Year 3 Monitoring Report

Bucky's Branch Mitigation Project

FINAL

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

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

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For Environmental Banc and Exchange, LLC

Prepared For:
NC Department of Environmental Quality
Division of Mitigation Services

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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 were 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/ 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**.

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

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 3 Monitoring Performance

Monitoring of the four permanent vegetation plots completed on October 6th, 2022. Vegetation tables are in **Appendix B** and associated photos are in **Appendix C**. Year 3 monitoring data indicates that all plots are exceeding the success criteria of 260 planted stems per acre. Planted stem densities ranged from 324 to 567 planted stems per acre with a mean of 455 planted stems per acre across all plots. A total of 12 native species were documented within the plots. Volunteer species were noted during Year 3 monitoring, averaging 121 stems per acre, and are expected to increase in upcoming years. The average tree height observed was 2.7 feet.

Visual assessment of vegetation outside of the monitoring plots indicates that the herbaceous vegetation is becoming well established throughout the project and minimal invasive species were observed. Those

that were observed, mainly multiflora rose (*Rosa multiflora*), were treated via foliar spray in August 2022. Invasive species will continue to be monitored and treated as necessary. The fence is mostly in good condition; however, a tree fell on a portion of the fence along the western boundary, bending the frame. The tree has remained on the fence, creating a natural barricade, and therefore has maintained temporary cattle exclusion. This area of fencing will be repaired as soon as possible. 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

Credit Type	Location	Subject?	Feature Type	Mitigation Activity	Min-Max Buffer Width (ft)	Feature Name	Total Area (sf)	Creditable Area (sf)	Initial Credit Ratio (x:1)	% Full Credit	Final Credit Ratio (x:1)	Riparian Buffer Credits
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
							Total	**253,564**				**183,312.294**

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

Elapsed Time Since planting complete: 2 Yr., 6 Mo.
Number of reporting Years[1]: 3

Activity or Deliverable	Data Collection Complete	Completion or Delivery
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
Supplemental Bareroot Planting	NA	Jan-21
Year 2 Monitoring	Nov-21	Nov-21
Invasive Species Treatment	NA	Aug-22
Year 3 Monitoring	Oct-22	Nov-22
Year 4 Monitoring		
Year 5 Monitoring		

1 = The number of reports or data points produced excluding the baseline

Table 3. Project Contacts Table Bucky's Branch Site	
Planting Contractor	H&J Forestry
Planting contractor POC	Matt Hitch
Nursery Stock Suppliers	Arborgen
Monitoring Performers	RES / 3600 Glenwood Ave, Suite 100, Raleigh, NC 27612
Monitoring POC	Emily Ulman (910) 274-8231

Table 4. Project Background Information			
Project Name	Bucky's Branch		
County	Randolph		
Project Area (acres)	6.17		
Project Coordinates (latitude and longitude)	Latitude: 35.859 N Longitude: -79.881 W		
Planted Acreage (Acres of Woody Stems Planted)	4.83		
Project Watershed Summary Information			
Physiographic Province	Southern Outer Piedmont		
River Basin	Cape Fear		
USGS Hydrologic Unit 8-digit	03030003	USGS Hydrologic Unit 14-digit	03030003010060
DWR Sub-basin	03-06-08		

