MONITORING YEAR 3
ANNUAL BUFFER REPORT
FINAL

DRY CREEK MITIGATION SITE
Durham County, NC
NCDEQ Contract No. 6827
DMS ID No. 97082
NCDWR Project No. 2016-0369
RFP No. 16-006477

Neuse River Basin
HUC 03020201

Data Collection Period: September 2022
Draft Submission Date: October 31, 2022
Final Submission Date: December 7, 2022

PREPARED FOR:

NC Department of Environmental Quality
Division of Mitigation Services
1652 Mail Service Center
Raleigh, NC 27699-1652

December 7, 2022

Lindsay Crocker
NC Department of Environmental Quality, Division of Mitigation Services
217 W. Jones Street, Suite 3000
Raleigh, NC 27609-1652

Subject: DMS Comments
Dry Creek MY3, Project ID #97082, DMS Contract #6827

Dear Ms. Crocker,

We have reviewed the comments on the MY3 draft report for the above referenced project dated November 21, 2022 and have revised the report based on these comments. The revised documents are submitted with this letter. Below are responses to each of your comments. For your convenience, the comments are reprinted with our response in italics.

Report Comments:

1. Reminder that IRT (Browning) requested additional transect vegetation monitoring in MY4 for the replanted areas. The buffer portion of the project will also require monitoring regardless.

   Response: Wildlands will conduct additional transect vegetation monitoring in MY4 for the replanted areas and annual vegetation monitoring in the buffer portion of the project.

2. Please update cross-section graphs with more clear versions if possible (this may be issue with DMS tool output and if so-ok).

   Response: Cross-section graphs display blurry when report pdfs are reduced. To view clearer versions, refer to the non-reduced report pdf.

3. The vegetative narrative requests that five non-planted species be counted toward success, which is outside the typical IRT success criteria for vegetation. It should be noted that of these five, tulip poplar is on the original planting plan, and that red cedar is on the replanting list. Additionally, DMS recommends that Wildlands also request all the planted species on the 2.3-acre replanting list be added to the list of planted species counting for success. This decision should be made by IRT review and documented at credit release meeting for MY4 monitoring.

   Response: The species list for the supplemental planting was approved by the IRT prior to planting. It is Wildlands understanding that these would automatically be added to the list of species counted towards success. Appendix F of the stream report documents the IRT's approval of these species for planting.

Buffer Report Comments:

1. 1. Section 1.3 Remove success wording for planted stems only. The riparian buffer rule states that "Native hardwood and native shrub volunteer species may be included to meet the final performance standard of 260 stems per acre." Additionally, there is no requirement in the Riparian buffer rule that the volunteer vegetation must come from the planted list (like IRT rules). Please revise accordingly.

   Response: Wildlands has revised the language used in the Buffer Report to properly align with the riparian buffer rule.

2. Section 1.3.1, second paragraph, update language to include all stems (desirable), and remove references to planted list species. The species selected do not have to be proposed, they should be considered desirable.

   Response: Wildlands has revised the language in section 1.3.1 and 1.4.

If you have any questions, please contact me by phone (919) 851-9986, or by email (jlorch@wildlandseng.com).

Sincerely,

Jason Lorch, *Monitoring Coordinator*

PREPARED BY:

Wildlands Engineering, Inc.
312 West Millbrook Road, Suite 225
Raleigh, NC 27609

Jason Lorch
jlorch@wildlandseng.com
Phone: (919) 851-9986

DRY CREEK MITIGATION SITE

Monitoring Year 3 Report

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APPENDICES

Section 1: PROJECT OVERVIEW

1.1 Project Summary

Wildlands Engineering, Inc. (Wildlands) implemented a full delivery project at the Dry Creek Mitigation Site (Site) for the North Carolina Department of Environmental Quality Division of Mitigation Services (DMS) to restore a total of 9,811 linear feet of perennial and intermittent streams in Durham County, NC. The Site included the restoration of Dry Creek and seven unnamed tributaries. The Site also restored, enhanced, and preserved a total of 29.764 acres (1,209,399.84 ft^2) of riparian buffer at the Site, which will provide Riparian Buffer Credits and Nutrient Offset Credits. The Site is located approximately three miles northwest of Butner, NC and approximately 2 miles west of the Granville County/Durham County line (Figure 1) in the Neuse River Basin 8-Digit Hydrologic Unit Code (HUC) 03020201. The Site is located within a DMS targeted watershed for the Neuse River Basin HUC 03020201010050 and NC Division of Water Resources (NCDWR) Subbasin 03-04-01. The Site contains Dry Creek and eight unnamed tributaries (UT1-UT7; UT1a) which flow to Lake Michie on the Flat River and then into Falls Lake. The Flat River is classified as Water Supply Waters (WS-III), Nutrient Sensitive Waters (NSW). The downstream drainage area of the Site is 807 acres.

Prior to stream construction, the Site was a mix of active pastures, fields, and woodlands. Two in-line ponds were removed as part of the stream restoration, one on UT1 Reach 2 and one on Dry Creek Reach 1. Additionally, two other off-line ponds near UT1 were removed.

Work at the Site was planned, designed, and constructed per the Dry Creek Mitigation Plan (Wildlands, 2018) and the Consolidated Buffer Mitigation Rule (15A NCAC 02B .0295). The purpose of the riparian buffer restoration is to provide riparian buffer credits to compensate for buffer impacts within the HUC 03020201 and the Falls Lake Watershed. The service area for the Riparian Buffer Credits is depicted in Figure 2. The mitigation credits generated from the Site are listed in Tables 1a and 1b and shown in Figure 3.

1.2 Project Goals and Objectives

The major goals of the buffer restoration project are to provide ecological and water quality enhancements to the Neuse River Basin within the Falls Lake Water Supply Watershed by creating a functional riparian corridor and restoring the riparian buffer. This project supports specific goals identified in the 2010 Neuse River Basin Restoration Priorities Plan (RBRP) for the Neuse River Targeted Local Watershed. This document highlights the importance of riparian buffers for stream restoration projects. Riparian buffers immobilize and retain nutrients and suspended sediment. The RBRP also supports the Falls Lake Watershed Plan. Specific enhancements to water quality and ecological processes are outlined below:

- Decrease nutrient levels - Nutrient input will be decreased by filtering runoff from the agricultural fields through restored native buffer zones. The off-site nutrient input will also be absorbed on-site by dispersing flood flows through native vegetation, thereby reducing nutrient inputs to waters of the Neuse River Basin.
- Exclude cattle from project streams - Install fencing around project areas adjacent to cattle pastures.
- Decrease water temperature and increase dissolved oxygen concentrations - Establishment and maintenance of riparian buffers will create additional long-term shading of the channel reducing thermal pollution.
- Restore and enhance native floodplain vegetation - Plant native tree species in riparian zone where currently insufficient.

- Permanently protect the Site from harmful uses - Establish a conservation easement on the Site to protect aquatic habitat and the receiving Water Supply Waters.

