
Monitoring Report – Year 5
FINAL VERSION
Lake Wendell Mitigation Project (Riparian Buffer Mitigation)
Calendar Year of Data Collection: 2022

NCDEQ DMS Project Identification # 97081
NCDEQ DMS Contract # 6826
Neuse River Basin (Cataloging Unit 03020201)
USACE Action ID Number: SAW-2016-00876
NCDEQ DWR Project # 2016-0385
Johnston County, NC
Contracted Under RFP # 16-006477
Data Collection Period: September 2021
Submission Date: November 30th, 2022



Prepared for:



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

Prepared by:



WATER & LAND SOLUTIONS

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1 Project Summary

Water and Land Solutions, LLC (WLS) completed the construction and planting of the Lake Wendell Mitigation Project (Project) full-delivery project for the North Carolina Department of Environmental Quality (NCDEQ), Division of Mitigation Services (DMS) in March 2018. The Project is located in Johnston County, North Carolina, between the Community of Archer Lodge and the Town of Wendell at 35.73739°, -78.3538°. The Project site is located in the NCDEQ Sub-basin 03-04-06, in the Upper Buffalo Creek Sub-watershed 030202011502.

The Project involved the restoration, enhancement, preservation, and permanent protection of five stream reaches (R1, R2, R3, R4, and R5) and their riparian buffers, totaling 4,269 linear feet of streams and 490,477 square feet of riparian buffers. Monitoring Year 5 (MY5) monitoring activities occurred in September 2022 (Table 2). This report presents the data for the fifth year of monitoring (MY5). The Project meets the MY5 success criteria for vegetation. Based on these results, WLS requests the riparian buffer mitigation project be closed out.

2 Project Background

2.1 Project Location, Setting, and Existing Conditions

The Project site is located in the Upper Buffalo Creek Sub-watershed 030202011502 study area of the Neuse 01 Regional Watershed Plan, in the Wake-Johnston Collaborative Local Watershed Plan, and in Targeted Local Watershed 03020201180050.

The catchment area is 102 acres and has an impervious cover less than one percent. The dominant surrounding land uses are agriculture and mixed forest. Prior to construction, livestock had access to all Project streams, except R4, and the riparian buffers were less than 50 feet wide.

2.2 Mitigation Project Goals and Objectives

The following riparian buffer mitigation site-specific goals were developed:

- Restore and protect riparian buffer functions and habitat connectivity in perpetuity by recording a permanent conservation easement,
- Implement agricultural BMPs to reduce nonpoint source inputs to receiving waters.

To accomplish these site-specific goals, the following objectives will be measured and included with the performance standards to document overall project success:

- Increase native species riparian buffer vegetation density/composition along streambank and floodplain areas that meet requirements of a minimum 50-foot-wide and 260 stems/acre after monitoring year 5.
- Prevent cattle from accessing the conservation easement boundary by installing permanent fencing and reducing fecal coliform bacteria from the pre-restoration levels.



2.3 Project History, Contacts, and Timeframe

The Project will provide riparian buffer mitigation credits in accordance with North Carolina Administrative Code (NCAC), “Consolidated Buffer Mitigation Rule”, Rule 15A NCAC 02B .0295, effective November 1, 2015. Riparian buffer mitigation site viability was confirmed by DWRs April 28, 2016 letter entitled “Site Viability for Buffer Mitigation & Nutrient Offset – Lake Wendell Located Near 2869 Wendell Road, Wendell, NC, Johnston County”. The referenced site viability letter included a determination by DWR that Project Reaches R1, R2, R3 and R4 were either intermittent or perennial. A separate request for Stream Origin/Buffer Applicability Determination for Potential Mitigation for Project Reach R5 was submitted to DWR on May 18, 2017, as required under the referenced site viability letter. On June 1, 2017 DWR performed the requested determination and Reach R5 was determined to be intermittent, as communicated in the DWR June 8, 2017 letter entitled “On-Site Stream Determination for Applicability to the Neuse Riparian Buffer Rules and Water Quality Standards (15A NCAC 02B.0233)”, therefore confirming Reach R5’s eligibility for riparian buffer mitigation. See Appendix D for DWR correspondence and approval letters.

The final mitigation plan and PCN were submitted to DMS August 25, 2017, for submission to DWR and the NCIRT. The Section 404 General (Regional and Nationwide) Permit Verification was issued October 5, 2017. Project construction started on November 13, 2017, and mitigation site earthwork was completed on March 13, 2018, by RiverWorks Construction. Mitigation site planting was completed on March 30, 2018, by RiverWorks Construction. Trueline Surveying, PC completed the as-built survey in June 2018. WLS completed the installation of baseline monitoring devices on April 19, 2018, and the installation of survey monumentation and conservation easement boundary marking on June 7, 2018. MY1 was completed on November 24th, 2019 and submitted December 4th, 2019. Monitoring Year 2 data collection was completed from June until October 29th, 2019. Monitoring Year 3 data collection was completed from September – October 15th, 2020. Monitoring Year 4 data collection was completed in September 2021. Monitoring Year 5 data collection was completed in September 2022.

