | 12                           | 12    | 16  | 10             | 10    | 11  | 18             | 18    | 18  | 14             | 14    | 14  | 54           | 54    | 59  | 107        | 107   | 107  |
| <b>size (ares)</b>             |                    |              | 1                            |       |     | 1              |       |     | 1              |       |     | 1              |       |     | 4            |       |     | 4          |       |      |
| <b>size (ACRES)</b>            |                    |              | 0.02                         |       |     | 0.02           |       |     | 0.02           |       |     | 0.02           |       |     | 0.10         |       |     | 0.10       |       |      |
| <b>Species count</b>           |                    |              | 7                            | 7     | 7   | 5              | 5     | 6   | 6              | 6     | 6   | 7              | 7     | 7   | 12           | 12    | 12  | 14         | 14    | 14   |
| <b>Stems per ACRE</b>          |                    |              | 486                          | 486   | 648 | 405            | 405   | 445 | 728            | 728   | 728 | 567            | 567   | 567 | 546          | 546   | 597 | 1083       | 1083  | 1083 |

# **Appendix C**

## **Vegetation Monitoring Plot Photos**

**Bucky's Branch Vegetation Monitoring Plot Photos**



Vegetation Plot 1 (11/04/2020)



Vegetation Plot 2 (11/04/2020)



Vegetation Plot 3 (11/04/2020)



Vegetation Plot 4 (11/04/2020)