The 29.764-acre Site is protected with a permanent conservation easement. Of the protected area, Neuse Riparian Buffer Credits were generated by restoring 8.02 acres; preserving 14.28 acres; and enhancing 3.57 acres. The remaining protected 3.89 acres will not generate buffer mitigation credit. In general, riparian buffer restoration area widths on streams extend out to 200 feet from top of bank for Neuse River Riparian Buffer Credits. There is also potential to convert some buffer credits to nutrient offset credits, dependent on the need. Figure 3 details the buffer credit generation.

1.3 Monitoring Year 3 Data Assessment

The Mitigation Plan (Wildlands, 2018) was submitted and accepted by DMS in October 2018. Construction activities were performed by Land Mechanic Designs, Inc. and planting by Bruton Natural Systems, Inc. were completed in April 2020. The baseline as-built survey (MY0) was completed by Kee Mapping and Surveying in July 2020. Refer to Appendix 1 for detailed Project Activity and Reporting History, Project Contact Table, and Project Information and Attributes.

Vegetative performance for buffer restoration areas will be in accordance with 15A NCAC 02B .0295(n)(2)(B) and (n)(4) (effective November 1, 2015). To meet success criteria, areas generating Neuse River Riparian Buffer Credits shall include a minimum of four native hardwood tree species, where no one species comprises greater than 50 percent of the stems and shall have a survival of at least 260 stems per acre at the end of the required five-year monitoring period. For the monitoring to be complete and buffer credits to be awarded, NCDWR must provide written approval of successful revegetation of buffer restoration areas. Methodology for annual monitoring is presented in the MY0 Annual Report (Wildlands, 2020).

1.3.1 Vegetative Assessment

The quantity of monitoring vegetation plots was determined in accordance with the Carolina Vegetation Survey-EEP Level 2 Protocol (Lee et al., 2008) such that at least 2 percent of the Site is encompassed in monitoring plots. A total of seven vegetation plots were established within the conservation easement boundaries which were at least five feet from the tops of stream banks. The plot corners have been marked and are recoverable either through field identification or with the use of a GPS unit. Reference photographs are taken at the origin looking diagonally across the plot to the opposite corner on an annual basis. Trees will be marked annually with flagging tape. Species composition, vigor, height, density, and survival rates will be evaluated by plot on an annual basis. The extent of invasive species coverage will also be monitored and controlled, as necessary.

The 2022 annual vegetation monitoring resulted in an average survivability of 401 stems per acre. This is greater than the final requirement of 260 stems per acre, but approximately 25% less than the MY0 density recorded (538 stems per acre) in April 2020. The average number of stems per plot for MY3 was 10, compared to 13 stems per plots from MY0. Of the seven vegetation plots, six plots are on track to meet the final success criteria required for MY5. Vegetation plots (VP) 5, is not on track to meet the final success criteria of 260 planted stems per acre. VP 5 missed the final success criteria by one stem and is an outlier to surrounding areas based on visual observations. Many desirable volunteers are coming in across the Site but are not yet established in the vegetation plots. Overall, the Site is on track to meet its final success criteria.

Herbaceous vegetation is abundant across the Site and includes native pollinator species indicating a healthy riparian habitat. The riparian habitat is helping to reduce nutrient runoff from the cattle fields outside the easement and stabilizing the stream banks. Refer to Appendix 3 for Vegetation Plot Data and

Vegetation Performance Standards Summary Table and Appendix 2 for Vegetation Plot Photographs, Vegetation Condition Assessment Table, and Monitoring Plan View Map.

1.3.2 Vegetation Areas of Concern

After members of the IRT and Wildlands staff walked the Site on June 13, 2022, notable diversity and low stem density issues were discussed. The IRT recommend Wildlands complete several additional vegetation transects and replant accordingly. After further inspection, lack of species diversity was the greatest concern and not low stem density. With this in mind, Wildlands created and received approval from the IRT to supplementally plant on 2.3 acres across the Site. The supplemental planting occurred on October 19, 2022.

1.4 Monitoring Year 3 Summary

Of the 7 vegetation plots, six are on track to meet the final success requirement of 260 stems per acre. Based on visual observations vegetation plot 5 is an outlier to surrounding areas and will not be included in the supplemental planting. Desirable volunteer species have been visually observed across the Site, but are not yet established in the vegetation plots. A dense herbaceous layer including wetland and pollinator species has established across the Site. An approved supplemental planting occurred on October 19, 2022. Summary information/data related to the 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 Mitigation Plan (Wildlands, 2018) available on DMS's website. All raw data supporting the tables and figures in the appendices are available from DMS upon request.

Section 2: REFERENCES

Breeding, R. 2010. Neuse River Basin Restoration Priorities. North Carolina Ecosystem Enhancement Program.

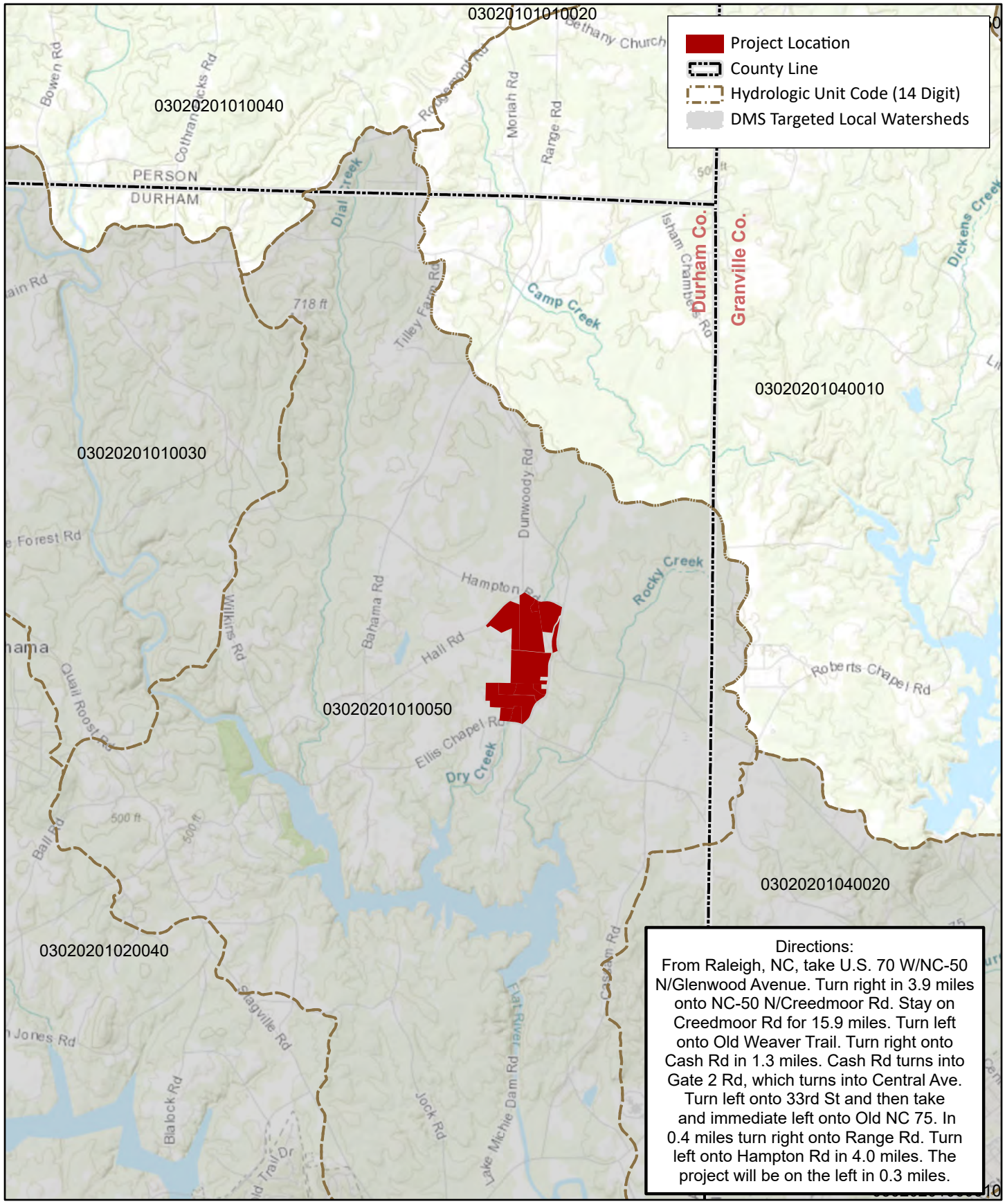
Lee, Michael T. Peet, Robert K., Steven D. Wentworth, Thomas R. 2008. CVS-EEP Protocol for Recording Vegetation Version 4.2.