The project background and attribute summary are presented in Table 1. Refer to Figure 1 and Table 2 for the project areas and buffer asset information. Relevant project contact information is presented in Table 3.

3 Project Mitigation Components

3.1 Riparian Buffer Mitigation Types and Approaches

Riparian buffer mitigation included restoring, enhancing, and preserving the riparian buffer functions and corridor habitat. The project included planting to re-establish a native species vegetation riparian buffer corridor, which extended a minimum of 50 feet from the top of the streambanks along each of the project reaches, as well as permanently protecting those buffers with a conservation easement. Many areas of the conservation easement had riparian buffer widths greater than 50 feet established along one or both streambanks to provide additional functional uplift. The only exception is at the upstream end of Reach R1, where the width of the proposed left riparian buffer varies between 20 feet and 29 feet from the left top of bank. This narrow area of proposed riparian buffer is due to the site constraint caused by an existing residential structure. For project reaches proposed for restoration and enhancement, the riparian buffers were restored through reforestation of the entire conservation easement with native species riparian



buffer vegetation (Table 5). For project reach sections proposed for preservation, the existing riparian buffers are permanently protected via the recorded conservation easement. Additionally, permanent fencing was installed along with alternative watering systems to exclude livestock from the restored riparian buffer and conservation easement areas. The permanent fencing system consisting of woven wire fencing was installed to NRCS technical standards in the pasture areas along and outside of the northern conservation easement boundaries of Reaches R1, R2, and R3. Table 1 (Appendix A) provides a summary of the project components.

3.1.1 Tree and Shrub Planting Approaches

The riparian buffer planting zones for the project included the streambanks, floodplain, riparian wetland, and upland transitional areas. Plantings were conducted using native species bare-root trees and shrubs, live stakes, and seedlings that were generally planted at a total target density of 680 stems per acre. WLS implemented a riparian buffer planting strategy that includes a combination of overstory, or canopy, and understory species. The site planting strategy also included early successional, as well as climax species. The vegetation selections were mixed throughout the project planting areas so that the early successional species will give way to climax species as they mature over time.

3.1.2 Temporary and Permanent Seeding Approaches

Permanent seed mixtures of native species herbaceous vegetation and temporary herbaceous vegetation seed mixtures were applied to all disturbed areas of the project site. Temporary and permanent seeding were conducted simultaneously at all disturbed areas of the site during construction utilizing mechanical broadcast spreaders. The as-built re-vegetation plan lists the utilized species, mixtures, and application rates for permanent seeding.

3.1.3 Invasive Species Vegetation Treatment

During the project construction, invasive species exotic vegetation was either mechanically removed or chemically treated both to control its presence and reduce its spread within the conservation easement areas.

4 Performance Standards

The applied success criteria for the Project will follow necessary performance standards and monitoring protocols presented in final approved mitigation plan. Annual monitoring and semi-annual site visits will be conducted to assess the condition of the project throughout the monitoring period. Monitoring activities will be conducted for a period of five years. Specific success criteria components and evaluation methods are described below.

4.1 Vegetation

Measurements of the final vegetative restoration success for the project will be achieving a density of no less than 260, five-year-old planted stems per acre in Year 5 of monitoring. This final performance criteria shall include a minimum of four native hardwood tree species or four native hardwood tree and native shrub species, where no one species is greater than 50 percent of the stems. Native hardwood tree and native shrub volunteer species will be included to meet the final performance criteria of 260 stems per acre. Volunteer species will only be counted toward success if they were included in the approved planting



plan and if they are surviving for at least two years. In addition, diffuse flow of runoff shall be maintained in the riparian buffer areas.

5 Monitoring Year 5 Assessment and Results

Annual monitoring was conducted during MY5 in accordance with the monitoring plan as described in the approved mitigation plan and was intended to document the site improvements based on restoration potential, catchment health, ecological stressors, and overall constraints. All the monitoring device locations are depicted on the CCPV (Figure 1) and MY5 monitoring data results are listed in the appendices. The Project meets the MY5 success criteria for vegetation for all veg plots.