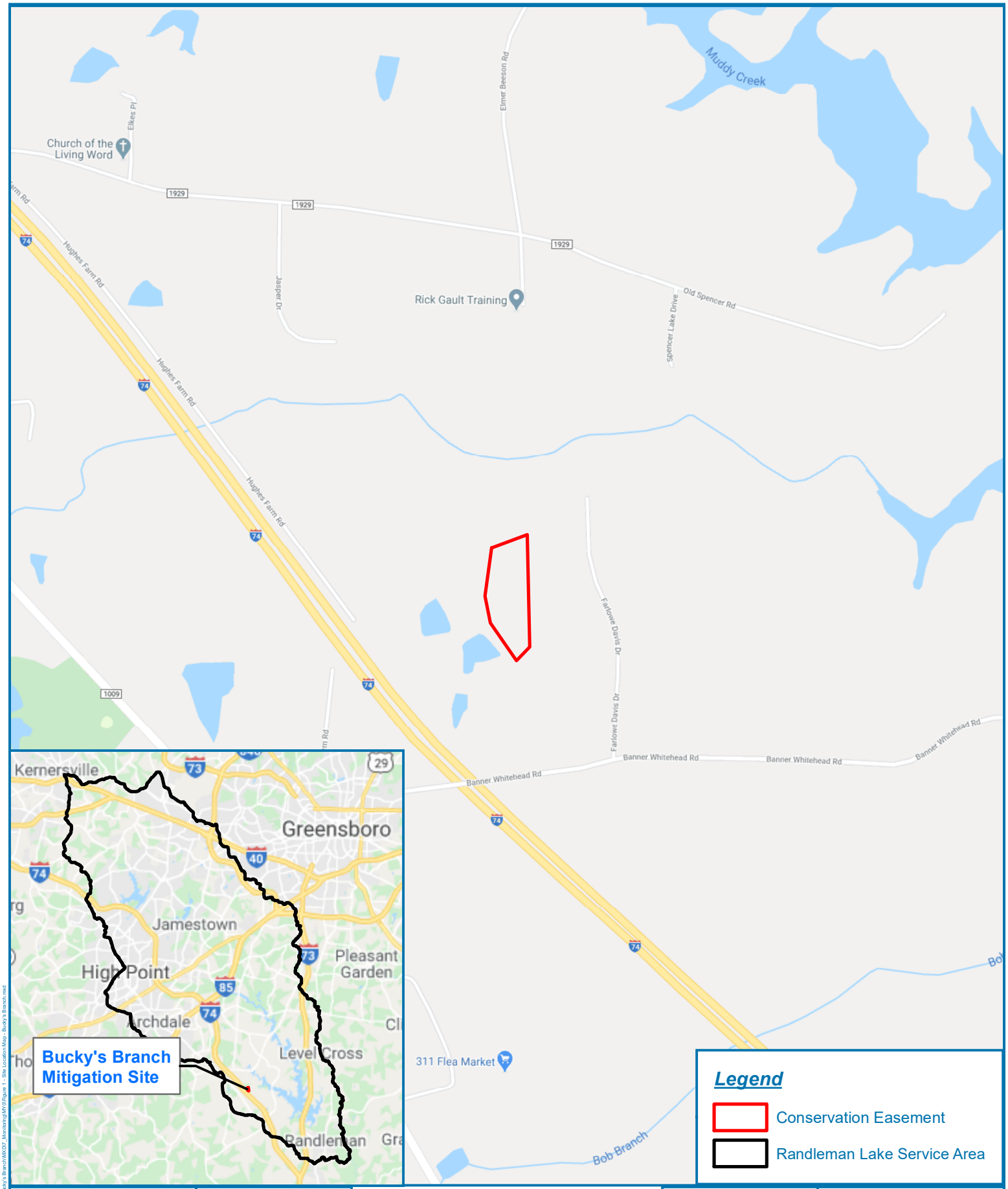

Figure 1 - Site Location Map

Bucky's Branch Mitigation Site

Randolph County, North Carolina

Date:	5/19/2020
Drawn by:	EJU
Checked by:	RTM
	1 inch = 1,000 feet

res

Document Path: R:\Respdata\pdp\projects\NC\Bucky's Branch\MY07_Monitoring\MY0\Figure 1 - Site Location Map - Bucky's Branch.mxd