North Carolina Department of Environmental Quality, Division of Mitigation Services (NCDMS), 2017. Riparian Buffer and Nutrient Offset Buffer Baseline and Annual Monitoring Report Template version 2.0

Wildlands Engineering, Inc. (2018). Dry Creek Mitigation Site – Riparian Buffer Mitigation Plan. North Carolina Department of Environmental Quality, Division of Mitigation Services (NCDMS), Raleigh, NC.

Wildlands Engineering, Inc. (2020). Dry Creek Mitigation Site – Monitoring Year 0 Annual Buffer Report. North Carolina Department of Environmental Quality, Division of Mitigation Services (NCDMS), Raleigh, NC.

APPENDIX 1. General Figures and Tables



WILDLANDS ENGINEERING

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Figure 1. Project Vicinity Map
Dry Creek Mitigation Site
Monitoring Year 3 Report (MY3)
Neuse River Basin (03020201)

Durham County, NC

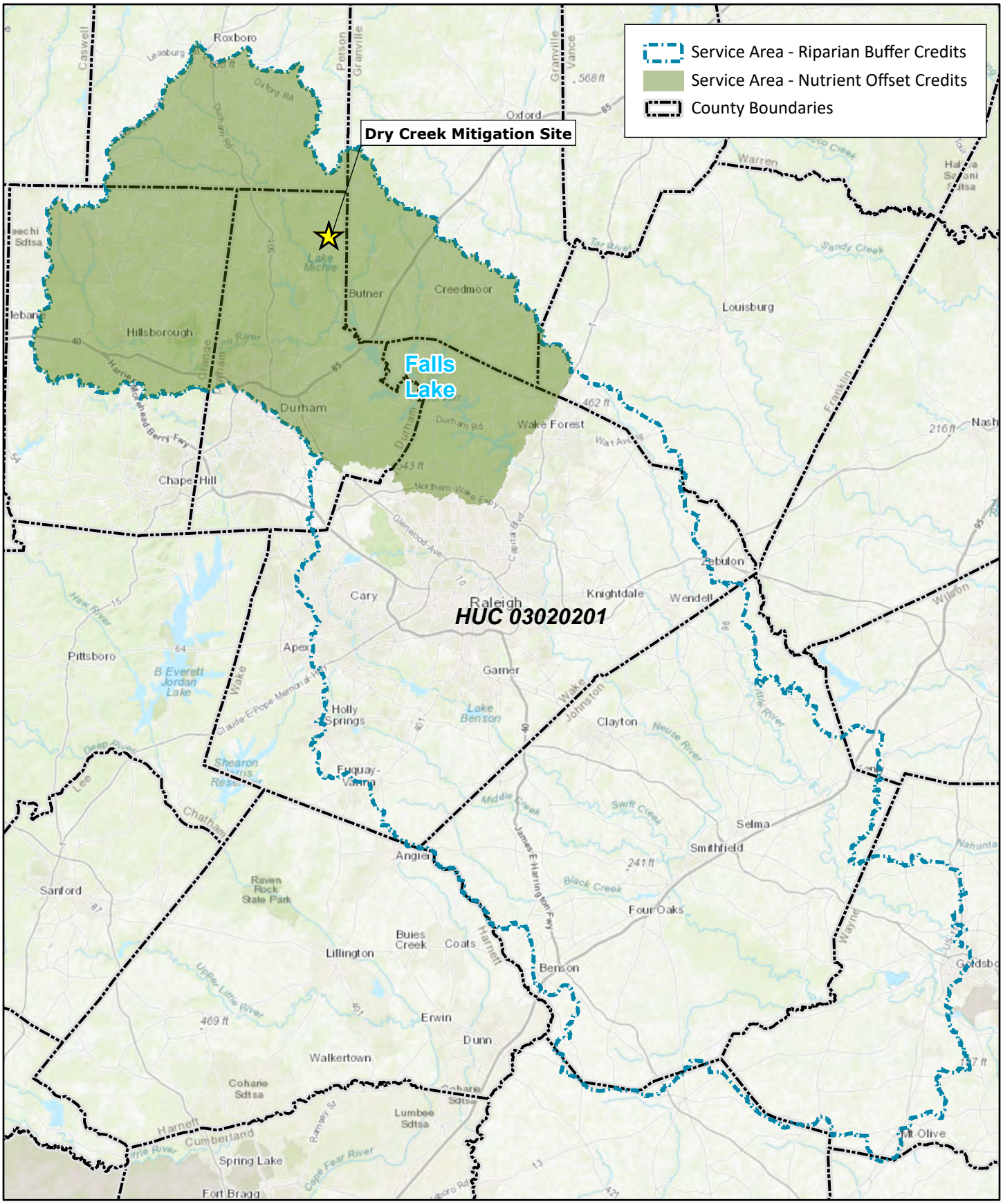

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Figure 2. Service Area Map
Dry Creek Mitigation Site
Monitoring Year 3 Report (MY3)
Neuse River Basin (03020201)