5.1 Vegetation

Vegetation monitoring for MY5 was conducted utilizing the seven vegetation monitoring plots, with monitoring conducted in accordance with the CVS-EEP Level I & II Monitoring Protocol (CVS, 2008) and DMS Stream and Wetland Monitoring Guidelines (DMS, 2017). See Figure 1 in Appendix B for the vegetation monitoring plot locations. All vegetation plots met MY5 success criteria. The surviving planted stems include a minimum of four native hardwood tree species or four native hardwood tree and native shrub species, where no one species is greater than 50 percent of the stems. Plots ranged from 405 to 607 stems per acre (including appropriate volunteers). The number of hardwood tree and shrub species per plot ranged from 6 to 8 species. The greatest percentage of a single species in a plot was 33 percent. Summary data and photographs of each plot can be found in Appendix B and C.

The MY5 vegetation monitoring was also conducted utilizing visual assessment along the Project stream reaches. The overall results of the visual assessment did not indicate any negative changes to the existing vegetation community. An area of encroachment approximately 0.009 acres was found along R5 in MY5, see Figure 1. This area was mowed by the farmer and was vegetated with dog fennel and pasture weeds. Management of this area began in June 2022 and included additional t-posts and a physical barrier (horse tape) to delineate the easement boundary and discourage further mowing. The landowner was contacted via mail by our attorney. As of September 2022, the farmer has ceased encroachment in this area.

During MY1 an area of concern was observed along R1 buffer as shown on the Figure 1. This area was utilized as a temporary staging area during construction and contains invasive species vegetation (kudzu) along the right buffer. This area was managed once during MY5 using foliar spray of the limited remaining stems in September using a 3 percent solution of Garlon 3A (see table below for treatments). Following these treatments, the percent cover of kudzu was reduced to approximately one percent. This area was planted with species from the approved list in the mitigation plan on February 1st, 2021. A random vegetation plot was surveyed on March 30th, 2022 (see table below for results). Additionally, the visual monitoring confirmed that diffuse flow of runoff is being maintained in the riparian buffer areas.



Kudzu Treatment Table

Monitoring Year	Invasive Treatment	Date Treatment Conducted
2	Kudzu foliar spray and cut	August 15, 2019
	Kudzu foliar spray	September 24, 2019
3	Kudzu crown removal (hand-digging)	March 18, 2020
	Kudzu foliar spray	October 7, 2020
4	Kudzu foliar spray	July 1, 2021
5	Kudzu spray and cut	September 8, 2022

Random Veg Plot Results

Species	Number of Stems	Height (ft)
Tulip Poplar	6	2.3, 5.2, 3, 2.4, 2, 4.4
Red Maple	3	8.5, 4.5, 1.5



6 References

- Lee, M., Peet R., Roberts, S., Wentworth, T. CVS-NCEEP Protocol for Recording Vegetation, Version 4.1, 2007.
- North Carolina Department of Environmental Quality, Division of Mitigation Services, Wildlands Engineering, Inc. 2015. Neuse 01 Regional Watershed Plan Phase II. Raleigh, NC.
- North Carolina Department of Environmental Quality, Division of Mitigation Services, 2017. Annual Report Format, Data Requirements, and Content Guidance. Raleigh, NC.
- Schafale, M. P., and A. S. Weakley. 1990. Classification of the natural communities of North Carolina, third approximation. North Carolina Natural Heritage Program. NCDENR Division of Parks and Recreation. Raleigh, NC.
- United States Army Corps of Engineers. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. Environmental Laboratory. US Army Engineer Waterways Experiment Station. Vicksburg, MS.
- _____. 1997. Corps of Engineers Wetlands Research Program. Technical Note VN-RS-4.1. Environmental Laboratory. U.S. Army Engineer Waterways Experiment Station. Vicksburg, MS.
- _____. 2003. Stream Mitigation Guidelines, April 2003, U.S. Army Corps of Engineers. Wilmington District.
- Water and Land Solutions, LLC (2017). Lake Wendell Stream and Riparian Buffer Mitigation Plan. NCDMS, Raleigh, NC.

Appendix A: Background Tables

Table 1. Buffer Project Attributes

Project Name	Lake Wendell Mitigation Project
Hydrologic Unit Code	03020201
River Basin	Neuse
Geographic Location (Lat, Long)	35.7373910 N, -78.3538050 W
Site Protection Instrument (DB, PG)	85, 148
Total Credits (BMU)	354,404.00
Types of Credits	Riparian Buffer
Mitigation Plan Date	Aug-18
Initial Planting Date	Mar-18
Baseline Report Date	Nov-18
MY1 Report Date	Dec-18
MY2 Report Date	Nov-19
MY3 Report Date	Dec-20
MY4 Report Date	Oct-21
MY5 Report Date	Nov-22