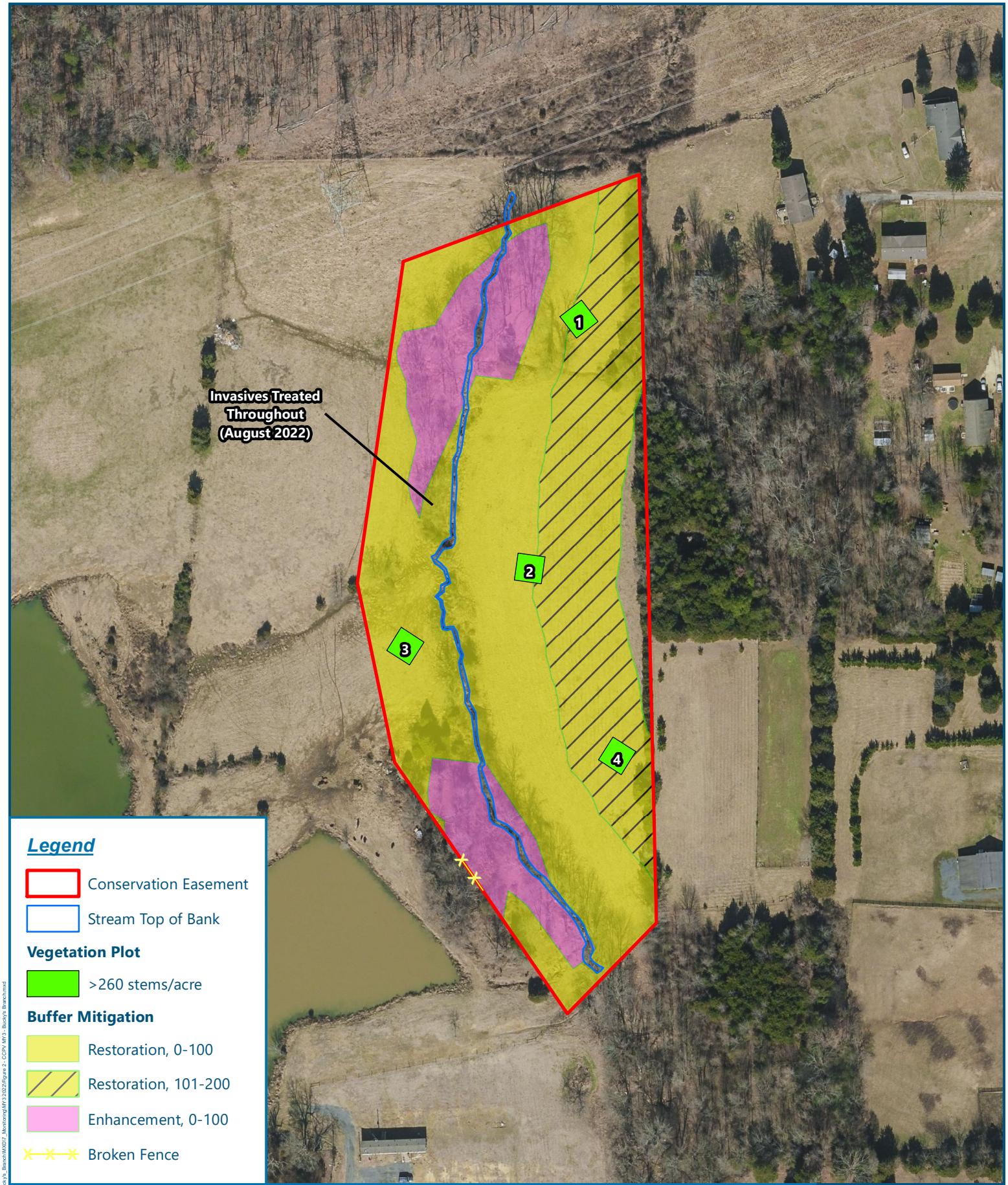

Figure 2 - Current Conditions Plan View

Bucky's Branch Mitigation Site
MY3 2022

Randolph County, North Carolina

Date: 11/10/2022
Drawn by: EJU
Checked by: RTM
1 inch = 150 feet

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Document Path: R:\Resilience\gis\Projects\101726_Bucky's_Branch\MXD\7_Monitoring\MY3 2022\Figure 2 - CCPV MY3 - Bucky's Branch.mxd