Durham County, NC

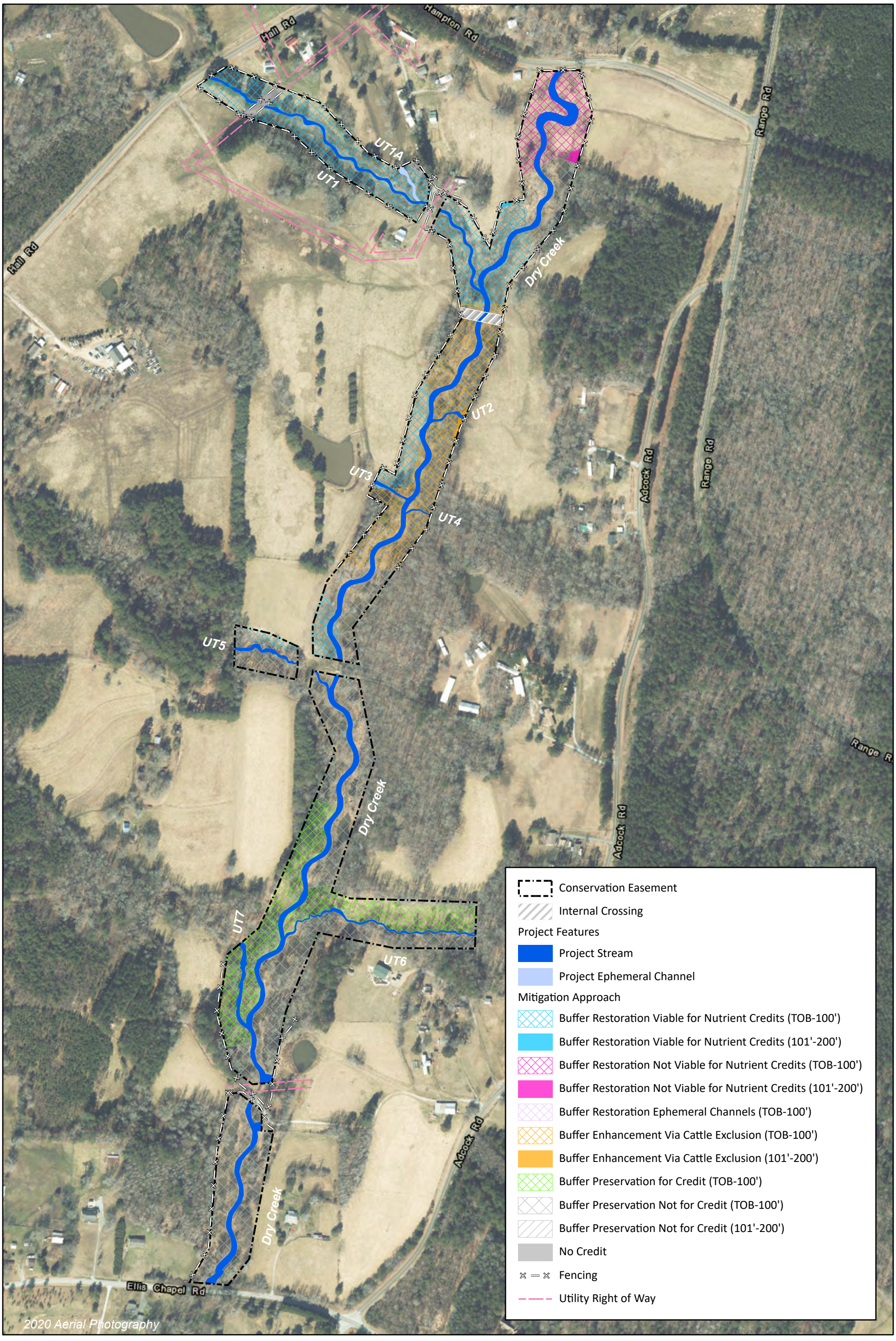

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Figure 3. Project Component / Asset Map
Dry Creek Mitigation Site
Monitoring Year 3 Report (MY3)
Neuse River Basin (03020201)
Durham County, NC

Table 1a. Buffer Project Area and Assets: Riparian Buffer Credits

Dry Creek Mitigation Site

Monitoring Year 3 - 2022

Location	Jurisdictional Streams	Restoration Type	Feature Type	Reach ID / Component	Buffer Width (ft)	Creditable Area (ac)*	Creditable Area (sf)*	Eligible Credit Area (ac)**	Initial Credit Ratio (x:1)	% Full Credit	Final Credit Ratio (x:1)	Riparian Buffer Credits (BMU)	Riparian Buffer Credits (ac)
Rural	Subject	Restoration	I/P	Dry Creek, UT1, UT3, UT5	0-100	7.93	345,454.00	7.93	1	1	1	345,454.00	7.93
	Subject		I/P	Dry Creek, UT1, UT3, UT5	101-200	0.06	2,516.00	0.06	1	0.33	3.03	830.36	0.02
	Not Subject		Ephemeral Channel	UT1a	0-100	0.03	1,489.00	0.03	1	1	1	1,489.00	0.03
	Subject		Ephemeral Channel	UT1a	101-201	0	0.00	0.00	1	0.33	3.03	0.00	0.00
Rural	Subject	Enhancement via Cattle Exclusion	I/P	Dry Creek, UT3, UT4	0-100	3.53	153,970.00	3.53	2	0.75	2	76,985.00	1.77
				Dry Creek, UT3, UT4	101-200	0.04	1,692.00	0.04	2	0.33	6.06	279.21	0.01
Rural	Subject	Preservation	I/P	Dry Creek	0-100	14.04	611,691.00	3.87	10	1	10	16,837.37	0.39
Rural	Subject	Preservation		Dry Creek	101-200	0.24	10,342.00	0.00	10	0.33	30.3	0.00	0.00
											Total:	**441,874.94**	10.15

* Preservation creditable area is over 25% of the total mitigation area, therefore the eligible creditable area has been reduced to 25% of the total creditable mitigation area. With that adjustment, the Site is in compliance with 15A NCAC 02B 0.0295(o)(5) which limits preservation mitigation area to no more than 25% of total mitigated area.

** Creditable area on ephemeral channels is <1% of the total eligible mitigation area and is therefore in compliance with 15A NCAC 02B 0.0295(o)(7) without any adjustments.

Table 1b. Buffer Project Area and Assets: Nutrient Offset Credits

Dry Creek Mitigation Site

Monitoring Year 3 - 2022

Location	Jurisdictional Streams	Restoration Type	Reach ID / Component	Buffer Width (ft)	Creditable Area (ac)*	Creditable Area (sf)*	Eligible Credit Area (ac)**	Convertible to Nutrient offset (Yes or No)	Nutrient Offset: N (lbs)	Nutrient Offset: P (lbs)
Rural	Subject	Restoration	Dry Creek, UT1, UT3, UT5	0-100	6.36	277,068.00	6.36	Yes	14460.75	932.89
				101-200	0.01	647.00	0.01	Yes	33.77	2.18
			Dry Creek Fescue Lawn	0-100	1.57	68,386.00	1.57	No	0.00	0.00
				101-200	0.04	1,869.00	0.04	No	0.00	0.00
			UT1a	0-100	0.03	1,489.00	0.03	Yes	93.37	5.01
				101-200	0	0.00	0	Yes	0.00	0.00
Rural	Subject	Enhancement via Cattle Exclusion	Dry Creek, UT3, UT4	0-100	3.53	153,970.00	3.53	No	0.00	0.00
				101-200	0.04	1,692.00	0.04	No	0.00	0.00
Rural	Subject	Preservation	Dry Creek	0-100	14.04	611,691.00	3.87	No	0.00	0.00
				101-200	0.024	10,342.00	0	No	0.00	0.00
								Total:	**14,587.89**	**940.08**

*The above creditable areas all meet the 50-foot minimum width for buffer or nutrient credit sales.