Table 2. Buffer Project Areas and Assets: Lake Wendell

RIPARIAN BUFFER (15A NCAC 02B.0295)											If Converted to Nutrient Offset		
Location	Jurisdictional Streams	Restoration Type	Reach ID/ Component	Buffer Width (ft)	Total Area (sf)	Creditable Area (sf)*	Initial Credit Ratio (x:1)	% Full Credit	Final Credit Ratio (x:1)	Riparian Buffer Credits (BMU)	Convertible to Nutrient Offset (Yes or No)	Nutrient Offset: N (lbs)	Nutrient Offset: P (lbs)
Rural or Urban	Subject or Nonsubject	Restoration		20-29			1	75%	1.33333	-	Yes	17,873.412	-
			Restoration	0-100	342,525	342,525		100%	1.00000	342,525.000			
				101-200				33%	3.03030	-			
	Subject or	Enhancement		20-29			2	75%	2.66667	-	No	-	-
			Enh & Cattle Ex. Enh	0-100	44,852	44,852		100%	2.00000	22,426.000			
				101-200				33%	6.06061	-			
SUBTOTALS						387,377				364,951.000	17,873.412	-	

ELIGIBLE PRESERVATION AREA						129,126							
Location	Jurisdictional Streams	Restoration Type	Reach ID/ Component	Buffer Width (ft)	Total Area (sf)	Creditable Area (sf)*	Initial Credit Ratio (x:1)	% Full Credit	Final Credit Ratio (x:1)	Riparian Buffer Credits (BMU)			
Rural	Subject	Preservation		20-29			10	75%	13.33333	-	10,410.300		
			Preservation	0-100	104,103	104,103		100%	10.00000				
				101-200				33%	30.30303	-			
	Nonsubject			20-29			5	75%	6.66667	-	5.00000		
				0-100				100%	15.15152	-			
				101-200				33%	4.00000	-			
Urban	Subject or Nonsubject		20-29			3	75%	4.00000	-	3.00000			
			0-100				100%	9.09091	-				
			101-200				33%		-				
SUBTOTALS						104,103				10,410.300			
TOTALS						491,480				375,361.300			

Table 3. Project Contacts Lake Wendell Mitigation Project (NCDEQ DMS Project ID# 97081)	
Mitigation Provider	Water & Land Solutions, LLC 7721 Six Forks Road, Suite 130 Raleigh, NC 27615
Primary Project POC	Catherine Manner Phone: 571-643-3165
Construction Contractor	RiverWorks Construction 114 W. Main Street, Suite 106, Clayton, NC 27520
Primary Project POC	Bill Wright Phone: 919-590-5193
Survey Contractor (Existing Condition Surveys)	WithersRavenel 115 MacKenan Drive, Cary, NC 27511
Primary Project POC	Marshall Wight, PLS Phone: 919-469-3340
Survey Contractor (Conservation Easement, Construction and As-Builts Surveys)	True Line Surveying, PC 205 West Main Street, Clayton, NC 27520
Primary Project POC	Curk T. Lane, PLS 919-359-0427
Planting Contractor	RiverWorks Construction 114 W. Main Street, Suite 106, Clayton, NC 27520
Primary Project POC	Bill Wright Phone: 919-590-5193
Seeding Contractor	RiverWorks Construction 114 W. Main Street, Suite 106, Clayton, NC 27520
Primary Project POC	Bill Wright Phone: 919-590-5193
Seed Mix Sources	Green Resource 5204 Highgreen Ct., Colfax, NC 27235
	Rodney Montgomery Phone: 336-215-3458
Nursery Stock Suppliers	Foggy Mountain Nursery (Live Stakes) 797 Helton Creek Rd, Lansing, NC 28643 Glenn Sullivan Phone: 336-977-2958
	Dykes & Son Nursery (Bare Root Stock) 825 Maude Etter Rd, McMinnville, Tn 37110 Jeff Dykes Phone: 931-668-8833
Monitoring Performers	Water & Land Solutions, LLC 7721 Six Forks Road, Suite 130 Raleigh, NC 27615
Stream Monitoring POC	Emily Dunnigan Phone: 269-908-6306
Vegetation Monitoring POC	Emily Dunnigan Phone: 269-908-6306

Appendix B:

Visual Assessment Data



Legend

- Conservation Easement
- Stream
- Top of Streambank
- Kudzu Area (0.13 acres)
- Encroachment (0.009 acres)
- Random Veg Plot VPA1
- CVS Plot Origin