Appendix B

Vegetation Assessment Data

Table 5. Bucky's Branch Planted Species Summary

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

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

Plot #	Planted Stems/Acre	Volunteer Stems/Acre	Total Stems/Acre	Success Criteria Met?	Avg Planted Stem Height (ft)
1	486	486	971	Yes	2.5
2	324	0	324	Yes	2.2
3	567	0	567	Yes	3.9
4	445	0	445	Yes	2.7
Project Avg	**455**	**121**	**577**	**Yes**	**2.9**

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

Bucky's Branch			Current Plot Data (MY3 2022)												Annual Means											
			100109-01-0001			100109-01-0002			100109-01-0003			100109-01-0004			MY3 (2022)			MY2 (2021)			MY1 (2020)			MY0 (2020)		
Scientific Name	Common Name	Species Type	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer negundo	boxelder	Tree																		2						
Betula nigra	river birch	Tree	3	3	3										3	3	3	4	4	4	4	4	4	13	13	13
Celtis laevigata	sugarberry	Tree										4	4	4	4	4	4	5	5	5	6	6	6			
Cercis canadensis	eastern redbud	Tree				2	2	2							2	2	2	3	3	3	4	4	4	5	5	5
Diospyros virginiana	common persimmon	Tree							3	3	3	1	1	1	4	4	4	3	3	3	3	3	3	7	7	7
Fraxinus pennsylvanica	green ash	Tree	3	3	15	1	1	1							4	4	16	2	2	18	1	1	8	1	1	1
Juglans nigra	black walnut	Tree										1	1	1	1	1	1	1	1	1	1	1	1	3	3	3
Liriodendron tulipifera	tuliptree	Tree				1	1	1							1	1	1	2	2	2	3	3	3	5	5	5
Malus angustifolia	southern crabapple	Tree	1	1	1	2	2	2							3	3	3	3	3	3	5	5	5	11	11	11
Platanus occidentalis	American sycamore	Tree							6	6	6	2	2	2	8	8	8	6	6	6	7	7	7	6	6	6
Prunus americana	American plum	Tree																1	1	1				7	7	7
Quercus alba	white oak	Tree	1	1	1	1	1	1	1	1	1				3	3	3	3	3	3	3	3	3	4	4	4
Quercus nigra	water oak	Tree																						7	7	7
Quercus phellos	willow oak	Tree	3	3	3				4	4	4	2	2	2	9	9	9	8	8	8	12	12	12	30	30	30
Quercus rubra	northern red oak	Tree	1	1	1	1	1	1				1	1	1	3	3	3	4	4	4	5	5	5	5	5	5
Sambucus canadensis	Common Elderberry	Shrub																						3	3	3
	Stem count		12	12	24	8	8	8	14	14	14	11	11	11	45	45	57	45	45	63	54	54	61	107	107	107
	size (ares)		1			1			1			1			4			4			4			4		
	size (ACRES)		0.02			0.02			0.02			0.02			0.10			0.10			0.10			0.10		
	Species count		6	6	6	6	6	6	4	4	4	6	6	6	12	12	12	13	13	14	12	12	12	14	14	14
	Stems per ACRE		486	486	971	324	324	324	567	567	567	445	445	445	455	455	577	455	455	637	546	546	617	1083	1083	1083

Appendix C

Vegetation Monitoring Plot Photos

Bucky's Branch Vegetation Monitoring Plot Photos

Vegetation Plot 1 (10/06/2022)

Vegetation Plot 2 (10/06/2022)

Vegetation Plot 3 (10/06/2022)

Vegetation Plot 4 (10/06/2022)