** Impacts that occur in the watershed of Falls Lake in the upper Neuse River Basin may be offset only by load reductions in the same watershed; 15A NCAC 02B .0282 (2) (Figure 2).

Table 2. Project Activity and Reporting History

Dry Creek Mitigation Site

Monitoring Year 3 - 2022

Activity or Report	Data Collection Complete	Completion or Scheduled Delivery
Mitigation Plan	October 2018	October 2018
Final Design - Construction Plans	November 2019	April 2019
Construction	October 2019-April 2020	April 2020
Temporary S&E mix applied to entire project area[1]	October 2019-April 2020	April 2020
Permanent seed mix applied to reach/segments[1]	October 2019-April 2020	April 2020
Bare root and live stake plantings for reach/segments	April 2020	April 24, 2020
Baseline Monitoring Document (Year 0)	April 27, 2020	August 2020
Year 1 Monitoring	November 4, 2020	December 2020
Year 2 Monitoring	September 16, 2021	December 2021
Year 3 Monitoring	September 14, 2022	December 2022
Supplemental Planting		October 19, 2022
Year 4 Monitoring	2023	December 2023
Year 5 Monitoring	2024	December 2024

[1]Seed and mulch is added as each section of construction is completed.

Table 3. Project Contact Table

Dry Creek Mitigation Site

Monitoring Year 3 - 2022

Designer Nicole Macaluso, PE	**Wildlands Engineering, Inc.** 312 West Millbrook Road, Suite 225 Raleigh, NC 27609 919.851.9986
Planting Contractor	**Bruton Natural Systems, Inc** P.O. Box 1197 Fremont, NC 27830
Seeding Contractor	**Land Mechanic Designs, Inc.** 126 Circle G Lane Willow Spring, NC 27592
Seed Mix Sources	**Garrett Wildflower Seed Company**
Nursery Stock Suppliers **Bare Roots**	**Dykes and Sons Nursery and Greenhouse**
Live Stakes	**Bruton Natural Systems, Inc**
Monitoring Performers Monitoring POC	**Wildlands Engineering, Inc.** Jason Lorch 919.851.9986, ext. 107

Table 4. Project Information and Attributes

Dry Creek Mitigation Site

Monitoring Year 3 - 2022

PROJECT INFORMATION	
Project Name	Dry Creek Mitigation Site
County	Durham County
Project Area (acres)	29.764
Planted Area (acres)	14.04
Project Coordinates (latitude and longitude)	36° 11’ 07.92” N, 78° 49’ 39.00” W
PROJECT WATERSHED SUMMARY INFORMATION	
Physiographic Province	Carolina Slate Belt of the Piedmont Physiographic Province
River Basin	Neuse River
USGS Hydrologic Unit 8-digit	03020201
USGS Hydrologic Unit 14-digit	3020201010050
DWR Sub-basin	03-04-01
Project Drainage Area (acres)	807
Project Drainage Area Percentage of Impervious Area	<1%
CGIA Land Use Classification	50% Forested, 40% Cultivated, 9% Residential Area

Table 5. Adjacent Forested Areas Existing Tree and Shrub Species

Dry Creek Mitigation Site

Monitoring Year 3 - 2022

Common Name	Scientific Name	Wetland Indicator Status
Red Maple	*Acer rubrum*	FAC
Green Ash	*Fraxinus pennsylvanica*	FACW
Sweet Gum	*Liquidambar styraciflua*	FAC
River Birch	*Betula nigra*	FACW
Northern Red Oak	*Quercus rubra*	FACU
White Oak	*Quercus alba*	FACU