CVS Plots

- Success Criteria Met

Buffer Mitigation Types

- Preservation
- Enhancement
- Restoration

0 230 460 Feet

Aerial: Google Earth March 2021



Lake Wendell Mitigation Project
Johnston County, North Carolina

NCDMS Contract No. 6826
 NCDMS Project No. 97081
 November 2022
 MY5

Riparian Buffer
 Mitigation Plan View

NAD 1983 2011 State Plane
 North Carolina FIPS 3200 FT US

FIGURE
1

Table 4. Vegetation Condition Assessment Project Lake Wendell Mitigation Project (NCDEQ DMS Project ID# 97081) Planted Acreage¹ 8.9						
Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage
1. Bare Areas	Very limited cover of both woody and herbaceous material.	0.01 acres	Solid light blue	0	0.00	0.0%
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.1 acres	Pattern and Color	0	0.00	0.0%
Total				0	0.00	0.0%
3. Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.	0.25 acres	Pattern and Color	0	0.00	0.0%
Cumulative Total				0	0.00	0.0%
Easement Acreage²	12					
Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Easement Acreage
4. Invasive Areas of Concern ⁴	Areas or points (if too small to render as polygons at map scale).	1000 SF	orange hatched	1	0.13	1.1%
5. Easement Encroachment Areas ³	Areas or points (if too small to render as polygons at map scale).	none	yellow hatched	1	0.009	0.1%



Veg Plot 1, November 5, 2018 (MY-01)



Veg Plot 1, September 13, 2022 (MY-05)



Veg Plot 2, April 27, 2018 (MY-00)



Veg Plot 2, September 13, 2022 (MY-05)



Veg Plot 3, November 5, 2018 (MY-01)



9/13/22, 8:27 AM
Johnston County

Veg Plot 3, September 13, 2022 (MY-05)



Veg Plot 4, April 13, 2018 (MY-00)



9/13/22, 8:41 AM
Johnston County

Veg Plot 4, September 13, 2022 (MY-05)



Veg Plot 5, April 13, 2018 (MY-00)



9/13/22, 9:01 AM
Johnston County

Veg Plot 5, September 13, 2022 (MY-05)



Veg Plot 6, April 13, 2018 (MY-00)



9/13/22, 9:19 AM
Johnston County

Veg Plot 6, September 13, 2022 (MY-05)



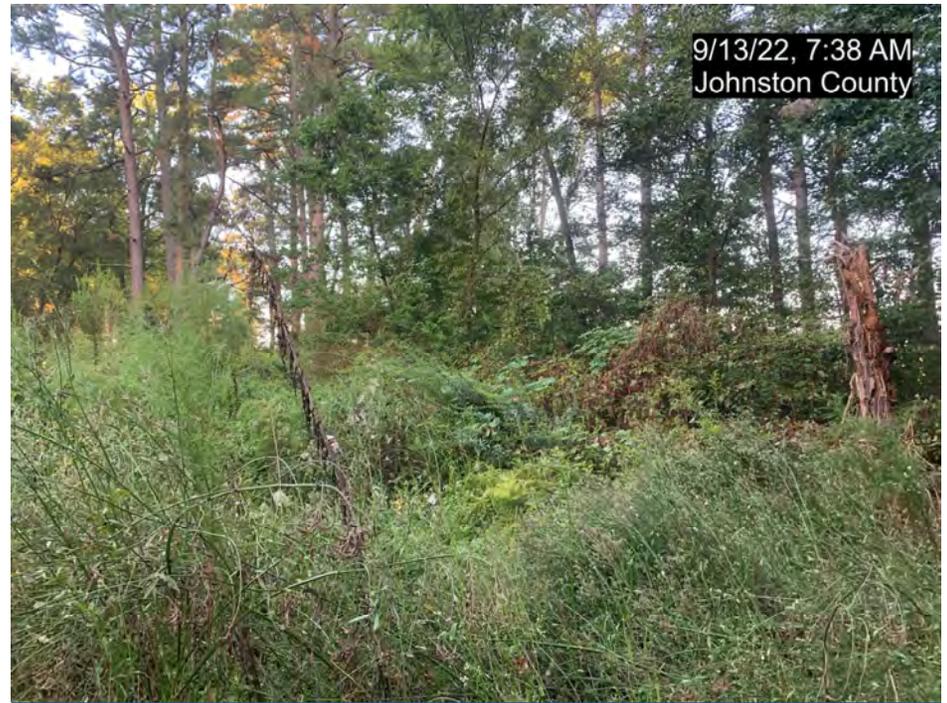
Veg Plot 7, April 13, 2018 (MY-00)



Veg Plot 7, September 13, 2022 (MY-05)



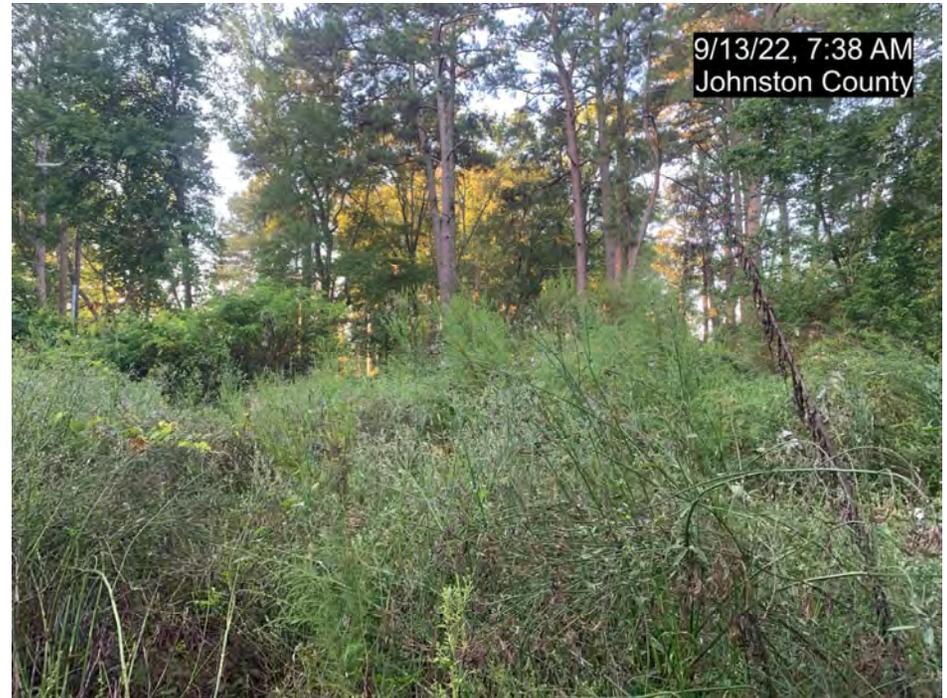
Kudzu Problem Area (VPA1), October 22, 2020 (MY-03)



Kudzu Problem Area (VPA1), September 13, 2022 (MY-05)



Kudzu Problem Area (VPA1), October 22, 2020 (MY-03)



Kudzu Problem Area (VPA1), September 13, 2022 (MY-05)



6/14/22, 10:37 AM
Johnston County

Encroachment Area (VPA3), June 14, 2022 (MY-05)



9/13/22, 7:33 AM
Johnston County

Encroachment Area (VPA3), September 13, 2022 (MY-05)



3/30/22, 9:28 AM
Johnston County

Random Veg Plot in VPA1, March 30, 2022 (MY-05)

Appendix C:
Vegetation Monitoring Plot
Data

Table 5a: Vegetation Plot Mitigation Success Summary Table

Plot #	Planted Stems/Acre	Volunteers/Acre	Total Stems/Acre	Stems/Acre Success Criteria Met	Number of Hardwood Shrub/Tree Species	Number of Species Success Criteria Met	Greatest Percentage of a Single Species by Plot
1	324	81	405	Yes	8	Yes	20%
2	364	121	485	Yes	6	Yes	25%
3	486	0	486	Yes	7	Yes	33%
4	567	40	607	Yes	6	Yes	33%
5	486	81	567	Yes	8	Yes	21%
6	486	0	486	Yes	8	Yes	25%
7	405	0	405	Yes	6	Yes	30%
Project Average	445	46	492	Yes	7	Yes	27%

Appendix D:
NC DWR Correspondence and
Approvals



PAT MCCRORY

Governor

DONALD R. VAN DER VAART

Secretary

S. JAY ZIMMERMAN

Director

April 28, 2016

DWR Project #: 2016-0385

Scott Hunt
 Water & Land Solutions, LLC
 11030 Raven Ridge Rd, Suite 119
 Raleigh, NC 27614
 (via electronic mail)

Re: Site Viability for Buffer Mitigation & Nutrient Offset – Lake Wendell
 Located near 2869 Wendell Rd, Wendell, NC
 Johnston County

Dear Mr. Hunt,

On April 8, 2016, Katie Merritt, with the Division of Water Resources (DWR), assisted you and others from Water & Land Solutions, LLC at the proposed Lake Wendell Mitigation Site (Site) in Wendell, NC. The Site is located in the Neuse River Basin within the 8-digit Hydrologic Unit Code 03020201. The Site is being proposed as part of a full-delivery stream restoration project for the Division of Mitigation Services (RFP #16-006477). The Interagency Review Team (IRT) was also present onsite. At your request, Ms. Merritt performed a site assessment of features onsite to determine suitability for buffer and nutrient offset mitigation. Features are more accurately shown in the attached maps signed by Ms. Merritt on April 20, 2016. If approved, mitigating this site could provide stream mitigation credits, riparian buffer credits and/or nutrient offset credits.