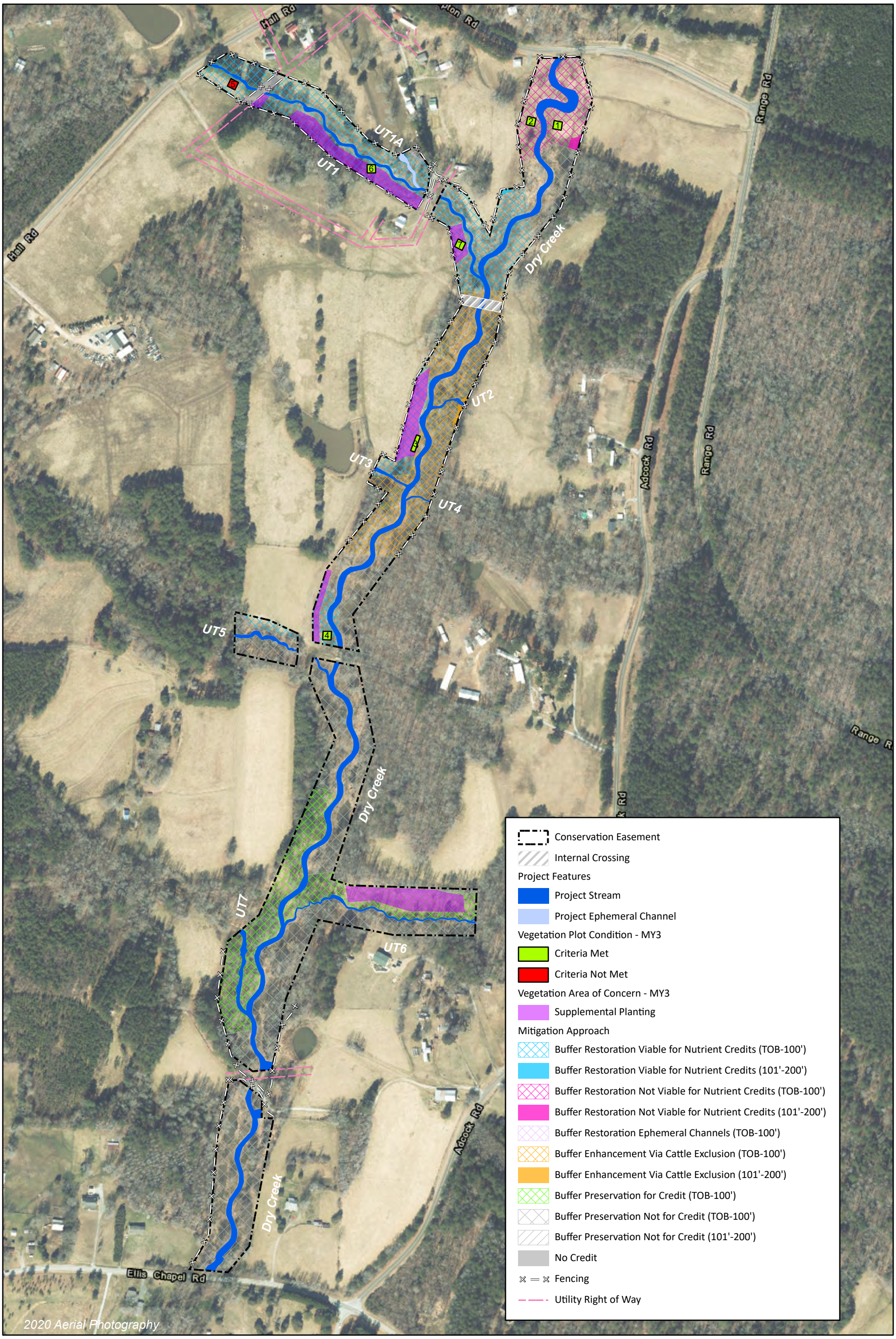
Table 6. Planted Tree Species

Dry Creek Mitigation Site

Monitoring Year 3 - 2022

Common Name	Scientific Name	Number Planted	% of Total
Willow Oak	*Quercus phellos*	1,049	10%
Sycamore	*Platanus occidentalis*	2,098	19%
River Birch	*Betula nigra*	2,098	19%
Cherrybark Oak	*Quercus pagoda*	1,049	10%
Swamp Chestnut Oak	*Quercus michauxii*	1,049	10%
Tulip Poplar	*Liriodendron tulipifera*	1,049	10%
Eastern Cottonwood	*Populus deltoides*	630	6%
Black Willow	*Salix nigra*	920	9%
Green Ash	*Fraxinus pennsylvanica*	735	7%

APPENDIX 2. Visual Assessment Data



WILDLANDS ENGINEERING

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Figure 4. Monitoring Plan View Map
Dry Creek Mitigation Site
Monitoring Year 3 Report (MY3)
Neuse River Basin (03020201)

Durham County, NC

Table 7. Vegetation Condition Assessment Table

Dry Creek Mitigation Site

Monitoring Year 3 - 2022

Planted Acreage **14.03**

Vegetation Category	Definitions	Mapping Threshold (Ac)	Number of Polygons	Combined Acreage	% of Planted Acreage
Bare Areas	Very limited cover of both woody and herbaceous material.	0.1	0	0	0%
Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.1	0	2.30*	16%
		Total	**0**	**2.30**	**16%**
Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.	0.25 Ac	0	0	0%
		Cumulative Total	**0**	**2.30**	**16%**

*An approved supplemntal planting occurred on October 19, 2022 to increase species diversity.

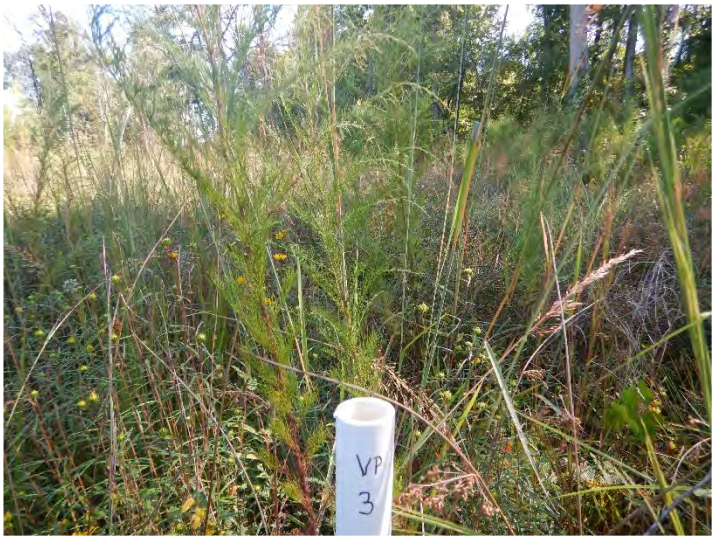
Easement Acreage **29.76**

Vegetation Category	Definitions	Mapping Threshold (SF)	Number of Polygons	Combined Acreage	% of Easement Acreage
Invasive Areas of Concern	Areas of points (if too small to render as polygons at map scale).	1,000	0	0	0%
Easement Encroachment Areas	Areas of points (if too small to render as polygons at map scale).	none	0	0	0%

VEGETATION PLOT PHOTOGRAPHS

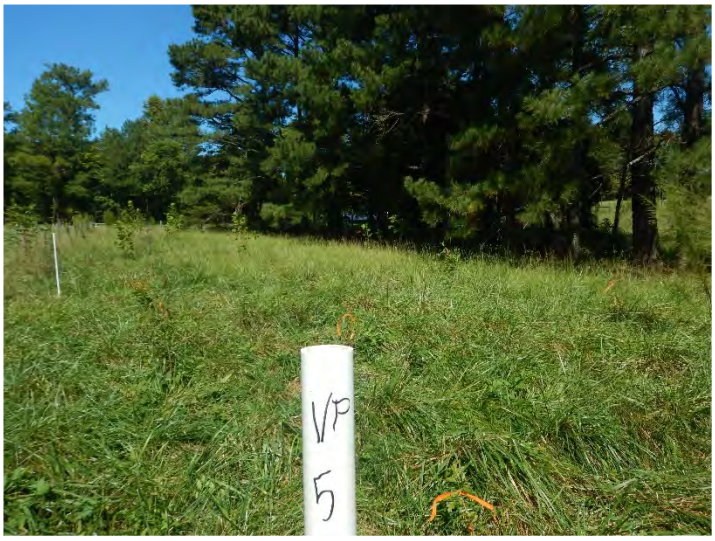
VEG PLOT 1 *(9/14/2022)*

VEG PLOT 2 *(9/14/2022)*



VEG PLOT 3 *(9/14/2022)*

VEG PLOT 4 *(9/14/2022)*



VEG PLOT 5 *(9/14/2022)*

VEG PLOT 6 *(9/14/2022)*

VEG PLOT 7 *(9/14/2022)*

APPENDIX 3. Vegetation Plot Data

Table 8. Vegetation Plot Criteria Attainment Table

Dry Creek Mitigation Site

Monitoring Year 3 - 2022

Plot	Success Criteria Met *	Tract Mean
Vegetation Plot 1	Yes	86%
Vegetation Plot 2	Yes	
Vegetation Plot 3	Yes	
Vegetation Plot 4	Yes	
Vegetation Plot 5	No	
Vegetation Plot 6	Yes	
Vegetation Plot 7	Yes	

*Success Criteria Met is based on the final success criteria for MY5 of 260 stems per acre.

Table 9. Vegetation Plot Data

Dry Creek Mitigation Site

Monitoring Year 3 - 2022

Planted Acreage	14.04
Date of Initial Plant	2020-04-24
Date of Current Survey	2022-09-14
Plot size (ACRES)	0.0247

	Scientific Name	Common Name	Tree/S hrub	Indicator Status	Veg Plot 1 F		Veg Plot 2 F		Veg Plot 3 F		Veg Plot 4 F		Veg Plot 5 F		Veg Plot 6 F		Veg Plot 7 F	
					Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total
Species Included in Approved Mitigation Plan	Betula nigra	river birch	Tree	FACW	6	6	2	2					3	3	2	2		2
	Fraxinus pennsylvanica	green ash	Tree	FACW					3	3	1	1	1	1	1	1		
	Platanus occidentalis	American sycamore	Tree	FACW	1	4	5	5	5	9	2	3			2	5	3	3
	Populus deltoides	eastern cottonwood	Tree	FAC	2	2									1	1		
	Quercus lyrata	overcup oak	Tree	OBL									2	2				
	Quercus michauxii	swamp chestnut oak	Tree	FACW					2	2	5	5					2	2
	Quercus nigra	water oak	Tree	FAC														
	Quercus pagoda	cherrybark oak	Tree	FACW			1	1										
	Quercus phellos	willow oak	Tree	FAC														
	Salix nigra	black willow	Tree	OBL		3						2						
Sum				Performance Standard	9	15	8	8	10	14	8	11	6	6	6	9	5	7
Post Mitigation Plan Species	*Liquidambar styraciflua*	*sweetgum*	*Tree*	*FAC*								*1*						
	Pinus taeda	*loblolly pine*	*Tree*	*FAC*				*1*										
Sum				Proposed Standard	9	15	8	8	10	14	8	11	6	6	6	9	5	7
Mitigation Plan Performance Standard				Current Year Stem Count		15		8		14		11		6		9		7
				Stems/Acre		607		324		546		445		243		364		283
				Species Count		4		3		3		4		3		4		3
				Dominant Species Composition (%)		40		56		64		42		50		56		43
				Average Plot Height (ft.)		6		4		3		4		3		6		4
				% Invasives		0		0		0		0		0		0		0
Post Mitigation Plan Performance Standard				Current Year Stem Count		15		8		14		11		6		9		7
				Stems/Acre		607		324		546		445		243		364		283
				Species Count		4		3		3		4		3		4		3
				Dominant Species Composition (%)		40		56		64		42		50		56		43
				Average Plot Height (ft.)		6		4		3		4		3		6		4
				% Invasives		0		0		0		0		0		0		0

1). Bolded species are proposed for the current monitoring year, italicized species are not approved, and a regular font indicates that the species has been approved.

2). The "Species Included in Approved Mitigation Plan" section contains only those species that were included in the original approved mitigation plan. The "Post Mitigation Plan Species" section includes species that are being proposed through a mitigation plan addendum for the current monitoring year (bolded) , species that have been approved in prior monitoring years through a mitigation plan addendum (regular font), and species that are not approved (italicized).

3). The "Mitigation Plan Performance Standard" section is derived only from stems included in the original mitigation plan, whereas the "Post Mitigation Plan Performance Standard" includes data from mitigation plan approved, post mitigation plan approved, and proposed stems.

Table 10. Vegetation Performance Standards Summary Table

Dry Creek Mitigation Site

Monitoring Year 3 - 2022

	Veg Plot 1 F				Veg Plot 2 F				Veg Plot 3 F			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3	607	6	4	0	324	4	3	0	567	3	3	0
Monitoring Year 2	364	3	3	0	405	3	4	0	405	2	3	0
Monitoring Year 1	486	2	5	0	486	2	4	0	607	2	5	0
Monitoring Year 0	526	2	5	0	486	3	4	0	648	2	6	0

	Veg Plot 4 F				Veg Plot 5 F				Veg Plot 6 F			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3	445	4	4	0	243	3	3	0	364	6	4	0
Monitoring Year 2	405	3	5	0	243	2	3	0	202	4	3	0
Monitoring Year 1	445	3	6	0	364	2	5	0	283	2	4	0
Monitoring Year 0	567	3	7	0	486	2	6	0	486	2	5	0

	Veg Plot 7 F			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 7				
Monitoring Year 5				
Monitoring Year 3	283	4	3	0
Monitoring Year 2	243	4	3	0
Monitoring Year 1	364	3	5	0
Monitoring Year 0	486	2	6	0

APPENDIX 4. Overview Photographs

APPENDIX 5. Additional Documentation

Carolyn Lanza

From: Browning, Kimberly D CIV USARMY CESAW (USA) <Kimberly.D.Browning@usace.army.mil>
Sent: Friday, August 19, 2022 10:09 AM
To: Jason Lorch; Jeff Keaton
Cc: Carolyn Lanza
Subject: RE: Dry Creek MY3 Supplemental Planting

This update looks fine. I forwarded it to the IRT and received no comments. You're good to move forward.
Have a good weekend
Kim

Kim (Browning) Isenhour
Mitigation Project Manager, Regulatory Division I U.S. Army Corps of Engineers l 919.946.5107

-----Original Message-----
From: Jason Lorch <jlorch@wildlandseng.com>
Sent: Thursday, August 18, 2022 3:27 PM
To: Browning, Kimberly D CIV USARMY CESAW (USA) <Kimberly.D.Browning@usace.army.mil>; Jeff Keaton <jkeaton@wildlandseng.com>
Cc: Carolyn Lanza <clanza@wildlandseng.com>
Subject: [URL Verdict: Neutral][Non-DoD Source] RE: Dry Creek MY3 Supplemental Planting

Kim, this is actually the most up to date planting list for Dry Creek that we sent you. Jeff's last e-mail was the original version that the IRT previously commented on. Our staff is preparing to order plants and wanted to make sure the IRT is good with the updated planting list. Let us know if you have any questions or concerns. Thanks!

Jason Lorch, GISP | Senior Environmental Scientist

O: 919.851.9986 x107 M: 919.413.1214

Wildlands Engineering, Inc. <Blockedhttp://www.wildlandseng.com/>

312 West Millbrook Road, Suite 225

Raleigh, NC 27609

From: Jason Lorch
Sent: Wednesday, August 03, 2022 2:54 PM
To: 'Browning, Kimberly D CIV USARMY CESAW (USA)' <Kimberly.D.Browning@usace.army.mil>; Jeff Keaton <jkeaton@wildlandseng.com>
Cc: Carolyn Lanza <clanza@wildlandseng.com>; Davis, Erin B <erin.davis@ncdenr.gov>; Bowers, Todd <bowers.todd@epa.gov>; Tugwell, Todd J CIV USARMY CESAW (USA) <Todd.J.Tugwell@usace.army.mil>; Merritt, Katie

<katie.merritt@ncdenr.gov>; Dow, Jeremiah J <jeremiah.dow@ncdenr.gov>; Crocker, Lindsay <Lindsay.Crocker@ncdenr.gov>
Subject: RE: Dry Creek MY3 Supplemental Planting

Kim, attached is the updated planting list for Dry Creek based on the IRT's comments. Below is a list of the changes we made, and we will add random vegetation plots to the supplemental planted areas during MY4. Let me know if you have any additional questions or comments. Thanks!

UT1 and Dry Creek

Box elder was reduced from 10% to 5%.

Red Mulberry was reduced from 10% to 5%.

Painted buckeye was added at 5%.

Minor adjustments were made to several species based on the reduction in mulberry and box elder.

UT6

Red mulberry was reduced from 8% to 5%.

Minor adjustments were made to several species based on the reduction in mulberry.

A riparian seed mix was added as well.