Ms. Merritt's evaluation of features from Top of Bank (TOB) out to 200' for buffer and nutrient offset mitigation pursuant to Rule 15A NCAC 02B .0295 (effective November 1, 2015) and Rule 15A NCAC 02B .0240 is provided in the table below:

<u>Feature</u>	<u>Classification</u>	<u>¹Subject to Buffer Rule</u>	<u>Adjacent Landuses</u>	<u>Buffer Credit Viable</u>	<u>²Nutrient Offset Viable at 2,273 lbs/acre</u>	<u>Mitigation Type/Comments</u>
R1 (above pipe)	Modified Natural Stream	Yes	narrow buffer of Mixed native hardwood & pine forest	Yes ³	No	Enhancement per 15A NCAC 02B .0295 (b)(4) in entire 50' from TOB
R1 (piped portion – fence line)	Piped stream	Yes ³	managed lawn	Yes ³	No	Restoration
R1 (below fence line – R5 confluence)	Modified natural stream	Yes	pasture actively grazed by cattle	Yes	Yes	Restoration

R2	Stream	Yes	Pasture actively grazed by cattle and narrow closed canopy of native hardwoods	Yes	Yes (<i>outside of forested area</i>)	Narrow closed canopy = Enhancement per 15A NCAC 02B .0295 (o)(6); Outside of forested areas = Restoration
R3	Ag Pond (<i>to be drained</i>)	Yes	Pasture actively grazed by cattle	Yes ³	Yes	Restoration (<i>if pond is drained, a stream channel has to develop to be viable for any credit</i>)
R4	Stream	Yes	Native hardwood forest, closed canopy	Yes	No	Preservation per 15A NCAC 02B .0295 (o)(5)
R5	Undetermined conveyance	Not on maps	Pasture actively grazed by cattle	n/a	Yes	Need stream determination by DWR; if feature is a stream, feature is viable for buffer restoration per 15A NCAC 02B .0295 (o)(3)

¹Subjectivity calls were determined using the 1:24,000 scale quadrangle topographic map prepared by USGS and the most recent printed version of the soil survey map prepared by the NRCS

²For nutrient offset viability to be determined, the landowner must provide proof in writing that the land is being used for agriculture or has been used for agriculture previously (prior to rule baseline). Dates, supported by photos or other written records, must be included to confirm that the uses of the open fields onsite are/were for hay crop cultivation/row crop/cattle.

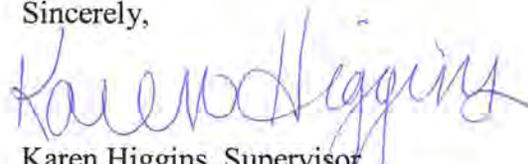
³Feature has been piped or is a pond, but has potential for buffer mitigation if feature is restored into a stream.

Maps showing the project site and the features are provided and signed by Ms. Merritt on April 20, 2016. This letter should be provided in all future mitigation plans for this Site. In addition, all vegetative plantings, performance criteria and other mitigation requirements for riparian restoration, enhancement and preservation must follow the requirements in 15A NCAC 02B .0295 to be eligible for buffer and nutrient offset credits. Where buffer and nutrient offset credits are viable in the same area, only one credit type is allowed to be generated for credit, not both.

For any areas depicted as not being viable for nutrient offset credit, one could propose a different measure other than riparian restoration/enhancement, along with supporting calculations and sufficient detail to support estimates of load reduction, for review by the DWR to determine viability for nutrient offset according to 15A NCAC 02B .0240.

Please contact Katie Merritt at (919)-807-6371 if you have any questions regarding this correspondence.

Sincerely,



Karen Higgins, Supervisor
401 and Buffer Permitting Branch

KAH/km

Attachments: Site Aerial Map, USGS Topographic Map, NRCS Soil Survey

cc:File Copy (Katie Merritt)

DMS – Jeff Schaffer (via electronic mail)

Legend

- Sediment Sample
- Cross Section
- Conservation
- Easement
- Existing Stream
- R1
- R2
- R3
- R4
- R5

Channel Incision and Stream Bank Erosion

Reach ID	Existing Stream Length (ft)	Not Incised (BHR ~1.0)	Slightly Incised (BHR = 1.1-1.3)	Severely Incised (BHR >1.5)	BHR @ Cross-section	Bank Scour %	Mass Wasting %
R1	848	N/A	N/A	N/A	1.1	30-40%	20-30%
R2	920	0%	0%	100%	1.9	40-50%	30-40%
R3	930	N/A	N/A	N/A	2.0	0-10%	0%
R4	853	90%	10%	0%	1.0	0-10%	0%
R5	350	50%	10%	40%	3.3	40-50%	50-60%

Notes: Approx. 350' along R1 is piped and/or severely manipulated/degraded, therefore channel incision and bank erosion were not estimated along the entire reach. The R3 cross-section survey was taken upstream of pond/backwater conditions.