Jason Lorch, GISP | Senior Environmental Scientist

O: 919.851.9986 x107 M: 919.413.1214

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Raleigh, NC 27609

-----Original Message-----
From: Browning, Kimberly D CIV USARMY CESAW (USA) <Kimberly.D.Browning@usace.army.mil <mailto:Kimberly.D.Browning@usace.army.mil> >
Sent: Friday, July 22, 2022 11:50 AM
To: Jeff Keaton <jkeaton@wildlandseng.com <mailto:jkeaton@wildlandseng.com> >
Cc: Jason Lorch <jlorch@wildlandseng.com <mailto:jlorch@wildlandseng.com> >; Carolyn Lanza <clanza@wildlandseng.com <mailto:clanza@wildlandseng.com> >; Davis, Erin B <erin.davis@ncdenr.gov <mailto:erin.davis@ncdenr.gov> >; Bowers, Todd <bowers.todd@epa.gov <mailto:bowers.todd@epa.gov> >; Tugwell, Todd J CIV USARMY CESAW (USA) <Todd.J.Tugwell@usace.army.mil <mailto:Todd.J.Tugwell@usace.army.mil> >; Merritt, Katie <katie.merritt@ncdenr.gov <mailto:katie.merritt@ncdenr.gov> >; Dow, Jeremiah J <jeremiah.dow@ncdenr.gov <mailto:jeremiah.dow@ncdenr.gov> >; Crocker, Lindsay <Lindsay.Crocker@ncdenr.gov <mailto:Lindsay.Crocker@ncdenr.gov> >
Subject: RE: Dry Creek MY3 Supplemental Planting

Hi Jeff,

I ran this by the IRT for comments and would offer the following:

1. Red mulberry and box elder are not high quality restoration species, but they are acceptable in low quantities in the proposed diverse mix of species.

2. We appreciate the diversity of species proposed, including uncommon species such as Canadian serviceberry, and multiple understory trees/shrubs.

3. Please add a native seed mix for any bare areas.

4. Please add transects to the supplemental planted areas and plan to monitor veg in MY4.

Thanks for reach out. Have a good weekend, Kim

Kim (Browning) Isenhour

Mitigation Project Manager, Regulatory Division I U.S. Army Corps of Engineers l 919.946.5107

-----Original Message-----

From: Jeff Keaton <jkeaton@wildlandseng.com <mailto:jkeaton@wildlandseng.com> >

Sent: Wednesday, July 20, 2022 9:18 AM

To: Browning, Kimberly D CIV USARMY CESAW (USA) <Kimberly.D.Browning@usace.army.mil <mailto:Kimberly.D.Browning@usace.army.mil> >

Cc: Jason Lorch <jlorch@wildlandseng.com <mailto:jlorch@wildlandseng.com> >; Carolyn Lanza <clanza@wildlandseng.com <mailto:clanza@wildlandseng.com> >

Subject: [URL Verdict: Neutral][Non-DoD Source] Dry Creek MY3 Supplemental Planting

Hi Kim,

Attached is the proposed supplemental planting list and map for Dry Creek. Wildlands' Scientist surveyed supplemental vegetation plots throughout the potential low stem density areas on June 30th. Those findings are also in the attached PDF. Even though several of the supplemental vegetation plots meet stem density requirements, species diversity is below the required amounts. Due to the lack of species diversity, new species are being added to the supplemental planting list. The total supplemental planting is 16% (2.3 acres) of the entire planted area (14.3 acres) at MY0, so an Adaptive Management Plan should not be not required.

Please let us know if there are any questions or concerns about the proposed supplemental planting plan. Thanks.

Jeff Keaton, PE | Senior Water Resources Engineer

O: 919.851.9986 x103 M: 919.302.6919

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312 West Millbrook Road, Suite 225

Raleigh, NC 27609

Table 1. Supplemental Planting

Dry Creek Mitigation Site
DMS Project No. 97082
Monitoring Year 3 - 2022

Supplemental Planting Along UT1 and Dry Creek

Scientific Name	Common Name	Stratum	Wetland Indicator Status	Container Type	Percentage of Stems	Number of Stems
Acer negundo	Box Elder	Canopy	FAC	Gallon	5%	16
Aesculus sylvatica	Painted Buckeye	Understory	FAC	Tubling	5%	16
Asimina triloba	Pawpaw	Understory	FAC	Tubling	5%	16
Betula nigra	River Birch	Canopy	FACW	Tubling	5%	16
Diospyros virginiana	Persimmon	Understory	FAC	Tubling	10%	32
Hamamelis virginiana	Witch Hazel	Understory	FACU	Tubling	8%	26
Juniperus virginiana	Eastern Red Cedar	Canopy	FACU	Tubling	9%	29
Morus rubra	Red Mulberry	Canopy	FACU	Tubling	5%	16
Quercus alba	White Oak	Canopy	FACU	Tubling	10%	32
Quercus nigra	Water Oak	Canopy	FAC	Tubling	10%	32
Quercus phellos	Willow Oak	Canopy	FAC	Tubling	10%	32
Quercus shumardii	Shumard Oak	Canopy	FAC	Tubling	8%	26
Ulmus alata	Winged Elm	Canopy	FACU	Tubling	10%	32
				Total	100%	321

Supplemental Planting Along UT6

Scientific Name	Common Name	Stratum	Wetland Indicator Status	Container Type	Percentage of Stems	Number of Stems
Amelanchier canadensis	Canadian Serviceberry	Shrub	FAC	Tubling	3%	11
Asimina triloba	Pawpaw	Understory	FAC	Tubling	3%	11
Betula nigra	River Birch	Canopy	FACW	Tubling	10%	37
Carpinus caroliniana	American Hornbeam	Understory	FAC	Tubling	6%	22
Diospyros virginiana	Persimmon	Understory	FAC	Tubling	10%	37
Hamamelis virginiana	Witch Hazel	Understory	FACU	Tubling	6%	22
Lindera benzoin	Common Spicebush	Shrub	FAC	Tubling	3%	11
Morus rubra	Red Mulberry	Canopy	FACU	Tubling	5%	19
Quercus michauxii	Swamp Chestnut Oak	Canopy	FACW	Tubling	10%	37
Quercus nigra	Water Oak	Canopy	FAC	Tubling	10%	37
Quercus pagoda	Cherrybark Oak	Canopy	FACW	Gallon	5%	19
Quercus phellos	Willow Oak	Canopy	FAC	Tubling	10%	37
Quercus shumardii	Shumard Oak	Canopy	FAC	Tubling	10%	37
Ulmus alata	Winged Elm	Canopy	FACU	Tubling	9%	33
				Total	100%	370

Riparian Seeding

Species Name	Common Name	Stratum	Wetland Status*	Percentage	Density (lbs/acre)
Dichanthelium clandestinum	Deertongue	Herb	FAC	15%	3
Elymus virginicus	Virginia Wild Rye	Herb	FACW	20%	4
Panicum virgatum	Switchgrass	Herb	FAC	5%	1
Sorghastrum nutans	Indiangrass	Herb	FACU	15%	3
Rudbeckia hirta	Blackeyed Susan	Herb	FACU	10%	2
Coreopsis lanceolata	Lanceleaf Coreopsis	Herb	FACU	10%	2

Chamaecrista fasciculata	Partridge Pea	Herb	FACU	2.5%	0.5
Bidens aristosa	Bur-Marigold	Herb	FACU	2.5%	0.5
Schizachyrium scoparium	Little Bluestem	Herb	FACU	20%	4
			Total	100%	20