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aergrid, IGN, IGP, swisstopo, and the GIS User Community



Lake Wendell
Mitigation Project

Rym
4/20/10

Channel Stability &
Monitoring Features

NAD 1983 2011 State Plane
North Carolina FIPS 3200 FT US

FIGURE
8

Kym 4/20/16

#2016-0385

Lake Wendell Site

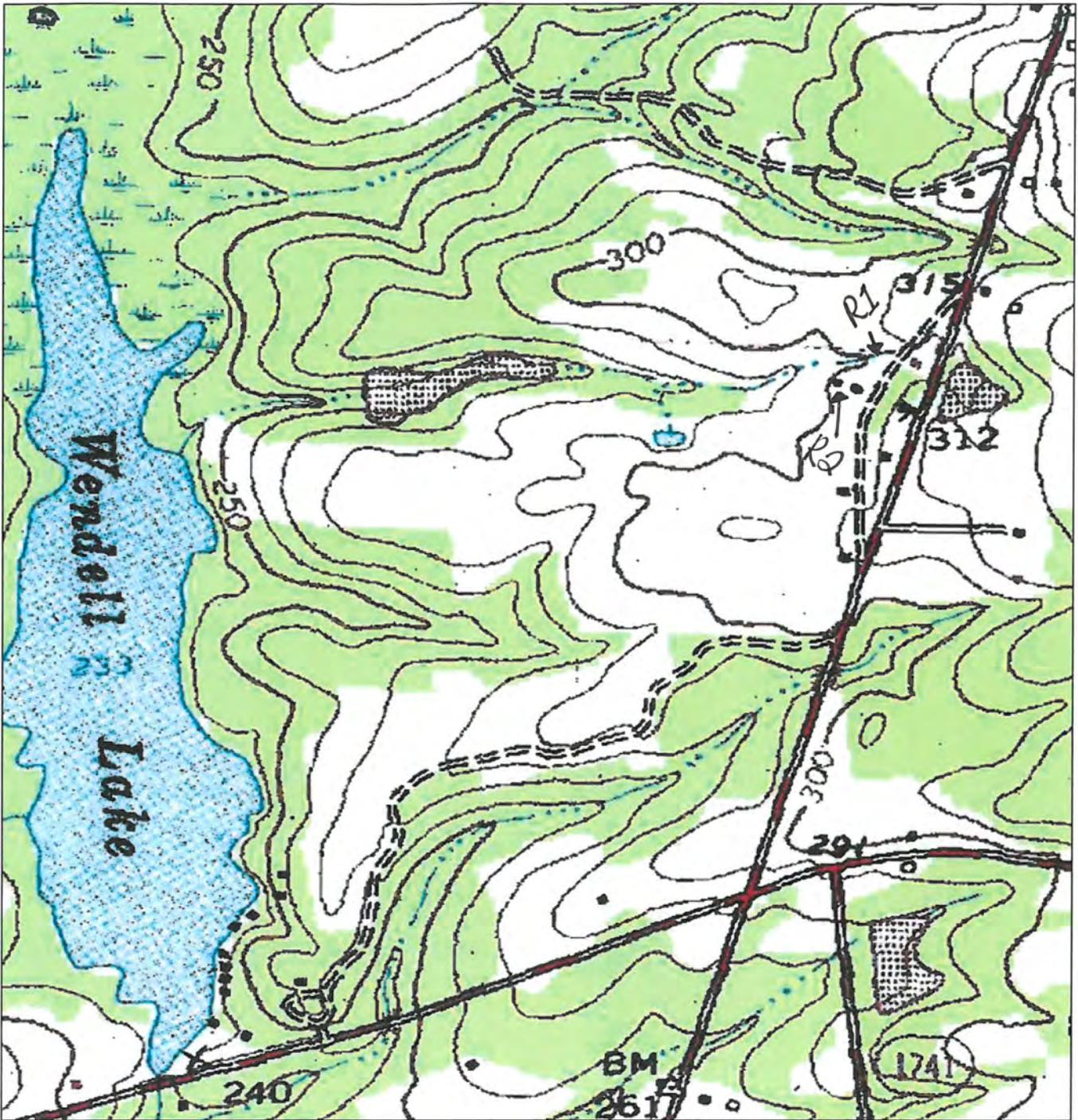


This map was prepared by the U.S. Department of Agriculture, Soil Conservation Service, and is based on the original data of the U.S. Geological Survey. It is not to be used for any other purpose without the express written consent of the U.S. Department of Agriculture.



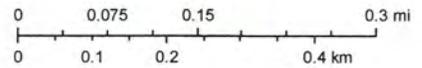
JOHNSON COUNTY, NORTH CAROLINA NO. 2

NC USGS Topo & Parcels Map



April 20, 2016

1:6,528



Kym 4/20/16
2016-0385
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